



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 Recycle Pond; IEPA ID # W1350150004-04

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 Recycle Pond (IEPA ID # W1350150004-04). 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,

A handwritten signature in blue ink that reads "Cynthia 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 RECYCLE POND

Prepared by



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

October 25, 2021

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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: W1350150004-04 for the GMF Recycle Pond. The National Inventory of Dams (NID) number assigned for the GMF Recycle Pond by the Illinois Department of Natural Resources (IDNR) is IL50578.

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 Recycle 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 Recycle 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. Owner Signatures

Section 845.210(b)(2): 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.

Section 845.210(b)(3): 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

Section 845.210(c): 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

Section 845.210(d): 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.

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

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

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

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

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

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

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

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

2. OPERATING PERMIT

2.1. Initial Operating Permit

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

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

2.2. History of Construction

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

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

2.3. Chemical Constituents

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

An analysis of the chemical constituents found within the CCR placed within the Coffeen GMF Recycle Pond is provided in Attachment C.

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

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

2.4. Location Standards Demonstration

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

The Coffeen GMF Recycle Pond location standards as specified in Section 845.230(d)(2)(D) are described in the following sections.

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

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

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

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

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

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

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

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

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

The previous unstable area demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.64. The requirements described in 40 C.F.R. § 257.64 are identical to the requirements contained in Section 845.340. Pursuant to

Section 845.210(d)(2), a certification is not required for the unstable area demonstration. The previously completed unstable area demonstration is included in Attachment D.

The boundaries of the impoundment were determined by a survey conducted by a professional surveyor licensed in the State of Illinois. The boundaries of the GMF Recycle Pond were compared to the existing FEMA floodplain map, and it was determined that the GMF Recycle 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 Recycle 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 Recycle Pond is incised and therefore not subject to the requirements of the slope protection described in Section 845.430.

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

2.11. History of Groundwater Exceedances

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

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

2.12. Financial Assurance Requirements

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

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

2.13. Hazard Potential Classification

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

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

2.14. Structural Stability Assessment

Section 845.230(d)(2)(P): Structural stability assessment and accompanying certification (see Section 845.450(c));

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

2.15. Safety Factor Assessment

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.

2.16. 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 Assessment as required by Section 845.510(c)(3) is provided in Attachment U.

2.17. 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.

2.18. 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 Recycle 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.



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

Bureau of Water ID Number:

For IEPA Use Only

CCR Permit Number:

Facility Name:

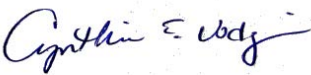
SECTION 1: FACILITY, OPERATOR, AND OWNER INFORMATION (35 Ill. Adm. Code 845.210(b))

Facility, Operator, and Owner Information	1.1	Facility Name		
	1.2	Illinois EPA CCR Permit Number (if applicable)		
	1.3	Facility Contact Information		
		Name (first and last)	Title	Phone Number
		Email address		
	1.4	Facility Mailing Address		
		Street or P.O. box		
		City or town	State	Zip Code
	1.5	Facility Location		
		Street, route number, or other specific identifier		
		County name	County code (if known)	
	City or town	State	Zip Code	
1.6	Name of Owner/Operator			

Facility, Operator, and Owner Info	1.7	Owner/Operator Contact Information		
		Name (first and last)	Title	Phone Number
		Email address		
	1.8	Owner/Operator Mailing Address		
		Street or P.O. box		
	City or town	State	Zip Code	
SECTION 2: LEGAL DESCRIPTION (35 Ill. Adm. Code 845.210(c))				
Legal Description	2.1	Legal Description of the facility boundary		
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)		
	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.		
			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
		Signature 		Date Signed



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:

For IEPA Use Only

CCR Permit Number:

Facility Name:

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.
	1.2	Identification number of the CCR surface impoundment (if one has been assigned by the Agency).
	1.3	Description of the boundaries of the CCR surface impoundment (35 Ill. Adm. Code 845.210(c)).
	1.4	State the purpose for which the CCR surface impoundment is being used.
	1.5	How long has the CCR surface impoundment been in operation?
	1.6	List the types of CCR that have been placed in the CCR surface impoundment.

Construction History (Continued)	1.7	List name of the watershed within which the CCR surface impoundment is located.		
	1.8	Size in acres of the watershed within which the CCR surface impoundment is located.		
	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

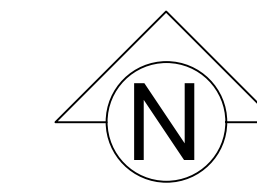
CONTROL MONUMENTATION				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
2008	876619.65	2517127.46	623.84	FOUND IRON PIN @ NORTH 1/4 CORNER OF SEC. 11
2009	873984.91	2517176.22	614.30	FOUND 2IN PIPE @ THE CENTER OF SEC. 11
2010	873979.62	2514535.96	623.85	FOUND BRASS DISK IN CONCRETE @ THE WEST 1/4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

**SW 1/4
SEC. 2**



0' 150' 300'

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

SURVEY NOTE:
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CCR FACILITY BOUNDARY CORNERS		
Point #	Northing	Eastng
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 PLAN 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



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

DATE



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

Submissions / Revisions:	Date:
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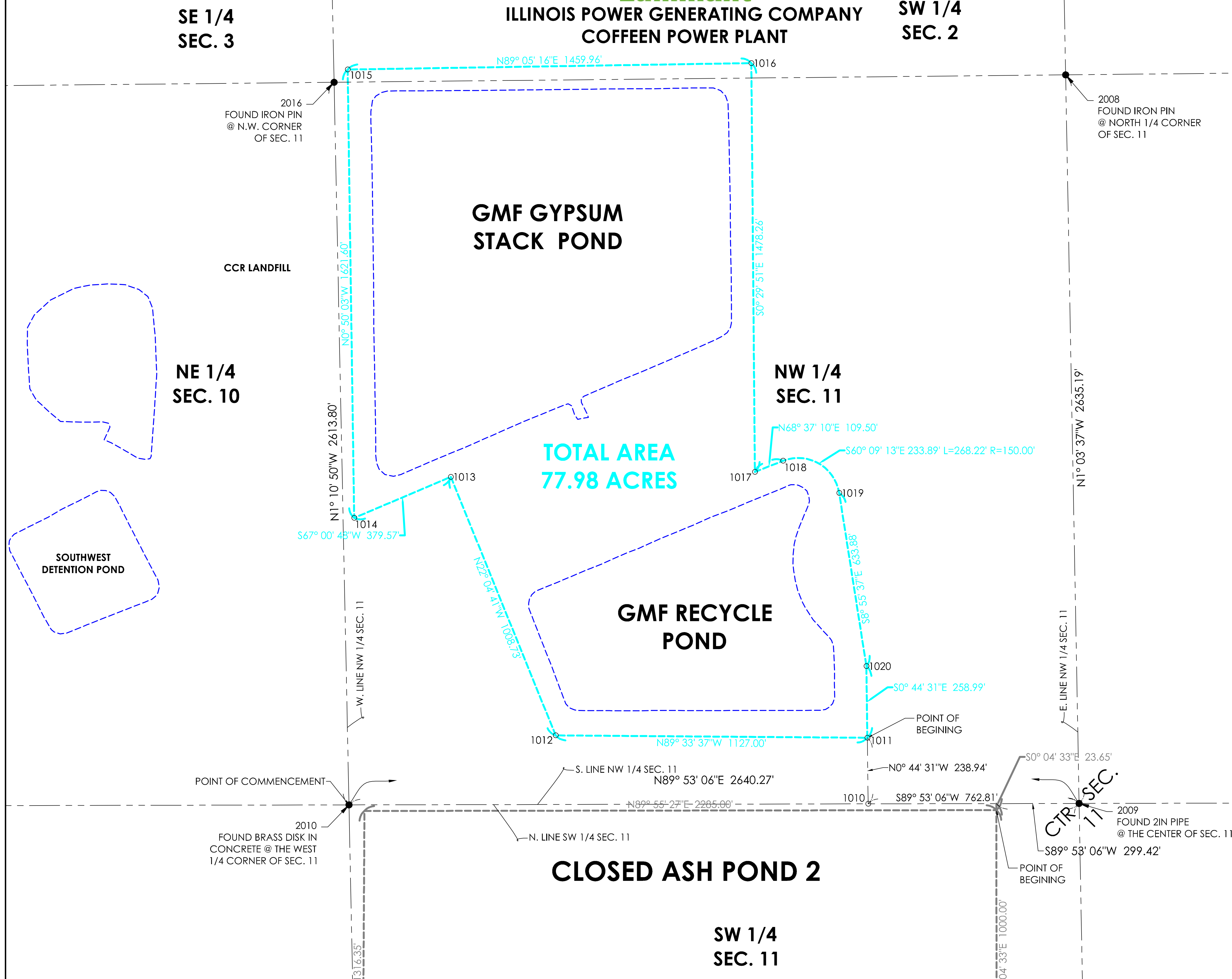
Project Name & Location:
**COFFEEN
POWER PLANT**

134 CIPS Lane
Coffeen, IL 62017

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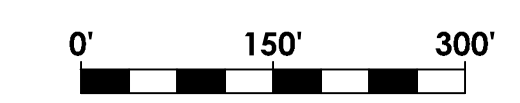
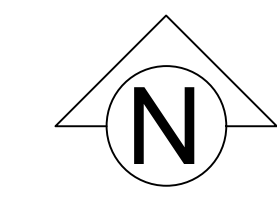
Drawing Name:	
CCR FACILITY BOUNDARY EXHIBIT	
Date: 9/21/2021	Project No.
Type: SITE	Drawing No.
Drawn By: CB	1
Approved By: BH	
Scale: AS NOTED	



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
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



**ILLINOIS POWER GENERATING COMPANY
COFFEEN POWER PLANT**



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

SURVEY NOTE:
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CCR FACILITY BOUNDARY CORNERS		
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1019	875107.47	2516308.60
1020	874481.26	2516406.96



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1	
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Project Name & Location:
**COFFEEN
POWER PLANT**

134 CIPS Lane
Coffeen, IL 62017

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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



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.

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 7¹/₂ 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.

§ 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.”

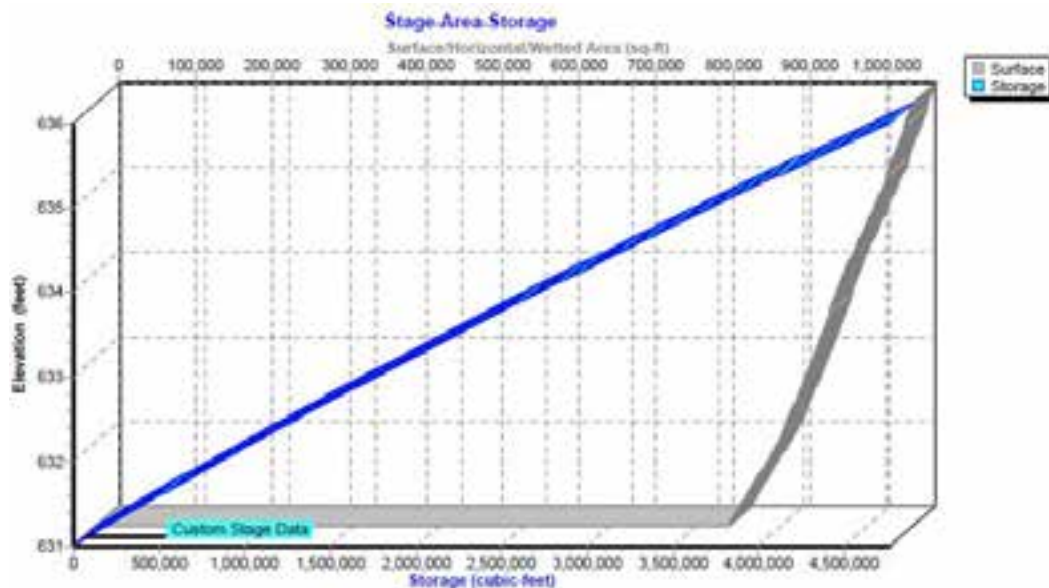


Figure 1. Area-capacity curve for Ash Pond No. 1

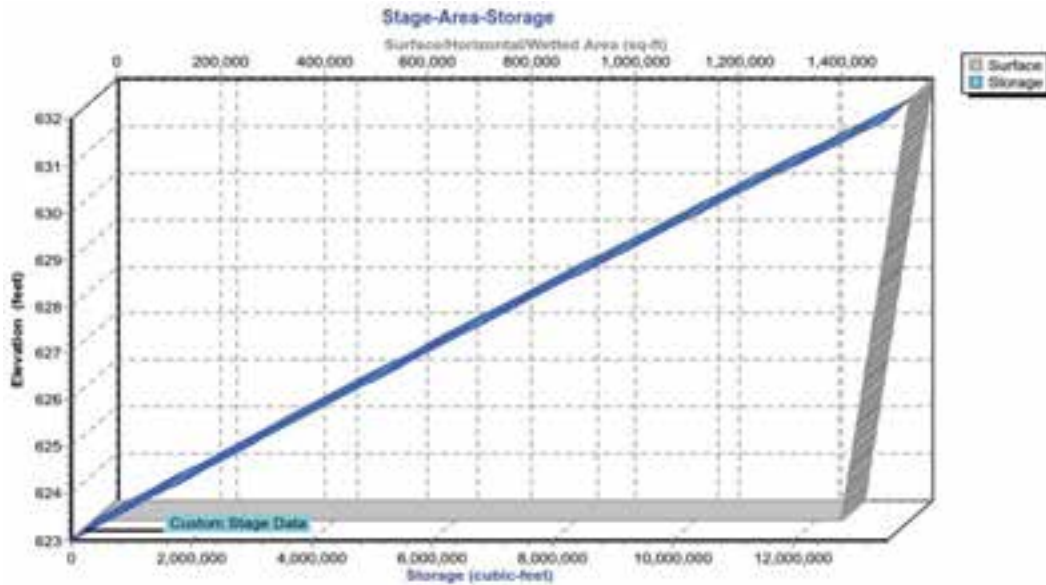


Figure 2. Area-capacity curve for GMF Pond

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
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

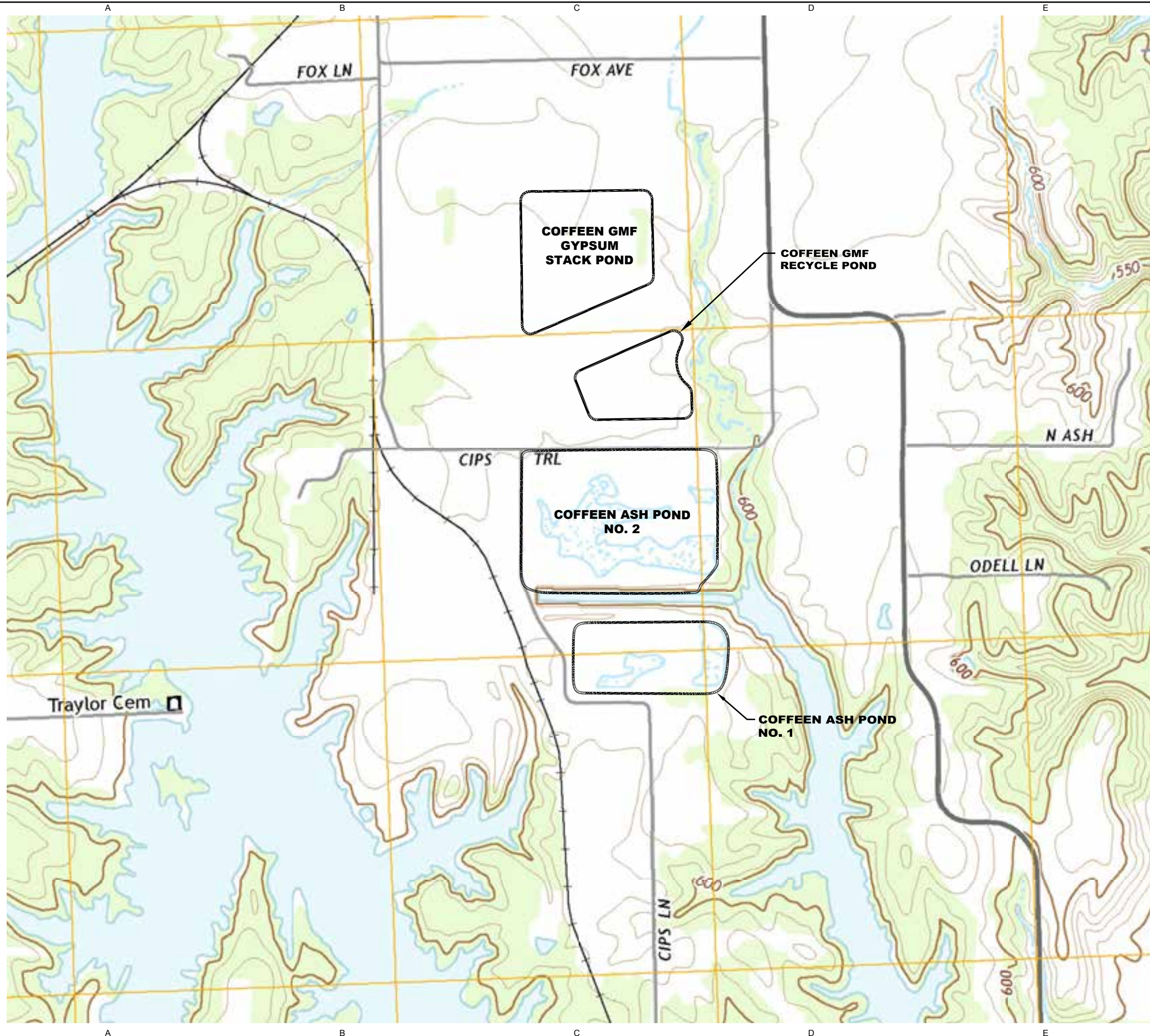
Appendix F: Operation and Maintenance Manual, Gypsum Management Facility Operation (2015)

Appendix G: Photos of 2015 Sloughing Repair



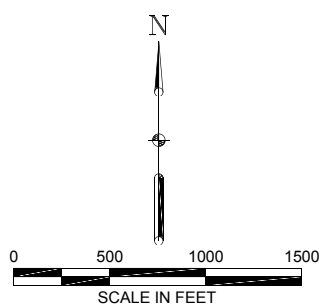
Appendix A: History of Construction Vicinity Map

AECOM DRAWING PATH: P:\Projects\Geotech\60428794_DyregyCCR\13_Construction\History\04_Technical\Production\10_Coffeen\References\Figures\C-01_History of Construction Vicinity Map (Coffeen)_ZLF.dwg
 NAVAK, MATT, 8/30/2016 10:52 AM



LEGEND
 CCR UNITS

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



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

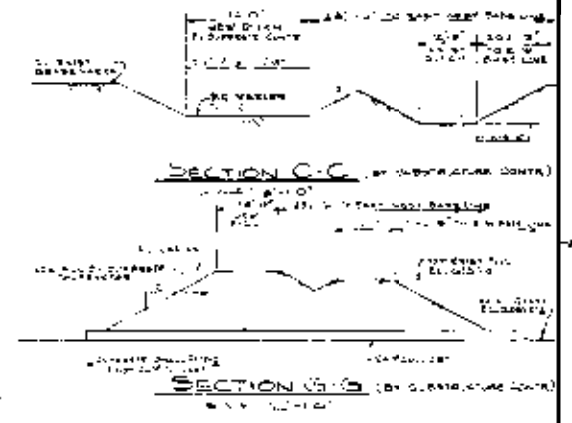
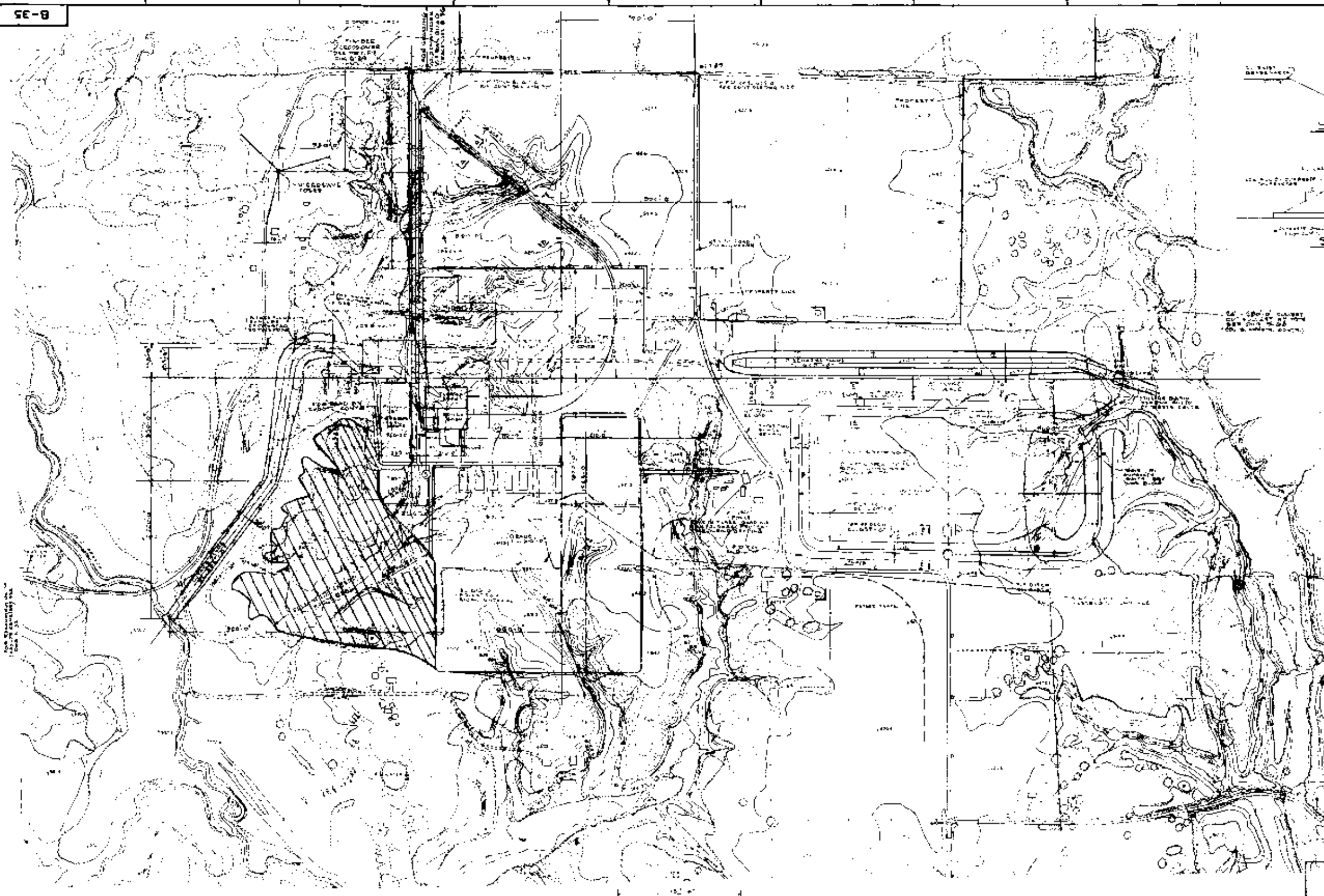
Appendix B: Coffeen Power Station Drawings

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.



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.



NOTES

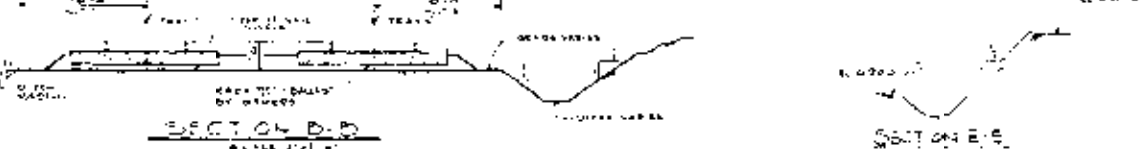
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2. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.

REFERENCE DRAWINGS

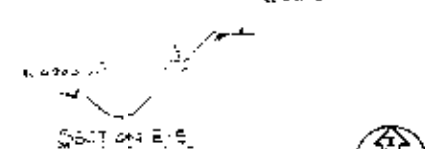
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- R-21 PROPOSED GRADING
- R-22 PROPOSED GRADING
- R-23 PROPOSED GRADING
- R-24 PROPOSED GRADING
- R-25 PROPOSED GRADING
- R-26 PROPOSED GRADING
- R-27 PROPOSED GRADING
- R-28 PROPOSED GRADING
- R-29 PROPOSED GRADING
- R-30 PROPOSED GRADING
- R-31 PROPOSED GRADING
- R-32 PROPOSED GRADING
- R-33 PROPOSED GRADING
- R-34 PROPOSED GRADING
- R-35 PROPOSED GRADING
- R-36 PROPOSED GRADING
- R-37 PROPOSED GRADING
- R-38 PROPOSED GRADING
- R-39 PROPOSED GRADING
- R-40 PROPOSED GRADING



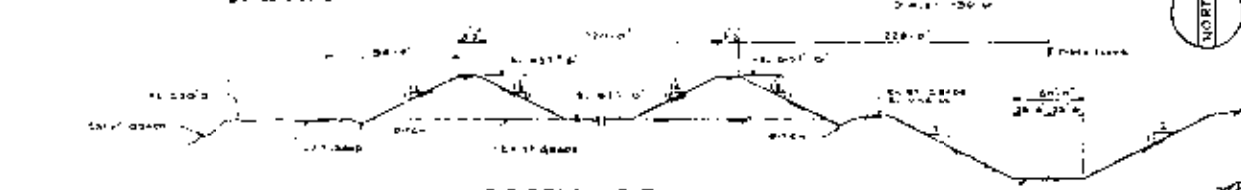
SECTION A-A



SECTION B-B



SECTION E-E



SECTION D-D



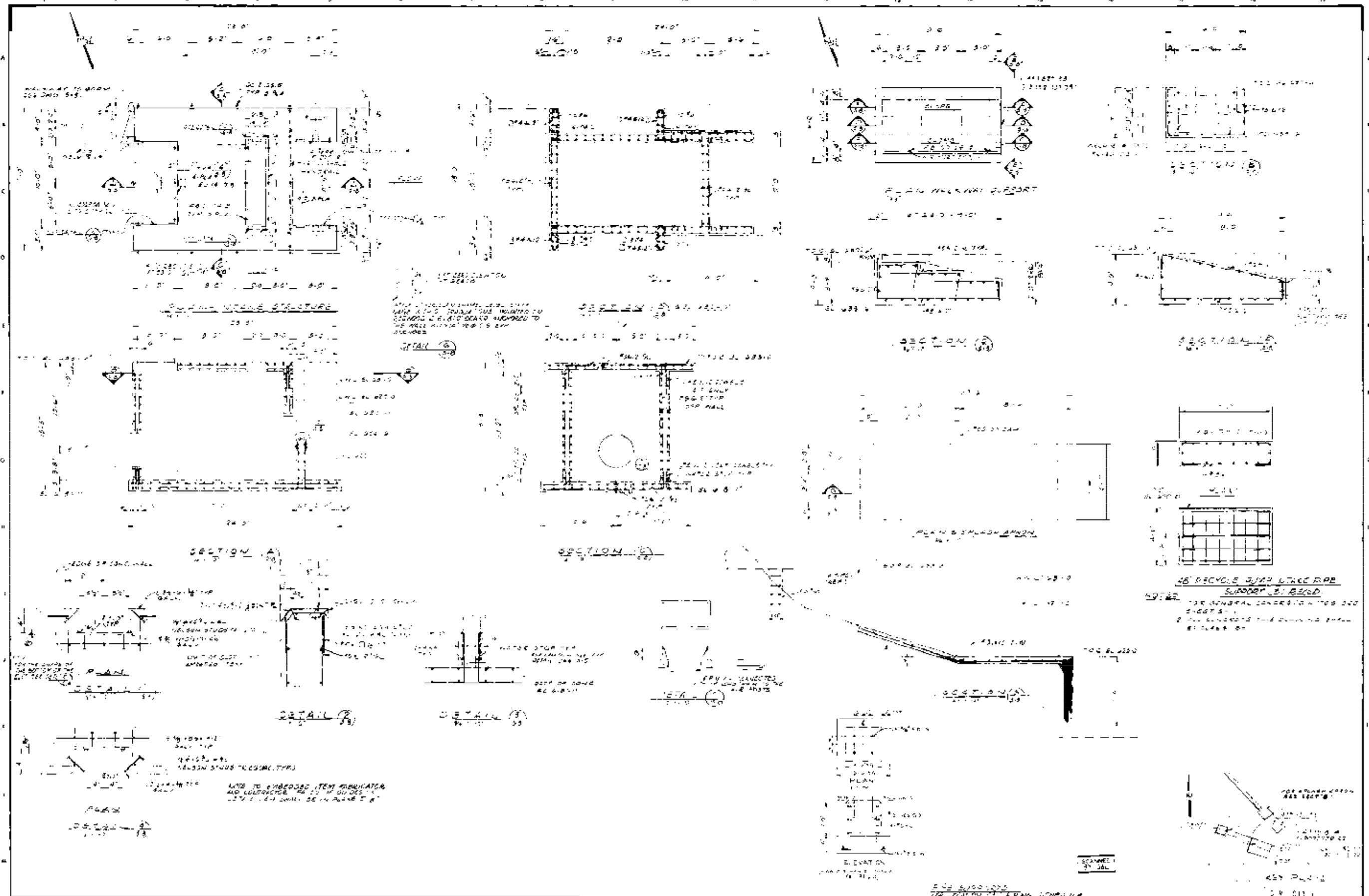
SUBSTRUCTURE BIDS
 1-15-69
 THIS DRAWING FOR
 REFERENCE ONLY

SCANNED BY SD

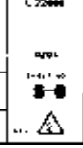
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40	1-15-69	PROPOSED GRADING	SD	SD

EARTHWORK & GRADING PLAN
UNIT I
COFFEEN POWER STATION
CENTRAL ILL. PUBLIC SERVICE CO.
COFFEEN, ILLINOIS

SARGENT & LUNDY
ENGINEERS
 CHICAGO, ILLINOIS
 DRAWING NO.
B-35



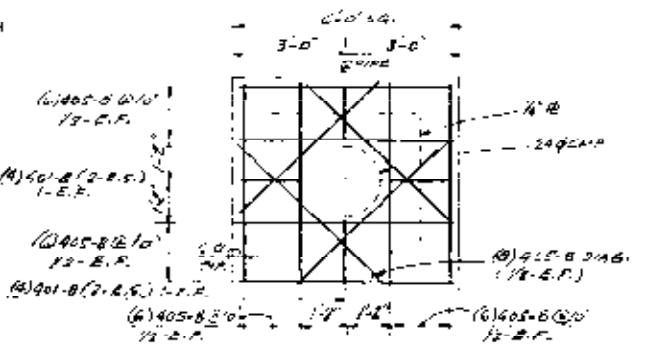
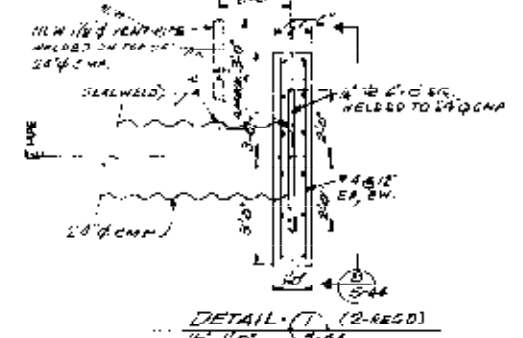
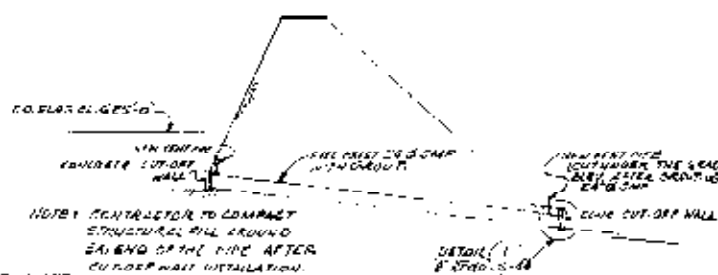
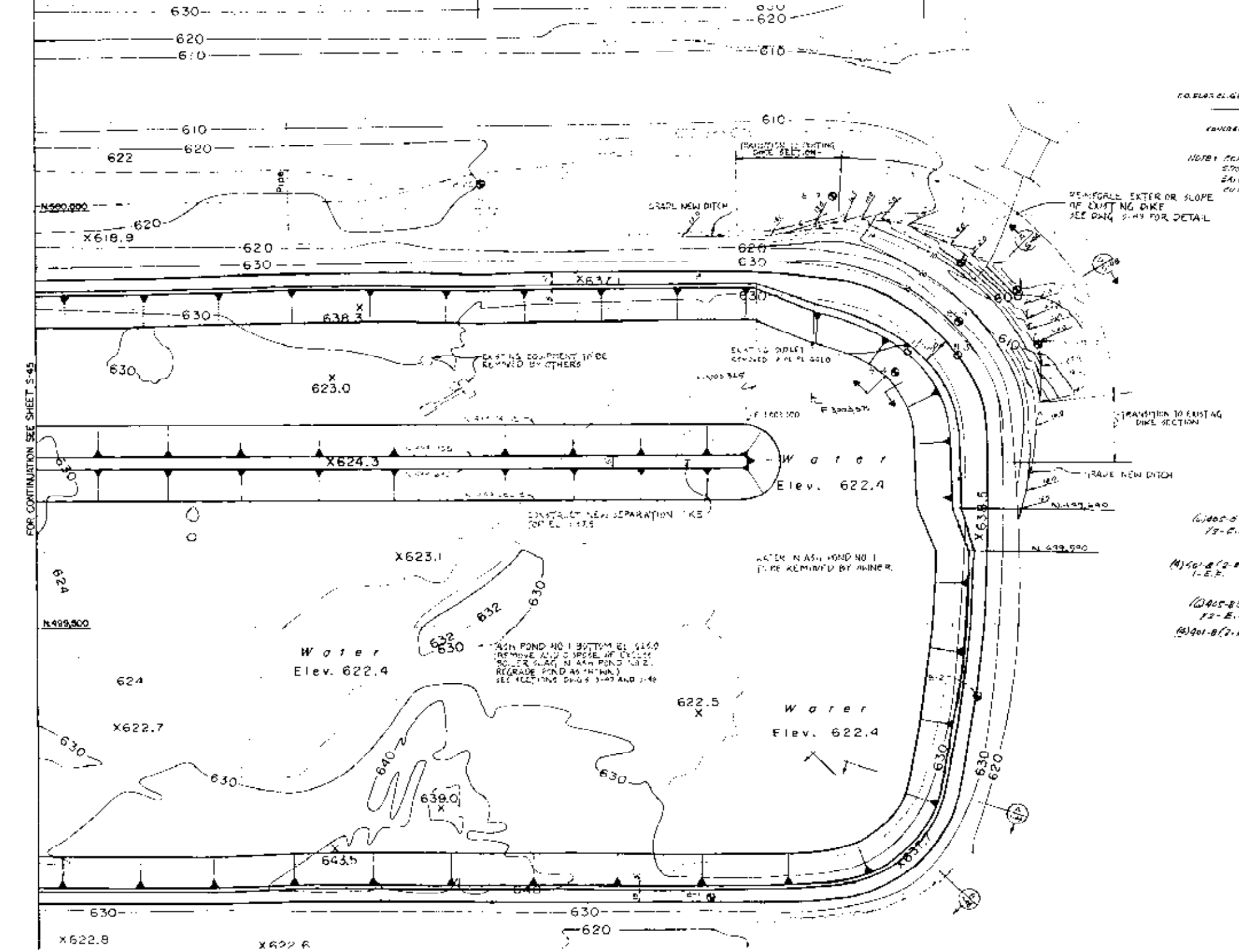
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E3,002,500

E3,003,000

E3,003,500



NOTES:

- 1 FOR LEGEND SEE DWG S-40.
- 2 FOR ASH POND AND LAYOUT SECTION SEE DWG S-46 AND S-48.
- 3 FOR SITE PLAN SEE DWG S-40.

SCANNED BY SCL

S.R. NO. 12-4



NO.	REVISIONS	DATE
1	GENERAL REVISIONS	
2	REVISIONS FOR CONSTRUCTION	
3	ADD SECTION A-A AND DETAIL T	
4	ADD DETAIL B TO COMPLETE ENHANCEMENT AS SHOWN	
5	CHANGE TO 2'	

NO.	REFERENCE DRAWINGS
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2	S-46
3	S-48

NO.	PRINT RECORD
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2	S-46
3	S-48

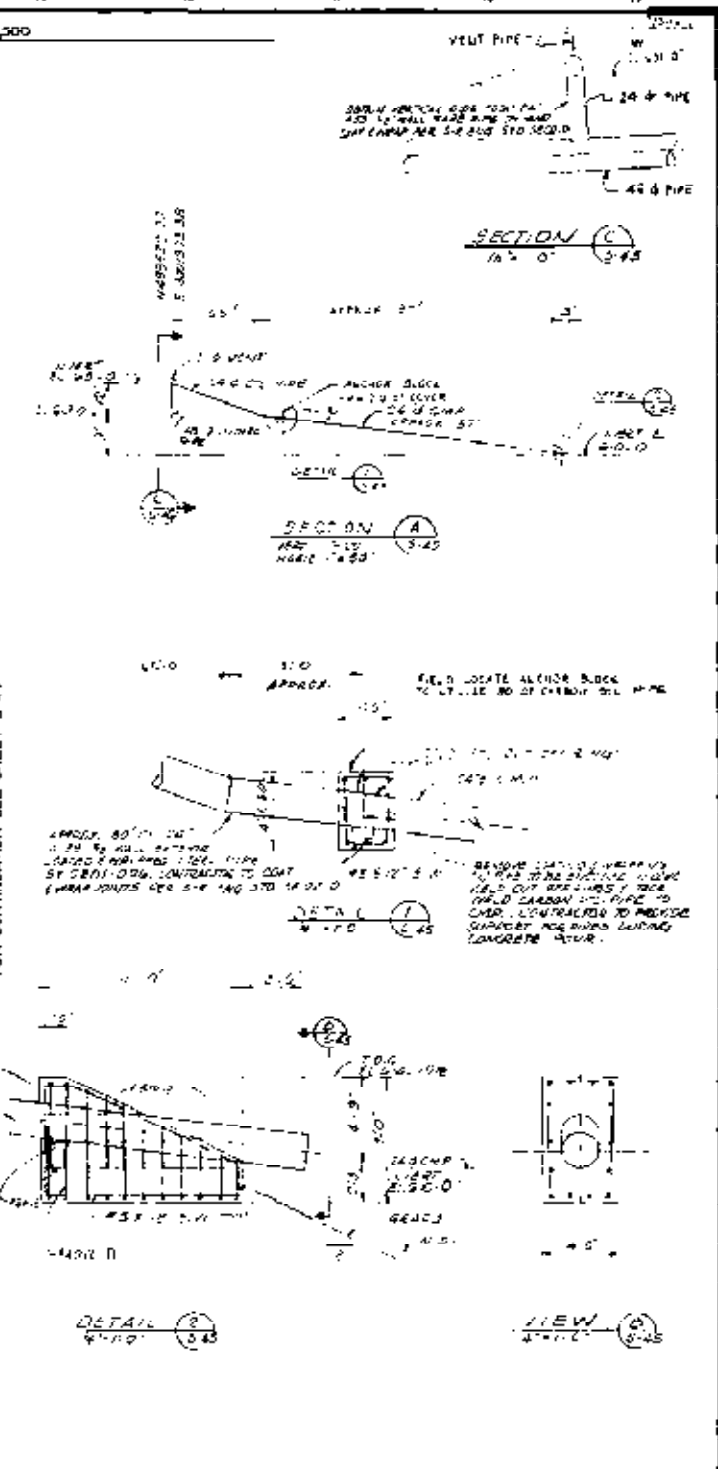
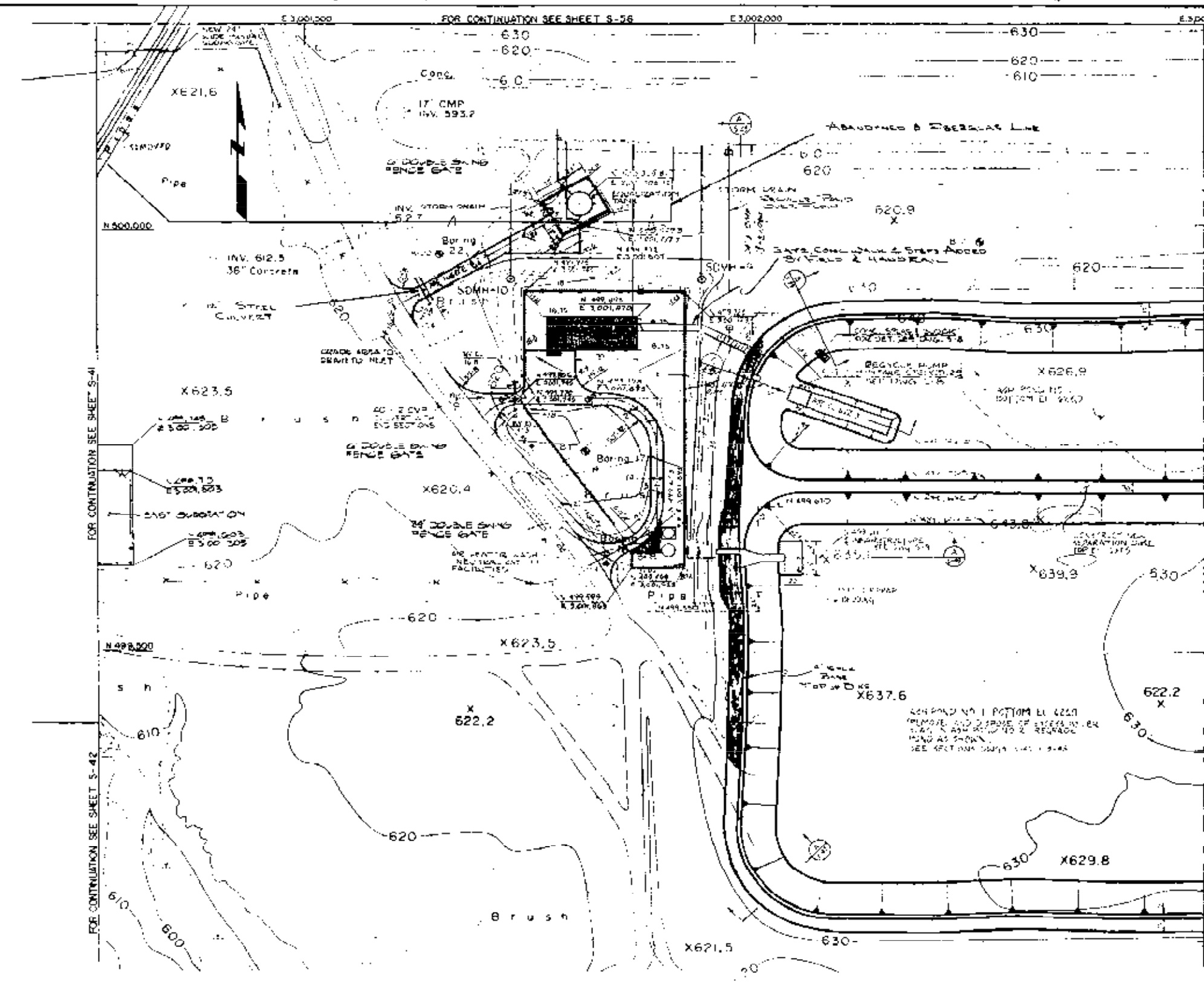
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2	S-46
3	S-48

NO.	DRAWING STATUS
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2	CHECKED
3	APPROVED

CIVIL
LAYOUT & GRADING PLAN SHEET 4

WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
DOFFEN POWER STATION

Hearn-Roger



NOTES:
 1. FOR ROAD PROFILES AND SECTIONS SEE DWG S-43.
 2. FOR LEGEND SEE DWG S-40.
 3. FOR 18\"/>



NO.	REVISIONS	DATE
1	ADD L&S GEN. N.Y. DIMENSIONS FOR CONCRETE	10/1/88
2	ADDED SUBSTATION AND REVISED GATE SIZES	10/1/88
3	ADD COMMENTS TO AS BUILT	10/1/88
4	ADD COMMENTS TO AS BUILT	10/1/88
5	ADD COMMENTS TO AS BUILT	10/1/88
6	ADD COMMENTS TO AS BUILT	10/1/88
7	ADD COMMENTS TO AS BUILT	10/1/88
8	ADD COMMENTS TO AS BUILT	10/1/88
9	ADD COMMENTS TO AS BUILT	10/1/88
10	ADD COMMENTS TO AS BUILT	10/1/88

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SHEET NO. S-45

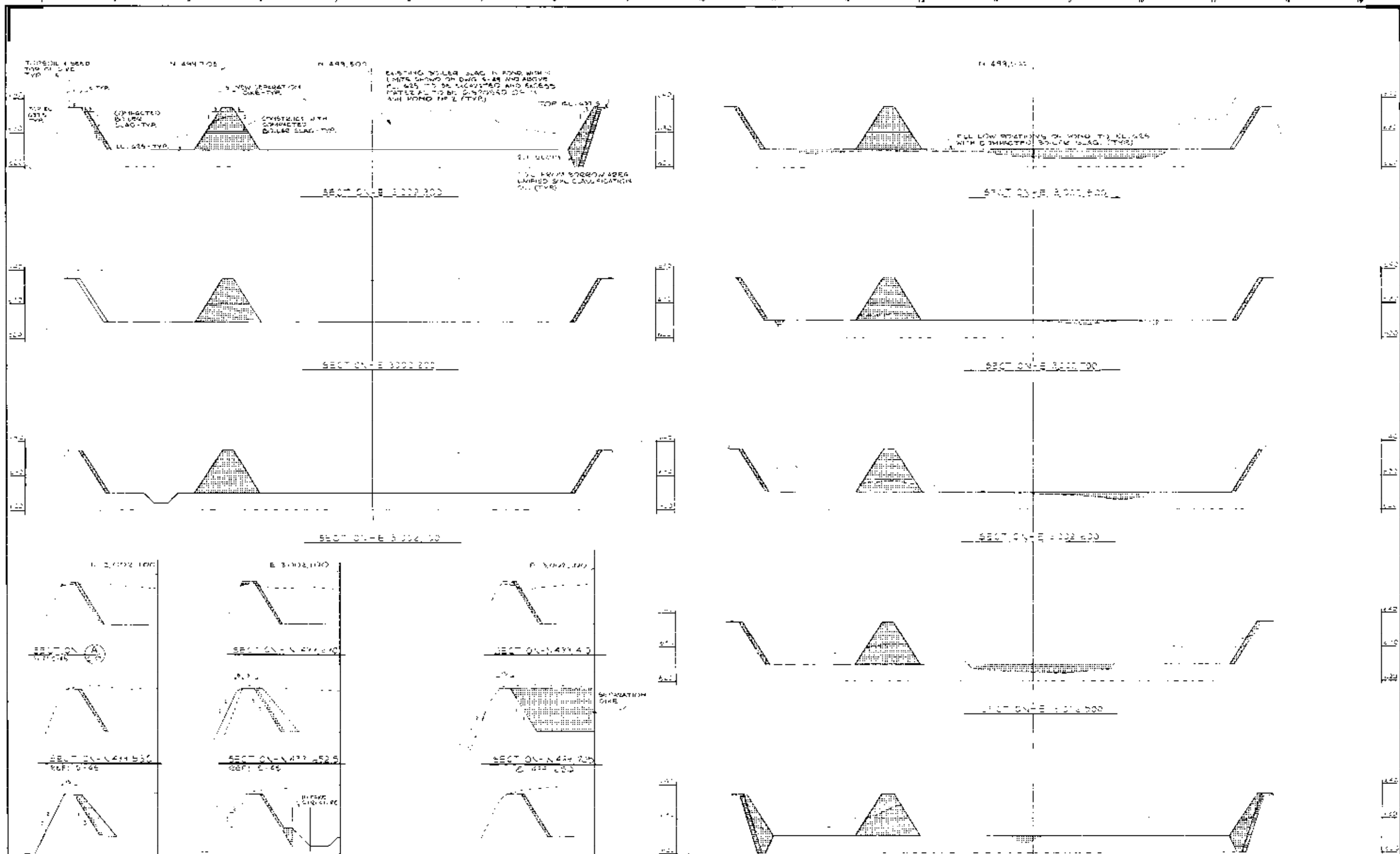
DRAWING STATUS

CIVIL
LAYOUT & GRADING PLAN SHEET 5

WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COFF FLEM POWER STATION

Stearns-Roger

SCALE: 1"=50'



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

SCANNED BY EAL



NO.	REVISIONS	REFERENCE DRAWINGS	PRINT RECORD	ENG. RECORD	DRAWING STATUS
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SR NO Y2-7

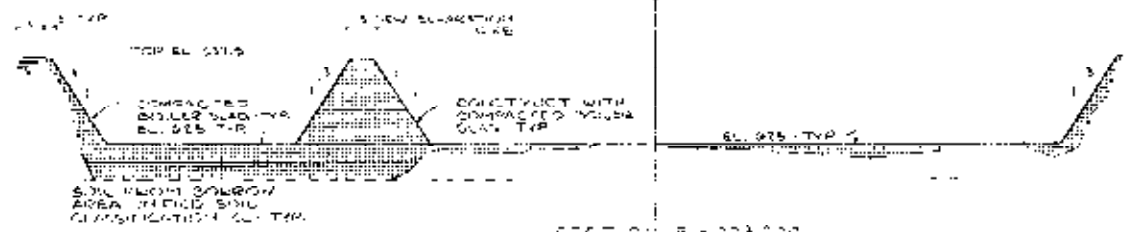
CIVIL
 MISCELLANEOUS SECTIONS AND DETAILS
 SHEET 2

WASTEWATER WASTEWATER FACILITIES
 CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
 CUPPER POWER STATION

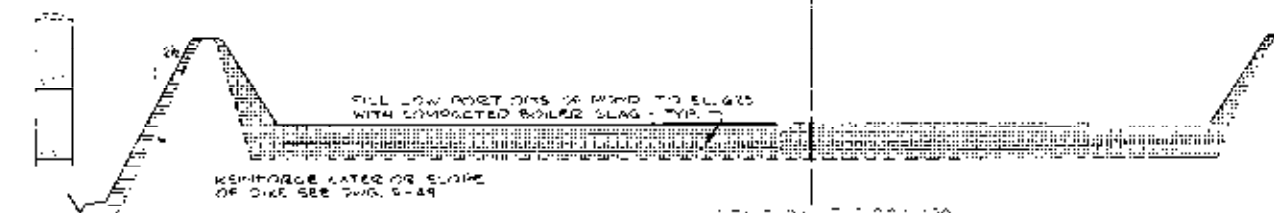
Stearns-Roger

10/1/45
 R.A. STEARNS
 REGISTERED PROFESSIONAL ENGINEER
 STATE OF ILLINOIS
 NO. 1014

TOP EL. 511.5
FOR 15' DIKE
TOP-15



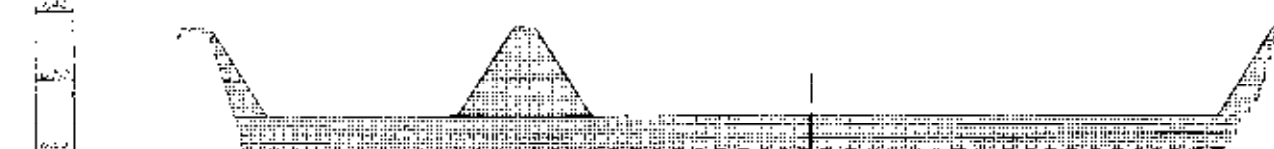
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SECTION E 3004 400



SECTION E 3003 000



SECTION E 3003 800

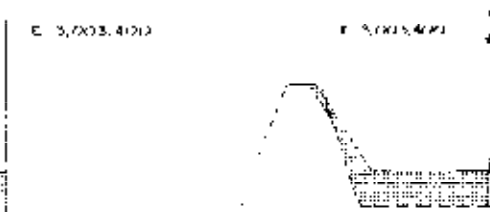
EXISTING BOILER SLAG IN POND WITHIN LIMITS SHOWN ON DWG. S-48 AND ABOVE EL. 425 TO BE REMOVED AND AREA THEREAFTER TO BE IMPROVED OR IN ACC. TO DWG. S-49.



SECTION E 3003 400



SECTION A 3003 400
REF. S-48



SECTION B 3003 400
REF. S-48



SECTION C 3003 400
REF. S-48



SECTION E 3003 600



SECTION A 3003 600
REF. S-48

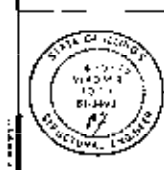


SECTION B 3003 600
REF. S-48



SECTION C 3003 600
REF. S-48

NOTES:
1. FOR LAYOUT SEE DWG. S-40
2. FOR ASH POND 125' PLANS SEE DWG. S-48 AND S-49
3. FOR 15' DIKE PLANS SEE DWG. S-40



NO.	REVISIONS	DATE	BY	CHKD.	APPD.
1	EMPHASIS	10/1/88	JLW		
2	REVISED	10/1/88	JLW		

NO.	REFERENCE DRAWINGS
1	ASPHALT DRIVE CONSTRUCTION
2	ASPHALT DRIVE

DATE	BY	CHKD.	APPD.
10/1/88	JLW		
10/1/88	JLW		

NO.	ENG. RECORD	DATE
1	DESIGN	10/1/88
2	CONSTRUCTION	10/1/88

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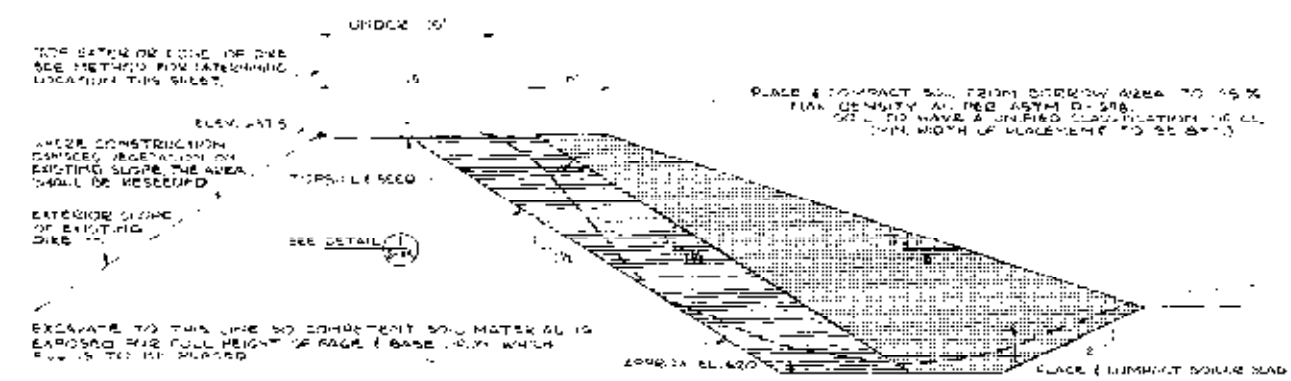
SR NO Y2-B

CIVIL
ASH POND NO. 1 SECTIONS AND DETAILS

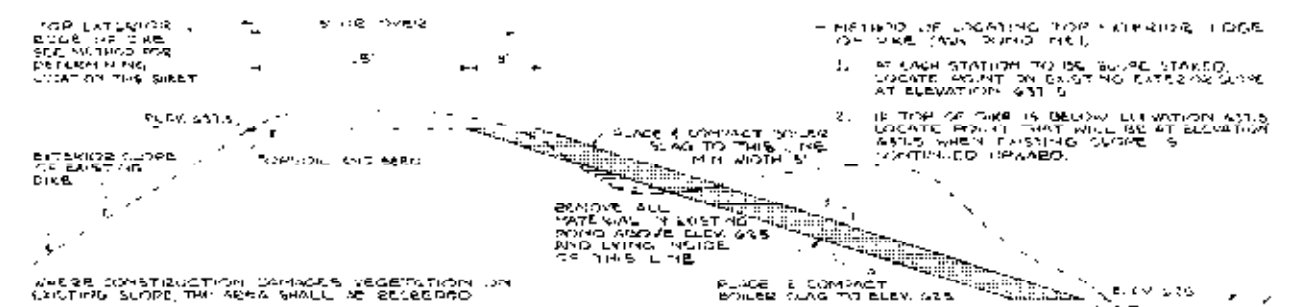
WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COFFEE POWER STATION

Stearns-Roger

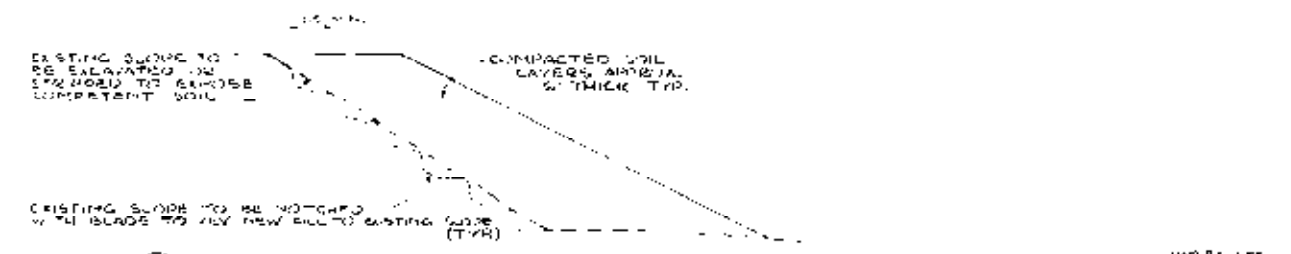
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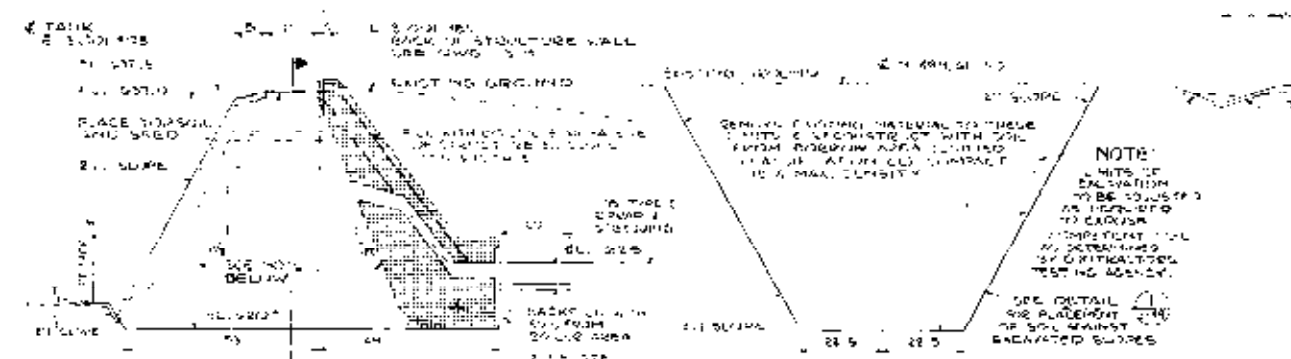
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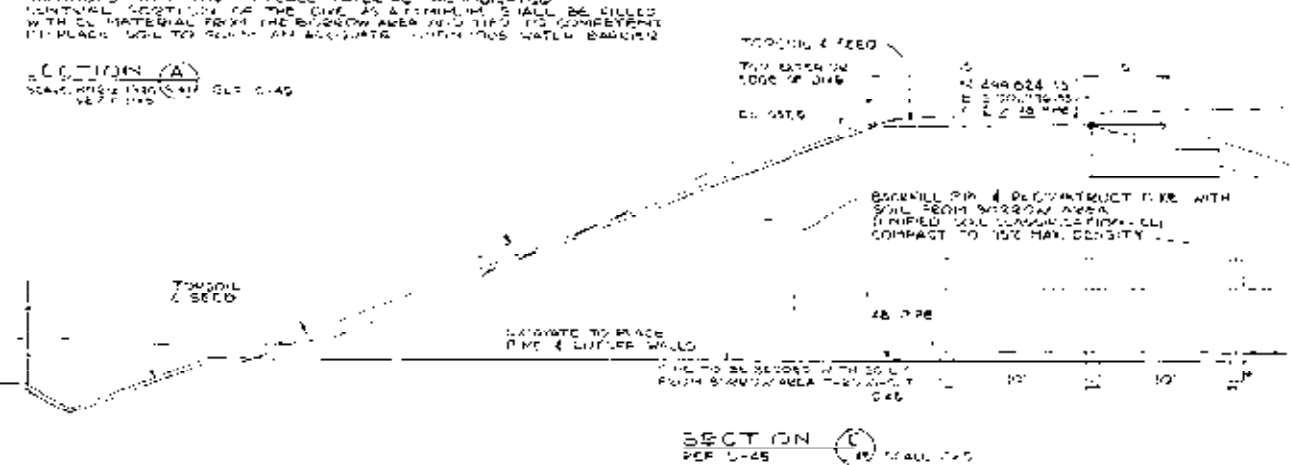
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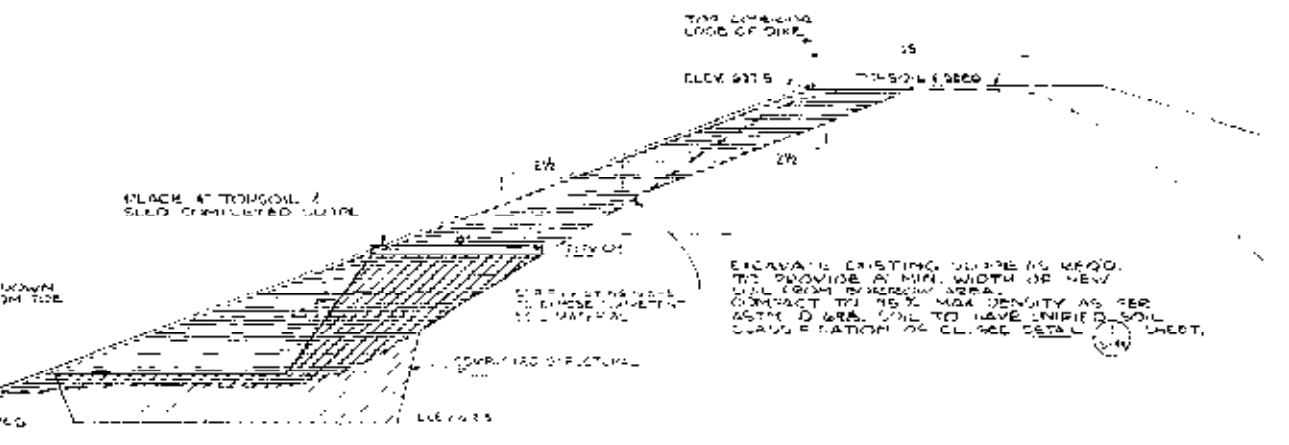
DETAIL 1/4"=1' SCALE
BLANKING NEW FILL AGAINST EXISTING SLOPE



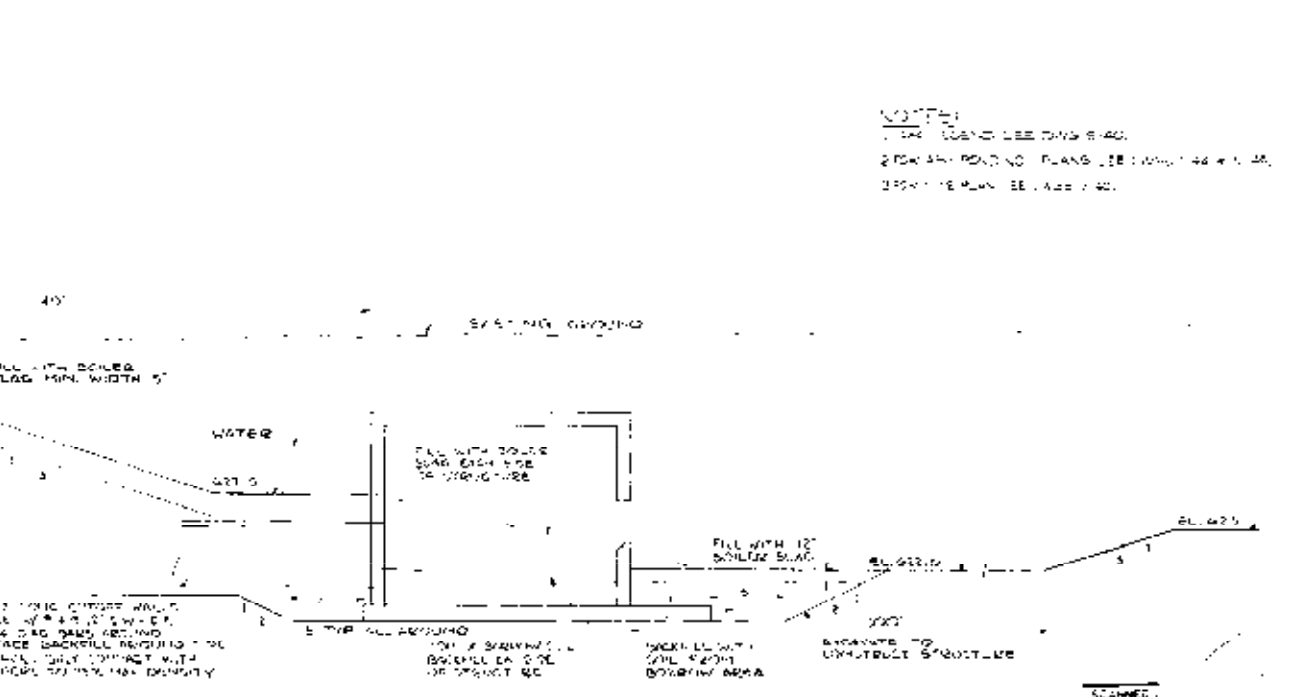
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SECTION (B) SCALE 1/4"=1' SCALE



SECTION (C) SCALE 1/4"=1' SCALE



ASH POND NO. 1 SCALE 1"=10'
TYPICAL SECTION FOR DIRMING WHERE EXISTING DIKE IS 15' OR OVER



SECTION (D) SCALE 1/4"=1' SCALE



NO.	REVISIONS	DATE	BY	CHKD.
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2	NOTE CONNECTIONS FOR WALL CONSTRUCTION	11/15/88	JLH	...
3	FIELD REVISIONS	11/15/88	JLH	...
4	REVISION	11/15/88	JLH	...

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NO.	PRINT RECORD
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NO.	ENG. RECORD
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NO.	DRAWING STATUS
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SR NO. Y2-9

CIVIL

MISCELLANEOUS SECTIONS & DETAILS SHEET 4

WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COOPER POWER PLANT

SCALE AS SHOWN

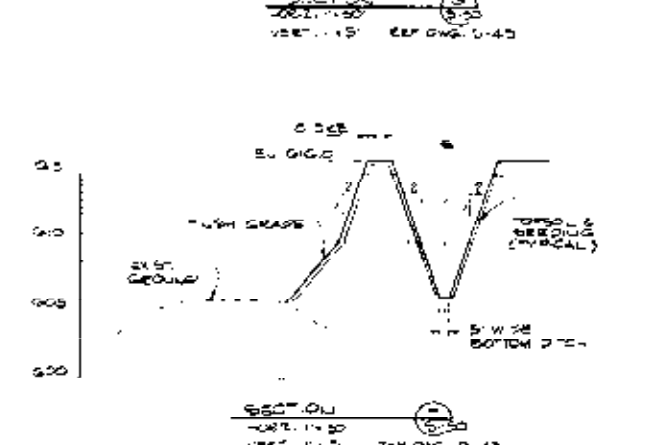
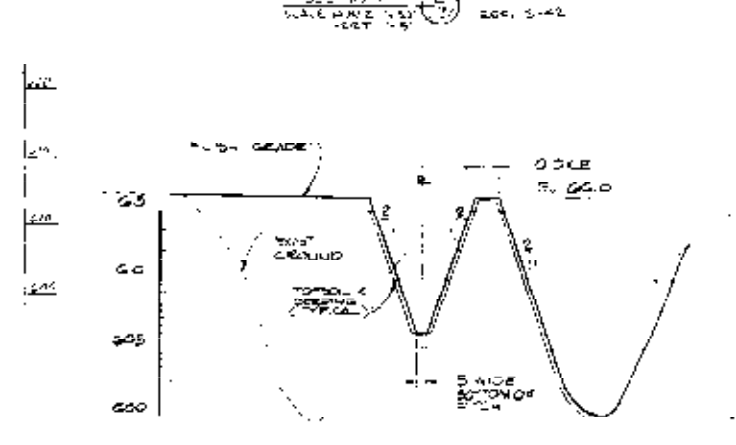
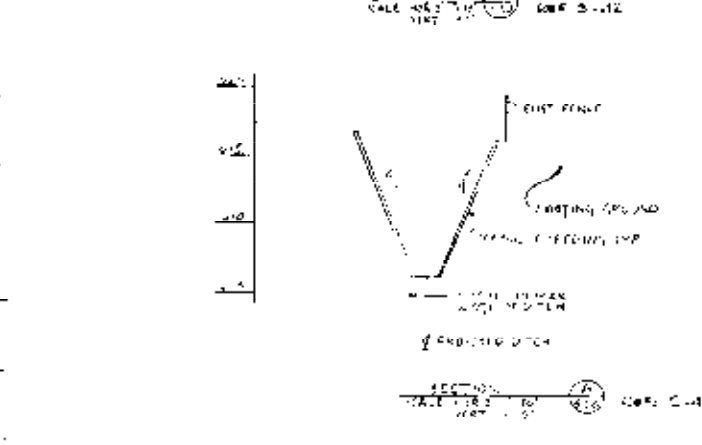
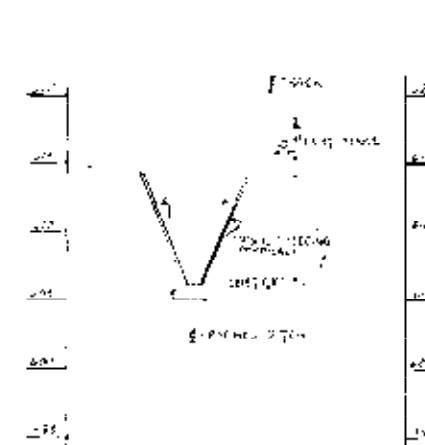
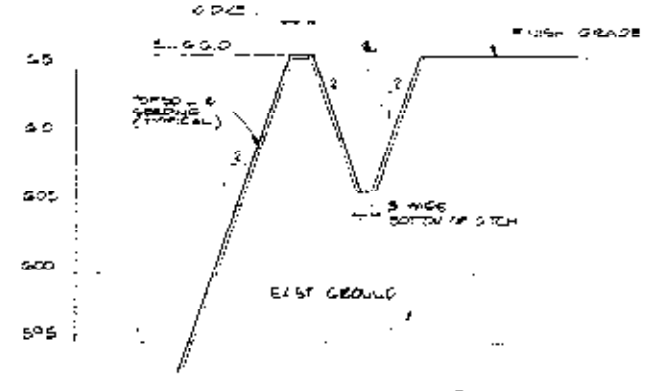
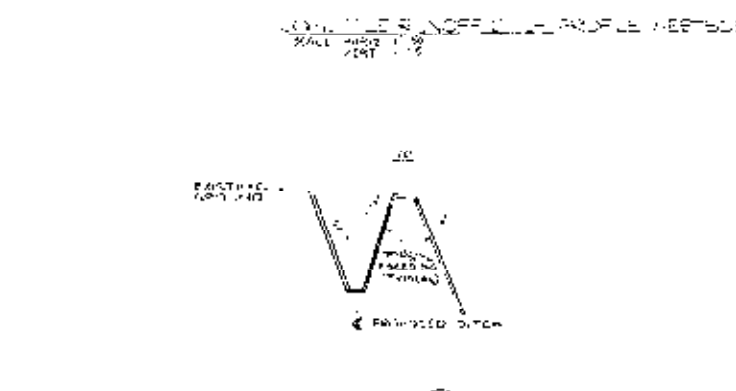
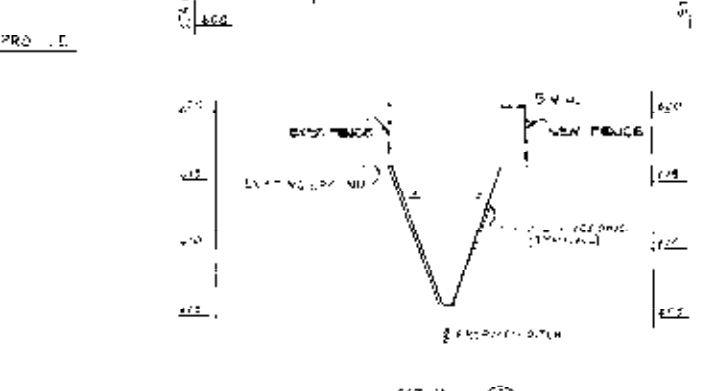
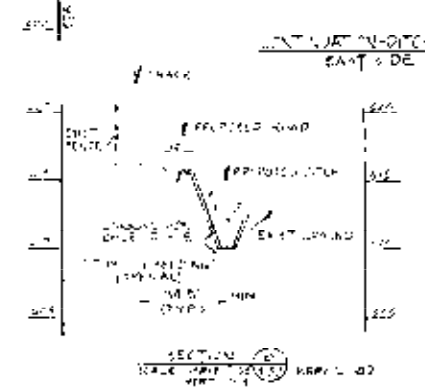
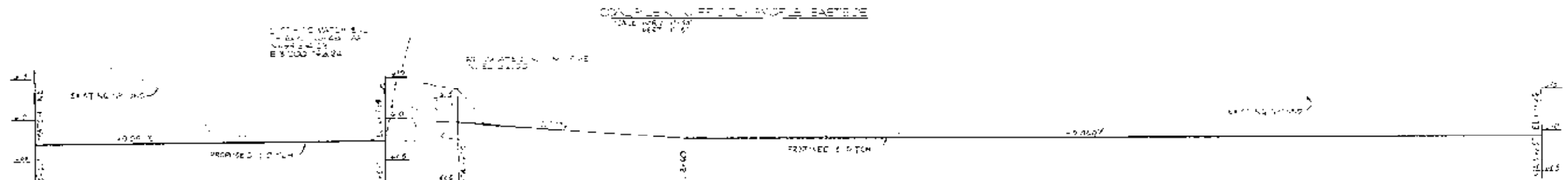
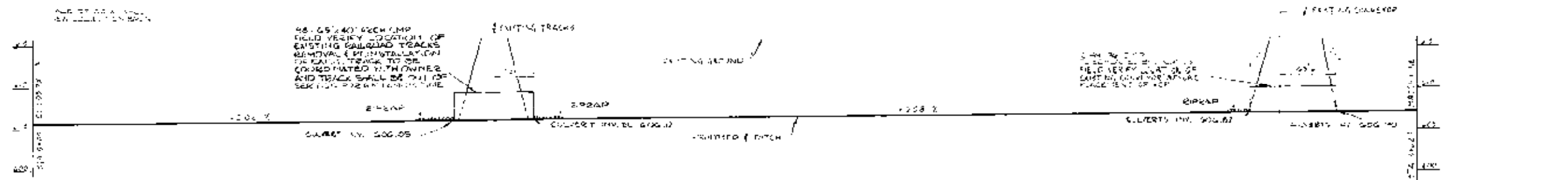
Stearns-Roger

DATE: 11/15/88

PROJECT NO: 88-200

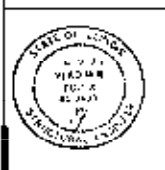
DRAWING NO: S-49

SCALE: 1"=10'



NOTE:
THE WIDTH OF BOTTOM OF DITCH IS 5.0' EXCEPT AS INDICATED OTHERWISE.

NOTES:
FOR 2 TO 1 PLAN SEE DWG. 1414-10
FOR 4 TO 1 PLAN SEE DWG. 1415-10



NO.	REVISIONS
1	GENERAL NOTES
2	ADD NOTES FOR CONSTRUCTION
3	ADD DITCH GRADE, ADD NEW SECTION 17.50 & 17.51
4	ADD SECTION 17.52

NO.	REFERENCE DRAWINGS
1	1414-10
2	1415-10

NO.	DATE	BY	FOR
1	11/11/10	...	...
2	11/11/10	...	...

NO.	DATE	BY	FOR
1	11/11/10	...	...
2	11/11/10	...	...

NO.	DATE	BY	FOR
1	11/11/10	...	...
2	11/11/10	...	...

SCANNED BY: [Signature]

CIVIL
MISCELLANEOUS SECTIONS & DETAILS SHEET

WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COOPER POWER STATION

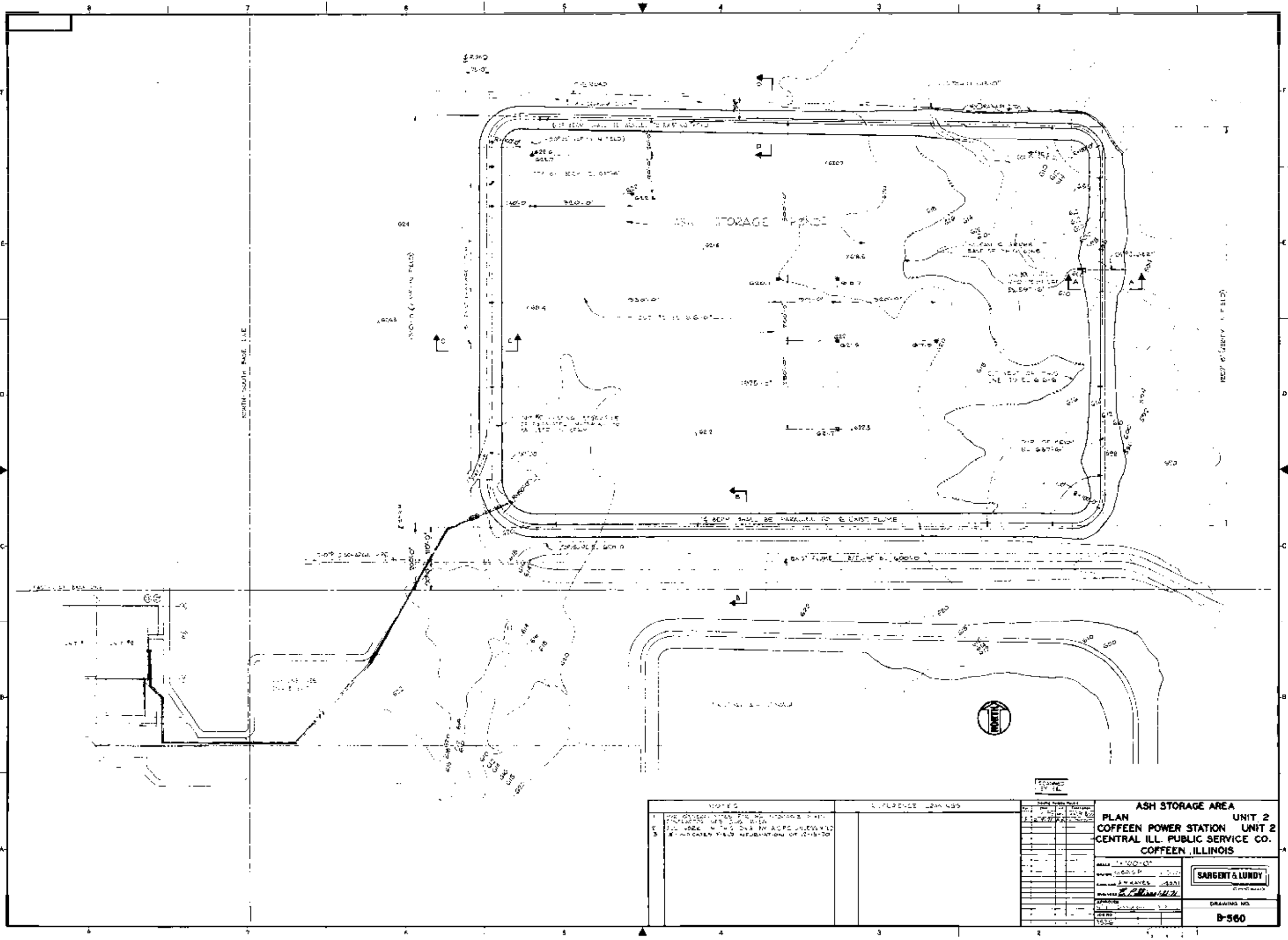
AS SHOWN

Stearns-Roger

DATE: 11/11/10
SCALE: AS SHOWN

SHEET NO. 12-10

6201
9:50



NOTES

1. SEE EXISTING PLAN FOR LOCATION OF ALL EXISTING UTILITIES.
2. ALL NEW UTILITIES SHOWN BY APPROPRIATE SYMBOLS.
3. * INDICATES FIELD REVISIONS OF 1-15-70

REFERENCE DRAWINGS

NO.	DATE	DESCRIPTION

REVISIONS

NO.	DATE	DESCRIPTION

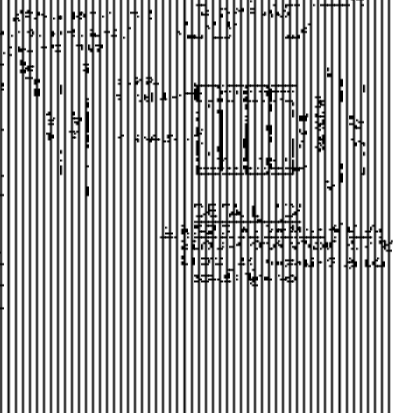
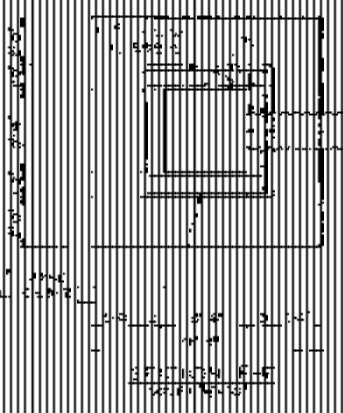
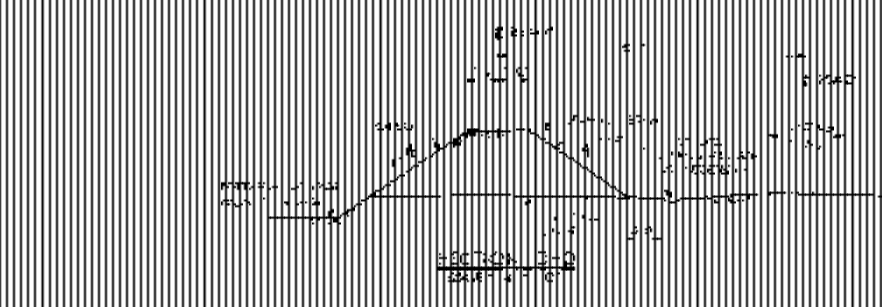
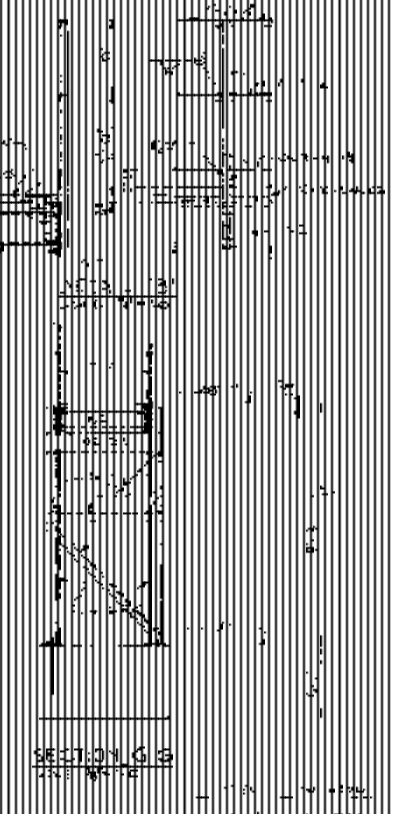
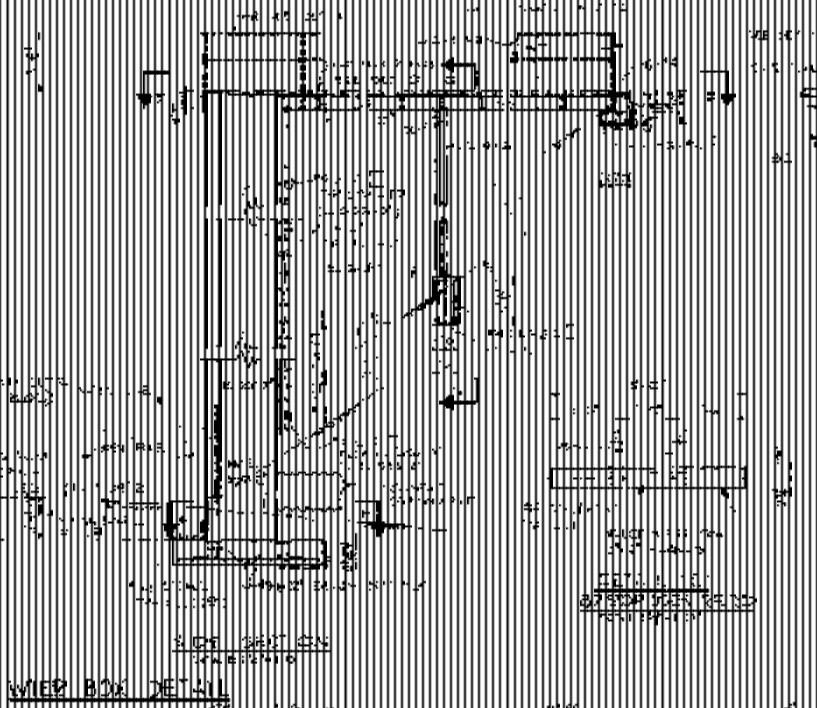
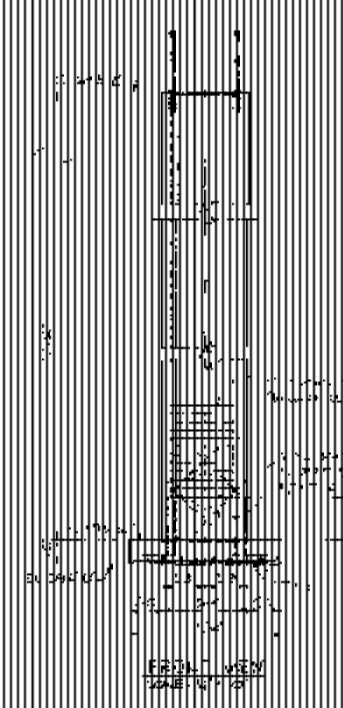
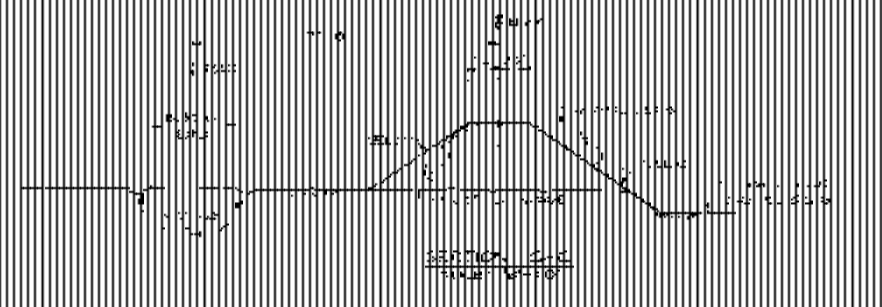
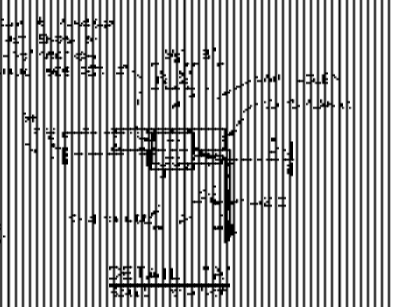
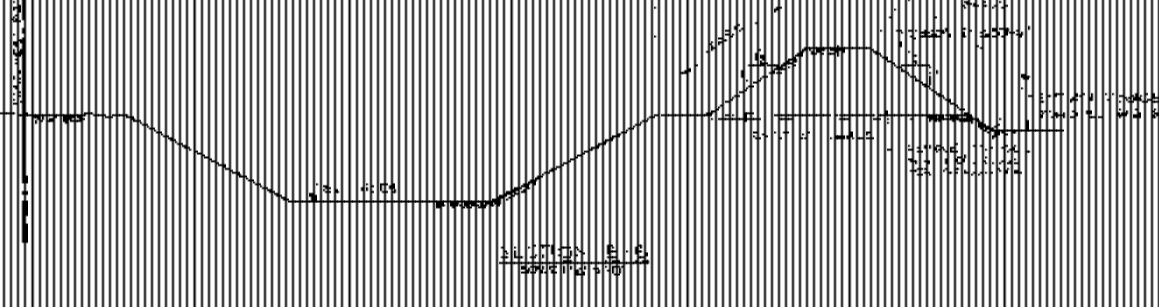
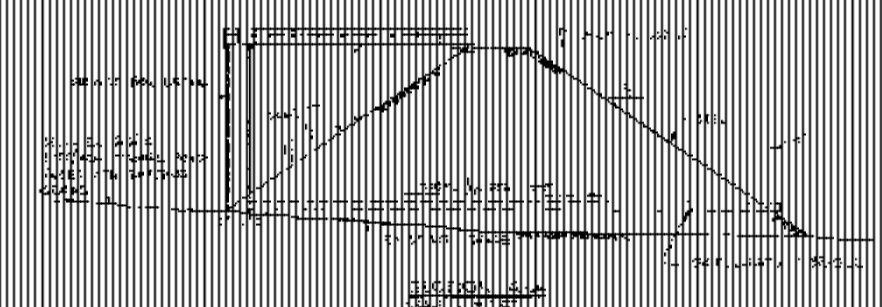
ASH STORAGE AREA UNIT 2
PLAN
COFFEEN POWER STATION UNIT 2
CENTRAL ILL. PUBLIC SERVICE CO.
COFFEEN, ILLINOIS

SCALE: 1" = 100'-0"

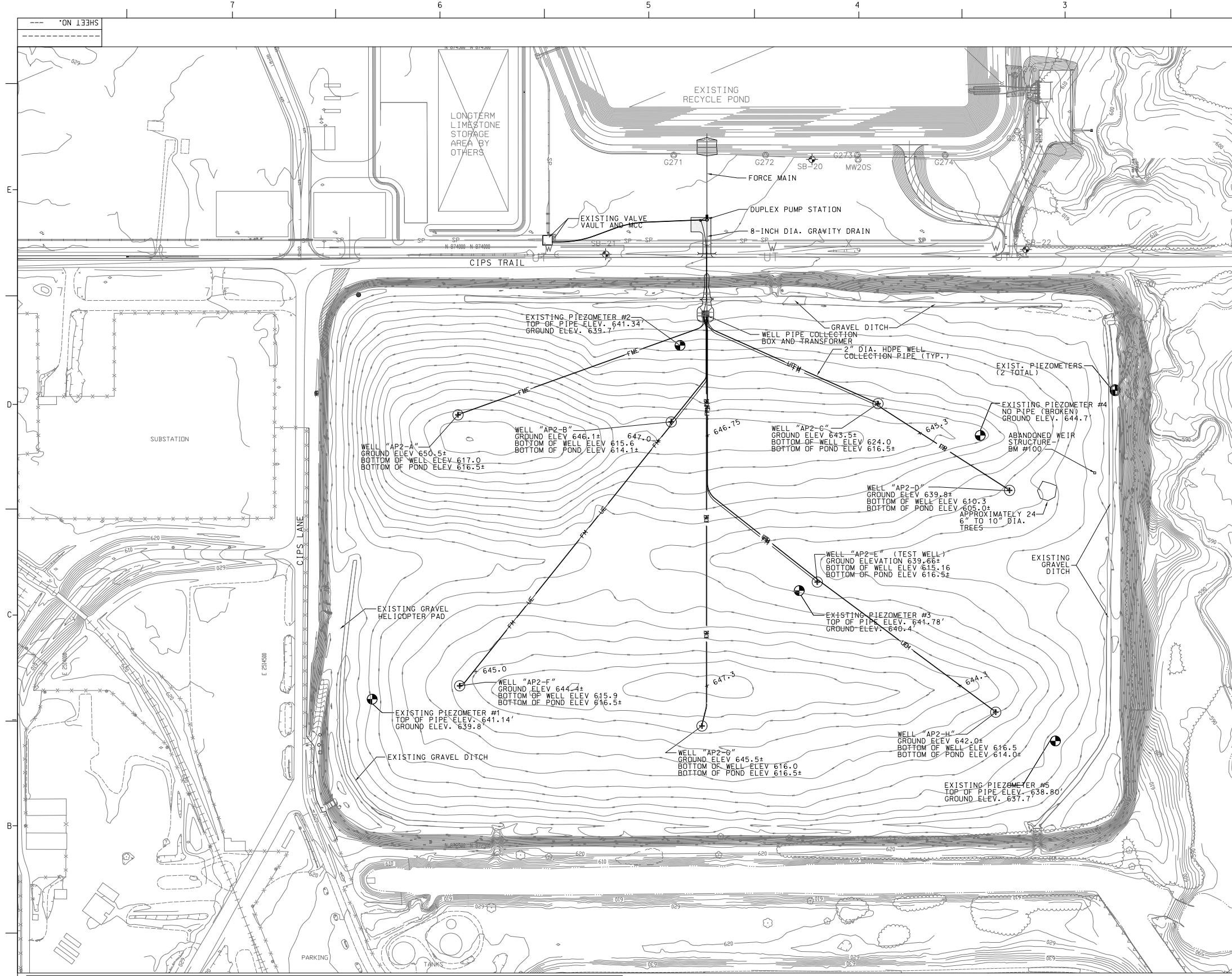
DATE: 10-25-69
 DRAWN BY: J. W. HAYES
 CHECKED BY: J. W. HAYES
 APPROVED BY: J. W. HAYES

SARGENT & LUNDY
 CIVIL ENGINEERS

DRAWING NO. **D-560**



NORTH 		REFERENCE DRAWINGS SEE DRAWING NO. _____ SEE DRAWING NO. _____ SEE DRAWING NO. _____		ASH STORAGE AREA SECTIONS & DETAILS UNIT 2 COFFEE POWER STATION UNIT 2 CENTRAL ILL. PUBLIC SERVICE CO. COFFEE, ILLINOIS	
DATE _____	DRAWN BY _____	CHECKED BY _____	SCALE _____	SHEET NO. _____	TOTAL SHEETS _____
SARGENT & LUNDY ENGINEERS 100 N. WASHINGTON ST. CHICAGO, ILL. 60602				0-561	



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.

COORDINATE TABLE

POINT	STATE PLANE COORDINATES			DESCRIPTION	PLANT COORDINATES		
	NORTH	EAST	ELEV.		NORTH	EAST	ELEV.
100	873,444.5	2,516,566.2	636.78'	BENCHMK: CHISELED "C" 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	2,515,980.73	.	WELL AP2-G			
5008	872,842.91	2,516,316.70	.	WELL AP2-H			

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

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

AS BUILT

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

SITE: ASH POND #2

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

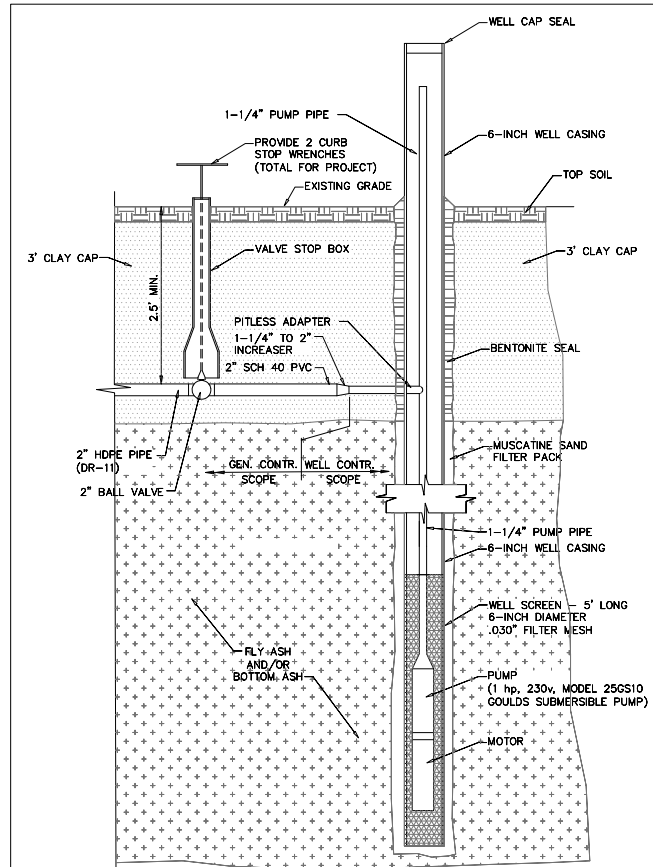
Ameren Energy
Resources
Generating

NOTICE OF LIMITED RESPONSIBILITY
THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE DESIGN AND CONSTRUCTION OF THE PROJECT SHOWN ON THESE PLANS. THE ENGINEER DOES NOT ASSUME ANY RESPONSIBILITY FOR THE DESIGN OR CONSTRUCTION OF ANY OTHER WORK NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF ANY OTHER WORK NOT SHOWN ON THESE PLANS.

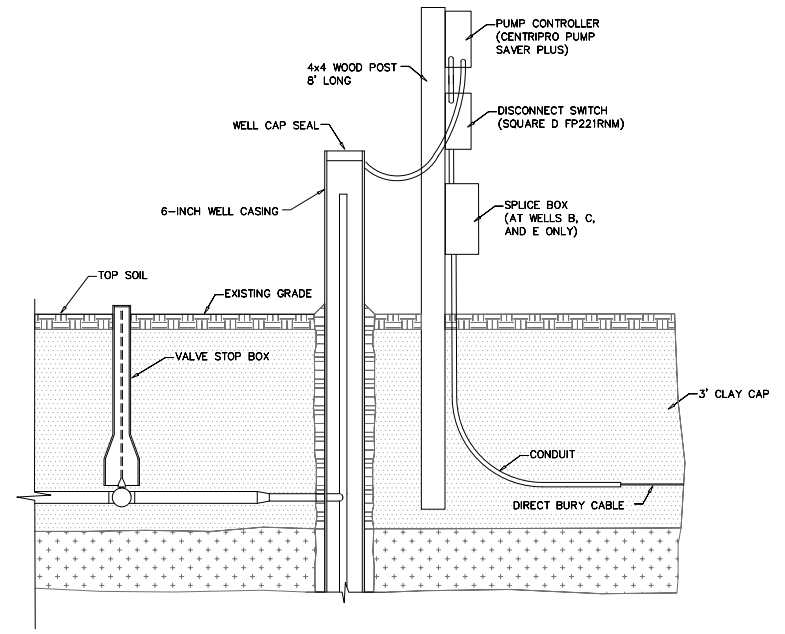
NOTES

REFERENCE DRAWINGS

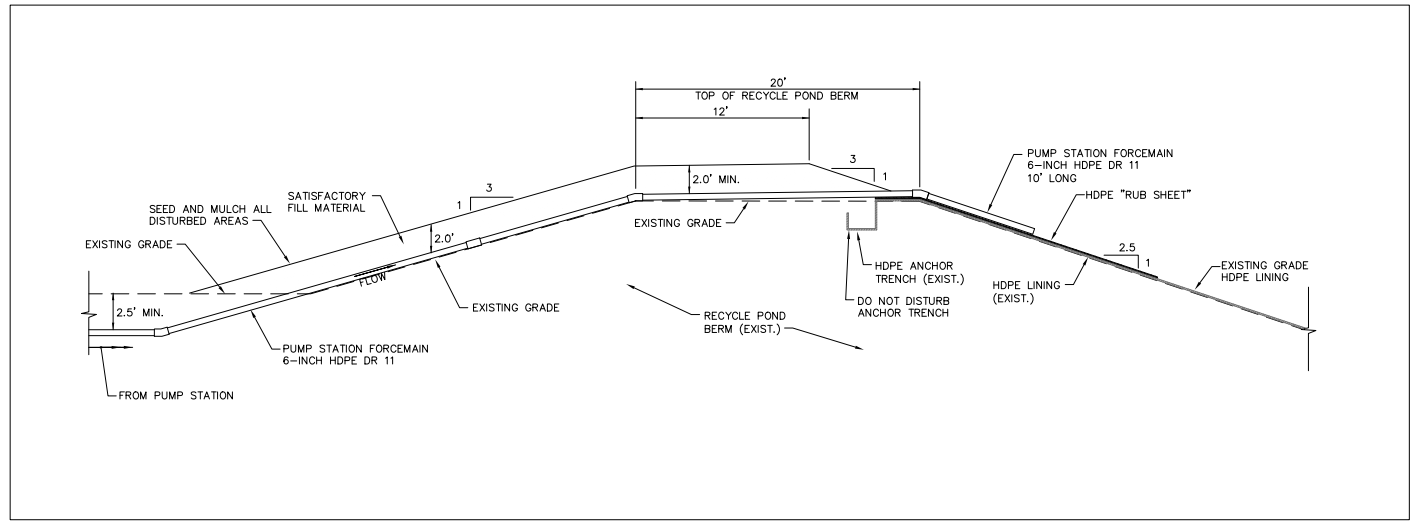
REV.	DATE	PROJECT NO.	AMEREN NO.	SUPV. ENGR.	DRAFTING	ENGR. APPROVAL	DESCRIPTION
A	10-12-09	#1314	SDB	MJW	SDB	MJW	



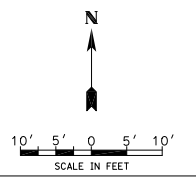
1 WELL PUMP PIPING DETAIL
NOT TO SCALE



2 WELL PUMP CONTROLLER/DISCONNECT DETAIL
NOT TO SCALE

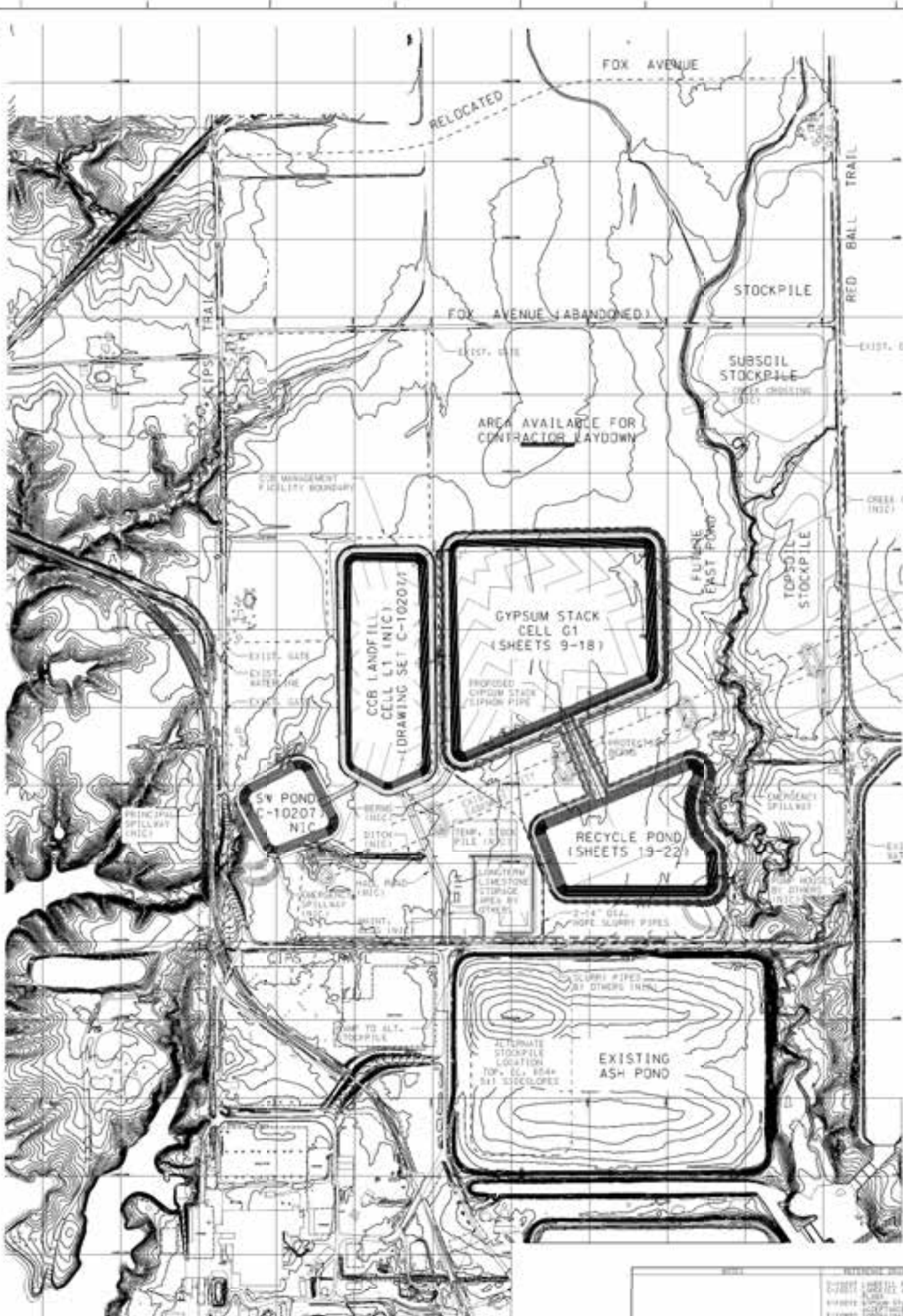


3 FORCE MAIN OUTLET DETAIL
NOT TO SCALE



NOTES		REFERENCE DRAWINGS		DRAWING RECORD				SCALE		SITE DETAILS	
REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING	ENGR APPROVAL	DESCRIPTION	SCALE	SITE DETAILS		DRAWING NO.	REV.
A	10-12-09	#1314	SDB	MJW	SDB	MJW	AS BUILT	DEWATERING SYSTEM ASH POND #2 AMEREN COFFEEN POWER STATION		A1000	0
								SITE: ASH POND #2		DRAWING NO. 4 OF 5	
								CLASS: Resources		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
 - CONTROL POINT - HORIZ. & VERT.
 - GEOLOGICAL CROSS SECTION LINE
 - LANDFILL CONTOURS
 - BORING
 - PREVIOUSLY INSTALLED GROUNDWATER MONITORING WELL
 - GROUNDWATER MONITORING WELL
 - WELLS - NOT PART OF MONITORING PLAN

NOTES:

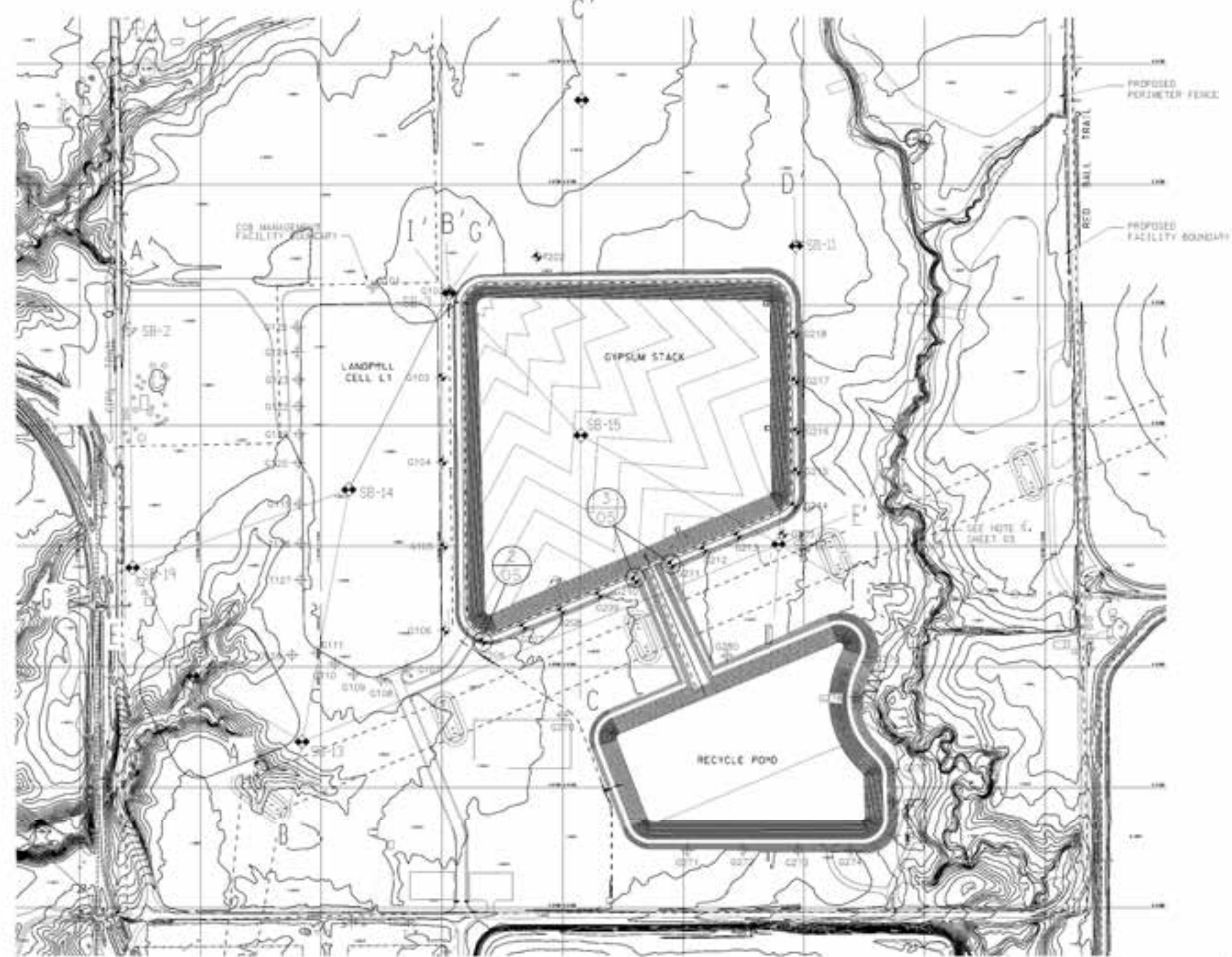
1. SEE NOTES ON SHEET 2 REGARDING THE RESPONSIBILITY FOR EXISTING UTILITIES.
2. (NIC) INDICATES SITE FEATURES WHICH ARE NOT PART OF THIS CONTRACT. THEY ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. HORIZONTAL AND VERTICAL CONTROL ARE BASED ON NAD 83, ILLINOIS STATE PLANE COORDINATE SYSTEM WEST ZONE, NAVD 83, 50 SURVEY FEET, AND THE FOLLOWING PROJECT CONTROL POINTS WERE ESTABLISHED BY HADSON PROFESSIONAL SERVICES:

HORIZONTAL CONTROL

POINT	NORTHING	EASTING	ELEV.	DESCRIPTION
CP-1000	873398.37	251524.17	620.81	HW REBAR 1/4" X 6" DIA. CONCRETE MONUMENT
CP-1001	873395.17	2513180.94	621.96	HW REBAR 1/4" X 6" DIA. CONCRETE MONUMENT
CP-1002	877937.74	2514555.24	623.10	HW REBAR 1/4" X 6" DIA. CONCRETE MONUMENT
CP-1003	877949.43	2514495.49	622.10	HW REBAR 1/4" X 6" DIA. CONCRETE MONUMENT



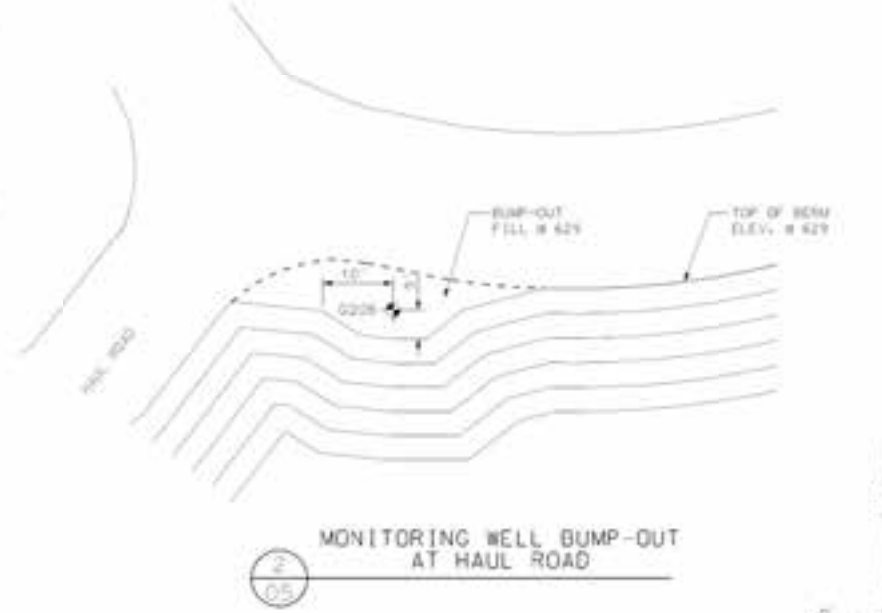
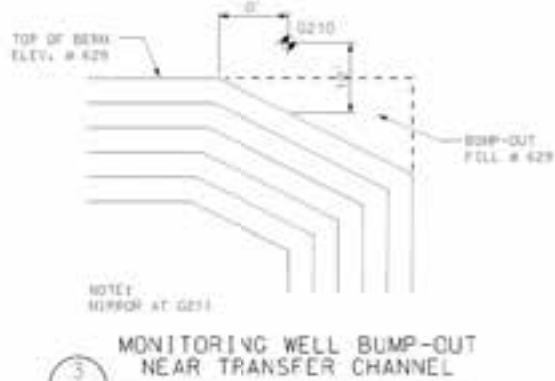
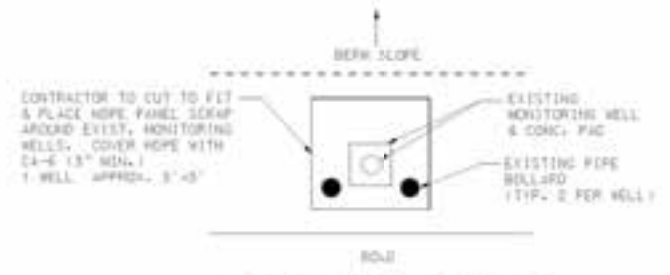
REVISIONS	<table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO.	DATE	DESCRIPTION										PROJECT	<p>PROPOSED SITE PLAN</p> <p>CCR MANAGEMENT FACILITY</p> <p>LINE 1000</p>
NO.	DATE	DESCRIPTION													
<p>DATE: 08/11/2011</p> <p>TIME: 10:00 AM</p> <p>BY: [Signature]</p> <p>CHECKED: [Signature]</p> <p>SCALE: 1" = 300'</p>		<p>PROJECT NO.: C-10206</p> <p>SHEET NO.: 04</p> <p>DATE: 08/11/2011</p> <p>SCALE: 1" = 300'</p>													



STANDARD LEGEND
(ALL SYMBOLS MAY NOT BE USED ON EACH PLAN)

- ORIGINAL CONTOURS
- FENCELINE
- TRANSMISSION TOWER
- OVERHEAD ELECTRIC
- WATER MAIN
- TELEPHONE LINE
- LIMITS OF VEGETATION
- GRAVEL ROAD
- RAILROAD
- CP-1000 CONTROL POINT - HORIZ. & VERT.
- A GEOLOGICAL CROSS SECTION LINE
- LINEFILL CONTOURS
- SB-05 BORING
- GVM GYPSUM STACK MONITORING WELL
- GM OTHER MONITORING WELL

- NOTES:**
1. CONTOURS SHOWN IN GYPSUM STACK ARE TOP OF CLAY LINER. (NOTE) THE LOWER PORTION OF THE PROCESS WATER RECOVERY SYSTEM LINER WAS ELIMINATED AS PART OF THE CLOSURE REVISIONS.
 2. THE PROPERTY IS LOCATED IN SECTIONS 10 & 11, TOWNSHIP 1 NORTH, RANGE 3 WEST, 9TH P.M., MONTGOMERY COUNTY, ILLINOIS.
 3. THE DESIGN ELEMENTS INCLUDED IN THESE DRAWINGS WERE BASED UPON EXISTING AERIAL MAPPING AS OBTAINED FROM AEREN.
 4. ALL DISTURBED AREAS, INCLUDING THE CREST AND EXTERIOR FACE OF BOTH EMBANKMENTS WILL BE SEEDDED AND MULCHED WITH 100# CLASS 1# SEED MIXTURE.
 5. FILL MATERIAL FOR DIRT EMBANKMENT WILL BE PLACED IN MAXIMUM UNCOMPACTED LIFTS OF 8" THICKNESS 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 IN THIS DRAWING.



NO.	REVISIONS/CHANGES	DATE	BY	APP. AUTHORITY	DESCRIPTION

WELLS & BORING INFORMATION

OPERATOR MONITORING & BORING PLAN

COB MANAGEMENT FACILITY

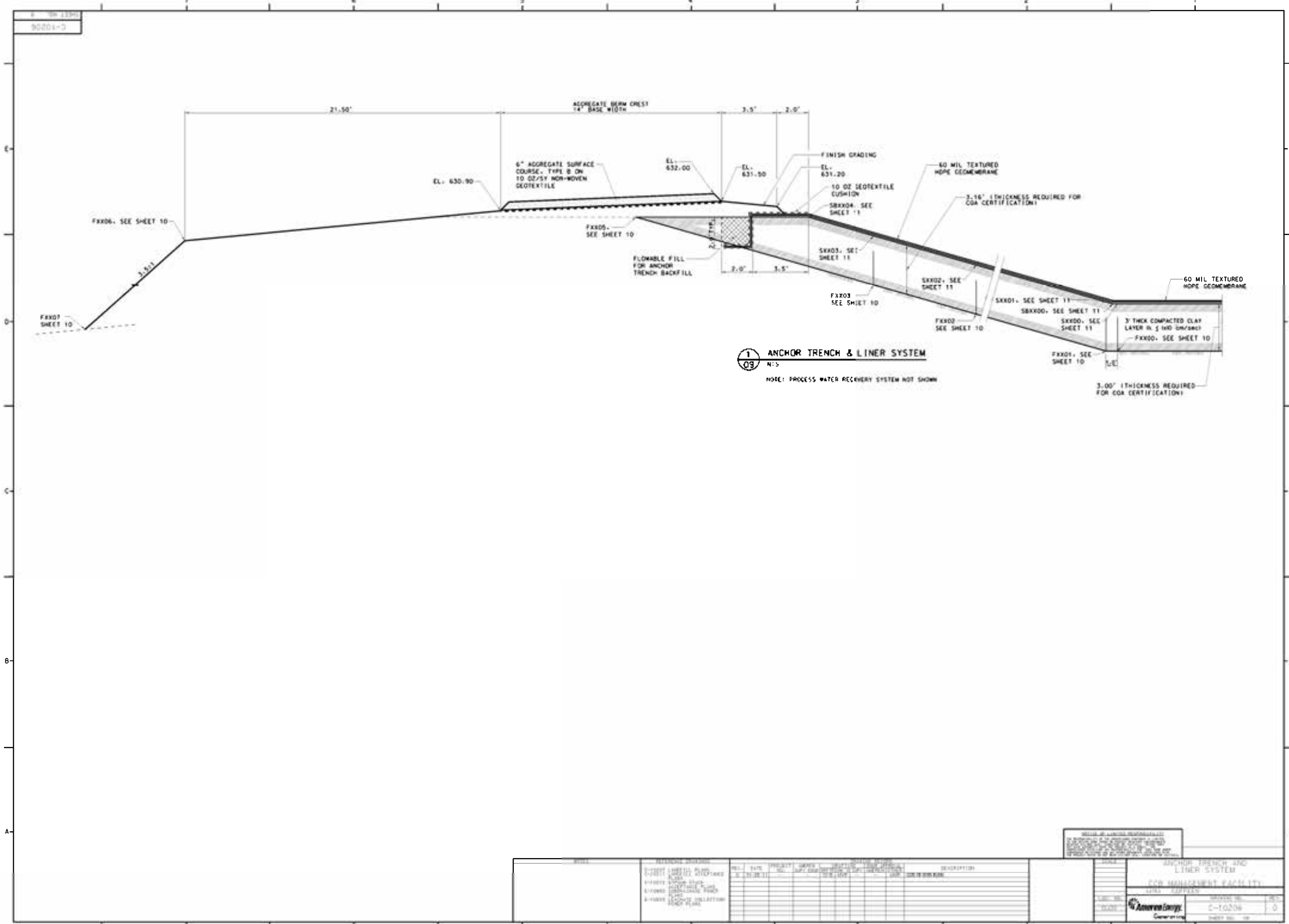
DATE: 03/19/08

SCALE: 1" = 200'

Amesbury CONSULTING

C-10204

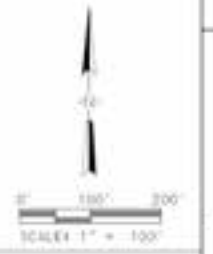
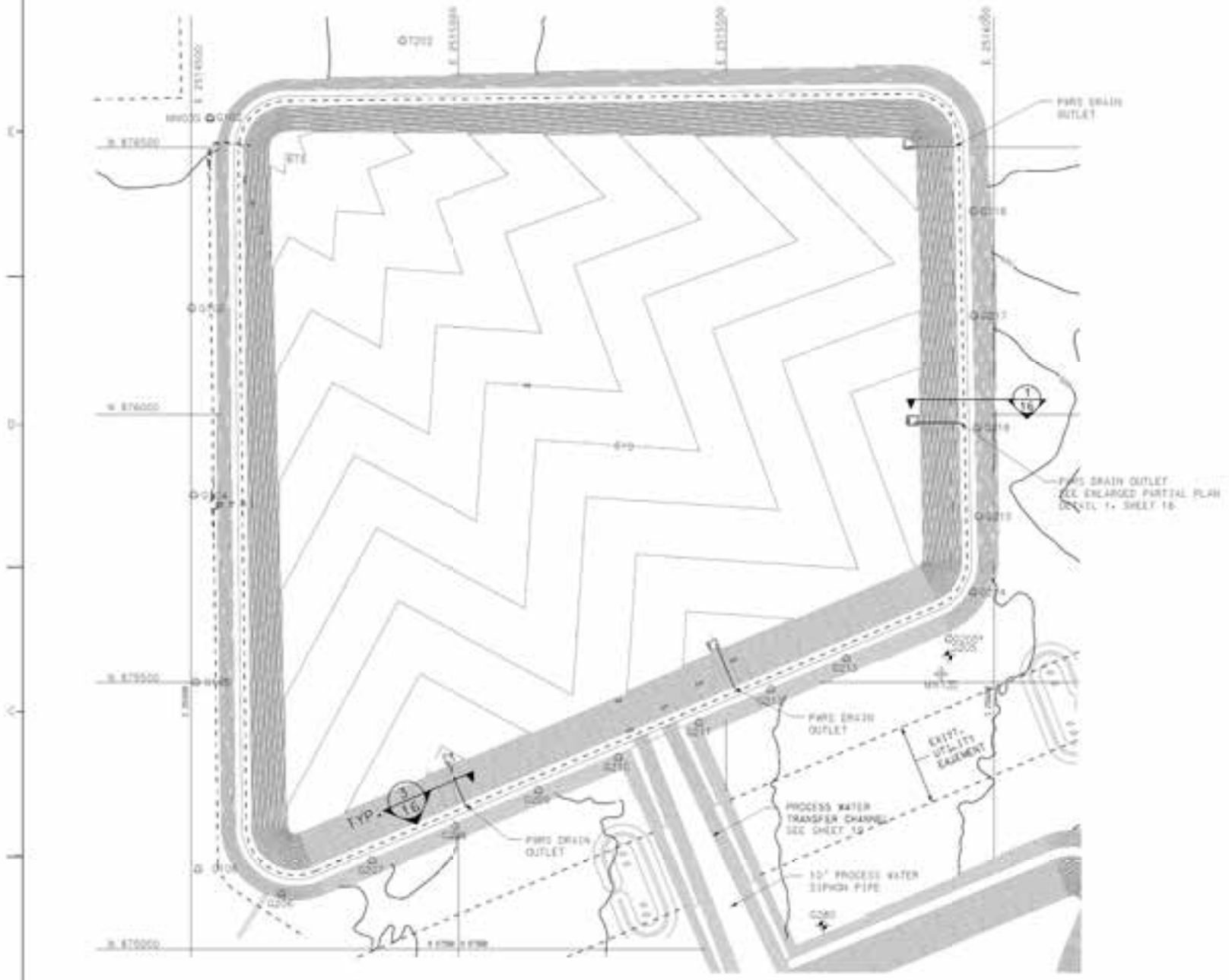
90201-3



1
09
ANCHOR TRENCH & LINER SYSTEM
 N:5

NOTE: PROCESS WATER RECOVERY SYSTEM NOT SHOWN

SHEET NO. 1 PROJECT NO. 90201-3 DATE 12/20/23 SCALE 1"=10'-0"		PROJECT NAME PROJECT LOCATION PROJECT DESCRIPTION		SHEET NO. 1 PROJECT NO. 90201-3 DATE 12/20/23 SCALE 1"=10'-0"	
ANCHOR TRENCH AND LINER SYSTEM FOR WASTEWATER TREATMENT FACILITY				SHEET NO. 1 PROJECT NO. 90201-3 DATE 12/20/23 SCALE 1"=10'-0"	
APPROVED BY: _____ DATE: _____				APPROVED BY: _____ DATE: _____	



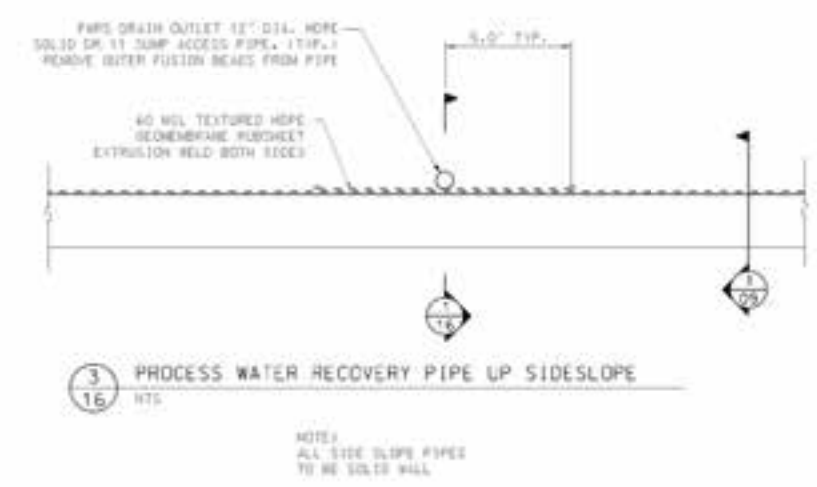
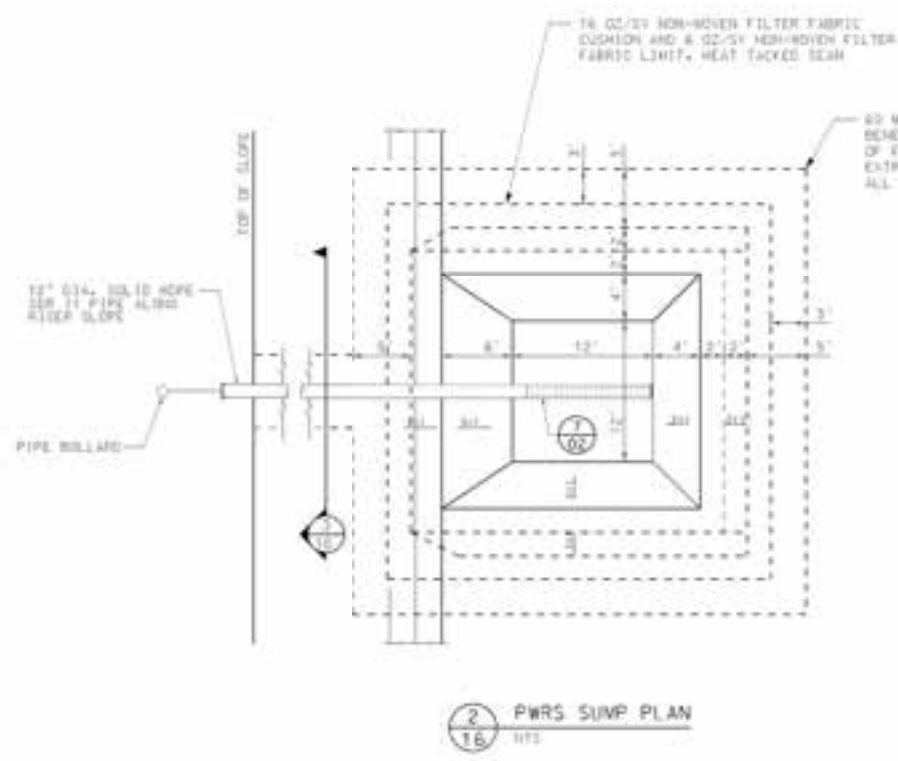
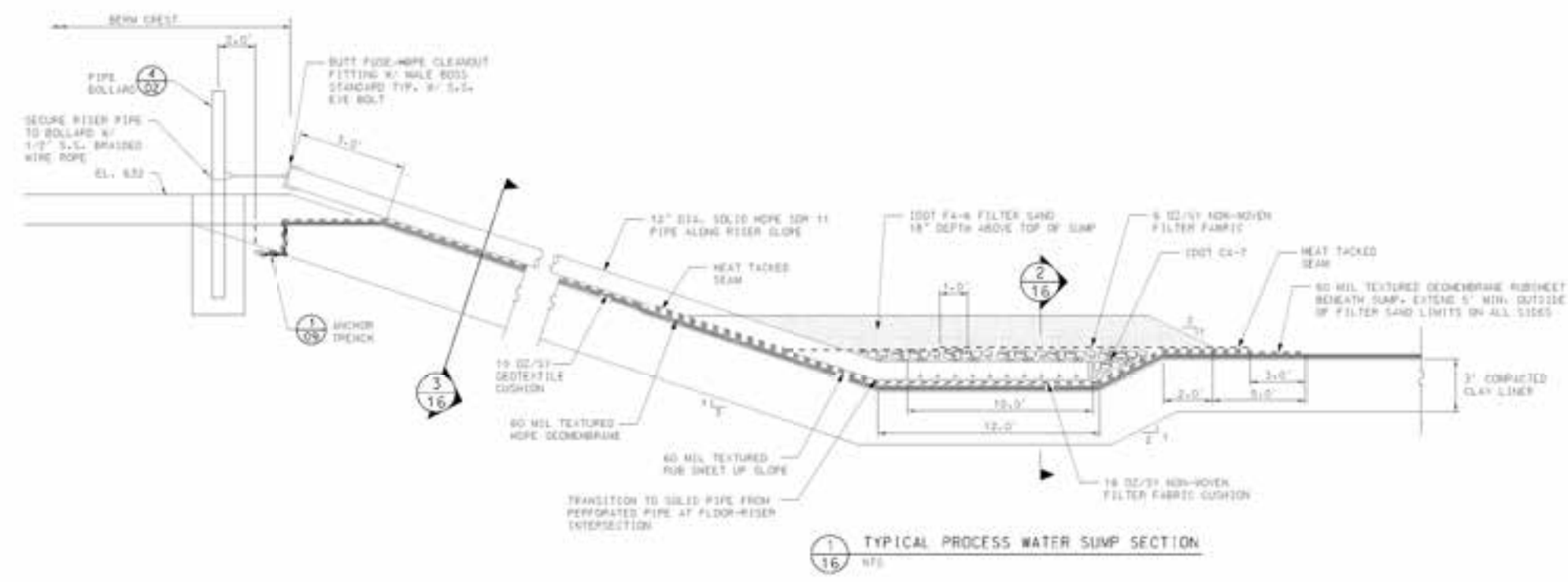
WELLA & ASSOCIATES, INC.
 ENGINEERS, ARCHITECTS & PLANNERS
 10000 W. 11th Avenue, Suite 1000
 Golden, CO 80401
 PHONE: (303) 440-1100
 FAX: (303) 440-1101
 WWW.WELLA.COM

NO.	REVISION DESCRIPTION	REV.	DATE	PROJECT	OWNER	DESIGNER	DATE	DESCRIPTION
1	ISSUED FOR PERMIT	1	03/2024	CELL U1 PROCESS WATER RECOVERY SYSTEM	URS CORP	WELLA & ASSOCIATES, INC.	03/2024	ISSUED FOR PERMIT
2	REVISIONS	2						
3		3						
4		4						
5		5						

CELL U1-PROCESS WATER RECOVERY SYSTEM
 CDR MANAGEMENT FACILITY
 URS CORP

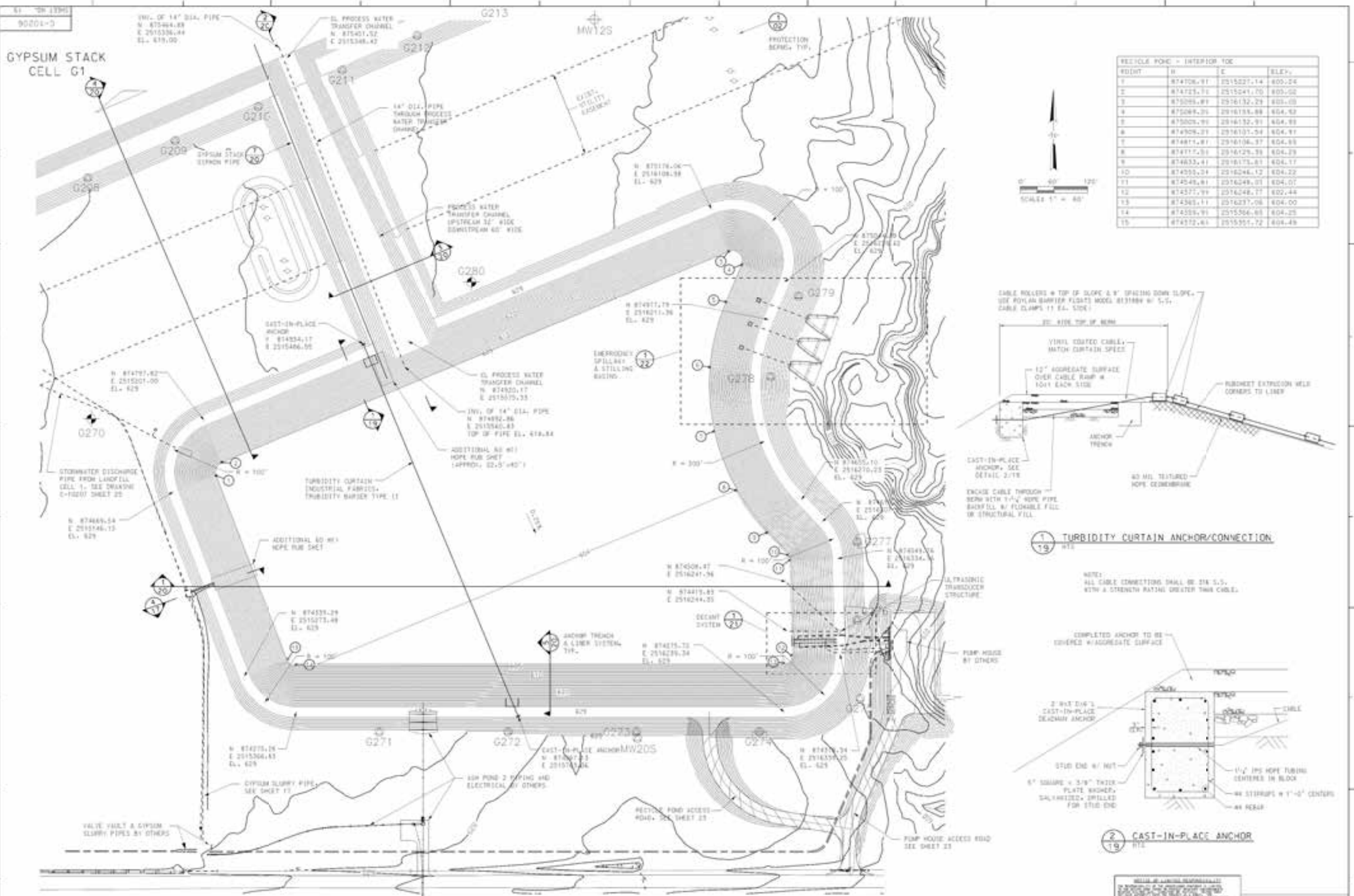
DATE: 03/2024
 SHEET NO.: 0

WELLA & ASSOCIATES, INC.
 Golden, CO



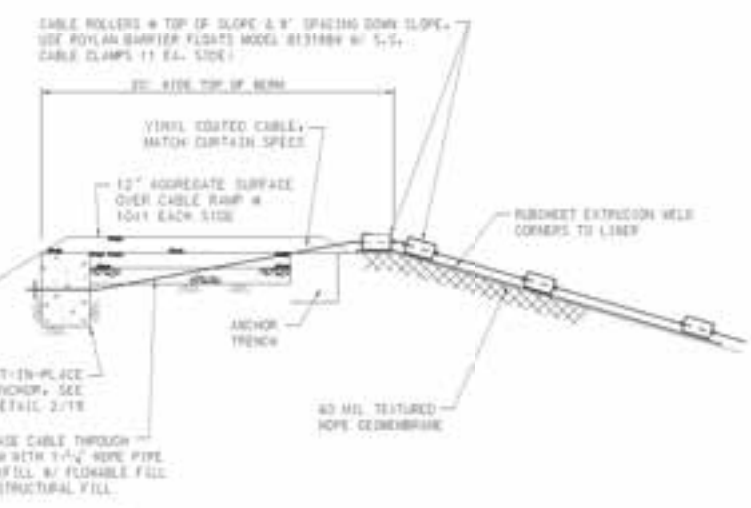
NO.	REVISION	DATE	BY	CHKD.	DESCRIPTION
1	ISSUED FOR PERMIT	08/13/20	...	...	...
2
3
4
5

CELL 01-PWS DRAIN DETAILS	
PCW MANAGEMENT FACILITY	
URS CORP.	
DATE: 08/13/20	PROJECT NO.: C-10206
SCALE: AS SHOWN	SHEET NO.: 16



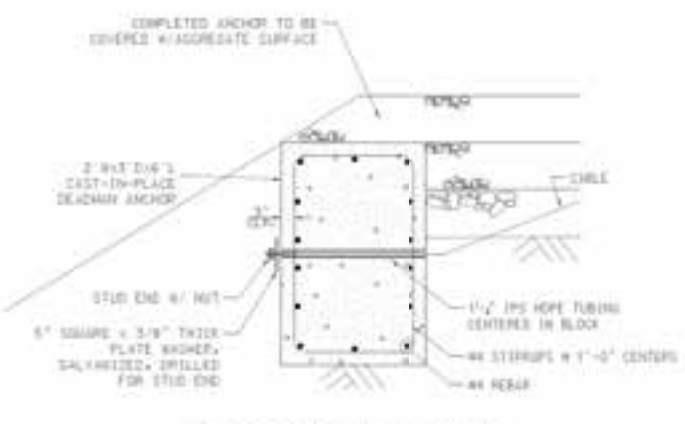
RECYCLE POND - INTERIOR TOE

POINT	N	E	ELEV.
1	874708.91	2515221.14	800.24
2	874725.71	2515241.70	800.00
3	875099.87	2516132.29	800.00
4	875099.25	2516135.88	804.93
5	875005.91	2516132.91	804.89
6	874928.21	2516101.54	804.91
7	874871.87	2516106.97	804.89
8	874717.31	2516125.91	804.29
9	874633.41	2516175.81	804.17
10	874558.34	2516246.12	804.22
11	874549.81	2516249.01	804.07
12	874577.99	2516248.77	802.44
13	874561.11	2516237.08	804.00
14	874559.91	2515566.81	804.25
15	874712.61	2515551.72	804.49



1 TURBIDITY CURTAIN ANCHOR/CONNECTION
1/16

NOTE:
ALL CABLE CONNECTIONS SHALL BE 218 S.S.
WITH A STRENGTH RATING GREATER THAN CABLE.



2 CAST-IN-PLACE ANCHOR
1/16

NO.	REVISION	DATE	BY	CHKD.	DESCRIPTION
1	ISSUED FOR PERMIT	08/20/2013
2
3
4
5
6
7
8
9
10
11
12
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14
15
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RECYCLE POND PLAN & CONTROL DATA

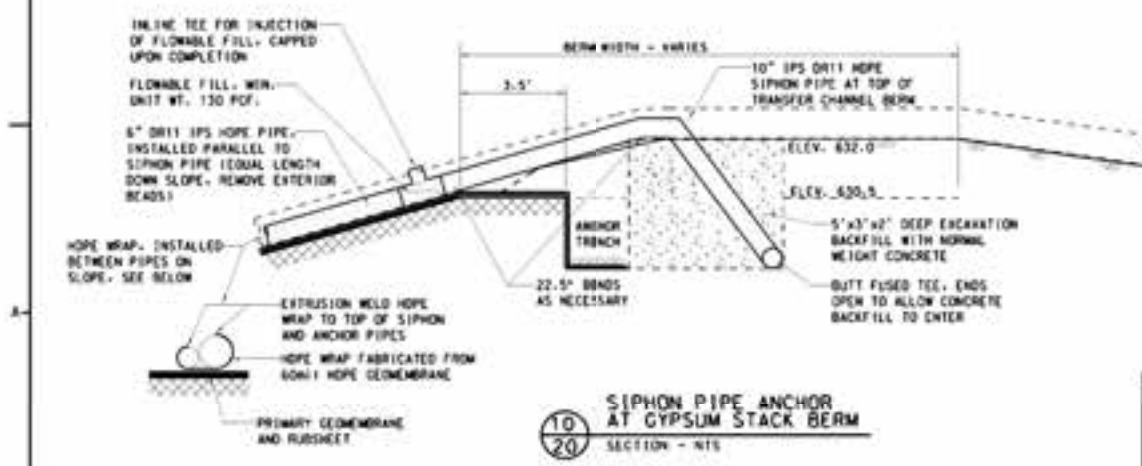
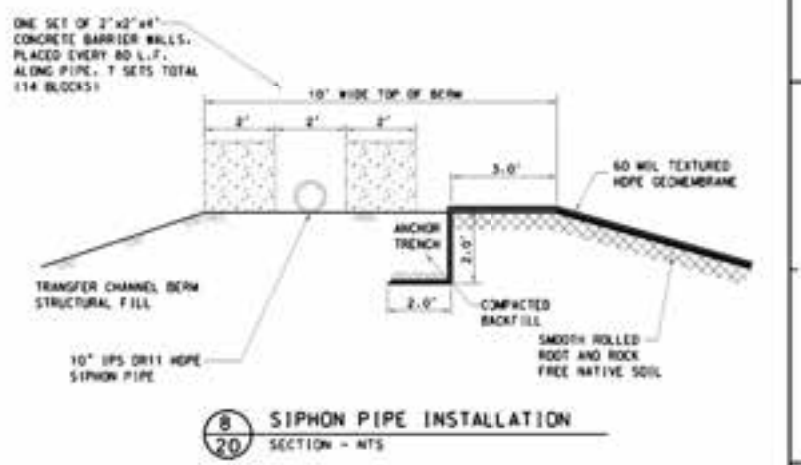
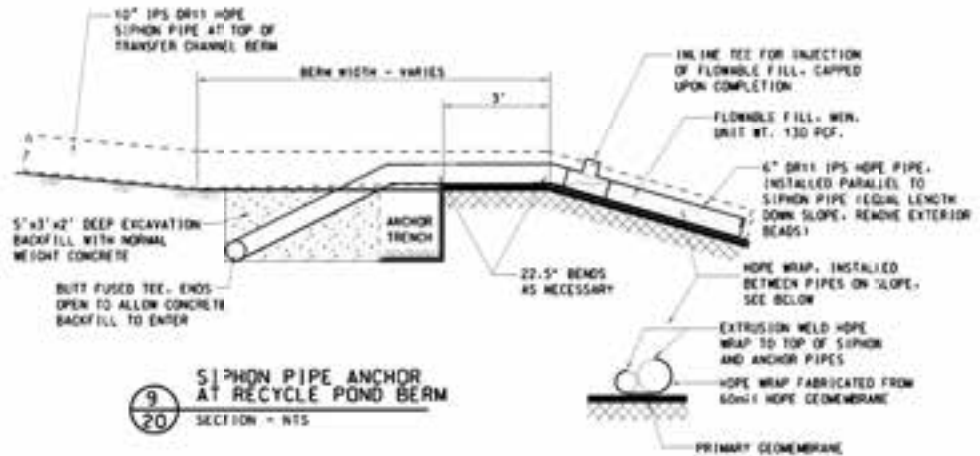
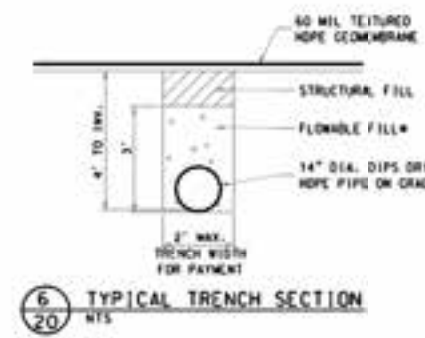
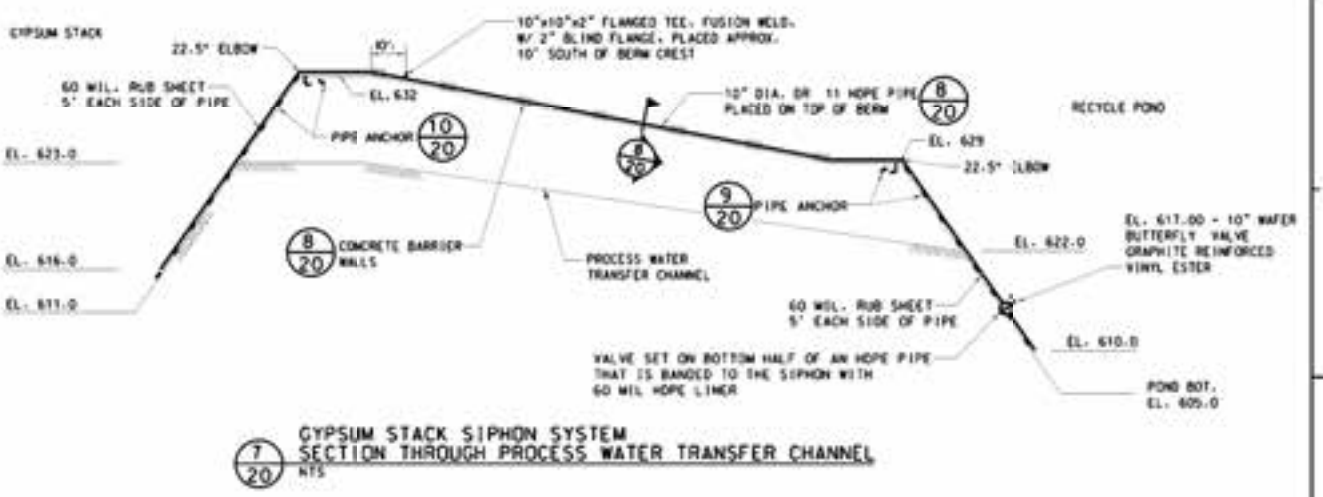
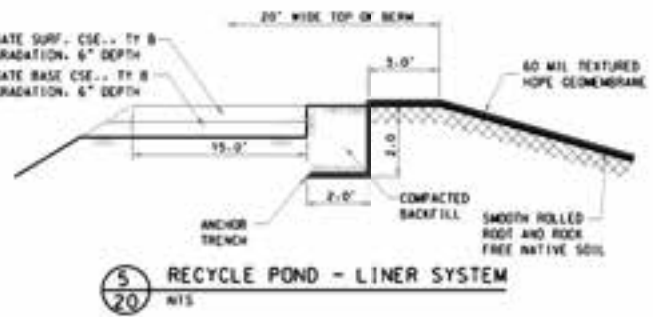
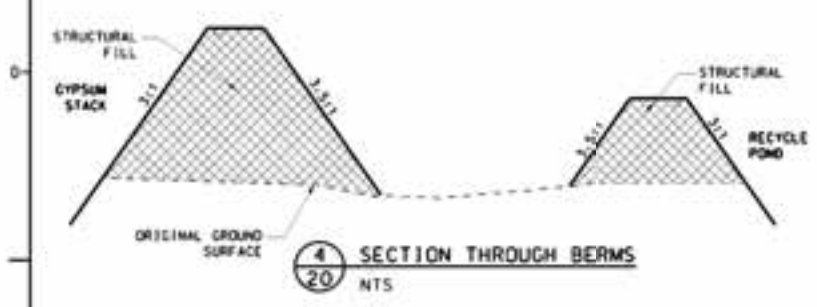
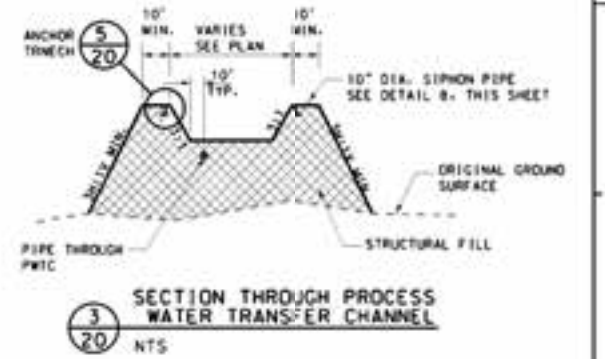
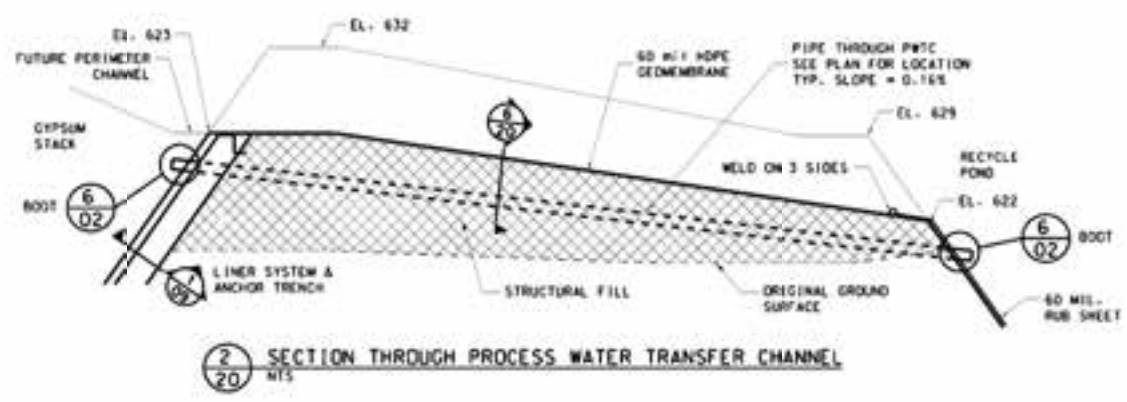
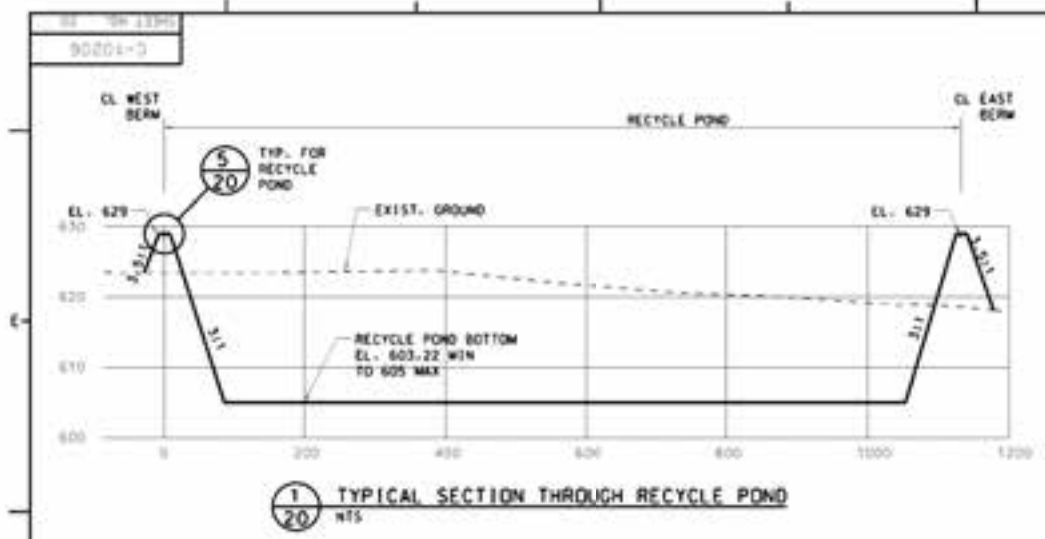
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DATE: 08/20/13

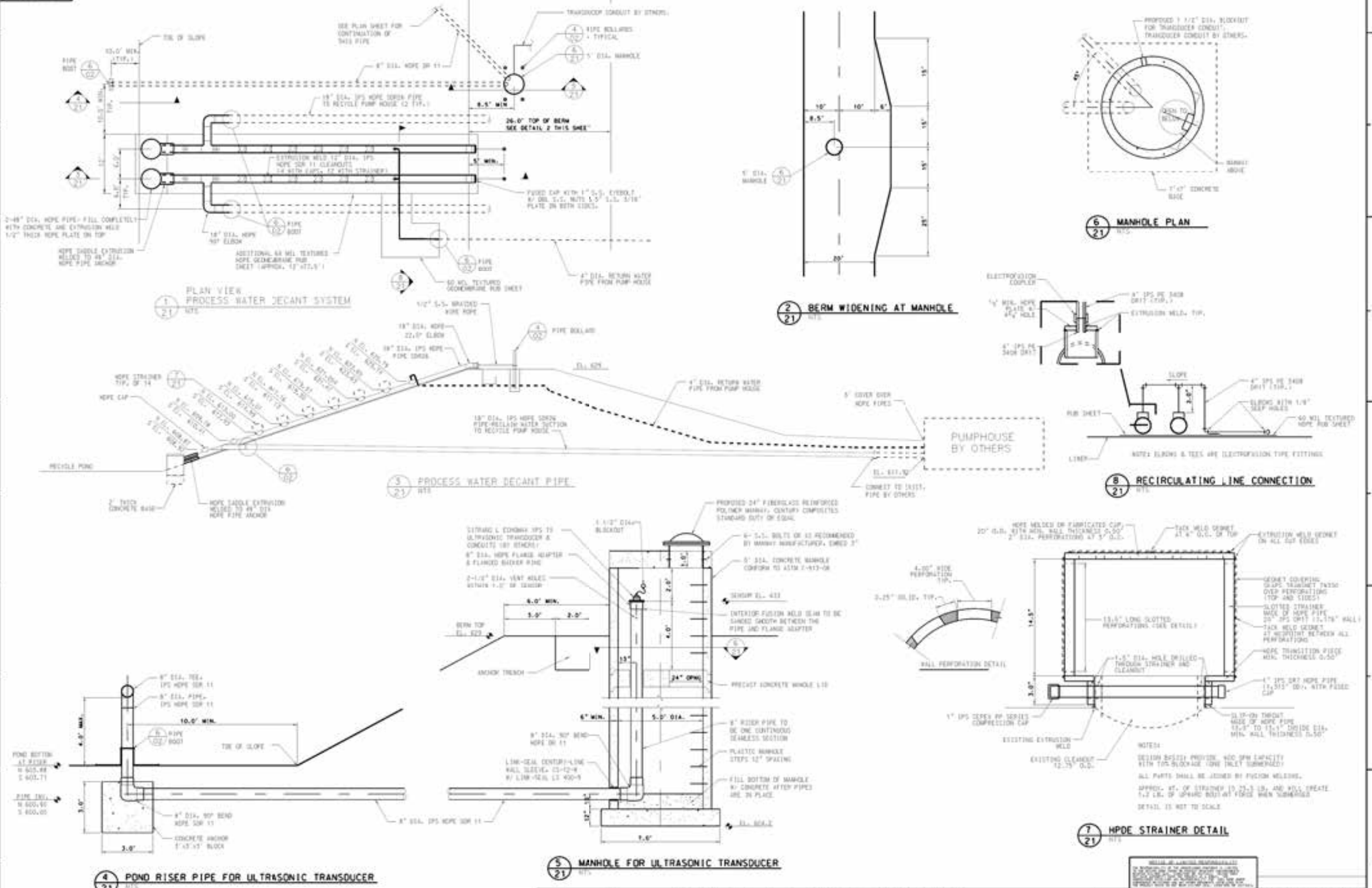
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PROJECT: C-10206

SHEET NO. 19



REVISIONS NO. DATE BY DESCRIPTION 1 08/11/2010 JLM/MSD/MSD/MSD/MSD/MSD 2 08/11/2010 JLM/MSD/MSD/MSD/MSD/MSD 3 08/11/2010 JLM/MSD/MSD/MSD/MSD/MSD 4 08/11/2010 JLM/MSD/MSD/MSD/MSD/MSD 5 08/11/2010 JLM/MSD/MSD/MSD/MSD/MSD 6 08/11/2010 JLM/MSD/MSD/MSD/MSD/MSD 7 08/11/2010 JLM/MSD/MSD/MSD/MSD/MSD 8 08/11/2010 JLM/MSD/MSD/MSD/MSD/MSD 9 08/11/2010 JLM/MSD/MSD/MSD/MSD/MSD 10 08/11/2010 JLM/MSD/MSD/MSD/MSD/MSD		PROJECT INFORMATION PROJECT: C-1020M SHEET: C-1020M-0 DATE: 08/11/2010 DRAWN BY: JLM/MSD/MSD/MSD/MSD/MSD CHECKED BY: JLM/MSD/MSD/MSD/MSD/MSD APPROVED BY: JLM/MSD/MSD/MSD/MSD/MSD		DESCRIPTION RECYCLE POND - PROCESS WATER TRANSFER CHANNEL DETAILS CFW MANAGEMENT FACILITY LMS COPPER 100% AMERICAN ENERGY SERVICES C-1020M SHEET NO. 00	
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4 POND RISER PIPE FOR ULTRASONIC TRANSDUCER
N.T.S.

5 MANHOLE FOR ULTRASONIC TRANSDUCER
N.T.S.

7 HDPE STRAINER DETAIL
N.T.S.

8 RECIRCULATING LINE CONNECTION
N.T.S.

2 BERM WIDENING AT MANHOLE
N.T.S.

6 MANHOLE PLAN
N.T.S.

1 PLAN VIEW PROCESS WATER DECANT SYSTEM
N.T.S.

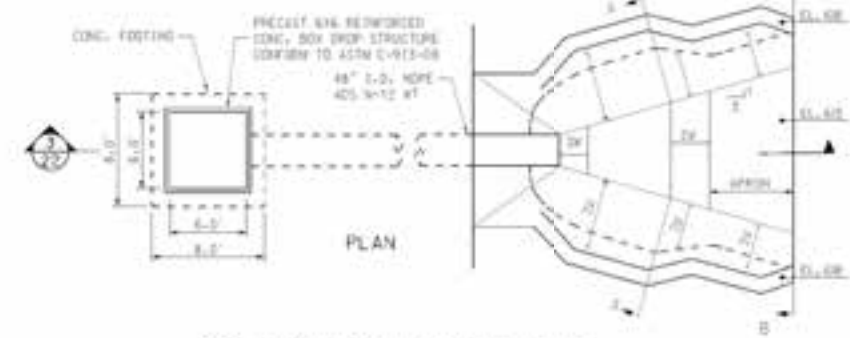
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RECYCLE POND - PROCESS WATER DECANT SECTION & DETAILS
PCW MANAGEMENT FACILITY
LMS 10/2008

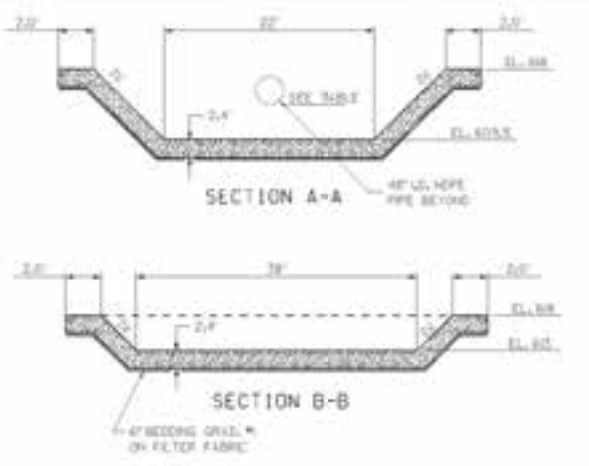
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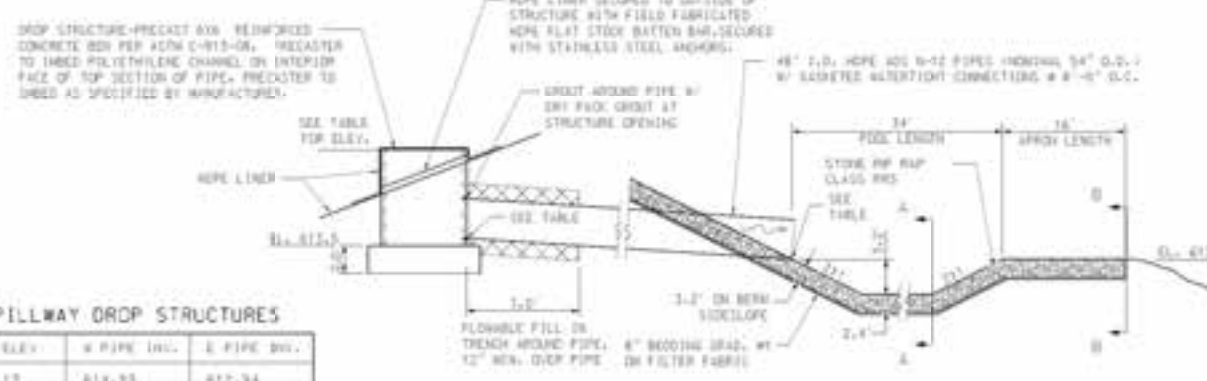
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NTS



2 RIPRAP STILLING BASIN PLAN
NTS

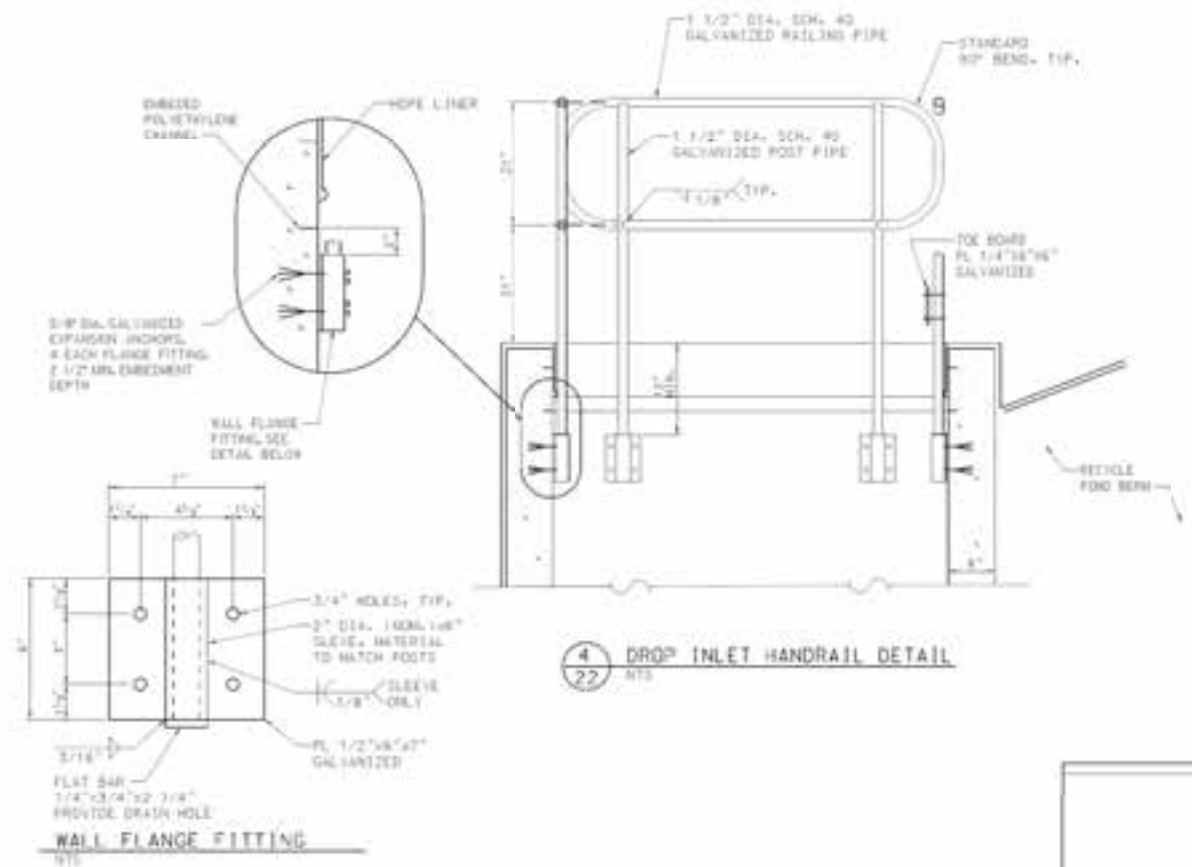


3 RIPRAP STILLING BASIN SECTION
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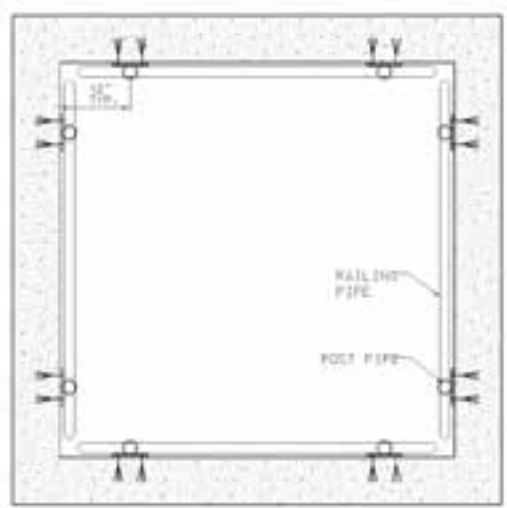


EMERGENCY SPILLWAY DROP STRUCTURES

STRUCTURE	TOP ELEV.	W PIPE (IN.)	E PIPE (IN.)
NORTH	824.13	814.95	812.34
MIDDLE	824.15	814.95	813.00
SOUTH	824.11	814.05	813.06



4 DROP INLET HANDRAIL DETAIL
NTS



5 DROP INLET HANDRAIL PLAN
NTS

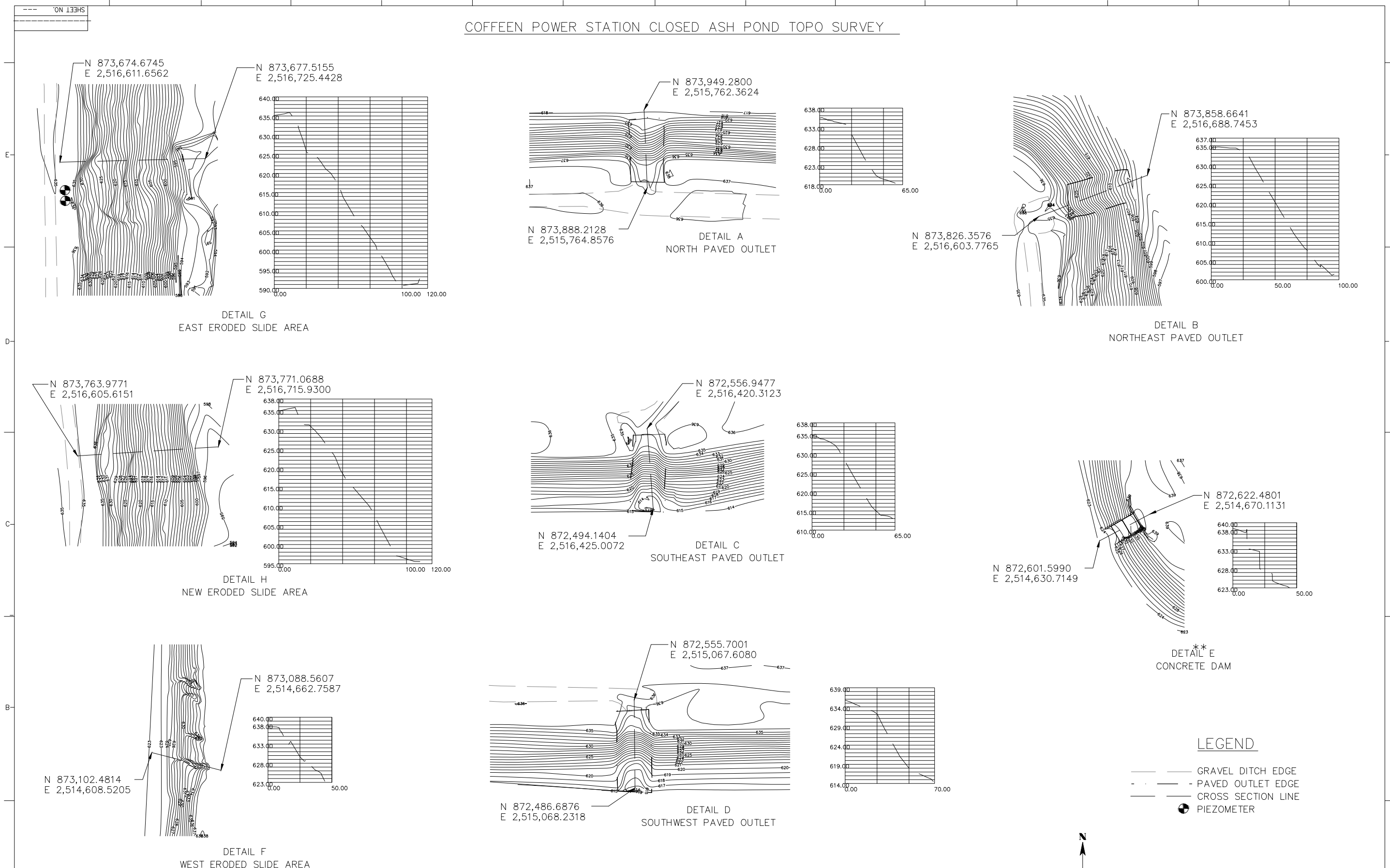
HANDRAIL NOTES

- HT-1 WELD 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.
- HT-2 BUTT WELD END-TO-END JOINTS, OR USE WELDING CONNECTIONS.
- HT-3 CLEAN WELDED AREAS USING A RIFE BRUSH TO REMOVE SLAG AND LOOSE PARTICULATE, RIFE BRUSH DUST WITH A CLEAN DRY RAG AND CLEAN THE WELDED SURFACE IN ACCORDANCE WITH SSPC-SP 11.
- HT-4 TREAT ALL WELD ZONES WITH TWO COATS OF COLD GALVANIZING COMPOUND.
- HT-5 COAT THE WELDED HANDRAIL ASSEMBLY PER THE FOLLOWING:
 - 1 - 4 MIL COAT OF KYLON INDUSTRIAL GALVANIZED METAL PRIMER
 - 2 - 3 MIL COATS OF KYLON INDUSTRIAL RUST TONER DTM ALKYLID ENAMEL - COLOR: OSHA SAFETY YELLOW

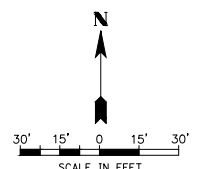
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1	ISSUED FOR PERMIT					
2	REVISED FOR CONSTRUCTION					
3	REVISED FOR CONSTRUCTION					
4	REVISED FOR CONSTRUCTION					
5	REVISED FOR CONSTRUCTION					

TITLE: RECYCLE POND - EMERGENCY SPILLWAY SECTIONS & DETAILS PROJECT: CCM MANAGEMENT FACILITY CLIENT: ONS CORP.		DRAWN BY: [Blank] CHECKED BY: [Blank] DATE: [Blank] SCALE: [Blank]
PROJECT NO.: [Blank] DRAWING NO.: C-10204 SHEET NO.: 03		APPROVED BY: [Signature] DATE: [Blank]

COFFEEN POWER STATION CLOSED ASH POND TOPO SURVEY



- LEGEND**
- GRAVEL DITCH EDGE
 - - - PAVED OUTLET EDGE
 - CROSS SECTION LINE
 - ⊙ PIEZOMETER

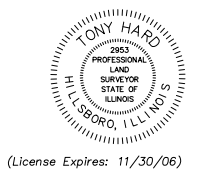


NOTICE OF LIMITED RESPONSIBILITY
THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE DESIGN AND CONSTRUCTION OF THE PROJECT AS SHOWN ON THIS DRAWING. THE ENGINEER HAS NOT PERFORMED A VISUAL INSPECTION OF THE PROJECT AND HAS NO KNOWLEDGE OF ANY CHANGES TO THE PROJECT SINCE THE DATE OF THE ORIGINAL DESIGN OF THE PROJECT.

AS BUILT

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



THIS IS TO CERTIFY TO AMEREN ENERGY 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.

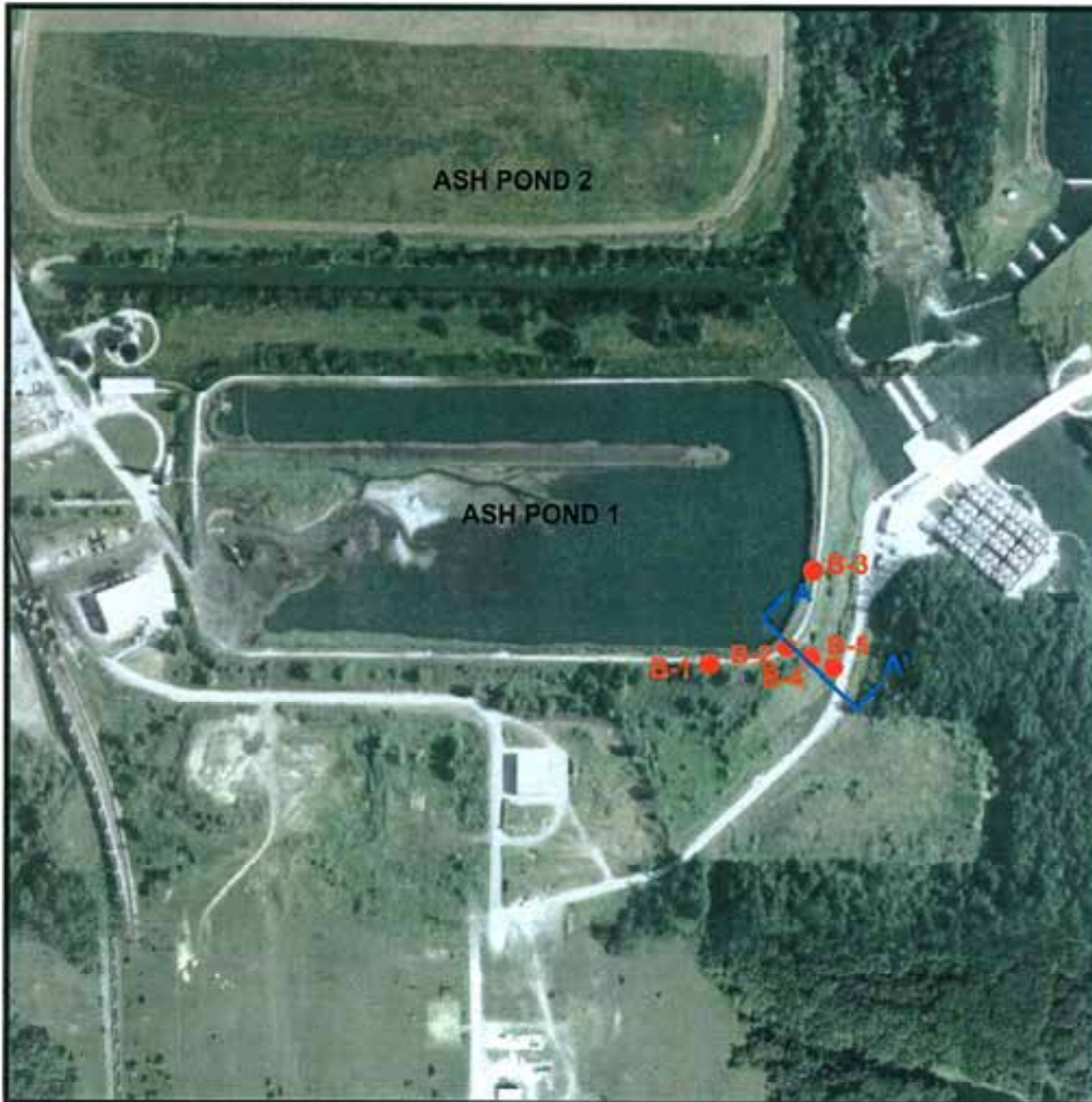
ILLINOIS PROFESSIONAL LAND SURVEYOR NO. 035-2953 DATE _____
FIELD WORK FOR THIS SURVEY WAS COMPLETED ON MAY 28, 2009

NOTES		REFERENCE DRAWINGS		DRAWING RECORD				DESCRIPTION
REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING	ENGR APPROVAL	AMEREN OTHER		

SCALE	1" = 30'
PROJECT	COFFEEN POWER STATION ASH POND #2 DRAINAGE MODIFICATIONS
SITE	AMEREN CLOSED ASH POND
LOC. NO.	
CLASS	
DRAWING NO.	W1008
REV.	
SHEET NO.	2 OF 2



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



Drawn By: SLC	CK'd By: <i>SLC</i>	App'vd By: <i>SLC</i>
Date: 11-04-10	Date: <i>12/21/10</i>	Date: <i>1/4/11</i>



Coffeen Power Station
Coffeen, Illinois

**AERIAL PHOTOGRAPH OF SITE
AND BORING LOCATIONS**

Project Number
J017150.01

PLATE 2

File: P:\PROJECTS\GEOTECH\60428794_DYNEGY\CCR\04\TASKS\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



COFFEEN ASH POND NO. 1

COF-P008
COF-P003

COF-P007
COF-P005

COF-P006

COF-P000

COF-P001

COF-P002

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

LEGEND

PIEZOMETER LOCATION

CCR UNIT BERM ALIGNMENT



APPROXIMATE SCALE FEET



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



SOURCE:
MAP PROVIDED BY GOOGLE EARTH PRO 2015

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SOURCE:
MAP PROVIDED BY GOOGLE EARTH PRO 2015

LEGEND

-  AECOM PIEZOMETER LOCATION
-  HISTORICAL PIEZOMETER LOCATION



CCR UNIT BERM ALIGNMENT



APPROXIMATE SCALE FEET



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



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:

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

January 2008

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

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<u>Division 2 – Site Work</u>	
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

DIVISION 1—GENERAL REQUIREMENTS
Section 01356 – Storm Water Pollution Prevention
Measures

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

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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 1×10^{-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 disc'd 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

DIVISION 2 – SITEWORK
Section 02315 – Granular Materials

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 meet the Description of Gravel, as described in Section 1004.01(a)(1) of the IDOT Standard Specifications, and shall be spherical to sub-discoidal, sub-rounded to well rounded particles as defined by AGI Data Sheet, 4th 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 Na₂SO₄ 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 1×10^{-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

DIVISION 2 - SITEWORK

Section 02376 – Geosynthetic Clay Liner

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 $1 \times 10^{-8} \text{ m}^3/\text{m}^2/\text{s}$ 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 x 10 ⁻⁸ m ³ /m ² /sec max
GCL Hydraulic Conductivity ⁴	ASTM D 5887	Weekly	5 x 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 to the manufacturer's production facilities.

² Bentonite mass/area 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 5x10⁻⁹ 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

02376-9

DIVISION 2 - SITE WORK
Section 02640 – HDPE Piping

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

02640-2

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 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.

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- 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 Seam Testing

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.

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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 CONTROL

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

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- 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 prefabricated 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

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- 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

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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.

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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 seam 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
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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

DIVISION 2 - SITE WORK

Section 02936 - Topsoil, Seeding, and Mulching

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:

<u>Seed Type</u>	<u>Pounds/Acre</u>
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 than 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

DIVISION 3 - CONCRETE

Section 03100 - Concrete Formwork

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. Weyerhaeuser 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

DIVISION 3 - CONCRETE
Section 03200 - Concrete Reinforcement

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.

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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

DIVISION 3 - CONCRETE
Section 03300 - Cast-In-Place Concrete

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.

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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% (\pm 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

DIVISION 3 - CONCRETE

Section 03400 - Concrete Embedment Liner

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.

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- 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 5 th roll
Density, g/cm ³	ASTM D 1505	0.94	0.94	0.94	0.94	1/100,000 ft ²
Tensile Properties	ASTM D 6693					
Strength@Yield, lb/in ² (MPa)	Type IV, Dumbbell	2,200 (14.5)	2,200 (14.5)	2,200 (14.5)	2,200 (14.5)	1/100,000 ft ²
Elongation @ Break, %	G.L.= 2.0in.	500	500	500	500	
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, %						1/100,000 ft ²
Black Liner	ASTM D 1603, mod.	2-3	2-3	2-3	2-3	
Gray Liner	ASTM D 5630, mod.	1.5 – 2.5	1.5 – 2.5	1.5 – 2.5	1.5 – 2.5	
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

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¹Note: Concrete must have a compressive strength of at least 5,000 lb/in² (34,500 kPa).

²Note: 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.

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Table 2: Raw Material Properties

Property	Test Method	Value	Testing Frequency
Density, g/cm ³	ASTM D 1505	0.932	1/ resin lot
Melt Flow, g/10 min	ASTM D 1238 (190/2.16)	≤ 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



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.
-

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- 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 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 from 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 Facility Operation (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:

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Original: February 2008
Amended: March 2015

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

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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, operation and maintenance 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			Transfer Channel		
Bottom Width	15.00	feet	Bottom Width	32.00	feet
Top Width	73.50	feet	Top Width	86.00	feet
Depth	9.00	feet	Depth	9.00	feet
Outer Side Slope	3:1	H:V	Upstream Invert	623.00	feet
Inner Side Slope	3:1	H:V	Downstream Invert	622.00	feet
Upstream Invert	624.85	feet	Weir Elevation	625.00	feet
Downstream Invert	623.00	feet	Weir Length (at 2 ft height)	44.00	feet
Ditch slope	0.00050	ft/ft			
Bank Full Cross-sectional Area	378.00	sf	Dam		
Length of Each Ditch (Centerline)	3710.00	feet	Top of Dam Elevation	632	feet
Bank Full Volume of Each Ditch	32.19	acre-ft	Reservoir Surface Area	77.29	acres
Total Ditch length (Centerline)	7420.00	feet	Total Watershed Area	77.29	acres
Total Ditch Bank Full Volume	64.39	acre-ft	Dam Length	7720	feet
			Dam Height	13	feet
1.0 PMF Storm Event			0.5 PMF Storm Event		
Storm Duration	24	hours	Storm Duration	24	hours
Peak Outflow Discharge	1100.7	cfs	Peak Outflow Discharge	541.1	cfs
Total Discharge Volume	228.83	acre-ft	Total Discharge Volume	122.41	acre-ft
Peak WSEL in Perimeter Ditches	629.89	feet	Peak WSEL in Perimeter Ditches	628.23	feet
Freeboard over Max WSEL	2.11	feet	Freeboard over Max WSEL	3.77	feet
Wave Runup/Wind Setup	2.06	feet	Wave Runup/Wind Setup	2.06	feet
Adequate Freeboard?	YES		Adequate Freeboard?	YES	
100-yr Storm Event - Critical Duration			100-yr Storm Event - 24 Hour Duration		
Storm Duration	12	hours	Storm Duration	24	hours
Peak Outflow Discharge	92.6	cfs	Peak Outflow Discharge	62.9	cfs
Total Discharge Volume	50.91	acre-ft	Total Discharge Volume	57.01	acre-ft
Peak WSEL in Perimeter Ditches	626.07	feet	Peak WSEL in Perimeter Ditches	625.84	feet
Freeboard over Max WSEL	5.93	feet	Freeboard over Max WSEL	6.16	feet
Wave Runup/Wind Setup	2.06	feet	Wave Runup/Wind Setup	2.06	feet
Adequate Freeboard?	YES		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			3 Spillways- 6ft x 6ft inlet w/ 4ft dia outlet pipe		
Top of Dam Elevation	629	feet	Weir Length	22	feet
Invert of Reservoir Elevation	605	feet	Weir Elevation	624.00	feet
Reservoir Area at Invert	11.55	acres	Outlet Conduit Length	120	feet
Reservoir Area at Top of Dam	17.07	acres	Outlet Conduit Diameter (Inside)	48	inch
Total Reservoir Volume	341.91	acre-ft	Upstream Invert	615	feet
Volume at Elevation 624 ft	259.60	acre-ft	Downstream Invert	614	feet
Total Watershed Area	94.36	acres	Outlet Conduit Slope	0.00833	
Dam Length	3600	feet			
Dam Height	16	feet			
1.0 PMF Storm Event - Normal Pool at Elev. 624 ft			1.0 PMF Storm Event - Normal Pool at Elev. 609 ft		
Storm Duration	24	hours	Critical Storm Duration	24	hours
Peak Inflow	1261.6	cfs	Peak Inflow	1261.6	cfs
Peak Outflow	586.9	cfs	Peak Outflow	289.7	cfs
Peak Storage	315.47	acre-ft	Peak Storage	280.65	acre-ft
Peak WSEL (HEC-HMS)	627.45	feet	Peak WSEL (HEC-HMS)	625.34	feet
Freeboard over Peak WSEL	1.55	feet	Freeboard over Peak WSEL	3.66	feet
Wave Runup/Wind Setup	1.20	feet	Wave Runup/Wind Setup	1.20	feet
Adequate Freeboard?	YES		Water Released from Dam?	YES	
0.5 PMF Storm Event - Normal Pool at Elev. 624 ft			0.5 PMF Storm Event - Normal Pool at Elev. 613 ft		
Storm Duration	24	hours	Critical Storm Duration	24	hours
Peak Inflow	608.4	cfs	Peak Inflow	608.4	cfs
Peak Outflow	413.6	cfs	Peak Outflow	0	cfs
Peak Storage	286.48	acre-ft	Peak Storage	255.83	acre-ft
Peak WSEL (HEC-HMS)	625.69	feet	Peak WSEL (HEC-HMS)	623.75	feet
Freeboard over Peak WSEL	3.31	feet	Freeboard over Peak WSEL	5.25	feet
Wave Runup/Wind Setup	1.20	feet	Wave Runup/Wind Setup	1.20	feet
Adequate Freeboard?	YES		Water Released from Dam?	NO	
100-yr Storm Event - Normal Pool at Elev. 624 ft			100-yr Storm Event - Normal Pool at Elev. 619 ft		
Critical Storm Duration	12	hours	Critical Storm Duration	24	hours
Peak Inflow	113.2	cfs	Peak Inflow	76.6	cfs
Peak Outflow	95.8	cfs	Peak Outflow	0	cfs
Peak Storage	269.36	acre-ft	Peak Storage	258.48	acre-ft
Peak WSEL (HEC-HMS)	624.63	feet	Peak WSEL (HEC-HMS)	623.94	feet
Freeboard over Peak WSEL	4.37	feet	Freeboard over Peak WSEL	5.06	feet
Wave Runup/Wind Setup	1.20	feet	Wave Runup/Wind Setup	1.20	feet
Adequate Freeboard?	YES		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/ft³. 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.

4.6.3 Review of Emergency Action Plan

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:

IDOT Class 1A Salt Tolerant Lawn Mixture

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

<u>ITEM</u>	<u>NO</u>	<u>YES</u>	<u>IF YES</u>
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)

City _____ Zip Code _____ County Montgomery

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

<u>EC</u>	:	<u>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.</u>
<u>NE</u>	:	<u>No evidence of a problem</u>
<u>GC</u>	:	<u>Good condition</u>
<u>MM</u>	:	<u>Item needing minor maintenance and/or repairs within the year, the safety or integrity of the item is not yet imperiled</u>
<u>IM</u>	:	<u>Item needing immediate maintenance to restore or ensure its safety or integrity. Remediation should be completed within 1 month.</u>
<u>EC</u>	:	<u>Emergency condition which if not immediately repaired or other appropriate measures taken could lead to failure of the dam</u>
<u>OB</u>	:	<u>Condition requires regular observation to ensure that the condition does not become worse</u>
<u>NA</u>	:	<u>Not applicable to this dam</u>
<u>NI</u>	:	<u>Not inspected - list the reason for non-inspection under deficiencies</u>
<u>EC</u>	:	<u>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.</u>

GYP SUM 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			

GYP SUM STACK - EARTH EMBANKMENT

(Continued)

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Vegetative Cover			

GYPSUM STACK - GYPSUM 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 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)

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)

Drop Inlet Structure

Overflow Spillway Structure

Gated

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Structural Cracks			

RECYCLE POND - PRINCIPAL SPILLWAY (Center)

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)

Drop Inlet Structure

Overflow Spillway Structure

Gated

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Structural Cracks			

RECYCLE POND - PRINCIPAL SPILLWAY (Right, Looking Downstream)

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

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			

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 – Gypsum Recycle Pond’s Chemical Constituents

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

<i>Labelling according to 29 CFR 1910.1200 Appendices A, B and C*</i>	
Hazard Pictogram(s):	
Signal word:	DANGER
Hazard Statement(s):	<p><i>May cause respiratory irritation.</i></p> <p><i>Causes damage to lungs after repeated/prolonged exposure via inhalation.</i></p> <p><i>May cause cancer of the lungs.</i></p>
Precautionary Statement(s):	<p><i>Obtain special instructions before use.</i></p> <p><i>Do not handle until all safety precautions have been read and understood.</i></p> <p><i>Do not breathe dust.</i></p> <p><i>Wash hands thoroughly after handling.</i></p> <p><i>Do not eat, drink or smoke when using this product.</i></p> <p><i>Wear protective gloves/protective clothing/eye protection/face protection.</i></p> <p><i>Do not eat drink or smoke when using this product.</i></p> <p><i>Use outdoors or in a well-ventilated area.</i></p> <p><i>If inhaled: Remove to fresh air and keep comfortable for breathing.</i></p> <p><i>Get medical advice/attention if you feel unwell.</i></p> <p><i>Store in a secure area.</i></p> <p><i>Dispose of product in accordance with local/national regulations.</i></p>

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.
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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.
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**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.
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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.
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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 (<i>Pimephales promelas</i>): Acute, 7-day LC50 > 1,970 mg/L Acute, 96-hour NOEC = 1,470 mg/L
	Rainbow trout (<i>Oncorhynchus mykiss</i>): Chronic, 30-day NOEC (survival, growth, reproduction) = 732 mg/L
	Bluegill (<i>Lepomis macrochirus</i>): Acute, 96-hour LC50 = 2,890 mg/L
Toxicity to Aquatic Invertebrates	Water Flea (<i>Ceriodaphnia dubia</i>): Acute, 96-hour NOEC = 1447.4 mg/L
	Water Flea (<i>Daphnia magna</i>): 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 (<i>Navicula seminulum</i> ; <i>Nitzschia linearis</i>): Chronic, 96-hour LC50 and EC50 (growth) = 3,200 mg/L

¹The 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

Preparation Date: 02/27/2018



- 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



Date: 25 October 2021

Subject: 35 Ill. Admin. Code Part 845 - Fault Area Location Demonstration for GMF Recycle Pond at Coffeen Power Plant

Illinois Power Generating Company operates the coal fired Coffeen Power Plant located in Montgomery County, Illinois. The Coffeen GMF Recycle Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the GMF Recycle 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 Recycle Pond
Coffeen, Illinois


Illinois Power Generating Company operates the coal-fired Coffeen Power Station (Plant) located near Coffeen, Illinois. The GMF Recycle 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.

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

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

Signed: 
Consulting Engineer

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

Professional Engineer's Seal:



Memorandum



Date: 25 October 2021

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

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

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

Section 845.300 Placement Above the Uppermost Aquifer

- a) Existing and new CCR surface impoundments, and all lateral expansions of CCR surface impoundments must, be constructed with a base that is located at least 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR surface impoundment and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table).
- b) The owner or operator of the CCR surface impoundment must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of subsection (a).

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

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



HALEY & ALDRICH, INC.
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MEMORANDUM

16 October 2018
File No. 129788

SUBJECT: Location Restriction Demonstration – Placement Above Uppermost Aquifer
GMF Recycle Pond
Coffeen Power Station
Coffeen, Illinois

Illinois Power Resources Generating, LLC operates the coal-fired Coffeen Power Station (Plant) located near Coffeen, Illinois. The GMF Recycle 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, 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).

Coffeen Power Station - GMF Recycle Pond
Location Restriction – Placement Above Uppermost Aquifer
16 October 2018
Page 2

§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:



Memorandum



Date: 25 October 2021

Subject: 35 Ill. Admin. Code Part 845 – Seismic Impact Zone Location Demonstration for GMF Recycle Pond at Coffeen Power Plant

Illinois Power Generating Company operates the coal fired Coffeen Power Plant located in Montgomery County, Illinois. The Coffeen GMF Recycle Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the GMF Recycle 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.



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MEMORANDUM

16 October 2018
File No. 129788

SUBJECT: Location Restriction Demonstration – Seismic Impact Zone
Coffeen Power Station
GMF Recycle Pond
Coffeen, Illinois

Illinois Power Generating Company operates the coal-fired Coffeen Power Station (Plant) located near Coffeen, Illinois. The GMF Recycle 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 Recycle 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 Hanson report entitled "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" dated October 2016 (Hanson 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 Hanson 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 Hanson in the subject report; those elements of the report are considered the professional opinions and determinations of Hanson.

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 – Unstable Areas and Floodplains Location Standard Demonstration for the GMF Recycle 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 Recycle Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the GMF Recycle 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.

I.A.C. Part 845 – Unstable Areas and Floodplains Certification for GMF Recycle Pond at Coffeen Power Plant

25 October 2021

Page 2

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

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 Recycle Pond is outside of the FEMA 100-year floodplain, therefore, it was determined that the Coffeen GMF Recycle Pond is not located within the floodplain.

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

I.A.C. Part 845 – Unstable Areas and Floodplains Certification for GMF Recycle Pond at Coffeen Power Plant

25 October 2021

Page 3

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





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 Recycle Pond
Coffeen, Illinois

Illinois Power Generating Company operates the coal-fired Coffeen Power Station (Plant) located near Coffeen, Illinois. The GMF Recycle 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 Hanson Professional Services, Inc. (Hanson) entitled "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" dated October 2016 concluded that the soils beneath the Unit are not susceptible to liquefaction.


Determination of compliance with §257.64(b)(2) - Based on available United States Geological Survey (USGS) and Illinois State Geological Survey (ISGS) information karst topography or physiographic features such as sinkholes, vertical shafts, sinking streams, caves, large springs, or blind valleys do not exist at the Plant. To evaluate the susceptibility of landslides, we reviewed readily available USGS and 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) - There are no documented surface or subsurface anthropogenic activities that would be indicative of creating unstable foundation conditions.

§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:



Memorandum



Date: 25 October 2021

Subject: 35 I.A.C. Admin. Code Part 845 - Wetland Location Demonstration for GMF Recycle 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 Recycle Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the GMF Recycle 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 Recycle Pond
Coffeen, Illinois

Illinois Power Generating Company operates the coal-fired Coffeen Power Station (Plant) located near Coffeen, Illinois. The GMF Recycle 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.

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

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

Signed: 
Consulting Engineer

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

Professional Engineer's Seal:



ATTACHMENT E

**COFFEEN GMF
RECYCLE POND**

ID #: W1350150004-04

**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

Phil Morris
Senior Director, Corporate Environmental

9/27/21

Date



**COFFEEN POWER PLANT
EMERGENCY ACTION PLAN
CCR IMPOUNDMENTS & RELATED FACILITIES**

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**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:

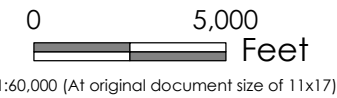
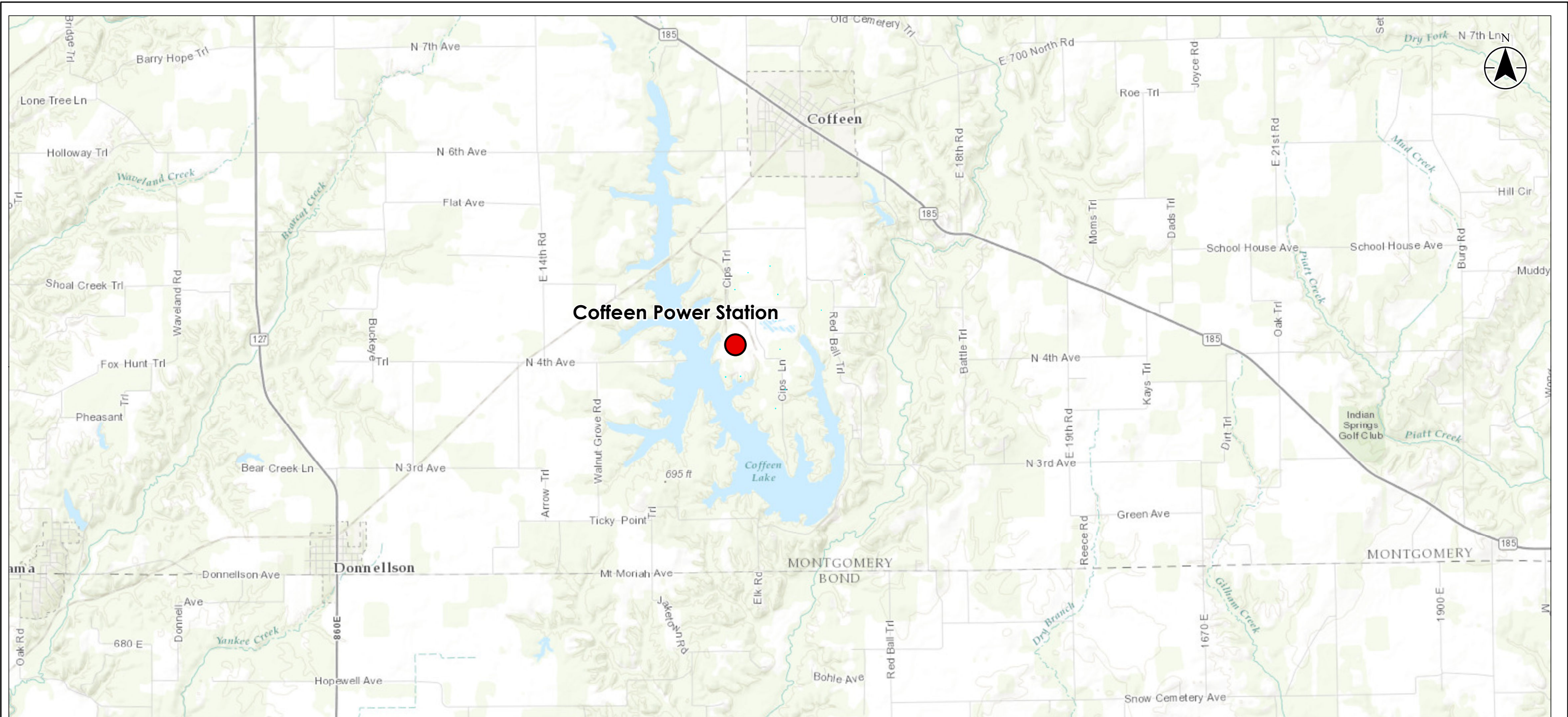
- Gypsum Management Facility (GMF) Pond (NID # IL50579) (IEPA # W1350150004-03)
- GMF Recycle Pond (NID # IL50578) (IEPA # W1350150004-04)
- Ash Pond No. 1 (NID # IL50722) (IEPA # W1350150004-01)
- Ash Pond No. 2 (Capped/Closed) (NID # IL50723) (IEPA # W1350150004-02)

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.



Project Location: 175605019
 Latitude: 39.059113
 Longitude: -89.403293
 Montgomery County, Illinois
 Prepared by RMGB on 3/29/2017
 Technical Review by NS on 3/29/2017
 Independent Review by MM on 3/29/2017

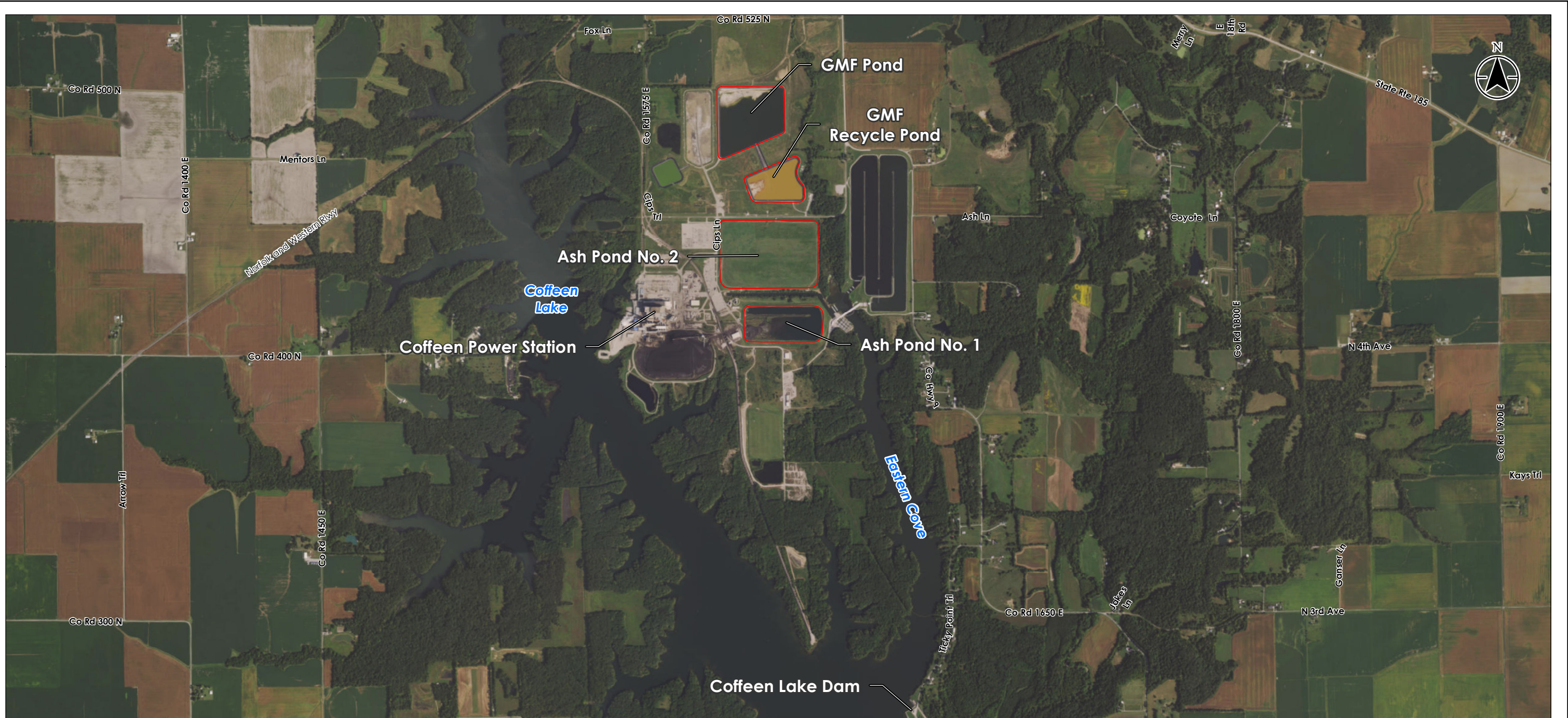
Client/Project
 Coffeen Power Station
 Emergency Action Plan

Figure No.
1-1

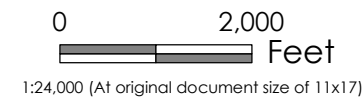
Title
Location Map

- 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)

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



Legend
 CCR Surface Impoundment Boundary



Project Location: 175605019
 Latitude: 39.059113
 Longitude: -89.403293
 Montgomery County, Illinois
 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.

1-2

Title

CCR Impoundments

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)

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

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

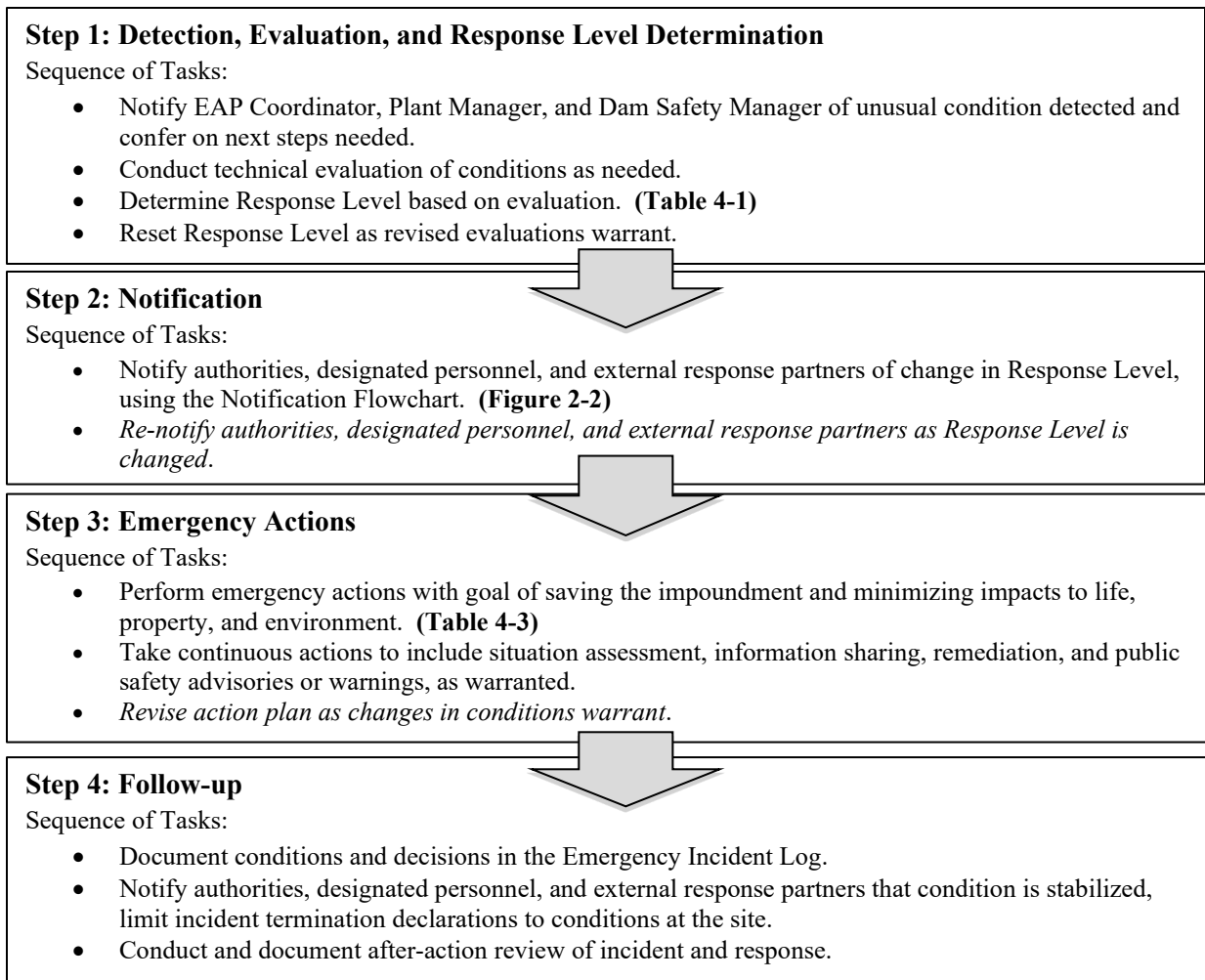


Figure 2-2. Notification Flowchart

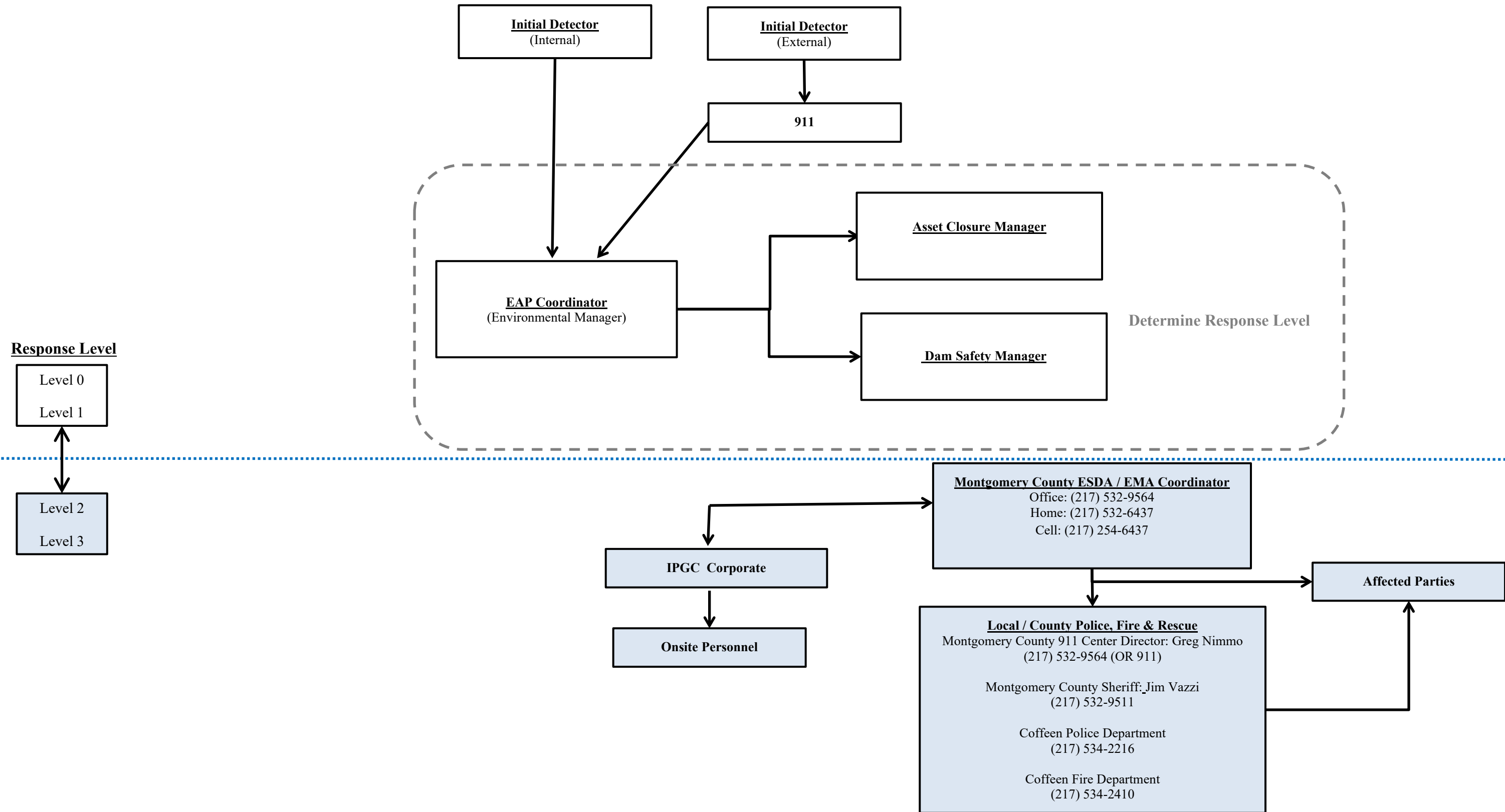


Figure 2-3. EAP Response Process Decision Tree

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.

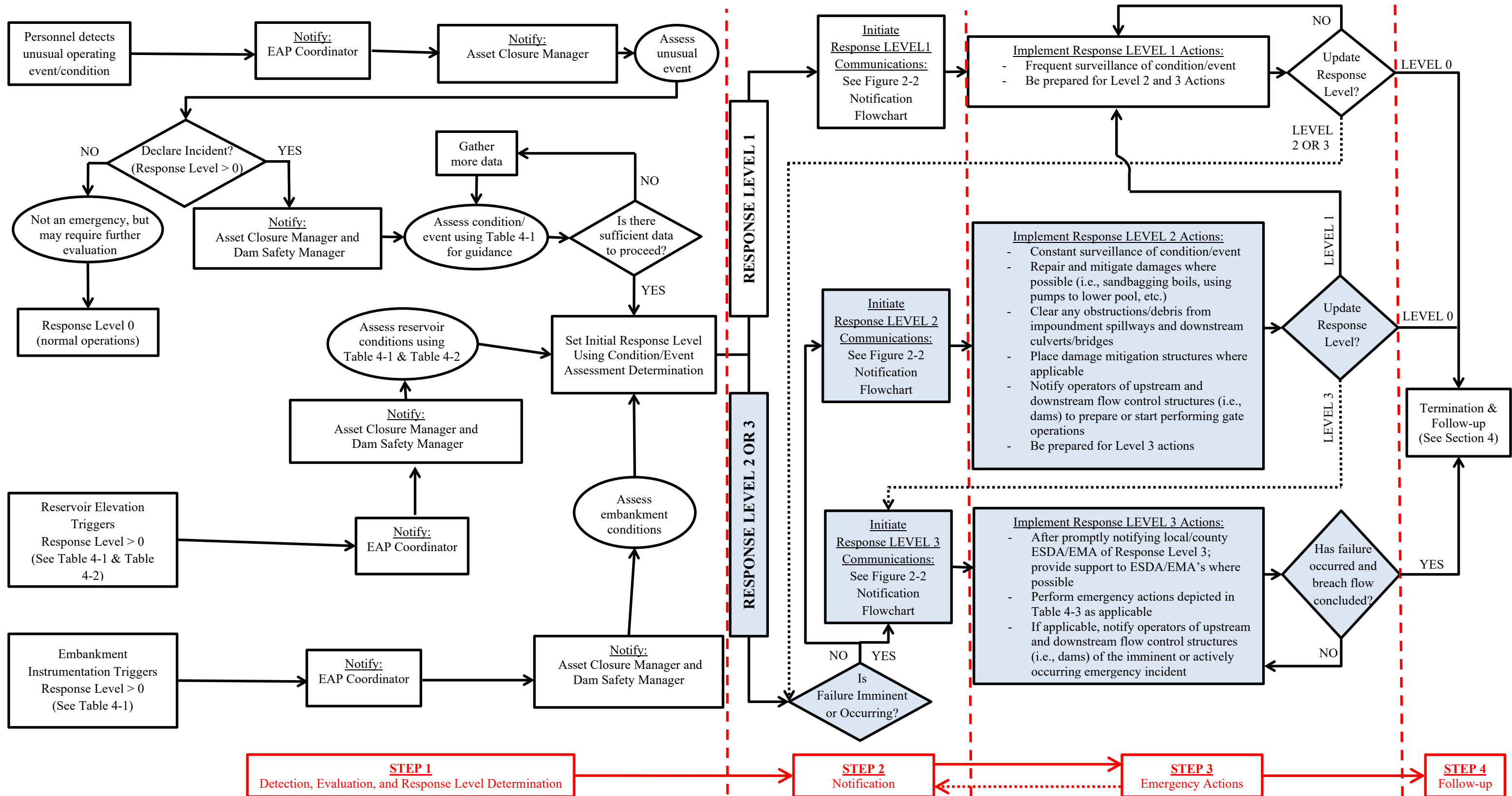


Table 2-1. EAP Emergency Responders

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)	<p>ERT: IPGC personnel responsible for EAP implementation, distribution, updates/maintenance, and training activities. The <u>ERT</u> is comprised of the following roles:</p> <ol style="list-style-type: none"> 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. <p style="text-align: center;"><u>Emergency Event – EAP Responsibilities</u></p> <ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Receive Response Level reports from <u>IPGC Corporate</u> through <u>EAP Coordinator</u>. 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 <u>IPGC Corporate</u> and/or <u>EAP Coordinator</u>, 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 <u>IPGC Corporate</u>. 7. If necessary, coordinate with <u>State ESDA/EMA</u>.
Local/County Police, Fire & Rescue	<ol style="list-style-type: none"> 1. Receive alert status reports from the <u>ERT</u> or the Montgomery County <u>ESDA/EMA</u>. 2. If necessary, notify affected parties and general public within inundation areas (see Section 7). 3. Render assistance to Montgomery County <u>ESDA/EMA</u>, as necessary. 4. Render assistance to <u>IPGC Corporate</u> and <u>Power Plant Management</u>, 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.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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	<p>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.</p>	<ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 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.
	<p>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.</p>	<ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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.)	<p>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.</p>	<ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 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	<p>Sluice gate damaged structurally (sabotage, debris, etc.) with uncontrolled release of water at a constant volume. Condition appears stable.</p>	<ol style="list-style-type: none"> 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	<u>Great Western Bag Co.</u> (314) 421-0498 (days) (314) 993-5287 (nights/weekends)	66	1416 N. Broadway St. Louis, MO
Gravel, Sand, & Riprap	<u>Fuller Brothers Ready Mix</u> (217) 532-2422	11	935 Ash Street Hillsboro, IL
Gravel, Sand, & Riprap	<u>Vandalia Sand and Gravel</u> (618) 283-4029	20	Route 140 Vandalia, IL
Gravel, Sand, & Riprap	<u>Central Illinois Materials</u> (618) 283-3259	20	RR 2 Vandalia, IL
Gravel, Sand, Riprap & High-Capacity Portable Pumps	<u>The Curry Companies</u> Brian Fenton: (217) 854-3101	40	21149 Route 4 Carlinville, IL
High-Capacity Portable Pumps	<u>Rain for Rent</u> Mark ByBee: (618) 931-0901	60	3711 Horseshoe Lake Road Granite City, IL
High-Capacity Portable Pumps	<u>Linden and Company</u> (800) 383-4811	145	800 W. Deerbrook Peoria, IL 61615
High-Capacity Portable Pumps	<u>Heartland Pumps</u> (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	<u>Grand Rental Station Fairview Heights, IL</u> (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)	<u>Grand Rental Station Litchfield, IL</u> (217) 324-4000 (866) 645-0218 (after hours)	20	1105 West Weir Street Litchfield, IL 62056
Concrete (Ready Mix Concrete Supplier)	<u>Vandalia Ready Mix</u> (618) 283-1600	20	1021 Janette Drive Vandalia, IL 62471
Concrete (Ready Mix Concrete Supplier)	<u>Greenville Ready Mix</u> (618) 664-1340	17	1311 S. 4 th Street Greenville, IL 62246
Large Earthmoving Equipment (25,000 to 50,000 lb. Track hoe Excavators & 3.0 to 3.4 CY Wheel Loaders)	<u>United Rentals</u> (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.

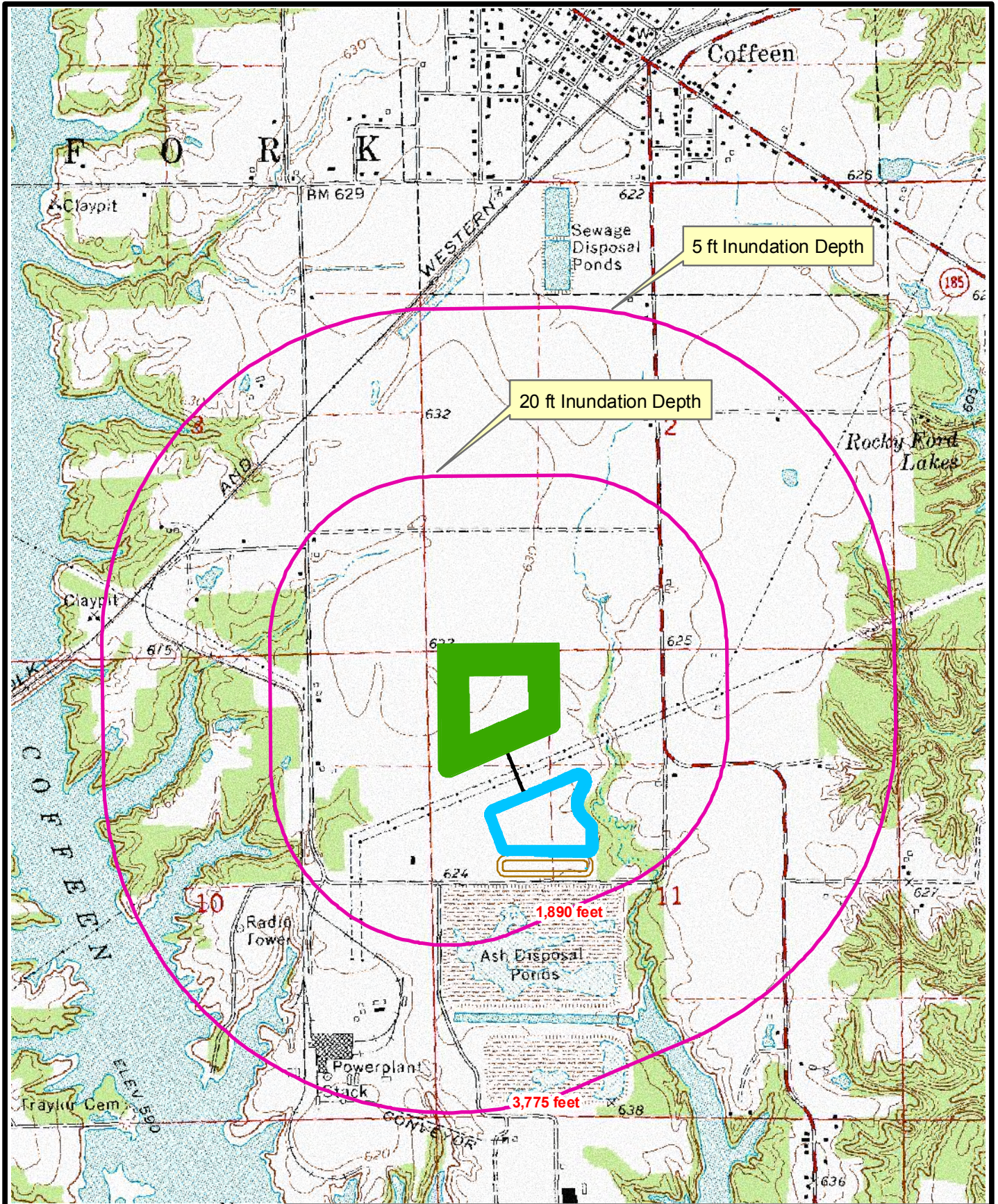
The methodology used to identify probable inundation extents for potential breach scenarios varied as a function of the impoundment size, location, surrounding topography, and surrounding structures/facilities/waterbodies.

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.

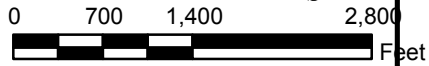
The GMF Recycle Pond breach analysis consisted of a Probable Maximum Precipitation (PMP) failure scenario at the eastern embankment. The resultant breach discharges were modeled downstream using 1D and 2D capabilities of HEC-RAS. The approximate inundation area is illustrated in the inundation map shown 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.



I:\05jobs\05s3004A\GIS\Projects\IDNR-OWR_Schematic.mxd

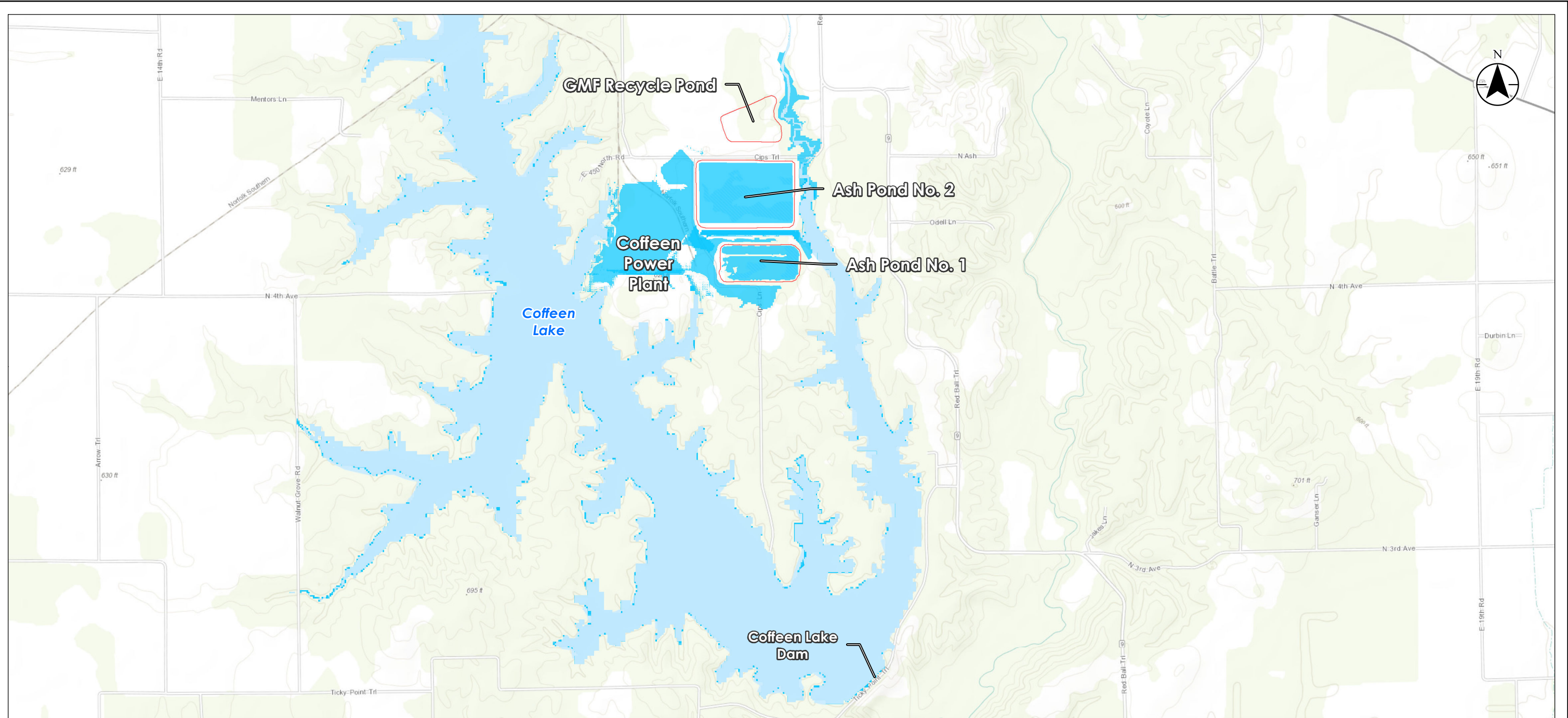


GYPSUM BREACH INUNDATION MAP

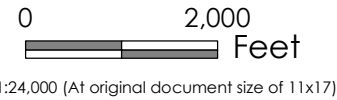
**GYPSUM MANAGEMENT FACILITY
COFFEEN POWER GENERATING STATION
MONTGOMERY COUNTY, ILLINOIS**

Job Number 05S3004A

Figure Appendix C - 1



- Legend**
- CCR Surface Impoundment Boundary
 - 100-year Storm Event Inundation Approximate Limits
 - Expected Breach Inundation Area



Project Location: 175605019
 Latitude: 39.059113
 Longitude: -89.403293
 Montgomery County, Illinois
 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.
7-2

Title
**Inundation Map
 GMF Recycle Pond, Ash Pond No.1,
 Ash Pond No.2**

- 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)

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

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

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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

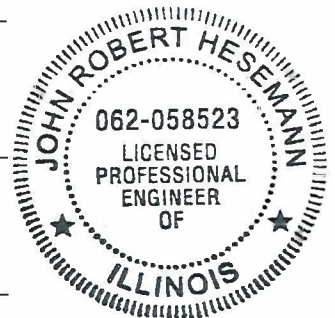
The owner or operator must obtain a certification from a qualified professional engineer that the initial CCR fugitive dust control plan, or any subsequent amendment of it, meets the requirements of 40 C.F.R. § 257.80 and 35 I.A.C. 845.500. See 40 C.F.R. § 257.80(b)(7); 35 I.A.C. 845.500(b)(7).

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

John R. Hesemann 9/09/2021
Signature of Qualified Professional Engineer and Date

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



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

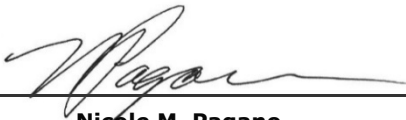
GMF RECYCLE POND COFFEEN POWER PLANT COFFEEN, ILLINOIS

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT COFFEEN POWER PLANT GMF RECYCLE POND

Project Name **Coffeen Power Plant GMF Recycle Pond**
Project No. **1940100806-002**
Recipient **Illinois Power Generating Company**
Document Type **Hydrogeologic Site Characterization Report**
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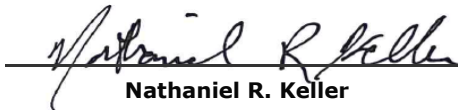
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Appendix E	Groundwater Contour Maps, Elevations, and Vertical Gradients
Appendix F	Hydraulic Conductivity Test Data
Appendix G	FEMA Flood Hazard Map

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
§	Section
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/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 No.	National Pollutant Discharge Elimination System number
NRT	Natural Resource Technology, Inc.
NRT/OBG Part 845	NRT, an OBG Company 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
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 Coffeen Gypsum Management Facility Recycle Pond (GMF RP) 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 RP, which has been collected from 2015 to 2021. The GMF RP 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 the GMF RP (Vistra Identification [ID] Number [No.] 104, Illinois Environmental Protection Agency [IEPA] ID No. W1350150004-04, and National Inventory of Dams [NID] No. IL50578). The GMF RP is a 17-acre, lined surface impoundment (SI) used to manage CCR waste streams at the CPP.

The CPP property 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 RP required the excavation and removal of this layer within the unit footprint and the UCU has been eroded east of the GMF RP, 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 RP 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 5 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 on the CPP property.

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 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. § 845.600 parameters were monitored in the uppermost aquifer monitoring wells at the GMF RP 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 greater than the applicable 35 I.A.C. § 845.600 groundwater protection standards (GWPSs) and are considered potential exceedances:

- Boron in downgradient uppermost aquifer wells G271 and G275.
- Chloride in downgradient uppermost aquifer well G279.
- Lead in downgradient uppermost aquifer wells G275 and G276. Lead was also detected in background uppermost aquifer well G280.
- Sulfate in downgradient uppermost aquifer wells G271, G273, G275, and G279; in background uppermost aquifer well G288; and in downgradient LCU (potential migration pathway [PMP]) well G285.
- Thallium in downgradient uppermost aquifer well G271.
- Total dissolved solids (TDS) in downgradient uppermost aquifer wells G273, G275, G276, and G279; in background uppermost aquifer well G288; and in downgradient LCU (PMP) well G285.

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 RECYCLE 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

TABLE ES-1. PART 845 REQUIREMENTS CHECKLIST

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

COFFEEN POWER PLANT

GMF RECYCLE 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 RECYCLE 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 RP. However, information gathered to evaluate other CCR units on site regarding geology, hydrogeology, and groundwater quality is included, where appropriate. The GMF RP is a lined SI with an underdrain system that covers an area of approximately 17 acres. This HCR includes Part 845 content requirements specific to 35 I.A.C. § 845.620(b) (Hydrogeologic Site Characterization) for the GMF RP 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 above 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 Gypsum Management Facility Gypsum Stack Pond (GMF GSP) and GMF RP.

In conjunction with this report, a GMP is being prepared for the GMF RP.

1.4 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 RP is located in Montgomery County, in central Illinois, within Section 11 Township 7 North and Range 7 East. The GMF RP 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, GMF RP (Part 845 regulated CCR Unit and subject of this HCR), and Landfill (LF). The GMF GSP is located north and immediately adjacent to the GMF RP, therefore the geology and hydrogeology are similar and results from the 845 investigations from both units are included and discussed in this report, and the HCR prepared for the GMF GSP. 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 included in **Section 4** includes only data from monitoring wells specific to the subject unit (GMF RP).

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.

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. IPGC ceased receipt of waste to AP1 by April 11, 2021.

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 the IEPA on January 30, 2018.

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 1×10^{-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 following placement of CCR is no longer 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 1×10^{-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.

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 RP are located at an elevation of approximately 628 feet North American Vertical Datum of 1988 (NAVD88) with the surrounding areas having low topographic relief, generally at an elevation of around 615 to 625 feet NAVD88 (**Figure 2-1**). East and south of the GMF RP, 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 GMF RP falling from 600 to 620 feet msl (**Appendix A**). No former major drainage features run through the current extent of the GMF RP.

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 RP are identified as: Herrick Biddle-Piasa silt loams (0 to 2 percent slopes) to the northeastern, northern, western, and southwestern boundaries of the GMF RP; Cowden-Piasa silt loams (0 to 2 percent slopes) underlying the central portion of the GMF RP and to the south; Cowden silt loam (0 to 2 percent slopes) along the southeastern boundary of the GMF RP; and Marine silt loam (2 to 5 percent slopes) and Tamalco silt loam (2 to 5 percent slopes) on the eastern side of the GMF RP. Farther north of the GMF RP, the surficial soils include Herrick-Biddle silt loams (0 to 2 percent slopes), Cowden silt loam (0 to 2 percent slopes), and Cowden-Piasa silt loams (0 to 2 percent slopes). 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 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 (youngest to oldest): the Hagarstown Member, the Vandalia Member, the Mulberry Grove Member, and the Smithboro Member. 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 Loudon 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 RP (**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 RP is located within a seismic impact zone, it satisfies the demonstration requirements of 35 I.A.C. § 845.330. The Hanson report titled "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", dated October 2016, includes engineering analysis, calculations, and findings that support the requirements of 40 C.F.R. § 257.63(a) (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 RP. 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 southernmost portion of the GMF RP 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 RP lies within the buffer zone of the Clover Leaf No. 4 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 below ground surface (ISGS, 2019). The GMF RP 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 RP. The elevation at the top of the fill layer estimated from the topographic surface (**Figure 2-1**) within the limits of the GMF RP is from approximately 606 to 614 feet NAVD88.

Gypsum thickness was estimated at a maximum of 12 feet in 2016 (AECOM, 2016). The GMF RP currently only receives process water from the GMF GSP, and investigatory borings were not proposed as part of the 2021 investigation. Based on a topographic survey conducted in 2021, and the base of GMF RP (**Figure 2-8**), gypsum thickness is approximately 2 feet at the southeastern extent of the pond up to at a maximum depth of 13 feet in the western extent of the pond.

Geotechnical and geochemical samples of CCR materials were unable to be collected from the GMF RP for safety reasons. Additionally, X201 (**Figure 2-6**), which collects contact water (leachate) from process piping located in the southeast corner of the GMF RP, was sampled as a representative source water location in 2021. The results of source water samples collected from the GMF RP are summarized in **Table 2-2**.

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 across the CPP. 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 RP, the Loess Unit was typically encountered from 1 to 3 feet bgs, at elevations of approximately 605 to 615 feet NAVD88, and was generally 3 to 14 feet thick, where present near the GMF RP and GMF GSP. 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 17.6 percent and ranges from 15.5 to 20.2 percent.
- Average calculated porosity is 32.0 percent and ranges from 29.6 to 34.3 percent.
- Average dry density is 109.4 pounds per cubic foot (pcf) and ranges from 104.6 to 111.6 pcf.
- Average specific gravity is 2.58 and ranges from 2.54 to 2.66.
- Particle size distribution is 0 percent gravel, 30 to 45 percent sand, and 55 to 70 percent fines (silt and 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 2-3**.

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.

During construction of the LF, GMF GSP, and the 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 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 RP was generally encountered between 6 and 25 feet bgs, at elevations of approximately 603 to 612 feet NAVD88, and was generally 1 to 4 feet thick, 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 Hagarstown Member indicated the following:

- Average moisture content is 16.2 percent and ranges from 12.7 to 20.4 percent.

- Average calculated porosity is 30.5 percent and ranges from 25.5 to 36.1 percent.
- Average dry density is 113.2 pcf and ranges from 102.5 to 122.2 pcf.
- Average specific gravity is 2.59 and ranges from 2.56 to 2.63.
- Particle size distribution is 0 percent gravel, 47 to 58 percent sand, and 42 to 55 percent fines (silt and 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 2-3**.

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 2 to 13 feet bgs, at elevations of approximately 603 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:

- Moisture content of the sample collected from G275D is 13.2 percent.
- Calculated porosity of the sample collected from G275D is 26.2 percent.
- Dry density of the sample collected from G275D is 121.6 pcf.
- Specific gravity of the G275D sample is 2.64.
- Particle size distribution of the G275D sample is 0 percent gravel, 23 percent sand, 50 percent silt, and 27 percent clay.

A soil sample collected from the Vandalia Member was also submitted to an analytical laboratory for chemical analysis. The results of this chemical analysis are summarized in **Table 2-3**.

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 CPP 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 RP. 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:

- Moisture content of the sample collected from G275D is 13.3 percent.
- Calculated porosity of the sample collected from G275D is 25.9 percent.
- Dry density of the sample collected from G275D is 122.0 pcf.
- Specific gravity of the G275D sample is 2.64.
- Particle size distribution of the sample collected from G275D is 0 percent gravel, 31 percent sand, 43 percent silt, and 26 percent clay.

No samples were collected from the Smithboro Member for chemical analysis.

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 in G275D at approximately 51 feet bgs, at an elevation of approximately 567 feet NAVD88, and was 3 feet thick. 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 G275D sample is 10.2 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 G275D sample is 2.59.
- Particle size distribution of the G275D sample is 0 percent gravel, 90 percent sand, 10 percent silt, and 0 percent clay.

No samples were collected from the Yarmouth Soil for chemical analysis.

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, boring G275D encountered

the Lierle Clay at 54 feet bgs, at approximately 564 feet NAVD88. No borings penetrated the full thickness of the Banner Formation near the GMF RP.

The geotechnical testing results from the sample collected at G275D 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 G275D is 20.6 percent.
- Calculated porosity of the sample collected from G275D is 36.0 percent.
- Dry density of the sample collected from G275D is 106.3 pcf.
- Specific gravity of the sample collected from G275D is 2.66.
- Particle size distribution of the sample collected from G275D is 0 percent gravel, 17 percent sand, 48 percent silt, and 35 percent clay.

No sample was collected from the Lierle Clay for chemical analysis.

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. Two monitoring wells were installed in 2008 and nine monitoring wells in 2009. These wells are utilized around the GMF RP to meet the requirements of the CCR Rule. In 2021, eight additional wells 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 RP, 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 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 606 to 609 feet and was removed below the footprint of the GMF RP (**Figure 2-7**). The base of the uppermost aquifer 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

PMPs were interpreted using the lithologic composition and hydrogeologic properties (hydraulic conductivity, 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 wells G283 and G285 are LCU PMP locations and G275D is considered a DA PMP monitoring location. Wells G283 and G285 evaluate the potential for migration of impacts through the LCU where the uppermost aquifer is absent.

3.2.4 Water Table Elevation and Groundwater Flow Direction

X201 was utilized during the 2021 investigation to collect leachate samples from the GMF RP (**Table 2-2**). A transducer was installed near X201 during the 2021 investigation to monitor pond water levels in the GMF RP. The water elevations in the GMF RP showed minimal variation, with elevations from approximately 617 to 619 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 RP were typically between 601 and 623 feet 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 southeast across the GMF RP (**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 to 590 feet NAVD88. G275D is nearest the GMF RP and typically has groundwater elevations ranging from about 568 to 572 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 at nested well locations within the uppermost aquifer, LCU, and DA. Vertical hydraulic gradients for the GMF RP 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 -0.19 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 G275/G275D, located near the southeast corner of the GMF RP, were consistently strongly downward, with an average vertical gradient of 0.84 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, located near the southeast corner of AP1, were consistently 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 RP, the Loess Unit and the Hagarstown Member were excavated. Groundwater surface does not appear to be affected by water levels in the GMF RP, which is hydraulically isolated by a composite HDPE liner with 3 feet of recompacted soil with a hydraulic conductivity of 1×10^{-7} cm/s. Changes in pond elevations are minimal, and do not result in, or vary with, corresponding changes in groundwater elevations. Minor amounts of saturated gypsum have been observed within the GMF RP. As discussed above, the water within the GMF RP 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 RP 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 RP ranged from 7.8×10^{-4} to 1.7×10^{-3} cm/s. Tests had a geometric mean value of 1.2×10^{-3} cm/s. This is generally consistent with tests conducted prior to 2017 as part of CCR Rule characterization efforts that indicated hydraulic conductivities varied between 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 near the GMF RP ranged from 2.7×10^{-4} to 4.5×10^{-3} cm/s. Tests had a geometric mean of 1.2×10^{-3} cm/s. 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 between 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 RP 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 G275D, located near the GMF RP.
- 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 RP are shown on **Figure 2-6**. The geotechnical laboratory report is provided in **Appendix D**. The results are summarized in **Table 2-1** and discussed below.

- CCR: No geotechnical samples of CCR were collected from within the GMF RP.
- 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. No laboratory vertical hydraulic conductivity tests were completed on UCU materials near the GMF RP.
 - 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.
- 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 RP 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 G270 to G272. Horizontal gradients are between 0.003 and 0.010 ft/ft, equating to a minimum flow velocity of 0.05 feet per day (ft/day) and a maximum flow velocity of 0.18 ft/day. Average calculated flow velocity across the GMF GSP is 0.10 ft/day (**Table 3-4**); however, the flow velocity is not representative of actual groundwater flow conditions since the uppermost aquifer is not present beneath the footprint of the GMF RP.

3.2.7 Groundwater Classification

Per 35 I.A.C. § 620.210, groundwater within the uppermost aquifer at the GMF RP 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 between 2001 and 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.

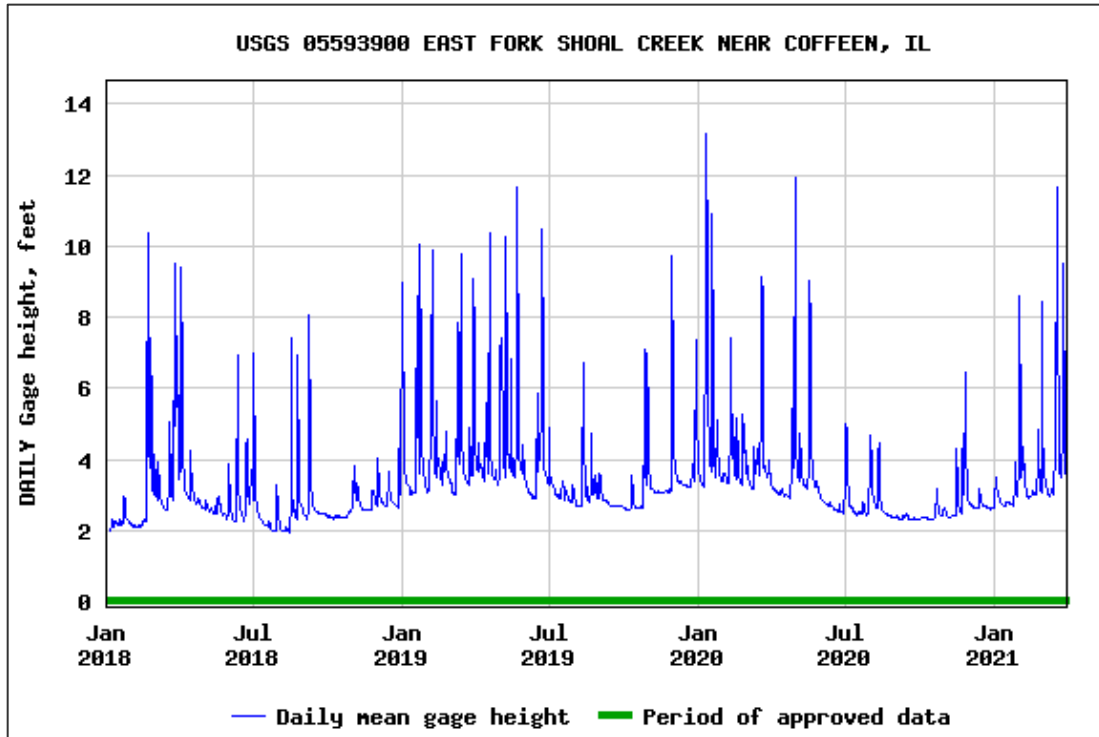


Figure A. Daily Gage Height of East Fork Shoal Creek Near Coffeen, Illinois (USGS 05593900)

Historically, Coffeen Lake received water discharge from both CPP and the Hillsboro Mine in addition 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 RP (and 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 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 both the 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 six monitoring wells screened in the uppermost aquifer, including two background monitoring wells (G270 and G280) and four compliance wells (G271, G273, G276, and G279). The boring logs, well construction forms, and other related monitoring well forms for the 40 C.F.R. § 257 monitoring well network are 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			

¹Dissolved 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 combines the GMF GSP and GMF RP. The monitoring well network consists of thirty-one monitoring wells screened in the uppermost aquifer (G102, G103, 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, R104, and R201) in accordance with IEPA Water Pollution Control Permit No. 2020-EO-65043. The boring logs and well construction

forms for the GMF well network are included in **Appendix C** of this HCR. The GMF 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 Parameters¹			
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.

¹Dissolved oxygen, oxidation/reduction potential, and turbidity were recorded during sample collection.

4.1.3 Part 845 Well Installation and Groundwater Monitoring

In 2021, seven additional monitoring wells (G275D, G283, G284, G285, G286, G287, and G288), one CCR source sample collection point (X201), and one staff gauge (SG04) were installed around the GMF RP 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 RP 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 Parameters¹			
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			

¹Dissolved 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 RP 40 C.F.R. § 257 and IEPA 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, arsenic, barium, beryllium, cadmium, calcium, cobalt, fluoride, lithium, molybdenum, pH, 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 Boron

Boron is a primary indicator parameter for CCR leachate impacts on groundwater quality. Boron has been detected historically at concentrations greater than the GWPS (2 milligrams per liter [mg/L]) at downgradient uppermost aquifer well G275. Boron has also been detected intermittently at concentrations greater than the GWPS at downgradient uppermost aquifer well G271. Boron concentrations in the two downgradient uppermost aquifer wells have ranged from 0.11 to 4.6 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.

No uppermost aquifer PMP monitoring wells east of the Unnamed Tributary had concentrations greater than the boron GWPS.

The DA monitoring well G275D did not have concentrations greater than the boron GWPS.

4.2.2 Chloride

Chloride was detected at a concentration greater than the GWPS (200 mg/L) during one event in August 2020 at downgradient uppermost aquifer well G279. Chloride concentrations in G279 range from 4.7 to 410 mg/L.

No uppermost aquifer PMP monitoring wells east of the Unnamed Tributary had concentrations greater than the chloride GWPS.

The DA monitoring well did not have concentrations greater than the chloride GWPS.

4.2.3 Lead

Lead has been intermittently detected at concentrations greater than the GWPS (0.0075 mg/L) in two downgradient uppermost aquifer wells (G275 and G276). Lead was also detected at a concentration greater than the GWPS in background uppermost aquifer well G280 during November 2015. Lead concentrations in the downgradient uppermost aquifer wells listed above ranged from non-detect (at a reporting limit of 0.0005 mg/L) to 0.035 mg/L. Lead concentrations in the background uppermost aquifer well noted above ranged from non-detect to 0.012 mg/L.

No uppermost aquifer PMP monitoring wells east of the Unnamed Tributary had concentrations greater than the lead GWPS.

The DA monitoring well did not have concentrations greater than the lead GWPS.

4.2.4 Sulfate

Sulfate is also a primary indicator parameter for CCR leachate impacts on groundwater quality. Sulfate has been consistently detected at concentrations greater than the GWPS (400 mg/L) at three downgradient uppermost aquifer wells (G271, G273, and G279) and intermittently at downgradient uppermost aquifer well G275. Sulfate concentrations in the aforementioned downgradient uppermost aquifer wells ranged from 83 to 1,600 mg/L.

Sulfate has been detected intermittently at concentrations greater than the GWPS at background uppermost aquifer well G288. Sulfate concentrations in well G288 ranged from 29 to 770 mg/L.

Sulfate was consistently detected at concentrations greater than the GWPS at downgradient LCU PMP well G285. Sulfate concentrations in G285 ranged from 490 to 620 mg/L.

The DA monitoring well did not have concentrations greater than the sulfate GWPS.

4.2.5 Thallium

Thallium was detected at a concentration greater than the GWPS (0.002 mg/L) in downgradient uppermost aquifer well G271 during one event in May 2017. Concentrations of thallium in G271 range from non-detect (at a reporting limit of 0.001 mg/L) to 0.0021 mg/L.

No uppermost aquifer PMP monitoring wells east of the Unnamed Tributary had concentrations greater than the thallium GWPS.

The DA monitoring well did not have concentrations greater than the thallium GWPS.

4.2.6 Total Dissolved Solids

TDS has been consistently detected at concentrations greater than the GWPS (1,200 mg/L) at downgradient uppermost aquifer well G279 and intermittently at downgradient uppermost aquifer wells G273, G275, and G276. TDS concentrations in the downgradient uppermost aquifer wells ranged from 370 to 3,000 mg/L.

TDS was detected at a concentration greater than the GWPS during the April 2021 event at background uppermost aquifer well G288. TDS concentrations in G288 ranged from 310 to 1,400 mg/L.

TDS was consistently detected at concentrations greater than the GWPS at downgradient LCU PMP well G285, with concentrations ranging from 1,400 to 1,700 mg/L.

The DA monitoring well did not have 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 RP. Based on State of Illinois records obtained from the ISGS Illinois Water and Related Wells (ILWATER) Map¹ there are sixteen Illinois water wells located within 1,000 meters of the GMF RP. These included thirteen monitoring wells and three farm/domestic wells. A map of wells in the vicinity of the GMF RP is presented in **Appendix B**.

5.2 Surface Water

A search was performed utilizing the United States Fish and Wildlife Service (USFWS) Wetlands Mapper² and the USGS National Map³ for surface water bodies within 1,000 meters of the GMF RP. 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 RP. 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 0.1 to 0.8 acres and one emergent wetland approximately 1.6 acres in size to the southeast of the GMF RP. A map of wetlands and surface waters in the vicinity of the GMF RP 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.

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 RP 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 Database⁴ for natural areas and protected areas within 1,000 meters of the GMF RP was performed. No natural or protected areas within the IDNR database were identified within 1,000 meters of the GMF RP. 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 County⁵ 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 Division⁶ 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 RP. 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 RP.

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 RP 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 RP (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 RP (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 RP collected from 2015 to present was compared to the Part 845 Standards.

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 RP, these include the following in descending order:
 - **CCR:** Minimal CCR, consisting primarily of gypsum scrubber waste, and run-off from the GMF GSP is present within the GMF RP and non-CCR fill material consisting of silt, clay, and sand comprises the berms surrounding the GMF RP.
 - **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 RP 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 RP, 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 Till and the Smithboro Till. 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 RP.

- 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 RP, 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 RP are greater than the surrounding areas; however, the GMF RP is lined and water elevation within the GMF RP 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 southeast across the GMF RP.
- Vertical gradients measured near the site indicate downward flow from the uppermost aquifer to the LCU and DA. The LCU in locations without the uppermost aquifer and the DA have been identified as PMPs due to the presence of downward gradients and also the relatively higher hydraulic conductivities measured in the DA.
- As determined by the detailed geologic information provided for the GMF RP, and the hydrogeologic and groundwater quality data, groundwater within the uppermost aquifer at the GMF RP 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 RP in the various hydrostratigraphic units as follows:
 - Boron in downgradient uppermost aquifer wells G271 and G275.
 - Chloride in downgradient uppermost aquifer well G279.
 - Lead in downgradient uppermost aquifer wells G275 and G276. Lead was also detected in background uppermost aquifer well G280.

- Sulfate in downgradient uppermost aquifer wells G271, G273, G275, and G279 ; in background uppermost aquifer well G288; and in downgradient LCU (PMP) well G285.
- Thallium in downgradient uppermost aquifer well G271.
- TDS in downgradient uppermost aquifer wells G273, G275, G276, and G279; in background uppermost aquifer well G288; and in downgradient LCU (PMP) well G285.

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 RP at the CPP.

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TABLES

TABLE 2-1. GEOTECHNICAL DATA SUMMARY
 HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
 COFFEEN POWER PLANT
 GMF RECYCLE 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															
G275D/Comp 1	G275D	4	9.5	18.3	110.8	2.66	33.2	--	33	16	17	CL	0	37	63
G284/Comp 1	G284	4	9.9	15.5	110.4	2.56	30.9	--	30	14	16	CL	0	45	55
G288/Comp 1	G288	3.3	6	20.2	104.6	2.55	34.3	--	40	19	21	CL	0	30	70
G288/Comp 2	G288	6	11.2	16.4	111.6	2.54	29.6	--	27	14	15	CL	0	44	56
Hagarstown Member															
G275D/Comp 2	G275D	9.5	10.9	20.4	102.5	2.57	36.1	--	32	17	15	CL	0	47	53
G275D, ST7	G275D	12	14	15.8	115.9	--	--	1.6E-04	--	--	--	SC	--	--	--
G284/Comp 2	G284	10	14	12.7	122.2	2.63	25.5	--	18	12	6	SM	0	58	42
G288/Comp 3	G288	11.2	12	15.7	112.0	2.56	29.9	--	16	11	5	ML	0	55	55
Vandalia Member															
G275D/Comp 3	G275D	16	46	13.2	121.6	2.64	26.2	--	39	15	24	CL	0	23	77
Smithboro Member															
G275D/Comp 4	G275D	46	52	13.3	122.0	2.64	25.9	--	30	15	15	CL	0	31	69
Yarmouth Soil															
G275D/Comp 5	G275D	52	54	10.2	--	2.59	--	--	NP	NP	NP	SP-SM	0	90	10
Lierle Clay															
G275D/Comp 6	G275D	54	64	20.6	106.3	2.66	36.0	--	39	16	23	CL	0	17	83

[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 (ρ_b) to particle density (ρ_d) ($n = 100[1 - (\rho_b/\rho_d)]$)

-- = 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

CL = Lean Clay

ML = Silt

SC = Clayey Sand

SM = Silty Sand

SP-SM = Poorly Graded-Sand with silt

TABLE 2-2. LEACHATE ANALYTICAL RESULTS
 HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
 COFFEEN POWER PLANT
 GMF RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	Sample Date	pH (field) (SU)	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)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)
X201	10/05/2015	6.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
X201	03/31/2021	4.5	<0.003	0.0019	0.046	0.0016	46	0.029	350	1100	<0.004	0.079	37.2	<0.001	0.29	<0.0002	<0.001	0.00577	0.45	1600	<0.001
X201	04/21/2021	4.8	<0.003	0.0021	0.043	0.0019	43	0.031	360	1700	<0.004	0.087	37.1	<0.001	0.28	<0.0002	<0.001	0.173	0.48	17000	<0.001
X201	05/05/2021	4.7	<0.003	0.0023	0.044	0.0016	42	0.029	350	1200	<0.004	0.082	34.7	<0.001	0.3	<0.0002	<0.001	0.0728	0.46	16000	<0.001
X201	05/17/2021	4.7	0.0082	0.011	0.066	0.0088	45	0.046	460	1300	0.011	0.11	36.9	0.0081	0.29	0.00091	0.021	0.242	0.62	17000	0.0038
X201	06/14/2021	4.5	<0.003	0.0022	0.044	0.0014	42	0.03	380	1300	<0.004	0.081	36.9	<0.001	0.3	<0.0002	<0.001	1.45	0.5	16000	<0.001
X201	07/27/2021	4.7	<0.003	0.002	0.044	0.0014	39	0.029	360	1200	<0.004	0.078	34.4	<0.001	0.29	<0.0002	<0.001	0.04	0.43	15000	<0.001

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 2-3. SOIL ANALYTICAL RESULTS
 HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
 COFFEEN POWER PLANT
 GMF RECYCLE 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)
G275D	Loess Unit	4-9.5	01/28/2021	<2.9	4.3	47	<0.95	<9.5	<0.95	<10	14	6.3	<2.5	13	6.7	<0.19	<0.95	0.96	50	<0.95
G275D	Hagarstown Member	9.5-10.9	01/28/2021	<3	2.1	63	<1	<10	<1	<10	11	4.2	<2.5	7.2	12	<0.2	<1	<1	20	<1
G275D	Vandalia Till Member	16-46	01/29/2021	<3	2.6	53	<1	<10	<1	<10	9.1	4.3	<2.5	6.7	7.7	<0.2	1	<1	48	<1
G284	Loess Unit	4-8.9	01/20/2021	<3	<1	18	<1	<10	<1	<10	7.6	<2	3	3.4	<5	<0.2	<1	<1	23	<1
G284	Hagarstown Member	10-14	01/20/2021	<3	<1	48	<1	<10	<1	<10	4.7	5.9	<2.5	9.7	<5	<0.2	<1	<1	<10	<1
G288	Loess Unit	3.3-6	01/21/2021	<2.8	1.8	47	<0.94	<9.4	<0.94	<10	5.5	<1.9	3.2	5	<4.7	<0.19	<0.94	<0.94	17	<0.94
G288	Loess Unit	6-11.2	01/21/2021	<3	1.2	32	<1	<10	<1	<10	5.4	2.4	<2.5	5.8	<5	<0.2	<1	<1	12	<1
G288	Hagarstown Member	11.2-12	01/21/2021	<3	1.8	43	<1	<10	<1	<10	6.3	3.3	<2.5	6.5	<5	<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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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

TABLE 3-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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	-89.403333
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 RECYCLE 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
X201	S	--	--	618.47	--	--	--	--	--	--	--	--	--	--	39.065278	-89.3925
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

TABLE 3-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
 COFFEEN POWER PLANT
 GMF RECYCLE 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)
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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

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TABLE 3-2. 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

TABLE 3-2. 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

TABLE 3-3. 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

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

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
 COFFEEN POWER PLANT
 GYPSUM MANAGEMENT FACILITY RECYCLE 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 Recycle Pond (G270 to G272)

Distance between Wells (ft): 933

Hydraulic Conductivity (ft/day): 3.26

Effective Porosity (%): 18

Assumes: Sand, Silt, and Clay

Date	G270 Elevation (ft NAVD88)	G272 Elevation (ft NAVD88)	Change in Elevation (ft)	Horizontal Gradient (ft/ft)	Velocity (ft/day)
11/16/2015	621.06	NM	--	--	--
2/8/2016	622.94	614.93	8.01	0.009	0.15
5/9/2016	622.77	614.96	7.81	0.008	0.15
7/25/2016	617.73	614.79	2.94	0.003	0.06
11/12/2016	618.31	614.34	3.97	0.004	0.08
2/4/2017	619.02	615.08	3.94	0.004	0.08
5/13/2017	618.83	614.23	4.60	0.005	0.09
7/8/2017	617.99	615.12	2.87	0.003	0.05
10/21/2017	614.45	611.45	3.00	0.003	0.06
5/8/2018	618.76	613.58	5.18	0.006	0.10
8/2/2018	616.56	613.44	3.12	0.003	0.06
10/23/2018	617.01	612.96	4.05	0.004	0.08
1/15/2019	618.46	615.43	3.03	0.003	0.06
8/5/2019	622.12	616.88	5.24	0.006	0.10
1/20/2020	622.11	616.49	5.62	0.006	0.11
8/10/2020	618.11	613.19	4.92	0.005	0.09
1/20/2021	622.51	613.01	9.50	0.010	0.18
4/20/2021	622.74	614.50	8.24	0.009	0.16
7/25/21 -7/26/21	622.39	614.44	7.95	0.009	0.15
Average				0.006	0.10

[O:KLT 8/13/21, C:EDP 8/31/21]

TABLE 3-4. HORIZONTAL HYDRAULIC GRADIENTS AND GROUNDWATER FLOW VELOCITIES
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GYPSUM MANAGEMENT FACILITY RECYCLE 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 RECYCLE 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
G270	01/20/2015	--	<0.001	--	--	<0.01	<0.001	70	18	--	--	--	<0.001	--	--	--	7.4	--	--	140	--	500
G270	04/13/2015	<0.003	<0.001	0.05	<0.001	0.047	<0.001	70	20	<0.004	<0.002	0.334	<0.001	--	<0.0002	--	6.9	--	0.0016	120	<0.001	540
G270	07/22/2015	<0.003	<0.001	0.049	<0.001	<0.01	<0.001	--	15	<0.004	<0.002	0.427	0.0018	--	<0.0002	0.0011	7.4	--	<0.001	110	<0.001	550
G270	10/05/2015	<0.003	<0.001	0.037	<0.001	<0.01	<0.001	--	11	<0.004	<0.002	0.411	<0.001	--	<0.0002	<0.001	7.2	--	<0.001	82	<0.001	480
G270	11/20/2015	<0.003	0.001	0.045	<0.001	<0.01	<0.001	59	12	<0.004	<0.002	0.362	0.0015	<0.01	<0.0002	0.001	6.8	0.522	<0.001	89	<0.001	400
G270	02/10/2016	<0.003	<0.001	0.032	<0.001	<0.01	<0.001	49	16	<0.004	<0.002	0.472	<0.001	<0.01	<0.0002	<0.001	6.7	0.721	0.0012	77	<0.001	340
G270	05/12/2016	<0.003	<0.001	0.034	<0.001	<0.01	<0.001	57	12	<0.004	<0.002	0.46	<0.001	<0.01	<0.0002	0.001	7.0	0.422	0.0012	76	<0.001	340
G270	08/01/2016	<0.003	<0.001	0.037	<0.001	<0.01	<0.001	50	15	<0.004	<0.002	0.397	<0.001	<0.01	<0.0002	<0.001	7.0	0.997	<0.001	76	<0.001	360
G270	11/16/2016	<0.003	<0.001	0.031	<0.001	0.018	<0.001	48	12	<0.004	<0.002	0.327	<0.001	<0.01	<0.0002	<0.001	7.1	0.109	<0.001	63	<0.001	450
G270	02/10/2017	<0.003	<0.001	0.036	<0.001	<0.01	<0.001	53	11	<0.004	<0.002	0.364	<0.001	<0.01	<0.0002	<0.001	7.1	0.62	<0.001	55	<0.001	390
G270	05/16/2017	<0.003	<0.001	0.033	<0.001	<0.01	<0.001	54	9.7	<0.004	<0.002	0.358	<0.001	<0.01	<0.0002	<0.001	7.2	1.52	<0.001	50	<0.001	380
G270	07/12/2017	<0.003	<0.001	0.035	<0.001	<0.01	<0.001	52	12	<0.004	<0.002	0.338	<0.001	<0.01	<0.0002	<0.001	7.0	0.413	<0.001	54	<0.001	400
G270	10/25/2017	--	--	--	--	0.011	--	56	13	--	--	0.338	--	--	--	--	7.1	--	--	55	--	400
G270	05/11/2018	<0.003	<0.001	0.038	<0.001	<0.01	<0.001	53	7.9	<0.004	<0.002	0.27	<0.001	<0.01	<0.0002	0.0014	7.1	--	<0.001	53	<0.001	400
G270	05/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.283	--	--	--	--
G270	08/03/2018	--	<0.001	0.036	--	<0.01	<0.001	57	8.6	<0.004	<0.002	0.36	<0.001	<0.01	--	<0.001	7.1	0.99	--	54	--	420
G270	01/21/2019	<0.003	<0.001	0.047	<0.001	<0.01	<0.001	56	9.6	0.0043	<0.002	0.375	0.0013	<0.01	<0.0002	<0.001	7.0	0.651	<0.001	49	<0.001	480
G270	08/15/2019	--	<0.001	0.04	<0.001	<0.01	<0.001	54	9.8	<0.004	<0.002	0.461	<0.001	0.012	--	<0.001	7.1	1.34	<0.001	50	--	470
G270	01/24/2020	<0.003	<0.001	0.038	<0.001	0.015	<0.001	59	10	<0.004	<0.002	0.383	<0.001	<0.02	<0.0002	<0.001	7.3	0.471	0.0014	51	<0.001	480
G270	08/12/2020	--	<0.001	0.042	<0.001	0.1	<0.001	58	12	<0.004	<0.002	0.349	<0.001	<0.02	<0.0002	<0.001	7.1	0.248	<0.001	53	<0.001	380
G270	01/21/2021	<0.003	<0.001	0.039	<0.001	<0.01	<0.001	59	10	<0.004	<0.002	0.386	<0.001	<0.02	<0.0002	<0.001	7.1	0.249	<0.001	54	<0.001	360
G270	03/30/2021	<0.003	<0.001	0.045	<0.001	0.02	<0.001	58	14	<0.004	<0.002	0.372	<0.001	<0.02	<0.0002	<0.001	7.1	0.0308	<0.001	55	<0.001	510

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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
G270	04/21/2021	<0.003	<0.001	--	<0.001	--	<0.001	55	16	<0.004	<0.002	0.352	<0.001	<0.02	<0.0002	<0.001	7.1	0.0765	<0.001	53	<0.001	570
G270	05/06/2021	<0.003	<0.001	0.041	<0.001	0.013	<0.001	57	11	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0029	7.0	0.107	<0.001	57	<0.001	410
G270	05/19/2021	<0.003	<0.001	0.034	<0.001	<0.01	<0.001	53	10	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	<0.001	7.2	0.711	<0.001	58	<0.001	480
G270	06/15/2021	<0.003	<0.001	0.034	<0.001	0.011	<0.001	60	12	<0.004	<0.002	0.376	<0.001	<0.02	<0.0002	<0.001	7.0	0	<0.001	55	<0.001	390
G270	06/29/2021	<0.003	<0.001	0.033	<0.001	<0.01	<0.001	56	12	<0.004	<0.002	0.367	<0.001	<0.02	<0.0002	<0.001	7.0	0.606	<0.001	58	<0.001	400
G270	07/12/2021	<0.003	<0.001	0.035	<0.001	0.12	<0.001	55	11	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	<0.001	7.2	0.62	0.0027	56	<0.001	480
G270	07/27/2021	<0.003	<0.001	0.033	<0.001	<0.01	<0.001	52	12	<0.004	<0.002	0.564	<0.001	<0.02	<0.0002	<0.001	7.2	0.3	<0.001	55	<0.001	420
G271	01/21/2015	--	<0.001	--	--	0.51	<0.001	120	39	--	--	--	0.0014	--	--	--	7.5	--	--	490	--	870
G271	04/10/2015	<0.003	<0.001	0.029	<0.001	0.31	<0.001	130	45	<0.004	<0.002	0.406	<0.001	--	<0.0002	--	7.3	--	0.0035	440	<0.001	1000
G271	07/22/2015	<0.003	<0.001	0.028	<0.001	0.24	<0.001	--	35	<0.004	<0.002	0.406	0.0036	--	<0.0002	<0.001	7.2	--	0.0026	350	<0.001	1000
G271	10/08/2015	<0.003	<0.001	0.03	<0.001	0.33	<0.001	--	38	<0.004	<0.002	0.402	<0.001	--	<0.0002	0.0036	7.0	--	0.0035	400	<0.001	1000
G271	11/23/2015	<0.003	<0.001	0.031	<0.001	0.5	<0.001	130	38	<0.004	<0.002	0.347	0.0012	<0.01	<0.0002	0.0012	7.3	0.889	0.0024	420	<0.001	860
G271	02/16/2016	<0.003	<0.001	0.028	<0.001	0.61	<0.001	130	38	<0.004	<0.002	0.414	<0.001	<0.01	<0.0002	<0.001	7.5	1.02	0.0018	440	<0.001	1000
G271	05/12/2016	<0.003	<0.001	0.028	<0.001	0.98	<0.001	170	39	<0.004	<0.002	0.472	<0.001	<0.01	<0.0002	<0.001	7.2	0.228	0.0021	540	<0.001	940
G271	08/05/2016	<0.003	<0.001	0.032	<0.001	0.63	<0.001	110	37	<0.004	<0.002	0.414	0.0027	<0.01	<0.0002	<0.001	7.2	0.268	0.0022	440	<0.001	840
G271	11/21/2016	<0.003	<0.001	0.031	<0.001	0.4	<0.001	110	29	<0.004	<0.002	0.484	<0.001	<0.01	<0.0002	<0.001	7.2	0.296	0.0029	400	<0.001	910
G271	02/11/2017	<0.003	<0.001	0.027	<0.001	0.71	<0.001	100	30	<0.004	<0.002	0.392	<0.001	<0.01	<0.0002	<0.001	7.2	0.481	0.0025	430	<0.001	1100
G271	05/20/2017	<0.003	0.0017	0.029	0.0021	0.65	0.0013	110	28	0.0053	0.0022	<0.25	0.0024	<0.01	<0.0002	0.0031	7.1	0.652	0.0044	390	0.0021	870
G271	07/17/2017	<0.003	<0.001	0.028	<0.001	0.58	<0.001	110	29	<0.004	<0.002	0.466	<0.001	<0.01	<0.0002	<0.001	7.1	0.737	0.0023	380	<0.001	950
G271	11/04/2017	--	--	--	--	0.67	--	100	24	--	--	0.426	--	--	--	--	7.3	--	--	360	--	820
G271	05/16/2018	<0.003	<0.001	0.021	<0.001	0.41	<0.001	76	38	<0.004	<0.002	0.602	<0.001	<0.01	<0.0002	0.0015	7.3	--	0.0025	330	<0.001	820
G271	05/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.878	--	--	--	--

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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
G271	08/10/2018	--	<0.001	0.024	--	0.45	--	86	32	--	--	0.439	<0.001	<0.01	--	0.0013	7.1	1.16	0.0022	470	--	880
G271	01/22/2019	<0.003	<0.001	0.023	<0.001	0.88	<0.001	100	21	<0.004	<0.002	0.53	0.0012	<0.01	<0.0002	0.0014	7.2	0.644	0.0022	420	<0.001	770
G271	08/26/2019	--	0.002	0.042	--	0.78	--	100	21	0.0049	<0.002	0.57	0.0068	<0.01	--	0.0011	7.2	0.813	0.002	340	--	690
G271	01/22/2020	<0.003	<0.001	0.024	<0.001	2.5	<0.001	180	51	<0.004	<0.002	0.278	<0.001	<0.02	<0.0002	<0.001	7.2	0.922	0.001	610	<0.001	1100
G271	08/13/2020	--	<0.001	0.025	--	2.4	--	150	44	<0.004	<0.002	0.385	<0.001	<0.02	--	<0.001	7.2	0.338	<0.001	470	<0.001	900
G271	02/01/2021	<0.003	<0.001	0.021	<0.001	2.1	<0.001	150	60	<0.004	<0.002	<0.25	0.0016	<0.02	<0.0002	<0.001	7.2	0.164	0.0015	420	<0.001	980
G272	01/21/2015	--	<0.001	--	--	<0.01	<0.001	99	31	--	--	--	0.0022	--	--	--	7.6	--	--	380	--	790
G272	04/10/2015	<0.003	<0.001	0.059	<0.001	<0.01	<0.001	110	37	<0.004	<0.002	0.399	<0.001	--	<0.0002	--	7.2	--	0.0012	340	<0.001	800
G272	07/23/2015	<0.003	<0.001	0.06	<0.001	0.031	<0.001	--	29	<0.004	<0.002	0.493	<0.001	--	<0.0002	<0.001	7.2	--	<0.001	270	<0.001	840
G272	10/08/2015	<0.003	<0.001	0.058	<0.001	0.046	<0.001	--	33	<0.004	<0.002	0.361	<0.001	--	<0.0002	0.0024	7.2	--	0.0016	340	<0.001	660
G273	01/21/2015	--	<0.001	--	--	0.45	<0.001	150	46	--	--	--	<0.001	--	--	--	7.3	--	--	650	--	1200
G273	04/13/2015	<0.003	<0.001	0.028	<0.001	0.48	<0.001	200	41	<0.004	<0.002	0.32	<0.001	--	<0.0002	--	7.0	--	<0.001	690	<0.001	1300
G273	07/23/2015	<0.003	<0.001	0.044	<0.001	0.12	<0.001	--	39	<0.004	<0.002	0.382	<0.001	--	<0.0002	<0.001	7.2	--	<0.001	390	<0.001	1200
G273	10/08/2015	<0.003	<0.001	0.039	<0.001	0.15	<0.001	--	46	<0.004	<0.002	<0.25	<0.001	--	<0.0002	0.0019	7.4	--	<0.001	450	<0.001	930
G273	11/24/2015	<0.003	<0.001	0.049	<0.001	0.2	<0.001	140	41	<0.004	<0.002	<0.25	0.0011	<0.01	<0.0002	<0.001	7.1	2.06	<0.001	420	<0.001	890
G273	02/16/2016	<0.003	<0.001	0.031	<0.001	0.42	<0.001	150	45	<0.004	<0.002	0.388	<0.001	<0.01	<0.0002	<0.001	7.2	1.51	<0.001	550	<0.001	1100
G273	05/12/2016	<0.003	0.0045	0.031	<0.001	0.29	<0.001	170	44	<0.004	<0.002	0.537	<0.001	<0.01	<0.0002	<0.001	7.0	0.774	0.0051	520	<0.001	980
G273	08/05/2016	<0.003	<0.001	0.032	<0.001	0.17	<0.001	120	46	<0.004	<0.002	0.294	<0.001	<0.01	<0.0002	<0.001	7.1	0.657	<0.001	400	<0.001	840
G273	11/21/2016	<0.003	<0.001	0.036	<0.001	0.15	<0.001	140	48	<0.004	<0.002	0.39	<0.001	<0.01	<0.0002	<0.001	7.3	0.376	<0.001	440	<0.001	900
G273	02/15/2017	<0.003	<0.001	0.033	<0.001	0.18	<0.001	140	47	<0.004	<0.002	0.288	<0.001	<0.01	<0.0002	<0.001	6.9	0	<0.001	470	<0.001	990
G273	05/20/2017	<0.003	<0.001	0.032	<0.001	0.11	0.0018	130	51	<0.004	0.0021	<0.25	0.001	<0.01	<0.0002	0.0019	7.1	1.22	<0.001	390	0.0012	890
G273	07/17/2017	<0.003	<0.001	0.035	<0.001	0.066	<0.001	140	48	<0.004	<0.002	0.333	<0.001	<0.01	<0.0002	<0.001	7.3	1.28	<0.001	360	<0.001	920

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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
G273	11/04/2017	--	--	--	--	0.079	--	120	50	--	--	0.333	--	--	--	--	7.0	--	--	380	--	820
G273	05/16/2018	<0.003	<0.001	0.032	<0.001	0.25	<0.001	160	50	<0.004	<0.002	0.39	<0.001	0.012	<0.0002	<0.001	7.2	--	<0.001	490	<0.001	1100
G273	05/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.386	--	--	--	--
G273	08/10/2018	--	<0.001	0.027	--	0.12	--	140	53	--	--	0.367	<0.001	<0.01	--	<0.001	7.1	0.76	<0.001	460	--	940
G273	01/22/2019	<0.003	0.0015	0.049	<0.001	0.4	<0.001	170	54	<0.004	<0.002	0.462	<0.001	<0.01	<0.0002	<0.001	7.1	0.487	<0.001	590	<0.001	1300
G273	08/26/2019	--	<0.001	0.027	--	0.14	--	150	59	<0.004	<0.002	0.432	<0.001	0.011	--	0.0011	7.0	0.151	<0.001	440	--	1000
G273	01/22/2020	<0.003	0.0011	0.03	<0.001	0.18	<0.001	170	59	<0.004	<0.002	0.252	<0.001	<0.02	<0.0002	<0.001	7.1	0.641	<0.001	510	0.0012	1000
G273	08/13/2020	--	<0.001	0.027	--	0.064	--	150	64	<0.004	<0.002	0.34	<0.001	<0.02	--	<0.001	7.0	0.232	<0.001	410	<0.001	890
G273	02/01/2021	<0.003	<0.001	0.029	<0.001	0.15	<0.001	160	82	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	<0.001	6.9	0.406	<0.001	490	<0.001	1200
G274	01/21/2015	--	0.0011	--	--	0.5	<0.001	110	19	--	--	--	0.0029	--	--	--	7.3	--	--	260	--	770
G274	04/13/2015	<0.003	<0.001	0.052	<0.001	0.53	<0.001	110	24	<0.004	<0.002	0.341	<0.001	--	<0.0002	--	6.8	--	<0.001	390	<0.001	770
G274	07/23/2015	<0.003	<0.001	0.068	<0.001	0.49	<0.001	--	24	<0.004	<0.002	0.403	0.0018	--	<0.0002	<0.001	7.3	--	0.0014	320	<0.001	890
G274	10/08/2015	<0.003	<0.001	0.061	<0.001	0.74	<0.001	--	22	<0.004	<0.002	0.265	<0.001	--	<0.0002	0.0012	7.2	--	<0.001	320	<0.001	770
G275	01/21/2015	--	0.0043	--	--	4.6	<0.001	230	20	--	--	--	0.0079	--	--	--	7.0	--	--	940	--	1500
G275	04/13/2015	<0.003	<0.001	0.056	<0.001	1.8	<0.001	180	22	<0.004	<0.002	<0.25	<0.001	--	<0.0002	--	6.7	--	0.0012	650	<0.001	1500
G275	07/23/2015	<0.003	<0.001	0.035	<0.001	4	<0.001	--	30	<0.004	<0.002	0.307	<0.001	--	<0.0002	0.0014	7.1	--	0.0014	750	<0.001	1500
G275D	03/30/2021	<0.003	0.0053	0.43	<0.001	0.47	<0.001	170	32	0.0084	0.0031	0.398	0.0028	<0.02	<0.0002	0.03	7.1	0.571	<0.001	270	<0.001	1000
G275D	04/22/2021	<0.003	0.0033	0.36	<0.001	0.41	<0.001	170	34	<0.004	<0.002	0.522	<0.001	<0.02	<0.0002	0.036	7.1	0.411	<0.001	260	<0.001	1000
G275D	05/05/2021	<0.003	0.0074	0.34	<0.001	0.38	<0.001	160	51	<0.004	0.0049	0.372	<0.001	<0.02	<0.0002	0.029	7.0	0.681	<0.001	260	<0.001	910
G275D	05/18/2021	<0.003	0.0093	0.31	<0.001	0.36	<0.001	170	39	<0.004	0.0028	0.452	<0.001	<0.02	<0.0002	0.026	7.1	2.1	<0.001	240	<0.001	1100
G275D	06/15/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.472	--	--	--	--
G275D	07/28/2021	<0.003	0.0089	0.33	<0.001	0.3	<0.001	170	38	<0.004	<0.002	0.412	<0.001	<0.02	<0.0002	0.022	7.1	1.38	<0.001	210	<0.001	960

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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
G276	01/21/2015	--	<0.001	--	--	0.021	<0.001	100	30	--	--	--	<0.001	--	--	--	7.4	--	--	260	--	700
G276	04/13/2015	<0.003	0.0057	0.34	0.0016	0.036	<0.001	170	34	0.043	0.0047	0.486	0.022	--	<0.0002	--	6.9	--	0.0034	310	<0.001	780
G276	07/23/2015	<0.003	<0.001	0.096	<0.001	0.015	<0.001	--	26	<0.004	<0.002	0.377	0.0012	--	<0.0002	0.0012	7.4	--	<0.001	180	<0.001	800
G276	11/24/2015	<0.003	<0.001	0.077	<0.001	0.043	<0.001	120	28	<0.004	<0.002	0.345	<0.001	0.013	<0.0002	0.0017	7.3	1.29	<0.001	190	<0.001	710
G276	02/16/2016	<0.003	<0.001	0.09	<0.001	0.021	<0.001	120	23	<0.004	<0.002	0.456	0.0014	0.015	<0.0002	0.0013	7.2	0.181	0.0018	230	<0.001	760
G276	05/12/2016	<0.003	<0.001	0.078	<0.001	<0.01	<0.001	130	22	<0.004	<0.002	0.441	<0.001	0.012	<0.0002	<0.001	7.1	0.8	0.0017	230	<0.001	660
G276	08/03/2016	<0.003	<0.001	0.085	<0.001	0.019	<0.001	110	23	<0.004	<0.002	0.443	<0.001	<0.01	<0.0002	<0.001	7.2	1.15	0.0017	19	<0.001	680
G276	11/21/2016	<0.003	<0.001	0.081	<0.001	<0.01	<0.001	120	23	<0.004	<0.002	0.445	<0.001	0.011	<0.0002	<0.001	7.1	0.105	0.002	210	<0.001	720
G276	02/17/2017	<0.003	<0.001	0.082	<0.001	0.014	<0.001	110	23	<0.004	<0.002	0.358	<0.001	0.014	<0.0002	<0.001	7.2	0.689	0.0014	200	<0.001	680
G276	05/20/2017	<0.003	<0.001	0.081	<0.001	0.02	<0.001	110	22	<0.004	<0.002	<0.25	<0.001	0.012	<0.0002	0.0013	7.0	1.76	0.0023	220	<0.001	750
G276	07/18/2017	<0.003	<0.001	0.084	<0.001	0.011	<0.001	130	23	<0.004	<0.002	0.395	<0.001	0.012	<0.0002	<0.001	7.2	0.916	0.0018	220	<0.001	780
G276	11/04/2017	--	--	--	--	0.023	--	120	20	--	--	0.431	--	--	--	--	7.1	--	--	210	--	720
G276	05/16/2018	<0.003	<0.001	0.073	<0.001	0.021	<0.001	110	24	<0.004	<0.002	0.466	<0.001	0.015	<0.0002	<0.001	7.1	--	0.0018	220	<0.001	740
G276	05/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.04	--	--	--	--
G276	08/10/2018	--	<0.001	0.069	--	0.017	--	120	24	--	--	0.399	<0.001	0.013	--	<0.001	7.1	0.325	0.0011	230	--	760
G276	01/22/2019	<0.003	<0.001	0.076	<0.001	0.027	<0.001	120	26	<0.004	<0.002	0.421	<0.001	<0.01	<0.0002	<0.001	7.1	0.51	0.0014	240	<0.001	860
G276	08/26/2019	--	<0.001	0.066	--	0.028	--	140	21	<0.004	<0.002	0.443	<0.001	0.016	--	<0.001	7.2	0.339	0.0023	260	--	880
G276	01/23/2020	<0.003	<0.001	0.063	<0.001	0.037	<0.001	140	25	<0.004	<0.002	0.255	<0.001	<0.02	<0.0002	<0.001	7.0	1.12	0.0026	270	<0.001	1400
G276	08/12/2020	--	<0.001	0.053	--	0.041	--	140	23	<0.004	<0.002	0.396	<0.001	<0.02	--	<0.001	6.9	0.497	0.0019	280	<0.001	820
G276	06/28/2021	<0.003	<0.001	0.05	<0.001	0.022	<0.001	140	29	<0.004	<0.002	0.355	<0.001	<0.02	<0.0002	<0.001	7.1	1.02	0.0014	270	<0.001	900
G279	01/21/2015	--	<0.001	--	--	0.031	<0.001	100	74	--	--	--	<0.001	--	--	--	7.1	--	--	230	--	810
G279	04/13/2015	<0.003	0.0013	0.029	<0.001	0.016	<0.001	170	46	<0.004	<0.002	0.518	<0.001	--	0.00024	--	6.6	--	0.0056	470	<0.001	800

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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
G279	07/23/2015	<0.003	0.002	0.11	<0.001	0.065	<0.001	--	96	0.0042	0.0025	0.361	0.0041	--	<0.0002	0.0015	7.1	--	0.02	470	<0.001	1200
G279	10/08/2015	<0.003	0.0015	0.096	<0.001	1.4	<0.001	--	120	0.0047	0.0033	<0.25	0.0025	--	<0.0002	0.0015	7.0	--	0.017	810	<0.001	1700
G279	11/24/2015	<0.003	<0.001	0.053	<0.001	0.63	<0.001	140	61	<0.004	<0.002	0.334	0.0015	0.014	<0.0002	<0.001	7.2	1.05	0.0041	520	<0.001	1100
G279	02/16/2016	<0.003	<0.001	0.072	<0.001	0.23	<0.001	180	130	<0.004	<0.002	0.386	<0.001	0.012	<0.0002	0.043	7.2	1.43	0.017	610	<0.001	1400
G279	05/13/2016	<0.003	<0.001	0.054	<0.001	0.042	<0.001	120	18	<0.004	<0.002	0.608	<0.001	<0.01	<0.0002	0.024	6.9	0.841	0.0027	230	<0.001	600
G279	08/03/2016	<0.003	<0.001	0.069	<0.001	0.24	<0.001	210	110	<0.004	<0.002	0.394	<0.001	<0.01	<0.0002	<0.001	7.1	1.16	0.02	570	<0.001	1300
G279	11/22/2016	<0.003	<0.001	0.057	<0.001	0.49	<0.001	170	130	<0.004	<0.002	0.272	<0.001	0.011	<0.0002	<0.001	7.2	--	0.017	720	<0.001	1300
G279	12/07/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.764	--	--	--	--
G279	02/15/2017	<0.003	<0.001	0.053	<0.001	0.35	<0.001	210	120	<0.004	<0.002	0.263	<0.001	0.013	<0.0002	<0.001	7.1	0.672	0.013	700	<0.001	1500
G279	05/20/2017	<0.003	<0.001	0.089	<0.001	0.18	<0.001	150	57	<0.004	<0.002	0.28	<0.001	<0.01	<0.0002	<0.001	7.0	0.913	0.0055	370	<0.001	940
G279	07/18/2017	<0.003	<0.001	0.054	<0.001	0.42	<0.001	240	130	<0.004	<0.002	0.282	<0.001	0.012	<0.0002	<0.001	7.3	1.27	0.014	730	<0.001	1600
G279	11/04/2017	--	--	--	--	0.57	--	220	170	--	--	0.507	--	--	--	--	7.2	--	--	870	--	1600
G279	05/16/2018	<0.003	<0.001	0.052	<0.001	0.25	<0.001	180	76	<0.004	<0.002	0.492	<0.001	<0.01	<0.0002	<0.001	7.1	--	0.0072	540	<0.001	1200
G279	05/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.494	--	--	--	--
G279	08/10/2018	--	<0.001	0.044	--	0.53	--	250	160	--	--	0.427	<0.001	0.011	--	<0.001	7.1	0.799	0.0092	940	--	1800
G279	01/23/2019	<0.003	0.003	0.083	<0.001	0.021	<0.001	120	7.3	0.01	0.0022	0.626	0.0063	<0.01	<0.0002	<0.001	7.0	1.8	0.002	240	<0.001	740
G279	08/26/2019	--	<0.001	0.05	--	0.048	--	120	4.7	<0.004	<0.002	0.635	<0.001	<0.01	--	<0.001	7.0	0.618	<0.001	170	--	560
G279	01/23/2020	<0.003	<0.001	0.062	<0.001	0.33	<0.001	190	72	<0.004	<0.002	0.537	<0.001	<0.02	<0.0002	<0.001	7.0	1.44	0.0036	400	<0.001	830
G279	08/12/2020	--	<0.001	0.032	--	1.4	--	480	410	<0.004	<0.002	0.313	<0.001	<0.02	--	<0.001	6.8	0.914	0.0094	1600	<0.001	3000
G279	01/28/2021	<0.003	<0.001	0.043	<0.001	0.016	<0.001	100	5.8	<0.004	<0.002	0.524	<0.001	<0.02	<0.0002	<0.001	7.0	0.16	0.0025	190	<0.001	650
G280	01/21/2015	--	<0.001	--	--	<0.01	<0.001	74	62	--	--	--	<0.001	--	--	--	7.6	--	--	87	--	540
G280	04/13/2015	<0.003	<0.001	0.045	<0.001	<0.01	<0.001	71	67	<0.004	<0.002	0.358	<0.001	--	<0.0002	--	7.2	--	0.0037	86	<0.001	480

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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
G280	07/23/2015	<0.003	<0.001	0.049	<0.001	<0.01	<0.001	--	53	<0.004	<0.002	0.415	<0.001	--	<0.0002	0.0019	7.6	--	0.0033	74	<0.001	480
G280	10/08/2015	<0.003	<0.001	0.056	<0.001	0.024	<0.001	--	54	<0.004	<0.002	0.318	<0.001	--	<0.0002	0.0074	7.7	--	0.0017	92	<0.001	450
G280	11/24/2015	<0.003	0.0066	0.11	<0.001	0.029	<0.001	120	54	0.019	0.0059	0.343	0.012	0.019	<0.0002	0.0045	7.4	1.39	0.0032	94	<0.001	460
G280	02/10/2016	<0.003	<0.001	0.045	<0.001	<0.01	<0.001	60	52	<0.004	<0.002	0.466	0.0011	<0.01	<0.0002	0.0015	6.5	0.745	0.0029	84	<0.001	400
G280	05/10/2016	<0.003	<0.001	0.045	<0.001	<0.01	<0.001	63	50	<0.004	<0.002	0.429	<0.001	<0.01	<0.0002	0.0014	7.2	0.666	0.0044	80	<0.001	350
G280	08/03/2016	<0.003	<0.001	0.045	<0.001	<0.01	<0.001	65	46	<0.004	<0.002	0.397	0.0014	<0.01	<0.0002	0.0016	7.2	1.75	0.0048	55	<0.001	350
G280	11/20/2016	<0.003	<0.001	0.044	<0.001	<0.01	<0.001	63	49	<0.004	<0.002	0.473	<0.001	<0.01	<0.0002	0.0014	7.1	0.613	0.0034	67	<0.001	430
G280	02/15/2017	<0.003	0.0017	0.052	<0.001	<0.01	<0.001	64	46	0.0054	<0.002	0.362	0.0024	<0.01	<0.0002	0.0017	7.0	0.898	0.0021	94	<0.001	440
G280	05/20/2017	<0.003	<0.001	0.042	<0.001	<0.01	<0.001	54	44	<0.004	<0.002	0.348	<0.001	<0.01	<0.0002	0.0013	7.2	1.1	0.0026	84	<0.001	420
G280	07/18/2017	<0.003	<0.001	0.041	<0.001	<0.01	<0.001	67	46	<0.004	<0.002	0.378	<0.001	<0.01	<0.0002	0.0012	7.3	0.572	0.0034	58	<0.001	400
G280	11/04/2017	--	--	--	--	0.013	--	63	48	--	--	0.49	--	--	--	--	7.2	--	--	57	--	350
G280	05/16/2018	<0.003	0.0011	0.038	<0.001	<0.01	<0.001	57	43	<0.004	<0.002	0.288	0.0011	<0.01	<0.0002	0.0012	7.2	--	0.0042	52	<0.001	360
G280	05/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.397	--	--	--	--
G280	08/10/2018	--	<0.001	0.038	--	<0.01	--	62	55	--	--	0.414	<0.001	<0.01	--	<0.001	7.1	0.634	0.0022	63	--	400
G280	01/22/2019	<0.003	0.0035	0.07	<0.001	0.026	<0.001	82	52	0.011	0.0033	0.373	0.0061	<0.01	<0.0002	0.0016	7.1	1.283	0.0029	69	<0.001	500
G280	08/26/2019	--	<0.001	0.045	--	0.011	--	72	60	<0.004	<0.002	0.438	<0.001	<0.01	--	0.0014	7.1	1.01	<0.001	81	--	480
G280	01/23/2020	<0.003	<0.001	0.041	<0.001	0.015	<0.001	73	64	<0.004	<0.002	0.486	<0.001	<0.02	<0.0002	0.0015	7.7	0.484	0.0012	84	<0.001	1100
G280	08/11/2020	--	0.0034	0.21	--	0.52	--	220	68	0.015	0.006	0.289	0.0054	0.03	--	0.0023	7.3	0.472	<0.001	86	<0.001	440
G280	01/28/2021	<0.003	<0.001	0.043	<0.001	<0.01	<0.001	73	64	<0.004	<0.002	0.368	<0.001	<0.02	<0.0002	<0.001	7.3	0.0142	<0.001	86	<0.001	430
G280	03/30/2021	<0.003	<0.001	0.042	<0.001	0.015	<0.001	62	49	<0.004	<0.002	0.325	<0.001	<0.02	<0.0002	<0.001	7.4	0.0975	<0.001	84	<0.001	460
G280	05/06/2021	<0.003	<0.001	0.04	<0.001	0.057	<0.001	64	43	<0.004	<0.002	0.434	<0.001	<0.02	<0.0002	<0.001	7.2	0.197	<0.001	92	<0.001	440
G280	05/19/2021	<0.003	<0.001	0.038	<0.001	<0.01	<0.001	64	46	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	<0.001	7.4	0.0973	<0.001	81	<0.001	400

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEE POWER PLANT
GMF RECYCLE POND
COFFEE, 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
G280	06/16/2021	<0.003	<0.001	0.042	<0.001	<0.01	<0.001	73	67	<0.004	<0.002	0.366	<0.001	<0.02	<0.0002	<0.001	--	0.215	<0.001	82	<0.001	530
G280	06/28/2021	<0.003	<0.001	0.043	<0.001	1	<0.001	72	65	<0.004	<0.002	0.341	<0.001	<0.02	<0.0002	<0.001	7.4	1.09	<0.001	79	<0.001	420
G280	07/13/2021	<0.003	<0.001	0.041	<0.001	0.05	<0.001	70	65	<0.004	<0.002	0.27	<0.001	<0.02	<0.0002	<0.001	7.4	0.616	<0.001	81	<0.001	510
G280	07/27/2021	<0.003	<0.001	0.042	<0.001	<0.01	<0.001	74	63	<0.004	<0.002	0.485	<0.001	<0.02	<0.0002	<0.001	7.5	0.031	<0.001	77	<0.001	470
G283	03/31/2021	<0.003	0.0016	0.16	<0.001	0.041	<0.001	140	36	<0.004	<0.002	0.373	<0.001	<0.02	<0.0002	0.0031	6.9	0.698	<0.001	250	<0.001	780
G283	04/22/2021	<0.003	<0.001	0.16	<0.001	0.046	<0.001	140	41	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.002	7.0	0.675	<0.001	240	<0.001	870
G283	05/06/2021	<0.003	0.001	0.17	<0.001	0.046	<0.001	150	38	<0.004	<0.002	0.397	<0.001	<0.02	<0.0002	0.0019	7.1	1.4	<0.001	250	<0.001	770
G283	05/18/2021	<0.003	0.0012	0.16	<0.001	0.052	<0.001	140	40	<0.004	<0.002	0.379	<0.001	<0.02	<0.0002	0.0019	7.1	1.65	<0.001	240	<0.001	810
G283	06/15/2021	<0.003	0.001	0.17	<0.001	0.053	<0.001	140	38	<0.004	<0.002	0.455	<0.001	<0.02	<0.0002	0.0019	7.0	0.358	<0.001	240	<0.001	770
G283	06/29/2021	<0.003	<0.001	0.17	<0.001	0.057	<0.001	140	42	<0.004	<0.002	0.321	<0.001	<0.02	<0.0002	0.0019	7.0	0.887	<0.001	230	<0.001	790
G283	07/13/2021	<0.003	<0.001	0.17	<0.001	0.028	<0.001	130	41	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0013	7.1	0.442	<0.001	250	<0.001	920
G283	07/27/2021	<0.003	<0.001	0.16	<0.001	0.029	<0.001	140	39	<0.004	<0.002	0.528	<0.001	<0.02	<0.0002	0.0016	7.1	1.2	<0.001	240	<0.001	820
G284	03/30/2021	<0.003	<0.001	0.06	<0.001	0.049	<0.001	70	41	<0.004	<0.002	0.413	<0.001	<0.02	<0.0002	0.0013	7.2	0.187	<0.001	60	<0.001	460
G284	04/21/2021	<0.003	<0.001	0.067	<0.001	0.043	<0.001	75	45	<0.004	<0.002	0.605	<0.001	<0.02	<0.0002	0.0011	7.2	0.023	<0.001	71	<0.001	550
G284	05/06/2021	<0.003	<0.001	0.064	<0.001	0.046	<0.001	76	38	<0.004	<0.002	0.651	<0.001	<0.02	<0.0002	<0.001	7.1	0.115	<0.001	65	<0.001	440
G284	05/18/2021	<0.003	<0.001	0.064	<0.001	0.049	<0.001	76	42	<0.004	<0.002	0.725	<0.001	<0.02	<0.0002	0.0011	6.9	0.18	<0.001	68	<0.001	490
G284	06/14/2021	<0.003	<0.001	0.068	<0.001	0.053	<0.001	78	40	<0.004	<0.002	0.556	<0.001	<0.02	<0.0002	0.0011	7.3	0.125	<0.001	66	<0.001	410
G284	06/28/2021	<0.003	<0.001	0.063	<0.001	0.05	<0.001	69	64	<0.004	<0.002	0.487	<0.001	<0.02	<0.0002	<0.001	7.3	0.164	<0.001	95	<0.001	490
G284	07/13/2021	<0.003	<0.001	0.065	<0.001	0.034	<0.001	68	48	<0.004	<0.002	0.492	<0.001	<0.02	<0.0002	<0.001	7.2	0.808	<0.001	63	<0.001	520
G284	07/27/2021	<0.003	<0.001	0.065	<0.001	0.036	<0.001	74	44	<0.004	<0.002	0.729	<0.001	<0.02	<0.0002	<0.001	7.1	1.13	<0.001	68	<0.001	460
G285	03/30/2021	<0.003	<0.001	0.094	<0.001	0.11	<0.001	210	80	<0.004	<0.002	0.407	<0.001	<0.02	<0.0002	0.0096	6.8	3.07	<0.001	490	<0.001	1400
G285	04/22/2021	<0.003	<0.001	0.091	<0.001	0.12	<0.001	240	78	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0085	6.7	1.63	<0.001	550	<0.001	1500

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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
G285	05/06/2021	<0.003	<0.001	0.088	<0.001	0.13	<0.001	260	65	<0.004	0.0028	<0.25	<0.001	<0.02	<0.0002	0.0074	7.7	1.39	<0.001	580	<0.001	1500
G285	05/18/2021	<0.003	0.0012	0.076	<0.001	0.12	<0.001	250	63	<0.004	0.0028	<0.25	<0.001	<0.02	<0.0002	0.0069	6.8	1.96	<0.001	580	<0.001	1600
G285	06/15/2021	<0.003	0.0011	0.076	<0.001	0.12	<0.001	280	57	<0.004	0.0038	0.304	<0.001	<0.02	<0.0002	0.0066	6.8	0.92	<0.001	570	<0.001	1500
G285	06/28/2021	<0.003	<0.001	0.073	<0.001	0.11	<0.001	250	56	<0.004	0.0042	0.31	<0.001	<0.02	<0.0002	0.0061	6.9	2.29	<0.001	620	<0.001	1400
G285	07/13/2021	<0.003	0.0014	0.07	<0.001	0.11	<0.001	250	60	<0.004	0.0048	0.37	<0.001	<0.02	<0.0002	0.0057	6.8	1.36	<0.001	610	<0.001	1700
G285	07/27/2021	<0.003	0.001	0.065	<0.001	0.12	<0.001	270	47	<0.004	0.0044	0.365	<0.001	<0.02	0.0014	0.0057	6.9	1.57	<0.001	560	0.0012	1500
G286	03/31/2021	<0.003	<0.001	0.036	<0.001	0.056	<0.001	71	3.1	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0011	7.0	0.205	0.0034	16	<0.001	320
G286	04/22/2021	<0.003	<0.001	0.042	<0.001	0.034	<0.001	60	3.2	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0014	6.7	0.891	0.0012	12	<0.001	270
G286	05/06/2021	<0.003	<0.001	0.034	<0.001	0.032	<0.001	66	2.1	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	<0.001	7.1	0.117	0.0016	13	<0.001	300
G286	05/18/2021	<0.003	<0.001	0.032	<0.001	0.034	<0.001	66	1.7	<0.004	<0.002	0.514	<0.001	<0.02	<0.0002	0.0012	7.1	0.104	<0.001	11	<0.001	270
G286	06/15/2021	<0.003	<0.001	0.037	<0.001	0.042	<0.001	73	2.7	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0012	7.1	0.381	<0.001	11	<0.001	300
G286	06/28/2021	<0.003	<0.001	0.04	<0.001	0.042	<0.001	70	2.3	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0011	7.2	0.0191	0.0012	14	<0.001	230
G286	07/13/2021	<0.003	<0.001	0.041	<0.001	0.044	<0.001	70	2.6	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0012	7.0	1.27	<0.001	16	<0.001	370
G286	07/27/2021	<0.003	<0.001	0.046	<0.001	0.049	<0.001	75	2.7	<0.004	<0.002	<0.25	<0.001	<0.02	0.00042	0.0011	7.2	0.275	<0.001	15	<0.001	340
G287	03/29/2021	<0.003	<0.001	0.056	<0.001	0.019	<0.001	73	23	<0.004	<0.002	0.484	<0.001	<0.02	<0.0002	<0.001	7.3	0.226	<0.001	44	<0.001	410
G287	04/22/2021	<0.003	<0.001	0.062	<0.001	0.014	<0.001	79	27	<0.004	<0.002	0.336	<0.001	<0.02	<0.0002	<0.001	7.1	0.116	<0.001	46	<0.001	490
G287	05/06/2021	<0.003	<0.001	0.06	<0.001	<0.01	<0.001	79	23	<0.004	<0.002	0.614	<0.001	<0.02	<0.0002	<0.001	7.2	0.0477	<0.001	43	<0.001	420
G287	05/18/2021	<0.003	<0.001	0.057	<0.001	0.01	<0.001	77	24	<0.004	<0.002	0.695	<0.001	<0.02	<0.0002	<0.001	7.2	0.112	<0.001	41	<0.001	450
G287	06/14/2021	<0.003	<0.001	0.069	<0.001	0.019	<0.001	85	22	<0.004	<0.002	0.549	0.001	<0.02	<0.0002	<0.001	7.1	0.847	<0.001	43	<0.001	440
G287	06/28/2021	<0.003	<0.001	0.066	<0.001	<0.01	<0.001	77	28	<0.004	<0.002	0.511	<0.001	<0.02	<0.0002	<0.001	7.3	0.064	<0.001	50	<0.001	350
G287	07/13/2021	<0.003	<0.001	0.064	<0.001	<0.01	<0.001	73	35	<0.004	<0.002	0.436	<0.001	<0.02	<0.0002	<0.001	7.3	1.01	<0.001	45	<0.001	480
G287	07/27/2021	<0.003	<0.001	0.067	<0.001	<0.01	<0.001	81	24	<0.004	<0.002	0.358	<0.001	<0.02	0.00024	0.029	7.3	0.521	<0.001	43	<0.001	450

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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
G288	03/30/2021	<0.003	0.0011	0.046	<0.001	0.024	<0.001	69	18	<0.004	<0.002	0.616	<0.001	<0.02	<0.0002	0.0014	7.0	0.629	<0.001	600	<0.001	310
G288	04/21/2021	<0.003	0.0012	0.037	<0.001	1.3	<0.001	170	31	<0.004	<0.002	0.65	<0.001	<0.02	<0.0002	0.012	7.1	0	<0.001	770	<0.001	1400
G288	05/06/2021	<0.003	0.003	0.062	<0.001	0.031	<0.001	72	28	<0.004	<0.002	0.47	<0.001	<0.02	<0.0002	0.002	7.1	0.139	<0.001	41	<0.001	350
G288	05/18/2021	<0.003	0.0056	0.073	<0.001	0.028	<0.001	75	25	<0.004	<0.002	0.681	<0.001	<0.02	<0.0002	0.0019	7.2	0.554	<0.001	29	<0.001	390
G288	06/15/2021	<0.003	0.0047	0.074	<0.001	0.031	<0.001	79	31	<0.004	<0.002	0.552	<0.001	<0.02	<0.0002	0.0017	7.1	0.674	<0.001	37	<0.001	330
G288	06/28/2021	<0.003	0.004	0.076	<0.001	0.019	<0.001	74	38	<0.004	<0.002	0.434	<0.001	<0.02	<0.0002	0.0015	7.3	0.948	<0.001	42	<0.001	340
G288	07/13/2021	<0.003	0.0035	0.078	<0.001	<0.01	<0.001	71	51	<0.004	<0.002	0.412	<0.001	<0.02	<0.0002	0.0013	7.2	0.26	<0.001	43	<0.001	390
G288	07/27/2021	<0.003	0.0047	0.081	<0.001	0.023	<0.001	80	32	<0.004	<0.002	0.317	<0.001	<0.02	<0.0002	0.0016	7.5	0.607	<0.001	42	<0.001	410

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 RECYCLE 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)
G270	01/20/2015	--	--	7.4	348	--	--
G270	04/13/2015	--	--	6.9	823	--	--
G270	07/22/2015	--	--	7.4	545	--	--
G270	10/05/2015	--	--	7.2	690	--	--
G270	11/20/2015	0	-32	6.8	721	16.6	444
G270	02/10/2016	0	180	6.7	728	8.0	5.1
G270	05/12/2016	0	81	7.0	688	16.8	21
G270	08/01/2016	0	72	7.0	755	17.6	34.8
G270	11/16/2016	0	56	7.1	816	14.5	28.8
G270	02/10/2017	0	56	7.1	840	15.0	35.9
G270	05/16/2017	0	71	7.2	889	15.4	38.7
G270	07/12/2017	0	63	7.0	720	17.3	29.2
G270	10/25/2017	0	62	7.1	765	12.7	34
G270	05/11/2018	0	58	7.1	720	13.5	40.1
G270	08/03/2018	0	68	7.1	760	15.9	44
G270	01/21/2019	0	75	7.0	771	12.0	56.8
G270	08/15/2019	0	73	7.1	795	17.0	42.7
G270	01/24/2020	6.60	151	7.3	739.1	9.7	7.83
G270	08/12/2020	2.10	161	7.1	734	18.5	5.3
G270	01/21/2021	2.50	196	7.1	741	11.6	18.1
G270	03/30/2021	2.90	118	7.1	738	12.2	9.75
G270	04/21/2021	1.60	162	7.1	734	11.9	7.87
G270	05/06/2021	1.80	0	7.0	728.3	12.2	15.5
G270	05/19/2021	0.54	67.5	7.2	732	15.2	2.49
G270	06/15/2021	0.50	83.7	7.0	735	19.8	1.8
G270	06/29/2021	0.45	50	7.0	743	20.5	1.17
G270	07/12/2021	1.10	120	7.2	725	18.5	0.35
G270	07/27/2021	0.64	89.3	7.2	719	20.4	0.55
G271	01/21/2015	--	--	7.5	1275	--	--
G271	04/10/2015	--	--	7.3	1261	--	--
G271	07/22/2015	--	--	7.2	1039	--	--
G271	10/08/2015	--	--	7.0	873	--	--
G271	11/23/2015	1.40	123	7.3	1260	16.7	9
G271	02/16/2016	4.40	165	7.5	1380	10.6	--
G271	05/12/2016	1.55	205	7.2	1430	16.1	2.7
G271	08/05/2016	0	191	7.2	1490	19.2	16
G271	11/21/2016	0	154	7.2	1400	15.0	11.3
G271	02/11/2017	0	145	7.2	1285	15.0	11.8
G271	05/20/2017	0	152	7.1	1180	15.7	10.4
G271	07/17/2017	0	189	7.1	1350	20.7	8.7
G271	11/04/2017	0	170	7.3	1430	13.4	8.6
G271	05/16/2018	0	174	7.3	1590	13.2	16.9
G271	08/10/2018	0	117	7.1	1471	15.4	16.4
G271	01/22/2019	0	180	7.2	1478	11.4	12.4
G271	08/26/2019	0	183	7.2	1420	17.3	20.6
G271	01/22/2020	4.50	190	7.2	1481	12.8	2.13

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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)
G271	08/13/2020	3.10	-175	7.2	1508	22.9	7.8
G271	02/01/2021	1.90	-2.9	7.2	1366	11.1	0
G272	01/21/2015	--	--	7.6	1106	--	--
G272	04/10/2015	--	--	7.2	1104	--	--
G272	07/23/2015	--	--	7.2	1047	--	--
G272	10/08/2015	--	--	7.2	951	--	--
G273	01/21/2015	--	--	7.3	1618	--	--
G273	04/13/2015	--	--	7.0	1650	--	--
G273	07/23/2015	--	--	7.2	1442	--	--
G273	10/08/2015	--	--	7.4	917	--	--
G273	11/24/2015	0	105	7.1	1220	16.7	536
G273	02/16/2016	0.29	156	7.2	1620	10.9	5
G273	05/12/2016	0	177	7.0	1500	16.0	5.7
G273	08/05/2016	0	172	7.1	1222	18.2	15.2
G273	11/21/2016	0	150	7.3	1240	14.3	17.5
G273	02/15/2017	0	96	6.9	1192	15.6	21.1
G273	05/20/2017	0	60	7.1	879	15.0	29.6
G273	07/17/2017	0	142	7.3	1380	21.7	13.9
G273	11/04/2017	0	141	7.0	1260	12.6	8.5
G273	05/16/2018	0	168	7.2	1140	14.3	10.8
G273	08/10/2018	0	161	7.1	1170	15.2	20.2
G273	01/22/2019	0	173	7.1	1182	11.9	19.9
G273	08/26/2019	0	161	7.0	1100	16.9	16.8
G273	01/22/2020	1.70	109	7.1	1588	12.6	2.35
G273	08/13/2020	1.70	136	7.0	1513	17.6	1.3
G273	02/01/2021	1.40	180	6.9	1575	11.8	1.21
G274	01/21/2015	--	--	7.3	1113	--	--
G274	04/13/2015	--	--	6.8	1016	--	--
G274	07/23/2015	--	--	7.3	996	--	--
G274	10/08/2015	--	--	7.2	1170	--	--
G275	01/21/2015	--	--	7.0	1884	--	--
G275	04/13/2015	--	--	6.7	1360	--	--
G275	07/23/2015	--	--	7.1	1875	--	--
G275D	03/30/2021	1.10	-61.2	7.1	1598	18.1	49.4
G275D	04/22/2021	0.61	-53.3	7.1	1610	14.6	31.4
G275D	05/05/2021	1.70	52.9	7.0	1593	18.3	24.4
G275D	05/18/2021	0.39	-72	7.1	1667	17.5	8.74
G275D	07/28/2021	0.07	-132	7.1	1520	21.4	13.4
G276	01/21/2015	--	--	7.4	1132	--	--
G276	04/13/2015	--	--	6.9	1130	--	--
G276	07/23/2015	--	--	7.4	1002	--	--
G276	11/24/2015	5.10	112	7.3	1180	15.9	31.7
G276	02/16/2016	0	148	7.2	1250	10.8	--
G276	05/12/2016	4.81	186	7.1	1220	17.6	1.9
G276	08/03/2016	0	118	7.2	1220	18.2	44.6
G276	11/21/2016	0	96	7.1	1170	14.0	34.3

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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)
G276	02/17/2017	0	99	7.2	1192	14.6	48.8
G276	05/20/2017	0	98	7.0	993	15.7	52
G276	07/18/2017	0	98	7.2	1260	19.6	49.5
G276	11/04/2017	0	105	7.1	1290	12.9	38.8
G276	05/16/2018	0	122	7.1	1210	14.8	40.5
G276	08/10/2018	0	110	7.1	1205	15.2	39.2
G276	01/22/2019	0	114	7.1	1205	12.0	40.1
G276	08/26/2019	0	104	7.2	1260	17.2	30.5
G276	01/23/2020	7.30	198	7.0	1358	12.1	1.81
G276	08/12/2020	3.80	235	6.9	1390	22.2	7.2
G276	06/28/2021	8.00	150	7.1	1399	17.2	5.9
G279	01/21/2015	--	--	7.1	1285	--	--
G279	04/13/2015	--	--	6.6	1522	--	--
G279	07/23/2015	--	--	7.1	1115	--	--
G279	10/08/2015	--	--	7.0	983	--	--
G279	11/24/2015	8.40	71	7.2	1760	16.4	148
G279	02/16/2016	2.20	147	7.2	1930	10.7	3.4
G279	05/13/2016	4.59	127	6.9	1110	16.8	5.7
G279	08/03/2016	0	-63	7.1	1600	19.6	98.3
G279	11/22/2016	0	-76	7.2	1640	13.2	106
G279	02/15/2017	0	-70	7.1	1580	14.3	109
G279	05/20/2017	0	-62	7.0	1470	15.3	81.8
G279	07/18/2017	0	-65	7.3	1630	18.7	104
G279	11/04/2017	0	-61	7.2	1640	13.2	109
G279	05/16/2018	0	-57	7.1	1460	14.4	85.3
G279	08/10/2018	0	-70	7.1	1290	15.8	82.1
G279	01/23/2019	0	-64	7.0	1502	11.8	94.8
G279	08/26/2019	0	-69	7.0	1429	17.5	1000
G279	01/23/2020	7.40	342	7.0	1633	12.4	0.44
G279	08/12/2020	2.30	180	6.8	3898	19.6	1.4
G279	01/28/2021	9.00	102	7.0	1046	13.4	0.41
G280	01/21/2015	--	--	7.6	837	--	--
G280	04/13/2015	--	--	7.2	799	--	--
G280	07/23/2015	--	--	7.6	735	--	--
G280	10/08/2015	--	--	7.7	707	--	--
G280	11/24/2015	0	18	7.4	809	16.0	325
G280	02/10/2016	1.50	193	6.5	816	8.2	63
G280	05/10/2016	0	140	7.2	785	16.0	--
G280	08/03/2016	0	101	7.2	705	17.7	22.1
G280	11/20/2016	0	103	7.1	793	14.7	14.1
G280	02/15/2017	0	65	7.0	830	15.5	26.1
G280	05/20/2017	0	89	7.2	886	14.9	19.8
G280	07/18/2017	0	93	7.3	670	22.4	19.7
G280	11/04/2017	0	106	7.2	689	13.5	17.5
G280	05/16/2018	0	86	7.2	725	14.9	25.4
G280	08/10/2018	0	102	7.1	704	15.9	23.8

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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)
G280	01/22/2019	0	107	7.1	711	11.6	30
G280	08/26/2019	0	99	7.1	655	17.0	30
G280	01/23/2020	5.60	189	7.7	795.8	10.4	4.71
G280	08/11/2020	1.50	101	7.3	846	19.0	5.2
G280	01/28/2021	1.60	98.1	7.3	739	12.1	28.4
G280	03/30/2021	0.92	119	7.4	774	13.4	9.85
G280	05/06/2021	0.94	149	7.2	772	12.9	1.71
G280	05/19/2021	3.50	82.9	7.4	771	15.0	4.33
G280	06/28/2021	0.93	36	7.4	681	20.9	13
G280	07/13/2021	0.53	77.4	7.4	835	18.1	3.02
G280	07/27/2021	0.46	178	7.5	702.1	20.2	0
G283	03/31/2021	0.37	-16.1	6.9	1357	10.4	62.6
G283	04/22/2021	0.27	-59.5	7.0	1277	11.9	12
G283	05/06/2021	0.33	-21.9	7.1	1294	12.2	0.2
G283	05/18/2021	0.26	-65.3	7.1	1286	12.9	0.47
G283	06/15/2021	0.24	-55.9	7.0	1271	15.6	2.21
G283	06/29/2021	0.25	-80	7.0	1256	17.8	1.08
G283	07/13/2021	0.28	-86	7.1	1179	16.3	63.6
G283	07/27/2021	0.22	-74.1	7.1	1183	17.0	0.21
G284	03/30/2021	1.50	223	7.2	723	12.2	0.15
G284	04/21/2021	0.60	37.4	7.2	817.2	11.4	0.55
G284	05/06/2021	0.64	31.9	7.1	806	11.8	3.71
G284	05/18/2021	0.46	44.9	6.9	836	13.3	3.69
G284	06/14/2021	1.20	140	7.3	817	17.0	0
G284	06/28/2021	0.37	18.8	7.3	810.3	17.4	0
G284	07/13/2021	0.57	189	7.2	855	16.5	3.45
G284	07/27/2021	1.30	158	7.1	798.1	18.8	0
G285	03/30/2021	1.20	97.3	6.8	2077	12.6	27.6
G285	04/22/2021	0.33	124	6.7	2176	12.2	48
G285	05/06/2021	0.55	76.9	7.7	2069	13.0	20
G285	05/18/2021	0.37	55.5	6.8	2166	14.5	9.79
G285	06/15/2021	0.23	32.2	6.8	2144	16.7	115
G285	06/28/2021	0.35	16	6.9	2167	17.4	21.6
G285	07/13/2021	0.30	3	6.8	2141	16.6	34.8
G285	07/27/2021	0.33	-14.4	6.9	2143	17.8	42.2
G286	03/31/2021	6.50	128	7.0	575	9.6	0
G286	04/22/2021	3.90	138	6.7	494	11.2	0
G286	05/06/2021	3.70	89.5	7.1	528.5	16.0	1.78
G286	05/18/2021	2.40	79.7	7.1	498	13.4	0
G286	06/15/2021	1.80	99.8	7.1	546	19.7	1.29
G286	06/28/2021	2.80	38.4	7.2	158	19.8	0.05
G286	07/13/2021	2.50	130	7.0	558	19.5	2.2
G286	07/27/2021	3.70	92.7	7.2	573	20.0	0
G287	03/29/2021	5.70	59.6	7.3	798	11.1	2.85
G287	04/22/2021	5.50	128	7.1	816	11.6	98.2
G287	05/06/2021	5.40	147	7.2	802.6	11.9	3.21

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
 HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
 COFFEEN POWER PLANT
 GMF RECYCLE 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)
G287	05/18/2021	4.90	75	7.2	806	12.9	1.28
G287	06/14/2021	4.00	102	7.1	823	17.9	361
G287	06/28/2021	4.20	30.6	7.3	253	19.3	58.6
G287	07/13/2021	5.30	125	7.3	819	18.2	5.08
G287	07/27/2021	4.30	117	7.3	809	19.3	77
G288	03/30/2021	0.27	40.3	7.0	648	12.3	8.86
G288	04/21/2021	0.28	-21	7.1	691.1	0.0	11.3
G288	05/06/2021	1.10	-10.9	7.1	658	13.3	24.4
G288	05/18/2021	0.77	-74.3	7.2	706	13.2	5.91
G288	06/15/2021	0.32	-122	7.1	699	15.2	1.91
G288	06/28/2021	0.36	-96.7	7.3	719.7	17.6	0
G288	07/13/2021	1.30	-94.9	7.2	692	17.3	2.24
G288	07/27/2021	0.37	-113	7.5	611.9	19.1	6.71

Notes:

Field readings are reported with as many significant figures as provided by analytical laboratory.

-- = data not available

cm = centimeter

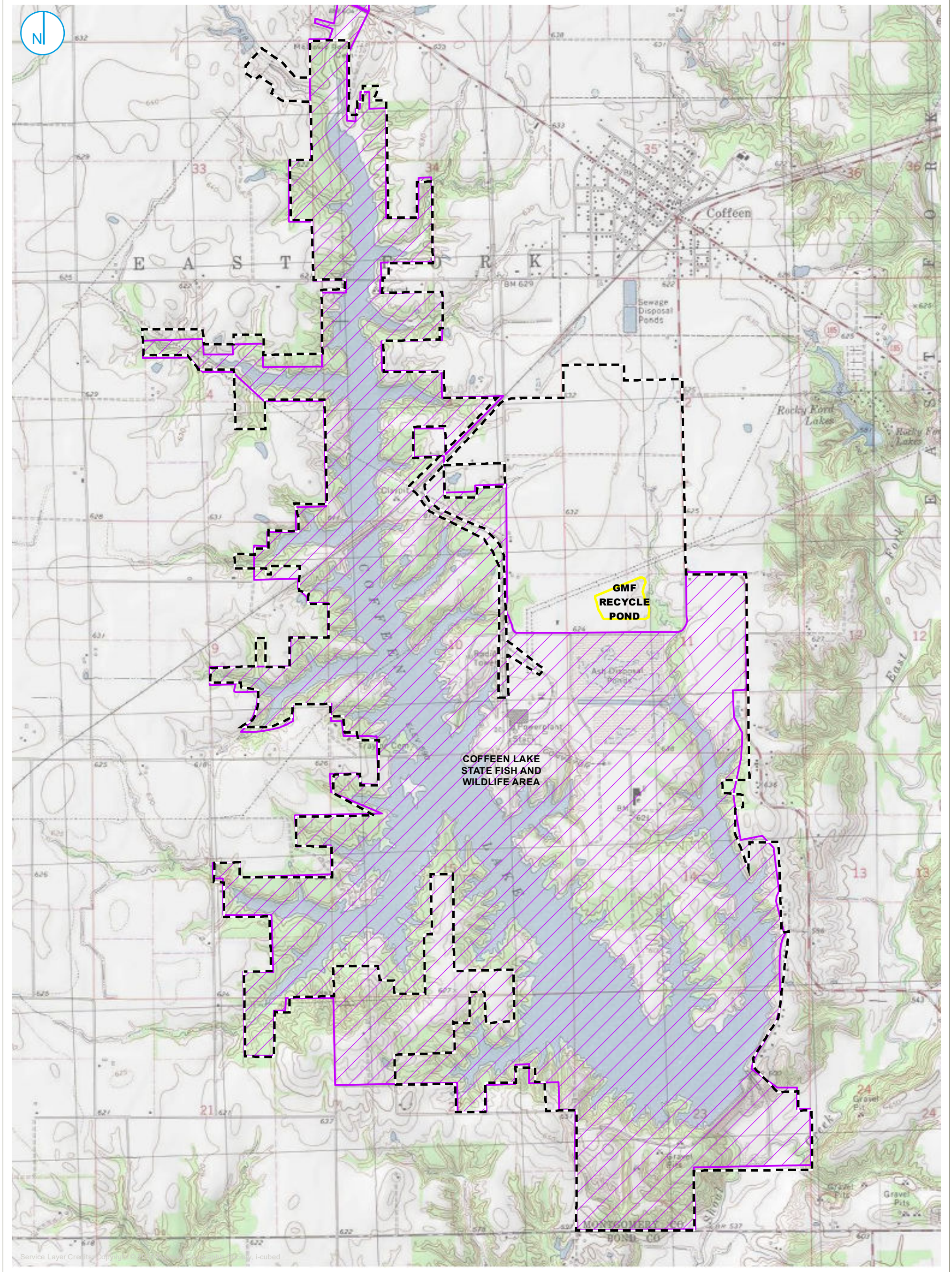
deg. C = degrees Celsius

mg/L = milligrams per liter

mV = millivolts

generated 10/22/2021, 11:51:12 AM CDT

FIGURES



- PART 845 REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY
- COFFEEN LAKE STATE FISH AND WILDLIFE AREA

SITE LOCATION MAP

FIGURE 1-1

0 1,000 2,000
Feet



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

- COAL MINE SHAFT
- PART 845 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- LIMITS OF FINAL COVER
- PROPERTY BOUNDARY

SITE MAP

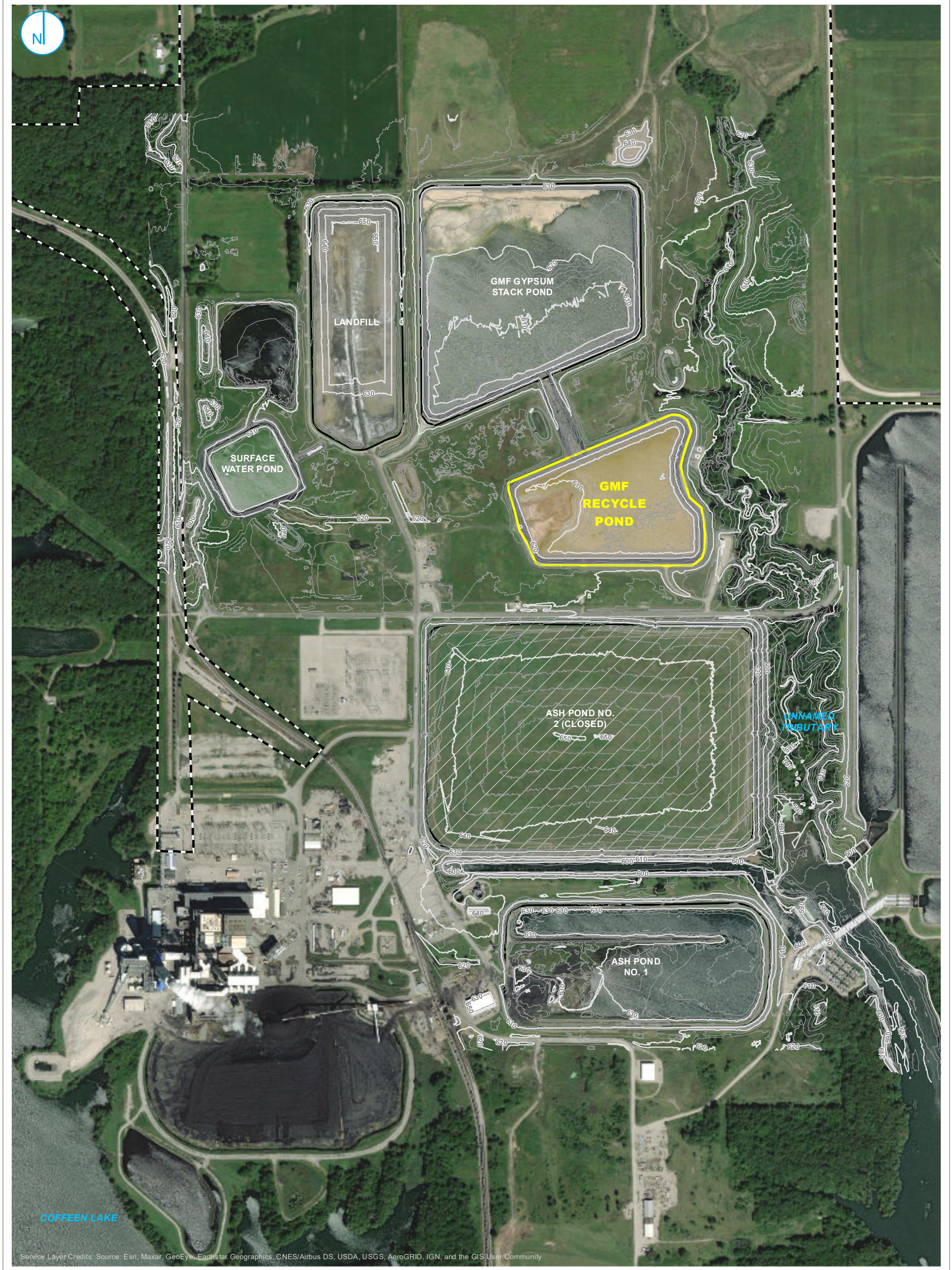
FIGURE 1-2

0 275 550
 Feet

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
 GMF RECYCLE POND
 COFFEEN POWER PLANT
 COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.





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

- 10-FT ELEVATION CONTOUR
- 2-FT ELEVATION CONTOUR
- PART 845 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- LIMITS OF FINAL COVER
- PROPERTY BOUNDARY

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

SITE TOPOGRAPHIC MAP

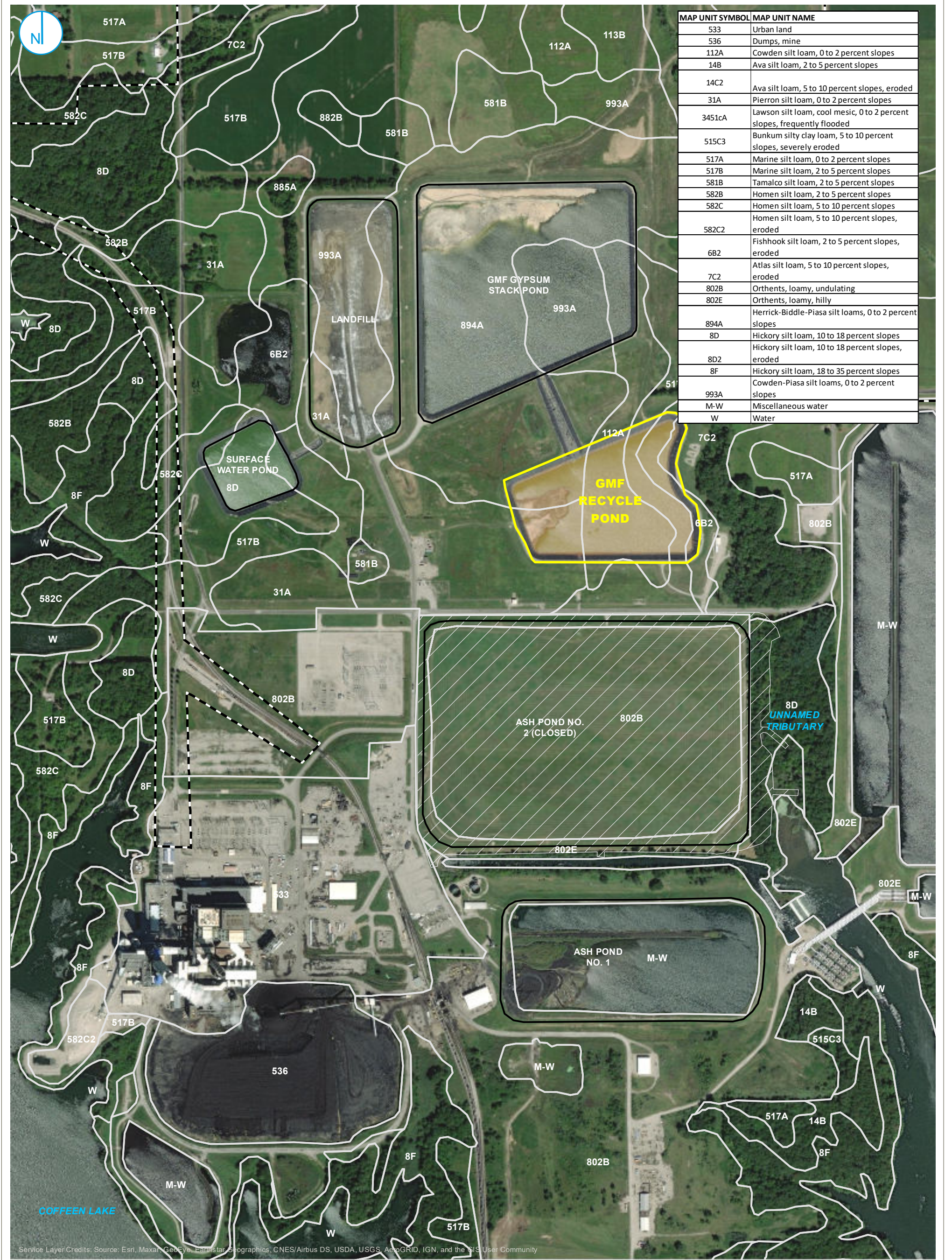
FIGURE 2-1

0 275 550 Feet
SOURCE: INGENAE SURVEY, 2021

**HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF RECYCLE POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS**

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.





- PROPERTY BOUNDARY
- PART 845 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- LIMITS OF FINAL COVER
- NRCS SOIL SURVEY MAP UNIT BOUNDARY

SOIL SURVEY MAP

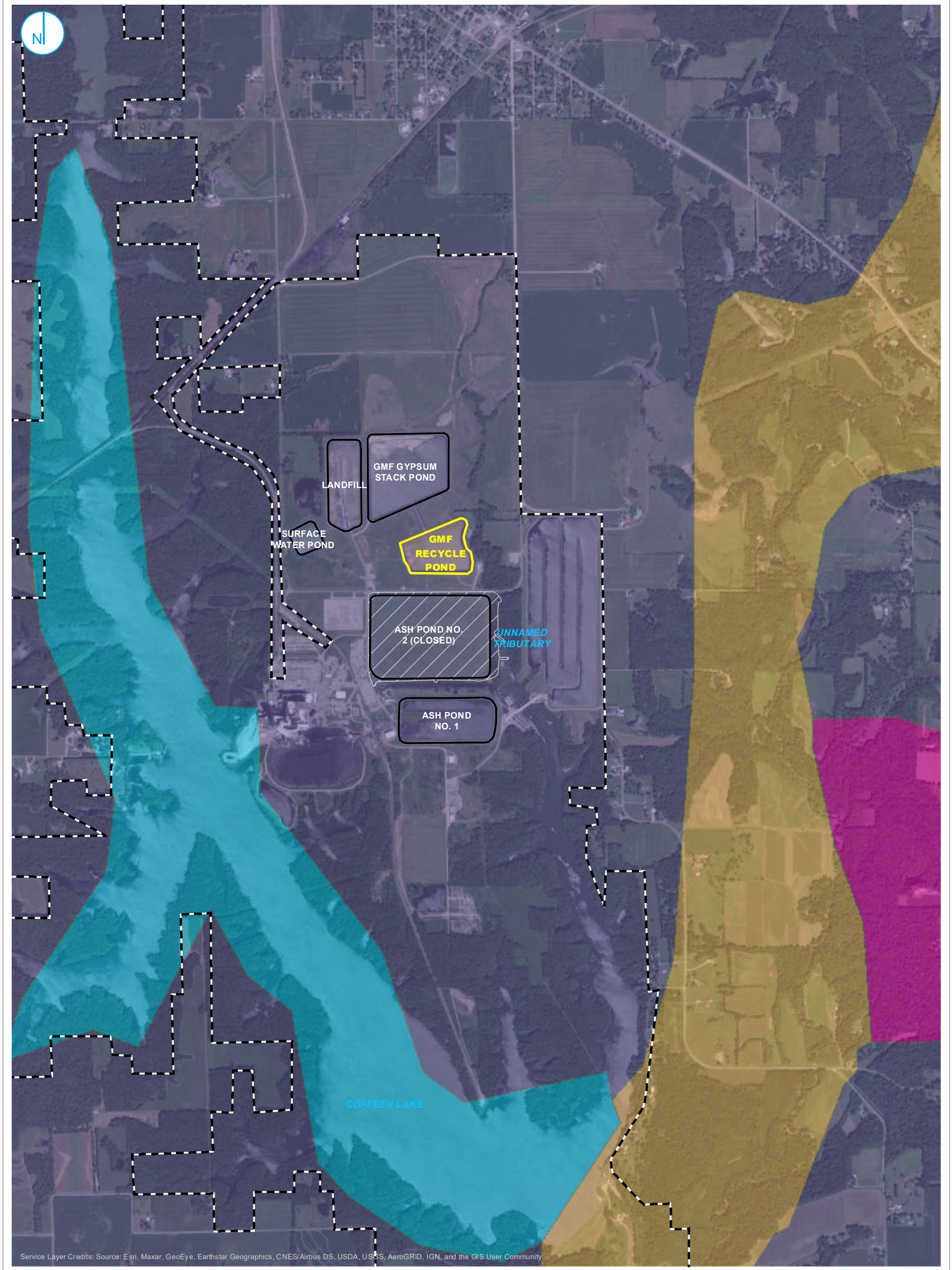
FIGURE 2-2



**HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF RECYCLE POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS**

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.





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

- 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
 SOURCE
 ILLINOIS STATE GEOLOGICAL SURVEY (ISGS)
 Feet

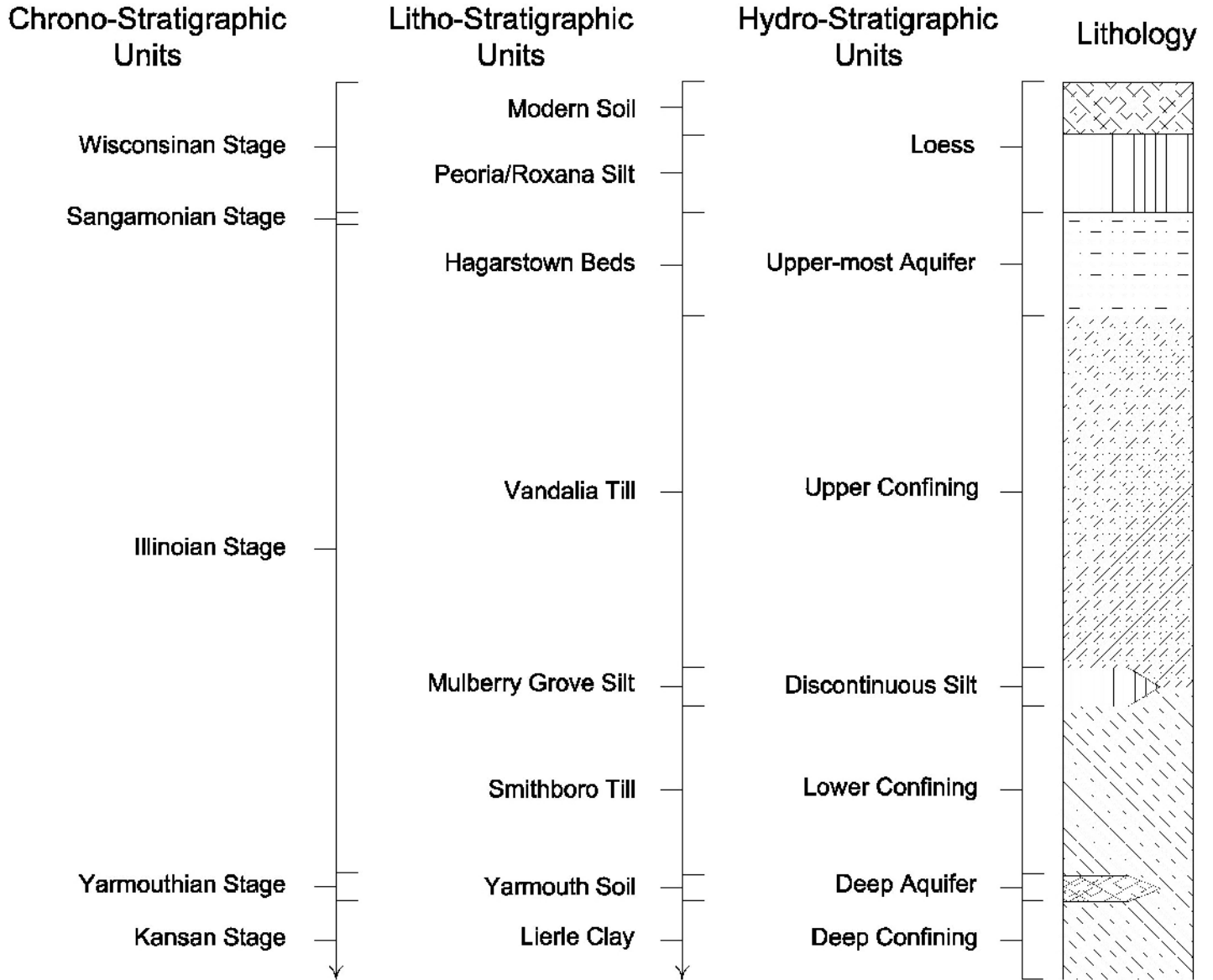
SURFICIAL GEOLOGIC DEPOSITS

FIGURE 2-3

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
 GMF RECYCLE POND
 COFFEEN POWER PLANT
 COFFEEN, ILLINOIS

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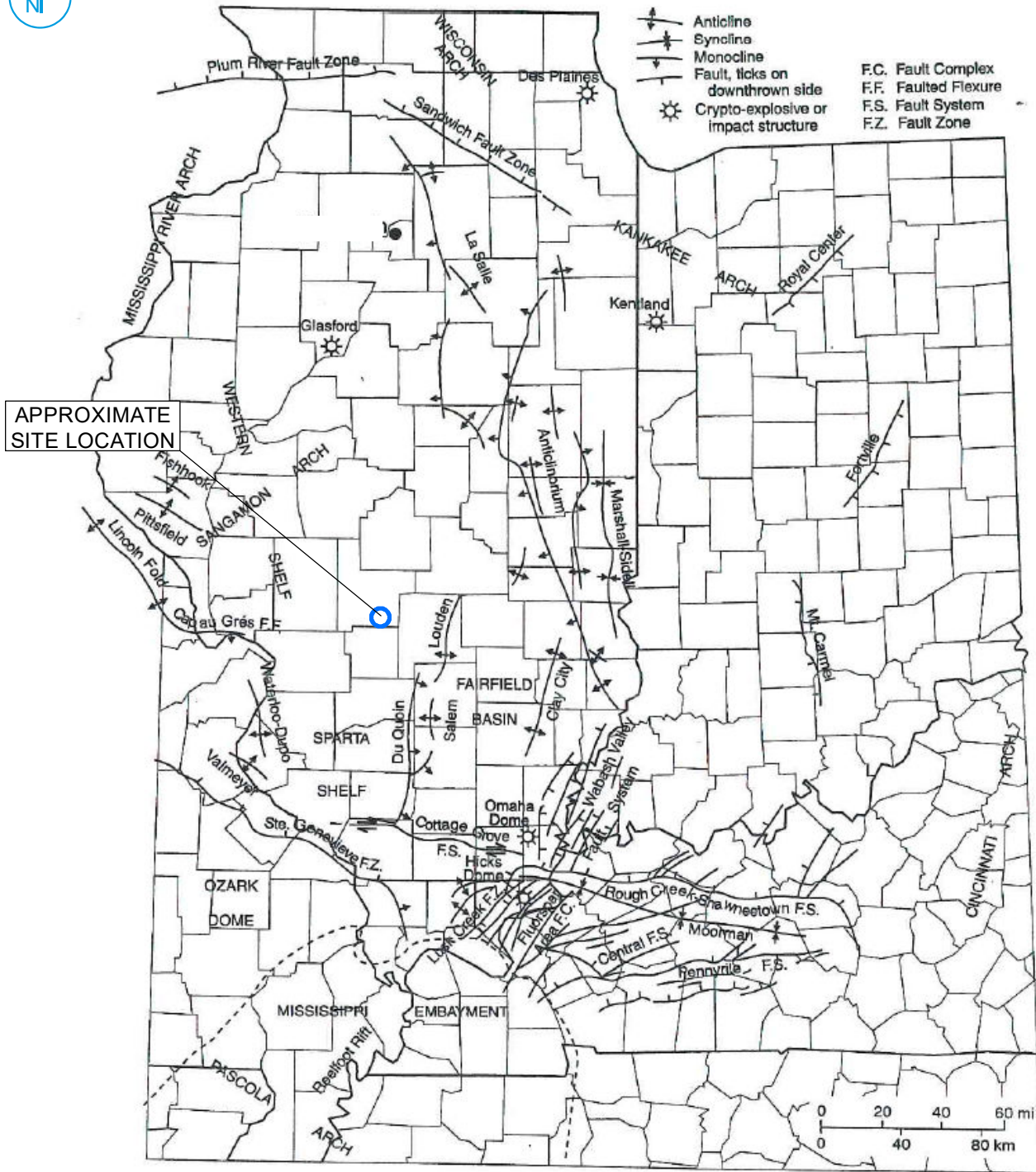


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GENERALIZED STRATIGRAPHIC COLUMN

FIGURE 2-4



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







Service Layer Credits:

MAJOR STRUCTURAL FEATURES OF ILLINOIS

FIGURE 2-5



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

-  MONITORING WELL
-  STAFF GAGE
-  PART 845 REGULATED UNIT (SUBJECT UNIT)
-  SITE FEATURE
-  LIMITS OF FINAL COVER
-  PROPERTY BOUNDARY

FIELD INVESTIGATION LOCATION MAP

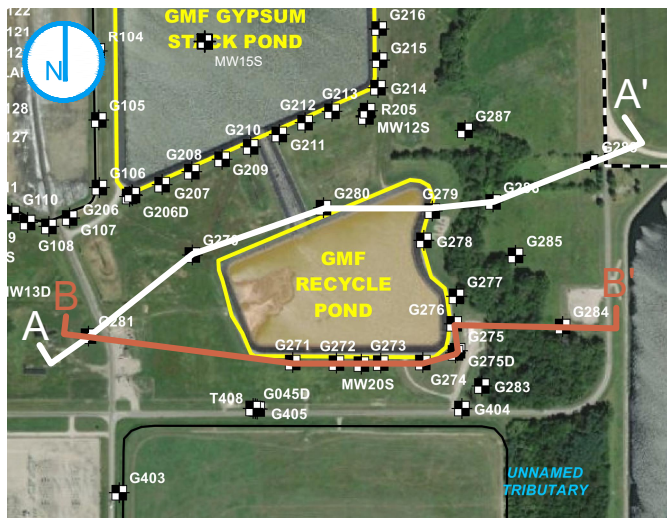
FIGURE 2-6



HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
RECYCLE POND
 COFFEEN POWER PLANT
 COFFEEN, ILLINOIS

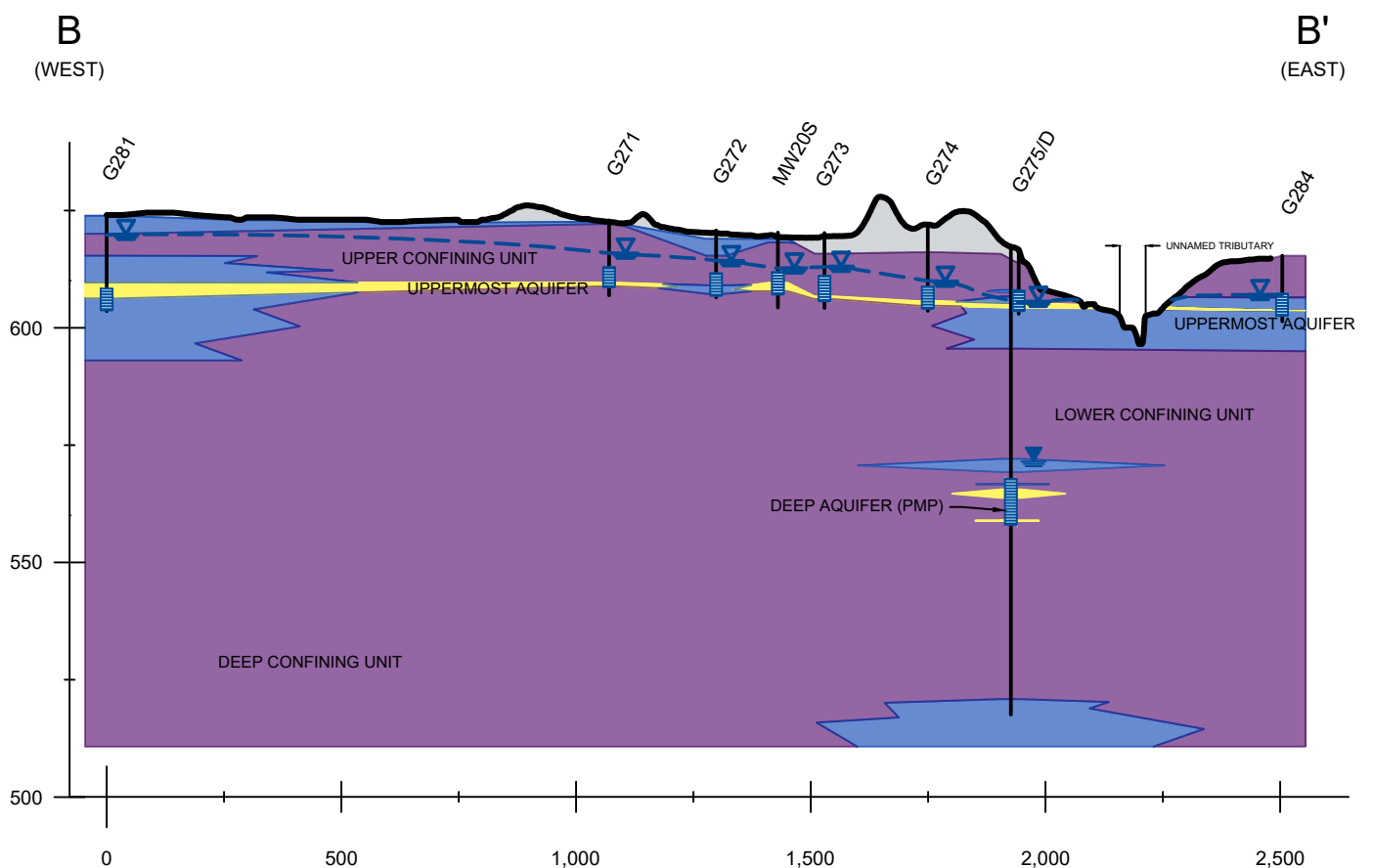
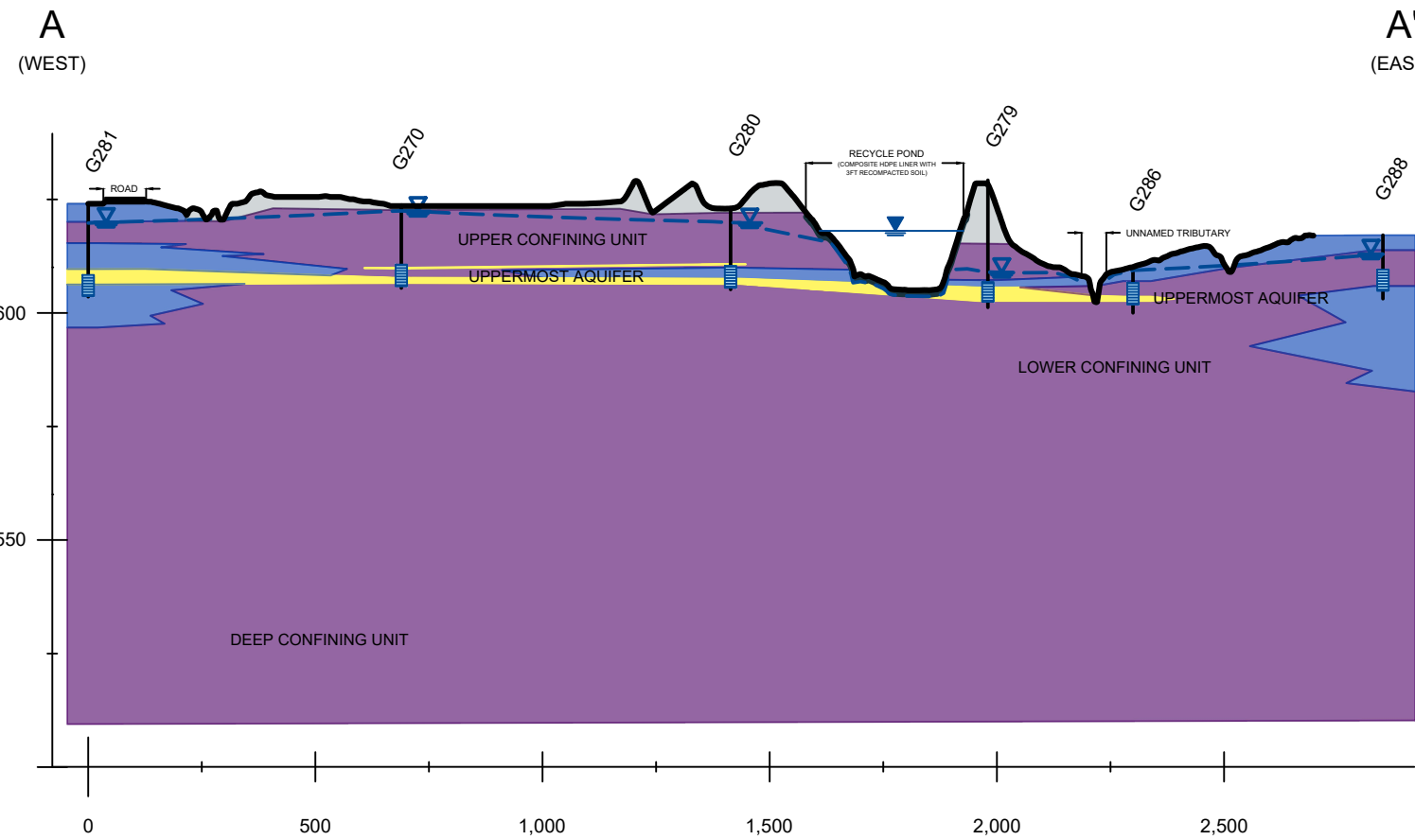
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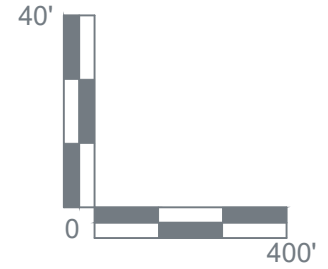
NOTES

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

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



**GEOLOGIC CROSS SECTIONS
A-A' & B-B'**

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF RECYCLE POND
 COFFEEN POWER PLANT
 COFFEEN, ILLINOIS

FIGURE 2-7

RAMBOLL AMERICAS
 ENGINEERING SOLUTIONS, INC.





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

- 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 RECYCLE POND
 COFFEEN POWER PLANT
 COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.





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

- BACKGROUND WELL
- MONITORING WELL
- SOURCE SAMPLE LOCATION
- STAFF GAGE
- PART 845 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- LIMITS OF FINAL COVER
- PROPERTY BOUNDARY



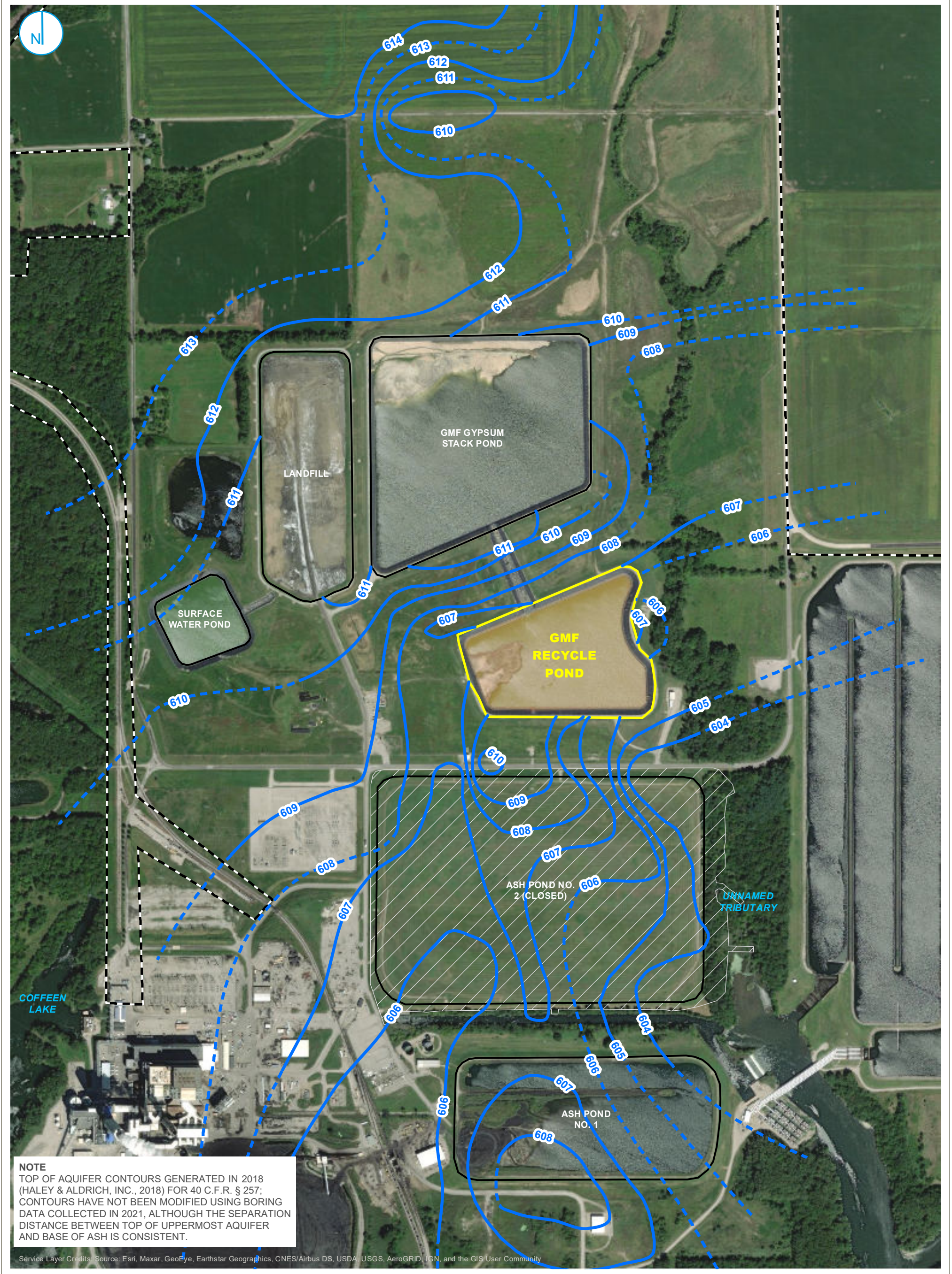
MONITORING WELL LOCATION MAP

FIGURE 3-1

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF RECYCLE POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.





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

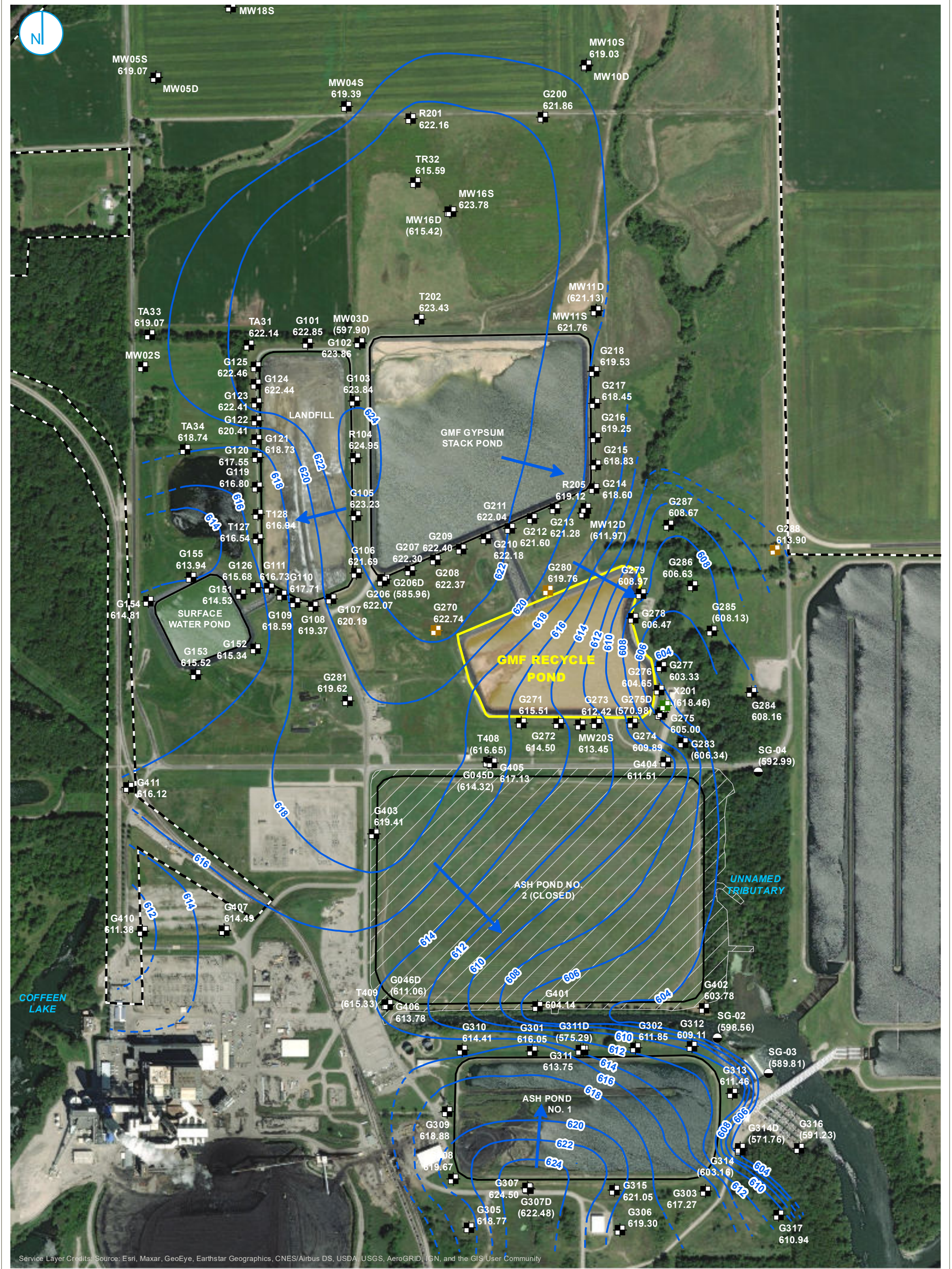
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- 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

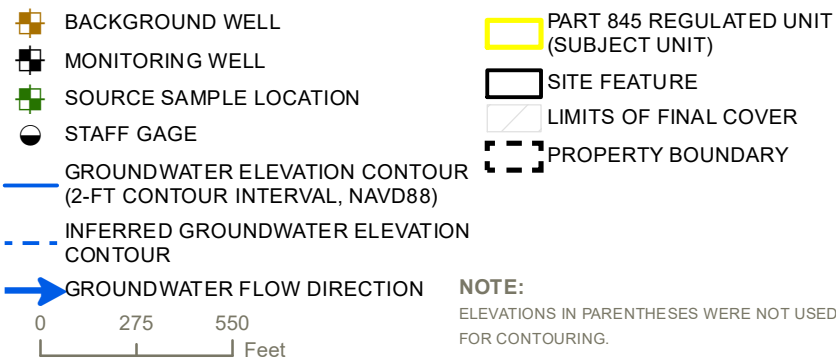
0 275 550
 Feet

TOP OF UPPERMOST AQUIFER

FIGURE 3-2



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



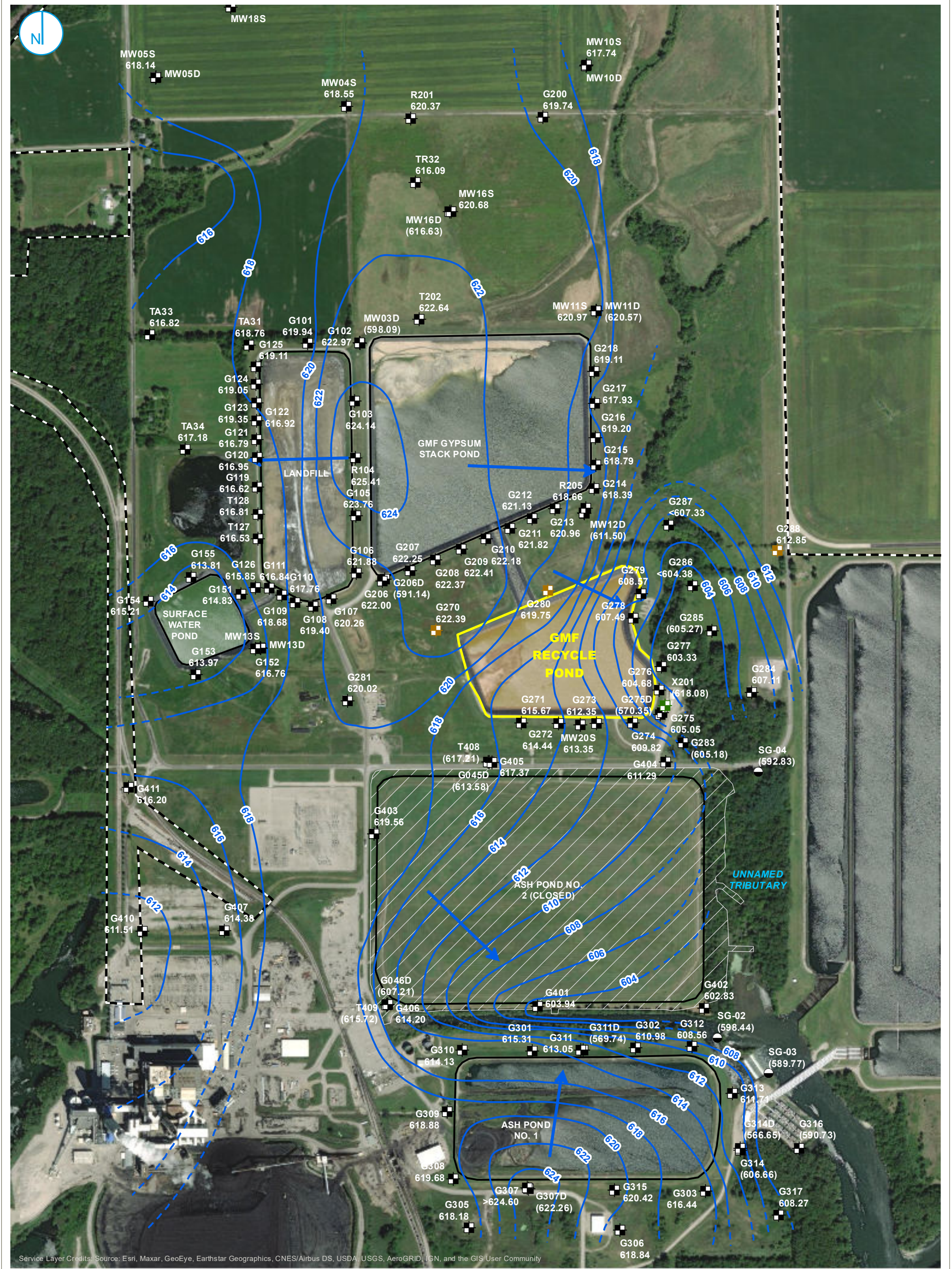
UPPERMOST AQUIFER GROUNDWATER ELEVATION CONTOURS
APRIL 20, 2021

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF RECYCLE POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

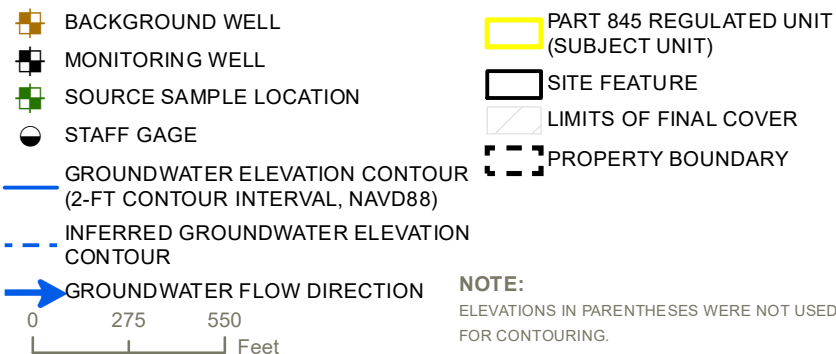
FIGURE 3-3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.





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



UPPERMOST AQUIFER GROUNDWATER ELEVATION CONTOURS JULY 26, 2021

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF RECYCLE POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

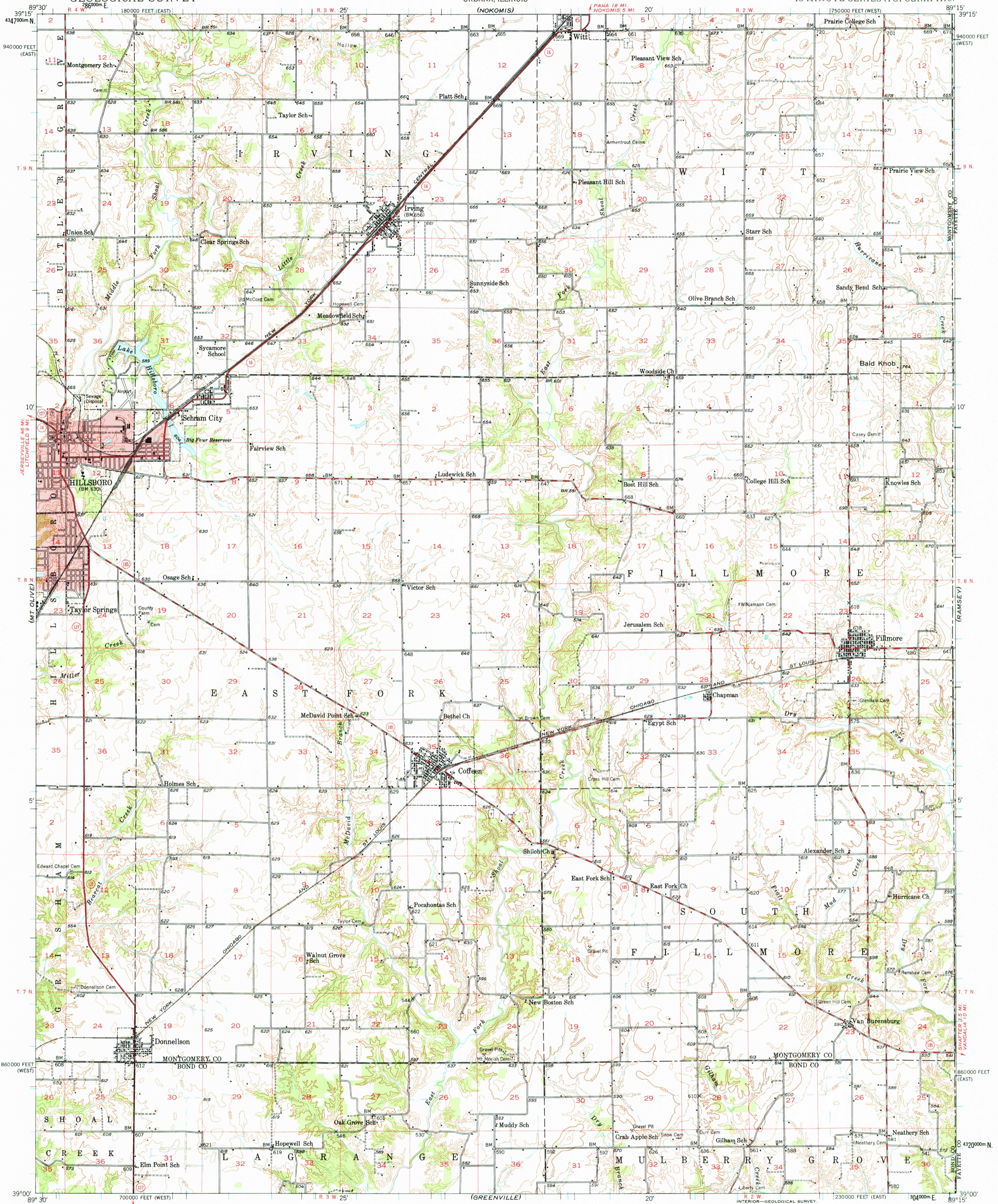
FIGURE 3-4

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.



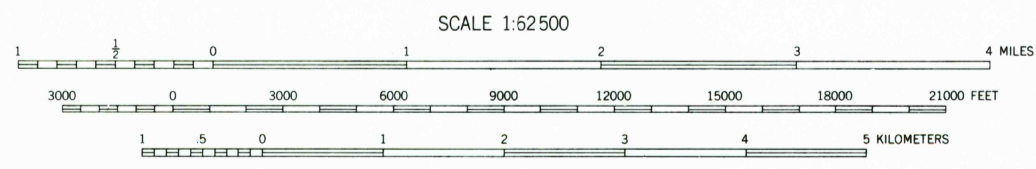
APPENDICES

APPENDIX A
HISTORIC TOPOGRAPHIC MAP



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

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN
DECLINATION, 1947



SCALE 1:62,500
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



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 A
HISTORIC TOPOGRAPHIC MAP

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

Stack Unit Map

- (P,Q,R,p*,q* or r*) Glassford Formation
- 98
- Bedrock_Topography

IDOT_Roadways

- Interstate
- Freeway and Expressway
- Other Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local Road or Street

Ponds

- Gypsum Stack Pond
- Recycle Pond
- 1000m Pond Buffer

Sand Units

- Alluvium/Coluvium [surficial sand]
- Formation Sands [subsurface sand]

National Hydrography Dataset Flowlines

- Perennial
- Intermittent
- Ephemeral

National Wetlands Inventory

- Lake
- Riverine

Managed Lands

- State Trust Land, Protected Biodiversity Area
- Coffeen Lake State Fish and Wildlife Area

Underground Coal Mines

- Underground Coal Mines
- Abandoned Coal Mine Shafts

Completed Quadrangle Mine Outlines

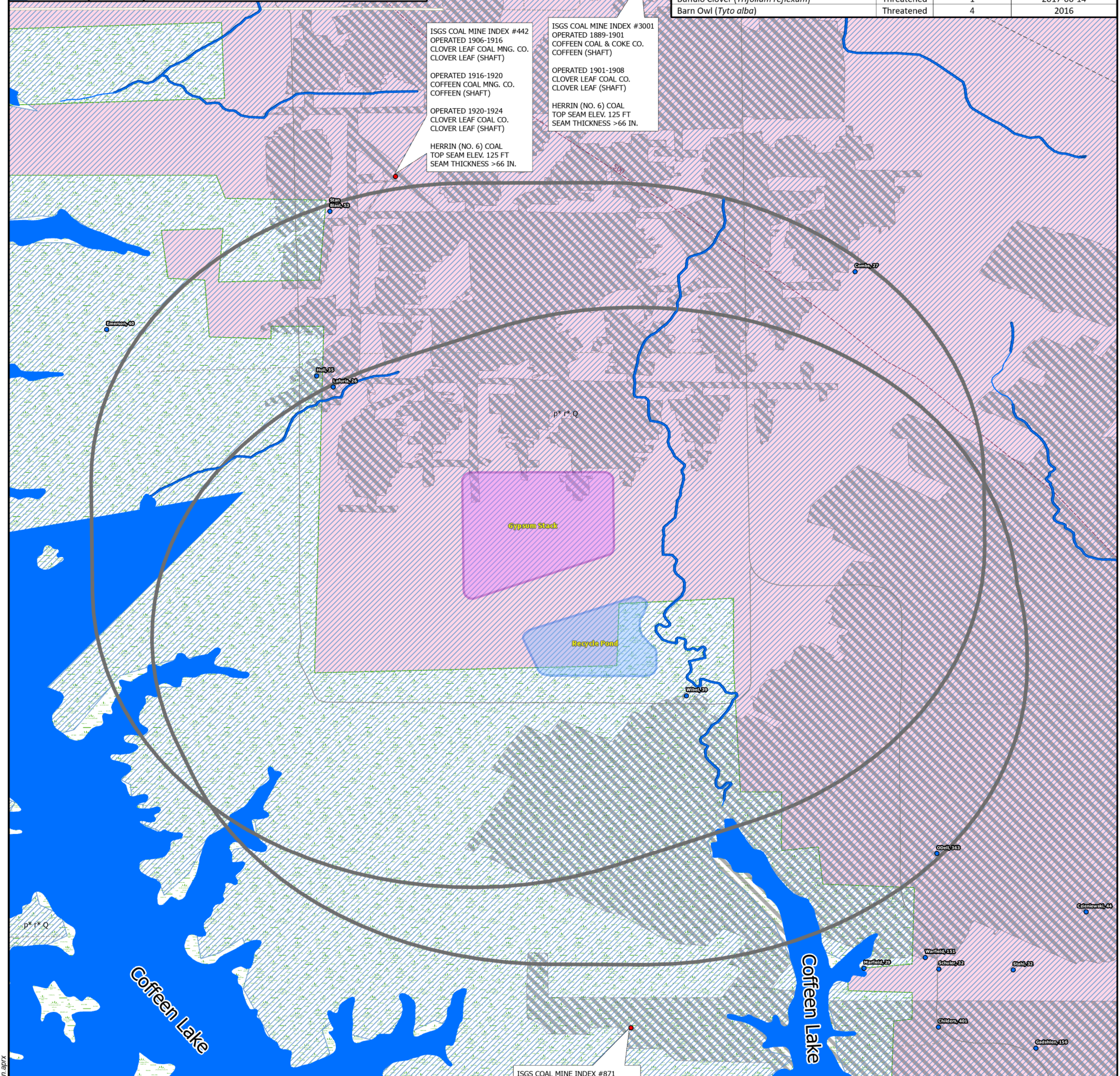
- Final
- Not Final

Water Wells*

- Water Wells*

Watershed:
HUC 8 - 07140203 (Shoal)
916 square miles

Montgomery County Threatened and Endangered Species			
Federally Listed Species			
Species	Status	Range	Habitat
Indiana Bat (<i>Myotis sodalis</i>)	Endangered	Montgomery	Caves, mines (hibernacula); small stream corridors with well-developed riparian woods, upland forests (foraging)
Northern Long-Eared Bat (<i>Myotis septentrionalis</i>)	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 (<i>Calephelis muticum</i>)	Endangered	1	2003-08-09
Northern Harrier (<i>Circus cyaneus</i>)	Endangered	1	2015-02-15
Bunchflower (<i>Melanthium virginicum</i>)	Threatened	1	2017-06-14
Prairie Rose Gentian (<i>Sabatia campestris</i>)	Endangered	1	PRE-2012
Royal Catchfly (<i>Silene regia</i>)	Endangered	1	2002-07-18
Eastern Blue-eyed Grass (<i>Sisyrinchium atlanticum</i>)	Endangered	2	2002-06-12
Ornate Box Turtle (<i>Terrapene ornata</i>)	Threatened	1	2013-06-03
Buffalo Clover (<i>Trifolium reflexum</i>)	Threatened	1	2017-06-14
Barn Owl (<i>Tyto alba</i>)	Threatened	4	2016



ISGS COAL MINE INDEX #442
OPERATED 1906-1916
CLOVER LEAF COAL MNG. CO.
CLOVER LEAF (SHAFT)

OPERATED 1916-1920
COFFEEN COAL MNG. CO.
COFFEEN (SHAFT)

OPERATED 1920-1924
CLOVER LEAF COAL CO.
CLOVER LEAF (SHAFT)

HERRIN (NO. 6) COAL
TOP SEAM ELEV. 125 FT
SEAM THICKNESS >66 IN.

ISGS COAL MINE INDEX #3001
OPERATED 1889-1901
COFFEEN COAL & COKE CO.
COFFEEN (SHAFT)

OPERATED 1901-1908
CLOVER LEAF COAL CO.
CLOVER LEAF (SHAFT)

HERRIN (NO. 6) COAL
TOP SEAM ELEV. 125 FT
SEAM THICKNESS >66 IN.

ISGS COAL MINE INDEX #871
OPERATED 1964-1970
TRUAX TRAEER COAL CO.
HILLSBORO (SHAFT)

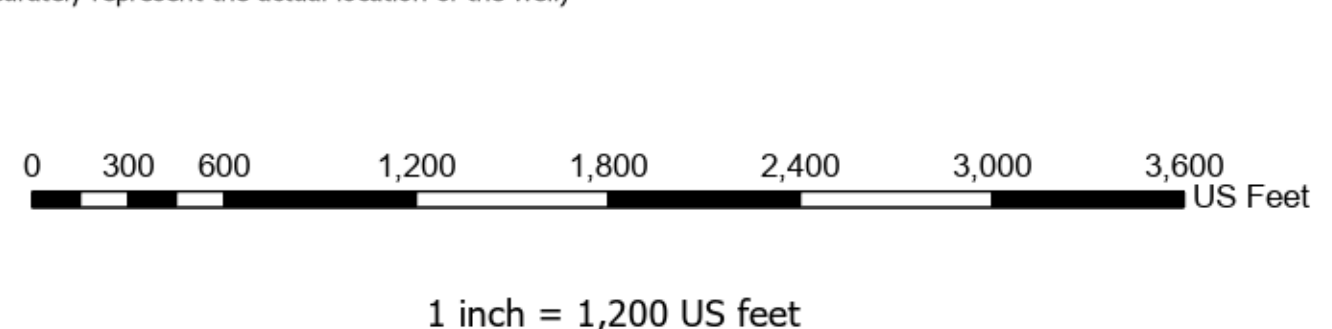
OPERATED 1971-1983
CONSOLIDATION CC, MIDWEST DIV.
HILLSBORO (SHAFT)

HERRIN (NO. 6) COAL
TOP SEAM ELEV. 125 FT
SEAM THICKNESS >66 IN.

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		

U:\hanson\dmf\20E0111A\GIS\Projects\Desktop\Evaluations\Desktop\Evaluation.aprx

*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)



Gypsum Management Facility

Work Plan Desktop Evaluation
Coffeen Power Station
Coffeen, Montgomery Co., Illinois

Job Number: 20E0111A Sheet 1

WATER WELL 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

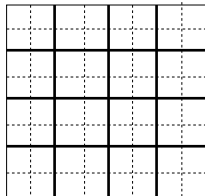
LATITUDE 39.07411

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	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

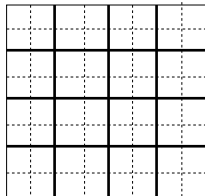
DATE DRILLED November 30, 1981 NO.

ELEVATION 0 COUNTY NO. 22832

LOCATION 115'S line, 102'W line of SE SE NW

LATITUDE 39.064493 LONGITUDE -89.391801

COUNTY Mo om y API 121352283200 11 - 7N - 3W

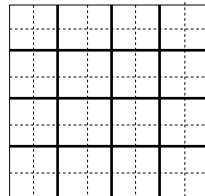


ILLINOIS STATE GEOLOGICAL SURVEY

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



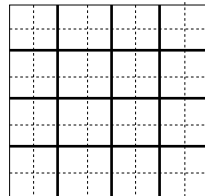
11 - 7N - 3W

ILLINOIS STATE GEOLOGICAL SURVEY

Monitoring	Top	Bottom
clay	0	3
silt	3	16
clay	16	17
Total Depth		17
Casing: 2" SSCH 40 PVC from 0' to 6'		
Screen: 10' of 2" diameter .01 slot		
Grout: CEMENT/BENT 5% from 0 to 3.		
Size hole below casing: 7.87"		
Water from at 0' to 11'.		
Static level 13' 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-3
 ELEVATION 621GL COUNTY NO. 23616
 LOCATION 1620'N line, 200'E line of section
 LATITUDE 39.066898 LONGITUDE -89.381266
 COUNTY Montgomery API 121352361600



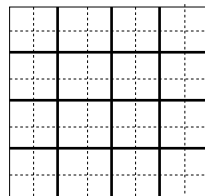
11 - 7N - 3W

ILLINOIS STATE GEOLOGICAL SURVEY

Monitoring	Top	Bottom
silty clay	0	25
Total Depth		25
Casing: 2" SCH 40 PVC from 0' to 15'		
Screen: 10' of 2" diameter .01 slot		
Grout: CEMENT/BENT 5% from 0 to 11.		
Size hole below casing: 7.87"		
Water from at 0' to 6'.		
Static level 9' below casing top which is 3' 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-11
ELEVATION 624GL **COUNTY NO.** 23617
LOCATION 1770'N line, 500'E line of section
LATITUDE 39.066488 **LONGITUDE** -89.382322
COUNTY Montgomery **API** 121352361700



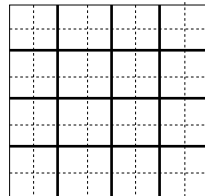
11 - 7N - 3W

ILLINOIS STATE GEOLOGICAL SURVEY

Monitoring	Top	Bottom
sandy clay	0	3
silty lclay	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



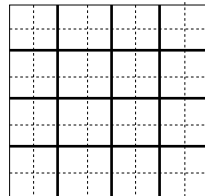
11 - 7N - 3W

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



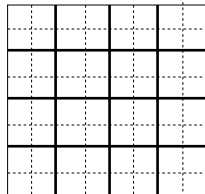
11 - 7N - 3W

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



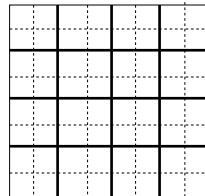
11 - 7N - 3W

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
brown sandy clay	0	7
orangish brown clay sandy & pebble hard	7	9
brown clay very sandy & pebble hard	9	40
gray clay very sandy & pebble hard	40	43
greenish gray clay tacky	43	50
brn sandy clay pebble hard & cobblestone	50	72
gray clay sandy pebble hard	72	85
brown clay tacky stiff	85	101
grn-gry shale w/f strk dk red/brn rock	101	107
gray shale sandy (H)	107	115
gray sandstone clean tight	115	117
gray shale very sandy	117	135
gray sandstone clean cemented (H)	135	157
gray shale sticky	157	177
gray shale very soft (cavey)	177	180
gray shale sticky little sandy	180	187
lime gray & dull gray (H-M)	187	196
gray & black shale sandy firm	196	201
gray shale sandy & sticky	201	263
gray & dk gry shale w/f pieces brn lime	263	274
gray & lt gray shale & sticky	274	288
gray sandstone loose (dirty)	288	290
gray sandstone w/streak of gry sandstone	290	297
gray sandstone clean loose semi loose	297	301

Permit Date: June 21, 1996

Permit #:

COMPANY Kohnen, Clarence

FARM O'Dell, Kenneth & Chong

DATE DRILLED August 6, 1996

NO.

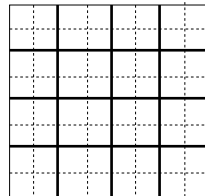
ELEVATION 0

COUNTY NO. 23802

LOCATION NW SE SE

LATITUDE 39.05958

LONGITUDE -89.383966



COUNTY Mo om y

API 121352380200

11 - 7N - 3W

gray shale very sandy	301	307
gray sandstone clean loose fine cuttings	307	315
gray sandstone w/streak of gray shale	315	317
gray sandstone clean semi loose	317	325
gray sandstone clean loose water bearing	325	363

Total Depth

Casing: 6" PVC SDR 21 from 0' to 116'		
4.5" PVC SDR 17 from 102' to 362'		
4.5" SLOTTED @ 321'-322' & from 342' to 362'		

Grout: BENTONITE SLRY from 0 to 116.

Water from light gray sandstone at 322' to 362'.

Static level 300' below casing top which is 1' above GL

Pumping level 362' when pumping at 15 gpm for 0 hours

Remarks: TDS 800, shale trap @ 116'-302'-322'-330'

Owner Address: 169 O'Dell Lane Coffeen, IL

Location source: Location from permit

ILLINOIS STATE GEOLOGICAL SURVEY

Monitoring	Top	Bottom
very dark grayish brn mst firm silt	0	1
yellowish brn mottles mst frm silty clay	1	6
gray w/yellowish brn mttls mst frm clay	6	8
yellowish brn mst frm clay w/ sand tr gv	8	11
yellowish brn mst soft sandy silt tr gvl	11	12
yellowish brn mst soft silty sand tr gvl	12	14
gray mst hard silty clay tr sand & gvl	14	16
Total Depth		16
Casing: 2" PVC from -3' to 11'		
2" PVC SCREEN from 11' to 16'		
2" PVC from 16' to 16'		
Screen: 4' of 2" diameter .01 slot		
Grout: HIGH SOLIDS BENT from 2 to 8.		
Grout: GRANULAR from 8 to 10.		
Grout: QUARTZ SAND from 10 to 16.		
Water from sand at 12' to 15'.		
Static level 5' below casing top which is 31' above GL		

Permit Date:

Permit #:

COMPANY

FARM Coffeen Power Station

DATE DRILLED March 20, 2017

NO.

ELEVATION 622GL

COUNTY NO. 24254

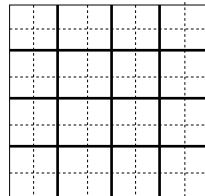
LOCATION NW NE SW

LATITUDE 39.068593

LONGITUDE -89.394164

COUNTY Montgomery

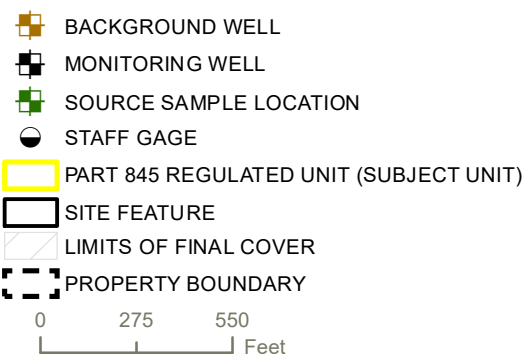
API 121352425400



11 - 7N - 3W

**APPENDIX C
BORING AND WELL CONSTRUCTION LOGS**

BORING AND WELL LOCATIONS MAP



MONITORING WELL LOCATION MAP

FIGURE C1

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF RECYCLE POND
 COFFEEN POWER PLANT
 COFFEEN, ILLINOIS

RAMBOLL AMERICAS
 ENGINEERING SOLUTIONS, INC.



BORING LOGS

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: 8/16/2016
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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/60 0%	BD					2	Black (10YR2/1), moist, soft, clayey SILT (TOPSOIL)		620	
	0/60 0%	BD					4	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY		618	
							6	Gray (10YR6/1), moist, firm, silty CLAY slight trace sand		616	
	0/60 0%	BD					6	Gray (10YR5/1), very moist, soft, clayey, very fine- to fine-grained SAND			
							8	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel		614	
							10	Yellowish brown (10YR5/8) with 40% gray (10YR6/1) mottles, moist, firm, silty CLAY with sand and trace gravel		612	
	0/48 0%	BD					12	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND		610	
							12	Dark brown (10YR3/3), very moist, soft, clayey, fine- to very coarse-grained SAND with slight trace gravel			
							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	
							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			
1A	24/24 100%	SS	6-23 37-44 N=60		11	1.50	16	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	18	Dark gray (10YR4/1), dry, hard, SILT with few fine- to coarse-grained sand, little clay and trace small gravel.		604	
3A	14/17 82%	SS	16-47 50/5"		7	4.50	20			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



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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
4A	19/24 79%	SS	15-36 32-36 N=68	8	4.50		22	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	
5A	19/24 79%	SS	10-18 30-33 N=48	8	4.50		24	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		26			596	
7A	11/24 46%	SS	28-26 23-26 N=49	11	4.50		28	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		30	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				16			30	Dark gray (10YR4/1), dry, hard, SILT with few fine- to coarse-grained sand, little clay and little small gravel.			
9B	17/24 71%	SS	7-14 12-12 N=26	14			30	Dark gray (10YR4/1), dry, very stiff, SILT with some very fine-grained SAND.		590	
9C				9			32	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		34	Very dark gray (10YR3/1), moist, very stiff, CLAY with little silt and little medium-grained sand.		588	
11-1				15			34				
11-2	22/24 92%	SH		15			36			586	
11-3							36				
11-4							36				
12A	24/24 100%	SS	2-5 8-10 N=13	16	2.00		38	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		40	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	

NOTE(S): G45D installed in boring.
 Boring was blind drilled to 14.0 feet bgs. Blind drill lithologies from boring G405.

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: 8/16/2016
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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							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	42	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	
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



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Black (10YR2/1), moist, soft, clayey SILT (TOPSOIL)		620	
1A	19/24 79%	ss		43	0.78		2				
1B				26	1.94						
2A	12/12 100%	ss		27	2.52	BSh	4	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY		618	
3A				24	3.92	BSh					
3B	24/24 100%	ss		24	2.33	BSh	6	Gray (10YR6/1), moist, firm, silty CLAY slight trace sand		616	
4A	24/24 100%	ss		20	2.33	BSh	8	Gray (10YR5/1), very moist, soft, clayey, very fine- to fine-grained SAND		614	
5A	24/24 100%	ss		24	1.55	BSh	10	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel		612	
6A	24/24 100%	ss		19			12	Yellowish brown (10YR5/8) with 40% gray (10YR6/1) mottles, moist, firm, silty CLAY with sand and trace gravel		610	
6B				18				Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND			
7A	24/24 100%	ss		9	7.42	BSh		Dark brown (10YR3/3), very moist, soft, clayey, fine- to very coarse-grained SAND with slight trace gravel		608	
								Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND			
								Dark yellowish brown (10YR4/4), moist, soft, sandy SILT with trace gravel			
								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			

End of Boring = 14.2 ft. BGS

NOTE(S):

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

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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 75%	ss	4-3 4-6 N=7	11		1.50	1.50	Dark brown (10YR3/3), moist, stiff, SILT with few clay and trace organics.			
1B							3.00				
2A	12/24 50%	ss	4-6 3-3 N=9	12		2.50	2.50	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay and trace small gravel.		620	
2B							2.00				
3A	3/24 13%	ss	3-3 4-7 N=7	24			4.00	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay. Grayish brown (10YR5/2) with 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with few silt and little fine-grained sand.		618	
							6.00	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	8.00	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	10.00	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	12.00	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	14.00	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	16.00	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.		606	
8B							16.00	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			18.00	Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, moist, loose, fine-grained SAND with some clay.		604	
9B							18.00			604	
10A	17/24 71%	ss	13-31 33-42 N=64	7		4.50	20.00	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



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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen Township: East Fork Section 11, Tier 7 N.; Range 3 W.	▼ = Dry - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11-1	3/3 100%	SH											
	8/24 33%	DS											
12-1									22	Gray (10YR5/1), dry, hard, SILT with few clay, few fine- to coarse-grained sand and trace small gravel. <i>[Continued from previous page]</i>		600	
13-1													
13-2	24/24 100%	DS											
13-3													
13-4									24			598	
14A					19					Pale brown (10YR6/3), wet, loose, fine-grained SAND.			
14B	21/21 100%	SS	7-30 32-20 N=62	7		4.50				Pale brown (10YR6/3), wet, loose, fine-grained SAND and small GRAVEL.			
14C				8					26	Gray (10YR5/1), dry, hard, SILT with some clay, trace fine- to coarse-grained sand and trace small gravel.		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.			
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.			
17A	17/24 71%	SS	2-5 7-12 N=12	15		2.50				Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small to large gravel.			
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.			
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.			
20A	22/24 92%	SS	2-2 5-7 N=7	17		1.00				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.			
21A	24/24 100%	SS	2-3 4-6 N=7	17		1.00				Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.			

NOTE(S): G46D installed in boring.

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

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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
22A	24/24 100%	SS	1-3 5-6 N=8	17	1.50		42			580	
23-1											
23-2	24/24 100%	SH		16							
23-3											
23-4							44			578	
24A	24/24 100%	SS	3-4 6-7 N=10	17	1.50		46	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel. <i>[Continued from previous page]</i>		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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 75%	ss	1-1 2-3 N=3	24			0	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	
2A	18/24 75%	ss	1-3 3-5 N=6	30			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	
3A	19/24 79%	ss	2-3 4-4 N=7	26			4	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY, slight trace roots.		620	
4A	19/24 79%	ss	1-3 4-3 N=7	21			6	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		618	
5A	22/24 92%	ss	1-3 3-4 N=6	23			8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		616	
6A	20/24 83%	ss	1-2 2-3 N=4	24			10	Gray (10YR6/1) with 35% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		614	
7A	22/24 92%	ss	1-2 3-2 N=5	17			12	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, very moist, medium, silty, sandy CLAY with trace gravel.		612	
8A 8B	14/24 58%	ss	1-2 5-8 N=7	15 13			14	Brown (10YR5/3), very moist, medium, silty, clayey, very fine- to coarse-grained SAND with slight trace gravel.		610	
9A	16/24 67%	ss	2-5 15-25 N=20	16			16	Brown (10YR5/3), very moist, loose, silty, very fine- to coarse-grained SAND with slight trace gravel.		608	
10A 10B	17/24 71%	ss	19-20 22-18 N=42	14 8			18	Brown (10YR5/3), very moist, dense, silty, very fine- to coarse-grained SAND with slight trace gravel.		606	

NOTE(S): G101 installed in borehole.

FIELD BORING LOG



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: 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft 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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 14.00 - While drilling ▽ = 7.03 - 6/1/06 ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24	SS	2-2	17	2.07	SP	Very dark grayish brown (10YR3/2), lean CLAY Grayish brown (10YR5/2), lean CLAY, trace sand Yellowish brown (10YR5/6), lean CLAY, trace sand Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, lean CLAY, trace sand Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, sandy SILT, trace gravel Yellowish brown (10YR5/6) with 50% gray (N5/1) mottles, lean CLAY, trace sand and gravel Yellowish brown (10YR5/6), lean CLAY, little sand, trace gravel Dark gray (10YR4/1), sandy CLAY, trace gravel Gray (10YR6/1) with 50% yellowish brown (10YR5/8) mottles, lean CLAY, little sand, trace gravel Yellowish brown (10YR5/8), silty, fine SAND, little medium sand, trace gravel, wet Yellowish brown (10YR5/8), silty, fine SAND, little clay, wet 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		624 622 620 618 616 614 612 610				
1B	83%		4-6 N=6								20		
1C			26	3.30 B	2								
2A	17/24 71%	2-3 4-5 N=7	25	3.05 B	4								
3A	20/24 83%	2-3 3-5 N=6	16	1.96 B	6								
4A	24/24 100%	4-3 5-6 N=8	21	2.27 B	8								
5A	21/24 88%	1-3 3-4 N=6	20	2.18 B	10								
5B			19										
6A	18/24 75%	1-2 2-4 N=4	24	0.87 B	12								
7A	23/24 96%	SH SS	3-2 2-4 N=4	19	14								
7B	16/24 67%												
8A	23/24 96%	3-12 29-50 N=41	13		16								
8B			13										
8C			12										
9A	12/12 100%	8-82	10	6.98 B									

NOTE(S): G102 (MW03S) installed in blind-drilled borehole within 10 ft of SB-03.

FIELD BORING LOG



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▽ = 14.00 - While drilling ▽ = 7.03 - MW03S on 6/1/06 ▽ = 55.40 - MW03D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24	ss	2-2	17	2.07	SP	Very dark grayish brown (10YR3/2), lean CLAY Grayish brown (10YR5/2), lean CLAY, trace sand Yellowish brown (10YR5/6), lean CLAY, trace sand Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, lean CLAY, trace sand Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, sandy SILT, trace gravel Yellowish brown (10YR5/6) with 50% gray (N5/1) mottles, lean CLAY, trace sand and gravel Yellowish brown (10YR5/6), lean CLAY, little sand, trace gravel Dark gray (10YR4/1), sandy CLAY, trace gravel Gray (10YR6/1) with 50% yellowish brown (10YR5/8) mottles, lean CLAY, little sand, trace gravel Yellowish brown (10YR5/8), silty, fine SAND, little medium sand, trace gravel, wet Yellowish brown (10YR5/8), silty, fine SAND, little clay, wet 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 Gray (10YR5/1), sandy SILT, trace gravel		626 624 622 620 618 616 614 612 610 608 606				
1B	83%		4-6 N=6	20		2							
1C				26	3.30	B					2		
2A	17/24	ss	2-3 4-5 N=7	25	3.05	B					4		
3A	20/24	ss	2-3 3-5 N=6	16	1.96	B					6		
4A	24/24	ss	4-3 5-6 N=8	21	2.27	B					8		
5A	21/24	ss	1-3 3-4 N=6	20	2.18	B					10		
5B				19							10		
6A	18/24	ss	1-2 2-4 N=4	24	0.87	B					12		
7A	23/24	SH	3-2	19							14		
7B	16/24	SS	2-4 N=4	12							14		
8A	23/24	ss	3-12 29-50 N=41	13							16		
8B				13							16		
8C				12							16		
9A	14/24	ss	8-82 85-72 N=167	10	6.98	B					18		
9B				13	6.18	BSh					18		
10A	18/24	ss	6-21 32-49 N=53	8	11.95	Sh					20		

Shelby tube taken from shallow well borehole at indicated depth.

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 14.00 - While drilling ▽ = 7.03 - MW03S on 6/1/06 ▽ = 55.40 - MW03D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	19/24 79%	ss	3-20 35-29 N=55	10	5.36	S _h			22			604	Wood fragments
12A	20/24 83%	ss	15-25 89-69 N=114	8	13.00	S _h			24	Gray (10YR5/1), sandy SILT, trace gravel [Continued from previous page]		602	
13A	23/24 96%	ss	14-19 24-22 N=43	9					26	Yellowish brown (10YR5/4), lean CLAY, trace sand and gravel		600	
13B				13	6.98	B _S h							
14A	24/24 100%	ss	19-21 26-32 N=47	15	7.01	B _S h			28	Gray (10YR4/1), clayey SILT, trace sand and gravel		598	
15A	21/24 88%	ss	10-25 25-23 N=50	12						Light gray (10YR6/1), SILT, trace sand			
15B				13	8.53	B _S h			30			596	
16A	24/24 100%	ss	7-12 19-30 N=31	13	9.16	B _S h			32			594	
17A	24/24 100%	ss	29-35 39-42 N=74	14	6.59	B			34	Gray (10YR4/1), lean CLAY, trace sand and gravel		592	
17B				14	3.49	S _h							
18A	23/24 96%	ss	6-8 11-17 N=19	13	7.21	B _S h			36			590	
19A	24/24 100%	ss	19-21 31-31 N=52	13	6.98	B _S h			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	B _S h			40	Gray (10YR4/1), lean CLAY, trace sand and gravel		586	

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▽ = 14.00 - While drilling ▽ = 7.03 - MW03S on 6/1/06 ▽ = 55.40 - MW03D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
21A	19/24 79%	ss	4-10 16-23 N=26	13	8.04 BSh		Gray (10YR4/1), lean CLAY, trace sand and gravel [Continued from previous page]		42			584	
22A	21/24 88%	ss	19-27 28-32 N=55	13	7.56 BSh		Gray (10YR4/1), clayey SILT, trace sand and gravel		44			582	
23A	23/24 96%	ss	4-9 14-18 N=23	14	6.98 BSh		Gray (10YR4/1), lean CLAY, trace sand and gravel		46			580	
24A	24/24 100%	ss	20-26 30-33 N=56	14	6.59 BSh		Gray (10YR4/1), lean CLAY, trace sand and gravel		48			578	
25A	24/24 100%	ss	6-10 13-12 N=23	20	3.30 BSh		Gray (10YR4/1), lean CLAY, trace sand and gravel		50			576	
26A	24/24 100%	ss	4-7 6-7 N=13	22	2.91 BSh		Gray (10YR4/1), lean CLAY, trace sand and gravel		52			574	
27A	24/24 100%	ss	7-18 37-85 N=55	16	4.05 BSh		Gray (10Y4/1), silty, fine to medium SAND, wet		54			572	
27B				13			Gray (10YR4/1), silty, fine SAND, trace clay, wet		54			572	
28A	23/24 96%	ss	15-34 34-19 N=68	11	3.22 SP				56			570	
28B				13	5.82 B				56			570	
29A	24/24 100%	ss	19-22 28-18 N=50	20	4.36 BSh		Very dark gray (10YR3/1), lean CLAY, trace sand and gravel		58			568	

End of Boring = 58.0 ft. BGS

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = Dry - While drilling ▼ = ▼ = 16.99 - 3/1/2010	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	ss	5-4 5-7 N=9	16					2	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.		626	
2A	16/24 67%	ss	3-4 6-7 N=10	25					4			624	
3A	17/24 71%	ss	3-5 7-8 N=12	21					6	Grayish brown (10YR5/2) with 25% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.		622	
4A	16/24 67%	ss	2-3 5-6 N=8	24					8	Grayish brown (10YR5/2) with 25% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		620	
5A	24/24 100%	ss	3-4 4-4 N=8	22					10	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		618	
6A	20/24 83%	ss	1-1 3-3 N=4	23					12			616	
7A	22/24 92%	ss	1-2 2-4 N=4	26					14	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, soft, medium, silty CLAY with trace sand and slight trace gravel.		614	
8A	20/24 83%	ss	1-2 3-3 N=5	22					16			612	
9A	22/24 92%	ss	1-10 21-33 N=31	14					18	Brown (10YR5/3) with 15% gray (10YR6/1) mottles, very moist, medium dense, silty, very fine- to medium-grained SAND.		610	
9B				10						Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.			

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



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 (10-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	16/24 67%	ss	9-11 12-14 N=23	16			2	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	
2A	20/24 83%	ss	3-5 9-12 N=14	21			4			624	
3A	19/24 79%	ss	3-6 8-9 N=14	21			6	Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.		622	
4A	17/24 71%	ss	2-3 4-7 N=7	25			8			620	
5A	22/24 92%	ss	1-2 5-8 N=7	24			10	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		618	
6A	18/24 75%	ss	1-2 3-5 N=5	21			12			616	
7A	23/24 96%	ss	woh-2 3-4 N=5	23			14	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		614	
8A	22/24 92%	ss	1-3 3-3 N=6	24			16	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		612	
9A				16			16	Gray (10YR6/1), moist, very soft, clayey, very fine- to coarse-grained SAND with trace gravel.		612	
9B	17/24 71%	ss	woh-6 27-40 N=33	13			18	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.		610	
10A	22/24 92%	ss	10-24 44-66 N=68	7			20	Gray (10YR4/1), slightly moist, hard, clayey SILT with sand and gravel.		608	

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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/16/2010
 Finish: 2/16/2010

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" 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

WEATHER: Sunny, cold, windy (mid-20's)

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = Dry - While drilling ▽ = ▽ = 16.08 - 3/1/2010	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 75%	ss	4-4 4-7 N=8	20					2	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.		626	
2A	19/24 79%	ss	2-4 6-10 N=10	19					4			624	
3A	19/24 79%	ss	2-4 5-6 N=9	29					6	Grayish brown (10YR5/2) with 40% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY, slight trace roots.		622	
4A	20/24 83%	ss	1-4 4-5 N=8	29					8	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		620	
5A	22/24 92%	ss	1-3 3-3 N=6	20					10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		618	
6A	24/24 100%	ss	1-2 3-4 N=5	25					12	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		616	
7A	24/24 100%	ss	1-2 3-5 N=5	22					14			614	
8A	19/24 79%	ss	1-2 2-2 N=4	18					16	Gray (10YR6/1) with 15% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		612	
9A	18/24 75%	ss	1-2 8-10 N=10	14					18	Gray (10YR5/1), very moist to wet, loose, silty, fine- to coarse-grained SAND with slight trace gravel.		610	
9B									18	Brown (10YR5/3), very moist to wet, loose, silty, very fine- to coarse-grained SAND with slight trace gravel.			
10A	19/22 86%	ss	11-40 53-60/4" N=93	7					18	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel. Gray (10YR4/1), slightly moist, hard, clayey SILT with sand and gravel.		608	

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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	17/24 71%	SS	7-8 13-16 N=21	18			0			625.96	
2A	16/24 67%	SS	2-4 5-7 N=9	16			2	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.		624	
3A	17/24 71%	SS	2-4 6-7 N=10	21			4	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.		622	
4A	20/24 83%	SS	2-3 5-6 N=8	24			6	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, medium, silty CLAY with slight trace sand.		620	
5A	22/24 92%	SS	1-3 3-5 N=6	21			8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		618	
6A	22/24 92%	SS	1-2 4-4 N=6	24			10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		616	
7A	23/24 96%	SS	1-3 4-4 N=7	22			12	Yellowish brown (10YR5/6) with 10% gray (10YR6/1) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		614	
8A	19/24 79%	SS	1-4 7-7 N=11	20			14	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand.		612	
8B				14			14	Brown (10YR5/3), moist, medium dense, clayey, very fine-to medium-grained SAND with slight trace gravel.		610	
9A	23/24 96%	SS	7-15 22-22 N=37	8			16	Yellowish brown (10YR5/6) with 5% gray (10YR6/1) mottles, moist, medium, clayey SILT with trace sand and gravel.		610	
							16	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.		608	
							18	Gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and 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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/17/2010
 Finish: 2/17/2010

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" 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

WEATHER: Overcast, cold, windy (mid-20's)

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/18 0%	BD						GRAVEL FILL		626	
1A	5/6 83%	SS	3	12			2				
2A	14/24 58%	SS	3-3 6-8 N=9	17			4	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 gravel.		624	
3A	16/24 67%	SS	3-5 5-7 N=10	20			6	Grayish brown (10YR5/2) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel.		622	
4A	18/24 75%	SS	2-3 6-7 N=9	27			8			620	
5A	22/24 92%	SS	2-3 4-5 N=7	18			10			618	
6A	22/24 92%	SS	1-3 3-4 N=6	23			12	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		616	
7A	24/24 100%	SS	1-2 3-4 N=5	27			14			614	
8A	2/24 8%	SS	1-3 2-3 N=5	23			16	Brown (10YR5/3), very moist to wet, very loose, clayey, very fine- to coarse-grained SAND.		612	
9A	20/24 83%	SS	woh-3 8-12 N=11	22			18	Brown (10YR5/3), slightly moist, stiff, clayey SILT with trace sand and gravel.		610	
9B	20/24 83%	SS	8-25 26-58 N=51	11			20	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.		608	
10A	20/24 83%	SS	8-25 26-58 N=51	11			20	Gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and gravel.		608	

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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	23/24 96%	ss	24-25 13-13 N=38	16			2	FILL - Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/6) mottles, moist, hard, silty CLAY with slight trace gravel.		624	
2A	13/24 54%	ss	4-5 8-11 N=13	26			4	FILL - Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with trace sand and slight trace gravel.		622	
3A	20/24 83%	ss	2-2 5-7 N=7	28			6	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.		620	
4A	24/24 100%	ss	2-3 5-6 N=8	18			8			618	
5A	23/24 96%	ss	1-2 3-4 N=5	20			10	Gray (10YR5/1) with 10% brownish yellow (10YR6/8) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		616	
6A	24/24 100%	ss	1-3 3-5 N=6	19			12	Grayish brown (10YR5/2) with brownish yellow (10YR6/8) mottles, moist, soft, sandy CLAY with trace gravel.		614	
7A	19/24 79%	ss	1-1 1-2 N=2	19			14	Brownish yellow (10YR6/8), very moist, soft, sandy CLAY with trace gravel.		612	
8A	23/24 96%	ss	2-4 7-10 N=11	19			16	Light yellowish brown (10YR6/4) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, clayey SILT with trace sand and gravel.		610	
8B				13			18	Gray (10YR5/1), slightly moist, hard, SILT with gravel.		608	
9A	22/24 92%	ss	10-24 25-10 N=49	11			18	Gray (10YR5/1), wet, hard, SILT with sand and gravel.		606	
9B				8			20	Gray (10YR5/1), very moist, hard, SILT with gravel.		606	
10A	24/24 100%	ss	10-25 40-40 N=65	10			20				

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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▽ = 14.20 - While drilling ▽ = 11.50 - Upon completion ▽ = 8.85 - 3/1/2010	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	ss	6-7 7-8 N=14	22						2	FILL - Grayish brown (10YR5/2) with 40% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace gravel.		624	
2A	19/24 79%	ss	3-5 5-6 N=10	27						4	Light yellowish brown (10YR6/4) with 50% brownish yellow (10YR6/8) mottles, moist, medium, silty CLAY, slight trace roots.		622	
3A	20/24 83%	ss	2-5 6-8 N=11	24						6			620	
4A	24/24 100%	ss	2-4 5-6 N=9	19						8	Light brownish gray (10YR6/2) with 10% brownish yellow (10YR6/6) mottles, moist, medium, silty CLAY with slight trace sand and gravel.		618	
5A	22/24 92%	ss	2-3 4-5 N=7	20						10	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	
6A	24/24 100%	ss	1-3 3-4 N=6	19						12	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, moist, medium, sandy CLAY with slight trace gravel.		614	
7A	23/24 96%	ss	1-1 2-2 N=3	19						14	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, moist, medium, sandy CLAY with slight trace gravel.		612	
8A	22/24 92%	ss	8-15 15-21 N=30	14						16	Brownish yellow (10YR6/6), wet, dense, silty SAND with trace gravel.		610	
9A	24/24 100%	ss	12-29 44-45 N=73	7						18	Brownish yellow (10YR6/8), wet, dense, SAND with trace gravel.		608	
										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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = 15.00 - While drilling ▽ = ▽ = 9.50 - 3/1/2010	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	SS	8-6 6-8 N=12	17					2			624	
2A	14/24 58%	SS	2-4 5-7 N=9	25					4	FILL - Yellowish brown (10YR5/6) with 20% light brownish gray (10YR6/2) mottles, moist, stiff, silty CLAY with slight trace sand.		622	
3A	22/24 92%	SS	1-4 5-9 N=9	22					6			620	
4A	24/24 100%	SS	3-6 8-9 N=14	18					8	Grayish brown (10YR5/2) with 20% yellowish brown (10YR5/6) and 5% very dark brown (10YR2/2) mottles, moist, medium, silty CLAY.		618	
5A	24/24 100%	SS	1-3 4-6 N=7	21				▽	10	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	
6A	24/24 100%	SS	2-4 4-6 N=8	21					12	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, moist, medium, clayey SILT with trace sand and gravel.		614	
7A	24/24 100%	SS	1-2 3-3 N=5	22					14	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, very moist, medium, sandy CLAY with trace gravel.		612	
8A	19/24 79%	SS	1-2 2-1 N=4	24				▽	16	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, moist, soft, clayey SILT with trace sand and slight trace gravel.		610	
									16	Gray (10YR6/1) with 30% brownish yellow (10YR6/8) mottles, wet, soft, sandy CLAY.			
9A	24/24 100%	SS	7-26 49-60 N=75	6					18	Grayish brown (10YR5/2), slightly moist, hard, clayey SILT with trace sand and 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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	SS	7-7 6-9 N=13		18				0			624	
2A	13/24 54%	SS	3-5 7-8 N=12		20				2	FILL - Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel.		622	
3A	18/24 75%	SS	2-4 6-8 N=10		20				4			620	
4A	16/24 67%	SS	4-12 20-17 N=32		18				6	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	
5A	22/24 92%	SS	2-3 4-5 N=7		21				8	Grayish brown (10YR5/2) with 5% yellowish brown (10YR5/6) mottles, moist, medium, clayey SILT with trace sand.		616	
6A	24/24 100%	SS	2-3 6-6 N=9		23				10			614	
7A	24/24 100%	SS	1-4 5-6 N=9		20				12			612	
8A	24/24 100%	SS	1-2 2-2 N=4		17				14	Grayish brown (10YR5/2) with 30% yellowish brown (10YR5/8) mottles, moist, stiff, clayey SILT with trace sand and gravel.		610	
9A	18/18 100%	SS	12-50 66 N=116		7				16	Yellowish brown (10YR5/8), wet, soft, clayey SAND with trace gravel.		608	
	0/6 0%	BD							18	Grayish brown (10YR5/2) with 20% brownish yellow (10YR6/6) mottles, slightly moist, hard, clayey SILT with gravel.			

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



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 (10-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = Dry - While drilling ▽ = ▽ = 11.26 - 3/1/2010	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	16/24 67%	ss	3-2 3-3 N=5	21									626	
2A	16/24 67%	ss	2-4 5-5 N=9	20							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.		624	
3A	10/24 42%	ss	2-5 5-6 N=10	25									622	
4A	17/24 71%	ss	2-5 4-5 N=9	18							Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand.		620	
5A	20/24 83%	ss	2-3 4-5 N=7	19									618	
6A	19/24 79%	ss	1-3 4-6 N=7	21					▽		Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		616	
7A	20/24 83%	ss	1-3 3-5 N=6	20							Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and gravel.		614	
8A	18/24 75%	ss	1-2 2-2 N=4	18							Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, soft, sandy CLAY with slight trace gravel.		612	
9A	22/24 92%	ss	3-9 13-16 N=22	13							Brown (10YR5/3), moist, medium, silty CLAY with trace sand and slight trace gravel.		610	
9B				12							Brown (10YR5/3), moist, medium dense, silty, very fine-grained SAND.			
											Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.			
10A	17/24 71%	ss	6-25 33-39 N=58	8							Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and gravel.		608	
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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▽ = Dry - While drilling ▽ = ▽ = 13.85 - 3/1/2010	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	ss	3-3 4-5 N=7		16								626	
2A	19/24 79%	ss	3-4 7-9 N=11		20						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.		624	
3A	16/24 67%	ss	2-3 4-5 N=7		26						Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel.		622	
4A	17/24 71%	ss	3-5 6-6 N=11		24						Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel, slight trace roots.		620	
5A	14/24 58%	ss	2-4 4-6 N=8		22						Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with slight trace sand.		618	
6A	22/24 92%	ss	1-3 3-4 N=6		23						Gray (10YR5/1) with brownish yellow (10YR6/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		616	
7A	22/24 92%	ss	1-2 3-5 N=5		21								614	
8A	19/24 79%	ss	woh-2 3-3 N=5		25						Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		612	
9A	24/24 100%	ss	woh-3 12-21 N=15		21						Brown (10YR5/3), very moist, soft, clayey SAND with slight trace gravel.		610	
9B					10						Brown (10YR5/3), slightly moist, stiff, clayey SILT with trace sand and slight trace gravel.		610	
10A	24/24 100%	ss	13-36 46-70 N=82		7						Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and gravel.		608	
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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	22/24 92%	ss	4-4 7-8 N=11		15		2			626	
2A	20/24 83%	ss	3-5 8-12 N=13		16		4	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.		624	
3A	18/24 75%	ss	1-4 5-6 N=9		27		6	Dark yellowish brown (10YR4/4), moist, medium, silty CLAY with slight trace sand.		622	
4A	18/24 75%	ss	2-3 5-6 N=8		25		8	Gray (10YR5/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, medium, clayey SILT with trace sand.		620	
5A	18/24 75%	ss	2-2 3-4 N=5		24		10	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		618	
6A	13/24 54%	ss	2-2 4-4 N=6		23		12			616	
7A	19/24 79%	ss	woh-2 3-4 N=5		23		14	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		614	
8A	18/24 75%	ss	1-2 2-2 N=4		23		16			612	
9A	23/24 96%	ss	woh-woh 1-2		21		18	Brown, (10YR5/3), very moist, very soft, clayey SAND with slight trace gravel.		610	
10A	22/24 92%	ss	4-12 26-30 N=38		8		20	Brown (10YR5/3), slightly moist, hard, very silty CLAY with trace sand and gravel.		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



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
							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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	23/24 96%	ss	5-5 6-11 N=11		16				2	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	
2A	20/24 83%	ss	3-3 5-5 N=8		22				4			624	
3A	20/24 83%	ss	3-4 5-6 N=9		25				6	Dark yellowish brown (10YR4/4), moist, medium, silty CLAY.		622	
4A	19/24 79%	ss	1-5 5-6 N=10		29				8			620	
5A	20/24 83%	ss	1-3 3-3 N=6		21				10	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, medium, silty CLAY.		618	
6A	19/24 79%	ss	1-2 3-3 N=5		22				12	Grayish brown (10YR5/2), moist, medium, clayey SILT with sand.		616	
7A	16/24 67%	ss	1-2 3-4 N=5		21				14	Yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace gravel.		614	
8A	19/24 79%	ss	1-1 2-2 N=3		21				16	Gray (10YR5/1), moist, medium, clayey SILT with fine sand.		612	
9A	20/24 83%	ss	1-1 4-16 N=5		14				18	Brown (10YR4/3), moist, medium, silty CLAY with trace gravel.		610	
10A	24/24 100%	ss	1-1 51-58 N=89		6				20	Grayish brown (10YR5/2), moist, soft, sandy SILT. Yellowish brown (10YR5/4) with 40% dark yellowish brown (10YR4/6) mottles, moist, medium, silty CLAY with slight trace sand.			
									20	Brownish yellow (10YR6/6), slightly moist, hard, clayey SILT with trace sand and gravel. Gray (10YR5/1), slightly moist, hard, clayey SILT with gravel.			

End of Boring = 20.00 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



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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	22/24 92%	ss	6-8 9-11 N=17	16			0			628	
2A	19/24 79%	ss	4-5 6-7 N=11	18			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.		626	
3A	17/24 71%	ss	2-3 5-6 N=8	24			4			624	
4A	18/24 75%	ss	1-3 5-8 N=8	24			6	Dark grayish brown (10YR4/2) with 20% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand, slight trace roots.		622	
5A	20/24 83%	ss	2-3 4-5 N=7	18			8	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		620	
6A	19/24 79%	ss	1-2 3-5 N=5	21			10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		618	
7A	23/24 96%	ss	1-3 4-4 N=7	19			12	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with sand and slight trace gravel.		616	
8A	22/24 92%	ss	1-2 3-3 N=5	17			14	Dark yellowish brown (10YR3/6) with dark yellowish brown (10YR4/6) mottles, moist, medium, silty CLAY with trace gravel.		614	
							16	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, sandy SILT.		612	
9A	22/24 92%	ss	1-1 2-2 N=3	19			18	Dark yellowish brown (10YR4/6), wet, soft, clayey SAND.		610	
10A	12/24 50%	ss	3-3 3-4 N=6	16			20	Yellowish brown (10YR5/6), wet, medium, sandy SILT with trace gravel.			

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



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: 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W		▽ = 16.50 - While drilling ▽ = ▽ = 15.98 - 3/1/2010		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	20/24 83%	ss	6-12 12-12 N=24	11			22	Yellowish brown (10YR5/6), wet, medium, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		608	
12A	19/24 79%	ss	3-8 13-9 N=21	9			24	Gray (10YR5/1), moist, very stiff, clayey SILT with trace gravel. Dark gray (10YR4/1), moist, very stiff, sandy SILT with trace clay and gravel.		606	
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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = Dry - While drilling ▽ = ▽ = 10.99 - 3/1/2010	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	ss	6-4 5-6 N=9	17					0			628	
2A	22/24 92%	ss	4-5 7-8 N=12	21					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.		626	
3A	19/24 79%	ss	2-4 6-7 N=10	25					4			624	
4A	13/24 54%	ss	3-3 6-6 N=9	28					6	Dark grayish brown (10YR4/2) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY.		622	
5A	20/24 83%	ss	1-3 5-6 N=8	21					8	Dark grayish brown (10YR4/2) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY, slight trace roots.		620	
6A	17/24 71%	ss	1-3 3-4 N=6	22				▽	10	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand and gravel.		618	
7A	18/24 75%	ss	1-3 3-4 N=6	23					12	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		616	
8A	20/24 83%	ss	woh-woh 2-3	28					14			614	
8B				22					16	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, very soft, silty CLAY with trace sand and slight trace gravel.		612	
9A	19/24 79%	ss	1-2 3-3 N=5	22					18	Gray (10YR6/1) with 5% yellowish brown (10YR5/6) mottles, moist, medium, sandy CLAY with slight trace gravel.		610	
9B				17					18	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, medium, sandy CLAY with slight trace gravel.			
10A	20/24 83%	ss	4-10 17-23 N=27	12					18	Yellowish brown (10YR5/4), moist, medium, clayey SILT with trace sand and slight trace gravel.		610	
									19	Yellowish brown (10YR5/4), slightly moist, stiff, clayey SILT with trace sand and slight trace gravel.			
									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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = 17.00 - While drilling ▽ = Dry - Upon completion ▽ = 8.58 - 3/1/2010	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 75%	ss	5-6 7-9 N=13	17					2	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.		628	
2A	16/24 67%	ss	3-4 6-9 N=10	17					4			626	
3A	20/24 83%	ss	2-5 5-7 N=10	25					6	Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel, slight trace roots.		624	
4A	19/24 79%	ss	2-4 5-5 N=9	23					8			622	
5A	14/24 58%	ss	3-4 4-6 N=8	25				▽	10	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand and gravel, slight trace roots.		620	
6A	18/24 75%	ss	2-3 3-5 N=6	22					12	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		618	
7A	20/24 83%	ss	3-4 3-4 N=7	23					14	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		616	
8A	24/24 100%	ss	3-3 3-3 N=6	23					16	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		614	
9A	24/24 100%	ss	woh-1 2-1 N=3	25				▽	18	Brown (10YR5/3), very moist, very soft, clayey SAND with slight trace gravel.		612	
9B				18					20			610	
10A				22									
10B	19/24 79%	ss	woh-1 7-19 N=8	11						Brown (10YR5/3), slightly moist, medium, clayey SILT with trace sand and slight trace gravel.		610	

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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/10/2010
Finish: 2/10/2010

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

WEATHER: Partly cloudy, wind 10 mph, ~25F

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft 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		0	FILL - Dark yellowish brown (10YR4/6), moist, very stiff, sandy CLAY with silt and trace gravel.		622	
2A	19/24 79%	ss	2-4 6-9 N=10		26		2	Light grayish brown (10YR6/2), slightly moist, stiff, silty CLAY.		620	
3A	22/24 92%	ss	2-4 5-7 N=9		20		4	Light grayish brown (10YR6/2) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY, slight trace roots.		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	Light grayish brown (10YR6/2) with 30% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		614	
6A	22/24 92%	ss	1-3 4-5 N=7		18		10	Grayish brown (10YR5/2) with dark yellowish brown (10YR4/6) mottles, moist, medium, clayey SILT with sand and slight trace gravel.		612	
7A	20/24 83%	ss	1-2 3-4 N=5		19		12	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	
9A	23/24 96%	ss	29-39 39-29 N=78		8		16	Brownish yellow (10YR6/8), moist, very stiff, sandy SILT with gravel.		606	
							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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	21/24 88%	ss	2-3 4-5 N=7				0	FILL - Light yellowish brown (10YR6/4), silty CLAY with some sand and gravel.		622	
2A	19/24 79%	ss	2-3 6-9 N=9				2	FILL - Brown (10YR5/3), silty CLAY with some sand and slight trace gravel.		620	
	19/24 79%	ss	2-4 6-8 N=10				4	FILL - Brown (10YR5/3), silty CLAY with some sand and slight trace gravel.		618	
3A							6	Brown (10YR5/3) with 30% gray (10YR6/1) mottles, clayey SILT with trace sand and slight trace gravel.		616	
4A	19/24 79%	ss	15-15 18-11 N=33				8			614	
5A	18/24 75%	ss	1-3 4-4 N=7				10	Brown (10YR5/3) with 30% gray (10YR6/1) mottles, silty CLAY with sand and gravel.		612	
6A	16/24 67%	ss	3-3 4-6 N=7				12	Light gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, sandy CLAY with some silt and slight trace gravel.		610	
7A	22/24 92%	ss	9-9 10-9 N=19				14	Light brown (10YR5/3) silty SAND with slight trace gravel.		608	
8A	19/24 79%	ss	15-15 35-70 N=50				16	Light gray (10YR6/1), silty SAND with slight trace gravel.		606	
9A	4/4 100%	ss	50/4"				18	Light brown (10YR6/4), silty SAND with some gravel.		604	
10A	10/23 43%	ss	12-18 70-99/5" N=88				20	Dark gray (10YR5/1), very silty CLAY with sand and trace gravel.			

End of Boring = 20.5 ft. BGS

NOTE(S): G151 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = 14.50 - While drilling ▽ = 3.05 - Upon completion ▽ = 17.00 - 12/21/2011	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	12/24 50%	SS	2-2 2-3 N=4						1	Dark brown (10YR4/2), silty CLAY with trace sand and slight trace gravel.		622	
2A	22/24 92%	SS	2-4 9-7 N=13					▽	2	Light yellowish brown (10YR6/4), silty CLAY with trace sand and slight trace gravel.			
2B									3	Gray (10YR6/1), silty CLAY with trace sand and slight trace gravel.		620	
3A									4	Gray (10YR6/1) and 25% brown (10YR5/6) mottles, silty CLAY with trace sand and slight trace gravel.			
3B	15/24 63%	SS	3-4 5-6 N=9						5	Gray (10YR6/1) and 25% brown (10YR5/6) mottles, silty CLAY with trace sand and slight trace gravel.		618	
5A	19/24 79%	SS	10-10 12-10 N=22						6	Gray (10YR5/1), clayey SILT silty CLAY with sand and slight trace gravel.		616	
									8				
5B	20/24 83%	SS	2-4 6-7 N=10						9	Gray (10YR5/1) with 25% brown (10YR5/6) mottles, silty CLAY with trace sand and slight trace gravel.		614	
6A	21/24 88%	SS	2-3 5-7 N=8						10	Gray (10YR5/1) with 25% brown (10YR5/6) mottles, silty CLAY with trace sand and slight trace gravel.		612	
									12	Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, silty CLAY with trace sand and slight trace gravel.		610	
7A	20/24 83%	SS	5-7 9-10 N=16						13	Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, clayey SAND with some silt and slight trace gravel.		610	
8A	21/24 88%	SS	3-4 7-11 N=11					▽	14	Yellowish brown (10YR5/6) with 20% gray (10YR6/1), mottles, clayey SAND with some silt and slight trace gravel.		608	
8B									15	Yellowish brown (10YR5/6), silty SAND.		608	
									16	Yellowish brown (10YR5/6), silty SAND with slight trace gravel.			
									17	Dark grayish brown (10YR4/2), very silty CLAY with sand and trace gravel.			
9A	23/24 96%	SS	14-35 60-70 N=95					▽	18	Grayish brown (10YR5/2) silty CLAY with sand and trace gravel.		606	

End of Boring = 18.6 ft. BGS

NOTE(S): G152 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	16/24 67%	ss							0	FILL - Light yellowish brown (10YR6/4), silty CLAY with sand and slight trace gravel.			
1B									2	FILL - Gray (10YR6/1), silty CLAY with sand and slight trace gravel.		622	
2A	17/24 71%	ss	woh-3 4-6 N=7						4	Gray (10YR6/1) with 50% brownish yellow (10YR6/8) mottles, silty CLAY with trace sand.		620	
3A	18/24 75%	ss	3-4 5-5 N=9						6	Gray (10YR5/1), silty CLAY with trace sand.		618	
4A	21/24 88%	ss	4-5 6-8 N=11						8	Gray (10YR6/1), silty CLAY with sand and slight trace gravel.		616	
5A	20/24 83%	ss	1-4 4-5 N=8						10	Gray (10YR6/1), silty CLAY with sand and slight trace gravel.		614	
6A	20/24 83%	ss	1-4 4-6 N=8						12	Gray (10YR6/1) with 50% brownish yellow (10YR6/8) mottles, silty CLAY with sand and slight trace gravel.		612	
7A	23/24 96%	ss	7-6 6-15 N=12						14	Gray (10YR6/1) with 25% brownish yellow (10YR6/8) mottles, clayey SAND with trace silt.		610	
8A	19/24 79%	ss	15-23 37-50 N=60						16	Yellowish brown (10YR5/8), silty SAND with slight trace gravel.		608	
9A	9/12 75%	ss	50-99						18	Brownish yellow (10YR6/8), silty CLAY with sand and trace gravel.		606	
10A	20/24 83%	ss	23-50 58-109 N=108						20	Dark gray (10YR4/1), silty CLAY with sand and trace gravel.		604	
11A	6/7 86%	ss	75-99/1*						20.76	End of Boring = 20.8 ft. BGS			

NOTE(S): G153 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	14/24 58%	ss	3-4 4-5 N=8					FILL - Light yellowish brown (10YR6/4), silty CLAY with trace sand and slight trace gravel.		622	
2A	10/24 42%	ss	woh-1 4-5 N=5					Brownish yellow (10YR6/6) with 25% gray (10YR6/1) mottles, silty CLAY with trace sand.		620	
3A	14/24 58%	ss	2-4 6-7 N=10					Gray (10YR5/1) with 25% yellowish brown (10YR5/4) mottles, silty CLAY with trace sand.		618	
4A	21/24 88%	ss	6-8 10-10 N=18							616	
5A	16/24 67%	ss	1-4 6-8 N=10					Gray (10YR6/1) with 25% brownish yellow (10YR6/6) mottles, silty CLAY with trace sand and slight trace gravel.		614	
6A	13/24 54%	ss	1-4 6-8 N=10							612	
7A	20/24 83%	ss	4-6 8-12 N=14					Gray (10YR6/1) with 10% brownish yellow (10YR6/8) mottles, silty CLAY with trace sand and slight trace gravel.			
7B								Gray (10YR6/1), silty CLAY with trace sand and slight trace gravel.		610	
8A								Gray (10YR6/1), clayey SAND with trace silt.			
8B	23/24 96%	ss	4-18 30-37 N=48					Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, silty SAND with slight trace gravel.			
8C								Dark yellowish brown (10YR4/4), silty CLAY with sand and trace gravel.		608	
9A	21/24 88%	ss	40-75 86-84 N=161					Brown (10YR4/3), silty CLAY with sand and trace gravel.		606	
10A	20/24 83%	ss	28-28 30-34 N=58					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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	ss	4-6 8-6 N=14				0	FILL - Yellow (10YR7/6), silty CLAY with trace sand and slight trace gravel.		622	
2A	20/24 83%	ss	2-4 6-7 N=10				2	FILL - Brown (10YR5/3), silty CLAY with sand and trace gravel.		620	
3A	17/24 71%	ss	2-4 5-8 N=9				4	FILL - Brownish yellow (10YR6/6), silty CLAY with trace sand and slight trace gravel.		618	
4A	24/24 100%	ss	6-7 11-11 N=18				6	FILL - Dark grayish brown (10YR4/2), silty CLAY with trace sand and slight trace gravel.		616	
5A	22/24 92%	ss	woh-3 6-6 N=9				8	Gray (10YR5/1), silty CLAY with trace sand and slight trace gravel.		614	
6A	17/24 71%	ss	2-4 6-6 N=10				10	Brownish yellow (10YR6/6) with 10% gray (10YR6/1) mottles, silty CLAY with trace sand and slight trace gravel.		612	
7A	24/24 100%	ss	6-8 10-12 N=18				12	Dark gray (10YR4/1) with 10% brown (10YR4/3) mottles, silty CLAY with trace sand and slight trace gravel.		610	
8A	23/24 96%	ss	woh-woh 4-15				14	Dark yellowish brown (10YR4/6) with 30% grayish brown (10YR5/2) mottles, silty CLAY with trace sand and slight trace gravel.		608	
8B	16/16 100%	ss	15-50 99/4"				16	Yellowish brown (10YR6/4), clayey SAND with trace silt.		606	
9A	15/17 88%	ss	24-68 99/5"				18	Yellowish brown (10YR5/6), silty SAND with slight trace gravel.		604	
10A							20	Light brownish gray (10YR6/2), silty CLAY with sand and trace gravel.			
							20.23	Light gray (10YR6/2), silty CLAY with sand and trace gravel.			End of Boring = 20.2 ft. BGS

NOTE(S): G155 installed in borehole.

FIELD BORING LOG



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	SS	3-3 3-3 N=5		31	1.36 B	2	Very dark grayish brown (10YR3/2), moist, firm, friable, clayey SILT		624	
2A	19/24 79%	SS	3-3 6-6 N=9		26	1.94 BSh	2	Dark gray (10YR4/1) with 5% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY		622	
2B					26	2.33 Sh	4	Dark gray (10YR4/1) with 70% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY		620	
3A	19/24 79%	SS	3-3 4-5 N=7		26	1.59 B	4	Dark gray (10YR4/1) with 70% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand		620	
3B					23	1.55 B	6	Very dark gray (10YR3/1), moist, firm, silty CLAY, slight trace sand		618	
4A	22/24 92%	SS	5-5 5-5 N=10		29	0.31 B	8	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, trace coarse sand		616	
5A	20/24 83%	SS	2-2 3-5 N=5		25	1.09 B	10	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, sand and slight trace gravel		614	
6A	22/24 92%	SS	1-3 2-3 N=5		22	1.01	12	Yellowish brown (10YR5/8), moist, soft, sandy CLAY		612	
7A	24/24 100%	SS	3-3 5-6 N=8		15	0.50 B	14	Gray (10YR5/1), wet, soft, fine- to coarse-grained SAND		610	
7B					18						
8A	19/24 79%	SS	0-3 5-8 N=8		17	0.27 B	14	Gray (10YR5/1), wet, soft, silty CLAY, trace sand and gravel		610	
8B					17		16	Yellowish brown (10YR5/4), wet, soft, fine- to coarse-grained SAND, trace gravel		608	
9A					13						
9B	24/24 100%	SS	8-15 30-50 N=45		8		18	Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel			

End of Boring = 18.0 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▼ = 10.20 - While drilling ▽ = 2.17 - 3/12/08 ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	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	Dark brown (10YR3/3), moist, soft, silty CLAY		622	
2A	22/24 92%	SS	2-3 5-6 N=8	26		2.33 BSh			2.33	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			1.94	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			1.24	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			1.16	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						Yellowish brown (10YR5/8), wet, soft, silty SAND, trace gravel		612	
7A	20/24 83%	SS	3-6 6-12 N=12	22		2.72 BSh				Yellowish brown (10YR5/8), moist, firm, clayey SILT			
8A	24/24 100%	SS	4-7 7-10 N=14	23		1.59 Sh				Greenish gray (5GY6/1), moist, firm, interbedded clayey SILT and SILT		610	
8B				19						Yellowish brown (10YR5/8), wet, soft, fine- to coarse-grained SAND, slight trace gravel		608	
9A				15						Yellowish brown (10YR5/8), wet, firm, very fine- to fine-grained silty SAND			
9B	24/24 100%	SS	7-12 25-30 N=37	20						Gray (10YR5/1), wet, soft, SILT			
9C				11						Gray (10YR5/1), wet, soft, fine- to coarse-grained SAND, slight trace gravel			
										Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel		606	

End of Boring = 18.15 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	SS	4-3 4-4 N=7	22				Very dark grayish brown (10YR3/2), moist, firm, clayey SILT		622	
1B				30	1.67	Sh	2	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	4	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	6	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand, slight trace gravel		616	
4A	19/24 79%	SS	5-6 7-8 N=13	20	1.12	B	8	Yellowish brown (10YR5/6), moist, firm, silty CLAY with sand, trace gravel		614	
5A	16/24 67%	SS	2-2 3-5 N=5	20	0.62	BSh	10	Yellowish brown (10YR5/6), moist, soft, sandy SILT, slight trace gravel		612	
6A	22/24 92%	SS	1-2 3-3 N=5	17	0.62	BSh	12	Yellowish brown (10YR5/6), moist, soft, sandy SILT, slight trace gravel		610	
7A				17							
7B	23/24 96%	SS	3-3 5-6 N=8	17	1.36	BSh	14	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			16	Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel			

End of Boring = 16.0 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 22.00 - While drilling ▽ = 21.54 - Upon completion ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	12/24 50%	ss	2-2 3-2 N=5	18					0	FILL - Grayish brown (10YR5/2), moist, firm, silty CLAY with trace sand and gravel.		630	
2A	20/24 83%	ss	2-2 3-5 N=5	16					2			628	
3A	20/24 83%	ss	4-9 6-8 N=15	19					4	FILL - Dark gray (10YR4/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		626	
4A	19/24 79%	ss	2-4 5-6 N=9	20					6			624	
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.		622	
									10	Dark grayish brown (10YR4/2) with 35% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.		620	
6A	22/24 92%	ss	2-3 4-6 N=7	19					12	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand and gravel.		618	
7A	23/24 96%	ss	1-2 3-4 N=5	23					14	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		616	
8A	22/24 92%	ss	1-1 3-3 N=4	22					16	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		614	
9A	24/24 100%	ss	1-1 2-2 N=3	21					18	Dark yellowish brown (10YR4/6) with 30% gray (10YR5/1) mottles, moist, soft, silty CLAY with trace sand and gravel.		612	
									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					20	Gray (10YR5/1), moist, very soft, very fine- to fine-grained sandy CLAY with trace gravel.			
									20	Gray (10YR5/1), moist, firm, very fine- to fine-grained			

NOTE(S): G206 installed in borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
DATES: Start: 10/14/2010
Finish: 10/14/2010
WEATHER: Sunny, warm, breezy (10-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	22/24 92%	ss	19-6 13-19 N=19	13				sandy CLAY with trace gravel.		610	
11B				16			22	Dark yellowish brown (10YR4/6), wet dense, silty, fine- to coarse-grained SAND with trace gravel.			
								Dark yellowish brown (10YR4/6), moist, hard, clayey SILT with sand and gravel.			
								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.			
								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



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: 4 1/4" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smal
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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	23/24 96%	ss	6-5 5-8 N=10	15			1	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.		630	
2A	24/24 100%	ss	4-4 7-8 N=11	15			2	FILL - Gray (10YR5/1) with 20% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY with sand and trace gravel.		628	
3A	23/24 96%	ss	3-6 7-9 N=13	17			4	FILL - Yellowish brown (10YR5/8) with 20% gray (10YR6/1) mottles, moist, hard, silty CLAY with sand and trace gravel.		626	
4A	24/24 100%	ss	3-4 6-7 N=10	16			6	FILL - Dark yellowish brown (10YR4/4), moist, hard, silty CLAY with slight trace sand and gravel.		624	
5A	24/24 100%	ss	2-2 3-4 N=5	22			8	FILL - Gray (10YR5/1) with 20% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY with slight trace sand and gravel.		622	
5B				24			10	Yellowish brown (10YR5/6) with 25% gray (10YR5/1) mottles, moist, firm, silty CLAY with slight trace sand and gravel.		620	
6A	22/24 92%	ss	2-2 2-5 N=4	27			10	Gray (10YR5/1) with 15% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand and gravel.		620	
7A	24/24 100%	ss	2-2 2-3 N=4	27			12	Gray (10YR5/1) with 40% yellowish brown (10YR5/8) mottles, very moist, firm, silty CLAY with slight trace sand and gravel.		618	
8A	24/24 100%	ss	woh-1 2-3 N=3	25			14	Yellowish brown (10YR5/8) with 30% gray (10YR6/1) mottles, very moist, soft, silty CLAY with trace sand and gravel.		616	
9A	23/24 96%	ss	woh-2 2-3 N=4	22			16	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, very moist, soft, silty CLAY with sand and slight trace gravel.		614	
10A	24/24 100%	ss	woh-woh 2-3	19			18	Yellowish brown (10YR5/6) with 25% gray (10YR6/1) mottles, very moist, very soft, sandy, silty CLAY with trace gravel.		612	
							20	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



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W		▼ = Dry - While drilling ▼ = Dry - Upon completion ▼ =		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	22/24 92%	ss	woh-1 2-2 N=3	18			22	Yellowish brown (10YR5/6) with 30% gray (10YR6/1) mottles, very moist, very soft, sandy CLAY with silt and trace gravel. <i>[Continued from previous page]</i> 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.		610	
12A	24/24 100%	ss	10-24 26-30 N=50				24	Gray (10YR5/1), slightly moist, hard, very silty CLAY with trace sand and slight trace gravel.		608	
End of Boring = 24.0 ft. BGS											

NOTE(S): G207 installed in borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = Dry - While drilling ▼ = 23.92 - Upon completion ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	19/24 79%	ss	4-3 3-5 N=6	23					0	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	
2A	24/24 100%	ss	2-3 4-6 N=7	14					2			628	
3A	24/24 100%	ss	2-4 4-7 N=8	21					4	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.		626	
4A	24/24 100%	ss	2-4 6-8 N=10	17					6			624	
5A	20/24 83%	ss	2-2 4-5 N=6	24					8	Very dark gray (10YR3/1), moist, firm, silty CLAY with trace sand and gravel, trace roots.		622	
6A	23/24 96%	ss	1-2 4-4 N=6	26					10	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand, trace roots.		620	
7A	19/24 79%	ss	1-2 2-3 N=4	23					12	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand, trace roots.		618	
8A	22/24 92%	ss	1-1 2-3 N=3	24					14	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel, trace roots.		616	
9A	24/24 100%	ss	1-1 2-3 N=3	24					16	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel, trace roots.		614	
9B				20					18	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	
10A	22/24 92%	ss	woh-woh 1-2	20					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.			
10B				17					20				

NOTE(S): G208 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W		▽ = Dry - While drilling ▽ = 23.92 - Upon completion ▽ =		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	20/24 83%	ss	woh-2 5-12 N=7	13			22	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			24	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



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 (10-50's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	ss	4-4 4-6 N=8	21			0			630	
2A	24/24 100%	ss	3-4 6-6 N=10	13			2	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.		628	
3A	24/24 100%	ss	2-3 6-8 N=9	19			4			626	
4A	22/24 92%	ss	2-3 6-8 N=9	17			6			624	
5A	18/24 75%	ss	2-3 3-5 N=6	20			8	Grayish brown (10YR5/2), moist, firm, clayey SILT with trace sand and gravel.		622	
6A	24/24 100%	ss	1-2 2-5 N=4	26			10	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.		620	
7A	22/24 92%	ss	1-3 4-4 N=7	22			12	Dark gray (10YR4/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.		618	
8A	24/24 100%	ss	woh-1 2-3 N=3	25			14			616	
9A	19/24 79%	ss	woh-1 2-3 N=3	24			16			614	
10A	14/24 58%	ss	woh-2 3-3 N=5	20			18	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		612	
							20				

NOTE(S): G209 installed in borehole.

FIELD BORING LOG



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 (10-50's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
11A	1/24 4%	ss	woh-1 1-1 N=2	21			21	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel. <i>[Continued from previous page]</i>		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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 20.00 - While drilling ▽ = 19.90 - Upon completion ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	ss	4-3 5-6 N=8	16					0			630	
2A	24/24 100%	ss	3-4 7-7 N=11	15					2	FILL - Brown (10YR4/3) with 20% dark gray (N5/1) mottles, moist, firm, silty CLAY with trace sand and gravel.		628	
3A	24/24 100%	ss	3-5 10-9 N=15	19					4			626	
4A	24/24 100%	ss	3-6 9-11 N=15	17					6	FILL - Dark grayish brown (10YR4/2), slightly moist, firm, clayey SILT with trace sand and gravel.		624	
5A	24/24 100%	ss	3-4 5-7 N=9	15					8	Gray (10YR5/1) with 10% dark grayish brown (10YR4/2) mottles, moist, firm, silty CLAY with trace sand.		622	
6A	22/24 92%	ss	2-2 4-6 N=6	26					10	Dark gray (10YR4/1), moist, firm, silty CLAY with trace sand, trace roots.		620	
7A	19/24 79%	ss	1-3 3-5 N=6	23					12	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with trace sand.		618	
8A	24/24 100%	ss	2-2 2-4 N=4	26					14	Gray (10YR5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with sand and trace gravel.		616	
9A	24/24 100%	ss	1-1 2-3 N=3	24					16	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with sand and trace gravel.		614	
10A	20/24 83%	ss	1-1 2-2 N=3	24					18	Gray (N6/1), very moist, very soft, silty, very fine- to fine-grained sandy CLAY with trace gravel.		612	
10B				31					20				

NOTE(S): G210 installed in borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W		▽ = 20.00 - While drilling ▽ = 19.90 - Upon completion ▽ =		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	14/24 58%	ss	woh-5 6-18 N=11	12			22	Yellowish brown (10YR5/4), moist, medium dense, silty, fine- to coarse-grained SAND with trace gravel. Gray (N6/1), moist, medium dense, silty, very fine- to fine-grained SAND. Yellowish brown (10YR5/4), slightly moist, hard, clayey SILT with sand and gravel.		610	
12A	19/24 79%	ss	7-18 26-36 N=44	14			24	Brown (10YR5/3), very moist, dense, very fine- to fine-grained sandy SILT with trace gravel. Gray (N5/1), slightly moist, hard, very silty CLAY with sand and gravel.		608	
13A	10/12 83%	ss	27-50/6"	9						606	

End of Boring = 25.0 ft. BGS

NOTE(S): G210 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 20.00 - While drilling ▽ = 20.60 - Upon completion ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	ss	5-3 4-5 N=7	23					2	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					4			628	
3A	24/24 100%	ss	2-3 5-7 N=8	24					6	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					8			624	
5A	24/24 100%	ss	2-2 3-5 N=5	31					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					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					14	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					16			616	
9A	22/24 92%	ss	1-1 1-2 N=2	19					18	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					20	Dark yellowish brown (10YR4/4) with 15% grayish brown (10YR5/2) mottles, moist, firm, clayey SILT with sand and gravel.		612	

NOTE(S): G211 installed in borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft 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			20.00	Grayish brown (10YR5/2), slightly moist, hard, very silty CLAY with sand and gravel.		610	
12A	24/24 100%	ss	4-14 15-17 N=29	13			20.60	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): G211 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 19.00 - While drilling ▽ = 20.72 - Upon completion ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	ss	4-3 3-6 N=6	17					1	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					2	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					4	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					6	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.		624	
5A	24/24 100%	ss	2-2 4-7 N=6	29					8	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	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	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.		618	
8A	24/24 100%	ss	woh-1 2-3 N=3	27					14	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		616	
9A	22/24 92%	ss	1-1 2-2 N=3	25					16	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		614	
10A	24/24 100%	ss	woh-woh 1-2	19					18	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					20	Gray (10YR5/1), loose, wet, silty, very fine- to			

NOTE(S): G212 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	7/24 29%	ss	1-6 10-22 N=16	19			19.00	medium-grained SAND. 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			24.00	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.		608	
End of Boring = 24.0 ft. BGS											

NOTE(S): G212 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 20.00 - While drilling ▽ = 19.92 - Upon completion ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	23/24 96%	ss	4-3 4-5 N=7	15					0			630	
2A	22/24 92%	ss	2-4 6-8 N=10	21					2			628	
3A	22/24 92%	ss	2-4 7-8 N=11	17					4	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.		626	
4A	22/24 92%	ss	2-4 4-8 N=8	16					6			624	
5A	20/24 83%	ss	1-3 6-6 N=9	12					8			622	
6A	20/24 83%	ss	2-2 5-7 N=7	24					10	Dark gray (10YR4/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand, trace roots.		620	
7A	20/24 83%	ss	2-3 3-5 N=6	19					12	Gray (10YR5/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT, trace roots.		618	
8A	22/24 92%	ss	1-2 2-3 N=4	24					14	Dark gray (10YR4/1) with 3% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		616	
9A	24/24 100%	ss	woh-1 2-2 N=3	24					16	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		614	
10A	18/24 75%	ss	woh-woh 1-2	24					18	Gray (10YR5/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		612	
									20	Dark yellowish brown (10YR4/6), very moist, soft, sandy CLAY with trace gravel.			

NOTE(S): G213 installed in borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4/4" HSA w/SS samplers

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

DATES: Start: 10/12/2010
Finish: 10/12/2010

FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

WEATHER: Partly cloudy, mild (mid-50's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
							Quadrangle: Coffeen, IL	Township: East Fork	Section 11, Tier 7N; Range 3W	▽ = 20.00 - While drilling	▽ = 19.92 - Upon completion	▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	18/24 75%	ss	1-1 1-2 N=2	18			18	Dark yellowish brown (10YR4/6), moist, soft, clayey, very fine- to coarse-grained SAND with trace gravel.		610		
12A	22/24 92%	ss	10-13 18-22 N=31	11			22	Dark yellowish brown (10YR4/6), moist, firm, very silty CLAY with sand and gravel.		608		
							24	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.				
End of Boring = 24.0 ft. BGS												

NOTE(S): G213 installed in borehole.

FIELD BORING LOG



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 (10-40's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	SS	6-7 7-9 N=14	15			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.		630	
2A	24/24 100%	SS	3-3 6-5 N=9	22			4	FILL - Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		628	
3A	24/24 100%	SS	3-4 6-8 N=10	18			6	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.		626	
4A	24/24 100%	SS	3-4 7-10 N=11	17			8			624	
5A	24/24 100%	SS	3-2 4-5 N=6	19			10	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.		622	
6A	24/24 100%	SS	2-3 4-7 N=7	24			12	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.		620	
7A	24/24 100%	SS	2-3 4-6 N=7	22			14	Gray (10YR6/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY.		618	
7B				16							
8A	24/24 100%	SS	woh-2 3-4 N=5	22			16	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		616	
9A	22/24 92%	SS	1-2 2-3 N=4	21			18	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		614	
10A	22/24 92%	SS	woh-2 2-2 N=4	15			20	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		612	
10B				21				Gray (10YR5/1), wet, loose, silty, very fine- to medium-grained SAND with trace gravel and clayey seams.			

NOTE(S): G214 installed in borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
DATES: Start: 10/14/2010
Finish: 10/14/2010
WEATHER: Sunny, cool (10-40's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Section 11, Tier 7N; Range 3W		▼ = Dry - While drilling	▽ = Dry - Upon completion	▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	20/24 83%	ss	woh-woh 3-12	24			22	Gray (10YR5/1), wet, loose, silty, very fine- to medium-grained SAND with trace gravel and clayey seams. <i>[Continued from previous page]</i>		610	
11B				14				Dark yellowish brown (10YR4/6), moist, firm, very silty CLAY with trace sand and gravel.			
12A	24/24 100%	ss	12-28 32-28 N=60	7			24	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with trace sand and gravel.		608	
End of Boring = 24.0 ft. BGS											

NOTE(S): G214 installed in borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smal
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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = Dry - While drilling ▽ = Dry - Upon completion ▽ = 22.52 - 10/14/10	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	23/24 96%	ss	5-3 3-5 N=6	18					0			630	
2A	19/24 79%	ss	3-3 5-6 N=8	17					2	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.		628	
3A	20/24 83%	ss	2-3 7-7 N=10	13					4			626	
4A	23/24 96%	ss	3-6 6-7 N=12	16					6	FILL - Dark grayish brown (10YR4/2), moist, firm, silty CLAY with trace sand and gravel.		624	
4B				27					8	FILL - Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.			
5A	20/24 83%	ss	3-3 3-5 N=6	20					8	Very dark gray (10YR3/1), moist, firm, silty CLAY with trace sand, trace roots.		622	
6A	13/24 54%	ss	2-2 3-5 N=5	24					10	Dark gray (10YR4/1) with 30% dark yellowish brown (10YR4/6) moist, firm, silty CLAY with trace sand.		620	
7A	19/24 79%	ss	2-3 4-6 N=7	17					12	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand.		618	
8A	20/24 83%	ss	2-3 4-5 N=7	19					14	Dark gray (10YR4/1), moist, firm, clayey SILT with trace sand.		616	
9A	22/24 92%	ss	1-3 3-4 N=6	19					16	Dark gray (10YR4/1) with 30% Dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		614	
10A	24/24 100%	ss	woh-1 2-2 N=3	17					18	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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4/4" HSA w/SS samplers

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

DATES: Start: 10/13/2010
Finish: 10/13/2010

FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

WEATHER: Sunny, warm, windy (hi-60's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W		▮ = Dry - While drilling ▮ = Dry - Upon completion ▮ = 22.52 - 10/14/10		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	20/24 83%	SS	2-4 4-4 N=8	17			22	Dark yellowish brown (10YR4/6), moist, medium dense, clayey SILT with sand and trace gravel.		610	
12A	24/24 100%	SS	7-11 17-19 N=28	11			22	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.			
12B	0/4 0%	BD		9			24	Grayish brown (10YR5/2), slightly moist, very firm, very silty CLAY with sand and gravel.		608	
							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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" HSA w/SS samplers

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

DATES: Start: 10/13/2010
 Finish: 10/13/2010

FIELD STAFF: Driller: D. Mahurin
 Helper: J. Litsch/D. Smail
 Eng/Geo: .

WEATHER: Partly cloudy, mild, windy (10-60's)

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf)	Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 21.00 - While drilling ▽ = Dry - Upon completion ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	ss	3-2 2-4 N=4	22									630	
2A	19/24 79%	ss	2-2 5-4 N=7	28							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.		628	
3A	24/24 100%	ss	2-2 4-5 N=6	19							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.		624	
4A	22/24 92%	ss	3-4 6-6 N=10	19							FILL - Dark grayish brown (10YR4/2) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		622	
5A	20/24 83%	ss	2-3 3-6 N=6	18							Dark gray (10YR4/1) with 40% gray (10YR6/1) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand.		620	
6A	18/24 75%	ss	2-3 3-4 N=6	17									618	
7A	16/24 67%	ss	1-2 3-4 N=5	20							Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		616	
8A	22/24 92%	ss	2-2 5-5 N=7	20							Very dark gray (10YR3/1), moist, firm, silty CLAY with trace sand.		614	
9A	23/24 96%	ss	woh-2 3-3 N=5	18							Gray (10YR5/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		612	
10A	24/24 100%	ss	woh-woh 1-2	17							Gray (10YR5/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, sandy CLAY with trace gravel. Dark yellowish brown (10YR4/6) and 40% gray			

NOTE(S): G216 installed in borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" HSA w/SS samplers

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

DATES: Start: 10/13/2010
Finish: 10/13/2010

FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

WEATHER: Partly cloudy, mild, windy (10-60's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	20/24 83%	ss	2-9 9.7 N=18		14				21.00	(10YR5/1) mottles, moist, soft, sandy CLAY with trace gravel. [Continued from previous page]		610	
12A	22/24 92%	ss	5-10 21-25 N=31		19				22	Light brownish gray (10YR6/2), wet, medium dense, very fine- to fine-grained sandy SILT with trace gravel. Yellowish brown (10YR5/6), wet, medium dense, silty, very fine- to medium-grained SAND.		608	
12B					16				24	Gray (10YR5/1), very moist, medium dense, very fine- to fine-grained sandy SILT. Gray (10YR5/1), wet, medium dense, very fine- to fine-grained sandy SILT. Dark gray (10YR4/1), wet, dense, silty, fine- to coarse-grained SAND with gravel.		606	
13A	20/24 83%	ss	14-25 27-27 N=52		9				26	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.			

End of Boring = 26.0 ft. BGS

NOTE(S): G216 installed in borehole.

FIELD BORING LOG



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: 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	ss	5-2 3-4 N=5	21			0			630	
2A	19/24 79%	ss	2-3 5-6 N=8	28			2	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.		628	
3A	19/24 79%	ss	2-3 6-7 N=9	14			4	FILL - Dark gray (10YR4/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		626	
4A	23/24 96%	ss	5-6 7-8 N=13	15			6	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.		624	
5A	20/24 83%	ss	3-5 7-6 N=12	13			8	FILL - Dark grayish brown (10YR4/2) with 5% dark yellowish brown (10YR4/6) slightly moist, firm, clayey SILT with trace sand and gravel.		622	
6A	19/24 79%	ss	3-3 4-5 N=7	27			10	FILL - Very dark gray (10YR3/1), moist, firm, silty CLAY with trace sand and gravel. Dark gray (10YR4/1), moist, firm, silty CLAY with trace sand and gravel.		620	
7A	18/24 75%	ss	3-4 6-8 N=10	28			12	Dark grayish brown (10YR4/2) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY trace sand, trace roots.		618	
8A	20/24 83%	ss	2-4 6-8 N=10	16			14	Dark gray (10YR4/1), moist, firm, silty CLAY with trace sand and gravel.		616	
9A	19/24 79%	ss	2-3 4-5 N=7	26			16	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		614	
10A	19/24 79%	ss	1-2 2-3 N=4	18			18	Gray (10YR5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with sand and trace gravel.		612	
							20				

NOTE(S): G217 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	22/24 92%	ss	woh-woh 1-2	18			22	Gray (10YR5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with sand and trace gravel. <i>[Continued from previous page]</i>		610	
12A	10/24 42%	ss	4-6 7-10 N=13	13			24	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with sand and trace gravel.		608	
13A	22/24 92%	ss	8-18 17-17 N=35	12			26	Yellowish brown (10 YR5/4), wet, medium dense, silty, very fine- to coarse-grained SAND with trace gravel.		606	
							26	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.			

End of Boring = 26.0 ft. BGS

NOTE(S): G217 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 24.00 - While drilling ▽ = 24.76 - Upon completion ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 75%	ss	4-1 2-1 N=3	20					0	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.		630	
2A	22/24 92%	ss	2-2 3-5 N=5	20					2			628	
3A	19/24 79%	ss	2-3 4-8 N=7	17					4	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.		626	
4A	22/24 92%	ss	2-5 6-8 N=11	14					6			624	
5A	20/24 83%	ss	3-4 8-7 N=12	17					8	FILL - Brown (10YR5/3) with 10% dark gray (10YR4/1) mottles, slightly moist, firm, clayey SILT with trace sand and gravel.		622	
6A				19					10	Dark grayish brown (10YR4/2) with 5% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand.		620	
6B	19/24 79%	ss	2-2 3-5 N=5	25					12	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand, slight trace roots.		618	
7A	22/24 92%	ss	2-3 5-7 N=8	22					14	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand.		616	
8A	18/24 75%	ss	2-3 4-5 N=7	19					16			614	
9A	24/24 100%	ss	2-2 2-4 N=4	19					18	Gray (10YR5/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		612	
10A	24/24 100%	ss	1-2 2-3 N=4	18					20				

NOTE(S): G218 installed in borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W		▽ = 24.00 - While drilling ▽ = 24.76 - Upon completion ▽ =		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	22/24 92%	ss	woh-woh woh-woh	16			22	Gray (10YR5/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, very soft, clayey, very fine- to coarse-grained SAND with trace gravel.		610	
12A	24/24 100%	ss	1-1 1-3 N=2	10				Yellowish brown, wet, loose, silty, very fine- to coarse-grained SAND with trace gravel.		608	
12B				16			24	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.			
13A	24/24 100%	ss	1-5 9-13 N=14	20			24	Gray (10YR5/1), wet, loose, silty, very fine- to coarse-grained SAND with trace gravel.		606	
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



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	ss	2-2 2-4 N=4		24			Dark grayish brown (10YR4/2), moist, firm, clayey SILT		622	
2A	19/24 79%	ss	3-4 5-9 N=9		22	2.33 B		Dark grayish brown (10YR4/2), moist, firm, silty CLAY		620	
2B					20	5.04 Sh	4	Dark grayish brown (10YR4/2) with 5% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand			
3A	20/24 83%	ss	14-5 7-8 N=12		17	2.52 Sh	6	Gray (10YR5/1) with 70% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand and gravel		618	
4A	24/24 100%	ss	8-6 7-5 N=13		21	1.24 BSh		Dark gray (10YR4/1) with 5% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, trace sand, slight trace gravel		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		614	
5A	22/24 92%	ss	2-3 4-4 N=7		21	1.36 B	10	Gray (10YR5/1) with 60% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, trace sand, slight trace gravel		612	
6A	24/24 100%	ss	1-2 2-3 N=4		21	0.74 BSh		Gray (10YR5/1), moist, soft, sandy CLAY		610	
6B					24	0.78 B	12	Gray (10YR5/1), moist, soft, fine- to coarse-grained SAND, trace gravel		608	
7A	17/24 71%	ss	2-2 2-3 N=4		21			Dark yellowish brown (10YR4/4), moist, soft, sandy CLAY		606	
8A					20		14	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand and gravel			
8B	19/24 79%	ss	1-3 5-6 N=8		17	4.46 Sh		Yellowish brown (10YR5/4), wet, soft, fine to coarse SAND		606	
9A	24/24 100%	ss	6-8 30-35 N=38		20			Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel			
9B					8		18				

End of Boring = 18.27 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	SS	2-5 5-6 N=10	27			0	FILL - Yellowish brown (10YR5/4), moist, firm, silty CLAY with trace sand. Grayish brown (10YR5/2), dry, friable, clayey SILT.		622	
2A	24/24 100%	SS	2-6 5-5 N=11	23			2	Yellowish brown (10YR5/6) with 10% gray (10YR6/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.		620	
3A	23/24 96%	SS	4-5 4-5 N=9	18			4	Gray (10YR6/1), moist, firm, very silty CLAY with slight trace sand.		618	
4A	24/24 100%	SS	2-4 4-5 N=8	17			6	Gray (10YR5/1) with 30% brownish yellow (10YR6/6) mottles, moist, firm, silty CLAY with sand and trace gravel.		616	
5A	24/24 100%	SS	2-4 4-6 N=8	20			8	Very dark gray (10YR3/1), organic-rich (PEAT), silty CLAY and trace sand.		614	
6A	24/24 100%	SS	2-4 4-5 N=8	22			10	Brownish yellow (10YR6/8) with 20% gray (10YR5/1) mottles, moist, firm, silty CLAY with sand and trace gravel.		612	
6B				20			12	Gray (10YR6/1) with 20% brownish yellow (10YR6/8) mottles, very moist, soft, sandy CLAY with silt and slight trace gravel.			
7A				20			12				
7B	20/24 83%	SS	2-2 3-7 N=5	19			13	Brownish yellow (10YR6/6), very moist to wet, soft, sandy CLAY with silt and slight trace gravel.		610	
							14	Gray (10YR6/1), wet, loose, very fine to medium SAND with silt.			
8A	24/24 100%	SS	10-19 30-33 N=49	7			16	Gray (10YR5/1), slightly moist, hard, very silty CLAY with sand and gravel.		608	

End of Boring = 16.0 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▽ = 13.00 - While drilling ▽ = 9.49 - 9/21/09 ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	SS	3-2 3-4 N=5	18					0	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					2	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					4			616	
3B				17					6			614	
4A	24/24 100%	SS	3-4 4-4 N=8	20					8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with sand and trace gravel.		612	
5A	23/24 96%	SS	2-3 3-5 N=6	21				▽	10	Yellowish brown (10YR5/8) with 15% gray (10YR6/1) mottles, moist, soft, silty CLAY with sand and slight trace gravel.		610	
6A	22/24 92%	SS	2-3 3-3 N=6	23					12	Gray (10YR6/1) with 30% brownish yellow (10YR6/6) mottles, very moist, soft, silty CLAY with sand and slight trace gravel.		608	
7A	18/24 75%	SS	2-9 15-21 N=24	14				▽	14	Gray (10YR6/1), very moist, loose, SILT and very fine sand.			
7B				10					14	Gray (10YR6/1), wet, loose, SILT and very fine sand.			
									14	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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 13.50 - While drilling ▼ = 9.89 - 9/21/09 ▼ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	16/24 67%	SS	3-3 3-3 N=6	24					0	FILL -Dark yellowish brown (10YR4/6), moist, firm, silty CLAY with slight trace sand.		620	
2A	24/24 100%	SS	3-4 5-7 N=9	28					2	FILL - Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with slight trace sand and gravel.		618	
3A				18					4	Brownish yellow (10YR6/8) with 40% gray (10YR5/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.		616	
3B	24/24 100%	SS	3-5 6-8 N=11	25					6	Gray (10YR6/1) with 10% brownish yellow(10YR6/6) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.		614	
4A				19					8	Gray (10YR5/1), moist, firm, silty CLAY with sand and trace gravel.		612	
4B	24/24 100%	SS	3-5 5-6 N=10	16					10	Yellowish brown (10YR5/8) with 30% gray (10YR6/1) mottles, moist, soft, sandy CLAY with silty and slight trace gravel.		610	
5A	23/24 96%	SS	2-4 5-4 N=9	19					12	Brownish yellow (10YR6/8) with 10% gray (10YR6/1) mottles, very moist, soft, sandy CLAY with silt and slight trace gravel.		608	
5B				21					14	Gray (10YR6/1), moist, hard, very silty CLAY with sand and trace gravel.		606	
6A	24/24 100%	SS	1-2 3-4 N=5	19					16	Light yellowish brown (10YR6/4), wet, loose, very fine- to very coarse-grained SAND with trace silt.			
7A	24/24 100%	SS	4-8 17-24 N=25	11						Light yellowish brown (10YR6/4), wet, dense, sandy, silty CLAY.			
7B				11						Gray (10YR6/1), moist, hard, very silty CLAY with sand and trace gravel.			
8A	22/24 92%	SS	9-22 22-23 N=44	8									

End of Boring = 16.0 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 16.00 - While drilling ▼ = 13.12 - 9/21/09 ▼ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	SS	2-3 3-4 N=6		17				2	FILL - Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.		620	
2A	24/24 100%	SS	4-6 7-9 N=13		25				4			618	
3A	24/24 100%	SS	3-4 6-9 N=10		26				6			616	
3B					21				6			616	
4A	16/24 67%	SS	3-6 6-8 N=12		24				8	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with slight trace sand and gravel.		614	
5A	24/24 100%	SS	2-4 4-6 N=8		20				10	Dark gray (10YR4/1) with 15% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		612	
6A	22/24 92%	SS	1-3 4-6 N=7		19				12			610	
7A	23/24 96%	SS	1-2 4-4 N=6		21			▼	14	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with sand and trace gravel.		608	
8A	22/24 92%	SS	1-3 3-6 N=6		17				16	Yellowish brown (10YR5/8), very moist, soft, silty CLAY with sand and trace gravel.		606	
9A	14/24 58%	SS	wor-4 9-11 N=13		13				16	Brownish yellow (10YR6/6), wet, loose, very fine- to very coarse-grained SAND.		604	
9B					13				18	Brownish yellow (10YR6/6), moist, firm, very silty CLAY with sand and gravel.		604	
					13				18	Gray (10YR6/1), moist, hard, very silty CLAY with sand and gravel.		604	

End of Boring = 18.1 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	22/24 92%	SS	2-4 4-6 N=8	22			0	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	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	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	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with sand and slight trace gravel.		610	
5A	24/24 100%	SS	1-2 3-3 N=5	18			8	Yellowish brown (10YR5/8) with 15% gray (10YR6/1) mottles, very moist, soft, silty CLAY with sand and trace gravel.		608	
5B				21			10	Gray (10YR6/1) with 20% yellowish brown (10YR5/8) mottles, very moist, very soft, silty CLAY with sand and trace gravel.		606	
6A				16			10				
6B	20/24 83%	SS	woh-4 5-2 N=9	13			11	Gray (10YR6/1), wet, loose, very fine- to very coarse-grained SAND with trace gravel.		604	
6C				15			12	Yellowish brown (10YR5/6), moist, hard, very silty CLAY with sand and gravel.		604	
7A	12/12 100%	SS	10-35	8			13.2				

End of Boring = 13.2 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	17/24 71%	SS	5-8 9-10 N=17	10			2			628	
2A	19/24 79%	SS	7-7 10-14 N=17	15			4	FILL - Yellowish brown (10YR5/4) with 20% gray (10YR5/1) mottles, moist, hard, silty CLAY with trace sand and slight trace gravel.		626	
3A	11/24 46%	SS	5-10 14-27 N=24	14			6			624	Rock fragment in split spoon shoe
4A	24/24 100%	SS	5-9 10-14 N=19	8			8	FILL - Yellowish brown (10YR5/4) with 10% gray (10YR5/1) mottles, slightly moist, hard, friable, clayey SILT with sand and trace gravel.		622	
4B				5			8				
5A	17/24 71%	SS	4-4 8-19 N=12	22			10	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			12			618	
7A	16/24 67%	SS	6-7 2-4 N=9	20			14			616	
8A	20/24 83%	SS	2-4 6-6 N=10	21			16	Gray (10YR6/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand and gravel.		614	
9A				17			18				
9B	22/24 92%	SS	1-4 5-7 N=9	13			18	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, sandy CLAY with silt and slight trace gravel.		612	
10A	23/24 96%	SS	2-3 8-12 N=11	20			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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	24/24 100%	ss	1-3 5-7 N=8	21			21	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and slight trace gravel. <i>[Continued from previous page]</i>		608	
12A	24/24 100%	ss	1-4 6-7 N=10	16			22	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			24	Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, very moist, soft, silty CLAY with sand and trace gravel.		604	
14A	24/24 100%	ss	1-5 15-29 N=20	16			26	Gray (10YR6/1), very moist, loose, very fine- to fine-grained, SAND		602	
							26	Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, very moist, soft, silty CLAY with sand and trace gravel.			
							26	Gray (10YR6/1), very moist, firm, clayey SILT with trace very fine-grained sand.			
							27	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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	23/24 96%	ss	2-2 4-6 N=6			21			0	FILL - Yellowish brown (10YR5/4) with 10% yellowish brown (10YR5/8) mottles, very moist, soft, silty CLAY with slight trace sand and gravel.		620	
2A	24/24 100%	ss	2-4 6-7 N=10			22			2	FILL - Yellowish brown (10YR5/4) with 20% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand and gravel.		618	
2B						16			4	Yellowish brown (10YR5/4) with 20% gray (10YR5/1) and 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand.			
3A						11			4	Light brownish gray (10YR6/2), dry, friable, clayey SILT.			
3B	17/24 71%	ss	4-7 9-11 N=16			22			6	Light brownish gray (10YR6/2) with 25% yellowish brown (10YR5/8) mottles, moist, firm, clayey SILT with slight trace sand.		616	
4A	18/24 75%	ss	4-8 8-6 N=16			13			6	Light brownish gray (10YR6/2) with 25% yellowish brown (10YR5/8) mottles, moist, firm, clayey SILT with slight trace sand.		614	
5A	19/24 79%	ss	3-7 8-9 N=15			12			8	Gray (10YR6/1) with 50% very dark grayish brown (10YR3/2) mottles, moist, hard, clayey SILT with slight trace sand and gravel.		612	
6A	22/24 92%	ss	3-9 9-10 N=18			14			10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, hard, very silty CLAY with sand and slight trace gravel.		610	
6B						16			12				
7A	18/24 75%	ss	3-5 7-9 N=12			17			14	Yellowish brown (10YR5/8) with 30% gray (10YR6/1) mottles, moist, hard, silty CLAY with sand and trace gravel.		608	
8A	22/24 92%	ss	2-5 5-8 N=10			12			16	Gray (10YR6/1), moist, slightly dense, silty, very fine- to very coarse-grained SAND.		606	
9A	22/24 92%	ss	1-2 3-3 N=5			14			16	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel.		604	
10A						11			18	Gray (10YR6/1) with 20% brownish yellow (10YR6/6) mottles, wet, very soft, silty, very fine- to fine-grained SAND with trace gravel.			
10B	23/24 96%	ss	1-3 19-47 N=22			9			18	Gray (10YR6/1) with 30% grayish brown (10YR5/2) mottles, moist, soft, sandy CLAY with slight trace gravel.		602	
10									20	Brownish yellow (10YR6/6) with 25% gray (10YR6/1) mottles, moist, hard, very silty CLAY with sand and trace gravel.			

End of Boring = 20.0 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	16/24 67%	ss	3-4 6-7 N=10	19			0			628	
2A	24/24 100%	ss	4-7 8-11 N=15	21			2			626	
3A	22/24 92%	ss	9-10 9-35 N=19	10			4			624	Rock fragment in split spoon shoe
4A	4/24 17%	ss	20-7 10-8 N=17				6	FILL - Yellowish brown (10YR5/4) with 15% yellowish brown(10YR5/8) mottles, moist, hard, silty CLAY with trace sand and slight trace gravel.		622	Rock fragment in split spoon shoe
5A	14/24 58%	ss	11-6 8-8 N=14	15			8			620	Rock fragment in split spoon shoe
6A	20/24 83%	ss	6-4 8-9 N=12	26			10			618	
7A	24/24 100%	ss	2-4 8-11 N=12	18			12			616	
8A	20/24 83%	ss	4-7 10-11 N=17	12			14	Gray (10YR6/1) with 30% brownish yellow (10YR6/6) mottles, moist, firm, clayey SILT with slight trace sand.		614	
8B				22			16	Very dark gray (10YR3/1), moist, firm, clayey SILT with slight trace sand and trace roots.		614	
9A	22/24 92%	ss	4-6 6-9 N=12	17			18	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel.		612	
10A	20/24 83%	ss	2-4 5-8 N=9	21			20	Gray (10YR6/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel.		610	
							22	Yellowish brown (10YR5/8) with 20% gray (10YR5/1) mottles, moist, firm, silty CLAY with sand and trace gravel.			

NOTE(S):

FIELD BORING LOG



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: 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W		▮ = Dry - While drilling ▮ = 23.98 - 9/21/09 ▮ =			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
11A	18/24 75%	ss	2-4 7-7 N=11	19			20	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				16								
12B	20/24 83%	ss	1-5 10-18 N=15	10			24	Yellowish brown (10YR5/4), moist, hard, very silty CLAY with sand and trace gravel.		606		
							▮ 24	End of Boring = 24.1 ft. BGS				

NOTE(S):

FIELD BORING LOG



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: 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	SS	3-3 5-6 N=8	18			2	FILL - Brown (10YR4/3) with 30% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with sand and trace gravel.		628	
2A	24/24 100%	SS	5-9 10-11 N=19	14			4			626	
3A	24/24 100%	SS	5-9 9-10 N=18	17			6			624	
4A	24/24 100%	SS	4-5 7-6 N=12	21			8			622	
5A	24/24 100%	SS	3-3 5-7 N=8	19			10	FILL - dark gray (10YR4/1) with 10% brownish yellow (10YR6/6) mottles, moist, hard, silty CLAY with sand and trace gravel.		620	
6A	24/24 100%	SS	3-4 6-9 N=10	17			12			618	
7A	23/24 96%	SS	2-5 5-6 N=10	23			14			616	
8A	24/24 100%	SS	2-3 7-6 N=10	23			16	Brownish yellow (10YR6/8) with 30% gray (10YR5/1) mottles, moist, firm, silty CLAY with slight trace sand and gravel.		614	
9A	18/24 75%	SS	4-7 8-9 N=15	25			18	Yellowish brown (10YR5/8) with 20% gray (10YR6/1) mottles, moist, firm, silty CLAY with slight trace sand and gravel.		612	
10A	24/24 100%	SS	3-6 7-10 N=13	17			20	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel.		610	

NOTE(S):

FIELD BORING LOG



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: 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W		▽ = 23.60 - While drilling ▽ = 24.68 - 9/21/09 ▽ =		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	23/24 96%	ss	2-4 5-7 N=9	18			22	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel. <i>[Continued from previous page]</i>		608	
12A	19/24 79%	ss	4-9 8-9 N=17	13			24	Yellowish brown (10YR5/8), moist, firm, clayey SILT and very fine-grained SAND with slight trace gravel.		606	
12B				12							
13A	17/24 71%	ss	1-5 5-7 N=10	18			26	Light brownish gray (10YR6/2), wet, loose, very fine- to coarse-grained SAND.		604	
14A				16							
14B	24/24 100%	ss	10-10 18-18 N=28	14			28	Brownish yellow (10YR6/6), moist, hard, very silty CLAY with sand and trace gravel. 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



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: 3/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▽ = 15.60 - While drilling ▽ = 4.34 - 3/12/08 ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	SS	5-3 4-4 N=7	23						Dark grayish brown (10YR4/2), moist, firm, clayey SILT		622	
1B				26		2.33 B			2	Brown (10YR4/3) with 20% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY			
2A	24/24 100%	SS	3-4 4-6 N=8	30		1.28 BSh				Dark yellowish brown (10YR4/4), moist, firm, silty CLAY		620	
2B				25					4	Dark gray (10YR4/1) with 40% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY			
3A	19/24 79%	SS	3-4 6-6 N=10	14		3.10 Sh			6	Dark gray (10YR4/1) with 40% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand		618	
4A	22/24 92%	SS	9-11 10-8 N=21	18		1.67 BSh			8	Dark gray (10YR4/1) with 40% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, trace sand, slight trace gravel		616	
5A	19/24 79%	SS	2-2 4-4 N=6	20		1.47 B			10	Dark gray (10YR4/1) with 40% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, sand, trace gravel		614	
5B				21		1.28 B			12	Yellowish brown (10YR5/8) with 20% light gray (10YR6/1) mottles, moist, soft, sandy CLAY		612	
6A	22/24 92%	SS	2-3 3-3 N=6	20					14	Yellowish brown (10YR5/8), moist, soft, fine to coarse SAND, trace gravel		610	
7A	23/24 96%	SS	3-14 23-21 N=37	13					14	Yellowish brown (10YR5/8), moist, firm, sandy CLAY, trace gravel		610	
8A	23/24 96%	SS	12-17 24-26 N=41	9					16	Yellowish brown (10YR5/4), moist, firm, clayey SILT, trace sand and gravel		608	
8B				15					16	Yellowish brown (10YR5/4), wet, soft, fine- to coarse-grained SAND, trace gravel		606	
9A	24/24 100%	SS	11-27 54-43 N=81	26						Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel		606	
9B				7									

End of Boring = 17.98 ft. BGS

NOTE(S):

FIELD BORING LOG



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 (3 1/4" overdrill / 4 1/4")
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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = 14.00 - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	17/24 71%	SS	15-10 7-6 N=17	14					0	Light gray (10YR7/2), dry, very stiff, SILT with little clay and trace gravel.			
2A	19/24 79%	SS	2-4 5-5 N=9	25	1.50				2	Yellowish brown (10YR5/4) with 5% dark brown (10YR3/3) mottles, dry, very stiff, SILT with few clay and trace gravel.		622	
3A	22/24 92%	SS	2-2 3-4 N=5	23	0.40				4	Yellowish brown (10YR5/4) with 15% dark yellowish brown (10YR4/6) and 5% dark brown (10YR3/3) mottles, moist, stiff, SILT with few clay.		620	
4A	24/24 100%	SS	5-5 6-6 N=11	19	1.20				6	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.		618	
5A	20/24 83%	SS	2-2 3-4 N=5	21	1.40				8	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.		616	
6A	22/24 92%	SS	2-2 3-3 N=5	18	0.50				10	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.		614	
7A	17/24 71%	SS	3-4 5-5 N=9	19	0.30				12	Dark yellowish brown (10YR4/6) 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.		612	
									14	Dark yellowish brown (10YR4/6) with 15% yellowish brown (10YR5/4) mottles, moist, soft, SILT with few clay and very fine- to fine-grained sand and trace small gravel.		610	
	19/24 79%	SS	3-11 21-28 N=32						16	Dark yellowish brown (10YR4/4), wet, dense, very fine- to fine-grained SAND with some silt, few clay and trace small gravel.		608	
	24/24 100%	SS	21-36 39-50 N=75						18	Dark yellowish brown (10YR4/4), wet, dense, very fine- to fine-grained SAND with few silt, little clay and trace small gravel.		606	
8A	11/24 46%	SS	16-9 30-50 N=39	7	4.50				18	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.		604	
	0/3 0%	BD							20	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.		604	

End of boring = 20.29 feet

NOTE(S): G281 installed in borehole.

FIELD BORING LOG



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 (3/4" overdrill / 4/4")
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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 12.00 - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	19/24 79%	SS	4-4 3-5 N=7	18		1.80			1.80	Brown (10YR4/3), moist, stiff, SILT with few clay, trace organics.		620	
2A	22/24 92%	SS	2-4 4-6 N=8	26		2.40			2.40	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			4.00	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			6.00	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					8.00	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			10.00	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			12.00	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			14.00	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							16.00				

End of boring = 16.21 feet

NOTE(S): G301 installed in borehole.

FIELD BORING LOG



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 (3/4" overdrill / 4/4")
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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	23/24 96%	SS	5-5 5-6 N=10	17	1.50		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		2.60	Very dark brown (10YR3/1), moist, hard, SILT with some clay and trace fine-grained sand and small gravel.		616	
3A	21/24 88%	SS	1-2 3-4 N=5	26	1.80		4.40	Dark grayish brown (10YR4/2) with very dark gray (10YR3/1) mottles, moist, stiff, CLAY with some silt and trace sand.		614	
4A	24/24 100%	SS	4-7 8-8 N=15	18	1.60		6.00	Brown (10YR5/3) with dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with some silt and trace sand.		612	
5A	24/24 100%	SS	2-3 5-5 N=8	17	1.80		8.00	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			10.00	Brown (10YR4/3) with dark yellowish brown (10YR4/6) mottles, moist, stiff, SILT with some clay and few sand.		608	
7A	24/24 100%	SS	7-7 8-8 N=15	16	1.70		12.00	Dark gray (10YR4/1), moist, stiff, SILT with some clay and few sand.		606	
8A							13.00	Yellowish brown (10YR5/8) with reddish brown (5YR4/4) inclusions, moist, stiff, SILT with some clay and few sand.			
8B	22/24 92%	SS	2-5 25-32 N=30	12	4.50		14.00	Dark gray (10YR4/1), moist, stiff, SILT with some clay, few sand and trace small gravel.		604	
9A	24/24 100%	SS	7-24 48-38 N=72	8	4.50		16.00	Grayish brown (10YR5/2), wet, hard, SILT with little clay and very fine-grained sand and trace small gravel.		602	
	0/5 0%	BD					18.00	Brown (10YR5/3) grading to yellowish brown (10YR5/4), moist, hard, SILT with some clay, few small gravel.		600	

End of boring = 18.39 feet

NOTE(S): G302 installed in borehole.

Surface Elevation: 619.10

Completion Date: 8/26/10

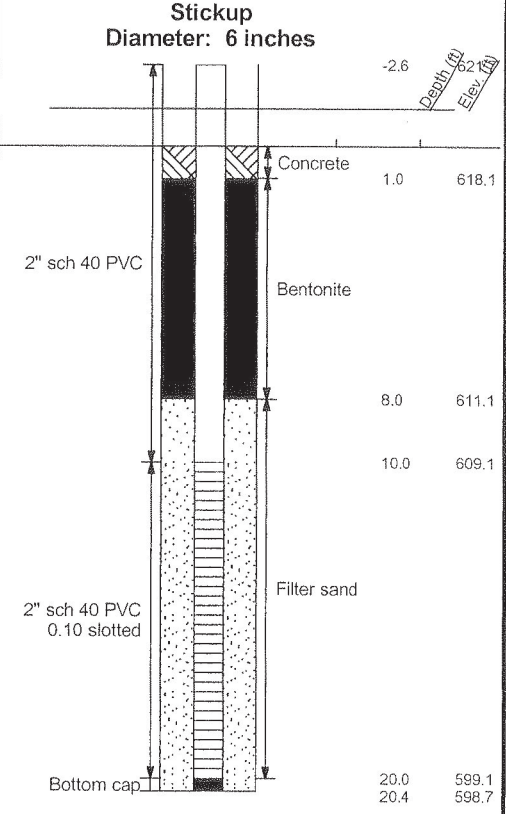
Northing: 871382.45

Easting: 2516641.06

Datum msl

WELL DIAGRAM

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			
5			1-3-3	SS2
			1-3-4	SS3
	Soft, brown, silty CLAY - CL			
10	Stiff to hard, brown to grayish-brown, silty CLAY - CL (TILL)			
			2-3-3	SS4
			27-44 -50/1"	SS5
15				
			44-50/2"	SS6
20	Boring terminated at 20 feet.			
25				
30				
35				



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: SK App'vd. by: KBS
Date: 9/10/10 Date: 1-4-11 Date: 1/4/11



Ameren-Coffeen Ash Pond Evaluation

Renamed G303
LOG OF BORING: APW-3

Project No. J017150.01

Surface Elevation: 623.46

Completion Date: 8/26/10

Datum msl

Northing: 871397.48

Easting: 2515520.23

WELL DIAGRAM

DEPTH IN FEET

DESCRIPTION OF MATERIAL

GRAPHIC LOG

DRY UNIT WEIGHT (pcf)
SPT BLOW COUNTS
CORE RECOVERY/RQD

SAMPLES

Stickup
Diameter: 6 inches

Depth (ft)
Elev. (ft)

Medium stiff, grayish-brown, silty CLAY - CL

0-1-1 SS1

1-2-5 SS2

1-3-4 SS3

1-2-3 SS4

1-2-1 SS5

14-47 SS6

2" sch 40 PVC

2" sch 40 PVC
0.10 slotted

Bottom cap

Concrete

Bentonite

Filter sand

1.0 622.5

8.0 615.5

10.0 613.5

20.0 603.5

20.4 603.1

Medium to fine SAND - SP
Hard, gray, silty CLAY - CL (TILL)

Boring terminated at 20 feet.

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - COFFEEN.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 14 FEET ∇

REMARKS:

DRILLING DATA

 AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM FEET
MVU DRILLER SWG LOGGER
CME 55TRK DRILL RIG
HAMMER TYPE Auto

Drawn by: KSA

Checked by: DK

App'vd. by: RS

Date: 9/10/10

Date: 1-4-11

Date: 1/7/11



GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren-Coffeen Ash Pond Evaluation

Renamed G304
LOG OF BORING: APW-4

Project No. J017150.01

FIELD BORING LOG



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 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (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	FILL - Grayish brown (10YR5/2), moist, soft, silty CLAY with few small to coarse sand and few small to large gravel.		622	
2A	17/24 71%	SS	6-7 7-6 N=14		19				2	FILL - Black (10YR2/1), moist, loose, silty, fine- to coarse-grained SAND with little coal fragments.		620	
3A	18/24 75%	SS	3-3 6-4 N=9		28				4	Gray (10YR6/1) and light yellowish brown (10YR6/4), moist, very stiff, SILT with little clay.		618	
4A	16/24 67%	SS	6-6 7-8 N=13		24				6	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, very 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	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	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	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	
8A	19/24 79%	SS	3-3 4-4 N=7		18				14	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	
9A	22/24 92%	SS	1-3 7-14 N=10		19				16	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.		606	
9B	0/5 0%	BD			15				18	Brown (10YR5/3), wet, loose, very silty, very fine- to coarse-grained SAND with trace small gravel.		606	
									18	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



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 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:										
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf)	Failure Type	Quadrangle: Coffeen, IL	Township: East Fork	Section 14, Tier 7N; Range 3W	▽ = 5.50 - During Drilling	▽ =	▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	12/24 50%	ss	1-3 3-4 N=6		14										0	Very dark brown (10YR2/2), moist, medium, SILT with little clay and few very fine- to medium-grained sand, roots, trace coal fragments.		622	
2A	24/24 100%	ss	5-4 5-4 N=9		21										2	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	
2B					19										4	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, very stiff, SILT with little clay and trace very fine-grained sand.			
3A	22/24 92%	ss	2-2 3-3 N=5		30										6	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, very stiff, SILT with some clay and trace very fine-grained sand.		618	
4A	20/24 83%	ss	3-4 6-6 N=10		26										8			616	
5A	24/24 100%	ss	2-2 3-3 N=5		23										10	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	
6A	22/24 92%	ss	1-2 3-4 N=5		20										12			612	
7A	20/24 83%	ss	5-6 6-6 N=12		21										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	
8A	20/24 83%	ss	2-2 8-14 N=10		15										16	Yellowish brown (10YR5/6), wet, soft, very fine- to coarse-grained sandy CLAY with little silt.		608	
8B					12										18	Yellowish brown (10YR5/6), wet, medium dense, silty, very fine- to medium-grained SAND with trace coarse-grained sand.			
9A	23/24 96%	ss	14-17 28-50/5" N=45		10										16	Yellowish brown (10YR5/6), moist, dense, fine- to coarse-grained SAND with little silt, little very fine-grained sand, and trace small gravel.		606	
9B					13										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



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

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME 55LC Track Drill
Drilling Method: 4 1/4" 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

WEATHER: Overcast, warm & humid (mid-80s)

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf)	Failure Type	Quadrangle: Coffeen Township: East Fork Section 11, Tier 7N; Range 3W	▽ = 14.00 - during drilling ▽ = -1.76 - 7/27/2016 @ 07:30 ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 75%	SS	1-3 3-2 N=6	22						0	Brown (10YR5/3), moist, stiff, SILT with few clay, trace sand, gravel and roots.			
2A	22/24 92%	SS	2-1 3-3 N=4	28						2	Gray (10YR5/1), moist, soft, CLAY, with some silt, trace sand, gravel and roots.		620	
3A	24/24 100%	SS	1-2 3-4 N=5	26						4	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, CLAY with some silt, trace sand, gravel and roots.		618	
4A	24/24 100%	SS	1-3 3-3 N=6	18						6			616	
5A	24/24 100%	SS	3-3 4-5 N=7	19						8	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.		614	
6A	24/24 100%	SS	3-3 4-5 N=7	20						10			612	
7A	24/24 100%	SS	3-3 4-5 N=7	20						12	Gray (10YR5/1), moist, medium, CLAY with little silt and very fine to very coarse sand, trace gravel. Gray (10YR5/1) with 25% yellowish brown (10YR5/8) mottles, moist, soft, CLAY with some silt, trace sand and gravel.		610	
7B			woh-2 5-13 N=7	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						16	Yellow brown (10YR5/6), wet, medium dense, very fine- to very coarse-grained SAND, with little silt and trace gravel.		606	
9A	18/18 100%	SS	8-30 50 N=80	8						18	Yellowish brown (10YR5/8), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand and trace gravel. Gray (10YR5/1), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand and trace gravel.		604	
	0/9 0%	BD								18				

End of boring = 18.2 feet

NOTE(S):

FIELD BORING LOG



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 (3/4" overdrill / 4/4")
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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	16/24 67%	ss	2-2 3-7 N=5		17			Dark grayish brown (10YR4/2), moist, soft, CLAY with little silt and trace very fine- to fine-grained sand - FILL.		622	
2							2	Yellowish brown (10YR5/6) moist, medium, CLAY with some silt and trace very fine- to coarse-grained sand - FILL.			
2A	21/24 88%	ss	8-11 8-9 N=19		17	1.80		Dark gray (10YR4/1), moist, stiff, SILT with little clay and trace very fine-grained sand.		620	
2B					25		4	Yellowish brown (10YR5/6), moist, stiff, CLAY with some silt and trace very fine- to fine-grained sand.			
3A	23/24 96%	ss	3-4 7-8 N=11		23	2.50		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	
4A	24/24 100%	ss	8-9 12-14 N=21		21	3.30				616	
4B					19	2.80	8	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, stiff, SILT and very fine-grained SAND with trace clay.			
5A	24/24 100%	ss	2-3 4-5 N=7		21	1.30				614	
6A	24/24 100%	ss	2-4 5-6 N=9		17	2.50		Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with some silt and trace very fine- to fine-grained sand.		612	
7A	24/24 100%	ss	9-7 8-9 N=15		21	1.40				610	
8A	24/24 100%	ss	2-3 2-4 N=5		17	1.30		Gray (10YR6/1), moist soft, CLAY with very fine- to fine-grained sand and little silt.		608	
8B					19		16	Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND with trace silt.			
9A	20/24 83%	ss	5-4 5-10 N=9		21			Yellowish brown (10YR5/6), wet, medium, SILT with some very fine-grained sand and little clay.		606	
9B					16		18	Yellowish brown (10YR5/6), wet, loose, very fine- to medium-grained SAND with trace silt.			
10A	12/16 75%	ss	23-41 50/4"		6	4.50		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

Completion Date: 8/27/10

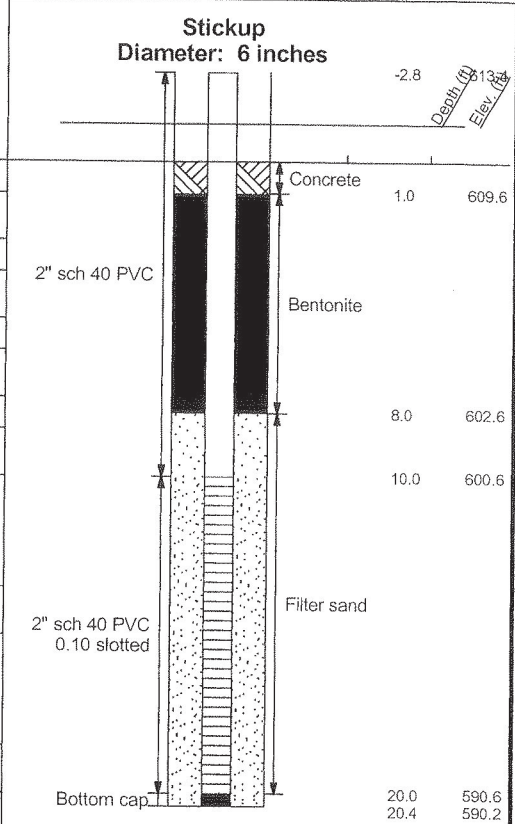
Datum msl

Northing: 872502.26

Easting: 2516632.59

WELL DIAGRAM

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/ROD	SAMPLES
	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
10	Hard to stiff, brown to gray, silty CLAY, trace sand seams - CL (TILL)			
			9-22-28	SS4
15			1-6-12	SS5
20	Boring terminated at 20 feet.		3-4-9	SS6



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: <u>DTK</u>	App'vd. by: <u>KR8</u>
Date: 9/10/10	Date: <u>1-4-11</u>	Date: <u>1/4/11</u>



Ameren-Coffeen Ash Pond Evaluation

Renamed G402
LOG OF BORING: APW-2

Project No. J017150.01

FIELD BORING LOG



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 (3/4" overdrill / 4/4")
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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 15.00 - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	19/24 79%	SS	2-2 2-2 N=4	25	0.80		Very dark brown (10YR2/2) grading to dark grayish brown (10YR4/2), moist, medium, SILT with some clay, trace roots and grass.		2			622	
2A	22/24 92%	SS	2-2 3-4 N=5	29	1.50		Very dark brown (10YR2/2) grading to dark grayish brown (10YR4/2), moist, stiff, SILT with some clay, trace wood.		3				
2B				26			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).		4			620	
3A	8/24 33%	SS	2-3 4-4 N=7	25	1.50		Yellowish brown (10YR5/4), moist, stiff, CLAY with little silt and trace very fine-grained sand.		6			618	
4A	21/24 88%	SS	8-7 8-7 N=15	20	1.30		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.		8			616	
5A	20/24 83%	SS	2-2 3-3 N=5	22	0.70		Grayish brown (10YR5/2) with 5% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with little silt and trace very fine-grained sand.		10			614	
6A	24/24 100%	SS	2-2 3-4 N=5	23	1.40		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.		12			612	
7A	21/24 88%	SS	5-5 6-5 N=11	20	0.90		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.		14			610	
8A	24/24 100%	SS	3-2 3-6 N=5	17			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.		16			608	
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.		18			606	
	0/2 0%	BD					Very dark grayish brown (10YR3/2), dry, hard, SILT with little clay and few very fine- to coarse-grained sand and gravel.		18.15				

End of boring = 18.15 feet

NOTE(S): G403 installed in borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 2.07 - 05/10/2007 ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	19/24 79%	ss		26	0.85 B				0.85	Black (10YR2/1), moist, firm, clayey SILT (TOPSOIL)		612	
1B				26					2.07				
2A	19/24 79%	ss		16	2.47 B				2.47	Gray (10YR5/1) with 35% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with sand and trace gravel		610	
3A	18/24 75%	ss		19	2.18 B				4.00				
3B				18	2.33 B				6.00	Gray (10YR6/1) with 20% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel		608	
4A	24/24 100%	ss		23	0.58 B				8.00	Yellowish brown (10YR5/8), moist, soft, sandy CLAY with slight trace gravel			
4B				18					8.00	Yellowish brown (10YR5/8), very moist to wet, very soft, clayey, very fine- to medium-grained SAND with trace gravel		606	
5A	23/24 96%	ss		10					10.00	Yellowish brown (10YR5/4) with 30% yellowish brown (10YR5/8) mottles, moist, hard, clayey SILT with sand and trace gravel		604	
5B				19					10.00	Yellowish brown (10YR5/6), wet, loose, very fine- to medium-grained SAND with coarse-grained sand and slight trace gravel			
6A	19/24 79%	ss		19					12.00	Dark yellowish brown (10YR4/6) with 40% yellowish brown (10YR5/8) mottles, moist, very hard, very silty CLAY with sand and gravel		602	
6B				11									

End of Boring = 12.0 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	19/24 79%	ss	43		0.78		0	Black (10YR2/1), moist, soft, clayey SILT (TOPSOIL)		620	
1B			26		1.94		2				
2A	12/12 100%	ss	27		2.52		4	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY		618	
3A			24		3.92		4				
3B	24/24 100%	ss	24		2.33		6	Gray (10YR6/1), moist, firm, silty CLAY slight trace sand		616	
4A	24/24 100%	ss	20		2.33		6	Gray (10YR5/1), very moist, soft, clayey, very fine- to fine-grained SAND		614	
5A	24/24 100%	ss	24		1.55		8	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel		612	
6A	24/24 100%	ss	19				10	Yellowish brown (10YR5/8) with 40% gray (10YR6/1) mottles, moist, firm, silty CLAY with sand and trace gravel		610	
6B			18				10	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND		610	
7A	24/24 100%	ss	9		7.42		12	Dark brown (10YR3/3), very moist, soft, clayey, fine- to very coarse-grained SAND with slight trace gravel		608	
							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			
							12	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			

End of Boring = 14.2 ft. BGS

NOTE(S):

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

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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen Township: East Fork Section 11, Tier 7 N.; Range 3 W.		▼ = Dry - During Drilling ▽ = ▽ =			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
							0	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	
							4	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay. Grayish brown (10YR5/2) with 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with few silt and little fine-grained sand.			618	
							6	Very pale brown (10YR7/4) with 25% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with trace silt.			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 and trace fine- to medium-grained sand.			614	
							10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with little 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. Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, moist, loose, fine-grained SAND with some clay.			606	
							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

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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 75%	ss	4-3 4-6 N=7	11		1.50	1.50	Dark brown (10YR3/3), moist, stiff, SILT with few clay and trace organics.			
1B							3.00				
2A	12/24 50%	ss	4-6 3-3 N=9	12		2.50	2.50	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay and trace small gravel.		620	
2B							2.00				
3A	3/24 13%	ss	3-3 4-7 N=7	24			4.00	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay. Grayish brown (10YR5/2) with 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with few silt and little fine-grained sand.		618	
							6.00	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	8.00	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	10.00	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	12.00	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	14.00	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	16.00	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.		606	
8B							16.00	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			18.00	Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, moist, loose, fine-grained SAND with some clay.		604	
9B							18.00			604	
10A	17/24 71%	ss	13-31 33-42 N=64	7		4.50	20.00	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



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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen Township: East Fork Section 11, Tier 7 N.; Range 3 W.	▼ = Dry - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11-1	3/3 100%	SH											
	8/24 33%	DS											
12-1									22	Gray (10YR5/1), dry, hard, SILT with few clay, few fine- to coarse-grained sand and trace small gravel. <i>[Continued from previous page]</i>		600	
13-1													
13-2	24/24 100%	DS											
13-3													
13-4									24			598	
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				26	Gray (10YR5/1), dry, hard, SILT with some clay, trace fine- to coarse-grained sand and trace small gravel.		596	
15A	12/24 50%	SS	15-16 10-11 N=26	10	4.50				28	Dark gray (10YR4/1), dry, hard, CLAY with some silt, trace fine- to coarse-grained sand and trace small gravel.		594	
16A	17/24 71%	SS	2-5 7-11 N=12	16	3.00				30	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.		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				34	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.		588	
19A	23/24 96%	SS	4-4 6-9 N=10	25	1.00				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



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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
22A	24/24 100%	SS	1-3 5-6 N=8	17	1.50		42			580	
23-1											
23-2	24/24 100%	SH		16							
23-3											
23-4							44			578	
24A	24/24 100%	SS	3-4 6-7 N=10	17	1.50		46	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel. <i>[Continued from previous page]</i>		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



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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen Township: East Fork Section 10, Tier 7 N.; Range 3 W.	▼ = 16.00 - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	12/24 50%	ss	4-3 3-3 N=6	14		3.50			0	Very dark gray (10YR3/1), wet, medium, SILT with some organics. [Fill]		618	
2A	20/24 83%	ss	2-2 4-4 N=6	18		1.50			2	Gray (10YR6/1), wet, loose, SAND with some gravel and little clay. [Fill]		616	
3A	23/24 96%	ss	1-2 3-4 N=5	19		1.75			4	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. 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.		614	
4A	24/24 100%	ss	1-3 3-5 N=6	19		1.50			6	Brown (10YR5/3) with 25% yellowish brown (10YR5/6) mottles, moist, stiff, CLAY with some silt, trace fine-grained sand and trace small gravel.		612	
5A	21/24 88%	ss	1-2 4-4 N=6	19		0.50			8	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.		610	
6A	22/24 92%	ss	1-2 2-1 N=4	17					10	Yellowish brown (10YR5/6) with 25% brown (10YR5/3) mottles, moist, medium, CLAY with few silt, few fine-grained sand, and trace small gravel.		608	
7A	24/24 100%	ss	7-29 33-17 N=62	8					12	Yellowish brown (10YR5/8) with 5% gray (10YR5/1) mottles, moist, very loose, fine-grained SAND with some clay and trace small gravel.		606	
8A	24/24 100%	ss	3-7 12-17 N=19	12		4.50			14	Gray (10YR5/1) with 25% yellowish brown (10YR5/8) mottles, moist, very dense, fine-grained SAND		604	
9A	24/24 100%	ss	4-9 14-20 N=23	13		4.00			16	Brown (10YR5/3), moist, hard, SILT with some clay and little fine- to coarse-grained sand.		602	
10A	24/24 100%	ss	2-8 14-19 N=22	14		4.50			18	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.		600	
									20	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 little small gravel.			
										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

NOTE(S): G407 installed in boring.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen Township: East Fork Section 10, Tier 7N; Range 3W	▽ = 11.00 - During drilling ▽ = 13.30 - Upon completion ▽ = 4.82 - 1 March 2018	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	14/24 58%	SS	2-3 1-5 N=4	26.7					0	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			614	
3A	17/24 71%	SS	2-3 4-6 N=7	17.9					4	Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with some silt and trace very fine- to fine-grained sand.		612	
4A	20/24 83%	SS	3-4 5-6 N=9	17.2					6			610	
5A	11/24 46%	SS	3-3 5-6 N=8	17.5					8	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.		608	
6A	22/24 92%	SS	2-3 4-6 N=7	16.9					10	Gray (10YR6/1), moist, loose, very fine- to medium-grained SAND with few silt and few clay.		606	
6B				16.8					12	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.		606	
7A	24/24 100%	SS	6-28 36-42 N=64	10.3					14	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



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: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
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	Quadrangle: Coffeen Township: East Fork Section 10, Tier 7N; Range 3W	▽ = 13.00 - During drilling ▽ = 8.00 - Upon completion ▽ = 2.65 - 1 March 2018			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	17/24 71%	SS	5-2 4-4 N=6	15.6						620	
2A	17/24 71%	SS	4-4 4-6 N=8	28.9						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						612	
6A	24/24 100%	SS	2-4 5-6 N=9	14.4						610	
7A	24/24 100%	SS	1-3 2-4 N=5	18.9						608	
	23/24 96%	SS	3-17 20-20 N=37							606	
	0/6 0%	BD									

End of Boring = 16.47 ft bgs

NOTE(S):

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: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = 34.00 - While drilling ▽ = ▽ = 36.28 - MW01D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	16/24 67%	ss	1-1 1-2 N=2	22	0.78 B				0	Very dark gray (10YR3/1), clayey SILT, trace sand		606	
2A	20/24 83%	ss	2-3 5-5 N=8	13	3.71 BSh				2	Light gray (10YR7/1) with 40% yellowish brown (10YR5/8) mottles, clayey SILT, trace sand and gravel		604	
3A	22/24 92%	ss	2-2 3-6 N=5	14	2.62 BSh				4	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, clayey SILT, trace sand and gravel		602	
4A	23/24 96%	ss	8-12 19-19 N=31	13	3.30 BSh				6	Yellowish brown (10YR5/6) with 20% black (10YR2/1) mottles, clayey SILT, little sand and gravel		600	
5A	24/24 100%	ss	4-9 13-19 N=22	13	4.80 BSh				8	Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, clayey SILT, trace sand and gravel		598	
6A	22/24 92%	ss	3-6 12-15 N=18	12	8.73 B				10	Dark gray (N4/1) with 25% yellowish brown (10YR5/6) mottles, clayey SILT, trace sand and gravel		596	
7A	24/24 100%	ss	14-19 23-30 N=42	12	7.86 B				12	Dark gray (N4/1), clayey SILT, trace sand and gravel		594	
8A	24/24 100%	ss	4-8 12-14 N=20	13	7.56 B				14	Dark gray (N4/1), clayey SILT, trace sand and gravel		592	
9A	24/24 100%	ss	16-16 20-21 N=36	14	7.01 B				16	Dark gray (N4/1), clayey SILT, trace sand and gravel		590	
10A	24/24 100%	ss	3-5 8-11 N=13	14	5.24 B				18	Dark gray (N4/1), clayey SILT, trace sand and gravel		588	

NOTE(S): MW01D installed in SB-01.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	24/24 100%	SH		15	3.69 B		22			586	Shelby tube taken from shallow well borehole at indicated depth.
12A	24/24 100%	SS	10-11 12-16 N=23	14	5.24 B		24			584	Shelby tube taken from shallow well borehole at indicated depth.
13A	6/24 25%	SH		14	3.69 B		26			582	
14A	24/24 100%	SS	10-12 18-18 N=30	15	4.27 B		28	Dark gray (N4/1), clayey SILT, trace sand and gravel [Continued from previous page]		580	
15A	24/24 100%	SS	5-9 11-16 N=20	14	4.27 B		30			578	
16A	24/24 100%	SS	5-8 10-12 N=18	17	2.72 BSh		32			576	
17A	24/24 100%	SS	8-14 14-16 N=28	14	5.62 B		34			574	
18A	23/24 96%	SS	8-28 40-65 N=68	14			36	Gray (N4/1), silty, fine to medium SAND, little coarse sand, trace gravel, wet		572	
19A	24/24 100%	SS	24-14 17-16 N=31	19	5.43 B		38	Very dark gray (10YR3/1), silty CLAY		570	
20A	24/24 100%	SS	3-5 6-10 N=11	24	3.50 BSh		40	Dark gray (N4/1) with 30% dark yellowish brown (10YR4/6) mottles, silty CLAY		568	

NOTE(S): MW01D installed in SB-01.

FIELD BORING LOG

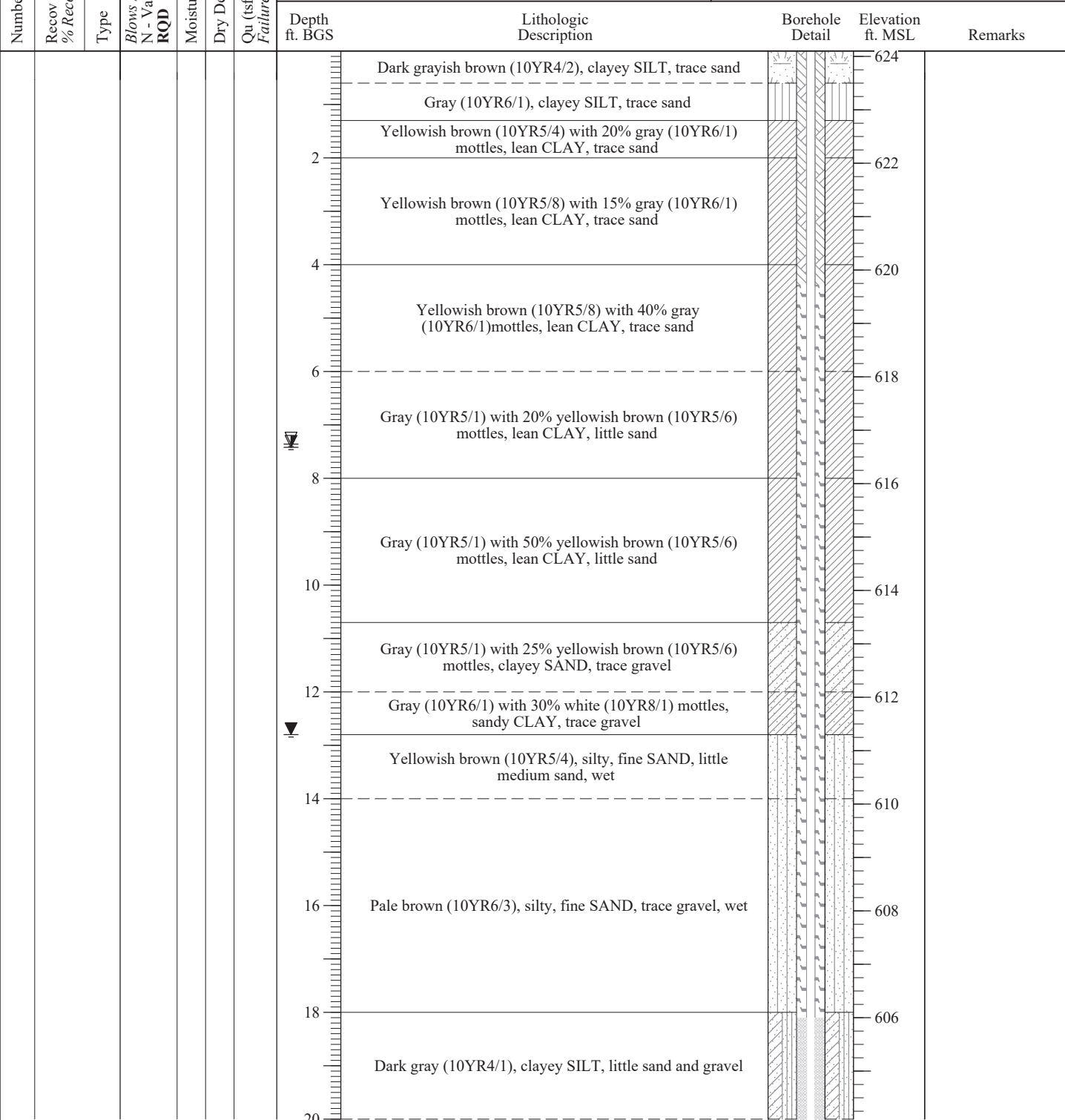


CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006

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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W			▽ = 12.80 - While drilling ▽ = 7.42 - MW02S on 6/1/06 ▽ = 7.36 - MW02D on 6/1/06		
									Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	



NOTE(S): MW02D installed in blind-drilled borehole within 10 ft of SB-02.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006

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

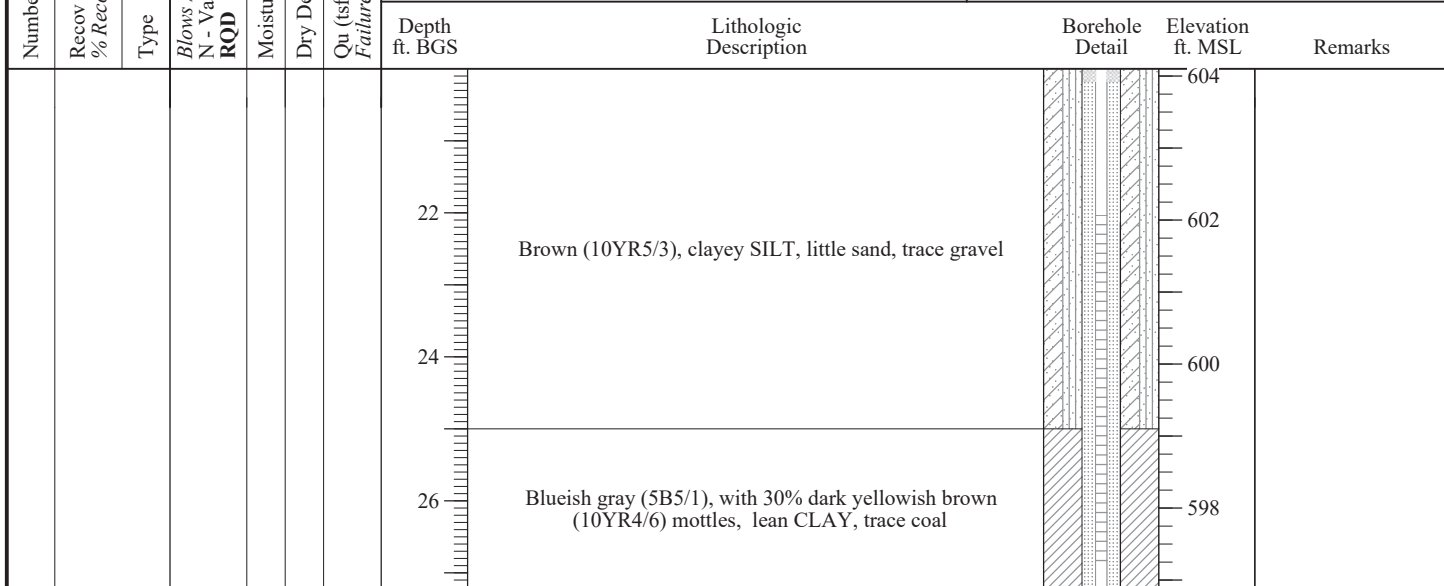
BOREHOLE ID: SB-02b
Well ID: MW2D
Surface Elev: 624 ft. MSL
Completion: 27 ft. BGS
Station: 876,414.0N
 2,513,209.7E

WEATHER: Partly cloudy, mild (high-50's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	

Quadrangle: Coffeen, IL
Township: East Fork
Section 10, Tier 7N; Range 3W

▽ = 12.80 - While drilling
 ▽ = 7.42 - MW02S on 6/1/06
 ▽ = 7.36 - MW02D on 6/1/06



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



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24	ss	3-3	23				Dark grayish brown (10YR4/2), clayey SILT, trace sand		624	
1B	100%		4-5			1.96 B		Gray (10YR6/1), clayey SILT, trace sand			
1C			N=7	18				Yellowish brown (10YR5/4) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand			
				29		1.94 B	2			622	
2A	24/24	ss	3-4	25		2.89 B	4	Yellowish brown (10YR5/8) with 15% gray (10YR6/1) mottles, lean CLAY, trace sand			
	100%		4-6							620	
			N=8								
3A	24/24	ss	3-5	20		2.91 B	6	Yellowish brown (10YR5/8) with 40% gray (10YR6/1) mottles, lean CLAY, trace sand			
	100%		5-7							618	
			N=10								
4A	24/24	ss	10-8	17		2.91 B	8	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, lean CLAY, little sand			
	100%		8-10							616	
			N=16								
5A	24/24	ss	3-3	19		1.94 B	10	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand			
	100%		4-5							614	
			N=7								
6A	24/24	ss	2-3	18		2.13 B	12	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, clayey SAND, trace gravel			
	100%		6-5							612	
			N=9								
7A	24/24	ss	4-4	14		2.06 B	14	Gray (10YR6/1) with 30% white (10YR8/1) mottles, sandy CLAY, trace gravel			
	100%		7-10							610	
			N=11								
8A	24/24	ss	15-23	10			16	Yellowish brown (10YR5/4), silty, fine SAND, little medium sand, wet			
	100%		33-68							608	
			N=56								
9A	10/10	ss	48-62/4"	10		3.92 Sh	18	Pale brown (10YR6/3), silty, fine SAND, trace gravel, wet			
	100%									606	
10A	12/12	ss	15-45	9		8.07 BSh	20	Dark gray (10YR4/1), clayey SILT, little sand and gravel			
	100%										

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station

Site: CCB Management Facility

Location: Coffeen, Illinois

Project: 05SS3004A

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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	36/60 60%	cs		9				22	Brown (10YR5/3), clayey SILT, little sand, trace gravel		604	
11B				11				24			602	
12A	60/60 100%	cs		21				26	Blueish gray (5B5/1), with 30% dark yellowish brown (10YR4/6) mottles, lean CLAY, trace coal		600	
12B				23				28			598	
13A	60/60 100%	cs		14				30	Very dark gray (10Y3/1), lean CLAY, trace sand and gravel		596	
								32			594	
								34			592	
14A	60/60 100%	cs		14				36			590	
								38			588	
								40			586	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Partly cloudy, mild (high-50's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:					
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks				
15A	60/60 100%	cs		14			42	Very dark gray (10Y3/1), lean CLAY, trace sand and gravel [Continued from previous page]							
16A	60/60 100%	cs		13		44									
						46									
						48									
						50									
End of Boring = 50.0 ft. BGS															

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



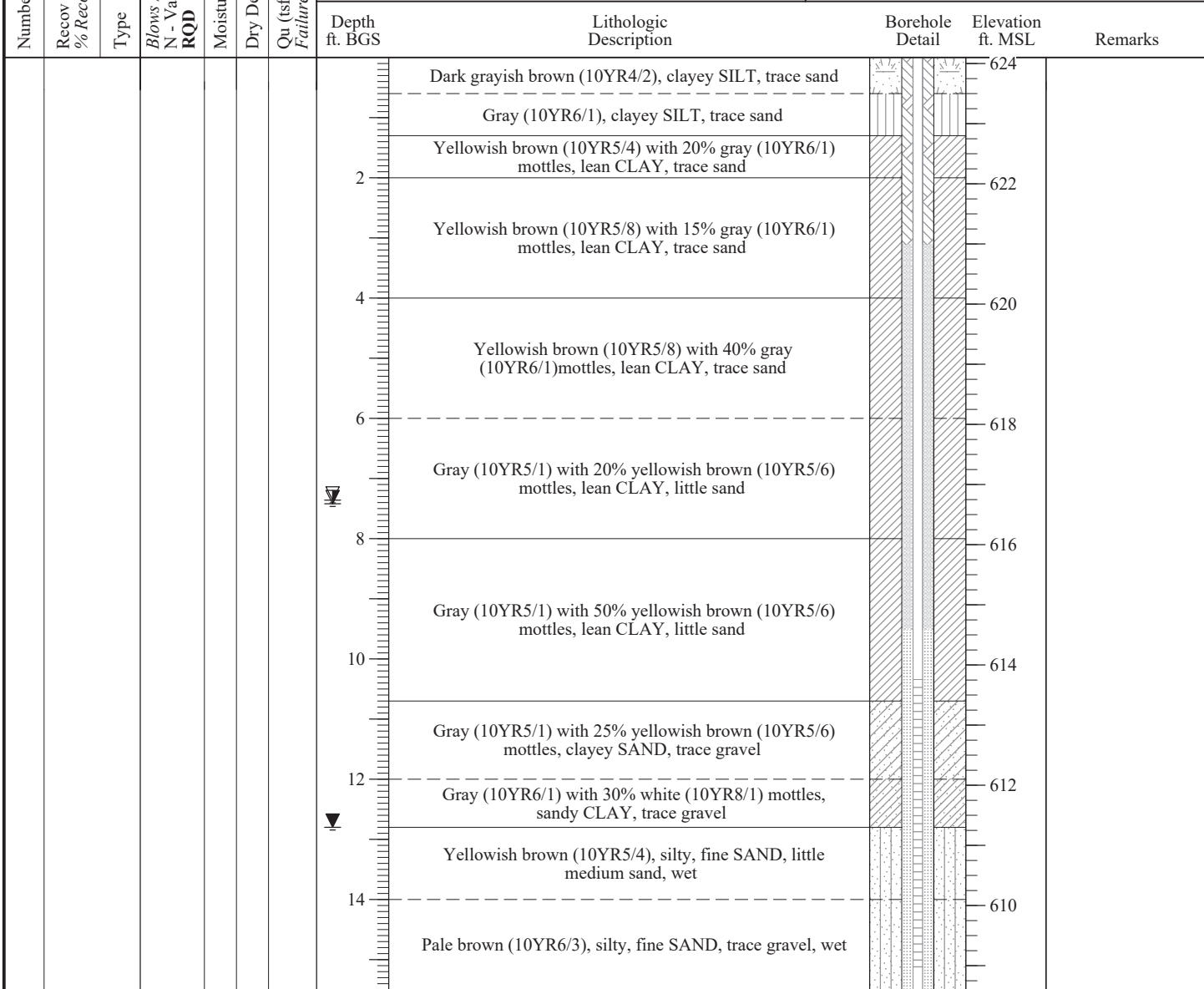
CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Partly cloudy, mild (high-50's)

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▽ = 12.80 - While drilling
								Township: East Fork	▽ = 7.42 - MW02S on 6/1/06
								Section 10, Tier 7N; Range 3W	▽ = 7.36 - MW02D on 6/1/06



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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Partly cloudy, mild (high-50's)

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24	ss	3-3	23				Dark grayish brown (10YR4/2), clayey SILT, trace sand		624	
1B	100%		4-5			1.96 B		Gray (10YR6/1), clayey SILT, trace sand			
1C			N=7	18				Yellowish brown (10YR5/4) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand			
				29		1.94 B	2			622	
2A	24/24	ss	3-4	25		2.89 B	4	Yellowish brown (10YR5/8) with 15% gray (10YR6/1) mottles, lean CLAY, trace sand			
	100%		4-6							620	
			N=8								
3A	24/24	ss	3-5	20		2.91 B	6	Yellowish brown (10YR5/8) with 40% gray (10YR6/1) mottles, lean CLAY, trace sand			
	100%		5-7							618	
			N=10								
4A	24/24	ss	10-8	17		2.91 B	8	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, lean CLAY, little sand			
	100%		8-10							616	
			N=16								
5A	24/24	ss	3-3	19		1.94 B	10	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand			
	100%		4-5							614	
			N=7								
6A	24/24	ss	2-3	18		2.13 B	12	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, clayey SAND, trace gravel			
	100%		6-5							612	
			N=9								
7A	24/24	ss	4-4	14		2.06 B	14	Gray (10YR6/1) with 30% white (10YR8/1) mottles, sandy CLAY, trace gravel			
	100%		7-10							610	
			N=11					Yellowish brown (10YR5/4), silty, fine SAND, little medium sand, wet			
8A	24/24	ss	15-23	10			16			608	
	100%		33-68								
			N=56								
9A	10/10	ss	48-62/4"	10		3.92 Sh	18	Pale brown (10YR6/3), silty, fine SAND, trace gravel, wet			
	100%									606	
10A	12/12	ss	15-45	9		8.07 BSh	20	Dark gray (10YR4/1), clayey SILT, little sand and gravel			

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station

Site: CCB Management Facility

Location: Coffeen, Illinois

Project: 05SS3004A

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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	36/60 60%	cs		9				22	Brown (10YR5/3), clayey SILT, little sand, trace gravel		604	
11B				11			24	602				
12A	60/60 100%	cs		21				26	Blueish gray (5B5/1), with 30% dark yellowish brown (10YR4/6) mottles, lean CLAY, trace coal		600	
12B				23			28	598				
13A	60/60 100%	cs		14			30	596				
								32	Very dark gray (10Y3/1), lean CLAY, trace sand and gravel		594	
14A	60/60 100%	cs		14			34	592				
								36			590	
								38			588	
								40			586	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Partly cloudy, mild (high-50's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:					
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks				
15A	60/60 100%	cs		14			42	Very dark gray (10Y3/1), lean CLAY, trace sand and gravel [Continued from previous page]							
16A	60/60 100%	cs		13		44									
						46									
						48									
						50									
End of Boring = 50.0 ft. BGS															

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:								
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qtz (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 14.00 - While drilling ▽ = 7.03 - MW03S on 6/1/06 ▽ = 55.40 - MW03D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks				
1A	20/24	ss	2-2	17	2.07	SP	Very dark grayish brown (10YR3/2), lean CLAY Grayish brown (10YR5/2), lean CLAY, trace sand Yellowish brown (10YR5/6), lean CLAY, trace sand Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, lean CLAY, trace sand Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, sandy SILT, trace gravel Yellowish brown (10YR5/6) with 50% gray (N5/1) mottles, lean CLAY, trace sand and gravel Yellowish brown (10YR5/6), lean CLAY, little sand, trace gravel Dark gray (10YR4/1), sandy CLAY, trace gravel Gray (10YR6/1) with 50% yellowish brown (10YR5/8) mottles, lean CLAY, little sand, trace gravel Yellowish brown (10YR5/8), silty, fine SAND, little medium sand, trace gravel, wet Yellowish brown (10YR5/8), silty, fine SAND, little clay, wet 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 Gray (10YR5/1), sandy SILT, trace gravel		626 624 622 620 618 616 614 612 610 608 606								
1B	83%		4-6 N=6	20													
1C				26	3.30	B					2						
2A	17/24	ss	2-3 4-5 N=7	25	3.05	B					4						
3A	20/24	ss	2-3 3-5 N=6	16	1.96	B					6						
4A	24/24	ss	4-3 5-6 N=8	21	2.27	B					8	▽					
5A	21/24	ss	1-3 3-4 N=6	20	2.18	B					10						
5B				19													
6A	18/24	ss	1-2 2-4 N=4	24	0.87	B					12						
7A	23/24	SH	3-2	19													Shelby tube taken from shallow well borehole at indicated depth.
7B	16/24	SS	2-4 N=4	12													
8A	23/24	ss	3-12 29-50 N=41	13							14	▽					
8B				13													
8C				12													
9A	14/24	ss	8-82 85-72 N=167	10	6.98	B											
9B				13	6.18	BSh					18						
10A	18/24	ss	6-21 32-49 N=53	8	11.95	Sh					20						

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W		▽ = 14.00 - While drilling ▽ = 7.03 - MW03S on 6/1/06 ▽ = 55.40 - MW03D on 6/1/06		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	19/24 79%	ss	3-20 35-29 N=55	10	5.36 Sh						Wood fragments
12A	20/24 83%	ss	15-25 89-69 N=114	8	13.00 Sh		Gray (10YR5/1), sandy SILT, trace gravel [Continued from previous page]				
13A	23/24 96%	ss	14-19 24-22 N=43	9							
13B				13	6.98 BSh		Yellowish brown (10YR5/4), lean CLAY, trace sand and gravel				
14A	24/24 100%	ss	19-21 26-32 N=47	15	7.01 BSh		Gray (10YR4/1), clayey SILT, trace sand and gravel				
15A	21/24 88%	ss	10-25 25-23 N=50	12			Light gray (10YR6/1), SILT, trace sand				
15B				13	8.53 BSh						
16A	24/24 100%	ss	7-12 19-30 N=31	13	9.16 BSh						
17A				14	6.59 B						
17B	24/24 100%	ss	29-35 39-42 N=74	14	3.49 Sh		Gray (10YR4/1), lean CLAY, trace sand and gravel				
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		Gray (10YR4/1), clayey SILT, trace sand and gravel				
20A	24/24 100%	ss	6-10 15-24 N=25	14	6.76 BSh		Gray (10YR4/1), lean CLAY, trace sand and gravel				

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▽ = 14.00 - While drilling ▽ = 7.03 - MW03S on 6/1/06 ▽ = 55.40 - MW03D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
21A	19/24 79%	ss	4-10 16-23 N=26	13	8.04 BSh		Gray (10YR4/1), lean CLAY, trace sand and gravel <i>[Continued from previous page]</i>		42			584	
22A	21/24 88%	ss	19-27 28-32 N=55	13	7.56 BSh			44				582	
23A	23/24 96%	ss	4-9 14-18 N=23	14	6.98 BSh			46				580	
24A	24/24 100%	ss	20-26 30-33 N=56	14	6.59 BSh			48				578	
25A	24/24 100%	ss	6-10 13-12 N=23	20	3.30 BSh			50				576	
26A	24/24 100%	ss	4-7 6-7 N=13	22	2.91 BSh			52				574	
27A	24/24 100%	ss	7-18 37-85 N=55	16	4.05 BSh			54				572	
27B				13									
28A	23/24 96%	ss	15-34 34-19 N=68	11	3.22 SP			56				570	
28B				13	5.82 B								
29A	24/24 100%	ss	19-22 28-18 N=50	20	4.36 BSh			58				568	

End of Boring = 58.0 ft. BGS

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4 1/4" 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

WEATHER: Partly sunny, cool (mid-50's)

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▼ = 8.00 - While drilling	▼ = 5.67 - MW04S on 6/1/06	▼ =
								Section 2, Tier 7N; Range 3W			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Very dark gray (10YR3/1), clayey SILT, trace sand			622
								Dark grayish brown (10YR4/2) with 15% yellowish brown (10YR5/6) mottles, lean CLAY			
							2				620
								Yellowish brown (10YR5/8) with 50% grayish brown (10YR5/2) mottles, lean CLAY			
							4				618
								Dark gray (10YR4/1), clayey SILT, trace sand			
							▼ 6				616
								Gray (10YR5/1), lean CLAY, trace sand and gravel			
							▼ 8				614
								Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, sandy SILT			
							10				612
								Very dark gray (10YR3/1) with 35% gray (10YR6/1) mottles, clayey SILT, wet			
							12				610
								Yellowish brown (10YR5/6), clayey SAND, trace gravel			
							14				608
								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			
								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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 8.00 - While drilling ▽ = 5.67 - MW04S on 6/1/06 ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	21/24 88%	ss	1-2 2-4 N=4	24		1.09 B			0	Very dark gray (10YR3/1), clayey SILT, trace sand		622	
1B				29					1	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	Yellowish brown (10YR5/8) with 50% grayish brown (10YR5/2) mottles, lean CLAY		620	
3A	16/24 67%	ss	2-3 4-6 N=7	23		1.71 B			4	Dark gray (10YR4/1), clayey SILT, trace sand		618	
4A	24/24 100%	ss	4-5 5-7 N=10	20		1.40 BSP			6	Gray (10YR5/1), lean CLAY, trace sand and gravel		616	
5A	24/24 100%	ss	1-2 2-2 N=4	23		0.70 B			8	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, sandy SILT		614	
6A	24/24 100%	ss	0-1 2-3 N=3	24		0.31 BSh			10	Very dark gray (10YR3/1) with 35% gray (10YR6/1) mottles, clayey SILT, wet		612	
6B				28					12	Yellowish brown (10YR5/6), clayey SAND, trace gravel		610	
7A	22/24 92%	ss	0-1 3-7 N=4	16		0.08 B			14	Light gray (10YR7/1) with 20% brown (10YR5/3) mottles, clayey SILT, trace sand and gravel			
7B				12					14	Yellowish brown (10YR5/8), silty, fine to medium SAND, trace coarse sand, wet		608	
7C				14					16			606	
8A	23/24 96%	ss	4-9 22-35 N=31	11		4.36 SP			18	Gray (10YR4/1), sandy SILT, trace gravel		604	
8B				7					20				
9A	24/24 100%	ss	27-38 54-50 N=92	9		2.18 BSh							
10A	24/24 100%	ss	24-29 39-34 N=68	9									

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
								Depth ft. BGS	Lithologic Description	▼ =	▼ =	▼ =
11A	60/60 100%	cs		7				22		602		
12A	60/60 100%	cs		7				24		600		
13A	60/60 100%	cs		8				26		598		
14A	60/60 100%	cs		13				28		596		
								30	Gray (10YR4/1), sandy SILT, trace gravel [Continued from previous page]	594		
								32		592		
								34		590		
								36		588		
								38		586		
								40		584		

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Partly sunny, cool (mid-50's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL		▽ = 8.00 - While drilling	
									Township: East Fork		▽ = 5.67 - MW04S on 6/1/06	
									Section 2, Tier 7N; Range 3W			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
15A	60/60 100%	cs			13				42	Gray (10YR4/1), sandy SILT, trace gravel [Continued from previous page]	582	
									44		580	
									46		578	
16A	60/60 100%	cs			14				48	Greenish gray (10BG5/1) with 20% dark yellowish brown (10YR4/6) mottles, lean CLAY, trace sand	574	
16B					21				50		572	
									52		570	
17A	60/60 100%	cs			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



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 3, Tier 7N; Range 3W	▼ = 10.00 - While drilling ▽ = 6.74 - MW05S on 6/1/06 ▽ = 50.44 - MW05D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	19/24 79%	ss	0-2 3-4 N=5									622	
1B									2	Gray (10YR5/1 with 50% yellowish brown (10YR5/6) mottles, clayey SILT		620	
2A	22/24 92%	ss	2-5 5-7 N=10			2.47 BSh			4	Very dark brown (10YR2/2) with 20% dark gray (10YR4/1) mottles, clayey SILT, trace sand			
2B						2.13 B			6	Dark gray (10YR4/1) with 30% light gray (10YR7/1) mottles, lean CLAY		618	
3A	24/24 100%	ss	2-2 3-6 N=5			2.33 BSP			8	Gray (10YR6/1), lean CLAY, trace sand		616	
4A	24/24 100%	ss	7-6 6-8 N=12			1.90 BSh			10	Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		614	
5A	18/24 75%	ss	1-3 4-5 N=7			1.78 B			12	Yellowish brown (10YR5/6), clayey SAND, trace gravel, wet		612	
6A	20/24 83%	ss	0-1 3-4 N=4			0.70 BSh			14	Yellowish brown (10YR5/6) with 50% gray 10YR5/1) mottles, sandy CLAY		610	
6B									16	Gray 10YR6/1), clayey, fine to medium SAND, trace gravel, wet			
7A	24/24 100%	ss	3-6 17-20 N=23						18	Brownish yellow (10YR6/6), silty, fine SAND, trace medium sand		608	
7B									20	Yellowish brown (10YR5/6), silty, fine SAND, wet		606	
8A	20/24 83%	ss	4-16 25-25 N=41						22	Brown (10YR5/3), silty SAND and GRAVEL, wet		604	
8B									24	Dark gray (10YR4/1), sandy SILT, trace clay and gravel			
9A	24/24 100%	ss	14-18 38-62 N=56						26				
9B									28				
10A	18/24 75%	ss	14-39 77 N=116			3.27 Sh			30				

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	60/60 100%	cs		7				22	Dark gray (10YR4/1), silty, fine SAND, trace medium sand		600	
11B				7				24			598	
12A	60/60 100%	cs		7				26			596	
								28			594	
13A	60/60 100%	cs		8				30	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		592	
								32			590	
14A	48/60 80%	cs		7				34			588	
								36			586	
14B				14				38	Gray (10YR6/1), fine to medium SAND		584	
								40	Dark gray (10YR4/1), sandy SILT, trace clay and gravel			

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
									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		
15A	60/60 100%	cs							42	Dark gray (10YR4/1), sandy SILT, trace clay and gravel [Continued from previous page]		582	
									44	Gray (10YR4/1), clayey SILT, trace sand		580	
16A	60/60 100%	cs							46	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		578	
16B									48			576	
									50	Gray(10YR4/1), silty, fine to medium SAND, trace organics and coal		574	
17A	24/24 100%	ss	7-10 15-16 N=25						52	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		572	
18A	24/24 100%	ss	17-18 19-21 N=37						54	Greenish gray (5G5/1) with 40% yellowish brown (10YR5/6)mottles, lean CLAY		570	
End of Boring = 54.0 ft. BGS													

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▽ = 10.00 - While drilling
								Township: East Fork	▽ = 6.74 - MW05S on 6/1/06
								Section 3, Tier 7N; Range 3W	▽ = 50.44 - MW05D on 6/1/06

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
0	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		618	
6	Dark gray (10YR4/1) with 30% light gray (10YR7/1) mottles, lean CLAY		616	
8	Gray (10YR6/1), lean CLAY, trace sand		614	
10	Yellowish brown (10YR5/6), clayey SAND, trace gravel, wet		612	
12	Yellowish brown (10YR5/6) with 50% gray 10YR5/1) mottles, sandy CLAY		610	
14	Gray 10YR6/1), clayey, fine to medium SAND, trace gravel, wet		608	
16	Brownish yellow (10YR6/6), silty, fine SAND, trace medium sand		606	
	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			

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



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 3, Tier 7N; Range 3W		▼ = 10.00 - While drilling ▽ = 6.74 - MW05S on 6/1/06 ▽ = 50.44 - MW05D on 6/1/06		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	19/24 79%	ss	0-2 3-4 N=5	29			Dark grayish brown (10YR4/2), clayey SILT, trace sand		622		
1B				28			Gray (10YR5/1 with 50% yellowish brown (10YR5/6) mottles, clayey SILT		620		
2A	22/24 92%	ss	2-5 5-7 N=10	27	2.47 BSh		Very dark brown (10YR2/2) with 20% dark gray (10YR4/1) mottles, clayey SILT, trace sand		620		
2B				22	2.13 B		Dark gray (10YR4/1) with 30% light gray (10YR7/1) mottles, lean CLAY		618		
3A	24/24 100%	ss	2-2 3-6 N=5	21	2.33 BSP		Gray (10YR6/1), lean CLAY, trace sand		616		
4A	24/24 100%	ss	7-6 6-8 N=12	21	1.90 BSh		Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		614		
5A	18/24 75%	ss	1-3 4-5 N=7	22	1.78 B		Yellowish brown (10YR5/6), clayey SAND, trace gravel, wet		612		
6A	20/24 83%	ss	0-1 3-4 N=4	22	0.70 BSh		Yellowish brown (10YR5/6) with 50% gray 10YR5/1 mottles, sandy CLAY		610		
7A	24/24 100%	ss	3-6 17-20 N=23	19			Gray 10YR6/1, clayey, fine to medium SAND, trace gravel, wet		610		
7B				16			Brownish yellow (10YR6/6), silty, fine SAND, trace medium sand		608		
8A	20/24 83%	ss	4-16 25-25 N=41	20			Yellowish brown (10YR5/6), silty, fine SAND, wet		608		
8B				11			Brown (10YR5/3), silty SAND and GRAVEL, wet		606		
9A	24/24 100%	ss	14-18 38-62 N=56	12			Dark gray (10YR4/1), sandy SILT, trace clay and gravel		604		
9B				8							
10A	18/24 75%	ss	14-39 77 N=116	9	3.27 Sh						

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	▽ = 10.00 - While drilling ▽ = 6.74 - MW05S on 6/1/06 ▽ = 50.44 - MW05D on 6/1/06
11A	60/60 100%	cs		7			22	Dark gray (10YR4/1), silty, fine SAND, trace medium sand			600	
11B				7			24				598	
12A	60/60 100%	cs		7			28				594	
13A	60/60 100%	cs		8			34				588	
14A	48/60 80%	cs		7			38	Gray (10YR6/1), fine to medium SAND			584	
14B				14			40					

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
15A	60/60 100%	cs					42	Dark gray (10YR4/1), sandy SILT, trace clay and gravel <i>[Continued from previous page]</i>		582	
							42	Gray (10YR4/1), clayey SILT, trace sand		580	
							44			578	
							46	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		576	
16A	60/60 100%	cs					48			574	
16B							50	Gray(10YR4/1), silty, fine to medium SAND, trace organics and coal		572	
17A	24/24 100%	ss	7-10 15-16 N=25				50	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		570	
18A	24/24 100%	ss	17-18 19-21 N=37				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



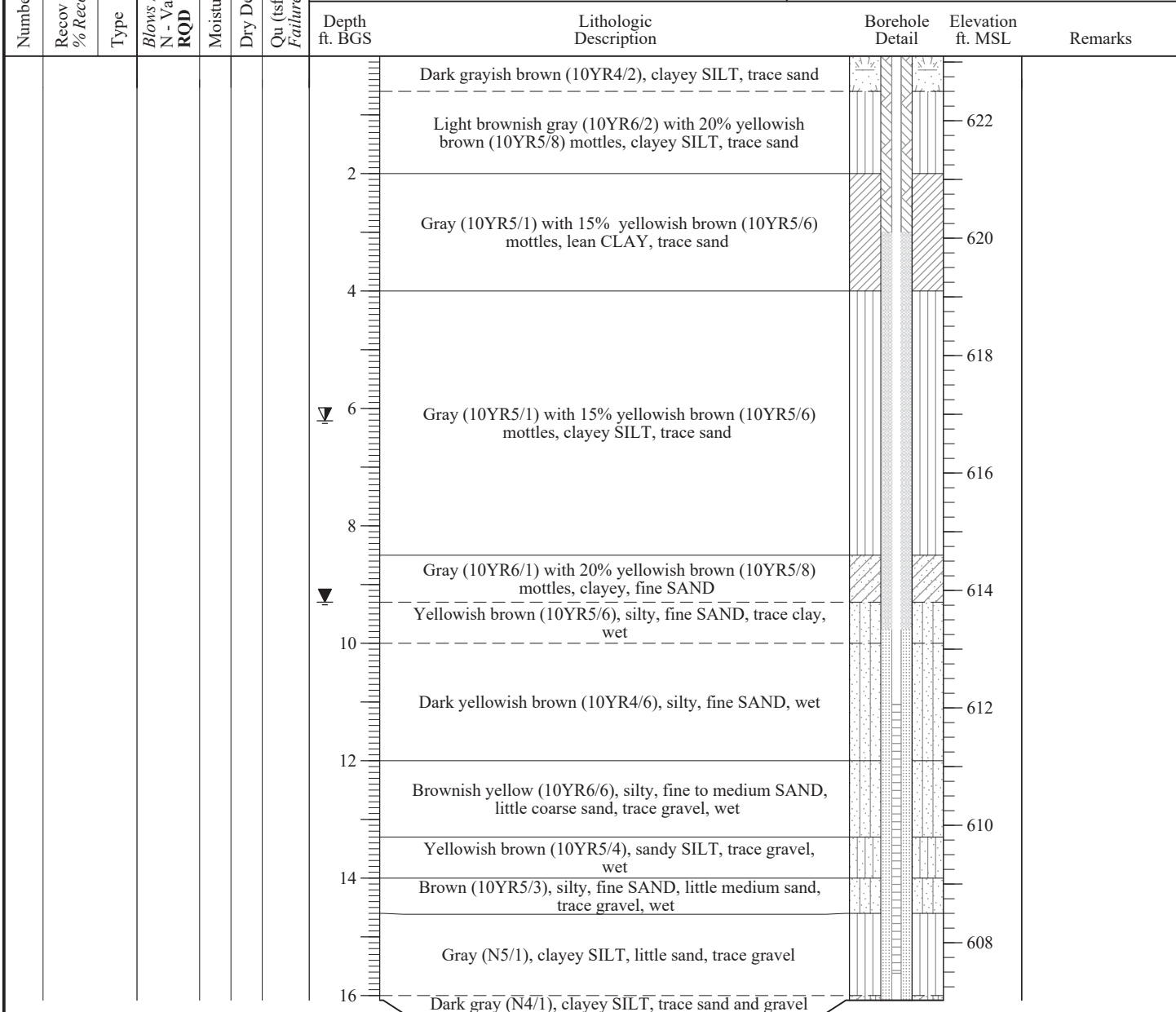
CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Partly sunny, cool (mid-50's)

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▽ = 9.30 - While drilling
								Township: East Fork	▽ = 6.21 - MW06S on 6/1/06
								Section 3, Tier 7N; Range 3W	▽ =



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



CLIENT: AEG Coffeen Power Station

Site: CCB Management Facility

Location: Coffeen, Illinois

Project: 05SS3004A

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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	ss	2-3 3-5 N=6	25	1.22 SP		0	Dark grayish brown (10YR4/2), clayey SILT, trace sand			
1B	24/24 100%	ss	2-3 3-5 N=6	28	1.96 B		2	Light brownish gray (10YR6/2) with 20% yellowish brown (10YR5/8) mottles, clayey SILT, trace sand		622	
2A	24/24 100%	ss	2-4 5-6 N=9	27	1.94 BSh		4	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		620	
2B	24/24 100%	ss	2-4 5-6 N=9	19	2.52 BSh		4				
3A	24/24 100%	ss	1-3 4 N=7	21	1.36 B		6	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, clayey SILT, trace sand		618	
4A	24/24 100%	ss	4-6 6 N=12	17	1.78 B		8			616	
5A	22/24 92%	ss	1-2 3-3 N=5	17	0.85 BSh		10	Gray (10YR6/1) with 20% yellowish brown (10YR5/8) mottles, clayey, fine SAND		614	
5B	22/24 92%	ss	1-2 3-3 N=5	21	0.81 None		10	Yellowish brown (10YR5/6), silty, fine SAND, trace clay, wet			
5C	20/24 83%	ss	0-1 2-4 N=3	25	0.31 None		10				
6A	20/24 83%	ss	0-1 2-4 N=3	25			12	Dark yellowish brown (10YR4/6), silty, fine SAND, wet		612	
7A	24/24 100%	ss	2-4 7-8 N=11	15			14	Brownish yellow (10YR6/6), silty, fine to medium SAND, little coarse sand, trace gravel, wet		610	
7B	24/24 100%	ss	2-4 7-8 N=11	12	1.48 BSh		14	Yellowish brown (10YR5/4), sandy SILT, trace gravel, wet			
8A	22/24 92%	ss	11-33 57-35 N=90	8	7.18 Sh		16	Brown (10YR5/3), silty, fine SAND, little medium sand, trace gravel, wet		608	
8B	22/24 92%	ss	11-33 57-35 N=90	8	7.18 Sh		16	Gray (N5/1), clayey SILT, little sand, trace gravel		606	
9A	22/24 92%	ss	30-39 46-55 N=85	9	11.35 Sh		18			604	
8A	22/24 92%	ss	30-39 46-55 N=85	11	11.35 Sh		18	Dark gray (N4/1), clayey SILT, trace sand and gravel			
10A	24/24 100%	ss	4-23 50-51 N=73	7	11.64 Sh		20			604	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

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

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Partly sunny, cool (mid-50's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	20/24 83%	ss	6-16 33-58 N=49	11		3.49 BSh	22			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	Dark gray (N4/1), clayey SILT, trace sand and gravel [Continued from previous page]		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	38			586	
19B				13		8.92 B					
20A	24/24 100%	ss	3-8 12-15 N=20	14		8.53 BSh	40	Very dark greenish gray (10Y3/1), lean CLAY, trace sand		584	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

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

CONTRACTOR: Testing Service Corporation
 Rig mfg/model: CME-650 Track Rig
 Drilling Method: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 3, Tier 7N; Range 3W		▽ = 9.30 - While drilling ▽ = 6.21 - MW06S on 6/1/06 ▽ =		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
21A	23/24 96%	ss	3-5 8-12 N=13	15	4.27 B					582	
22A	22/24 92%	ss	6-6 7-8 N=13	14	3.49 B					580	
23A	24/24 100%	ss	5-7 9-12 N=16	16	2.72 B		Very dark greenish gray (10Y3/1), lean CLAY, trace sand and gravel			578	
24A	24/24 100%	ss	4-8 10-11 N=18	15	4.07 B					576	
25A	24/24 100%	ss	5-6 9-13 N=15	15	3.10 B					574	
26A	24/24 100%	ss	5-6 8-12 N=14	22	1.94 B					572	
27A	24/24 100%	ss	5-6 8-8 N=14	23	2.13 B		Dark greenish gray (10BG4/1), lean CLAY			570	
28A	24/24 100%	ss	3-5 6-8 N=11	24	2.33 BSh					568	
29A	24/24 100%	ss	12-10 12-14 N=22	24	3.30 BSh		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		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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▽ = 10.80 - While drilling
								Township: East Fork	▽ = 4.90 - MW07S on 6/1/06
								Section 2, Tier 7N; Range 3W	▽ =

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
0	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.		624	
2	Dark gray (10YR4/1), moist, soft, silty CLAY with trace and and trace gravel.		622	
4	Gray (10YR5/1) with 20% yellowish brown mottles, moist, soft, silty CLAY with trace sand and trace gravel.		620	
4.90	Black (10YR2/1), very moist, soft, clayey SILT.		620	
5.5	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	
11.5	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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 75%	ss	1-1 1-1 N=2	23	2.40 B		0	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.		624	
1B				24			1	Dark gray (10YR4/1), moist, soft, silty CLAY with trace and trace gravel.			
2A	24/24 100%	ss	0-0 1-1 N=1	26	2.33 B		2	Gray (10YR5/1) with 20% yellowish brown mottles, moist, soft, silty CLAY with trace sand and trace gravel.		622	
3A				25	4.33 BSh		3	Black (10YR2/1), very moist, soft, clayey SILT.		620	
3B	24/24 100%	ss	0-1 1-2 N=2	25	2.52 BSh		4	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist soft, silty CLAY with trace sand and trace gravel.			
3C				22	3.05 B		5	Black (10YR2/1), moist, soft, silty CLAY with trace sand and trace gravel.			
4A	24/24 100%	ss	0-1 1-2 N=2	22	1.75 B		6	Dark gray (10YR4/1), very moist, soft, silty CLAY with some sand and trace gravel.		618	
5A	24/24 100%	ss	0-0 1-1 N=1	22	1.24 B		7			616	
6A	24/24 100%	ss	0-0 0-1 N=0	24	0.54 B		8	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with sand and gravel.		614	
6B				20	1.65 B		9	Yellowish brown (10YR5/8) wet, very soft, clayey, very fine- to fine-grained, SAND with trace gravel.			
7A				24			10	Yellowish brown (10YR5/8) wet, soft, clayey, very fine- to fine-grained, SAND with trace gravel.		612	
7B	24/24 100%	ss	0-0 1-2 N=1	13	2.89 B		11				
8A	24/24 100%	ss	2-5 7-9 N=12	8	5.04 BSh		12			610	
9A	24/24 100%	ss	3-6 6-8 N=12	9	9.27 BSh		13	Gray (10YR4/1), moist, very hard, sandy, clayey SILT with gravel.		608	
10A	24/24 100%	ss	3-6 8-11 N=14	9	11.13 BSh		14			606	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole. CME-1050 had 280# hammer for SPT.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station

Site: CCB Management Facility

Location: Coffeen, Illinois

Project: 05SS3004A

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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:							
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf)	Failure Type	Quadrangle: Coffeen, IL	▼ = 10.80 - While drilling	▼ = 4.90 - MW07S on 6/1/06	▼ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A				8				Section 2, Tier 7N; Range 3W Township: East Fork				604	Gray (10YR4/1), moist, very hard, sandy, clayey SILT with gravel. [Continued from previous page]			
11B	35/48 73%	cs		14					602	Gray (10YR6/1), wet, loose, fine- to medium-grained SAND.						
									600							
	50/60 83%	cs							598							
12A				7					596	Gray (10YR5/1), moist, very hard, sandy, clayey SILT with gravel.						
13A				6					594							
13B	56/60 93%	cs		6					592	Gray (10YR5/1), wet, loose, medium- to very coarse-grained SAND and GRAVEL.						
13C				8						Gray (10YR5/1), wet, dense, very fine- to fine-grained SAND.						
									590	Gray (10YR5/1), moist, very hard, sandy, clayey SILT with gravel.						
									588							
14A	60/60 100%	cs		14					586	Gray (10YR5/1), moist, firm, 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



CLIENT: AEG Coffeen Power Station

Site: CCB Management Facility

Location: Coffeen, Illinois

Project: 05SS3004A

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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL		▽ = 10.80 - While drilling		
									Township: East Fork		▽ = 4.90 - MW07S on 6/1/06		
									Section 2, Tier 7N; Range 3W				
									Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
15A	60/60 100%	cs			14				42	Gray (10YR5/1), moist, firm, sandy, clayey SILT with gravel. <i>[Continued from previous page]</i>		584	
								44	582				
									46			580	
	60/60 100%	cs							48			578	
16A					15				50	Dark greenish gray (10BG4/1), moist, soft, silty CLAY with trace sand and trace gravel.		576	
									52	Very dark gray (10YR3/1), moist firm, clayey SILT.		574	
17A	60/60 100%	cs			24				54	Dark greenish gray (10BG4/1), moist, soft, silty CLAY with trace sand and trace gravel.		572	
17B													

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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4 1/4" 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

WEATHER: Foggy to partly sunny, mild (hi-60's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▼ = 12.70 - While drilling			
								Township: East Fork	▼ = 5.33 - MW08S on 6/1/06			
								Section 2, Tier 7N; Range 3W	▼ =			
			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	
								Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.			622	
								Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.			620	
								Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.			618	
								Gray (10YR5/1), moist, soft, clayey SILT with little sand and trace gravel.			616	
								Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist, soft, sandy CLAY with sl. trace gravel.			614	
								Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, moist, soft, sandy CLAY with sl. trace gravel.			612	
								Gray (10YR5/1), wet, soft, very silty, very fine- to coarse-grained SAND.			610	
								Light gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, wet, very dense, very fine- to fine-grained SAND.			608	
								Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, wet, dense, fine- to very coarse-grained SAND.				
								Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.				

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



CLIENT: AEG Coffeen Power Station

Site: CCB Management Facility

Location: Coffeen, Illinois

Project: 05SS3004A

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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL	▼ = 12.70 - While drilling	▼ = 5.33 - MW08S on 6/1/06	▼ =	
							Section 2, Tier 7N; Range 3W				
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
2A	24/24 100%	ss	1-1 1 N=2				Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.		624		
	24/24 100%	ss	1-1 1 N=2			1.59 B	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		622		
3A	24/24 100%	ss	1-1 1 N=2			1.86 B	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		620		
3B	24/24 100%	ss	0-1 1 N=2			1.20 B	Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		618		
4A	24/24 100%	ss	0-1 1 N=2			1.01 None	Gray (10YR5/1), moist, soft, clayey SILT with little sand and trace gravel.		616		
5A	24/24 100%	ss	0-1 1 N=2				Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist, soft, sandy CLAY with sl. trace gravel.		614		
6A	24/24 100%	ss	0-1 1 N=2			0.70 BSh	Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, moist, soft, sandy CLAY with sl. trace gravel.		612		
6B	24/24 100%	ss	0-1 1 N=2				Gray (10YR5/1), wet, soft, very silty, very fine- to coarse-grained SAND.		610		
7A	20/24 83%	ss	0-1 3 N=4				Light gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, wet, very dense, very fine- to fine-grained SAND.		608		
7B	20/24 83%	ss	0-1 3 N=4				Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, wet, dense, fine- to very coarse-grained SAND.		606		
8A	23/24 96%	ss	7-11 16 N=27			5.45 Sh	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		606		
8B	23/24 96%	ss	7-11 16 N=27								
9A	24/30 80%	cs									

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole. 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: 5/9/2006

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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
10A	60/60 100%	cs		7			22			604	
11A	36/60 60%	cs		10			24			602	
							26			600	
							28			598	
							30	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		596	
12A	60/60 100%	cs		6			32			594	
							34			592	
							36			590	
13A	60/60 100%	cs		7			38			588	
							40			586	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole. 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: 5/9/2006

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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	60/60 100%	cs					42	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		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		582	
14B				11				Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.			
15A				12			44	Dark yellowish brown (10YR4/4), moist, firm, clayey SILT with some sand and trace gravel.		580	
15B	60/60 100%	cs		15			46	Gray (10YR4/1), moist, hard, clayey, sandy SILT with trace gravel.		578	
15C				13			48	Gray (10YR4/1) with 50% very dark grayish brown (10YR3/2), moist, firm, silty CLAY with sand and trace gravel.		576	
16A	60/60 100%	cs		14			50	Gray (10YR4/1), moist, hard, clayey, sandy SILT with trace gravel.		574	
16B				19			52			572	
17A				24			54	Greenish gray (10BG4/1), moist, soft, silty CLAY with little sand and sl. trace gravel.		570	
17B	60/60 100%	cs		19			56	Yellowish brown (10YR5/6) with 20% Greenish gray (10BG4/1) mottles, moist, soft, silty CLAY with little sand and sl. trace gravel.		568	
							58				

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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	22/24 92%	ss	0-1 1-1 N=2	24	1.65 B		1.65	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		2.06	Yellowish brown (10YR5/6), moist, soft, silty CLAY with little sand.		622	
3A	24/24 100%	ss	1-1 1-1 N=2	24	1.65 B		1.65	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		620	
4A	24/24 100%	ss	1-1 1-2 N=2	23	1.57 B		1.57	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with sand.		618	
5A	24/24 100%	ss	0-1 1-1 N=2	27	1.85 B		1.85	Yellowish brown (10YR5/6) with 10% Gray (10YR5/1) mottles, moist, soft, silty CLAY with sand.		616	
6A	24/24 100%	ss	0-0 0-0 N=0	22	1.44 B		1.44	Yellowish brown (10YR5/8), very moist, soft, sandy CLAY with trace gravel.		614	
7A	24/24 100%	ss	0-0 1-2 N=1	18	0.93 BSh		0.93	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist to very moist, clayey SILT with sand and trace gravel.		612	
7B	24/24 100%	ss	0-0 1-2 N=1	18	0.97 BSh		0.97	Gray (10YR5/1), wet, soft, clayey very fine- to fine-grained SAND.		610	
7C	24/24 100%	ss	1-3 6-6 N=9	18				Gray (10YR5/1), wet, loose, fine- to very coarse-grained SAND with trace gravel.		610	
8A	24/24 100%	ss	1-3 6-6 N=9	18				Gray (10YR5/1), wet, dense, silty very fine- to fine-grained SAND.		610	
8B	24/24 100%	ss	7-13 19-25 N=32	8	7.86 Sh		7.86	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		608	
9A	12/12 100%	cs								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: 05SS3004A

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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	60/60 100%	cs		2			22			604	
12A	49/60 82%	cs		3			26	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. [Continued from previous page]		602	
							28			598	2" Sand stringer
13A	60/60 100%	cs		3			30			600	
							32			596	
14A	60/60 100%	cs		10			36	Yellowish brown (10YR5/6) with 40% gray (10YR5/1) mottles, moist, very hard, clayey SILT with little sand and occasional dry, silt stringers (<1").		594	
							38	Gray (10YR5/1), moist, very hard, clayey SILT with little sand and trace gravel.		592	
14B				11			40	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		590	
										588	
										586	
											DRILLER NOTE: Appears more plastic

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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
									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		
15A	60/60 100%	cs			12				42	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		584	
									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	
16A					17				48	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. Dark gray (10YR3/1), moist, hard, clayey SILT.		576	
17A	60/60 100%	cs							50			574	
									52	Dark greenish gray (10BG4/1), moist, firm, silty CLAY with little sand and trace gravel.		572	
									54	End of Boring = 54.0 ft.			

NOTE(S): MW09D installed in SB-09.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

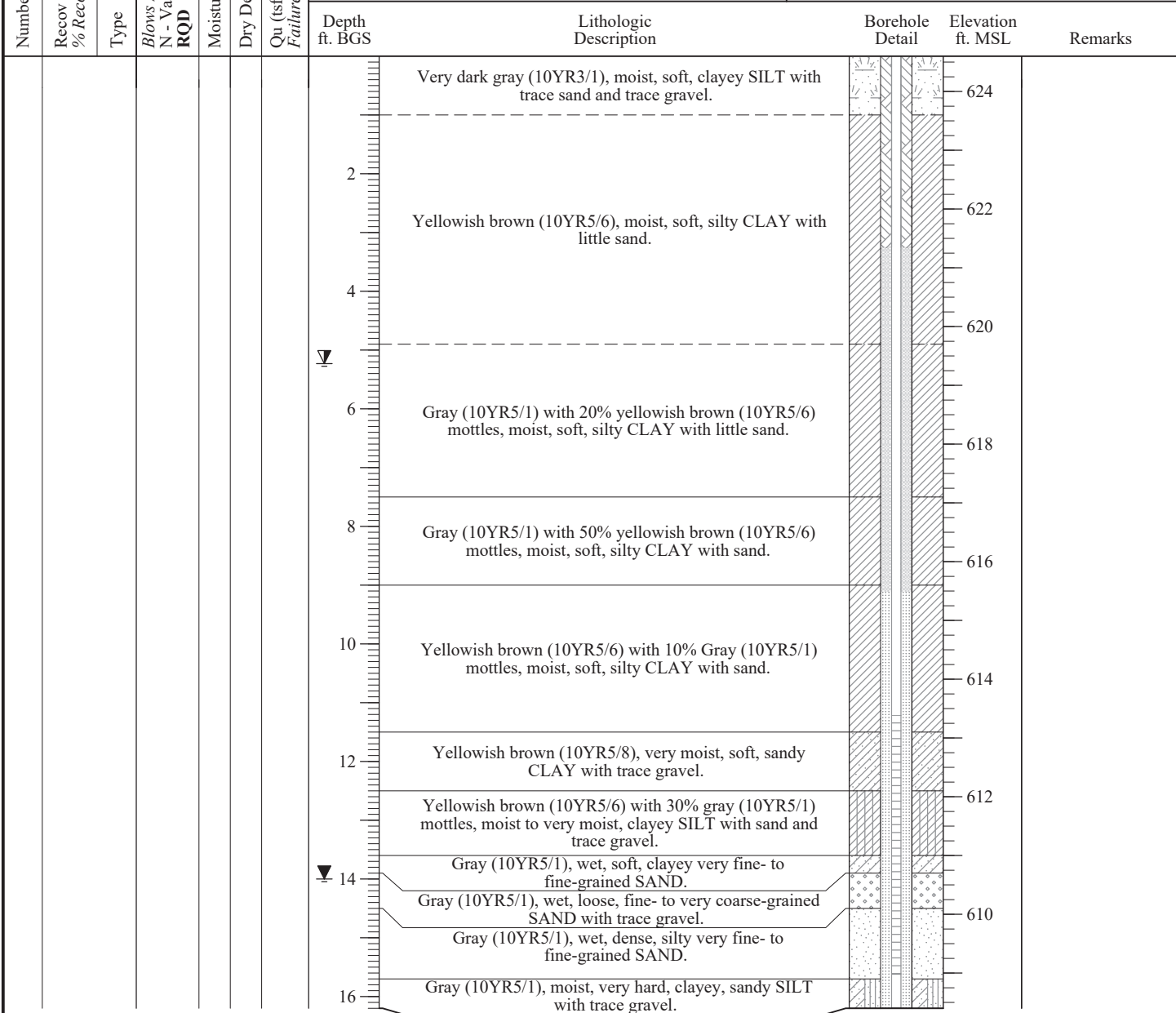


CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
DATES: Start: 5/3/2006
Finish: 5/3/2006
WEATHER: Overcast, mild (mid-60's)

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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 14.00 - While drilling ▽ = 5.23 - MW09S on 6/1/06 ▽ = 52.46 - MW09D on 6/1/06



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



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	22/24 92%	ss	0-1 1-1 N=2	24	1.65 B		1.65	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		2.06	Yellowish brown (10YR5/6), moist, soft, silty CLAY with little sand.		622	
3A	24/24 100%	ss	1-1 1-1 N=2	24	1.65 B		1.65	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		620	
4A	24/24 100%	ss	1-1 1-2 N=2	23	1.57 B		1.57	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with sand.		618	
5A	24/24 100%	ss	0-1 1-1 N=2	27	1.85 B		1.85	Yellowish brown (10YR5/6) with 10% Gray (10YR5/1) mottles, moist, soft, silty CLAY with sand.		616	
6A	24/24 100%	ss	0-0 0-0 N=0	22	1.44 B		1.44	Yellowish brown (10YR5/8), very moist, soft, sandy CLAY with trace gravel.		614	
7A	24/24 100%	ss	0-0 1-2 N=1	18	0.93 BSh		0.93	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist to very moist, clayey SILT with sand and trace gravel.		612	
7B	24/24 100%	ss	0-0 1-2 N=1	18	0.97 BSh		0.97	Gray (10YR5/1), wet, soft, clayey very fine- to fine-grained SAND.		610	
7C	24/24 100%	ss	1-3 6-6 N=9	18				Gray (10YR5/1), wet, loose, fine- to very coarse-grained SAND with trace gravel.		610	
8A	24/24 100%	ss	1-3 6-6 N=9	18				Gray (10YR5/1), wet, dense, silty very fine- to fine-grained SAND.		610	
8B	24/24 100%	ss	7-13 19-25 N=32	8	7.86 Sh		7.86	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		608	
9A	12/12 100%	cs								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: 05SS3004A
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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	60/60 100%	cs		2			22			604	
12A	49/60 82%	cs		3			26	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. [Continued from previous page]		602	
							28				600
13A	60/60 100%	cs		3			30			598	2" Sand stringer
							32			596	
14A	60/60 100%	cs		10			36	Yellowish brown (10YR5/6) with 40% gray (10YR5/1) mottles, moist, very hard, clayey SILT with little sand and occasional dry, silt stringers (<1").		594	
							38	Gray (10YR5/1), moist, very hard, clayey SILT with little sand and trace gravel.		592	
14B				11			40	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		590	
										588	
										586	

NOTE(S): MW09D installed in SB-09.
 CME-1050 had 280# hammer for SPT.

DRILLER NOTE:
 Appears more plastic

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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
									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		
15A	60/60 100%	cs			12				42	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		584	
									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	
16A					17				48	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. Dark gray (10YR3/1), moist, hard, clayey SILT.		576	
17A	60/60 100%	cs							50			574	
									52	Dark greenish gray (10BG4/1), moist, firm, silty CLAY with little sand and trace gravel.		572	
									54	End of Boring = 54.0 ft.			

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: 5/1/2006

Finish: 5/1/2006

WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.

Rig mfg/model: CME-1050 ATV Rig

Drilling Method: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	17/24 71%	ss	1-1 1-1 N=2	23	2.33	B	2.33	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.		620	
2A	24/24 100%	ss	1-1 2-2 N=3	25	2.47	BSh	2.47	Gray (10YR5/1) with 30% 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	2.33	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		616	
4A	24/24 100%	ss	1-1 1-1 N=2	23	1.55	B	1.55	Gray (10YR5/1), moist, soft, clayey, very fine- to fine-grained SAND.		614	
4B	24/24 100%	ss	1-1 1-1 N=2	23	1.55	B	1.55	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand and trace gravel.		612	
5A	17/24 71%	ss	1-1 1-2 N=2	23	2.06	B	2.06	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, clayey, very fine- to medium-grained SAND with trace gravel.		610	
6A	24/24 100%	ss	0-1 1-1 N=2	17	1.16	B	1.16	Grayish brown (10YR5/2), wet, loose, very fine- to medium-grained SAND with trace coarse- to very coarse-grained sand.		608	
7A	23/24 96%	ss	1-1 3-3 N=4	17	2.84	B	2.84	Yellowish brown (10YR5/6), moist, firm, silty CLAY with little sand and trace gravel.		606	
7B	23/24 96%	ss	1-1 3-3 N=4	18	2.84	B	2.84	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		604	
8A	24/24 100%	ss	3-5 9-9 N=14	10	7.64	BSP	7.64			602	
10A	12/33 36%	cs		16							

NOTE(S): MW10D installed in SB-10.
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: 5/1/2006
Finish: 5/1/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	56/60 93%	cs		12			22	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		600	
11B				13			24			598	
11C				196			26			596	2" Gravel stringer
12A	60/60 100%	cs		13			28	Dark grayish brown (10YR4/2), very moist, soft, PEAT.		594	
13A	60/60 100%	cs		12			30			592	
							32	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.		590	
							34			588	
							36			586	
							38			584	
							40			582	

NOTE(S): MW10D installed in SB-10.
 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: 5/1/2006
Finish: 5/1/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W		▽ = 11.80 - While drilling ▽ = 4.91 - MW10S on 6/1/06 ▽ = 47.48 - MW10D on 6/1/06			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
14A	60/60 100%	cs		14			42	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		580		
14B				23			44	Greenish gray (5G5/1), moist, firm, silty CLAY with little sand and sl. trace gravel.		578	1" Gravel stringer	
15A				13			46	Greenish gray (5G5/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with little sand and sl. trace gravel.		576		
15B	60/60 100%	cs		25			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

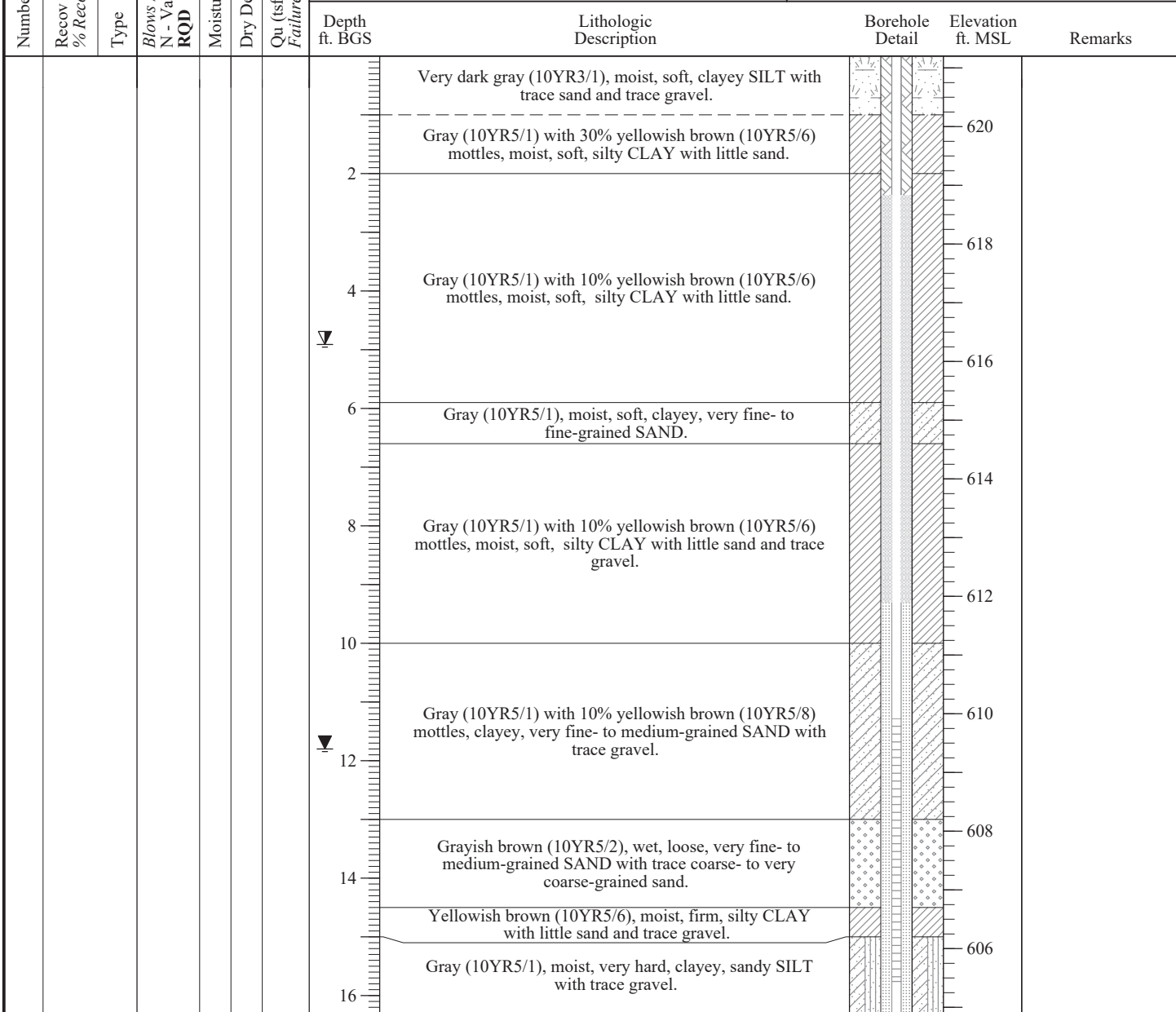


CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/2/2006
Finish: 5/2/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 11.80 - While drilling ▽ = 4.91 - MW10S on 6/1/06 ▽ = 47.48 - MW10D on 6/1/06



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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	17/24 71%	ss	1-1 1-1 N=2	23	2.33	B	2.33	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.		620	
2A	24/24 100%	ss	1-1 2-2 N=3	25	2.47	BSh	2.47	Gray (10YR5/1) with 30% 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	2.33	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		616	
4A	24/24 100%	ss	1-1 1-1 N=2	23	1.55	B	1.55	Gray (10YR5/1), moist, soft, clayey, very fine- to fine-grained SAND.		614	
4B	24/24 100%	ss	1-1 1-1 N=2	23	1.55	B	1.55	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand and trace gravel.		612	
5A	17/24 71%	ss	1-1 1-2 N=2	23	2.06	B	2.06	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, clayey, very fine- to medium-grained SAND with trace gravel.		610	
6A	24/24 100%	ss	0-1 1-1 N=2	17	1.16	B	1.16	Grayish brown (10YR5/2), wet, loose, very fine- to medium-grained SAND with trace coarse- to very coarse-grained sand.		608	
7A	23/24 96%	ss	1-1 3-3 N=4	17	2.84	B	2.84	Yellowish brown (10YR5/6), moist, firm, silty CLAY with little sand and trace gravel.		606	
7B	23/24 96%	ss	1-1 3-3 N=4	18	2.84	B	2.84	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		604	
8A	24/24 100%	ss	3-5 9-9 N=14	10	7.64	BSP	7.64			602	
10A	12/33 36%	cs		16						602	

NOTE(S): MW10D installed in SB-10.
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: 5/1/2006
Finish: 5/1/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	56/60 93%	cs		12			22	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		600	
11B				13			24			598	
11C				196			26			596	2" Gravel stringer
12A	60/60 100%	cs		13			28	Dark grayish brown (10YR4/2), very moist, soft, PEAT.		594	
13A	60/60 100%	cs		12			30			592	
							32	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.		590	
							34			588	
							36			586	
							38			584	
							40			582	

NOTE(S): MW10D installed in SB-10.
 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: 5/1/2006
Finish: 5/1/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
14A	60/60 100%	cs		14			42	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		580		
14B				23			44	Greenish gray (5G5/1), moist, firm, silty CLAY with little sand and sl. trace gravel.		578	1" Gravel stringer	
15A				13			46	Greenish gray (5G5/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with little sand and sl. trace gravel.		576		
15B	60/60 100%	cs		25			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



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: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:						
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 11.70 - While drilling ▽ = 5.42 - MW11S on 6/1/06 ▽ = 6.03 - MW11D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
1A	24/24 100%	ss	3-3 4-4 N=7	16					0	Very dark grey (10YR3/1), moist, soft, clayey SILT.				
1B						1.09 B			1.09	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	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	Gray (10YR5/1), moist, soft, clayey SILT.		616		
3B						2.33 B			6			616		
4A	24/24 100%	ss	7-8 13-14 N=21	21		2.13 None			8	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			10			612		
6A	24/24 100%	ss	3-2 2-3 N=4	19		0.78 BSh			12	Gray (10YR4/1), wet, soft, sandy CLAY.		610		
6B									12	Yellowish brown (10YR5/6) with 50% gray (10YR5/1) mottles, wet, soft, sandy CLAY with trace gravel.		608		
7A	24/24 100%	ss	3-6 14-21 N=20	16					14	Gray (10YR5/1), moist, very hard, sandy, clayey SILT with gravel.		608		
7B						5.45 BSP			14			608		
8A	11/12 92%	ss	41-61/5'	7					16	Gray (10YR5/1), moist, hard, silty CLAY with little sand and trace gravel.		606		
									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					18	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		604		
									20			602		

DRILLER NOTE:
sampler recovered wet.

NOTE(S): MW11D installed in SB-11.
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: 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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
10A	54/60 90%	cs		6			22	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		600	DRILLER NOTE: soft drilling 20.5' to 21.0' Wet, gravelly zone from 22.4' to 22.8'
11A	58/60 97%	cs		8		24	598				
12A	32/60 53%	cs		9			26	Gray (10YR5/1), wet, loose, clayey, very fine- to medium-grained SAND with little coarse-grained sand and trace gravel.		596	
12B				9		28	594				
13B	22/22 100%	ss	7-19 41-50/4" N=60	14		4.85 BSH	30	Gray (10YR6/1) with occasional black (10YR2/1) varves, dry, dense, SILT with trace sand.		592	
							32	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		590	
							34			588	
							36			586	

End of Boring = 36.33 ft.

NOTE(S): MW11D installed in SB-11.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
DATES: Start: 4/28/2006
Finish: 4/28/2006

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4 1/4" 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

WEATHER: Partly cloudy, mild (mid-60's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
								Very dark grey (10YR3/1), moist, soft, clayey SILT.				
							2	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist, soft, silty CLAY.		620		
							4	Yellowish brown (10YR5/6) with 40% gray (10YR5/1) mottles, moist, soft, silty CLAY.		618		
								Gray (10YR5/1), moist, soft, clayey SILT.				
							6			616		
							8	Gray (10YR4/1), moist, firm, silty CLAY with little sand and trace gravel.		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		

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



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	ss	3-3 4-4 N=7	16				Very dark grey (10YR3/1), moist, soft, clayey SILT.			
1B						1.09 B	1	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	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	Gray (10YR5/1), moist, soft, clayey SILT.		616	
3B						2.33 B	6			616	
4A	24/24 100%	ss	7-8 13-14 N=21	21		2.13 None	8	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	10			612	
6A	24/24 100%	ss	3-2 2-3 N=4	19		0.78 BSh	12	Gray (10YR4/1), wet, soft, sandy CLAY.		610	
6B								Yellowish brown (10YR5/6) with 50% gray (10YR5/1) mottles, wet, soft, sandy CLAY with trace gravel.			
7A	24/24 100%	ss	3-6 14-21 N=20	16			14	Gray (10YR5/1), moist, very hard, sandy, clayey SILT with gravel.		608	
7B						5.45 BSP		Gray (10YR5/1), moist, hard, silty CLAY with little sand and trace gravel.		606	
8A	11/12 92%	ss	41-61/5"	7			16	Light gray (10YR7/1) with 10% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY with little sand and trace gravel.		604	
9A	48/54 89%	cs		8			18	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		602	

NOTE(S): MW11D installed in SB-11.
CME-1050 had 280# hammer for SPT.

DRILLER NOTE:
sampler recovered wet.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station

CONTRACTOR: Reynolds Drilling Corp.

Site: CCB Management Facility

Rig mfg/model: CME-850 Track Rig

BOREHOLE ID: SB-11

Location: Coffeen, Illinois

Drilling Method: 4 1/4" HSA w/SS & CME samplers

Well ID: MW11D

Project: 05S3004A

DATES: Start: 4/27/2006

FIELD STAFF: Driller: K. Doetzel

Surface Elev: 622 ft. MSL

Finish: 4/28/2006

Helper: S. McCartney

Completion: 36 ft. BGS

Station: 876,749.6N

WEATHER: Partly cloudy, mild (mid-60's)

Eng/Geo: R. Hasenyager

2,515,976.7E

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
10A	54/60 90%	cs		6			22	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		600	DRILLER NOTE: soft drilling 20.5' to 21.0' Wet, gravelly zone from 22.4' to 22.8'
11A	58/60 97%	cs		8		24	598				
						26	596				
						28	594				
						30	592				
12A	32/60 53%	cs		9			32	Gray (10YR5/1), wet, loose, clayey, very fine- to medium-grained SAND with little coarse-grained sand and trace gravel.		590	
12B				9			34	Gray (10YR6/1) with occasional black (10YR2/1) varves, dry, dense, SILT with trace sand.		588	
13B	22/22 100%	ss	7-19 41-50/4" N=60	14		4.85 BSH	36	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		586	
End of Boring = 36.33 ft.											

NOTE(S): MW11D installed in SB-11.
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: 5/10/2006

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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24"/24	ss	2-3 4-5 N=7	22	1.27	Sh	0	Very dark gray (10YR3/1), clayey SILT, trace sand		622	
1B				27	2.33	B	2	Dark gray (10YR4/1) with 15% yellowish brown (10YR5/6) mottles, lean CLAY		620	
2A	19"/24	ss	2-4 5-7 N=9	24	2.91	B	4	Yellowish brown (10YR5/8) with 40% grayish brown (10YR5/2) mottles, lean CLAY		618	
3A	20"/24	ss	2-2 3-4 N=5	21	2.13	B	6	Gray (10YR5/1), lean CLAY, trace sand and gravel		616	
4A	24/24 100%	ss	4-5 5-6 N=10	21	1.36	BSh	8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		614	
5A	24"/24	ss	1-2 2-5 N=4	20	1.47	BSh	10	Yellowish brown (10YR5/8) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand and gravel		612	
6A	20"/24	ss	0-1 3-3 N=4	21	0.62	B	12	Yellowish brown (10YR 5/8) with 25% gray (10YR6/1) mottles, clayey SAND, trace gravel		610	
7A	21"/24	ss	2-2 3-5 N=5	22	0.19	B	14	Gray (10YR6/1), clayey SAND, trace gravel, wet		608	
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			
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	18	Dark greenish gray (N4/1), clayey SILT, trace sand and gravel		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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Foggy to partly sunny, mild (hi-60's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	60/60 100%	cs	6				22	Dark greenish gray (N4/1), clayey SILT, trace sand and gravel <i>[Continued from previous page]</i>		602	
							24			600	
12A	60/60 100%	cs	7				26	Dark greenish gray (N4/1), sandy SILT, trace gravel		598	
							28			596	
13A	60/60 100%	cs	13				30	Very dark gray (N3/1), clayey SILT, trace sand and gravel		594	
							32			592	
14A	60/60 100%	cs	16				34			590	
							36			588	
							38			586	
							40			584	

NOTE(S): MW12D installed in SB-12.

FIELD BORING LOG



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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
15A	60/60 100%	cs		14			42	Very dark gray (N3/1), clayey SILT, trace sand and gravel <i>[Continued from previous page]</i>		582		
							44			580		
							46	Very dark gray (N3/1), PEAT		578		
							48	Gray (N5/1) with 30% yellowish brown (10YR5/6) mottles, lean CLAY		576		
16A	60/60 100%	cs		45			50	End of Boring = 50.0 ft. BGS		574		

NOTE(S): MW12D installed in SB-12.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Foggy to partly sunny, mild (hi-60's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL						
							Section 11, Tier 7N; Range 3W						
								0	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 (10YR 5/8) 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		
								14	Gray (10YR6/1), clayey SAND, trace gravel, wet		608		
									Dark yellowish brown (10YR4/6), clayey SAND, trace gravel, wet				
									Light yellowish brown (10YR6/4) with 30% brownish yellow (10YR6/6) mottles, clayey SILT, trace sand and gravel				
									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



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24"/24	ss	2-3 4-5 N=7	22	1.27	Sh	0	Very dark gray (10YR3/1), clayey SILT, trace sand		622	
1B				27	2.33	B	2	Dark gray (10YR4/1) with 15% yellowish brown (10YR5/6) mottles, lean CLAY		620	
2A	19"/24	ss	2-4 5-7 N=9	24	2.91	B	4	Yellowish brown (10YR5/8) with 40% grayish brown (10YR5/2) mottles, lean CLAY		618	
3A	20"/24	ss	2-2 3-4 N=5	21	2.13	B	6	Gray (10YR5/1), lean CLAY, trace sand and gravel		616	
4A	24/24 100%	ss	4-5 5-6 N=10	21	1.36	BSh	8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		614	
5A	24"/24	ss	1-2 2-5 N=4	20	1.47	BSh	10	Yellowish brown (10YR5/8) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand and gravel		612	
6A	20"/24	ss	0-1 3-3 N=4	21	0.62	B	12	Yellowish brown (10YR 5/8) with 25% gray (10YR6/1) mottles, clayey SAND, trace gravel		610	
7A	21"/24	ss	2-2 3-5 N=5	22	0.19	B	14	Gray (10YR6/1), clayey SAND, trace gravel, wet		608	
7B				22				Dark yellowish brown (10YR4/6), clayey SAND, trace gravel, wet		606	
7C				15	3.71	B		Light yellowish brown (10YR6/4) with 30% brownish yellow (10YR6/6) mottles, clayey SILT, trace sand and gravel		604	
8A	24"/24	ss	4-13 18-29 N=31	9	5.15	BSh	16				
9A	24"/24	ss	26-32 46-50 N=78	9	6.59	Sh	18	Dark greenish gray (N4/1), clayey SILT, trace sand and gravel			
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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Foggy to partly sunny, mild (hi-60's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	60/60 100%	cs		6				22	Dark greenish gray (N4/1), clayey SILT, trace sand and gravel <i>[Continued from previous page]</i>		602	
							24	598				
12A	60/60 100%	cs		7				26	Dark greenish gray (N4/1), sandy SILT, trace gravel		596	
							28	594				
13A	60/60 100%	cs		13				30	Very dark gray (N3/1), clayey SILT, trace sand and gravel		592	
							32	590				
14A	60/60 100%	cs		16				34			588	
							36	586				
								38			584	
								40				

NOTE(S): MW12D installed in SB-12.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

WEATHER: Foggy to partly sunny, mild (hi-60's)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
15A	60/60 100%	cs		14			42	Very dark gray (N3/1), clayey SILT, trace sand and gravel <i>[Continued from previous page]</i>		582	
							44			580	
							46	Very dark gray (N3/1), PEAT		578	
							48	Gray (N5/1) with 30% yellowish brown (10YR5/6) mottles, lean CLAY		576	
16A	60/60 100%	cs		45			50	End of Boring = 50.0 ft. BGS		574	

NOTE(S): MW12D installed in SB-12.

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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	22/24	ss	4-5	21				Grayish brown (10YR5/2), clayey SILT, trace sand		622	
1B	92%		4-4 N=9	15				Light gray (10YR7/2), clayey SILT, trace sand			
1C				28		2.13 B	2	Light brownish gray (10YR6/2) with 15% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		620	
2A	21/24 88%	ss	3-4 5-8 N=9	25		2.13 BSh	4	Gray (10YR6/1) with 40% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand			
3A	24/24 100%	ss	4-5 6-8 N=11	22		2.84 Sh		Dark gray (10YR4/1), lean CLAY, trace sand and gravel		618	
3B				21		2.91 BSh	6				
4A	24/24 100%	ss	9-12 10-10 N=22	23		2.33 B	8			616	
5A	24/24 100%	ss	3-4 6-7 N=10	21		2.72 Sh	10	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand and gravel		614	
6A	19/24 79%	ss	1-3 6-8 N=9	23		1.94 Sh	12			612	
7A	21/24 88%	ss	6-8 10-12 N=18	18		1.94 Sh	14	Yellowish brown (10YR5/6), silty SAND, trace gravel, wet		610	
7B				13		1.55 BSh					
8A	22/24 92%	ss	7-21 29-30 N=50	11			16	Yellowish brown (10YR5/8) with 30% light brownish gray (10YR6/2) mottles, sandy SILT, trace gravel		608	
8B				9							
9A	23/24 96%	ss	25-28 28-45 N=56	9		9.16 Sh	18	Dark gray (10YR4/1), sandy SILT, trace gravel		606	
10A	24/24 100%	ss	18-27 31-36 N=58	8		12.00 Sh	20			604	

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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	60/60 100%	cs		13			22	Dark gray (10YR4/1), sandy SILT, trace gravel [Continued from previous page]		602	
							24			600	
							26			598	
							28			596	
12A	60/60 100%	cs					30			594	
							32			592	
							34			590	
13A	60/60 100%	cs		15			36			588	
							38			586	
							40			584	
14A	60/60 100%	cs		15					Dark gray (10YR4/1), lean CLAY, trace sand and gravel		

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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
15A	60/60 100%	cs		15				42		582		
								44		580		
								46	Dark gray (10YR4/1), lean CLAY, trace sand and gravel <i>[Continued from previous page]</i>	578		
								48		576		
16A	60/60 100%	cs		15				50		574		
								52		572		
17A	60/60 100%	cs		14				52	Gray (10YR4/1), silty, fine to medium SAND, wet	570		
17B				20					Gray (10YR4/1), sandy SILT			
17C				14								
								54	Dark greenish gray (5GY4/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY	568		
17D				22								

End of Boring = 55.0 ft. BGS

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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▽ = 12.00 - While drilling ▽ = 6.76 - MW13S on 6/1/06 ▽ = 46.90 - MW12D on 6/1/06			
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								0	Grayish brown (10YR5/2), clayey SILT, trace sand		622	
								1	Light gray (10YR7/2), clayey SILT, trace sand			
								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			
								6	Dark gray (10YR4/1), lean CLAY, trace sand and gravel			
								8				
								10	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand and gravel			
								12				
								14	Yellowish brown (10YR5/6), silty SAND, trace gravel, wet			
								16	Yellowish brown (10YR5/8) with 30% light brownish gray (10YR6/2) mottles, sandy SILT, trace gravel			
								16.62	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



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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	22/24	ss	4-5	21				Grayish brown (10YR5/2), clayey SILT, trace sand		622	
1B	92%		4-4 N=9	15				Light gray (10YR7/2), clayey SILT, trace sand			
1C				28		2.13 B	2	Light brownish gray (10YR6/2) with 15% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		620	
2A	21/24 88%	ss	3-4 5-8 N=9	25		2.13 BSh	4	Gray (10YR6/1) with 40% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand			
3A	24/24 100%	ss	4-5 6-8 N=11	22		2.84 Sh	6	Dark gray (10YR4/1), lean CLAY, trace sand and gravel		618	
3B				21		2.91 BSh	6				
4A	24/24 100%	ss	9-12 10-10 N=22	23		2.33 B	8			616	
5A	24/24 100%	ss	3-4 6-7 N=10	21		2.72 Sh	10	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand and gravel		614	
6A	19/24 79%	ss	1-3 6-8 N=9	23		1.94 Sh	12			612	
7A	21/24 88%	ss	6-8 10-12 N=18	18		1.94 Sh	12			610	
7B				13		1.55 BSh	14	Yellowish brown (10YR5/6), silty SAND, trace gravel, wet			
8A	22/24 92%	ss	7-21 29-30 N=50	11			16	Yellowish brown (10YR5/8) with 30% light brownish gray (10YR6/2) mottles, sandy SILT, trace gravel		608	
8B				9			16				
9A	23/24 96%	ss	25-28 28-45 N=56	9		9.16 Sh	18	Dark gray (10YR4/1), sandy SILT, trace gravel		606	
10A	24/24 100%	ss	18-27 31-36 N=58	8		12.00 Sh	20			604	

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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
									Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
11A	60/60 100%	cs			13									
12A	60/60 100%	cs							Dark gray (10YR4/1), sandy SILT, trace gravel <i>[Continued from previous page]</i>					
13A	60/60 100%	cs			15									
14A	60/60 100%	cs			15				Dark gray (10YR4/1), lean CLAY, trace sand and gravel					

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: 3/4" HSA w/SS sampler & 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
15A	60/60 100%	cs		15			42			582	
							44			580	
							46	Dark gray (10YR4/1), lean CLAY, trace sand and gravel <i>[Continued from previous page]</i>		578	
							48			576	
16A	60/60 100%	cs		15			50			574	
							52			572	
17A	60/60 100%	cs		14			52	Gray (10YR4/1), silty, fine to medium SAND, wet		570	
17B				20				Gray (10YR4/1), sandy SILT			
17C				14							
							54	Dark greenish gray (5GY4/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY		568	
17D				22							

End of Boring = 55.0 ft. BGS

NOTE(S): MW13D installed in SB-13.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station

Site: CCB Management Facility

Location: Coffeen, Illinois

Project: 05SS3004A

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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
								Grayish brown (10YR5/2), clayey SILT, trace sand		624		
							2	Gray (10YR6/1) with 30% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand				
								Light gray (10YR7/1) with 30% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand		622		
							4			620		
								Light gray (10YR7/1) with 15% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand		618		
							6			616		
							8					
							10			614		
							12	Yellowish brown (10YR5/8) with 50% light gray (10YR7/1) mottles, sandy CLAY		612		
							14	Yellowish brown (10YR5/6), silty, fine SAND, trace medium sand and gravel, wet		610		
								Yellowish brown (10YR5/6), sandy SILT, trace gravel				
							16	Yellowish 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



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	23/24 96%	ss	2-3 2-3 N=5	16				Grayish brown (10YR5/2), clayey SILT, trace sand		624	
1B				26		2.33 B	2	Gray (10YR6/1) with 30% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand			
2A	24/24 100%	ss	3-4 5-7 N=9	23		3.10 B	4	Light gray (10YR7/1) with 30% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand		622	
3A	23/24 96%	ss	3-3 5-5 N=8	19		2.33 B	6			620	
4A	24/24 100%	ss	5-6 5-7 N=11	23		2.68 BSh	8	Light gray (10YR7/1) with 15% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand		618	
5A	24/24 100%	ss	2-2 3-4 N=5	26		1.83 B	10			616	
6A	19/24 79%	ss	2-2 3-5 N=5	17		2.18 B	12	Yellowish brown (10YR5/8) with 50% light gray (10YR7/1) mottles, sandy CLAY		614	
7A	20/24 83%	ss	2-3 3-3 N=6	22		1.16 B	14			612	
8A	24/24 100%	ss	5-14 14-20 N=28	16		1.36 B	14	Yellowish brown (10YR5/6), silty, fine SAND, trace medium sand and gravel, wet		610	
8B				11		5.77 BSh	16	Yellowish brown (10YR5/6), sandy SILT, trace gravel			
9A	12/24 50%	ss	57-65	10			16	Yellowish brown (10YR5/6) with 40% gray (10YR6/1) mottles, sandy SILT, trace gravel		608	
10A	24/24 100%	ss	6-8 16-18 N=24	12		5.04 BSh	18	Dark gray (10YR4/1), clayey SILT, trace sand and gravel		606	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station

Site: CCB Management Facility

Location: Coffeen, Illinois

Project: 05SS3004A

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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	24/24 100%	ss	2-7 13-30 N=20	13	9.70 B		22			604	
12A	24/24 100%	ss	26-40 36-40 N=76	9	13.09 BSP		24			602	
13A	24/24 100%	ss	8-18 28-34 N=46	9	8.73 BSP		26			600	
14A	22/24 92%	ss	20-18 24-30 N=42	9	7.42 BSP		28	Dark gray (10YR4/1), clayey SILT, trace sand and gravel [Continued from previous page]		598	
15A	19/24 79%	ss	8-27 33-67 N=60	9			30			596	
16A	24/24 100%	ss	8-25 27-33 N=52	10	9.60 BSh		32			594	
17A	20/24 83%	ss	11-15 20-24 N=35	14	6.80 B		34			592	
18A	24/24 100%	ss	3-4 7-9 N=11	16	3.88 B		36			590	
19A	24/24 100%	ss	8-12 13-15 N=25	16	6.18 B		38	Dark gray (N4/1), lean CLAY, trace sand and gravel		588	
20A	24/24 100%	ss	3-7 10-13 N=17	14	3.10 B		40			586	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▽ = 14.00 - While drilling ▽ = 4.49 - MW14S on 6/1/06 ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
21A	23/24 96%	ss	3-6 8-13 N=14	15	4.80 B				42			584	
22A	24/24 100%	ss	13-15 16-18 N=31	14	5.62 B				44	Dark gray (N4/1), lean CLAY, trace sand and gravel [Continued from previous page]		582	
23A	24/24 100%	ss	4-8 11-13 N=19	15	4.65 B				46			580	
24A	24/24 100%	ss	18-18 20-20 N=38	15	4.65 B				48			578	
25A	24/24 100%	ss	4-7 9-11 N=16	19	2.13 BSh				50	Dark gray (N4/1), clayey SILT, trace sand and gravel		576	
26A	22/24 92%	ss	3-5 6-8 N=11	22	3.30 BSh				50	Gray (N4/1), wet, loose, fine- to medium-grained SAND		574	
27A	24/24 100%	ss	3-5 5-7 N=10	25	2.89 BSh				52	Dark gray (N4/1), clayey SILT, trace sand and gravel		572	
28A	21/24 88% 0/24 0%	ss SH	4-6 7-8 N=13	22	3.71 BSh				54	Greenish gray (5BG5/1), lean CLAY		570	
29A	14/24 58%	ss	0-0 0-0 N=0	22	3.09 BSh				56	Greenish gray (5BG5/1) with 15% yellowish brown (10YR5/6) mottles, lean CLAY		568	
30A	22/24 92%	ss	5-6 8-12 N=14	19	4.46 BSh				58	Greenish gray (5BG5/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY		566	
									60	Yellowish brown (10YR4/6) with 10% greenish gray (5BG5/1) mottles, lean CLAY			

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft 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	
									4	Gray (10YR6/1), lean CLAY, trace sand		620	
									5	Yellowish brown (10YR5/6) with 40% gray (10YR6/1) mottles, lean CLAY, trace sand		618	
									6	Gray (10YR6/1), lean CLAY, trace sand		616	
									8	Gray (10YR6/1), lean CLAY, trace sand		614	
									10	Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand, trace gravel		612	
									12	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		608	
									16	Yellowish brown (10YR5/4), silty, fine to coarse SAND, wet		606	
									17	Yellowish brown (10YR5/4) silty fine SAND, wet		604	
									18	Gray (10YR6/1), sandy SILT, trace medium to coarse sand and trace gravel		602	
									20	Dark gray (10YR4/1), clayey SILT, little sand, trace gravel		600	

NOTE(S): MW15D installed in blind-drilled borehole within 10 ft of SB-15.

FIELD BORING LOG



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)

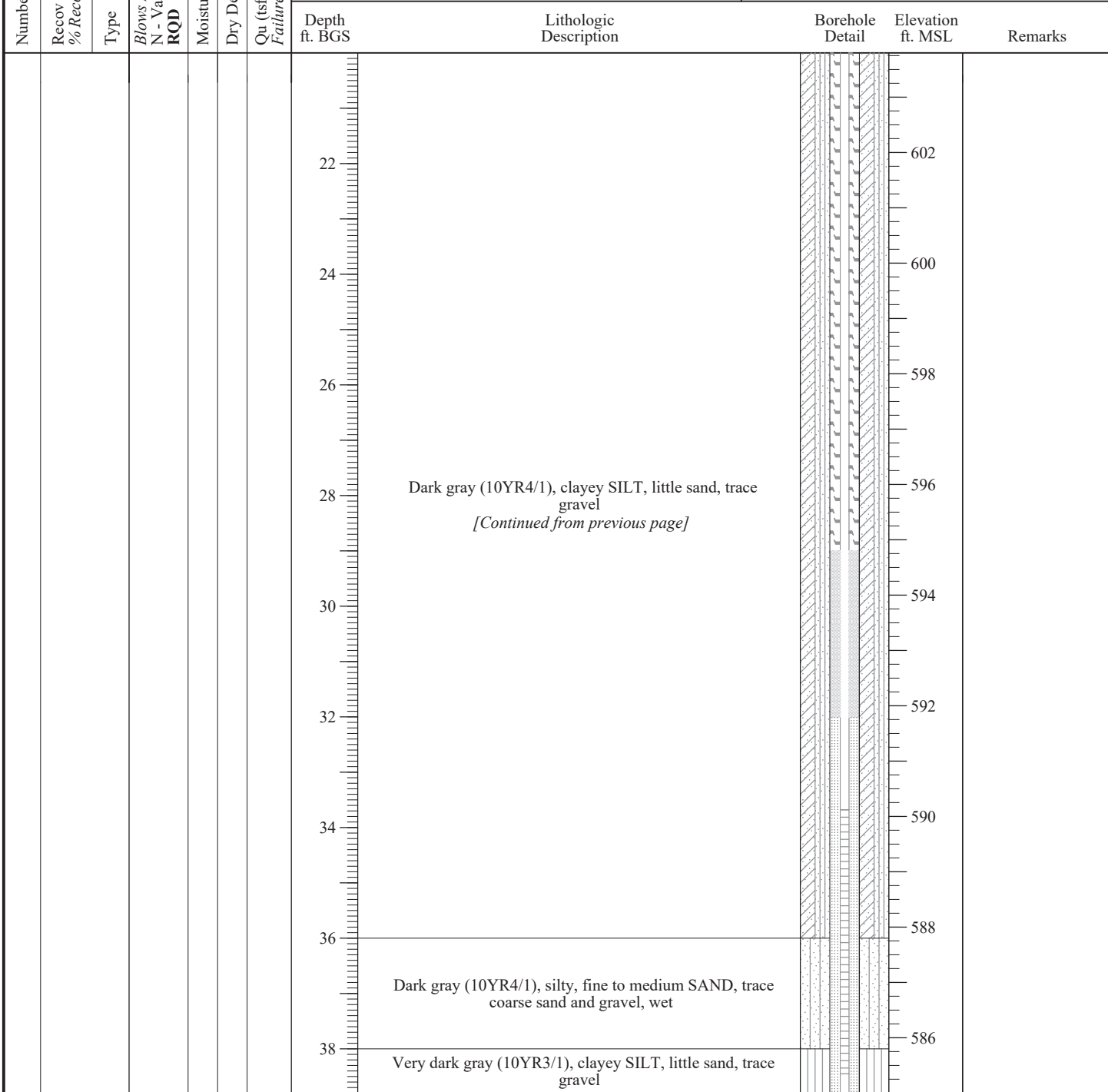
CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" HSA (blind drill)
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15b
Well ID: MW15D
Surface Elev: 624 ft. MSL
Completion: 39 ft. BGS
Station: 875,970.5N
 2,515,080.7E

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
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

Quadrangle: Coffeen, IL
Township: East Fork
Section 11, Tier 7N; Range 3W

▽ = 13.40 - While drilling
▽ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06



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



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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = 13.40 - While drilling ▽ = 4.99 - MW15S on 6/1/06 ▽ = 5.24 - MW15D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	ss	2-2 3-4 N=5	19					Dark brown (10YR3/3), clayey SILT				
1B				27	1.94 B				Dark grayish brown (10YR3/2), clayey SILT, trace sand			622	
2A	24/24 100%	ss	2-2 4-6 N=6	25	3.10 B				Grayish brown (10YR5/2), with 50% very dark gray (10YR3/1) mottles, lean CLAY, trace sand			620	
3A	20/24 83%	ss	2-3 3-5 N=6	29	2.10 B				Gray (10YR6/1), lean CLAY, trace sand			618	
4A	24/24 100%	ss	4-6 5-5 N=11	24	1.75 B				Yellowish brown (10YR5/6) with 40% gray (10YR6/1) mottles, lean CLAY, trace sand			616	
5A	22/24 92%	ss	1-2 3-4 N=5	26	1.55 B				Gray (10YR6/1), lean CLAY, trace sand			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			612	
7A	19/24 79%	SH							Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, silty, fine to medium SAND, trace coarse sand and gravel, wet			610	Shelby tube taken from shallow well borehole at indicated depth.
7B	24/24 100%	ss	4-4 5-5 N=9	23	1.22 B				Pale brown (10YR6/3), clayey SILT, little sand, trace gravel			608	
8A	21/24 88%	ss	2-6 15-19 N=21	11	3.22 BSP				Yellowish brown (10YR5/4), silty, fine to coarse SAND, wet			606	
9A				20					Yellowish brown (10YR5/4) silty fine SAND, wet				
9B	24/24 100%	ss	18-29 40-50 N=69	21					Gray (10YR6/1), sandy SILT, trace medium to coarse sand and trace gravel			606	
9C				9					Dark gray (10YR4/1), clayey SILT, little sand, trace gravel			604	
10A	17/24 71%	ss	11-43 59/5"	7	7.42 B								

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	14/24 58%	ss	14-55 45/2"		8				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	Dark gray (10YR4/1), clayey SILT, little sand, trace gravel [Continued from previous page]		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			588	
19A	8/24 33%	ss	61-39/2"		10				38	Dark gray (10YR4/1), silty, fine to medium SAND, trace coarse sand and gravel, wet		586	
20A	24/24 100%	ss	21-41 21-24 N=62		12		16.00	None		Very dark gray (10YR3/1), clayey SILT, little sand, trace gravel			
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



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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
21A	22/24 92%	ss	3-7 11-18 N=18	19	6.11	BSh	42	Dark gray (10YR4/1), clayey SILT, trace sand and gravel		582	
22A	24/24 100%	ss	4-7 8-10 N=15	23	4.46	B	44	Dark greenish gray (5GY4/1) with 30% dark gray (N4/1) mottles, lean CLAY, trace sand		580	
23A	24/24 100%	ss	3-6 6-10 N=12	21			46			578	
23B	24/24 100%	ss	10-12 10-15 N=22	16	3.69	B	48	Dark gray (N4/1), lean CLAY, trace sand and gravel		576	
24A	24/24 100%	ss	2-4 7-9 N=11	16	4.58	B	50			574	
25A	19/24 79%	ss	3-5 7-13 N=12	21	4.65	B	52			572	
26A	24/24 100%	ss	8-10 8-13 N=18	25	3.88	B	54	Dark yellowish brown (10YR3/4) with 50% dark grayish brown (10YR4/2) mottles, lean CLAY, trace sand and gravel		570	
27A	24/24 100%	ss	4-5 8-12 N=13	22	3.49	BSh	56	Greenish gray (10YR5/1) with 20% dark yellowish brown (10YR4/4) mottles, lean CLAY, trace sand and gravel		568	
28A	24/24 100%	ss	5-9 15-18 N=24	20	3.49	BSh	58			566	
29A	24/24 100%	ss	8-9 14-18 N=23	18	5.82	BSh	60	Olive (5Y4/3) with 15% greenish gray (10GY5/1) mottles, lean CLAY, trace sand and gravel		564	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
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	62	Olive (5Y4/3) with 15% greenish gray (10GY5/1) mottles, lean CLAY, trace sand and gravel <i>[Continued from previous page]</i>			562	
33A	24/24 100%	ss	6-10 11-13 N=21	16	6.98 BSh	64	Greenish gray (10Y5), lean CLAY, trace sand and gravel			560	
34A	24/24 100%	ss	11-14 18-31 N=32	18	6.98 BSh	66				558	
35A	23/24 96%	ss	9-18 27-40 N=45	15	11.95 BSh	68				556	
36A	24/24 100%	ss	4-12 18-24 N=30	16	7.15 BSh	70				554	
37A	24/24 100%	ss	17-29 36-47 N=65	17	8.24 BSh	72	Dark yellowish brown (10YR4/4), lean CLAY, trace sand and gravel			552	
38A	20/24 83%	ss	12-18 23-28 N=41	17	6.59 BSh	74				550	
39A	9/24 38%	ss	29-39 48-66 N=87	16		76				548	
40A	24/24 100%	ss	5-9 13-18 N=22	18	6.21 B	78				546	
						80				544	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf)	Failure Type	TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:			
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	▼ = 13.40 - While drilling	▽ = 4.99 - MW15S on 6/1/06
								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		
							4	Gray (10YR6/1), lean CLAY, trace sand				620		
							▼	Yellowish brown (10YR5/6) with 40% gray (10YR6/1) mottles, lean CLAY, trace sand				618		
							6	Gray (10YR6/1), lean CLAY, trace sand				616		
							8	Gray (10YR6/1), lean CLAY, trace sand				614		
							10	Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand, trace gravel				612		
							12	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				608		
							16	Yellowish brown (10YR5/4), silty, fine to coarse SAND, wet				606		
								Yellowish brown (10YR5/4) silty fine SAND, wet						
							18	Gray (10YR6/1), sandy SILT, trace medium to coarse sand and trace gravel				606		
								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



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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL	Township: East Fork	Section 11, Tier 7N; Range 3W	▽ = 13.40 - While drilling	▽ = 4.99 - MW15S on 6/1/06	▽ = 5.24 - MW15D on 6/1/06
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
1A	24/24 100%	ss	2-2 3-4 N=5	19			Dark brown (10YR3/3), clayey SILT					
1B				27	1.94 B		Dark grayish brown (10YR3/2), clayey SILT, trace sand			622		
2A	24/24 100%	ss	2-2 4-6 N=6	25	3.10 B		Grayish brown (10YR5/2), with 50% very dark gray (10YR3/1) mottles, lean CLAY, trace sand			620		
3A	20/24 83%	ss	2-3 3-5 N=6	29	2.10 B		Gray (10YR6/1), lean CLAY, trace sand			618		
4A	24/24 100%	ss	4-6 5-5 N=11	24	1.75 B		Yellowish brown (10YR5/6) with 40% gray (10YR6/1) mottles, lean CLAY, trace sand			616		
5A	22/24 92%	ss	1-2 3-4 N=5	26	1.55 B		Gray (10YR6/1), lean CLAY, trace sand			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			612		
7A	19/24 79%	SH										
7B	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		
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			608		
9A				20			Yellowish brown (10YR5/4), silty, fine to coarse SAND, wet					
9B	24/24 100%	ss	18-29 40-50 N=69	21			Yellowish brown (10YR5/4) silty fine SAND, wet					
9C				9			Gray (10YR6/1), sandy SILT, trace medium to coarse sand and trace gravel			606		
10A	17/24 71%	ss	11-43 59/5"	7	7.42 B		Dark gray (10YR4/1), clayey SILT, little sand, trace gravel			604		

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



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	14/24 58%	ss	14-55 45/2"		8				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	Dark gray (10YR4/1), clayey SILT, little sand, trace gravel [Continued from previous page]		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			588	
19A	8/24 33%	ss	61-39/2"		10				38	Dark gray (10YR4/1), silty, fine to medium SAND, trace coarse sand and gravel, wet		586	
20A	24/24 100%	ss	21-41 21-24 N=62		12		16.00 None			Very dark gray (10YR3/1), clayey SILT, little sand, trace gravel			
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



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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
							Depth ft. BGS	Lithologic Description	▼ = 13.40 - While drilling	▽ = 4.99 - MW15S on 6/1/06	▽ = 5.24 - MW15D on 6/1/06	Borehole Detail	Elevation ft. MSL	Remarks
21A	22/24 92%	ss	3-7 11-18 N=18	19	6.11	BSh	42	Dark gray (10YR4/1), clayey SILT, trace sand and gravel			582	
22A	24/24 100%	ss	4-7 8-10 N=15	23	4.46	B	44	Dark greenish gray (5GY4/1) with 30% dark gray (N4/1) mottles, lean CLAY, trace sand			580	
23A	24/24 100%	ss	3-6 6-10 N=12	21			46				578	
23B	24/24 100%	ss	10-12 10-15 N=22	16	3.69	B	48	Dark gray (N4/1), lean CLAY, trace sand and gravel			576	
24A	24/24 100%	ss	2-4 7-9 N=11	16	4.58	B	50				574	
25A	24/24 100%	ss	3-5 7-13 N=12	21	4.65	B	52	Dark yellowish brown (10YR3/4) with 50% dark grayish brown (10YR4/2) mottles, lean CLAY, trace sand and gravel			572	
26A	19/24 79%	ss	8-10 8-13 N=18	25	3.88	B	54	Dark yellowish brown (10YR3/4) with 50% dark grayish brown (10YR4/2) mottles, lean CLAY, trace sand and gravel			570	
27A	24/24 100%	ss	4-5 8-12 N=13	22	3.49	BSh	56	Greenish gray (10YR5/1) with 20% dark yellowish brown (10YR4/4) mottles, lean CLAY, trace sand and gravel			568	
28A	24/24 100%	ss	5-9 15-18 N=24	20	3.49	BSh	58	Olive (5Y4/3) with 15% greenish gray (10GY5/1) mottles, lean CLAY, trace sand and gravel			566	
29A	24/24 100%	ss	8-9 14-18 N=23	18	5.82	BSh	60				564	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	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 <i>[Continued from previous page]</i>		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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W		▽ = 13.40 - While drilling ▽ = 4.99 - MW15S on 6/1/06 ▽ = 5.24 - MW15D on 6/1/06		
							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



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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Q _u (tsf)	Failure Type	Quadrangle: Coffeen, IL	▼ = 12.80 - While drilling	▼ = 5.74 - MW16S on 6/1/06	▼ = 51.37 - MW16D on 6/1/06
								Section 2, Tier 7N; Range 3W			
							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			618	
							10	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with some sand and trace gravel.		616	
							12			614	
							14	Dark yellowish brown (10YR4/6), wet, sl. dense, silty, very fine- to fine-grained SAND.		612	
							15	Dark yellowish brown (10YR4/6), moist, firm, silty CLAY with sand and trace gravel.		612	
							16	Dark yellowish brown (10YR4/6), wet, loose, silty, very fine- to fine-grained SAND.		610	
							17	Dark yellowish brown (10YR4/6), wet, soft, silty CLAY with sand and trace gravel.		610	
							18	Yellowish brown (10YR5/6), wet, loose, very fine- to very coarse-grained SAND.		610	
							19	Gray (10YR5/1), wet, loose, fine- to medium-grained SAND.		608	
							20	Gray (10YR5/1), moist, hard, clayey SILT with sand and trace gravel.		608	
							21	Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.		608	
							22	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.		608	

NOTE(S): MW16D installed in blind-drilled borehole within 10 ft of SB-16.

FIELD BORING LOG



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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Q _u (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
							22					
							24					
							26					
							28					
							30	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>				
							32					
							34					
							36					
							38					
							40					

NOTE(S): MW16D installed in blind-drilled borehole within 10 ft of SB-16.

FIELD BORING LOG

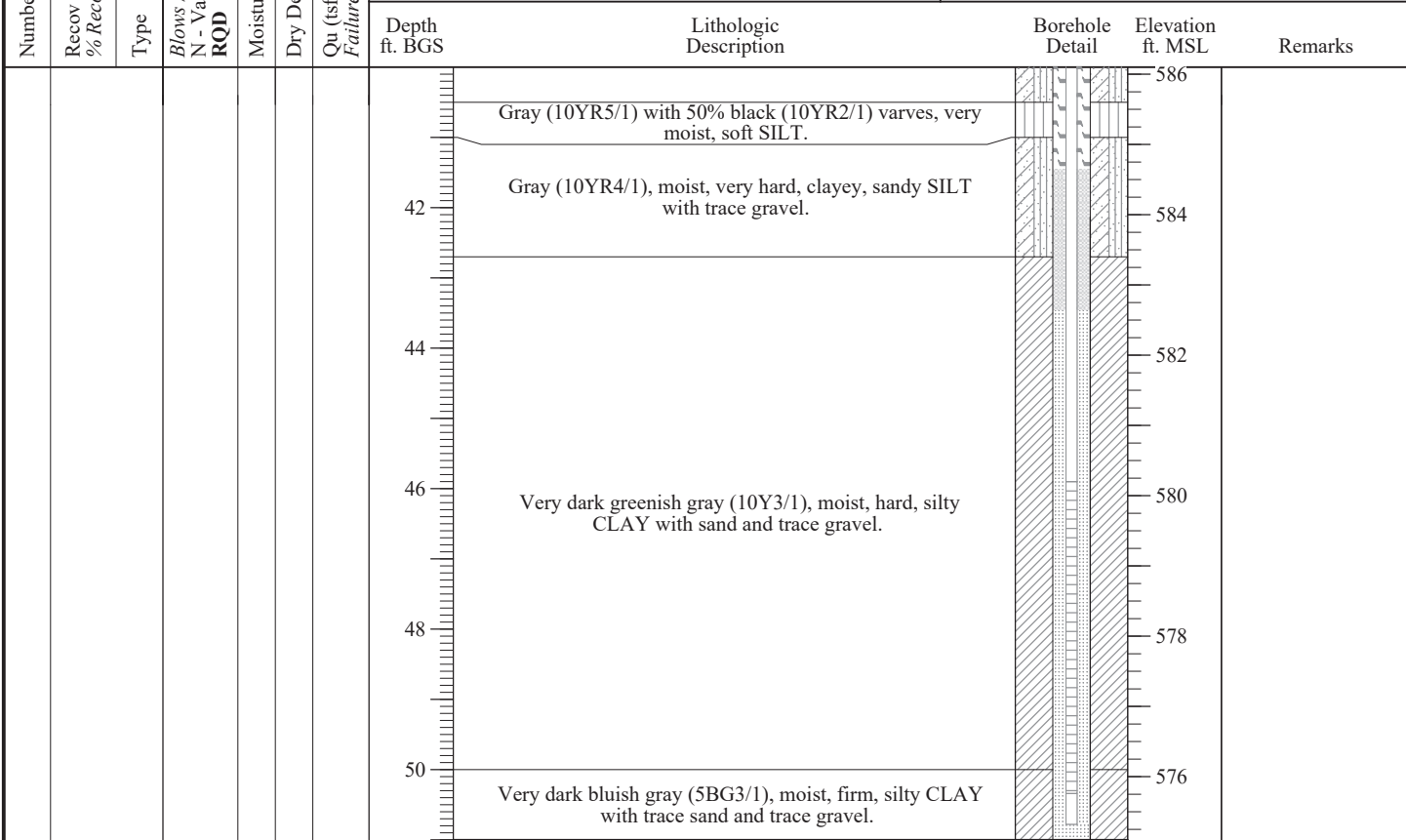


CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 12.80 - While drilling ▽ = 5.74 - MW16S on 6/1/06 ▽ = 51.37 - MW16D on 6/1/06



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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 12.80 - While drilling ▽ = 5.74 - MW16S on 6/1/06 ▽ = 51.37 - MW16D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	21/24 88%	SS	4-4 6-7 N=10	22					0	Black (10YR2/1), sl. moist, firm, clayey SILT with trace sand and trace gravel.		626	
1B				29	2.13	B			2	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			4	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			6	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, very soft, very silty CLAY with trace sand.		620	
4A	24/24 100%	SS	2-3 4-6 N=7	25	2.13	B			8			618	
5A	24/24 100%	SS	3-4 5-5 N=9	24	2.33	B			10	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			12			614	Shelby tube taken from shallow well borehole at indicated depth.
7A	24/24 100%	SS	4-7 7-7 N=14	18	1.94	BSh			14	Dark yellowish brown (10YR4/6), wet, sl. dense, silty, very fine- to fine-grained SAND.		612	
7B									14	Dark yellowish brown (10YR4/6), moist, firm, silty CLAY with sand and trace gravel.		612	
8A	21/24 88%	SS	1-2 2-4 N=4	20					16	Dark yellowish brown (10YR4/6), wet, loose, silty, very fine- to fine-grained SAND.		610	
9A	18/24 75%	SS	4-3 4-10 N=7	14					16	Dark yellowish brown (10YR4/6), wet, soft, silty CLAY with sand and trace gravel.		610	
9B				15					18	Yellowish brown (10YR5/6), wet, loose, very fine- to very coarse-grained SAND.		610	
10A				10					18	Gray (10YR5/1), wet, loose, fine- to medium-grained SAND.		608	
10B	20/24 83%	SS	27-54 59-59 N=113	17					18	Gray (10YR5/1), moist, hard, clayey SILT with sand and trace gravel.		608	
									20	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): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	10/24 42%	ss	10-96	8			22			606	
12A	14/24 58%	ss	84-132	10		3.10 BSh	24			604	
13A	20/24 83%	ss	41-68 82 N=150	10		7.56 B	26			602	
14A	12/24 50%	ss	58-119	10		9.89 B	28			600	
15A	24/24 100%	ss	30-48 70-71 N=118	9		5.62 B	30	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel. [Continued from previous page]		598	Dusky red (7.5YR3/4) staining.
16A	24/24 100%	ss	50-54 68-93 N=122	9			32			596	
17A	35/36 97%	cs		17			34			594	
18A	60/60 100%	cs		10			36			592	
							38			590	
							40			588	Wood fragments.

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
19A	60/60 100%	cs		19			42	Gray (10YR5/1) with 50% black (10YR2/1) varves, very moist, soft SILT.		586	
19B				11			44	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.		584	
20A	60/60 100%	cs		13			46	Very dark greenish gray (10Y3/1), moist, hard, silty CLAY with sand and trace gravel.		582	
21A	24/24 100%	ss	6-14 18-22 N=32	19		1.94 B	50			578	
	0/48 0%	cs					52	Very dark bluish gray (5BG3/1), moist, firm, silty CLAY with trace sand and trace gravel.		576	Possible rock at end of auger.
22A	24/24 100%	ss	2-7 7-15 N=14	21		3.71 BSh	54			574	
	24/24 100%	ss	4-8 11-13 N=19				56	Greenish gray (5G6/1) with 40% yellowish brown (10YR5/6) mottles, moist, hard, silty CLAY with sl. trace sand.		572	
23A	0/12 0%	BD		26		2.13 BSh	58			570	
							60			568	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▼ = 12.80 - While drilling	▽ = 5.74 - MW16S on 6/1/06	▽ = 51.37 - MW16D on 6/1/06	
			RQD					Section 2, Tier 7N; Range 3W				
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/48 0%	RC						62	Greenish gray (5G6/1) with 40% yellowish brown (10YR5/6) mottles, moist, hard, silty CLAY with sl. trace sand. [Continued from previous page]		566	
26A	24/24 100%	SS	32-34 42-51 N=76	25		2.72	BSh	64			562	
	0/24 0%	RC						66	Yellowish brown (10YR5/6) with 20% greenish gray (5G6/1) mottles, moist, hard, silty CLAY with trace sand and trace coal fragments.		560	
28A	24/24 100%	SS	15-21 21-21 N=42	18		2.72	BSh	68			558	
29A	24/24 100%	SS	14-17 21-25 N=38	20		2.91	BSh	70			556	70' to 79.5' - possible oxidation rinds.
30A	24/24 100%	SS	12-21 34-35 N=55	18		5.04	BSh	72			554	
31A	24/24 100%	SS	16-21 27-35 N=48	16		8.15	BSh	74			552	
								76	Yellowish brown (10YR5/6) with zones of gray (10YR4/1) mottles, moist, hard, clayey SILT with some sand and trace gravel.		550	
32A	60/60 100%	CS		19				78			548	
								80				

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▼ = 12.80 - While drilling	▽ = 5.74 - MW16S on 6/1/06	▽ = 51.37 - MW16D on 6/1/06	
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
33A	60/60 100%	cs		16				Yellowish brown (10YR5/6) with zones of gray (10YR4/1) mottles, moist, hard, clayey SILT with some sand and trace gravel. <i>[Continued from previous page]</i>				
	0/60 0%	cs						Yellow brown (10YR5/6), very moist, very soft, clayey, very fine-grained SAND and SILT.				
35A	24/24 100%	ss	9 11-16 N=20			2.72	BSh	Yellowish brown (10YR5/6), moist, hard, silty CLAY with sand and trace gravel.				Possible rock at end of auger.
								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



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▽ = 12.80 - While drilling
								Township: East Fork	▽ = 5.74 - MW16S on 6/1/06
								Section 2, Tier 7N; Range 3W	▽ = 51.37 - MW16D on 6/1/06

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.			
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			618	
10	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with some sand and trace gravel.		616	
12			614	
14	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	
14	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	
16	Yellowish brown (10YR5/6), wet, loose, very fine- to very coarse-grained SAND.			
18	Gray (10YR5/1), wet, loose, fine- to medium-grained SAND.			
18	Gray (10YR5/1), moist, hard, clayey SILT with sand and trace gravel.		608	
18	Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.			
19.90	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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 12.80 - While drilling ▽ = 5.74 - MW16S on 6/1/06 ▽ = 51.37 - MW16D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	21/24 88%	SS	4-4 6-7 N=10	22					0	Black (10YR2/1), sl. moist, firm, clayey SILT with trace sand and trace gravel.		626	
1B				29	2.13	B			2	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			4	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			6	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, very soft, very silty CLAY with trace sand.		620	
4A	24/24 100%	SS	2-3 4-6 N=7	25	2.13	B			8			618	
5A	24/24 100%	SS	3-4 5-5 N=9	24	2.33	B			10	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			12			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			14	Dark yellowish brown (10YR4/6), wet, sl. dense, silty, very fine- to fine-grained SAND.		612	
7B				18					14	Dark yellowish brown (10YR4/6), moist, firm, silty CLAY with sand and trace gravel.		612	
8A	21/24 88%	SS	1-2 2-4 N=4	20					16	Dark yellowish brown (10YR4/6), wet, loose, silty, very fine- to fine-grained SAND.		610	
9A	18/24 75%	SS	4-3 4-10 N=7	14					16	Dark yellowish brown (10YR4/6), wet, soft, silty CLAY with sand and trace gravel.		610	
9B				15					18	Yellowish brown (10YR5/6), wet, loose, very fine- to very coarse-grained SAND.		610	
10A				10					18	Gray (10YR5/1), wet, loose, fine- to medium-grained SAND.		608	
10B	20/24 83%	SS	27-54 59-59 N=113	17					18	Gray (10YR5/1), moist, hard, clayey SILT with sand and trace gravel.		608	
									20	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.		608	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	10/24 42%	ss	10-96	8			22			606	
12A	14/24 58%	ss	84-132	10		3.10 BSh	24			604	
13A	20/24 83%	ss	41-68 82 N=150	10		7.56 B	26			602	
14A	12/24 50%	ss	58-119	10		9.89 B	28			600	
15A	24/24 100%	ss	30-48 70-71 N=118	9		5.62 B	30	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel. [Continued from previous page]		598	Dusky red (7.5YR3/4) staining.
16A	24/24 100%	ss	50-54 68-93 N=122	9			32			596	
17A	35/36 97%	cs		17			34			594	
18A	60/60 100%	cs		10			36			592	
							38			590	
							40			588	Wood fragments.

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
19A	60/60 100%	cs		19			38	Gray (10YR5/1) with 50% black (10YR2/1) varves, very moist, soft SILT.		586	
19B				11			42	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.		584	
20A	60/60 100%	cs		13			44			582	
21A	24/24 100%	ss	6-14 18-22 N=32	19		1.94 B	50	Very dark greenish gray (10Y3/1), moist, hard, silty CLAY with sand and trace gravel.		580	
	0/48 0%	cs					52	Very dark bluish gray (5BG3/1), moist, firm, silty CLAY with trace sand and trace gravel.		576	Possible rock at end of auger.
22A	24/24 100%	ss	2-7 7-15 N=14	21		3.71 BSh	54			574	
	24/24 100%	ss	4-8 11-13 N=19				56	Greenish gray (5G6/1) with 40% yellowish brown (10YR5/6) mottles, moist, hard, silty CLAY with sl. trace sand.		570	
23A	0/12 0%	BD		26		2.13 BSh	58			572	
							60			568	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 12.80 - While drilling ▽ = 5.74 - MW16S on 6/1/06 ▽ = 51.37 - MW16D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/48 0%	RC								62	Greenish gray (5G6/1) with 40% yellowish brown (10YR5/6) mottles, moist, hard, silty CLAY with sl. trace sand. [Continued from previous page]		566	
26A	24/24 100%	SS	32-34 42-51 N=76	25		2.72	BSh			64			562	
	0/24 0%	RC								66	Yellowish brown (10YR5/6) with 20% greenish gray (5G6/1) mottles, moist, hard, silty CLAY with trace sand and trace coal fragments.		560	
28A	24/24 100%	SS	15-21 21-21 N=42	18		2.72	BSh			68			558	
29A	24/24 100%	SS	14-17 21-25 N=38	20		2.91	BSh			70			556	70' to 79.5' - possible oxidation rinds.
30A	24/24 100%	SS	12-21 34-35 N=55	18		5.04	BSh			72			554	
31A	24/24 100%	SS	16-21 27-35 N=48	16		8.15	BSh			74			552	
										76	Yellowish brown (10YR5/6) with zones of gray (10YR4/1) mottles, moist, hard, clayey SILT with some sand and trace gravel.		550	
32A	60/60 100%	CS		19						78			548	
										80				

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▼ = 12.80 - While drilling	▽ = 5.74 - MW16S on 6/1/06	▽ = 51.37 - MW16D on 6/1/06	
			RQD					Section 2, Tier 7N; Range 3W				
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
33A	60/60 100%	cs		16				82	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	
								84	Yellow brown (10YR5/6), very moist, very soft, clayey, very fine-grained SAND and SILT.		544	
	0/60 0%	cs						86			542	
								88	Yellowish brown (10YR5/6), moist, hard, silty CLAY with sand and trace gravel.		540	
								90			538	
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.		536	Possible rock at end of auger.
End of Boring = 92.0 ft. BGS												

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

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

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▽ = 11.70 - While drilling
								Township: East Fork	▽ = 6.89 - MW17S on 6/1/06
								Section 2, Tier 7N; Range 3W	▽ = 54.45 - MW17D on 6/1/06

Number	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	Dark grayish brown (10YR4/2), moist, soft, clayey SILT with trace sand and trace gravel.		626	
		Yellowish brown (10YR5/8), moist, soft, silty CLAY.			
2A	24/24 100%	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%	Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.		622	
4A	24/24 100%	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.		620	
5A	24/24 100%	Yellowish brown (10YR5/6), moist, soft, very sandy, clayey SILT.		618	
6A	24/24 100%	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, very moist, soft, very sandy, clayey SILT.		616	
6B		Moderate yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND.			
7A	24/24 100%	Yellowish brown (10YR5/6), wet, dense, silty, very fine- to fine-grained SAND.		614	
7B		Yellowish brown (10YR5/6), very moist, dense, silty, very fine-grained SAND.			
8A		Yellowish brown (10YR5/6) wet, dense, fine- to medium-grained SAND.			
8B	24/24 100%	Moderate yellowish brown (10YR5/4), wet, dense, SILT and very fine-grained SAND.		612	
8C		Yellowish brown (10YR5/6), moist, clayey SILT and very fine-grained SAND with trace gravel.			
9A	24/24 100%	Yellowish brown (10YR5/6), wet, loose, very fine- to medium-grained SAND.		610	
		Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND.			
10A	24/24 100%	Yellowish brown (10YR5/6), wet, sl. dense, SILT with some very fine-grained SAND.		608	
10B		Gray (10YR5/1), wet, sl. dense, SILT with some very			

NOTE(S): CME-1050 had 280# hammer for SPT.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
 Site: CCB Management Facility
 Location: Coffeen, Illinois
 Project: 05SS3004A
 DATES: Start: 5/4/2006
 Finish: 5/4/2006

CONTRACTOR: Reynolds Drilling Corp.
 Rig mfg/model: CME-1050 ATV Rig
 Drilling Method: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qt (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	12/24 50%	ss	0-1 1-2 N=2	21			21	fine-grained SAND. 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			22	Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.		604	
12B				9		4.65 BSH	24			602	
13A	25/60 42%	cs					26			600	
							28			598	
							30	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		596	
14A	60/60 100%	cs		9			32			594	
							34			592	
							36			590	
15A	60/60 100%	cs		16			38	Gray (10YR5/1), wet, dense, very fine- to fine-grained SAND.		590	
15B				8			38	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		588	
							40				

NOTE(S): 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: 5/4/2006

Finish: 5/4/2006

WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.

Rig mfg/model: CME-1050 ATV Rig

Drilling Method: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 11.70 - While drilling ▽ = 6.89 - MW17S on 6/1/06 ▽ = 54.45 - MW17D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
16A	48/60 80%	cs		14					42			586	
16B				8					44			584	
17A	60/60 100%	cs		13			Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. [Continued from previous page]		46			582	
18A	60/60 100%	cs		22					48			580	
18B				16			Dark bluish gray (10BG4/1), moist, hard, silty CLAY with little sand.		50			578	
18C				11			Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		52			576	
							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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (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.		626	
									2	Yellowish brown (10YR5/8), moist, soft, silty CLAY.			
									4	Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with little sand and trace gravel.		624	
									6	Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.		622	
									8	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.		620	
									10	Yellowish brown (10YR5/6), moist, soft, very sandy, clayey SILT.		618	
									12	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.		614	
									12	Yellowish brown (10YR5/6), wet, dense, silty, very fine- to fine-grained SAND.			
									14	Yellowish brown (10YR5/6), very moist, dense, silty, very fine-grained SAND.			
									14	Yellowish brown (10YR5/6) wet, dense, fine- to medium-grained SAND.			
									14	Moderate yellowish brown (10YR5/4), wet, dense, SILT and very fine-grained SAND.		612	
									16	Yellowish brown (10YR5/6), moist, clayey SILT and very fine-grained SAND with trace gravel.			
									18	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.			
									20	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



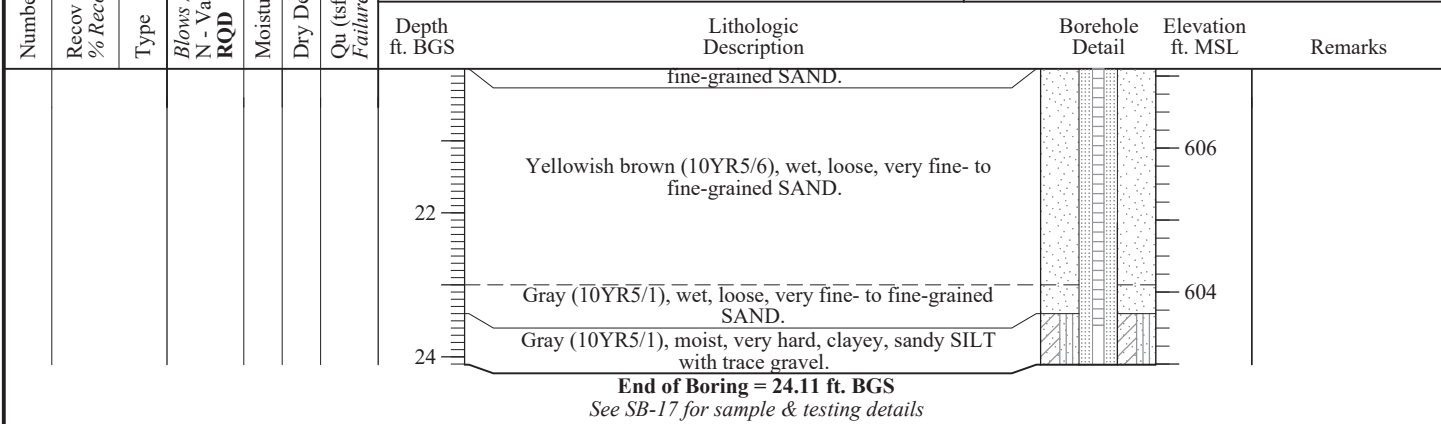
CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006

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

WEATHER: Partly sunny, cool (mid-50's)

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 11.70 - While drilling ▽ = 6.89 - MW17S on 6/1/06 ▽ = 54.45 - MW17D on 6/1/06	



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▼ = 11.70 - While drilling ▽ = 6.89 - MW17S on 6/1/06 ▽ = 54.45 - MW17D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 83%	ss	1-1 1-1 N=2	29						Dark grayish brown (10YR4/2), moist, soft, clayey SILT with trace sand and trace gravel.		626	
2A	24/24 100%	ss	1-1 2-2 N=3	26	1.71 None				2	Yellowish brown (10YR5/8), moist, soft, silty CLAY.		624	
3A	24/24 100%	ss	1-1 1-3 N=2	16	2.62 BSh				4	Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with little sand and trace gravel.		622	
4A	24/24 100%	ss	1-2 2-3 N=4	18	2.33 B				6	Yellowish brown (10YR5/6) with 10% 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) with 30% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.		618	
6A	24/24 100%	ss	1-1 1-1 N=2	21	0.58 B				10	Yellowish brown (10YR5/6), moist, soft, very sandy, clayey SILT.		616	
6B				18					12	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, very moist, soft, very sandy, clayey SILT.			
7A	24/24 100%	ss	1-1 3-7 N=4	21					12	Moderate yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND.			
7B				19					14	Yellowish brown (10YR5/6), wet, dense, silty, very fine-grained SAND.			
8A				15					14	Yellowish brown (10YR5/6) wet, dense, fine- to medium-grained SAND.			
8B	24/24 100%	ss	2-5 5-7 N=10	13					14	Moderate yellowish brown (10YR5/4), wet, dense, SILT and very fine-grained SAND.			
8C				13					16	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.			
10A	24/24 100%	ss	0-2 2-3 N=4	19					18	Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND.			
10B				23					18	Yellowish brown (10YR5/6), wet, sl. dense, SILT with some very fine-grained SAND.			
									20	Gray (10YR5/1), wet, sl. dense, SILT with some very		608	

NOTE(S): CME-1050 had 280# hammer for SPT.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
 Site: CCB Management Facility
 Location: Coffeen, Illinois
 Project: 05SS3004A
 DATES: Start: 5/4/2006
 Finish: 5/4/2006

CONTRACTOR: Reynolds Drilling Corp.
 Rig mfg/model: CME-1050 ATV Rig
 Drilling Method: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf)	Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 11.70 - While drilling ▽ = 6.89 - MW17S on 6/1/06 ▽ = 54.45 - MW17D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	12/24 50%	ss	0-1 1-2 N=2	21							fine-grained SAND.		606	
12A	24/24 100%	ss	2-2 5-7 N=7	18							Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND.		604	
12B				9		4.65	BSh				Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.		602	
13A	25/60 42%	cs											600	
													598	
											Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		596	
14A	60/60 100%	cs		9									594	
													592	
													590	
15A	60/60 100%	cs		16							Gray (10YR5/1), wet, dense, very fine- to fine-grained SAND.		590	
15B				8							Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		588	
													588	

NOTE(S): 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: 5/4/2006

Finish: 5/4/2006

WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.

Rig mfg/model: CME-1050 ATV Rig

Drilling Method: 4 1/4" 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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 2, Tier 7N; Range 3W	▽ = 11.70 - While drilling ▽ = 6.89 - MW17S on 6/1/06 ▽ = 54.45 - MW17D on 6/1/06	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
16A	48/60 80%	cs		14					42			586	
16B				8					44			584	
17A	60/60 100%	cs		13			Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. [Continued from previous page]		46			582	
18A	60/60 100%	cs		22					48			580	
18B				16			Dark bluish gray (10BG4/1), moist, hard, silty CLAY with little sand.		50			578	
18C				11			Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		52			576	
							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

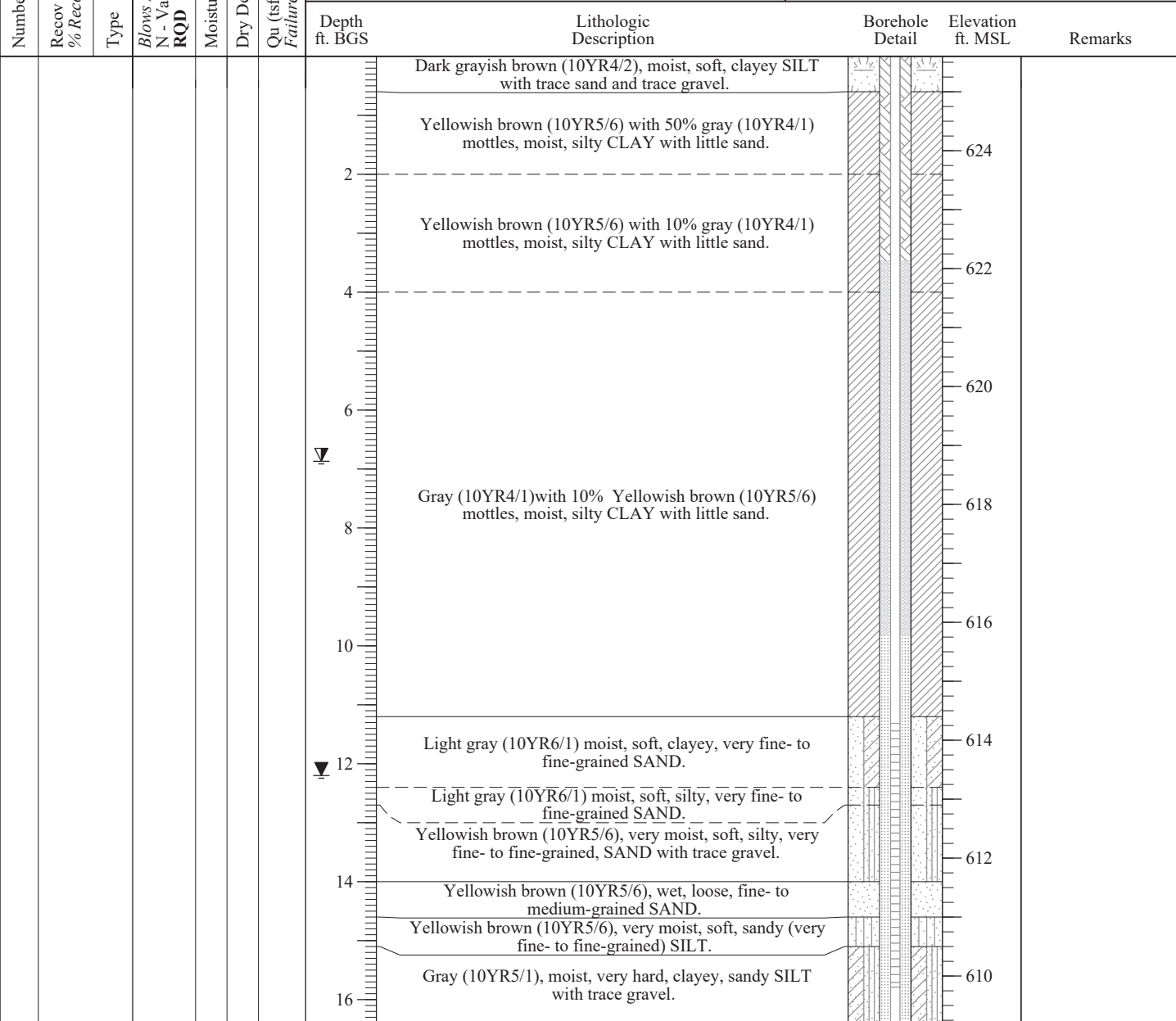


CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006

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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL	▽ = 12.20 - While drilling
								Township: East Fork	▽ = 6.87 - MW18S on 6/1/06
								Section 3, Tier 7N; Range 3W	▽ =



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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 75%	ss	0-1 1-1 N=2	24	1.31	BSh	0	Dark grayish brown (10YR4/2), moist, soft, clayey SILT with trace sand and trace gravel.		626	
2A	24/24 100%	ss	1-2 2-2 N=4	28	1.78	Sh	2	Yellowish brown (10YR5/6) with 50% 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	Yellowish brown (10YR5/6) with 10% gray (10YR4/1) mottles, moist, silty CLAY with little sand.		620	
4A	24/24 100%	ss	1-1 1-2 N=2	24	1.09	B	6	Gray (10YR4/1) with 10% Yellowish brown (10YR5/6) mottles, moist, silty CLAY with little sand.		618	
5A	24/24 100%	ss	1-1 1-2 N=2	28	0.54	BSh	8				616
6A	24/24 100%	ss	0-0 1-2 N=1	21	0.39	B	10	Light gray (10YR6/1) moist, soft, silty, very fine- to fine-grained SAND.		614	
7A	24/24 100%	ss	3-5 9-15 N=14	17			12				612
7B				15			14	Light gray (10YR6/1) moist, soft, silty, very fine- to fine-grained SAND.		612	
8A				14			14	Yellowish brown (10YR5/6), very moist, soft, silty, very fine- to fine-grained, SAND with trace gravel.		612	
8B	24/24 100%	ss	8-9 9-10 N=18	11			14	Yellowish brown (10YR5/6), wet, loose, fine- to medium-grained SAND.		610	
8C				9			16	Yellowish brown (10YR5/6), very moist, soft, sandy (very fine- to fine-grained) SILT.		610	
9A	24/36 67%	cs					18	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		608	
							20			606	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole. 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: 5/11/2006

Finish: 5/11/2006

WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.

Rig mfg/model: CME-1050 ATV Rig

Drilling Method: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
10A	60/60 100%	cs							22			604	
									24			602	
									26			600	
11A	60/60 100%	cs			5				28	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. <i>[Continued from previous page]</i>		598	
									30			596	
12A	60/60 100%	cs			11				32			594	Coal fragment seam
									34			592	
									36			590	
13A	60/60 100%	cs			10				38	Gray (10YR5/1), moist, dense, SILT.		588	
13B	60/60 100%	cs			12				40	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		586	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole. CME-1050 had 280# hammer for SPT.

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station

Site: CCB Management Facility

Location: Coffeen, Illinois

Project: 05SS3004A

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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf)	Failure Type	Quadrangle: Coffeen, IL		▽ = 12.20 - While drilling
									Township: East Fork		▽ = 6.87 - MW18S on 6/1/06
									Section 3, Tier 7N; Range 3W		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
14A	60/60 100%	cs			13					584	Appears more clayey
										582	
										580	
15A	60/60 100%	cs			13				Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. [Continued from previous page]	578	
										576	
16A	60/60 100%	cs			13					574	
16B					22				Greenish gray (10BG5/1), moist, firm, silty CLAY with little sand and trace gravel.	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



CLIENT: AEG Coffeen Power Station

CONTRACTOR: Reynolds Drilling Corp.

Site: Ash Pond Investigation

Rig mfg/model: CME-550 ATV Drill

BOREHOLE ID: SB20

Location: Coffeen, IL

Drilling Method: 4 1/4" Hollow stem auger with split spoon sampler

Well ID: MW20S

Project: 05S3004B

FIELD STAFF: Driller: A. Rachford

Surface Elev: 620.30 ft. MSL

DATES: Start: 5/1/2007

Helper: M. Brown

Completion: 16.00 ft. BGS

Finish: 5/1/2007

Station: 874,226.44N

WEATHER: Partly sunny, warm

Eng/Geo: R. Hasenyager

2,515,867.87E

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows/6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▽ = 4.28 - 05/10/2007 ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	12/24 50%	SS		24.9						Black (10YR2/1), moist, firm, clayey SILT with slight trace sand (TOPSOIL)		620	
1B				19.9					2	Gray (10YR6/1), moist, firm, clayey SILT with roots and slight trace sand			
2A	23/24 96%	SS		28.9		2.33 BSh				Gray (10YR5/1) with 40% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY		618	
3A	13/24 54%	SS		17.2					4	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand		616	
4A	24/24 100%	SS		20.5		2.52 B			6	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand		614	
4B				20.6		2.33 B			8	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel			
5A	24/24 100%	SS		23.1		1.63 B				Gray (10YR6/1), moist, firm, silty CLAY with trace sand and slight trace gravel		612	
5B				24.0		1.07 B			10	Yellowish brown (10YR5/8), very moist, soft, sandy CLAY with some silt		610	
6A				16.4						Yellowish brown (10YR5/8), very moist, soft, clayey, very fine- to medium-grained SAND			
6B	24/24 100%	SS		19.1		0.39 B			12	Gray (10YR6/1), wet, loose, very fine- to medium-grained SAND with trace coarse-grained sand		608	
6C				17.5									
7A	13/16 81%	SS		19.1						Brown (10YR5/3), moist, very hard, very silty CLAY with sand and gravel			
7B				11.7		1.75 BSh			14	Gray (10YR5/1), moist, very hard, very silty CLAY with sand and gravel		606	
8A	22/24 92%	SS		9.0		4.80 BSh			16				

End of Boring = 16.0 ft. BGS

NOTE(S):

FIELD BORING LOG



CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:						
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf)	Failure Type	TOPOGRAPHIC MAP INFORMATION:				
									Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
									Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W				
									2	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.		628	
									4			626	
									6	Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.		624	
									8			622	
									10	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		620	
									12			618	
									14	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		616	
									16	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		614	
									17	Gray (10YR6/1), moist, very soft, clayey, very fine- to coarse-grained SAND with trace gravel.		612	
									18	Brown (10YR5/3), slightly moist, hard, very silty CLAY with trace sand and gravel.		610	
									19	Gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.		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



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 (10-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) / Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = Dry - While drilling ▽ = ▽ = 15.40 - 3/1/2010	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	16/24 67%	ss	9-11 12-14 N=23	16					2	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	
2A	20/24 83%	ss	3-5 9-12 N=14	21					4			624	
3A	19/24 79%	ss	3-6 8-9 N=14	21					6	Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.		622	
4A	17/24 71%	ss	2-3 4-7 N=7	25					8			620	
5A	22/24 92%	ss	1-2 5-8 N=7	24					10	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		618	
6A	18/24 75%	ss	1-2 3-5 N=5	21					12			616	
7A	23/24 96%	ss	woh-2 3-4 N=5	23					14	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		614	
8A	22/24 92%	ss	1-3 3-3 N=6	24					16	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		612	
9A				16					16	Gray (10YR6/1), moist, very soft, clayey, very fine- to coarse-grained SAND with trace gravel.		612	
9B	17/24 71%	ss	woh-6 27-40 N=33	13					18	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.		610	
10A	22/24 92%	ss	10-24 44-66 N=68	7					20	Gray (10YR4/1), slightly moist, hard, clayey SILT with sand and gravel.		608	

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

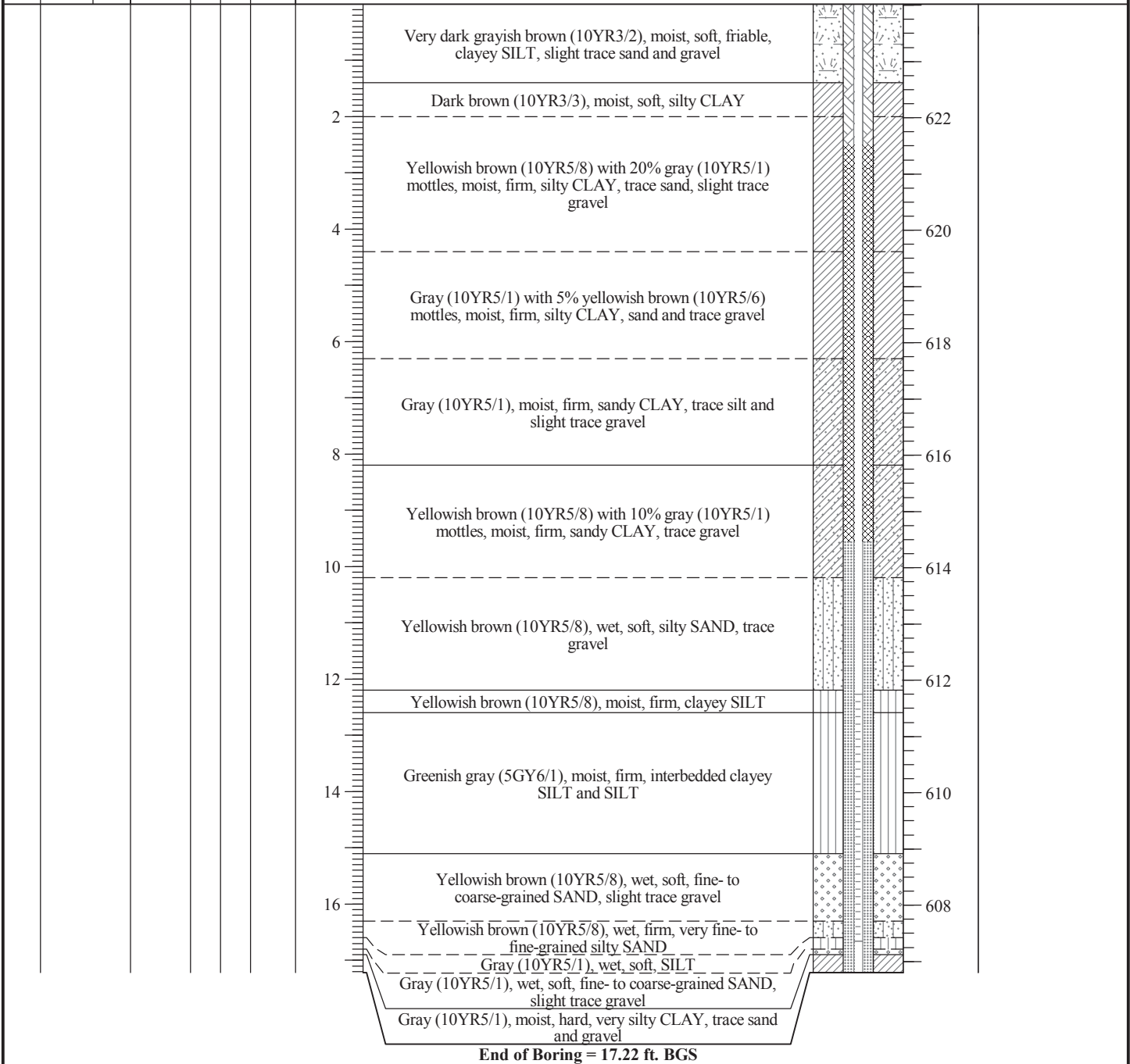


CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05SS3004A
DATES: Start: 10/15/2010
Finish: 10/15/2010
WEATHER: Sunny (mid-50's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:					
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:					
							Quadrangle:	Township:	Section:	Range:		
							Quadrangle:	Coffeen, IL	Township:	East Fork	Section:	2, Tier 7N; Range 3W



NOTE(S): R201 blind drilled in borehole approximately 8 ft. west of G201. Lithology taken from G201.

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▼ = Dry - Upon Completion ▼ = 2.50 - 3/21/2017 ▼ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
									0	Very dark grayish brown (10YR3/2), moist, firm, clayey SILT			
								▼	2	Yellowish brown (10YR5/4) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand		620	
									4	Yellowish brown (10YR5/4) with 30% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY, slight trace sand		618	
									6			616	
									8	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand, slight trace gravel		614	
									10	Yellowish brown (10YR5/6), moist, firm, silty CLAY with sand, trace gravel		612	
									12	Yellowish brown (10YR5/6), moist, soft, sandy SILT, slight trace gravel		610	
									14	Yellowish brown (10YR 5/4), moist, soft, silty SAND, trace gravel		608	
									16	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



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: 3/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	24/24 100%	SS	4-3 4-4 N=7	22				Very dark grayish brown (10YR3/2), moist, firm, clayey SILT		622	
1B				30	1.67	Sh	2	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	4	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	6	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand, slight trace gravel		616	
4A	19/24 79%	SS	5-6 7-8 N=13	20	1.12	B	8	Yellowish brown (10YR5/6), moist, firm, silty CLAY with sand, trace gravel		612	
5A	16/24 67%	SS	2-2 3-5 N=5	20	0.62	BSh	10	Yellowish brown (10YR5/6), moist, soft, sandy SILT, slight trace gravel		610	
6A	22/24 92%	SS	1-2 3-3 N=5	17	0.62	BSh	12	Yellowish brown (10YR5/4), moist, soft, silty SAND, trace gravel		608	
7A				17							
7B	23/24 96%	SS	3-3 5-6 N=8	17	1.36	BSh	14	Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel		608	
8A				15							
8B	17/24 71%	SS	5-19 26-35 N=45	10							

End of Boring = 16.0 ft. BGS

NOTE(S):

FIELD BORING LOG



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft 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				2	FILL - yellowish brown (10YR5/6) with 20% grayish brown (10YR5/2) mottles, moist, stiff, silty CLAY with trace sand and gravel.		624	
2	10/24 42%	SS	5-6 7-11 N=13				4			622	
3	20/24 83%	SS	1-4 5-7 N=9				6	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.		620	
4	24/24 100%	SS	2-4 5-6 N=9				8	Grayish brown (10YR5/2) with 20% dark yellowish brown (10YR4/6) mottles, moist, medium, clayey SILT with sand.		618	
5	24/24 100%	SS	2-4 5-6 N=9				10	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.		616	
6	24/24 100%	SS	3-3 5-7 N=8				12	Dark yellowish brown (10YR4/6) with 5% light brownish gray (10YR6/2) mottles, moist, medium, sandy SILT with gravel.		614	
7	24/24 100%	SS	1-2 3-3 N=5				14	Light brownish gray (10YR6/2) with 30% yellowish brown (10YR5/6) mottles, very moist, medium, clayey SAND with silt.		612	
8	24/24 100%	SS	1-1 2-1 N=3				16	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, wet, very loose, silty SAND trace with gravel.		610	
9	24/24 100%	SS	8-12 28-30 N=40				18	Brownish yellow (10YR6/8), wet, medium dense, silty SAND with gravel.		608	
10	22/22 100%	SS	8-44 65-60/4" N=109					Grayish brown (10YR5/2), slightly moist, hard, clayey SILT with sand and gravel.		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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = 16.84 - While drilling ▽ = ▽ = 12.35 - 3/1/10	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	12/24 50%	ss	37-17 15-18 N=32	14					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.		626	
2A	7/24 29%	ss	4-7 7-13 N=14						2	FILL - Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, hard (frozen), silty CLAY with slight trace sand and gravel.		624	
3A	12/24 50%	ss	3-4 6-8 N=10	26					4	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.		622	
4A	19/24 79%	ss	2-4 5-7 N=9	24					6			620	
5A	22/24 92%	ss	1-3 4-5 N=7	20					8	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with trace sand and slight trace gravel.		618	
6A	22/24 92%	ss	1-3 5-5 N=8	20					10			616	
7A	22/24 92%	ss	2-3 4-5 N=7	19					12			614	
8A	20/24 83%	ss	2-2 3-3 N=5	18					14	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		612	
9A	22/24 92%	ss	woh-1 8-7 N=9	19					16	Brown (10YR5/3), moist, soft, clayey SAND with slight trace gravel.		610	
9B				18					17	Gray (10YR6/1), wet, loose, silty, very fine- to coarse-grained SAND.			
10A									18	Brown (10YR5/3), wet, loose, silty, very fine- to fine-grained SAND.		608	
10B	18/24 75%	ss	3-10 13-11 N=23	17					20	Brown (10YR5/3), slightly moist, very stiff, clayey SILT with trace sand and gravel.			

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



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 (10-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	24/24 100%	ss	8-16 18-25 N=34	16			22	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace 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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
								Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W	▽ = Dry - While drilling ▽ = 15.42 - Upon completion ▽ =			
1A	23/24 96%	ss	6-4 5-7 N=9				27	FILL - Yellowish brown (10YR5/6), slightly moist, hard, silty CLAY with trace sand and gravel.		626		
2A	24/24 100%	ss	3-4 6-6 N=10				25	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist, hard, silty CLAY with slight trace sand and gravel.		624		
2B							26					
3A	22/24 92%	ss	2-4 5-6 N=9				22	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.		622		
4A	23/24 96%	ss	1-2 3-3 N=5				21	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		620		
5A	23/24 96%	ss	1-1 3-2 N=4				22			620		
6A	24/24 100%	ss	woh-1 3-3 N=4				23	Gray (10YR6/1) with 15% yellowish brown (10YR5/8) mottles, very moist, soft, silty CLAY with sand and slight trace gravel.		616		
6B							21	Yellowish brown (10YR5/8) with 10% gray (10YR6/1) mottles, very moist, firm, silty CLAY with sand and trace gravel.		614		
7A	24/24 100%	ss	1-2 1-2 N=3				21			614		
7B							25	Gray (10YR6/1) with 10% brownish yellow (10YR6/6) mottles, very moist, soft, sandy CLAY with silt and slight trace gravel.		612		
8A	24/24 100%	ss	woh-2 1-8 N=3				17	Gray (10YR5/1), wet, loose, very fine- to medium-grained SAND with trace gravel.		610		
9A	24/24 100%	ss	6-15 20-24 N=35				9	Gray (10YR6/1), moist, hard, very silty CLAY with sand and trace gravel.		610		
							18	End of Boring = 18.0 ft. BGS				

NOTE(S): T202 installed in borehole.

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: 8/17/2016
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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/60 0%	BD					2	Black (10YR2/1), moist, soft, clayey SILT (TOPSOIL)		620	
	0/60 0%	BD					4	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY		618	
	0/60 0%	BD					6	Gray (10YR6/1), moist, firm, silty CLAY slight trace sand		616	
	0/60 0%	BD					8	Gray (10YR5/1), very moist, soft, clayey, very fine- to fine-grained SAND		614	
	0/60 0%	BD					10	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel		612	
	0/60 0%	BD					12	Yellowish brown (10YR5/8) with 40% gray (10YR6/1) mottles, moist, firm, silty CLAY with sand and trace gravel		610	
	0/60 0%	BD					14	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND		608	
	0/60 0%	BD					14	Dark brown (10YR3/3), very moist, soft, clayey, fine- to very coarse-grained SAND with slight trace gravel		608	
	0/60 0%	BD					14	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND		608	
	0/60 0%	BD					14	Dark yellowish brown (10YR4/4), moist, soft, sandy SILT with trace gravel		608	
	0/60 0%	BD					14	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND		608	
	0/60 0%	BD					14	Gray (10YR5/1), moist, very hard, very silty CLAY with sand and gravel		608	
4A	22/24 92%	SS	8-16 33-35 N=49			4.50	16	Dark gray (10YR4/1), moist, hard, SILT with few fine- to coarse-grained sand, little clay and trace small gravel.		606	
	0/36 0%	BD					18	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



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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
7-1	0/36 0%	BD							22	Dark gray (10YR4/1), dry, hard, SILT with few fine-to coarse-grained sand, little clay and little small gravel.		600	
7-2	20/24 83%	DS							24	Dark gray (10YR4/1), moist, dense, fine- to coarse-grained SAND.		598	
7-3													
7-4	0/12 0%	BD								Dark gray (10YR4/1), dry, hard, SILT with few fine- to coarse-grained sand, little clay and little small gravel.		596	
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



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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) / Q _p (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/60 0%	BD							0	Dark brown (10YR3/3), moist, stiff, SILT with few clay and trace organics.		620	
	0/60 0%	BD							2	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay and trace small gravel.		618	
	0/60 0%	BD							4	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay. Grayish brown (10YR5/2) with 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with few silt and little fine-grained sand.		616	
	0/60 0%	BD							6	Very pale brown (10YR7/4) with 25% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with trace silt.		614	
	0/60 0%	BD							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.		612	
	0/60 0%	BD							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.		610	
	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.		608	
	0/60 0%	BD							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.		606	
	0/60 0%	BD							16	Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, wet, loose, fine-grained SAND with some clay. Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, moist, loose, fine-grained SAND with some clay.		604	
	0/60 0%	BD							18	Gray (10YR5/1), dry, hard, SILT with few clay, few fine- to coarse-grained sand and trace small gravel.		602	
									20				

NOTE(S): T409 installed in boring.
 Boring was blind drilled to 27.0 feet bgs. Blind drill lithologies from boring G406D.

FIELD BORING LOG

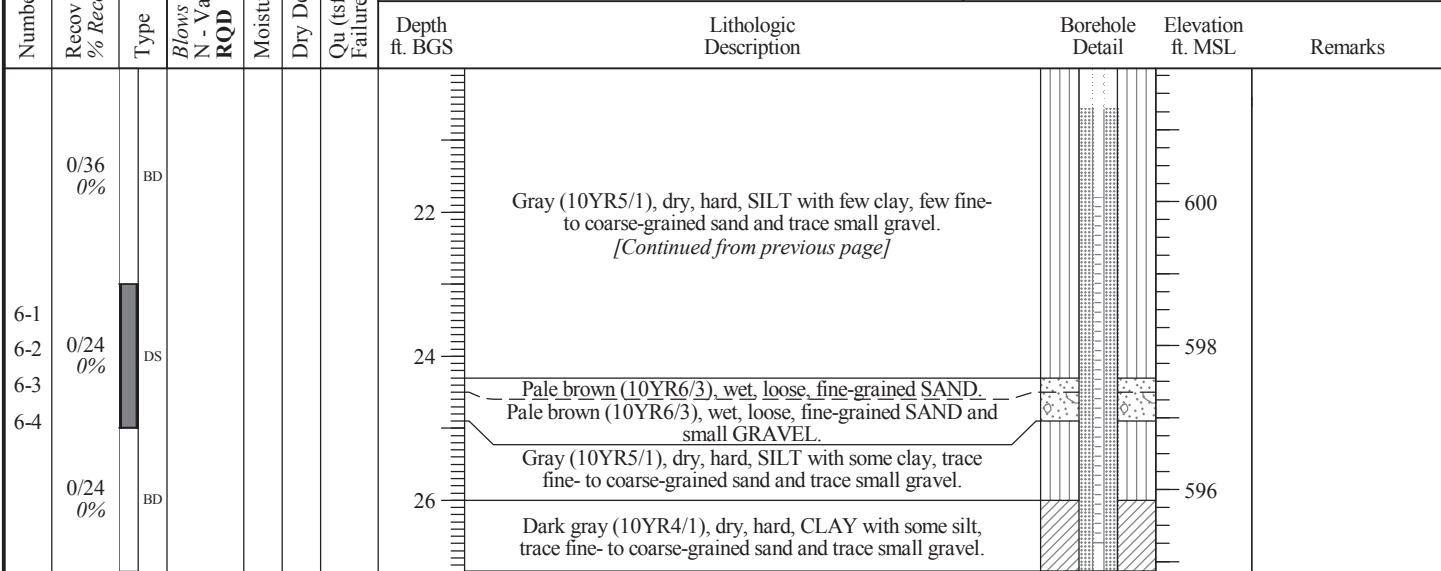


CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/19/2016
Finish: 8/19/2016
WEATHER: Cloudy, (70s)

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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:	
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf)	Failure Type	Quadrangle: Coffeen	▼ = Dry - During Drilling
									Township: East Fork	▽ =
									Section 11, Tier 7 N.; Range 3 W.	▽ =



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



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: 4 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 10, Tier 7N; Range 3W	▼ = 8.11 - 10/30/2014 ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1	24/24 100%	ss	1-2 2-2 N=4	26					2			622	
2	22/24 92%	ss	2-3 3-4 N=6	28	1.44 B				4	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.		620	
3	23/24 96%	ss	2-3 4-4 N=7	20	1.71 Sh				6			618	
4	24/24 100%	ss	6-7 6-6 N=13	22	1.55 Sh				8			616	
5	22/24 92%	ss	2-2 2-4 N=4	22	1.55 Sh				10	Gray (10YR5/1) with 20% yellowish brown (10YR5/8) mottles, moist, soft, CLAY with few silt and trace very fine to fine sand.		614	
6	24/24 100%	ss	2-1 3-2 N=4	20	0.93 B				12	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	
7A	24/24 100%	ss	2-3 3-3 N=6	19					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	
7B				22						Brownish yellow (10YR6/6), moist, soft, CLAY with few silt and trace very fine to fine sand and small gravel.			
8A	24/24 100%	ss	4-5 8-7 N=13	12						Brownish yellow (10YR6/6) wet, loose, SAND (very fine to very coarse) and trace small gravel.			
8B				13						Brownish yellow (10YR6/6) very moist, soft, SAND (very fine to medium) with few clay and silt.			
9	22/24 92%	ss	5-4 4-4 N=8	18					16	Yellowish brown (10YR5/8), moist, soft, CLAY with few silt and trace sand (very fine to very coarse) and small gravel.		608	
									18	Yellowish brown (10YR5/8), wet, loose, very fine to very coarse SAND.		606	
10	16/24 67%	ss	2-4 3-5 N=7	12					20	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.

NOTE(S): Monitoring well TA31 installed in borehole.

FIELD BORING LOG



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: 4/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL Township: East Fork Section 3, Tier 7N; Range 3W	▼ = 14.05 - 10/30/2014 ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1	18/24 75%	ss	2-1 2-3 N=3	21					0	Dark yellowish brown (10YR4/4), moist, soft, clayey SILT with trace sand (very fine).		618	
2	21/24 88%	ss	2-1 1-1 N=2	28					2			616	
3A	14/24 58%	ss	1-1 3-3 N=4	24					4	Black (10YR2/1), moist, soft, clayey SILT with trace sand (very fine).		614	
3B	20/24 83%	ss	4-5 4-7 N=9	22	1.15 Sh				6	Very dark gray (10YR3/1), moist, soft, CLAY with little silt and trace sand (very fine to fine).		612	
4	21/24 88%	ss	4-7 12-22 N=19	9	0.96 B				8	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).		610	
5	21/24 88%	ss	6-16 27-42 N=43	8	8.45 Sh				10	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).		608	
6	12/24 50%	ss	36-55 50/4"	6	10.47 Sh				12	Yellowish brown (10YR5/8), slightly moist, loose, SAND (very fine to very coarse) and few gravel (small to medium).		606	
7	16/24 67%	ss	16-35 69 N=104	8					14	Gray (10YR5/1), slightly moist, very hard, CLAY with silt and few gravel (small to medium).		604	
8									16	Gray (10YR5/1), moist, dense, SAND (very fine to coarse).		604	
									16	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



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 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	Quadrangle: Coffeen, IL		▼ = Dry - during drilling ▼ = 7.00 - 6/16/15 ▼ =		
								Township: East Fork				
Section 3, Tier 7N; Range 3W								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								0	Yellowish brown (10YR5/4), moist, stiff, clayey SILT, trace very fine-grained sand, roots.		622	
								2	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	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	
								6	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	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	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	
								12	Gray (10YR6/1) moist, medium, fine- to coarse-grained sandy CLAY, little silt, trace small to large gravel.		610	
								14	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.		608	
								16	Dark yellowish brown (10YR4/6), very moist, dense, silty, very fine- to medium-grained SAND.		606	
								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



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 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value	RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf)	Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	21/24 88%	ss	2-3 5-5 N=8						0	Yellowish brown (10YR5/4), moist, stiff, clayey SILT, trace very fine-grained sand, roots.		622	
2A	20/24 83%	ss	3-4 4-5 N=8						2	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	
3A	23/24 96%	ss	5-6 6-9 N=12						4	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	
4A	24/24 100%	ss	10-10 10-10 N=20						6	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	
5A	21/24 88%	ss	2-4 6-6 N=10						8	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	
6A	24/24 100%	ss	0-3 4-8 N=7						10	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	
7A	24/24 100%	ss	15-27 32-41 N=59						12	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									14	Dark yellowish brown (10YR4/6), very moist, dense, silty, very fine- to medium-grained SAND.		608	
8A	20/24 83%	ss	5-12 18-22 N=30						16	Brown (10YR5/3), slightly moist, hard, clayey SILT, few fine- to coarse-grained sand, trace small gravel.		606	
9A	16/24 67%	ss	23-44 50/5"						18			604	
10A	22/24 92%	ss	12-12 22-25 N=34						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



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 1/4" 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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Q _u (tsf) Q _p (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
							Quadrangle: Coffeen, IL	Township: East Fork	▽ = 13.80 - during drilling ▽ = ▽ =			
							Section 3, Tier 7N; Range 3W	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	24/24 100%	ss	11-17 25-32 N=42					22			602	
12A	23/24 96%	ss	17-23 35-44 N=58					24			600	
13A	21/24 88%	ss	26-30 30-37 N=60					26	Dark gray (10YR4/1), slightly moist, hard, clayey SILT, few fine- to coarse-grained sand, trace small to large gravel. <i>[Continued from previous page]</i>		598	
14A	18/24 75%	ss	19-35 47-50 N=82					28			596	
15A	24/24 100%	ss	18-27 34-35 N=61					30			594	
								End of boring = 30.0 feet				

NOTE(S): Borehole sealed with high-solids bentonite grout.

FIELD BORING LOG



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 1/4" 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

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft ³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	21/24 88%	SS	3-3 3-3 N=6				0	Gray (10YR5/1) with 10% dark yellowish brown (10YR3/6) mottles, moist, stiff, SILT, some clay, trace very fine-grained, roots.		624	
2A	17/24 71%	SS	2-2 4-6 N=6				2	Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/6) mottles, moist, very stiff, silty CLAY, trace fine-grained sand.		622	
3A	22/24 92%	SS	3-3 3-4 N=6				4	Light grayish brown (10YR6/2) with 15% yellowish brown (10YR5/6) mottles, slightly moist, very stiff, silty CLAY, trace fine-grained sand.		620	
4A	24/24 100%	SS	3-4 6-7 N=10				6	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	
5A	24/24 100%	SS	2-2 5-5 N=7				8	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.		616	
6A	22/24 92%	SS	3-3 4-5 N=7				10	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	
7A	21/24 88%	SS	3-3 4-5 N=7				12	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.		612	
7B							14	Gray (10YR6/1), very moist, loose, clayey, silty, fine- to medium-grained SAND, trace coarse grained sand.		610	
8A							14	Brown (10YR5/3), very moist, very dense, silty, fine- to coarse-grained SAND and small to large GRAVEL.		610	
8B	24/24 100%	SS	18-28 25-32 N=53				14	Yellowish brown (10YR5/6), slightly moist, hard, clayey SILT, little fine- to coarse-grained sand, trace small gravel.		610	
8C							14	Gray (10YR6/1), slightly moist, hard, clayey SILT, few fine- to coarse-grained sand, trace small gravel.		610	
							16	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.



Site #: _____ County: _____ Well #: TR32

Site Name: Coffeen Power Station Borehole #: TR32

State _____
Plan 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

Elevations **Depths** (0.01 ft.)
(MSL)* (BGS)

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: _____

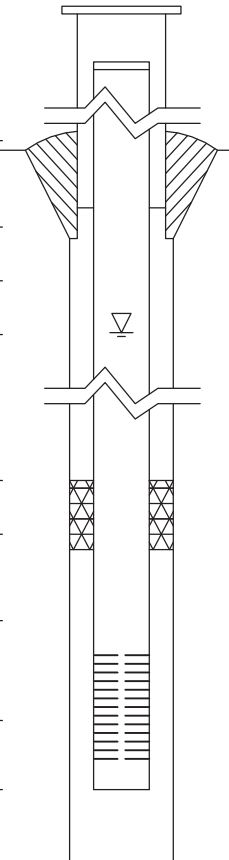
Type of Sand Pack: Quartz Sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a
(if applicable)

Installation Method: _____



<u>621.97</u>	<u>-2.69</u>	Top of Protective Casing
<u>621.68</u>	<u>-2.40</u>	Top of Riser Pipe
<u>619.28</u>	<u>0.00</u>	Ground Surface
<u>616.28</u>	<u>3.00</u>	Top of Annular Sealant
_____	_____	Static Water Level (After Completion)
<u>n/a</u>	<u>n/a</u>	Top of Seal
<u>609.77</u>	<u>9.51</u>	Top of Sand Pack
<u>608.28</u>	<u>11.00</u>	Top of Screen
<u>603.60</u>	<u>15.68</u>	Bottom of Screen
<u>603.11</u>	<u>16.17</u>	Bottom of Well
<u>603.11</u>	<u>16.17</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input type="checkbox"/> PVC	OTHER: _____
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input type="checkbox"/> PVC	OTHER: _____
Screen	SS304	SS316	PTFE	<input type="checkbox"/> PVC	OTHER: _____

CASING MEASUREMENTS

Diameter of Borehole	(inches)	<u>8.0</u>
ID of Riser Pipe	(inches)	<u>2.0</u>
Protective Casing Length	(feet)	<u>5.0</u>
Riser Pipe Length	(feet)	<u>13.40</u>
Bottom of Screen to End Cap	(feet)	<u>0.49</u>
Screen Length (1st slot to last slot)	(feet)	<u>4.68</u>
Total Length of Casing	(feet)	<u>18.57</u>
Screen Slot Size **	(inches)	<u>0.010</u>

**Hand-Slotted Well Screens Are Unacceptable

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

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 10.90 - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	21/24 88%	SS	3-4 5-10 N=9						0	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			610	
5A	24/24 100%	SS	2-3 5-6 N=8						8	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.		608	
6A	24/24 100%	SS	0-1 2-2 N=3						10	Dark yellowish brown (10YR3/6), moist, stiff, SILT, with some very fine- to medium-grained sand, few clay and small gravel. 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.		606	
7A	18/24 75%	SH							12	Dark yellowish brown (10YR3/6), wet, loose, 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	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.		602	
9A	24/24 100%	SS	5-12 18-22 N=30						16	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.		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	

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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
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
11A	24/24 100%	SS	3-9 13-22 N=22					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]		596	
12A	24/24 100%	SS	7-14 20-24 N=34				22			594	Vertical fractures with oxidation from 22 to 24 ft, no oxidation below 24 ft.
13A	24/24 100%	SS	6-11 15-21 N=26				24			592	Occasional thin SILT and SAND lenses from 25.3 to 25.8 ft.
14A	18/24 75%	SS	4-8 12-10 N=20				26			590	
15A	24/24 100%	SS	5-7 13-17 N=20				28			588	Trace wood fragments below 28 ft.
16A	23/24 96%	SS	4-7 12-16 N=19				30	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.		586	
17A	2/24 8%	SS	4-10 13-17 N=23				32			584	
18A	21/24 88%	SH					34			582	
19A	24/24 100%	SS	3-6 10-14 N=16				36			580	
20A	4/24 17%	SS	3-8 11-17 N=19				38			578	

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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
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	
21A	24/24 100%	SS	4-8 11-15 N=19				42	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. <i>[Continued from previous page]</i>		576	0.5" lignite fragment seam at 42.8 ft.	
22A	24/24 100%	SS	7-8 11-17 N=19				44			574		
23A	24/24 100%	SS	5-8 13-40 N=21				46	Dark gray (10YR4/1), moist, hard, SILT, with some to little clay and very fine- to fine-grained sand, few small to medium gravel.		572		
24A	23/24 96%	SS	22-45 35-23 N=80				48	Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand and small gravel.		570		
25A	24/24 100%	SS	7-9 14-21 N=23				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		
26A	24/24 100%	SS	3-8 15-15 N=23				52	Dark gray (10YR3/1), moist, SILT, with some very fine-grained sand seams. 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	Methane deposit encountered at approx. 51 ft.	
27A	17/24 71%	SS	12-27 13-15 N=40				54	Gray (10YR5/1), moist, dense, very fine- to medium-grained SAND, with some silt, trace small gravel.		564		
28A	24/24 100%	SS	4-9 11-13 N=20				56	Very dark grayish brown (10YR3/2), moist, hard, lean CLAY, with some silt, trace very fine-grained sand and organics.		562		
29A	24/24 100%	SS	5-9 13-12 N=22				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		
30A	24/24 100%	SS	3-4 7-14 N=11				60	Very dark grayish brown (10YR3/2), wet, SAND, with some silt. 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



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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
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	TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
							Quadrangle: Coffeen, IL	Township: East Fork Township	Section 11, Tier 7N; Range 3W	▽ = 10.90 - During Drilling	▽ =	▽ =
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
31A	24/24 100%	SS	0-4 5-7 N=9				62	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		
32A	24/24 100%	SS	4-6 8-11 N=14				64			554		
33A	24/24 100%	SH					66	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		
34A	24/24 100%	SS	5-10 22-41 N=32				68			550		
35A	24/24 100%	SS	12-24 33-45 N=57				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.		548	Trace medium gravel at 70 ft.	
36A	23/24 96%	SS	6-14 25-30 N=39				72			546		
37A	24/24 100%	SS	8-18 24-32 N=42				74			544		
38A	24/24 100%	SS	7-16 25-29 N=41				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.		542		
39A	24/24 100%	SS	7-15 20-21 N=35				78			540		
40A	19/24 79%	SS	3-5 7-10 N=12				80	Greenish gray (GLEY15/1) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very		538		

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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL	Township: East Fork Township	Section 11, Tier 7N; Range 3W	▽ = 10.90 - During Drilling	▽ =	▽ =
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
41A	22/24 92%	SS	1-5 7-11 N=12										
								82	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.		536		
42A	24/24 100%	SS	4-14 19-20 N=33										
43A													
44A	8/24 33%	SS	6-20 22-23 N=42										
45A	24/24 100%	SS	7-8 16-17 N=24										
46A	24/24 100%	SS	5-13 16-21 N=29										
47A	24/24 100%	SS	4-8 15-9 N=23										
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										
								98	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.		520		
									Greenish gray (GLEY15/1) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt and very		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

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

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

DATES: Start: 1/28/2021
Finish: 2/3/2021

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

WEATHER: Clear, cold (20s)

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL	Township: East Fork Township	Section 11, Tier 7N; Range 3W	▽ = 10.90 - During Drilling	▽ =	▽ =
						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.



FIELD BORING LOG

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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 18.80 - During Drilling ▽ = 55.90 - During Drilling ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	15/24 63%	SS	3-3 3-4 N=6						1	Gray (10YR6/1), wet, loose, GRAVEL, with some sand. [FILL]			
2A	17/24 71%	SS	3-4 4-5 N=8						2	Brown (10YR5/3), moist, stiff, lean CLAY, with some silt, trace very fine- to fine-grained sand. [FILL]			
3A	22/24 92%	SS	2-3 5-6 N=8						4	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]			
4A	20/24 83%	SS	3-4 4-5 N=8						6	Grayish brown (10YR5/2), moist, stiff, lean CLAY, with some silt, trace small gravel.			
5A	22/24 92%	SS	2-3 5-7 N=8						8	Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/4) mottles, moist, stiff, lean CLAY, with some silt, trace small gravel.			
6A	20/24 83%	SS	3-4 4-7 N=8						10	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.			
7A	20/24 83%	SS	2-3 4-5 N=7						12	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.			
8A	20/24 83%	SS	1-2 3-4 N=5						14	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	Dark gray (10YR4/1), moist, stiff, lean CLAY, with some silt.			
10A	24/24 100%	SS	0-1 1-0 N=2						18	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.			
10B	24/24 100%	SS	0-1 1-0 N=2						20	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.			
									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



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

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
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	Quadrangle: Coffeen, IL	▼ = 18.80 - During Drilling	▼ = 55.90 - During Drilling	▼ =	
							Section 11, Tier 7N; Range 3W				
							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.				
12A	24/24 100%	SS	7-12 17-24 N=29				Yellowish brown (10YR5/4), wet, fine- to medium-grained SAND. 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								
14A	22/24 92%	SS	8-17 16-22 N=33				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								
16A	22/22 100%	SS	5-25 33-50/4" N=58				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								
18A	24/24 100%	SS	4-8 10-16 N=18								
19A	24/24 100%	SS	5-8 13-15 N=21				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								

NOTE(S): G282D installed in borehole.

FIELD BORING LOG



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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
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
21A	24/24 100%	SS	4-8 11-14 N=19				42				
22A	22/24 92%	SS	3-7 8-12 N=15				44				
23A	24/24 100%	SS	3-6 9-13 N=15				46				Trace wood fragments below 45.7 ft.
24A	24/24 100%	SS	4-6 9-12 N=15				48	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]			
25A	24/24 100%	SS	4-6 12-13 N=18				50				0.5" gravel seam at 48.5 ft.
26A	24/24 100%	SS	2-7 9-13 N=16				52				
27A	24/24 100%	SS	4-7 11-14 N=18				54				
28A	24/24 100%	SS	6-12 9-18 N=21				56	Light yellowish brown (10YR6/5), moist, very fine- to medium-grained SAND, with some silt, little small to medium gravel.			
28B							56	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				58	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				60	Dark gray (10YR4/1) with 5% dark yellowish brown (10YR3/6) mottles, moist, stiff, lean CLAY, with some silt.			

NOTE(S): G282D installed in borehole.

FIELD BORING LOG



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

SAMPLE		TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL	Township: East Fork Township	Section 11, Tier 7N; Range 3W	▽ = 18.80 - During Drilling	▽ = 55.90 - During Drilling	▽ =
					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



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/18/2021
Finish: 1/18/2021

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

WEATHER: Overcast, cold (30s)

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL	Township: East Fork Township	Section 11, Tier 7N; Range 3W	▽ = 14.00 - During Drilling	▽ =	▽ =
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
1A	19/24 79%	SS	1-2 4-3 N=6								608		
1B													
2A	23/24 96%	SS	8-15 24-31 N=39								606		
3A	20/23 87%	SS	5-27 35-50/5" N=62								604		
4A	18/18 100%	SS	15-31 50/5.5"								602		
5A	19/22 86%	SS	9-29 38-50/4" N=67								600		
6A	21/24 88%	SS	12-24 25-30 N=49								598		
7A	24/24 100%	SS	14-22 32-38 N=54								596		
8A	22/24 92%	SS	6-17 12-12 N=29								594		0.5" very fine-grained SAND seam at 13.6 ft.
9A											592		
9B	24/24 100%	SS	0-8 16-19 N=24										
								18	End of boring = 18.0 feet				

NOTE(S): G283 installed in borehole.

FIELD BORING LOG



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

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
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	Very dark gray (10YR3/1), moist, very stiff, lean CLAY, some silt, few roots.			
2A	22/24 92%	SS	1-2 3-4 N=5					2	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, trace very fine-grained sand.		614	
3A	20/24 83%	SS	0-3 4-4 N=7					4	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand.		612	
4A	22/24 92%	SS	2-3 4-6 N=7					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	
5A	24/24 100%	SS	2-3 4-4 N=7					8	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	
5B								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					12	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	
7A	23/24 96%	SS	7-22 27-48 N=49					14	Yellowish brown (10YR5/4), wet, SAND, with some silt. 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. 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



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 (20s)

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: G285
Well ID: G285
Surface Elev: 610.54 ft. MSL
Completion: 26.00 ft. BGS
Station: 874,795.00N
 2,516,680.40E

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:			
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	20/24 83%	SS	0-2 3-3 N=5						1	Yellowish brown (10YR5/4), moist, stiff, lean CLAY, with some silt, few fine-grained sand.		610	
2A	18/24 75%	SS	1-3 4-6 N=7						2	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.		608	
3A	22/24 92%	SS	2-5 8-9 N=13						4	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.		606	
4A	22/24 92%	SS	3-8 12-15 N=20						6	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, hard, lean CLAY, with some silt, few very fine-grained sand and small gravel.		604	
5A	21/24 88%	SS	4-11 16-18 N=27						8	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, hard, lean CLAY, with some silt, few very fine-grained sand and small gravel.		602	
6A	23/24 96%	SS	3-8 13-17 N=21						10			600	
7A	23/24 96%	SS	4-9 12-17 N=21						12	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.		598	
8A	23/24 96%	SS	5-14 21-33 N=35						14	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.		596	
9A	23/24 96%	SS	5-7 10-15 N=17						16			594	
10A	4/24 17%	SS	4-6 12-14 N=18						18	Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine-grained sand and small gravel.		592	Sampler pushing gravel in Run 10.
									20				

NOTE(S): G285 installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler

BOREHOLE ID: G285
Well ID: G285
Surface Elev: 610.54 ft. MSL
Completion: 26.00 ft. BGS
Station: 874,795.00N
 2,516,680.40E

DATES: Start: 1/19/2021
 Finish: 1/19/2021

FIELD STAFF: Driller: Matt
 Helper: Corey
 Eng/Geo: C. Colin Winter

WEATHER: Clear, cold (20s)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
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
11A	24/24 100%	SS	4-7 9-11 N=16									590	
12A	3/24 13%	SS	4-7 8-13 N=15						22	Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine-grained sand and small gravel. [Continued from previous page]		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



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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
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	24/24 100%	SS	0-0 2-2 N=2				0	Dark grayish brown (10YR4/2), moist, medium stiff, SILT, with some clay, trace very fine-grained sand and small gravel.			
2A							2	Brown (10YR5/3), moist, stiff, SILT, with some clay, few very fine- to fine-grained sand, trace small gravel.		608	
2B	19/24 79%	SS	0-2 5-7 N=7				4	Grayish brown (10YR5/2), moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.		606	
3A	19/24 79%	SS	4-7 5-4 N=12				6	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	
4A	20/24 83%	SS	2-3 3-4 N=6				8	Gray (10YR5/1) with 10% dark yellowish brown (10YR3/6) mottles, wet, loose, SAND, with some silt and small to medium gravel, trace clay.		602	
4B											
5A	20/24 83%	SS	2-5 7-15 N=12				10	Gray (10YR5/1), moist, hard, SILT, with some very fine- to fine-grained sand, few small gravel.		600	
							End of boring = 10.0 feet				

NOTE(S): G286 installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/18/2021
Finish: 1/18/2021

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

WEATHER: Overcast, cold (30s)

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
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	12/24 50%	SS	0-1 2-3 N=3					0	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	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	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	
4A	23/24 96%	SS	2-3 3-4 N=6					6			608	
4B								7				
5A	20/24 83%	SS	2-3 7-8 N=10					8	Yellowish brown (10YR5/6) with 20% gray (10YR5/1), wet, loose, SAND, with some silt, few small gravel, trace clay.		606	
5B								9				
6A	17/22 77%	SS	3-7 15-50/4" N=22					10	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	
								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.			

End of boring = 11.8 feet

NOTE(S): G287 installed in borehole.

FIELD BORING LOG



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

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:			
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					1	Brown (10YR4/3), moist, medium stiff, SILT, with some clay, trace roots.		616	
2A	20/24 83%	SS	1-1 2-3 N=3					2			614	
2B								4	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					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					8	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					10	Light yellowish brown (10YR6/4), moist, stiff, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel.		606	
6A								12	Gray (10YR6/1), wet, medium stiff, SILT, with some very fine- to fine-grained sand, few small to medium gravel, occasional thin sand seams.		604	
6B	21/24 88%	SS	1-2 3-5 N=5					14	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.			
7A	22/24 92%	SS	5-12 19-19 N=31									

End of boring = 14.0 feet

NOTE(S): G288 installed in borehole.

FIELD BORING LOG



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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 18.60 - During Drilling ▽ = 8.00 - 1/27/2021 8am ▽ =			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	17/24 71%	SS	2-2 4-4 N=6								
2A	19/24 79%	SS	3-5 6-8 N=11								
3A	19/24 79%	SS	3-4 4-10 N=8								
4A	21/24 88%	SS	2-2 4-6 N=6								
5A	18/24 75%	SH									
6A	22/24 92%	SS	3-4 4-6 N=8								
6B											
7A	19/24 79%	SS	3-4 6-6 N=10								
8A	22/24 92%	SS	3-4 5-6 N=9								
9A	24/24 100%	SS	2-3 4-4 N=7								
10A	24/24 100%	SS	2-2 1-2 N=3								
10B											

NOTE(S):

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/26/2021
 Finish: 1/27/2021

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

WEATHER: Overcast, cold (30s)

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
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	Quadrangle: Coffeen, IL	▼ = 18.60 - During Drilling	▼ = 8.00 - 1/27/2021 8am	▼ =	
							Section 11, Tier 7N; Range 3W				
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	22/24 92%	SS	2-2 4-7 N=6				fine- to fine-grained sand and clay, few small gravel. 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.
12A	21/24 88%	SS	6-20 17-26 N=37				Gray (10YR6/1), moist, hard, SILT, with some very fine- to fine-grained sand, little clay, few small gravel. Gray (10YR6/1), wet, SILT, with some sand, little small to medium gravel.				
13A							Gray (10YR6/1), moist, hard, SILT, with some very fine- to fine-grained sand, little clay, few small gravel.				
13B	23/24 96%	SS	4-23 32-41 N=55				Gray (10YR6/1), wet, loose, very fine- to medium-grained SAND, with some silt, little small to medium gravel.				
14A	22/24 92%	SS	23-25 24-27 N=49								Trace large gravel from 27 to 28 ft.
15A	23/23 100%	SS	14-22 32-50/5" N=54				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"								Trace large gravel from 31 to 31.5 ft.
17A	11/11 100%	SS	27-50/5"								
18A	19/24 79%	SS	20-17 15-19 N=32								
19A	24/24 100%	SS	7-14 16-16 N=30				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								

NOTE(S):

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/26/2021
Finish: 1/27/2021

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

WEATHER: Overcast, cold (30s)

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
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
21A	24/24 100%	SH										
22A	24/24 100%	SS	5-13 20-22 N=33									Trace wood fragments below 42 ft.
23A	22/24 92%	SS	3-7 11-14 N=18									
24A	24/24 100%	SS	4-9 10-14 N=19						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]			
25A	23/24 96%	SS	2-5 7-10 N=12									
26A	24/24 100%	SS	4-10 12-18 N=22									
27A	24/24 100%	SS	5-9 11-15 N=20									
28A	24/24 100%	SS	3-5 7-8 N=12						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						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									Few fine- to medium-grained sand below 59 ft.

NOTE(S):

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/26/2021
Finish: 1/27/2021

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

WEATHER: Overcast, cold (30s)

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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
						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 ▽ =					
End of boring = 60.0 feet													

NOTE(S):

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/9/2021
 Finish: 2/9/2021

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

WEATHER: Overcast, very cold (10s)

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL	Township: East Fork Township	Section 11, Tier 7N; Range 3W	▽ = 12.80 - During Drilling	▽ =	▽ =
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
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	20/24 83%	SS	4-7 3-8 N=10										
7B													
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"										

NOTE(S): G307D installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/9/2021
 Finish: 2/9/2021

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

WEATHER: Overcast, very cold (10s)

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
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	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Quadrangle: Coffeen, IL	Township: East Fork Township	▽ = 12.80 - During Drilling ▽ = ▽ =		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	8/8 100%	SS	35-50/2"							602	Little sand below 20 ft.
12A	8/9 89%	SS	30-50/3"							600	
13A	17/17 100%	SS	23-39 50/5"							598	
14A	9/9 100%	SS	38-50/3"							596	
15A	23/23 100%	SS	31-44 34-50/5" N=78				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]			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"							592	
17A	10/10 100%	SS	34-50/4"							590	
18A	11/11 100%	SS	31-50/5"							588	
19A	17/17 100%	SS	28-44 50/5"							586	
20A	24/24 100%	SS	14-19 13-24 N=32				Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, little to few very fine- to fine-grained sand, few small gravel.			584	

NOTE(S): G307D installed in borehole.

FIELD BORING LOG



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

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
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	Quadrangle: Coffeen, IL	Township: East Fork Township	Section 11, Tier 7N; Range 3W	▽ = 12.80 - During Drilling	▽ =	▽ =
						Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks		
21A	24/24 100%	SS	7-8 12-15 N=20							582	Trace medium gravel below 40 ft.	
22A	20/24 83%	SH								580		
23A	24/24 100%	SS	6-8 10-12 N=18							578		
24A	24/24 100%	SS	5-6 10-12 N=16				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]			576		
25A	24/24 100%	SS	3-6 11-11 N=17							574	Trace wood fragments below 48.5 ft.	
26A	24/24 100%	SS	3-7 9-10 N=16							572		
27A	16/24 67%	SS	4-7 11-9 N=18							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				Greenish gray (GLEYS/6) 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				Yellowish brown (10YR5/6) with 30% greenish gray (GLEYS/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				Yellowish brown (10YR5/6) with 20% greenish gray (GLEYS/1) and 5% very dark grayish brown (10YR3/2) mottles, moist, stiff, lean CLAY, with some silt, trace small gravel.			564	Large wood fragment	

NOTE(S): G307D installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/9/2021
Finish: 2/9/2021

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

WEATHER: Overcast, very cold (10s)

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 12.80 - During Drilling ▽ = ▽ =	Borehole Detail	Elevation ft. MSL	Remarks

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



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

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 13.00 - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	16/24 67%	SS	2-2 2-3 N=4						0	Grayish brown (10YR5/2), moist, stiff, lean CLAY, with some silt, trace roots.		620	
2A	19/24 79%	SS	0-2 3-5 N=5						2	Brown (10YR5/3) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace roots.		618	
3A	17/24 71%	SS	2-4 5-6 N=9						4			616	
4A	23/24 96%	SS	1-4 5-6 N=9						6	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.		614	
5A	22/24 92%	SS	2-4 6-7 N=10						8	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	
6A	21/24 88%	SS	2-3 4-5 N=7						10	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	
7A	24/24 100%	SS	2-3 4-6 N=7						12			608	
8A	19/22 86%	SS	4-12 33-50/4" N=45						14	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.		606	
End of boring = 15.8 feet													

NOTE(S): G308 installed in borehole.

FIELD BORING LOG



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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 16.00 - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	13/24 54%	SS	2-4 3-3 N=7						0	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	Black (10YR2/1), moist, very loose, ASH. [FILL]		620	
3A	17/24 71%	SS	3-2 2-4 N=4						4	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	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	
5A	23/24 96%	SS	2-3 4-5 N=7						8	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.		614	
6A	22/24 92%	SS	1-2 3-5 N=5						10	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	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	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	
9A	8/24 33%	SS	5-12 24-22 N=36						16	Pale brown (10YR6/3), wet, hard, SILT, little very fine-grained sand, few clay and small to medium gravel.		606	
									18	Brownish yellow (10YR6/6), wet, loose, very fine- to fine-grained SAND, trace clay and small to medium gravel.			
									18	Pale brown (10YR6/3), wet, hard, SILT, little very fine-grained sand, few clay and small to medium gravel.			

Gravel plugged shoe in Run 8.

Sampler shoe lost in hole at 18 ft.

End of boring = 18.0 feet

NOTE(S): G309 installed in borehole.

FIELD BORING LOG



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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	21/24 88%	SS	2-7 4-6 N=11							Dark gray (10YR4/1), moist, very stiff, lean CLAY, with some silt, trace roots.			
1B									2	Gray (10YR6/1) with 15% yellowish brown (10YR5/6) mottles, moist, very stiff, SILT, few clay, trace roots.		618	
2A	18/24 75%	SS	2-4 4-6 N=8						4	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt.		616	
3A	23/24 96%	SS	2-3 4-5 N=7						6	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt.		614	
4A	24/24 100%	SS	2-3 5-6 N=8						8	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.		612	
5A	24/24 100%	SS	2-3 4-5 N=7						10	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.		610	
6A	24/24 100%	SS	2-3 4-4 N=7						12			608	
7A	24/24 100%	SS	0-1 2-2 N=3						14	Gray (10YR5/1), moist, medium stiff, SILT, with some clay, little very fine- to fine-grained sand, few small gravel.		606	
8A	17/23 74%	SS	8-16 26-50/5" N=42							Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, wet, hard, SILT, with some very fine-grained sand, few small gravel, trace clay.			
										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.			
										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.		604	

End of boring = 15.9 feet

NOTE(S): G310 installed in borehole.

FIELD BORING LOG



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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:				
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	TOPOGRAPHIC MAP INFORMATION:				
							Quadrangle: Coffeen, IL Township: East Fork Section 11, Tier 7N; Range 3W				
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0			618	
							2			616	
							4			614	
							6			612	
							8			610	
							10			608	
							12			606	
							14			604	

NOTE(S): G311 installed in borehole.

FIELD BORING LOG



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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:			
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	13/24 54%	SS	0-4 4-4 N=8						0	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	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						4	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			612	
5A	18/24 75%	SS	1-2 4-5 N=6						8	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.		610	
6A	24/24 100%	SS	1-3 3-4 N=6						10			608	
7A	24/24 100%	SS	2-6 12-13 N=18						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. Yellowish brown (10YR5/6), moist to wet, medium stiff, lean CLAY, with some very fine- to fine-grained sand, little silt, few small gravel.		606	
8A	24/24 100%	SS	2-6 12-13 N=18						14	Gray (10YR5/1), moist to wet, medium stiff, SILT, with some very fine- to fine-grained sand, few clay, trace small gravel.		604	
9A	24/24 100%	SS	6-15 18-22 N=33						16	Yellowish brown (10YR5/6), moist, hard, SILT, with some clay, some to little sand, few small gravel.		602	
10A	24/24 100%	SS	6-13 16-22 N=29						18	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	
									20				

NOTE(S): G311D installed in borehole.

1" wet, SAND at 13.5 ft.

Vertical fracture with very fine- to fine-grained sand from 16.9 to 18 ft.

FIELD BORING LOG



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

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
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	
11A	24/24 100%	SS	5-15 20-26 N=35				22			598		
12A	12/24 50%	SS	2-3 14-17 N=17				24			596	No oxidation below 22 ft.	
13A	24/24 100%	SS	6-11 14-20 N=25				26			594	Trace medium gravel below 24 ft.	
14A	24/24 100%	SS	4-8 11-16 N=19				28			592		
15A	24/24 100%	SH					30	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.		590		
16A	24/24 100%	SS	0-3 5-8 N=8				32			588		
17A	24/24 100%	SS	2-4 6-8 N=10				34			586		
18A	24/24 100%	SS	2-5 7-7 N=12				36			584	Gravel plugged shoe in Run 18.	
19A	13/24 54%	SS	2-7 8-11 N=15				38			582	Trace large gravel from 35 to 36 ft.	
20A	24/24 100%	SS	2-6 10-8 N=16				40			580	Trace lignite and wood fragments below 36 ft.	

NOTE(S): G311D installed in borehole.

FIELD BORING LOG



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

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
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
21A	16/24 67%	SS	3-3 6-8 N=9					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. <i>[Continued from previous page]</i>		578	
22B	24/24 100%	SS	3-4 7-8 N=11					44	Greenish gray (GLE Y15/1) with 20% dark reddish brown (10YR3/2) mottles, moist, medium stiff, lean CLAY, with some silt.		576	
23A	24/24 100%	SS	1-3 5-7 N=8					46			574	
24A	20/24 83%	SS	3-4 10-8 N=14					48	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.		572	
25A	24/24 100%	SS	3-5 8-13 N=13					50			568	
26A	24/24 100%	SS	2-5 10-12 N=15					52			566	
27A	24/24 100%	SS	2-6 10-14 N=16					54			564	Trace small gravel below 54.3 ft.
28A	24/24 100%	SS	4-7 7-11 N=14					56	Dark gray (10YR4/1) with 20% greenish gray (GLE Y15/1) and 5% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.		562	
29A	24/24 100%	SS	2-5 9-11 N=14					58	Greenish gray (GLE Y16/1) with 40% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.		560	0.5" small to medium GRAVEL.
30A	24/24 100%	SS	3-7 10-13 N=17					60	Yellowish brown (10YR5/6) with 30% greenish gray (GLE Y16/1) mottles, moist, very stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.			

NOTE(S): G311D installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 3.25" HSA w/SS sampler

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

DATES: Start: 2/5/2021
 Finish: 2/5/2021

FIELD STAFF: Driller: Matt
 Helper: Corey
Eng/Geo: C. Colin Winter

WEATHER: Clear, cold (20s)

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
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	Quadrangle: Coffeen, IL	▼ = 11.20 - During Drilling	▼ =	▼ =
						Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks

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
							End of boring = 60.0 feet				

NOTE(S): G311D installed in borehole.

FIELD BORING LOG



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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 12.70 - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	14/24 58%	SS	0-2 3-2 N=5							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							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							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							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							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							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	
7A	24/24 100%	SS	0-3 2-5 N=5							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.		604	
7B										Gray (10YR6/1) with 15% yellowish brown (10YR5/6), moist, very stiff, lean CLAY, with some silt and very fine- to fine-grained sand.			
8A	15/15 100%	SS	4-17 50/3"							Gray (10YR5/1), wet, loose, SILT, with some very fine- to fine-grained sand, few clay, trace small gravel.		602	
8B										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.			

End of boring = 15.25 feet

NOTE(S): G312 installed in borehole.

FIELD BORING LOG



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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 9.80 - During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	17/24	SS	0-2							Dark yellowish brown (10YR4/4), wet, stiff, lean CLAY, with some silt, few roots, trace small gravel.			
1B	71%		3-3 N=5							Gray (10YR6/1) with 15% yellowish brown (10YR5/6) mottles, moist, very stiff, SILT, with little clay, few roots.		610	
2A	13/24	SS	0-2 2-3 N=4							Dark gray (10YR4/1) with 5% black (10YR2/1) mottles, moist, stiff, lean CLAY, with some silt.		608	
3A	19/24	SS	2-3 5-5 N=8							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	SS	2-3 4-5 N=7							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	SS	2-5 9-12 N=14							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	21/24	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.			
6B	88%									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



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A

CONTRACTOR: Holcomb Foundation Engineering Co.
Rig mfg/model:
Drilling Method: 4.25" HSA w/SS sampler

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

DATES: Start: 2/26/2021
 Finish: 2/26/2021
WEATHER: Clear, mild (40s)

FIELD STAFF: Driller: Steve
 Helper: Jeff
Eng/Geo: C. Colin Winter

SAMPLE			TESTING				Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
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
										610	
										608	
										606	
										604	
										602	
										600	
										598	
										596	
										594	
										592	
										20	

NOTE(S): G314 installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A

CONTRACTOR: Holcomb Foundation Engineering Co.
Rig mfg/model:
Drilling Method: 4.25" HSA w/SS sampler

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

DATES: **Start:** 2/26/2021
Finish: 2/26/2021

FIELD STAFF: **Driller:** Steve
Helper: Jeff
Eng/Geo: C. Colin Winter

WEATHER: Clear, mild (40s)

SAMPLE			TESTING				Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
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					

NOTE(S): G314 installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
 Finish: 2/12/2021

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

WEATHER: Overcast, very cold (10s)

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
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	4/24 17%	SS	13-7 4-5 N=11					0	Moist, dense, small to large GRAVEL. [FILL]		610	
	1/24 4%	SS	3-4 5-5 N=9					2			608	
	24/24 100%	SS	1-3 4-5 N=7					4	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.		606	
3A	24/24 100%	SS	2-5 15-17 N=20					6			604	
4A	24/24 100%	SS	4-10 12-16 N=22					8	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.		602	
5A	24/24 100%	SS	4-5 14-18 N=19					10			600	
6A	24/24 100%	SS	3-11 14-18 N=25					12	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.		598	1" wet, SAND, with some silt at 11.6 ft.
7A	24/24 100%	SS	3-9 13-18 N=22					14			596	
8A	24/24 100%	SS	1-7 9-13 N=16					16	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						18	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	
								20				

NOTE(S): G314D installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
 Finish: 2/12/2021

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

WEATHER: Overcast, very cold (10s)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
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
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				580
16A	24/24 100%	SS	2-3 7-8 N=10					32			578	
17A	24/24 100%	SS	2-4 7-9 N=11					34			576	Trace roots below 34 ft.
18A	21/24 88%	SH						36	Gray (GLE15/), moist, stiff, lean CLAY, with some silt.		574	
								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.		572	
								40				

NOTE(S): G314D installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
 Finish: 2/12/2021

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

WEATHER: Overcast, very cold (10s)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:			
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	TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
								Quadrangle: Coffeen, IL	Township: East Fork Township	Section 11, Tier 7N; Range 3W	▽ =	During Drilling	
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
19A	24/24 100%	SS	7-12 N=12					42			570	Trace medium gravel below 41.3 ft.	
20A	24/24 100%	SS	4-8 10-14 N=18					44	Dark grayish brown (10YR4/2), moist, hard, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel and roots. <i>[Continued from previous page]</i>		568		
21A	24/24 100%	SS	3-9 13-16 N=22					46	Gray (10YR5/1), wet, dense, SAND, with some silt, few small gravel.		566		
22A	24/24 100%	SS	12-31 14-11 N=45					48	Gray (GLEYS/15) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand.		564	1" SILT, with some sand at 48.2 ft.	
22B								50			562		
23A	24/24 100%	SS	3-4 6-9 N=10					52	Yellowish brown (10YR5/6) with 20% gray (GLEYS/15) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand.		560		
24A	24/24 100%	SS	5-11 14-17 N=25					54	Yellowish brown (10YR5/6), moist, hard, lean CLAY, with some silt, little very fine- to fine-grained sand and small gravel.		558		
25A	24/24 100%	SS	4-6 11-15 N=17					56	Yellowish brown (10YR5/6) with 20% gray (GLEYS/15) mottles, moist, hard, lean CLAY, with some silt, little very fine- to fine-grained sand and small gravel.		556		
26A	20/24 83%	SS	4-5 18-30 N=23					58	Yellowish brown (10YR5/6) with 10% gray (GLEYS/15) 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.		554		
27A	20/24 83%	SS	9-22 33-33 N=55					60	Yellowish brown (10YR5/6) with 10% gray (GLEYS/15) 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		
28A	24/24 100%	SS	7-19 29-43										

NOTE(S): G314D installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
 Finish: 2/12/2021

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

WEATHER: Overcast, very cold (10s)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
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
			N=48									
29A	20/24 83%	SS	13-20 30-38 N=50					62			550	
30A	24/24 100%	SS	8-15 30-34 N=45					64	Yellowish brown (10YR5/6) with 10% gray (GLE15/) 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. <i>[Continued from previous page]</i>		548	
31A	24/24 100%	SS	5-17 28-29 N=45					66			546	
32A	24/24 100%	SS	7-18 29-43 N=47					68	Yellowish brown (10YR5/6) with 10% gray (GLE15/), 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.		544	
33A	24/24 100%	SS	5-14 32-26 N=46					70	Dark grayish brown (10YR4/2) with 5% gray (GLE15/), 5% yellowish brown (10YR5/6), and 5% light gray (10YR7/1) mottles, moist, hard, lean CLAY, with some silt, little sand and gravel.		542	
34A	24/24 100%	SS	8-17 26-38 N=43					72	Yellowish brown (10YR5/6) with 5% gray (GLE15/), 5% dark grayish brown (10YR4/2), and 5% light gray (10YR7/1) mottles.		540	
35A	24/24 100%	SS	5-12 24-24 N=36					74	Dark grayish brown (10YR4/2) with 5% gray (GLE15/), 5% yellowish brown (10YR5/6), and 5% light gray (10YR7/1) mottles.		538	
36A	24/24 100%	SS	14-24 20-33 N=44					76	Dark grayish brown (10YR4/2) with 5% gray (GLE15/), 5% yellowish brown (10YR5/6), and 5% light gray (10YR7/1) mottles.		536	
37A	24/24 100%	SS	6-14 17-31 N=31					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	
								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



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
 Finish: 2/12/2021

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

WEATHER: Overcast, very cold (10s)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
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
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	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.		528	
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.		526	
41A	24/24 100%	ss	6-10 25-33 N=35					88	Dark greenish gray (GLE Y14/1) with 5% yellowish brown (10YR5/6) mottles, moist, hard, lean CLAY, with some silt.		524	
42A	11/11 100%	ss	3-50/5"					90			522	Few very fine- to fine-grained sand below 88 ft.
43A	5/5 100%	ss	50/5"					92	Light reddish brown (2.5YR6/3) with 10% gray (GLE Y15/), dry, hard, SILT, with few clay and very fine-grained sand.		520	
44A	5/5 100%	ss	50/5"					94			518	
45A	8/8 100%	ss	49-50/2"					96			516	
46A	11/11 100%	ss	25-50/5"					98	Light reddish brown (2.5YR6/3) with 10% gray (GLE Y15/) and 5% dark yellowish brown (10YR4/6) mottles, dry, hard, SILT, with few clay and very fine-grained sand.		514	
								100			512	

NOTE(S): G314D installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
Finish: 2/12/2021

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

WEATHER: Overcast, very cold (10s)

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:			
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ =	During Drilling		
								Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks

47A	3/3 100%	☒ ss	50/3"						End of boring = 100.3 feet			
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NOTE(S): G314D installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/13/2021
Finish: 1/13/2021

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

WEATHER: Overcast, cool (40s)

SAMPLE			TESTING				TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
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	TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:		
							Quadrangle: Coffeen, IL	Township: East Fork Township	Section 11, Tier 7N; Range 3W	▽ = 13.00 - During Drilling	▽ =	▽ =
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks	
1A	15/24 63%	SS	0-2 3-2 N=5				0	Light gray (10YR7/1) with 20% brown (10YR4/3) mottles, moist, stiff, lean CLAY, with some silt, few roots.		620		
2A							2					
	9/24 38%	SS	1-1 2-2 N=3				4	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				6			616		
4A	24/24 100%	SS	1-2 2-4 N=4				8	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				10	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, lean CLAY, with some silt, few to trace small gravel.		612		
6A	19/24 79%	SS	0-2 4-5 N=6				12	Gray (10YR5/1) with 30% yellowish brown (10YR6/1) mottles, lean CLAY, with some silt, few to trace small gravel.		610	Gray (10YR6/1), SILT seam.	
7A							14					
7B	24/24 100%	SS	1-2 3-3 N=5				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.		608		
8A	21/23 91%	SS	8-16 32-50/5" N=48				15.9	Yellowish brown (10YR5/6), wet, very stiff, SILT, with some very fine- to fine-grained sand, little small to medium gravel, few clay.		606	Gravel plugged shoe in Run 8.	

End of boring = 15.9 feet

NOTE(S): G315 installed in borehole.

FIELD BORING LOG



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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 8.60 - During Drilling ▽ = 13.80 - During Drilling ▽ =			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	15/24 63%	SS	10-9 5-4 N=14								
2A	10/24 42%	SS	1-3 4-6 N=7								
3A	14/24 58%	SS	2-2 3-3 N=5								
4A	10/24 42%	SS	0-1 1-2 N=2								
5A											
5B	22/24 92%	SS	1-1 1-2 N=2								
6A	20/24 83%	SS	1-2 4-7 N=6								
7A	22/24 92%	SS	0-2 3-3 N=5								
8A	21/17 124%	SS	2-2 26-50/3" N=28								
8B											

NOTE(S): G316 installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/13/2021
 Finish: 1/14/2021

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

WEATHER: Overcast, cold (30s to 40s)

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
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	17/24 71%	SS	2-2 5-3 N=7					0			638	
2A	12/24 50%	SS	3-5 4-4 N=9					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.		636	
3A	15/24 63%	SS	1-2 3-4 N=5					4			634	
4A	11/24 46%	SS	3-5 5-4 N=10					6	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	
5A	12/24 50%	SS	3-4 4-4 N=8					8	Brownish yellow (10YR6/8) with 20% gray (10YR6/1) mottles, moist, stiff, SILT, with little fine-grained sand and small gravel.		630	
6A	4/24 17%	SS	2-2 3-4 N=5					10			628	Wood fragment plugged shoe in Run 6.
7A	14/24 58%	SS	1-3 4-3 N=7					12	Gray (10YR5/1) with 30% very dark gray (20YR3/1) mottles, moist, very stiff, lean CLAY, with some silt, trace lignite fragments and organics.		626	Gravel plugged shoe in Run 7.
7B								14	Gray (10YR5/1) with 10% yellowish brown (10YR5/4) mottles, moist, stiff, SILT, with some fine-grained sand, little small gravel.		624	
8A	20/24 83%	SS	2-2 3-4 N=5					16	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.		622	
9A	17/24 71%	SS	1-2 3-4 N=5					18	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.		620	Thin wood fragment seam at 19.4 ft.
10A	16/24 67%	SS	0-2 5-5 N=7					20				

NOTE(S): G317 installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/13/2021
 Finish: 1/14/2021

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

WEATHER: Overcast, cold (30s to 40s)

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:			WATER LEVEL INFORMATION:				
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	Quadrangle: Coffeen, IL	Township: East Fork Township	Section 11, Tier 7N; Range 3W	▽ = 34.00 - During Drilling	▽ =	▽ =
						Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks			
11A	16/24 67%	SS	3-5 6-11 N=11					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]		618			
12A	21/24 88%	SS	4-4 7-9 N=11					Gray (10YR5/1) moist, SILT, with some clay.		616			
13A	18/24 75%	SS	3-5 7-11 N=12					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.		614			
14A	20/24 83%	SS	2-5 7-9 N=12					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.		612			
15A	19/24 79%	SS	2-4 6-8 N=10					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.		610			
16A	24/24 100%	SS	1-5 7-9 N=12					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.		608			
17A	24/24 100%	SS	2-4 6-7 N=10					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.		606			
18A	24/24 100%	SS	0-1 14-34 N=15					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.		604			Sampler full in Run 18.
18B	24/24 100%	SS	0-1 14-34 N=15					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.		604			
						36	End of boring = 36.0 feet						

NOTE(S): G317 installed in borehole.

FIELD BORING LOG



CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/8/2021
 Finish: 2/8/2021

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

WEATHER: Overcast, very cold (10s)

SAMPLE			TESTING			TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:					
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 5.00 - Approx. During Drilling ▽ = ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	19/24 79%	SS	11-20 21-13 N=41						2	Black (10YR2/1), moist, BOTTOM ASH, fine- to coarse-grained, cohesionless. [FILL]		630	
2A	24/24 100%	SS	3-6 8-6 N=14						4	Black (10YR2/1), moist, BOTTOM ASH, very fine- to fine-grained, cohesive. [FILL]		628	
3A	0/24 0%	SH							6			626	
4A	24/24 100%	SS	1-5 7-8 N=12						8			624	
5A	19/24 79%	SS	1-1 1-6 N=2						10	Black (10YR2/1), wet, BOTTOM ASH, fine- to coarse-grained. [FILL]		622	
6A	15/24 63%	SS	4-5 4-4 N=9						12			620	
7A	18/24 75%	SS	1-3 5-6 N=8						14	Gray (10YR5/1) with 20% yellowish brown (10YR5/6), moist, stiff, lean CLAY, some silt, trace very fine grained sand.		618	

End of boring = 14.0 feet

NOTE(S): XPW01 installed in borehole.

FIELD BORING LOG



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

SAMPLE		TESTING				TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:			
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	Quadrangle: Coffeen, IL Township: East Fork Township Section 11, Tier 7N; Range 3W	▽ = 6.00 - During Drilling ▽ = ▽ =			
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	19/24 79%	SS	5-5 10-15 N=15							636	
2A	21/24 88%	SS	5-14 17-18 N=31				Black (10YR2/1), moist, BOTTOM ASH, fine- to coarse-grained, cohesionless. [FILL]			634	
3A	24/24 100%	SS	4-13 15-14 N=28							632	
	24/24 100%	SS	4-9 13-15 N=22							630	
5A	22/24 92%	SS	3-4 7-12 N=11							628	
6A	23/24 96%	SS	1-9 14-14 N=23				Black (10YR2/1), wet, BOTTOM ASH, fine- to coarse-grained, cohesionless. [FILL]			626	
7A	24/24 100%	SS	5-7 7-7 N=14							624	
8A	21/24 88%	SS	4-4 5-4 N=9							622	
9A	24/24 100%	SS	0-1 1-2 N=2							620	
9B							Dark gray (10YR4/1), moist, very soft, SILT, some clay.				
							18	End of boring = 18.0 feet			

NOTE(S): XPW02 installed in borehole.

WELL CONSTRUCTION LOGS



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Rows include: Top of Protective Casing (624.16, -3.22), Top of Riser Pipe (623.81, -2.87), Ground Surface (620.94, 0.00), Top of Annular Sealant (618.94, 2.00), Static Water Level (After Completion), Top of Seal (590.59, 30.35), Top of Sand Pack (589.62, 31.32), Top of Screen (589.06, 31.88), Bottom of Screen (579.42, 41.52), Bottom of Well (579.02, 41.92), Bottom of Borehole (578.94, 42.00).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (34.75 feet), Bottom of Screen to End Cap (0.40 feet), Screen Length (1st slot to last slot) (9.64 feet), Total Length of Casing (44.79 feet), Screen Slot Size ** (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well cross-section. Rows include: Top of Protective Casing (625.53, -3.62), Top of Riser Pipe (625.24, -3.33), Ground Surface (621.91, 0.00), Top of Annular Sealant (619.91, 2.00), Static Water Level (After Completion), Top of Seal (582.34, 39.57), Top of Sand Pack (581.21, 40.70), Top of Screen (580.30, 41.61), Bottom of Screen (570.65, 51.26), Bottom of Well (570.26, 51.65), Bottom of Borehole (569.91, 52.00).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (44.94 feet), Bottom of Screen to End Cap (0.39 feet), Screen Length (1st slot to last slot) (9.65 feet), Total Length of Casing (54.98 feet), Screen Slot Size ** (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

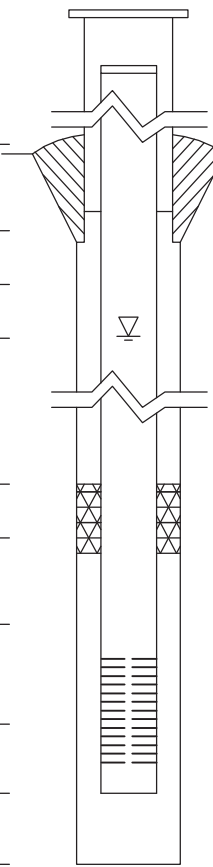
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>627.89</u>	<u>-2.62</u>	Top of Protective Casing
	<u>627.60</u>	<u>-2.33</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>625.27</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>622.27</u>	<u>3.00</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>617.96</u>	<u>7.31</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Gravity</u>	<u>614.27</u>	<u>11.00</u>	Top of Seal
Setting Time: <u>20 min</u>	<u>612.14</u>	<u>13.13</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>	<u>609.59</u>	<u>15.68</u>	Top of Screen
Grain Size: <u>10/20</u> (sieve size)	<u>604.95</u>	<u>20.32</u>	Bottom of Screen
Installation Method: <u>Gravity</u>	<u>604.38</u>	<u>20.89</u>	Bottom of Well
Type of Backfill Material: <u>Quartz sand</u> (if applicable)			
Installation Method: <u>Gravity</u>	<u>603.35</u>	<u>21.92</u>	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

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input type="text"/>
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>



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

Table with 3 columns: Description, Elevations (MSL)*, Depths (BGS) (0.01 ft.). Includes a central diagram of a well cross-section. Rows include: Top of Protective Casing (629.45, -3.75), Top of Riser Pipe (628.96, -3.26), Ground Surface (625.70, 0.00), Top of Annular Sealant (623.70, 2.00), Static Water Level (618.67, 7.03), Top of Seal (623.70, 2.00), Top of Sand Pack (616.20, 9.50), Top of Screen (613.68, 12.02), Bottom of Screen (608.92, 16.78), Bottom of Well (608.55, 17.15), Bottom of Borehole (608.55, 17.15).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (15.28 feet), Bottom of Screen to End Cap (0.37 feet), Screen Length (4.76 feet), Total Length of Casing (20.41 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., Screen.



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

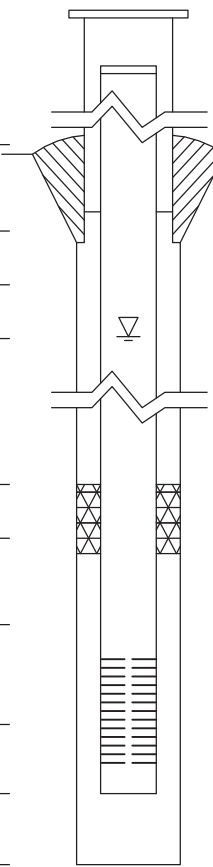
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>634.07</u>	<u>-3.08</u>	Top of Protective Casing
	<u>633.80</u>	<u>-2.81</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>630.99</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>624.93</u>	<u>6.06</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>614.00</u>	<u>16.99</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Gravity</u>	<u>618.51</u>	<u>12.48</u>	Top of Seal
Setting Time: <u>8 min</u>	<u>617.35</u>	<u>13.64</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>615.11</u>	<u>15.88</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>610.32</u>	<u>20.67</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>609.90</u>	<u>21.09</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>609.90</u>	<u>21.09</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	18.69
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



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

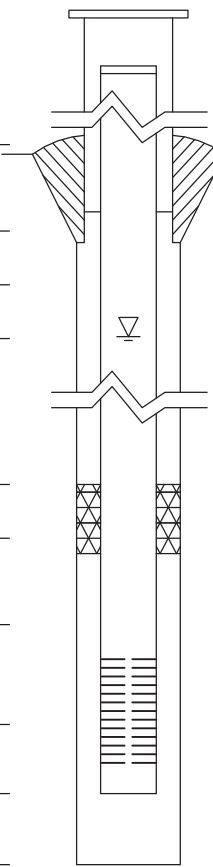
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>633.29</u>	<u>-3.17</u>	Top of Protective Casing
	<u>632.94</u>	<u>-2.82</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>630.12</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>624.92</u>	<u>5.20</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>614.72</u>	<u>15.40</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Gravity</u>	<u>619.17</u>	<u>10.95</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>617.42</u>	<u>12.70</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>	<u>615.21</u>	<u>14.91</u>	Top of Screen
Grain Size: <u>10/20</u> (sieve size)	<u>610.51</u>	<u>19.61</u>	Bottom of Screen
Installation Method: <u>Gravity</u>	<u>610.04</u>	<u>20.08</u>	Bottom of Well
Type of Backfill Material: <u>Quartz sand</u> (if applicable)			
Installation Method: <u>Gravity</u>	<u>607.92</u>	<u>22.20</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

RETURN ALL COPIES TO IDPH OR
LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

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)** **Range** 3 **(E)** **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



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

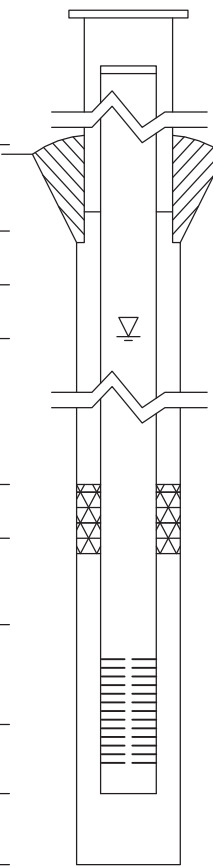
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>632.40</u>	<u>-3.14</u>	Top of Protective Casing
	<u>632.08</u>	<u>-2.82</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>629.26</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>623.80</u>	<u>5.46</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>613.18</u>	<u>16.08</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Gravity</u>	<u>616.55</u>	<u>12.71</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>615.50</u>	<u>13.76</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>613.15</u>	<u>16.11</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>608.36</u>	<u>20.90</u>	Bottom of Screen
Type of Backfill Material: <u>Quartz sand</u> (if applicable)	<u>607.89</u>	<u>21.37</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>606.80</u>	<u>22.46</u>	Bottom of Borehole



* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	<u>8.0</u>
ID of Riser Pipe	(inches)	<u>2.0</u>
Protective Casing Length	(feet)	<u>5.0</u>
Riser Pipe Length	(feet)	<u>18.93</u>
Bottom of Screen to End Cap	(feet)	<u>0.47</u>
Screen Length (1st slot to last slot)	(feet)	<u>4.79</u>
Total Length of Casing	(feet)	<u>24.19</u>
Screen Slot Size **	(inches)	<u>0.010</u>

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (17.13 feet), Bottom of Screen to End Cap (0.48 feet), Screen Length (4.69 feet), Total Length of Casing (22.30 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS

Table for well construction materials with columns for material type (SS304, SS316, PTFE, PVC, OTHER) and rows for Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.



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

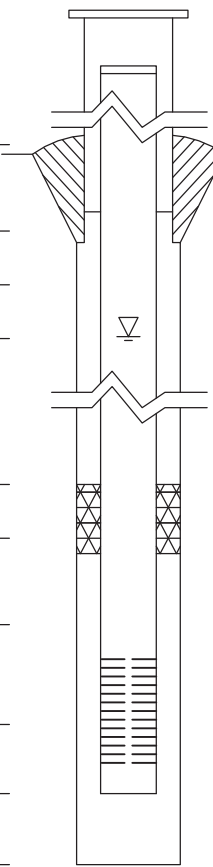
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>630.60</u>	<u>-2.81</u>	Top of Protective Casing
	<u>630.23</u>	<u>-2.44</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>627.79</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>624.08</u>	<u>3.71</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>617.39</u>	<u>10.40</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Gravity</u>	<u>617.41</u>	<u>10.38</u>	Top of Seal
Setting Time: <u>8 min</u>	<u>616.24</u>	<u>11.55</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>613.92</u>	<u>13.87</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>609.29</u>	<u>18.50</u>	Bottom of Screen
Type of Backfill Material: <u>Quartz sand</u> (if applicable)	<u>608.82</u>	<u>18.97</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>607.08</u>	<u>20.71</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

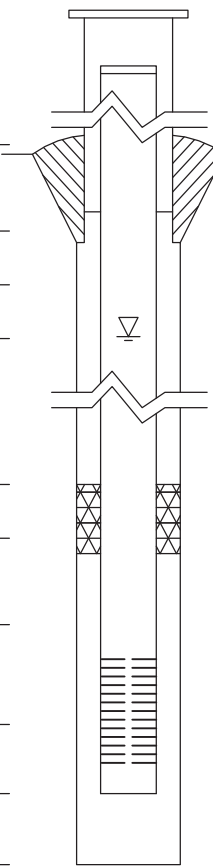
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>630.52</u>	<u>-3.02</u>	Top of Protective Casing
	<u>630.22</u>	<u>-2.72</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>627.50</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>622.50</u>	<u>5.00</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>618.57</u>	<u>8.93</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Granular</u>	<u>614.00</u>	<u>13.50</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>612.80</u>	<u>14.70</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>	<u>610.68</u>	<u>16.82</u>	Top of Screen
Grain Size: <u>10/20</u> (sieve size)			
Installation Method: <u>Gravity</u>	<u>606.00</u>	<u>21.50</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>605.50</u>	<u>22.00</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>605.50</u>	<u>22.00</u>	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

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:



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

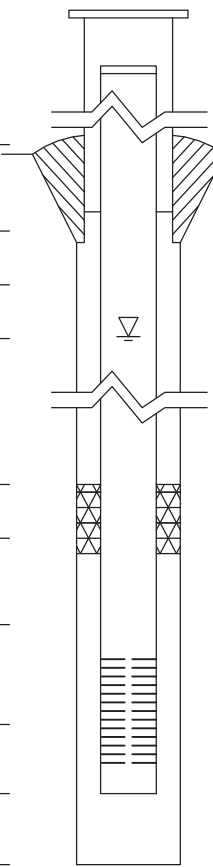
Logged By: Diane M. Lamb Date Started: 2/11/2010 Date Finished: 2/11/2010

Report Form Completed By: Diane M. Lamb Date: 2/19/2010

ANNULAR SPACE DETAILS

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>630.08</u>	<u>-2.88</u>	Top of Protective Casing
	<u>629.76</u>	<u>-2.56</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>627.20</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>621.70</u>	<u>5.50</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>618.35</u>	<u>8.85</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Granular</u>			
Setting Time: <u>10 min</u>			
Type of Sand Pack: <u>Quartz sand</u>	<u>614.90</u>	<u>12.30</u>	Top of Seal
Grain Size: <u>10/20</u> (sieve size)			
Installation Method: <u>Gravity</u>	<u>614.60</u>	<u>12.60</u>	Top of Sand Pack
Type of Backfill Material: <u>n/a</u> (if applicable)			
Installation Method: <u>n/a</u>			
	<u>611.81</u>	<u>15.39</u>	Top of Screen
	<u>607.27</u>	<u>19.93</u>	Bottom of Screen
	<u>606.70</u>	<u>20.50</u>	Bottom of Well
	<u>606.70</u>	<u>20.50</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well cross-section. Rows include: Top of Protective Casing (629.96, -2.94), Top of Riser Pipe (629.65, -2.63), Ground Surface (627.02, 0.00), Top of Annular Sealant (621.86, 5.16), Static Water Level (617.52, 9.50), Top of Seal (615.46, 11.56), Top of Sand Pack (614.06, 12.96), Top of Screen (611.97, 15.05), Bottom of Screen (607.43, 19.59), Bottom of Well (606.86, 20.16), Bottom of Borehole (606.86, 20.16).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (17.68 feet), Bottom of Screen to End Cap (0.57 feet), Screen Length (4.54 feet), Total Length of Casing (22.79 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., Screen.



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

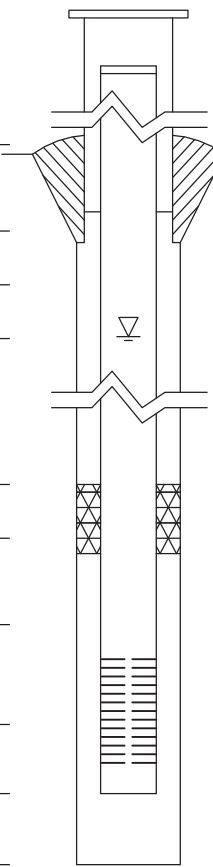
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>630.19</u>	<u>-2.95</u>	Top of Protective Casing
	<u>629.90</u>	<u>-2.66</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>627.24</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>622.52</u>	<u>4.72</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>616.74</u>	<u>10.50</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Granular</u>	<u>616.41</u>	<u>10.83</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>614.52</u>	<u>12.72</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>612.63</u>	<u>14.61</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>608.09</u>	<u>19.15</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>607.52</u>	<u>19.72</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>607.52</u>	<u>19.72</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

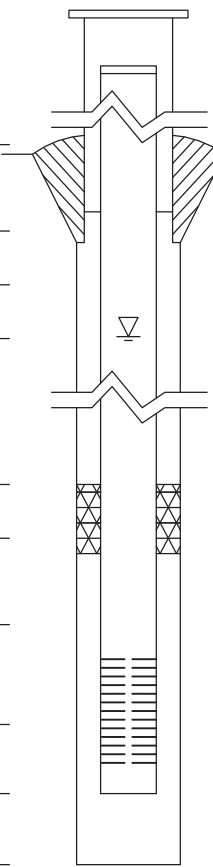
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>631.85</u>	<u>-3.00</u>	Top of Protective Casing
	<u>631.55</u>	<u>-2.70</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>628.85</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>623.57</u>	<u>5.28</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>617.59</u>	<u>11.26</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Gravity</u>	<u>614.87</u>	<u>13.98</u>	Top of Seal
Setting Time: <u>15 min</u>	<u>613.57</u>	<u>15.28</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>611.56</u>	<u>17.29</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>607.02</u>	<u>21.83</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>606.47</u>	<u>22.38</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>606.47</u>	<u>22.38</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:

CASING MEASUREMENTS

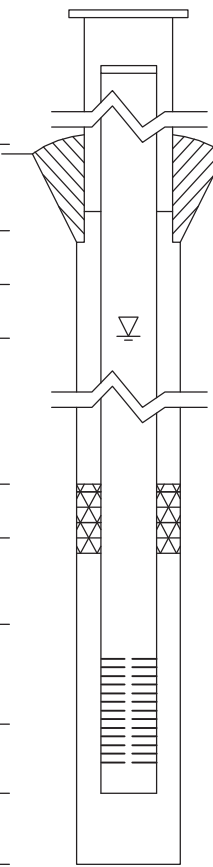
Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	19.99
Bottom of Screen to End Cap	(feet)	0.55
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	25.08
Screen Slot Size **	(inches)	0.010



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

Table with 3 columns: Description, Elevations (MSL)*, Depths (BGS) (0.01 ft.). Includes data for Top of Protective Casing, Top of Riser Pipe, Ground Surface, Top of Annular Sealant, Static Water Level, Top of Seal, Top of Sand Pack, Top of Screen, Bottom of Screen, Bottom of Well, and Bottom of Borehole.



* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Includes Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (17.67 feet), Bottom of Screen to End Cap (0.59 feet), Screen Length (4.52 feet), Total Length of Casing (22.78 feet), and Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.



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

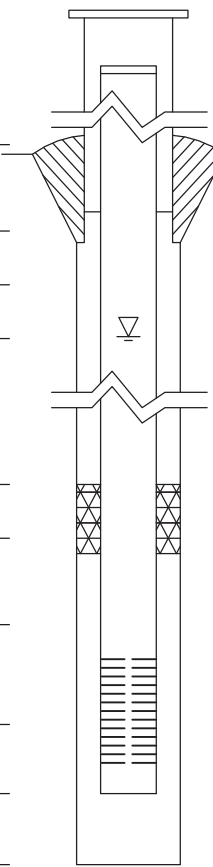
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>633.14</u>	<u>-3.57</u>	Top of Protective Casing
	<u>632.83</u>	<u>-3.26</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>629.57</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>624.41</u>	<u>5.16</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>615.13</u>	<u>14.44</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Gravity</u>	<u>616.81</u>	<u>12.76</u>	Top of Seal
Setting Time: <u>7 min</u>	<u>615.49</u>	<u>14.08</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>612.78</u>	<u>16.79</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>608.10</u>	<u>21.47</u>	Bottom of Screen
Type of Backfill Material: <u>Quartz sand</u> (if applicable)	<u>607.62</u>	<u>21.95</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>605.41</u>	<u>24.16</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

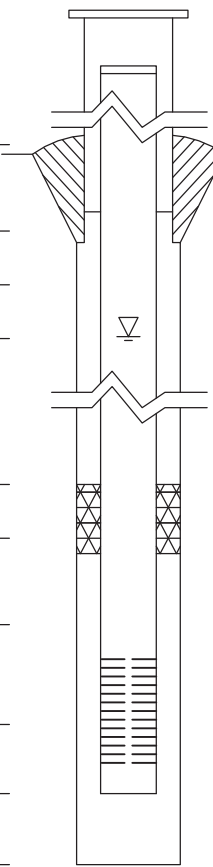
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>632.98</u>	<u>-3.12</u>	Top of Protective Casing
	<u>632.69</u>	<u>-2.83</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>629.86</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>625.01</u>	<u>4.85</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>617.02</u>	<u>12.84</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Gravity</u>	<u>617.01</u>	<u>12.85</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>615.41</u>	<u>14.45</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>	<u>613.35</u>	<u>16.51</u>	Top of Screen
Grain Size: <u>10/20</u> (sieve size)			
Installation Method: <u>Gravity</u>	<u>608.81</u>	<u>21.05</u>	Bottom of Screen
Type of Backfill Material: <u>Quartz sand</u> (if applicable)	<u>608.20</u>	<u>21.66</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>608.01</u>	<u>21.85</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

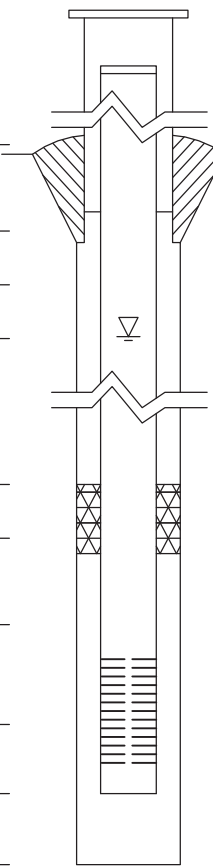
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>633.29</u>	<u>-3.16</u>	Top of Protective Casing
	<u>632.96</u>	<u>-2.83</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>630.13</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>625.06</u>	<u>5.07</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>614.15</u>	<u>15.98</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Gravity</u>	<u>612.31</u>	<u>17.82</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>611.14</u>	<u>18.99</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>609.19</u>	<u>20.94</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>604.67</u>	<u>25.46</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>604.06</u>	<u>26.07</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>604.06</u>	<u>26.07</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

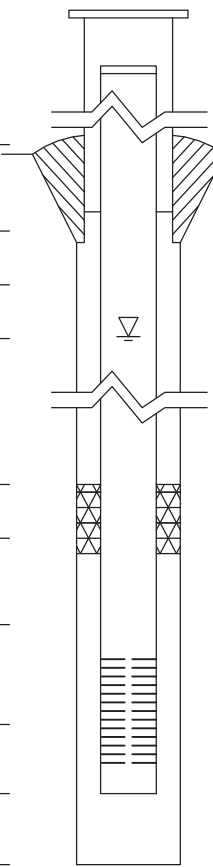
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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.)
	<u>633.70</u>	<u>-3.28</u>	Top of Protective Casing
	<u>633.39</u>	<u>-2.97</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>630.42</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>625.45</u>	<u>4.97</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>619.43</u>	<u>10.99</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Gravity</u>	<u>618.34</u>	<u>12.08</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>616.50</u>	<u>13.92</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>614.44</u>	<u>15.98</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>609.91</u>	<u>20.51</u>	Bottom of Screen
Type of Backfill Material: <u>Quartz sand</u> (if applicable)	<u>609.36</u>	<u>21.06</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>608.45</u>	<u>21.97</u>	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)	0.55
Screen Length (1st slot to last slot)	(feet)	4.53
Total Length of Casing	(feet)	24.03
Screen Slot Size **	(inches)	0.010

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

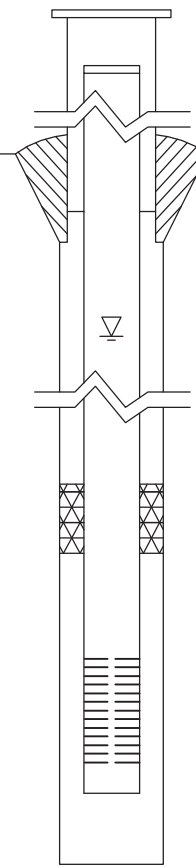
Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.)



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

CASING MEASUREMENTS table with 3 columns: Measurement, Unit, Value

WELL CONSTRUCTION MATERIALS

Table for Well Construction Materials with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER



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

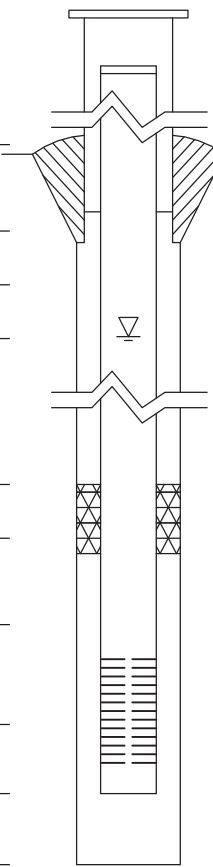
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>625.69</u>	<u>-2.73</u>	Top of Protective Casing
	<u>625.39</u>	<u>-2.43</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>622.96</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>619.96</u>	<u>3.00</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>614.14</u>	<u>8.82</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Granular</u>	<u>613.96</u>	<u>9.00</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>612.86</u>	<u>10.10</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>610.07</u>	<u>12.89</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>605.53</u>	<u>17.43</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>604.96</u>	<u>18.00</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>604.96</u>	<u>18.00</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

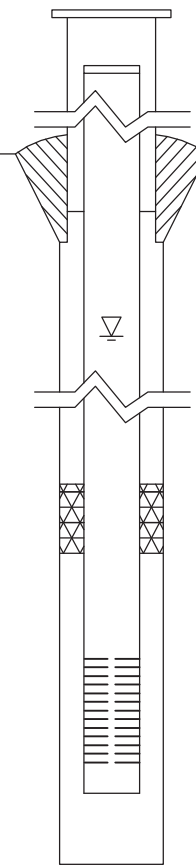
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>626.24</u>	<u>-3.42</u>	Top of Protective Casing
	<u>625.93</u>	<u>-3.11</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>622.82</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>620.49</u>	<u>2.33</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>615.03</u>	<u>7.79</u>	Static Water Level (After Completion) 12/21/2011
Installation Method: <u>Gravity</u>	<u>611.82</u>	<u>11.00</u>	Top of Seal
Setting Time: <u>24 min</u>	<u>609.07</u>	<u>13.75</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>	<u>607.48</u>	<u>15.34</u>	Top of Screen
Grain Size: <u>10/20</u> (sieve size)	<u>602.98</u>	<u>19.84</u>	Bottom of Screen
Installation Method: <u>Gravity</u>	<u>602.36</u>	<u>20.46</u>	Bottom of Well
Type of Backfill Material: <u>n/a</u> (if applicable)			
Installation Method: <u>n/a</u>	<u>602.36</u>	<u>20.46</u>	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

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input type="text"/>
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Key data points include: Top of Protective Casing (626.67 MSL, -3.61 BGS), Top of Riser Pipe (626.52 MSL, -3.46 BGS), Ground Surface (623.06 MSL, 0.00 BGS), Top of Annular Sealant (621.06 MSL, 2.00 BGS), Static Water Level (606.06 MSL, 17.00 BGS), Top of Seal (621.06 MSL, 2.00 BGS), Top of Sand Pack (611.56 MSL, 11.50 BGS), Top of Screen (609.47 MSL, 13.59 BGS), Bottom of Screen (604.97 MSL, 18.09 BGS), Bottom of Well (604.49 MSL, 18.57 BGS), Bottom of Borehole (604.49 MSL, 18.57 BGS).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (17.05 feet), Bottom of Screen to End Cap (0.48 feet), Screen Length (4.50 feet), Total Length of Casing (22.03 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.



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

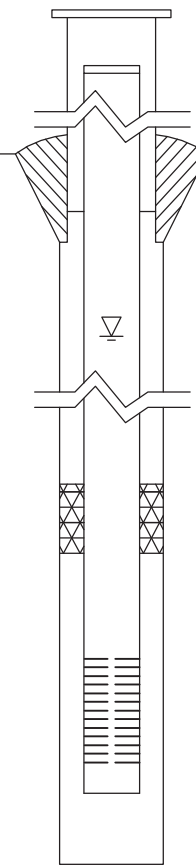
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>626.59</u>	<u>-3.29</u>	Top of Protective Casing
	<u>626.35</u>	<u>-3.05</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>623.30</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>622.63</u>	<u>0.67</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>605.75</u>	<u>17.55</u>	Static Water Level (After Completion) 12/21/2011
Installation Method: <u>Gravity</u>			
Setting Time: <u>>24 hr.</u>			
Type of Sand Pack: <u>Quartz sand</u>	<u>610.30</u>	<u>13.00</u>	Top of Seal
Grain Size: <u>10/20</u> (sieve size)	<u>608.30</u>	<u>15.00</u>	Top of Sand Pack
Installation Method: <u>Gravity</u>			
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>607.40</u>	<u>15.90</u>	Top of Screen
Installation Method: <u>n/a</u>	<u>602.96</u>	<u>20.34</u>	Bottom of Screen
	<u>602.54</u>	<u>20.76</u>	Bottom of Well
	<u>602.54</u>	<u>20.76</u>	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

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input type="text"/>
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

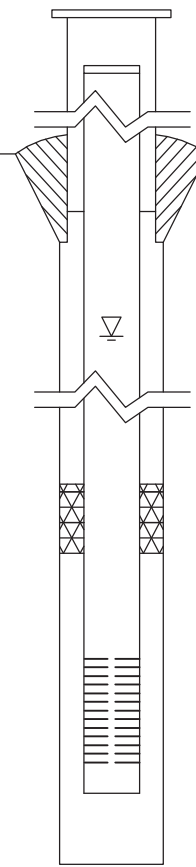
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>626.07</u>	<u>-3.18</u>	Top of Protective Casing
	<u>625.86</u>	<u>-2.97</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>622.89</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>621.39</u>	<u>1.50</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>614.99</u>	<u>7.90</u>	Static Water Level (After Completion) 12/21/2011
Installation Method: <u>Gravity</u>	<u>611.89</u>	<u>11.00</u>	Top of Seal
Setting Time: <u>27 min</u>	<u>609.14</u>	<u>13.75</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>607.80</u>	<u>15.09</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>603.31</u>	<u>19.58</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>602.66</u>	<u>20.23</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>602.66</u>	<u>20.23</u>	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: <input type="text"/>
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>

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



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

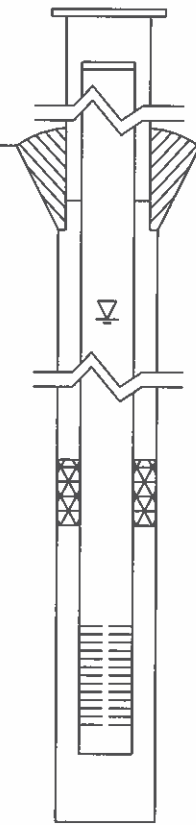
Drilling Method: Hollow stem auger Drilling Fluid (Type): _____

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

Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
<u>626.54</u>	<u>-2.34</u>	Top of Protective Casing
<u>625.94</u>	<u>-1.74</u>	Top of Riser Pipe
<u>624.20</u>	<u>0.00</u>	Ground Surface
<u>620.70</u>	<u>3.50</u>	Top of Annular Sealant
<u>621.45</u>	<u>2.75</u>	Static Water Level (After Completion) 3/12/2008
<u>620.70</u>	<u>3.50</u>	Top of Seal
<u>614.20</u>	<u>10.00</u>	Top of Sand Pack
<u>612.01</u>	<u>12.19</u>	Top of Screen
<u>607.22</u>	<u>16.98</u>	Bottom of Screen
<u>606.84</u>	<u>17.36</u>	Bottom of Well
<u>606.20</u>	<u>18.00</u>	Bottom of Borehole



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

* 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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:



Site #: _____ County: Montgomery Well #: G201

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G201

State- Plant
Plane 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

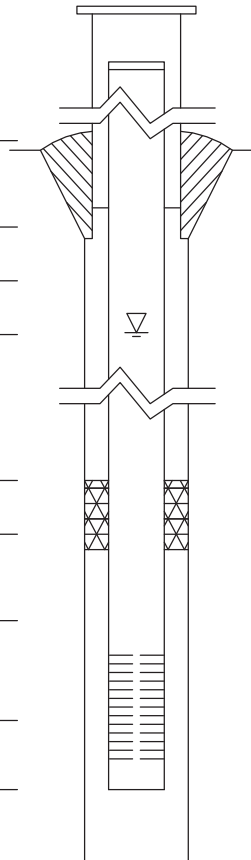
Drilling Method: Hollow stem auger Drilling Fluid (Type): _____

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>627.66</u>	<u>-3.76</u>	Top of Protective Casing
	<u>627.12</u>	<u>-3.22</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>623.90</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>Bentonite chips</u>	<u>620.60</u>	<u>3.30</u>	Top of Annular Sealant
Installation Method: <u>Gravity</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>621.73</u>	<u>2.17</u>	Static Water Level (After Completion) 3/12/2008
Installation Method: <u>Gravity</u>	<u>620.60</u>	<u>3.30</u>	Top of Seal
Setting Time: <u>>24 hr.</u>	<u>611.80</u>	<u>12.10</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>610.89</u>	<u>13.01</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>606.10</u>	<u>17.80</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>605.75</u>	<u>18.15</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>605.75</u>	<u>18.15</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

RETURN ALL COPIES TO IDPH OR
LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

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



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

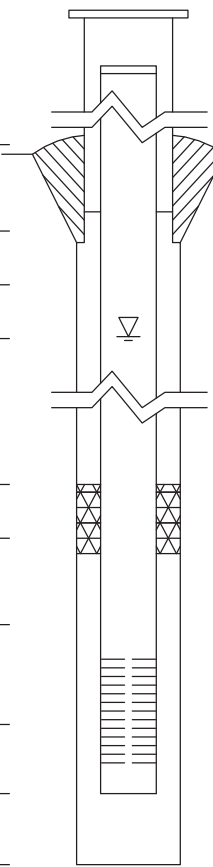
Drilling Method: Hollow stem auger Drilling Fluid (Type): _____

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>624.87</u>	<u>-2.72</u>	Top of Protective Casing
	<u>624.45</u>	<u>-2.30</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>622.15</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>Bentonite chips</u>	<u>619.95</u>	<u>2.20</u>	Top of Annular Sealant
Installation Method: <u>Gravity</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>617.09</u>	<u>5.06</u>	Static Water Level (After Completion) 3/12/2008
Installation Method: <u>Gravity</u>	<u>619.95</u>	<u>2.20</u>	Top of Seal
Setting Time: <u>>24 hr.</u>	<u>613.35</u>	<u>8.80</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>612.11</u>	<u>10.04</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>607.62</u>	<u>14.53</u>	Bottom of Screen
Type of Backfill Material: <u>Formation Sand</u> (if applicable)	<u>607.08</u>	<u>15.07</u>	Bottom of Well
Installation Method: <u>Slough</u>	<u>606.15</u>	<u>16.00</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	12.34
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

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
 DIVISION OF ENVIRONMENTAL HEALTH
 525 W. JEFFERSON ST.
 SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

RETURN ALL COPIES TO IDPH OR
 LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

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 Coffeen Montgomery
Address - Lot Number **City** **County**

General Description **Township** 7 **(N)** **Range** 3 **(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 **from** 0 **to** 16.0 **ft.**
(cement or other materials)

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.**

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**

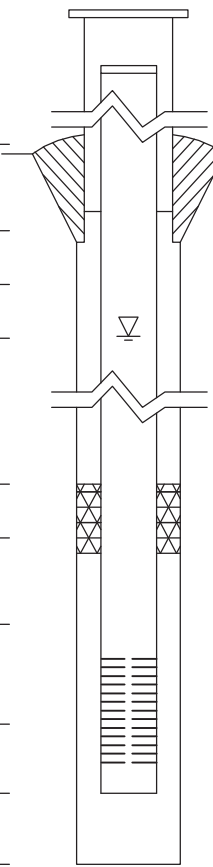
This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631



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

Table with 3 columns: Description, Elevations (MSL)*, Depths (BGS) (0.01 ft.). Includes data for Top of Protective Casing, Top of Riser Pipe, Ground Surface, Top of Annular Sealant, Static Water Level, Top of Seal, Top of Sand Pack, Top of Screen, Bottom of Screen, Bottom of Well, and Bottom of Borehole.



* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>633.37</u>	<u>-2.76</u>	Top of Protective Casing
	<u>633.21</u>	<u>-2.60</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>630.61</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>628.61</u>	<u>2.00</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>612.86</u>	<u>17.75</u>	Static Water Level (After Completion) 11/15/2010
Installation Method: <u>Gravity</u>			
Setting Time: <u>15 min</u>			
Type of Sand Pack: <u>Quartz sand</u>	<u>614.76</u>	<u>15.85</u>	Top of Seal
Grain Size: <u>10/20</u> (sieve size)	<u>613.63</u>	<u>16.98</u>	Top of Sand Pack
Installation Method: <u>Gravity</u>			
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>612.37</u>	<u>18.24</u>	Top of Screen
Installation Method: <u>n/a</u>			
	<u>607.84</u>	<u>22.77</u>	Bottom of Screen
	<u>607.31</u>	<u>23.30</u>	Bottom of Well
	<u>606.61</u>	<u>24.00</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

Table with 3 columns: Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (633.43, -2.86), Top of Riser Pipe (633.16, -2.59), Ground Surface (630.57, 0.00), Top of Annular Sealant (627.77, 2.80), Static Water Level (614.76, 15.81), Top of Seal (616.07, 14.50), Top of Sand Pack (613.90, 16.67), Top of Screen (613.04, 17.53), Bottom of Screen (608.51, 22.06), Bottom of Well (607.97, 22.60), Bottom of Borehole (606.57, 24.00).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material type (Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., Screen) and 5 options (SS304, SS316, PTFE, PVC, OTHER: Steel/PVC).

CASING MEASUREMENTS

Table with 3 columns: Measurement (Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, Screen Slot Size), Unit, and Value.



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well cross-section. Rows include: Top of Protective Casing (633.17, -2.69), Top of Riser Pipe (632.99, -2.51), Ground Surface (630.48, 0.00), Top of Annular Sealant (627.48, 3.00), Static Water Level (615.38, 15.10), Top of Seal (614.03, 16.45), Top of Sand Pack (612.98, 17.50), Top of Screen (611.09, 19.39), Bottom of Screen (606.55, 23.93), Bottom of Well (606.02, 24.46), Bottom of Borehole (605.48, 25.00).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (21.90 feet), Bottom of Screen to End Cap (0.53 feet), Screen Length (4.54 feet), Total Length of Casing (26.97 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

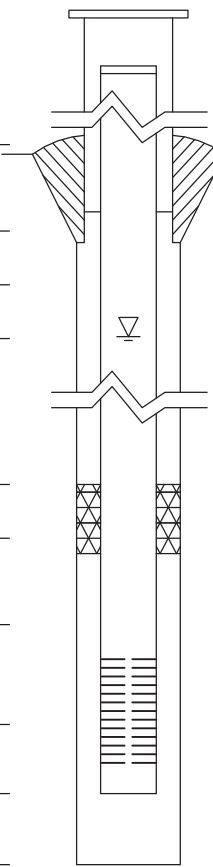
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>632.83</u>	<u>-2.52</u>	Top of Protective Casing
	<u>632.64</u>	<u>-2.33</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>630.31</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>627.31</u>	<u>3.00</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>616.17</u>	<u>14.14</u>	Static Water Level (After Completion) 11/15/2010
Installation Method: <u>Gravity</u>	<u>616.01</u>	<u>14.30</u>	Top of Seal
Setting Time: <u>15 min</u>	<u>614.91</u>	<u>15.40</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>612.97</u>	<u>17.34</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>608.43</u>	<u>21.88</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>607.90</u>	<u>22.41</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>606.31</u>	<u>24.00</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

Table with 3 columns: Description, Elevations (MSL)*, Depths (BGS) (0.01 ft.). Includes a central diagram of a well cross-section. Data points include: Top of Protective Casing (633.12, -2.53), Top of Riser Pipe (632.89, -2.30), Ground Surface (630.59, 0.00), Top of Annular Sealant (627.59, 3.00), Static Water Level (616.10, 14.49), Top of Seal (616.89, 13.70), Top of Sand Pack (615.79, 14.80), Top of Screen (613.85, 16.74), Bottom of Screen (609.30, 21.29), Bottom of Well (608.78, 21.81), Bottom of Borehole (606.59, 24.00).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (19.04 feet), Bottom of Screen to End Cap (0.52 feet), Screen Length (4.55 feet), Total Length of Casing (24.11 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., Screen.



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

Table with 3 columns: Description, Elevations (MSL)*, Depths (BGS) (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Key data points include: Top of Protective Casing (633.08 MSL, -2.74 BGS), Ground Surface (630.34 MSL, 0.00 BGS), Static Water Level (615.01 MSL, 15.33 BGS), Top of Screen (613.59 MSL, 16.75 BGS), Bottom of Well (608.52 MSL, 21.82 BGS).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table for well construction materials with columns for material type (SS304, SS316, PTFE, PVC, OTHER) and selection status. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table for casing measurements with columns for measurement (Diameter of Borehole, ID of Riser Pipe, etc.) and value. Measurements include: Diameter of Borehole (8.0 inches), Riser Pipe Length (19.22 feet), Total Length of Casing (24.29 feet), and Screen Slot Size (0.010 inches).



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

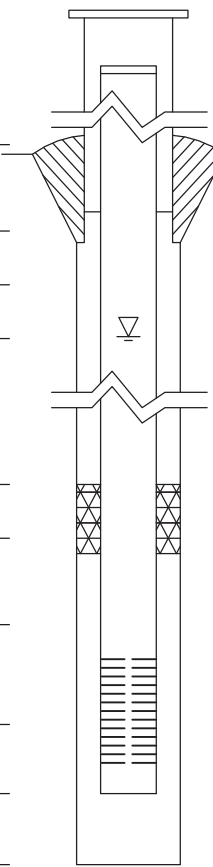
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>633.08</u>	<u>-2.69</u>	Top of Protective Casing
	<u>632.85</u>	<u>-2.46</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>630.39</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>626.99</u>	<u>3.40</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>609.48</u>	<u>20.91</u>	Static Water Level (After Completion) 11/15/2010
Installation Method: <u>Gravity</u>			
Setting Time: <u>14 min</u>			
Type of Sand Pack: <u>Quartz sand</u>	<u>615.39</u>	<u>15.00</u>	Top of Seal
Grain Size: <u>10/20</u> (sieve size)	<u>614.34</u>	<u>16.05</u>	Top of Sand Pack
Installation Method: <u>Gravity</u>			
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>612.64</u>	<u>17.75</u>	Top of Screen
Installation Method: <u>n/a</u>	<u>608.25</u>	<u>22.14</u>	Bottom of Screen
	<u>607.74</u>	<u>22.65</u>	Bottom of Well
	<u>606.39</u>	<u>24.00</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:

CASING MEASUREMENTS

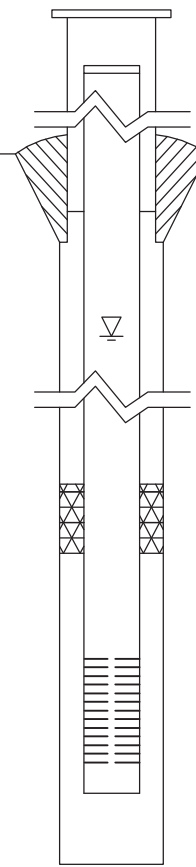
Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	20.21
Bottom of Screen to End Cap	(feet)	0.51
Screen Length (1st slot to last slot)	(feet)	4.39
Total Length of Casing	(feet)	25.11
Screen Slot Size **	(inches)	0.010



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

Table with 3 columns: Description, Elevations (MSL)*, Depths (BGS) (0.01 ft.). Includes data for Top of Protective Casing, Top of Riser Pipe, Ground Surface, Top of Annular Sealant, Static Water Level, Top of Seal, Top of Sand Pack, Top of Screen, Bottom of Screen, Bottom of Well, and Bottom of Borehole.



* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 2 columns: Measurement, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

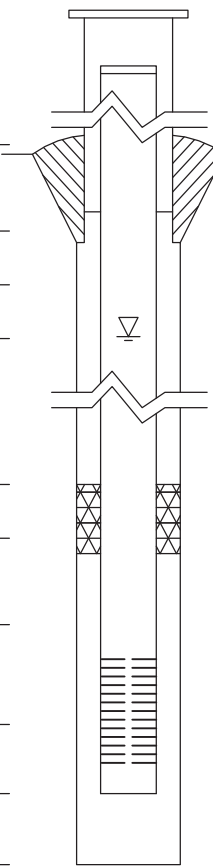
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>633.02</u>	<u>-2.74</u>	Top of Protective Casing
	<u>632.76</u>	<u>-2.48</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>630.28</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>627.78</u>	<u>2.50</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>607.52</u>	<u>22.76</u>	Static Water Level (After Completion) 11/15/2010
Installation Method: <u>Gravity</u>			
Setting Time: <u>15 min</u>			
Type of Sand Pack: <u>Quartz sand</u>	<u>613.28</u>	<u>17.00</u>	Top of Seal
Grain Size: <u>10/20</u> (sieve size)			
Installation Method: <u>Gravity</u>	<u>612.08</u>	<u>18.20</u>	Top of Sand Pack
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>610.24</u>	<u>20.04</u>	Top of Screen
Installation Method: <u>n/a</u>			
	<u>605.86</u>	<u>24.42</u>	Bottom of Screen
	<u>605.35</u>	<u>24.93</u>	Bottom of Well
	<u>604.28</u>	<u>26.00</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

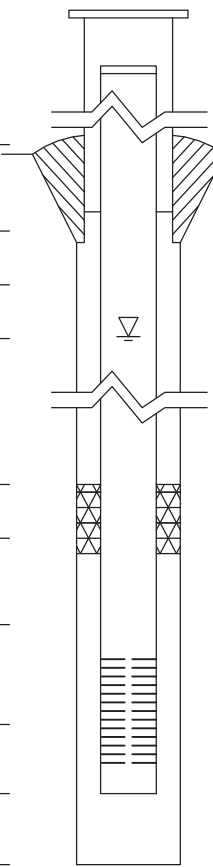
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>633.34</u>	<u>-2.67</u>	Top of Protective Casing
	<u>633.10</u>	<u>-2.43</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>630.67</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>628.27</u>	<u>2.40</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>609.28</u>	<u>21.39</u>	Static Water Level (After Completion) 11/15/2010
Installation Method: <u>Gravity</u>	<u>612.82</u>	<u>17.85</u>	Top of Seal
Setting Time: <u>11 min</u>	<u>611.82</u>	<u>18.85</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>610.18</u>	<u>20.49</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>605.79</u>	<u>24.88</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>605.29</u>	<u>25.38</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>604.67</u>	<u>26.00</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Key data points include: Top of Protective Casing (626.41 MSL, -3.49 BGS), Top of Riser Pipe (625.97 MSL, -3.05 BGS), Ground Surface (622.92 MSL, 0.00 BGS), Top of Annular Sealant (619.92 MSL, 3.00 BGS), Static Water Level (617.30 MSL, 5.62 BGS), Top of Seal (619.92 MSL, 3.00 BGS), Top of Sand Pack (610.92 MSL, 12.00 BGS), Top of Screen (609.79 MSL, 13.13 BGS), Bottom of Screen (605.00 MSL, 17.92 BGS), Bottom of Well (604.65 MSL, 18.27 BGS), Bottom of Borehole (604.65 MSL, 18.27 BGS).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (16.18 feet), Bottom of Screen to End Cap (0.35 feet), Screen Length (4.79 feet), Total Length of Casing (21.32 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.



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

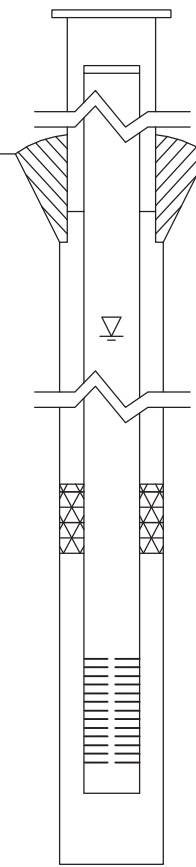
Drilling Method: Hollow stem auger Drilling Fluid (Type): _____

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>625.88</u>	<u>-2.99</u>	Top of Protective Casing
	<u>625.57</u>	<u>-2.68</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>622.89</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>619.89</u>	<u>3.00</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>610.39</u>	<u>12.50</u>	Static Water Level (After Completion) 9/21/2009
Installation Method: <u>Gravity</u>	<u>616.16</u>	<u>6.73</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>613.87</u>	<u>9.02</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>	<u>612.93</u>	<u>9.96</u>	Top of Screen
Grain Size: <u>10/20</u> (sieve size)			
Installation Method: <u>Gravity</u>	<u>608.58</u>	<u>14.31</u>	Bottom of Screen
Type of Backfill Material: <u>Quartz sand</u> (if applicable)	<u>608.10</u>	<u>14.79</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>606.89</u>	<u>16.00</u>	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

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input type="text"/>
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>



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

Elevations (MSL)* Depths (BGS) (0.01 ft.)

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

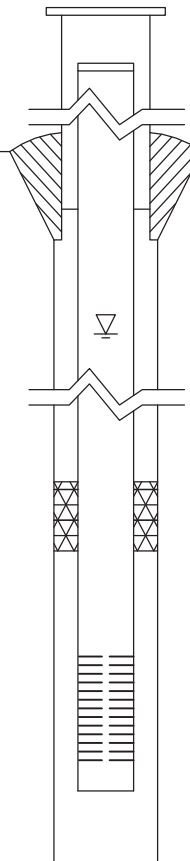
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



<u>624.11</u>	<u>-3.39</u>	Top of Protective Casing
<u>623.81</u>	<u>-3.09</u>	Top of Riser Pipe
<u>620.72</u>	<u>0.00</u>	Ground Surface
<u>617.72</u>	<u>3.00</u>	Top of Annular Sealant
<u>611.23</u>	<u>9.49</u>	Static Water Level (After Completion) 9/21/2009
<u>614.55</u>	<u>6.17</u>	Top of Seal
<u>612.74</u>	<u>7.98</u>	Top of Sand Pack
<u>611.61</u>	<u>9.11</u>	Top of Screen
<u>606.74</u>	<u>13.98</u>	Bottom of Screen
<u>606.40</u>	<u>14.32</u>	Bottom of Well
<u>606.40</u>	<u>14.32</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	12.20
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



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): _____

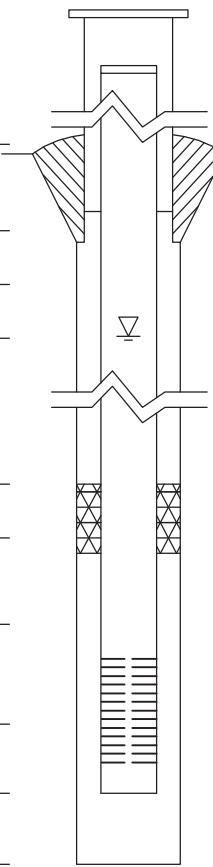
Logged By: Rhonald W. Hasenyager Date Started: 9/10/2009 Date Finished: 9/10/2009

Report Form Completed By: Suzanna Simpson Date: 10/7/2009

ANNULAR SPACE DETAILS

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>623.33</u>	<u>-3.16</u>	Top of Protective Casing
	<u>623.02</u>	<u>-2.85</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>620.17</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>617.17</u>	<u>3.00</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>610.28</u>	<u>9.89</u>	Static Water Level (After Completion) 9/21/2009
Installation Method: <u>Gravity</u>	<u>614.07</u>	<u>6.10</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>612.45</u>	<u>7.72</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>	<u>611.09</u>	<u>9.08</u>	Top of Screen
Grain Size: <u>10/20</u> (sieve size)			
Installation Method: <u>Gravity</u>	<u>605.61</u>	<u>14.56</u>	Bottom of Screen
Type of Backfill Material: <u>Quartz sand</u> (if applicable)	<u>605.07</u>	<u>15.10</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>604.17</u>	<u>16.00</u>	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: <input type="text"/>
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: _____
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: _____
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

Elevations (MSL)* Depths (BGS) (0.01 ft.)

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

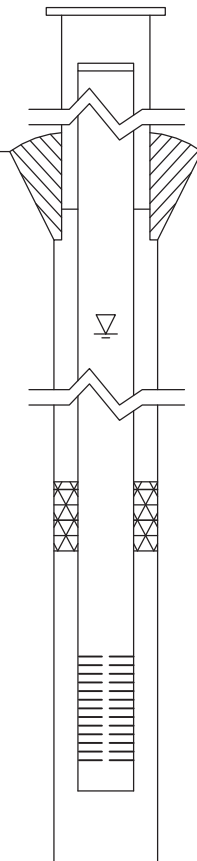


Table with 3 columns: Elevation (MSL)*, Depth (BGS), and Description. Rows include: Top of Protective Casing (624.32, -2.65), Top of Riser Pipe (624.04, -2.37), Ground Surface (621.67, 0.00), Top of Annular Sealant (618.67, 3.00), Static Water Level (608.55, 13.12), Top of Seal (611.93, 9.74), Top of Sand Pack (610.15, 11.52), Top of Screen (608.77, 12.90), Bottom of Screen (604.00, 17.67), Bottom of Well (603.61, 18.06), Bottom of Borehole (603.61, 18.06).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 2 columns: Material Type and Material Options. Rows include: 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

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (15.27 feet), Bottom of Screen to End Cap (0.39 feet), Screen Length (4.77 feet), Total Length of Casing (20.43 feet), Screen Slot Size (0.010 inches).



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

Elevations (MSL)* Depths (BGS) (0.01 ft.)

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

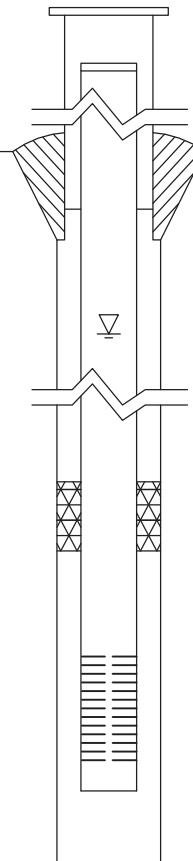
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



<u>618.53</u>	<u>-2.39</u>	Top of Protective Casing
<u>618.26</u>	<u>-2.12</u>	Top of Riser Pipe
<u>616.14</u>	<u>0.00</u>	Ground Surface
<u>613.14</u>	<u>3.00</u>	Top of Annular Sealant
<u>605.89</u>	<u>10.25</u>	Static Water Level (After Completion) 9/21/2009
<u>610.42</u>	<u>5.72</u>	Top of Seal
<u>609.16</u>	<u>6.98</u>	Top of Sand Pack
<u>607.92</u>	<u>8.22</u>	Top of Screen
<u>603.52</u>	<u>12.62</u>	Bottom of Screen
<u>602.95</u>	<u>13.19</u>	Bottom of Well
<u>602.95</u>	<u>13.19</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:

CASING MEASUREMENTS

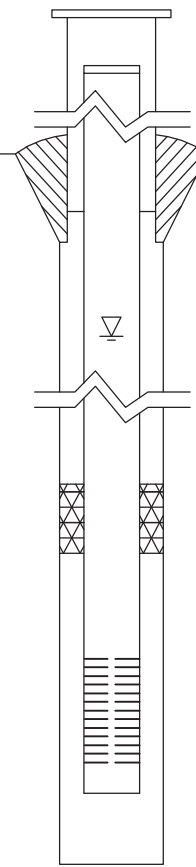
Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	10.34
Bottom of Screen to End Cap	(feet)	0.52
Screen Length (1st slot to last slot)	(feet)	4.45
Total Length of Casing	(feet)	15.31
Screen Slot Size **	(inches)	0.010



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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>632.40</u>	<u>-3.26</u>	Top of Protective Casing
	<u>632.00</u>	<u>-2.86</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>629.14</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>626.14</u>	<u>3.00</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>	<u>603.59</u>	<u>25.55</u>	Static Water Level (After Completion) 9/21/2009
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)			
Installation Method: <u>Gravity</u>	<u>610.06</u>	<u>19.08</u>	Top of Seal
Setting Time: <u>15 min</u>	<u>608.11</u>	<u>21.03</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>606.73</u>	<u>22.41</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>601.92</u>	<u>27.22</u>	Bottom of Screen
Type of Backfill Material: <u>Quartz sand</u> (if applicable)	<u>601.49</u>	<u>27.65</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>601.14</u>	<u>28.00</u>	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

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input type="text"/>
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: _____
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: _____
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: _____



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

Elevations (MSL)* Depths (BGS) (0.01 ft.)

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

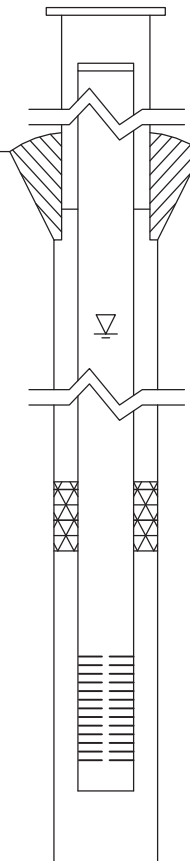


Table with 3 columns: Elevation (MSL)*, Depth (BGS), and Description. Rows include: Top of Protective Casing (623.35, -2.56), Top of Riser Pipe (623.08, -2.29), Ground Surface (620.79, 0.00), Top of Annular Sealant (617.79, 3.00), Static Water Level (602.56, 18.23), Top of Seal (608.00, 12.79), Top of Sand Pack (607.00, 13.79), Top of Screen (606.50, 14.29), Bottom of Screen (602.02, 18.77), Bottom of Well (601.55, 19.24), Bottom of Borehole (600.79, 20.00).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 2 columns: Material Type and Material Options. Rows include: 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

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (16.58 feet), Bottom of Screen to End Cap (0.47 feet), Screen Length (4.48 feet), Total Length of Casing (21.53 feet), Screen Slot Size (0.010 inches).



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

Elevations (MSL)* Depths (BGS) (0.01 ft.)

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: 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

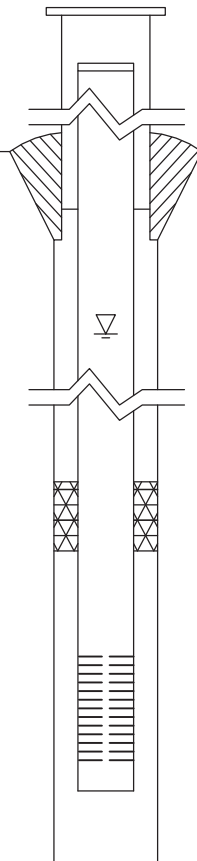


Table with 3 columns: Elevation (MSL)*, Depth (BGS), and Description. Rows include: Top of Protective Casing (631.49, -2.64), Top of Riser Pipe (631.17, -2.32), Ground Surface (628.85, 0.00), Top of Annular Sealant (625.85, 3.00), Static Water Level (604.87, 23.98), Top of Seal (613.74, 15.11), Top of Sand Pack (611.90, 16.95), Top of Screen (609.92, 18.93), Bottom of Screen (605.15, 23.70), Bottom of Well (604.79, 24.06), Bottom of Borehole (604.79, 24.06).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 2 columns: Material Type and Material Options. Rows include: 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

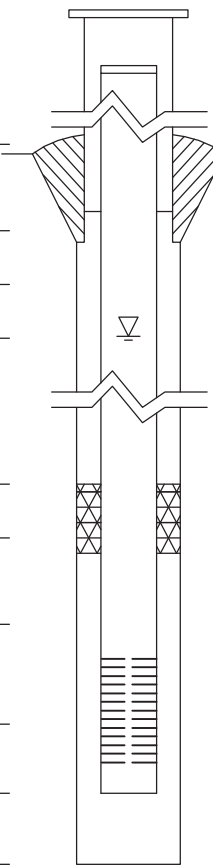
Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (21.25 feet), Bottom of Screen to End Cap (0.36 feet), Screen Length (4.77 feet), Total Length of Casing (26.38 feet), Screen Slot Size (0.010 inches).



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

Table with 3 columns: Description, Elevations (MSL)*, Depths (BGS) (0.01 ft.). Includes data for Top of Protective Casing, Top of Riser Pipe, Ground Surface, Top of Annular Sealant, Static Water Level, Top of Seal, Top of Sand Pack, Top of Screen, Bottom of Screen, Bottom of Well, and Bottom of Borehole.



* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Includes Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (25.25 feet), Bottom of Screen to End Cap (0.53 feet), Screen Length (4.39 feet), Total Length of Casing (30.17 feet), and Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well cross-section. Data points include: Top of Protective Casing (625.79, -2.84), Top of Riser Pipe (625.30, -2.35), Ground Surface (622.95, 0.00), Top of Annular Sealant (620.85, 2.10), Static Water Level (618.61, 4.34), Top of Seal (620.85, 2.10), Top of Sand Pack (611.75, 11.20), Top of Screen (610.16, 12.79), Bottom of Screen (605.32, 17.63), Bottom of Well (604.97, 17.98), Bottom of Borehole (604.97, 17.98).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Measurements include Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (15.14 feet), Bottom of Screen to End Cap (0.35 feet), Screen Length (4.84 feet), Total Length of Casing (20.33 feet), and Screen Slot Size (0.010 inches).



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER: Steel. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

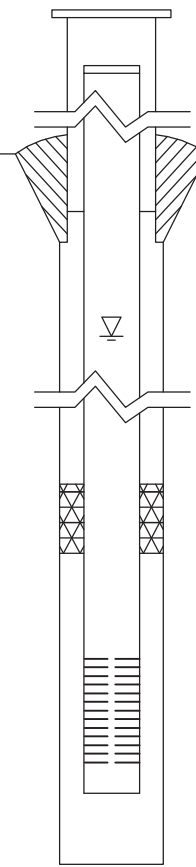
Drilling Method: Hollow stem auger Drilling Fluid (Type): none

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>622.98</u>	<u>-2.71</u>	Top of Protective Casing
	<u>622.65</u>	<u>-2.38</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>620.27</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>Bentonite Chips</u>	<u>618.20</u>	<u>2.07</u>	Top of Annular Sealant
Installation Method: <u>Gravity</u>			Static Water Level (After Completion)
Setting Time: <u>>24 hours</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>n/a</u>	<u>n/a</u>	Top of Seal
Installation Method: <u>Gravity</u>	<u>612.75</u>	<u>7.52</u>	Top of Sand Pack
Setting Time: <u>25 minutes</u>			
Type of Sand Pack: <u>Quartz Sand</u>	<u>608.96</u>	<u>11.31</u>	Top of Screen
Grain Size: <u>10-20</u> (sieve size)	<u>604.31</u>	<u>15.96</u>	Bottom of Screen
Installation Method: <u>Gravity</u>	<u>604.06</u>	<u>16.21</u>	Bottom of Well
Type of Backfill Material: <u>n/a</u> (if applicable)			
Installation Method: _____	<u>604.06</u>	<u>16.21</u>	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

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	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well cross-section. Rows include: Top of Protective Casing (620.34, -2.39), Top of Riser Pipe (620.04, -2.09), Ground Surface (617.95, 0.00), Top of Annular Sealant (615.95, 2.00), Static Water Level (After Completion), Top of Seal (607.78, 10.17), Top of Sand Pack (605.88, 12.07), Top of Screen (604.74, 13.21), Bottom of Screen (600.09, 17.86), Bottom of Well (599.56, 18.39), Bottom of Borehole (599.56, 18.39).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER: Steel. Rows include: Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (15.30 feet), Bottom of Screen to End Cap (0.53 feet), Screen Length (4.65 feet), Total Length of Casing (20.48 feet), Screen Slot Size (0.010 inches).

Surface Elevation: 619.10

Completion Date: 8/26/10

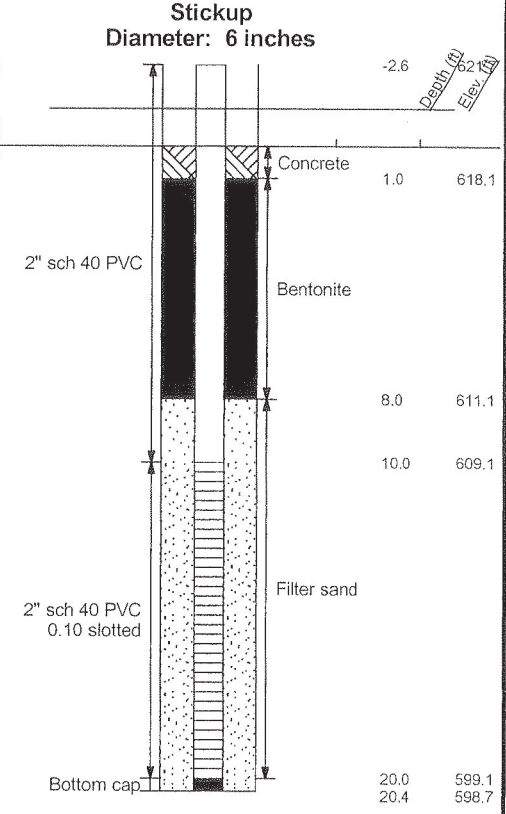
Northing: 871382.45

Easting: 2516641.06

Datum msl

WELL DIAGRAM

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			
5			1-3-3	SS2
			1-3-4	SS3
	Soft, brown, silty CLAY - CL			
10	Stiff to hard, brown to grayish-brown, silty CLAY - CL (TILL)			
			2-3-3	SS4
			27-44 -50/1"	SS5
15				
			44-50/2"	SS6
20	Boring terminated at 20 feet.			
25				
30				
35				



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: SK App'vd. by: KBS
Date: 9/10/10 Date: 1-4-11 Date: 1/4/11



Ameren-Coffeen Ash Pond Evaluation

Renamed G303
LOG OF BORING: APW-3

Project No. J017150.01

Surface Elevation: 623.46

Completion Date: 8/26/10

Datum msl

Northing: 871397.48

Easting: 2515520.23

WELL DIAGRAM

DEPTH IN FEET

DESCRIPTION OF MATERIAL

GRAPHIC LOG

DRY UNIT WEIGHT (pcf)
SPT BLOW COUNTS
CORE RECOVERY/RQD

SAMPLES

Stickup
Diameter: 6 inches

Depth (ft)
Elev. (ft)

Medium stiff, grayish-brown, silty CLAY - CL

0-1-1 SS1

1-2-5 SS2

1-3-4 SS3

1-2-3 SS4

1-2-1 SS5

14-47 SS6

2" sch 40 PVC

2" sch 40 PVC
0.10 slotted

Bottom cap

Concrete

Bentonite

Filter sand

1.0 622.5

8.0 615.5

10.0 613.5

20.0 603.5

20.4 603.1

Medium to fine SAND - SP
Hard, gray, silty CLAY - CL (TILL)

Boring terminated at 20 feet.

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - COFFEEN.GPJ GTINC 0638301.GPJ 12/13/10

GROUNDWATER DATA

ENCOUNTERED AT 14 FEET ∇

REMARKS:

DRILLING DATA

 AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM FEET
MVU DRILLER SWG LOGGER
CME 55TRK DRILL RIG
HAMMER TYPE Auto

Drawn by: KSA

Checked by: DK

App'vd. by: RS

Date: 9/10/10

Date: 1-4-11

Date: 1/7/11



GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren-Coffeen Ash Pond Evaluation

Renamed G304
LOG OF BORING: APW-4

Project No. J017150.01

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

RETURN ALL COPIES TO IDPH OR
LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

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



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well cross-section. Rows include: Top of Protective Casing (625.88, -3.34), Top of Riser Pipe (625.55, -3.01), Ground Surface (622.54, 0.00), Top of Annular Sealant (621.54, 1.00), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (611.04, 11.50), Top of Screen (609.10, 13.44), Bottom of Screen (604.27, 18.27), Bottom of Well (604.09, 18.45), Bottom of Borehole (604.09, 18.45).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (16.45 feet), Bottom of Screen to End Cap (0.18 feet), Screen Length (4.83 feet), Total Length of Casing (21.46 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., Screen.



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, sand pack, and screen.

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER: Steel. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Rows include: Top of Protective Casing (624.72, -2.64), Top of Riser Pipe (624.47, -2.39), Ground Surface (622.08, 0.00), Top of Annular Sealant (620.08, 2.00), Static Water Level (623.84, -1.76), Top of Seal (n/a, n/a), Top of Sand Pack (610.10, 11.98), Top of Screen (609.12, 12.96), Bottom of Screen (604.28, 17.80), Bottom of Well (603.86, 18.22), Bottom of Borehole (603.86, 18.22).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER: Steel. Rows include: Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (15.37 feet), Bottom of Screen to End Cap (0.40 feet), Screen Length (4.84 feet), Total Length of Casing (20.61 feet), Screen Slot Size (0.010 inches).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well cross-section. Data points include: Top of Protective Casing (625.84 MSL, -2.81 BGS), Top of Riser Pipe (625.57 MSL, -2.54 BGS), Ground Surface (623.03 MSL, 0.00 BGS), Top of Annular Sealant (621.33 MSL, 1.70 BGS), Static Water Level (After Completion), Top of Seal (n/a MSL, n/a BGS), Top of Sand Pack (610.12 MSL, 12.91 BGS), Top of Screen (608.67 MSL, 14.36 BGS), Bottom of Screen (604.24 MSL, 18.79 BGS), Bottom of Well (603.74 MSL, 19.29 BGS), Bottom of Borehole (603.73 MSL, 19.30 BGS).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (16.70 feet), Bottom of Screen to End Cap (0.50 feet), Screen Length (1st slot to last slot) (4.63 feet), Total Length of Casing (21.83 feet), Screen Slot Size ** (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER: Steel. Rows include: Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

Surface Elevation: 610.56

Completion Date: 8/27/10

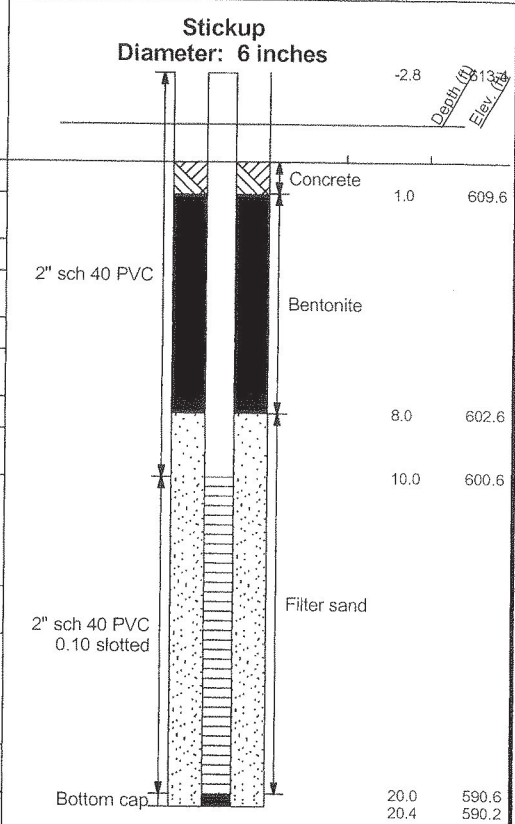
Datum msl

Northing: 872502.26

Easting: 2516632.59

WELL DIAGRAM

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	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
10	Hard to stiff, brown to gray, silty CLAY, trace sand seams - CL (TILL)			
			9-22-28	SS4
15			1-6-12	SS5
20	Boring terminated at 20 feet.		3-4-9	SS6



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING, 2002.WL, J017150.01 - COFFEEN GPJ, STINC 0638301 GPJ, 12/13/10

GROUNDWATER DATA

DRILLING DATA

ENCOUNTERED AT 7 FEET ∇

 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: <u>DTK</u>	App'vd. by: <u>KR8</u>
Date: 9/10/10	Date: <u>1-4-11</u>	Date: <u>1/4/11</u>



Ameren-Coffeen Ash Pond Evaluation

Renamed G402
LOG OF BORING: APW-2

Project No. J017150.01



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, sand pack, and screen.

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER: Steel. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



Site #: _____ County: Montgomery Well #: G404
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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (616.02, -2.92), Top of Riser Pipe (615.77, -2.67), Ground Surface (613.10, 0.00), Top of Annular Sealant (613.10, 0.00), Static Water Level (611.03, 2.07), Top of Seal (n/a, n/a), Top of Sand Pack (608.05, 5.05), Top of Screen (606.68, 6.42), Bottom of Screen (601.93, 11.17), Bottom of Well (601.48, 11.62), Bottom of Borehole (601.10, 12.00).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (9.09 feet), Bottom of Screen to End Cap (0.45 feet), Screen Length (4.75 feet), Total Length of Casing (14.29 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



Site #: _____ County: Montgomery Well #: G405
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

Table with columns: Elevations (MSL)*, Depths (BGS), (0.01 ft.), and a central diagram of a well casing. Rows include: Top of Protective Casing (624.04, -3.14), Top of Riser Pipe (623.78, -2.88), Ground Surface (620.90, 0.00), Top of Annular Sealant (620.90, 0.00), Static Water Level (619.67, 1.23), Top of Seal (n/a, n/a), Top of Sand Pack (613.19, 7.71), Top of Screen (611.89, 9.01), Bottom of Screen (607.14, 13.76), Bottom of Well (606.69, 14.21), and Bottom of Borehole (606.69, 14.21).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (11.89 feet), Bottom of Screen to End Cap (0.45 feet), Screen Length (4.75 feet), Total Length of Casing (17.09 feet), and Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), and Screen (PVC).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Rows include: Top of Protective Casing (625.70, -3.84), Top of Riser Pipe (625.36, -3.50), Ground Surface (621.86, 0.00), Top of Annular Sealant (619.86, 2.00), Static Water Level (After Completion), Top of Seal (610.74, 11.12), Top of Sand Pack (609.65, 12.21), Top of Screen (608.30, 13.56), Bottom of Screen (603.49, 18.37), Bottom of Well (603.11, 18.75), Bottom of Borehole (603.11, 18.75).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (17.06 feet), Bottom of Screen to End Cap (0.38 feet), Screen Length (4.81 feet), Total Length of Casing (22.25 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Rows include: Top of Protective Casing (621.70, -3.35), Top of Riser Pipe (621.32, -2.97), Ground Surface (618.35, 0.00), Top of Annular Sealant (616.35, 2.00), Static Water Level (After Completion), Top of Seal (607.50, 10.85), Top of Sand Pack (605.50, 12.85), Top of Screen (604.57, 13.78), Bottom of Screen (599.74, 18.61), Bottom of Well (599.31, 19.04), Bottom of Borehole (598.35, 20.00).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (16.75 feet), Bottom of Screen to End Cap (0.43 feet), Screen Length (4.83 feet), Total Length of Casing (22.01 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



Site #: _____ County: Montgomery Well #: G410
Site Name: Coffeen Power Station - Ash Pond 2 Borehole #: G410
State _____
Plan 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

Elevations (MSL)* Depths (BGS) (0.01 ft.)

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

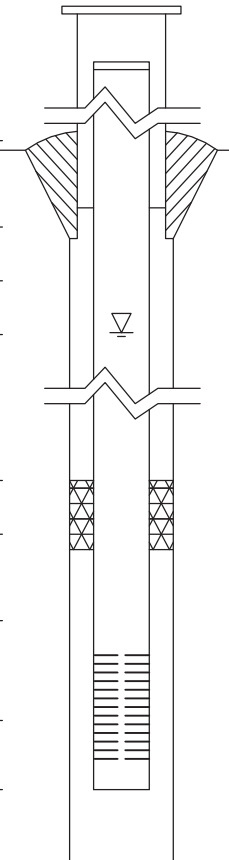


Table with 3 columns: Elevation (MSL)*, Depth (BGS), and Description. Rows include: Top of Protective Casing (620.18, -2.97), Top of Riser Pipe (619.79, -2.58), Ground Surface (617.21, 0.00), Top of Annular Sealant (n/a), Static Water Level (After Completion) 3/1/2018 (612.39, 4.82), Top of Seal (616.71, 0.50), Top of Sand Pack (609.81, 7.40), Top of Screen (608.32, 8.89), Bottom of Screen (603.53, 13.68), Bottom of Well (603.12, 14.09), Bottom of Borehole (603.12, 14.09).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (11.47 feet), Bottom of Screen to End Cap (0.41 feet), Screen Length (1st slot to last slot) (4.79 feet), Total Length of Casing (16.67 feet), Screen Slot Size (0.010 inches).



Site #: _____ County: Montgomery Well #: G411
Site Name: Coffeen Power Station - Ash Pond 2 Borehole #: G411
State _____
Plan 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

Elevations (MSL)* Depths (BGS) (0.01 ft.)

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

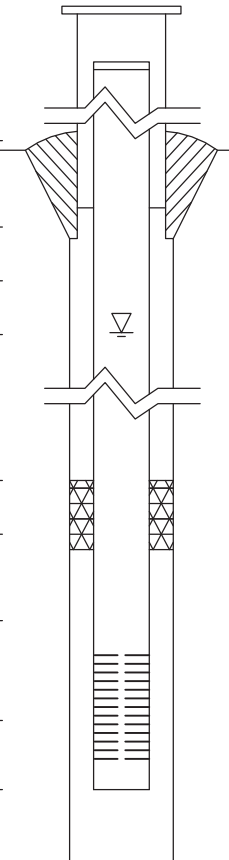


Table with 3 columns: Elevation (MSL)*, Depth (BGS), and Description. Rows include: Top of Protective Casing (623.60, -3.11), Top of Riser Pipe (623.25, -2.76), Ground Surface (620.49, 0.00), Top of Annular Sealant (n/a), Static Water Level (617.84, 2.65), Top of Seal (619.99, 0.50), Top of Sand Pack (610.42, 10.07), Top of Screen (609.28, 11.21), Bottom of Screen (604.42, 16.07), Bottom of Well (604.02, 16.47), Bottom of Borehole (604.02, 16.47).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).

CASING MEASUREMENTS

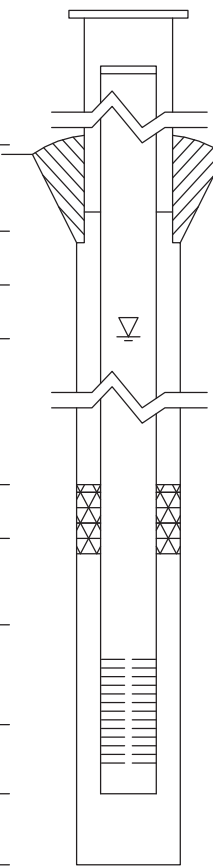
Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (13.97 feet), Bottom of Screen to End Cap (0.40 feet), Screen Length (4.86 feet), Total Length of Casing (19.23 feet), Screen Slot Size (0.010 inches).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.)



WELL CONSTRUCTION MATERIALS

Table for well construction materials with columns for material type and selection options.

CASING MEASUREMENTS

Table for casing measurements with columns for measurement type and value.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

**RETURN ALL COPIES TO IDPH OR
LOCAL HEALTH DEPARTMENT**

TYPE OR PRESS FIRMLY

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**

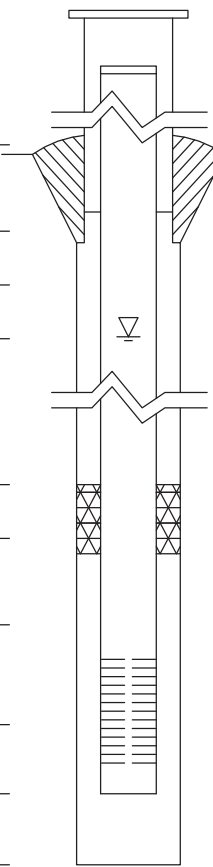
This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.)



WELL CONSTRUCTION MATERIALS

Table for well construction materials with columns for material type and selection options.

CASING MEASUREMENTS

Table for casing measurements with columns for measurement type and value.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
 DIVISION OF ENVIRONMENTAL HEALTH
 525 W. JEFFERSON ST.
 SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

RETURN ALL COPIES TO IDPH OR
 LOCAL HEALTH DEPARTMENT

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**

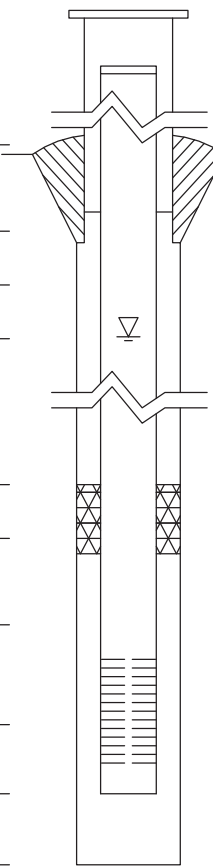
This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.)



WELL CONSTRUCTION MATERIALS

Table for well construction materials with columns for material type and selection options.

CASING MEASUREMENTS

Table for casing measurements with columns for measurement type and value.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

**RETURN ALL COPIES TO IDPH OR
LOCAL HEALTH DEPARTMENT**

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)** **Range** 3 **(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**

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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

Elevations (MSL)* Depths (BGS) (0.01 ft.)

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: 25 min.

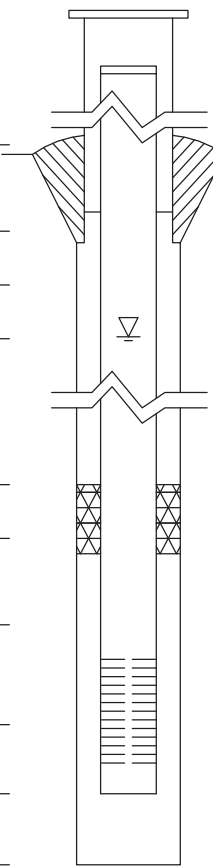
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: Cuttings (if applicable)

Installation Method: Over-drill borehole



	<u>629.37</u>	<u>-3.67</u>	Top of Protective Casing
	<u>628.94</u>	<u>-3.24</u>	Top of Riser Pipe
	<u>625.70</u>	<u>0.00</u>	Ground Surface
	<u>623.00</u>	<u>2.70</u>	Top of Annular Sealant
	<u>570.30</u>	<u>55.40</u>	Static Water Level (After Completion) 6/1/2006
	<u>576.70</u>	<u>49.00</u>	Top of Seal
	<u>575.60</u>	<u>50.10</u>	Top of Sand Pack
	<u>573.41</u>	<u>52.29</u>	Top of Screen
	<u>568.64</u>	<u>57.06</u>	Bottom of Screen
	<u>568.30</u>	<u>57.40</u>	Bottom of Well
	<u>567.70</u>	<u>58.00</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:

CASING MEASUREMENTS

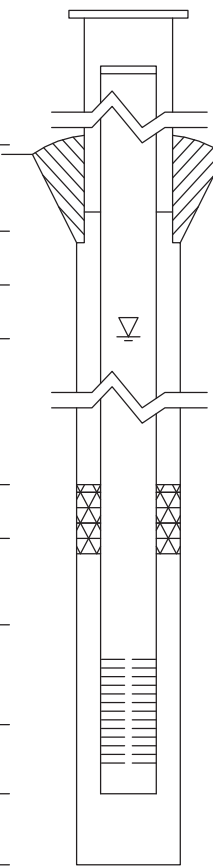
Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	55.51
Bottom of Screen to End Cap	(feet)	0.36
Screen Length (1st slot to last slot)	(feet)	4.77
Total Length of Casing	(feet)	60.64
Screen Slot Size **	(inches)	0.010



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.)



WELL CONSTRUCTION MATERIALS

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER: (Steel)

CASING MEASUREMENTS

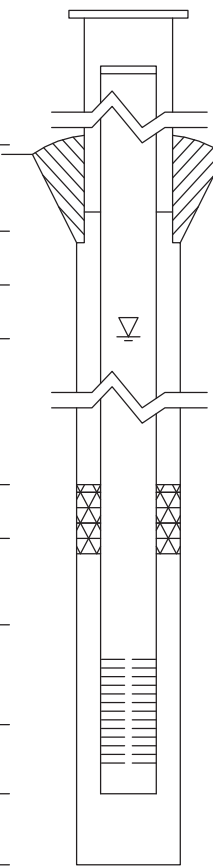
Table with 3 columns: Measurement, (inches/feet), Value



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.)



WELL CONSTRUCTION MATERIALS

Table for well construction materials with columns for material type and selection options.

CASING MEASUREMENTS

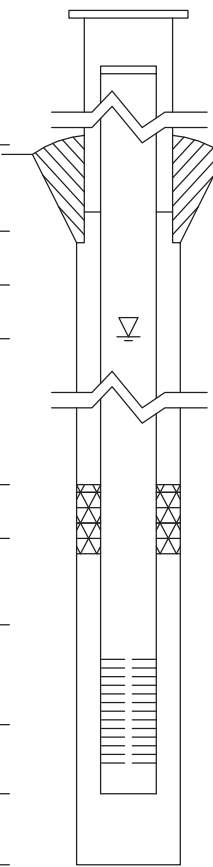
Table for casing measurements with columns for measurement type and value.



Site #: _____ County: Montgomery Well #: MW55
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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.)



WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER: (Steel)

CASING MEASUREMENTS

Table with 3 columns: Measurement, (inches/feet), and Value



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

Table with 3 columns: Description, Elevations (MSL)*, Depths (BGS) (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Rows include: Top of Protective Casing (626.67, -3.57), Top of Riser Pipe (626.21, -3.11), Ground Surface (623.10, 0.00), Top of Annular Sealant (620.10, 3.00), Static Water Level (616.89, 6.21), Top of Seal (620.10, 3.00), Top of Sand Pack (613.34, 9.76), Top of Screen (612.06, 11.04), Bottom of Screen (607.48, 15.62), Bottom of Well (607.02, 16.08), Bottom of Borehole (607.02, 16.08).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (7.3 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (14.15 feet), Bottom of Screen to End Cap (0.46 feet), Screen Length (4.58 feet), Total Length of Casing (19.19 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

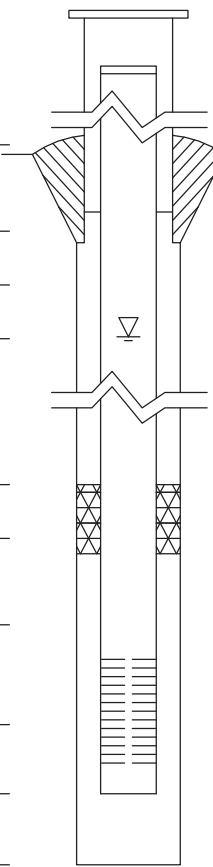
Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 3 columns: Elevations (MSL)*, Depths (BGS), and (0.01 ft.)
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



WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material type, SS304, SS316, PTFE, PVC, OTHER: (Steel, PVC)

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (628.26, -3.56), Top of Riser Pipe (627.92, -3.22), Ground Surface (624.70, 0.00), Top of Annular Sealant (622.20, 2.50), Static Water Level (619.37, 5.33), Top of Seal (622.20, 2.50), Top of Sand Pack (614.72, 9.98), Top of Screen (613.19, 11.51), Bottom of Screen (608.70, 16.00), Bottom of Well (608.10, 16.60), Bottom of Borehole (607.62, 17.08).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (14.73 feet), Bottom of Screen to End Cap (0.60 feet), Screen Length (4.49 feet), Total Length of Casing (19.82 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

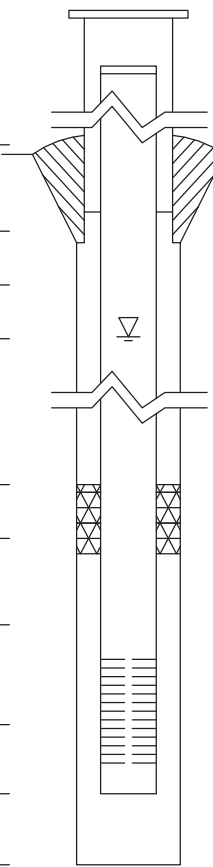
Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.)



WELL CONSTRUCTION MATERIALS

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER: (Steel)

CASING MEASUREMENTS

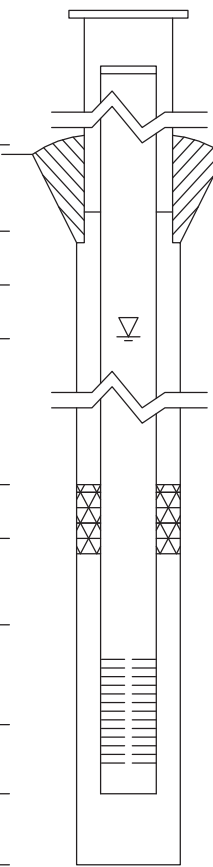
Table with 3 columns: Measurement, Unit, Value



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Rows include: Top of Protective Casing (627.84, -3.24), Top of Riser Pipe (627.51, -2.91), Ground Surface (624.60, 0.00), Top of Annular Sealant (621.35, 3.25), Static Water Level (619.37, 5.23), Top of Seal (621.35, 3.25), Top of Sand Pack (615.49, 9.11), Top of Screen (613.39, 11.21), Bottom of Screen (608.98, 15.62), Bottom of Well (608.40, 16.20), Bottom of Borehole (608.40, 16.20).



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

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (14.12 feet), Bottom of Screen to End Cap (0.58 feet), Screen Length (4.41 feet), Total Length of Casing (19.11 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (624.55, -3.35), Top of Riser Pipe (624.24, -3.04), Ground Surface (621.20, 0.00), Top of Annular Sealant (618.83, 2.37), Static Water Level (616.29, 4.91), Top of Seal (618.83, 2.37), Top of Sand Pack (611.90, 9.30), Top of Screen (609.92, 11.28), Bottom of Screen (605.44, 15.76), Bottom of Well (604.90, 16.30), Bottom of Borehole (604.90, 16.30).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (14.32 feet), Bottom of Screen to End Cap (0.54 feet), Screen Length (4.48 feet), Total Length of Casing (19.34 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (625.70, -3.70), Top of Riser Pipe (625.36, -3.36), Ground Surface (622.00, 0.00), Top of Annular Sealant (618.89, 3.11), Static Water Level (615.97, 6.03), Top of Seal (597.20, 24.80), Top of Sand Pack (595.59, 26.41), Top of Screen (593.69, 28.31), Bottom of Screen (588.96, 33.04), Bottom of Well (588.50, 33.50), Bottom of Borehole (585.67, 36.33).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (31.67 feet), Bottom of Screen to End Cap (0.46 feet), Screen Length (4.73 feet), Total Length of Casing (36.86 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Elevations (MSL)* Depths (BGS) (0.01 ft.)

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.

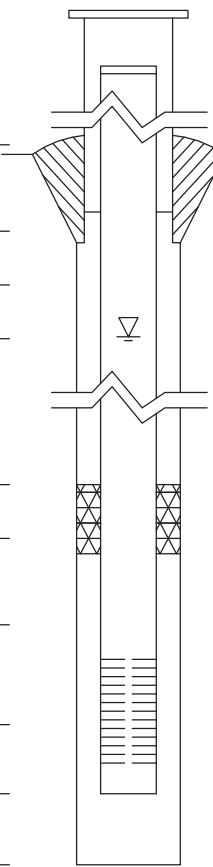
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



<u>625.47</u>	<u>-3.47</u>	Top of Protective Casing
<u>625.16</u>	<u>-3.16</u>	Top of Riser Pipe
<u>622.00</u>	<u>0.00</u>	Ground Surface
<u>620.00</u>	<u>2.00</u>	Top of Annular Sealant
<u>616.58</u>	<u>5.42</u>	Static Water Level (After Completion) 6/1/2006
<u>620.00</u>	<u>2.00</u>	Top of Seal
<u>615.25</u>	<u>6.75</u>	Top of Sand Pack
<u>613.11</u>	<u>8.89</u>	Top of Screen
<u>608.37</u>	<u>13.63</u>	Bottom of Screen
<u>607.92</u>	<u>14.08</u>	Bottom of Well
<u>607.92</u>	<u>14.08</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	12.04
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

**Hand-Slotted Well Screens Are Unacceptable



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (45.29 feet), Bottom of Screen to End Cap (0.48 feet), Screen Length (4.53 feet), Total Length of Casing (50.30 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table for well construction materials with columns for material type and selection options (e.g., SS304, SS316, PTFE, PVC, OTHER: Steel).



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

Diagram of well construction with elevations and depths. Includes data for Protective Casing, Riser Pipe, Ground Surface, Annular Sealant, Static Water Level, Seal, Sand Pack, Screen, and Bottom of Well/Borehole.

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole (7.3 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (13.51 feet), Bottom of Screen to End Cap (0.43 feet), Screen Length (4.57 feet), Total Length of Casing (18.51 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table for well construction materials with columns for material type (SS304, SS316, PTFE, PVC, OTHER) and selection for Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (626.33 MSL, -3.63 BGS), Top of Riser Pipe (625.87 MSL, -3.17 BGS), Ground Surface (622.70 MSL, 0.00 BGS), Top of Annular Sealant (619.64 MSL, 3.06 BGS), Static Water Level (566.67 MSL, 56.03 BGS), Top of Seal (577.48 MSL, 45.22 BGS), Top of Sand Pack (574.76 MSL, 47.94 BGS), Top of Screen (572.89 MSL, 49.81 BGS), Bottom of Screen (568.10 MSL, 54.60 BGS), Bottom of Well (567.70 MSL, 55.00 BGS), Bottom of Borehole (567.70 MSL, 55.00 BGS).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (52.98 feet), Bottom of Screen to End Cap (0.40 feet), Screen Length (4.79 feet), Total Length of Casing (58.17 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Rows include: Top of Protective Casing (626.42, -3.72), Top of Riser Pipe (625.92, -3.22), Ground Surface (622.70, 0.00), Top of Annular Sealant (619.35, 3.35), Static Water Level (614.46, 8.24), Top of Seal (619.35, 3.35), Top of Sand Pack (612.65, 10.05), Top of Screen (611.27, 11.43), Bottom of Screen (606.47, 16.23), Bottom of Well (606.08, 16.62), Bottom of Borehole (606.08, 16.62).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (7.3 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (14.65 feet), Bottom of Screen to End Cap (0.39 feet), Screen Length (4.80 feet), Total Length of Casing (19.84 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

RETURN ALL COPIES TO IDPH OR
LOCAL HEALTH DEPARTMENT

TYPE OR PRESS FIRMLY

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



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.

WATER WELL SEALING FORM

**RETURN ALL COPIES TO IDPH OR
LOCAL HEALTH DEPARTMENT**

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~~) **Range** 3 (~~E~~) **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**

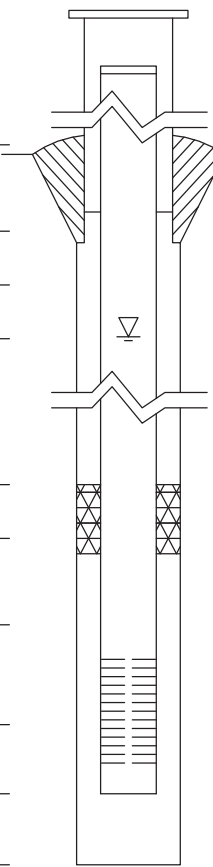
Hanson Professional Services Inc., 1525 S. 6th St. Springfield IL 62703
Address **City** **State/ZIP**



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.)



WELL CONSTRUCTION MATERIALS

Table for well construction materials with columns for material type and options like SS304, SS316, PTFE, PVC, OTHER.

CASING MEASUREMENTS

Table for casing measurements with columns for measurement type and values.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

**RETURN ALL COPIES TO IDPH OR
LOCAL HEALTH DEPARTMENT**

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**

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



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

Elevations (MSL)* Depths (BGS) (0.01 ft.)

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.

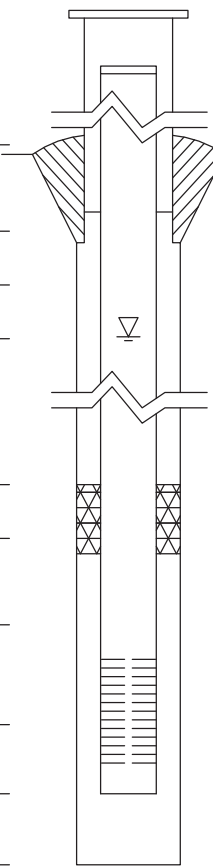
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: Re-drill borehole



<u>629.68</u>	<u>-3.58</u>	Top of Protective Casing
<u>629.33</u>	<u>-3.23</u>	Top of Riser Pipe
<u>626.10</u>	<u>0.00</u>	Ground Surface
<u>623.77</u>	<u>2.33</u>	Top of Annular Sealant
<u>574.73</u>	<u>51.37</u>	Static Water Level (After Completion) 6/1/2006
<u>584.65</u>	<u>41.45</u>	Top of Seal
<u>582.65</u>	<u>43.45</u>	Top of Sand Pack
<u>580.20</u>	<u>45.90</u>	Top of Screen
<u>575.76</u>	<u>50.34</u>	Bottom of Screen
<u>575.32</u>	<u>50.78</u>	Bottom of Well
<u>575.10</u>	<u>51.00</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

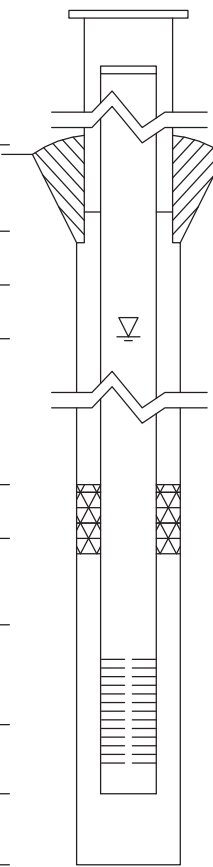
Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

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.)
	<u>629.62</u>	<u>-3.52</u>	Top of Protective Casing
	<u>629.28</u>	<u>-3.18</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>626.10</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>Bentonite chips</u>	<u>624.66</u>	<u>1.44</u>	Top of Annular Sealant
Installation Method: <u>Gravity</u>			
Setting Time: <u>+24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>620.36</u>	<u>5.74</u>	Static Water Level (After Completion) 6/1/2006
Installation Method: <u>Gravity</u>	<u>624.66</u>	<u>1.44</u>	Top of Seal
Setting Time: <u>17 min.</u>	<u>612.40</u>	<u>13.70</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>	<u>611.51</u>	<u>14.59</u>	Top of Screen
Grain Size: <u>#JC50FS</u> (sieve size)			
Installation Method: <u>Gravity</u>	<u>606.69</u>	<u>19.41</u>	Bottom of Screen
Type of Backfill Material: <u>Quartz sand</u> (if applicable)	<u>606.34</u>	<u>19.76</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>606.20</u>	<u>19.90</u>	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)	17.74
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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (630.62, -3.52), Top of Riser Pipe (630.29, -3.19), Ground Surface (627.10, 0.00), Top of Annular Sealant (624.92, 2.18), Static Water Level (572.65, 54.45), Top of Seal (581.55, 45.55), Top of Sand Pack (580.25, 46.85), Top of Screen (578.28, 48.82), Bottom of Screen (573.78, 53.32), Bottom of Well (573.23, 53.87), Bottom of Borehole (573.23, 53.87).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (52.01 feet), Bottom of Screen to End Cap (0.55 feet), Screen Length (4.50 feet), Total Length of Casing (57.06 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (630.68 MSL, -3.58 BGS), Top of Riser Pipe (630.34 MSL, -3.24 BGS), Ground Surface (627.10 MSL, 0.00 BGS), Top of Annular Sealant (626.40 MSL, 0.70 BGS), Static Water Level (620.21 MSL, 6.89 BGS), Top of Seal (617.33 MSL, 9.77 BGS), Top of Sand Pack (614.80 MSL, 12.30 BGS), Top of Screen (613.08 MSL, 14.02 BGS), Bottom of Screen (603.54 MSL, 23.56 BGS), Bottom of Well (602.99 MSL, 24.11 BGS), Bottom of Borehole (602.99 MSL, 24.11 BGS).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (17.26 feet), Bottom of Screen to End Cap (0.55 feet), Screen Length (9.54 feet), Total Length of Casing (27.35 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

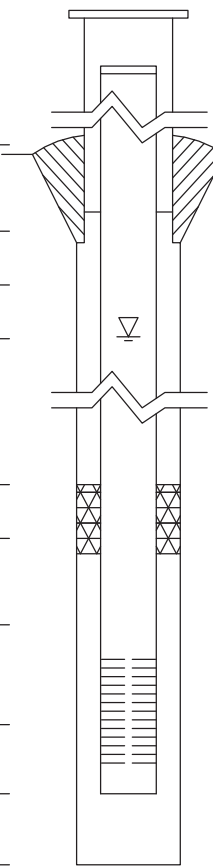
Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.)



WELL CONSTRUCTION MATERIALS

Table for well construction materials with columns for material type and selection options.

CASING MEASUREMENTS

Table for casing measurements with columns for measurement type and value.



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

Elevations (MSL)* **Depths** (BGS) (0.01 ft.)

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: _____

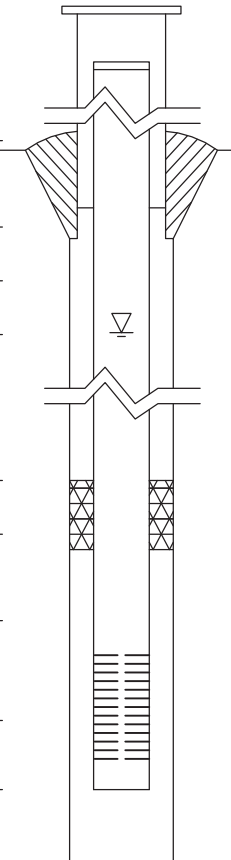
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: gravity

Type of Backfill Material: _____
(if applicable)

Installation Method: _____



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

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (17.60 feet), Bottom of Screen to End Cap (0.53 feet), Screen Length (4.53 feet), Total Length of Casing (22.66 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table for well construction materials with columns for material type (SS304, SS316, PTFE, PVC, OTHER) and rows for Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

Table with 3 columns: Description, Elevations (MSL)*, Depths (BGS) (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (624.94, -3.03), Top of Riser Pipe (624.52, -2.61), Ground Surface (621.91, 0.00), Top of Annular Sealant (619.91, 2.00), Static Water Level (619.41, 2.50), Top of Seal (614.26, 7.65), Top of Sand Pack (611.99, 9.92), Top of Screen (610.59, 11.32), Bottom of Screen (605.90, 16.01), Bottom of Well (605.49, 16.42), Bottom of Borehole (605.49, 16.42).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (13.93 feet), Bottom of Screen to End Cap (0.41 feet), Screen Length (4.69 feet), Total Length of Casing (19.03 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

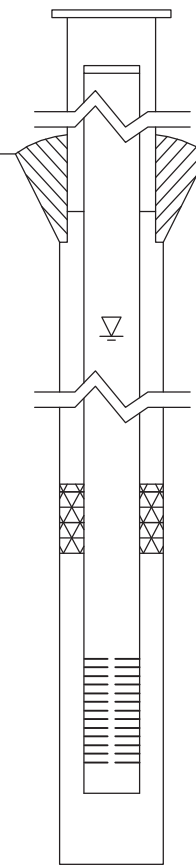
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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.)
	<u>631.29</u>	<u>-3.22</u>	Top of Protective Casing
	<u>630.96</u>	<u>-2.89</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>628.07</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>622.43</u>	<u>5.64</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>616.81</u>	<u>11.26</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Granular</u>	<u>613.43</u>	<u>14.64</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>612.32</u>	<u>15.75</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>610.54</u>	<u>17.53</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>606.00</u>	<u>22.07</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>605.43</u>	<u>22.64</u>	Bottom of Well
Installation Method: <u>n/a</u>	<u>605.43</u>	<u>22.64</u>	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: <input type="text"/>
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER: <input type="text"/>

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



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

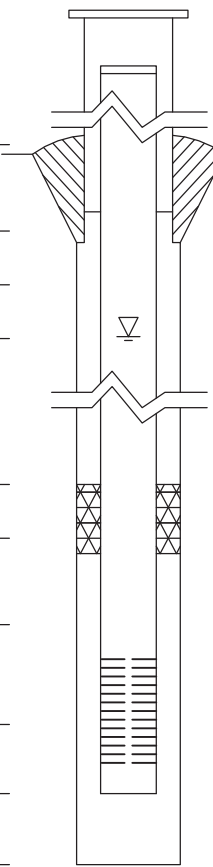
Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>631.23</u>	<u>-2.79</u>	Top of Protective Casing
	<u>630.93</u>	<u>-2.49</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>628.44</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>623.38</u>	<u>5.06</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>24 hr.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>616.09</u>	<u>12.35</u>	Static Water Level (After Completion) 3/1/2010
Installation Method: <u>Granular</u>	<u>615.53</u>	<u>12.91</u>	Top of Seal
Setting Time: <u>10 min</u>	<u>614.13</u>	<u>14.31</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10/20</u> (sieve size)	<u>611.91</u>	<u>16.53</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>607.40</u>	<u>21.04</u>	Bottom of Screen
Type of Backfill Material: <u>Quartz sand</u> (if applicable)	<u>606.80</u>	<u>21.64</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>604.38</u>	<u>24.06</u>	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

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (628.79, -2.57), Top of Riser Pipe (628.63, -2.41), Ground Surface (626.22, 0.00), Top of Annular Sealant (623.42, 2.80), Static Water Level (613.72, 12.50), Top of Seal (616.50, 9.72), Top of Sand Pack (615.27, 10.95), Top of Screen (613.95, 12.27), Bottom of Screen (609.57, 16.65), Bottom of Well (609.01, 17.21), Bottom of Borehole (608.22, 18.00).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 2 columns: Material Type and Material Options. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Measurements include Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (14.68 feet), Bottom of Screen to End Cap (0.56 feet), Screen Length (4.38 feet), Total Length of Casing (19.62 feet), and Screen Slot Size (0.010 inches).



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

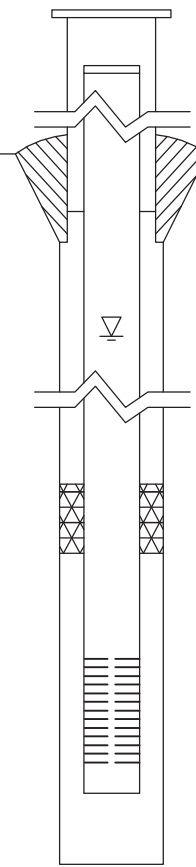
Drilling Method: Hollow stem auger Drilling Fluid (Type): none

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>624.44</u>	<u>-3.35</u>	Top of Protective Casing
	<u>624.08</u>	<u>-2.99</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>621.09</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>619.09</u>	<u>2.00</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			Static Water Level (After Completion)
Setting Time: <u>>24 hours</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>602.99</u>	<u>18.10</u>	Top of Seal
Installation Method: <u>Gravity</u>	<u>602.04</u>	<u>19.05</u>	Top of Sand Pack
Setting Time: <u>30 minutes</u>	<u>600.43</u>	<u>20.66</u>	Top of Screen
Type of Sand Pack: <u>Quartz Sand</u>	<u>595.60</u>	<u>25.49</u>	Bottom of Screen
Grain Size: <u>10-20</u> (sieve size)	<u>595.17</u>	<u>25.92</u>	Bottom of Well
Installation Method: <u>Gravity</u>	<u>595.17</u>	<u>25.92</u>	Bottom of Borehole
Type of Backfill Material: _____ (if applicable)			
Installation Method: _____			



* 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

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (24.95 feet), Bottom of Screen to End Cap (0.40 feet), Screen Length (4.80 feet), Total Length of Casing (30.15 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table for well construction materials with columns for material type (SS304, SS316, PTFE, PVC, OTHER) and selection for Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.



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

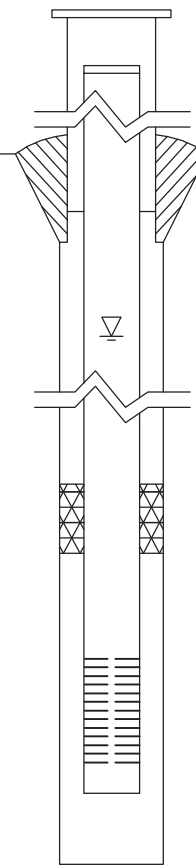
Drilling Method: Hollow Stem Auger Drilling Fluid (Type): none

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	626.90	-3.01	Top of Protective Casing
	626.55	-2.66	Top of Riser Pipe
Type of Surface Seal: Concrete	623.89	0.00	Ground Surface
Type of Annular Sealant: Bentonite	620.89	3.00	Top of Annular Sealant
Installation Method: tremie			
Setting Time: 45 min.			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	615.78	8.11	Static Water Level (After Completion) 10/30/2014
Installation Method: Gravity	613.56	10.33	Top of Seal
Setting Time: 30 min.	610.81	13.08	Top of Sand Pack
Type of Sand Pack: Quartz Sand			
Grain Size: 10/20 (sieve size)	608.80	15.09	Top of Screen
Installation Method: Gravity & Surge	604.32	19.57	Bottom of Screen
Type of Backfill Material: n/a (if applicable)	603.70	20.19	Bottom of Well
Installation Method: _____	603.70	20.19	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	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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)	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



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

Diagram of well construction with elevations and depths. Includes data for Protective Casing, Riser Pipe, Ground Surface, Annular Sealant, Static Water Level, Seal, Sand Pack, Screen, and Bottom of Well. Elevation (MSL)* and Depth (BGS) are provided for each level.

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (13.94 feet), Bottom of Screen to End Cap (0.65 feet), Screen Length (4.37 feet), Total Length of Casing (18.96 feet), and Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.



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

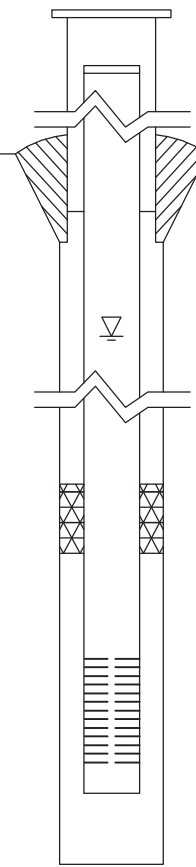
Drilling Method: Hollow Stem Auger Drilling Fluid (Type): None

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>625.05</u>	<u>-2.54</u>	Top of Protective Casing
	<u>625.27</u>	<u>-2.76</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>622.51</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>High-solids bentonite</u>	<u>620.51</u>	<u>2.00</u>	Top of Annular Sealant
Installation Method: <u>Tremie</u>			
Setting Time: <u>>48 hrs.</u>			
Type of Bentonite Seal -- <input checked="" type="checkbox"/> Granular <input type="checkbox"/> Pellet <input type="checkbox"/> Slurry (choose one)	<u>615.51</u>	<u>7.00</u>	Static Water Level (After Completion) 6/16/2015
Installation Method: <u>Gravity</u>	<u>614.51</u>	<u>8.00</u>	Top of Seal
Setting Time: <u>30 minutes</u>	<u>612.11</u>	<u>10.40</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>			
Grain Size: <u>10-20</u> (sieve size)	<u>610.28</u>	<u>12.23</u>	Top of Screen
Installation Method: <u>Gravity</u>	<u>605.62</u>	<u>16.89</u>	Bottom of Screen
Type of Backfill Material: <u>n/a</u> (if applicable)	<u>605.07</u>	<u>17.44</u>	Bottom of Well
Installation Method: _____	<u>605.07</u>	<u>17.44</u>	Bottom of Borehole



* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	<u>7.5</u>
ID of Riser Pipe	(inches)	<u>2.0</u>
Protective Casing Length	(feet)	<u>5.0</u>
Riser Pipe Length	(feet)	<u>14.99</u>
Bottom of Screen to End Cap	(feet)	<u>0.55</u>
Screen Length (1st slot to last slot)	(feet)	<u>4.66</u>
Total Length of Casing	(feet)	<u>20.20</u>
Screen Slot Size **	(inches)	<u>0.010</u>

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

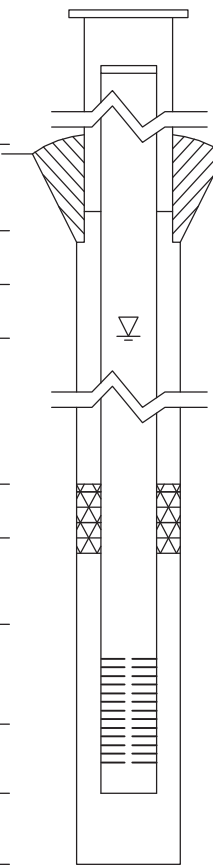
Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:



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

Table with 3 columns: Description, Elevations (MSL)*, Depths (BGS) (0.01 ft.). Includes data for Top of Protective Casing, Top of Riser Pipe, Ground Surface, Top of Annular Sealant, Static Water Level, Top of Seal, Top of Sand Pack, Top of Screen, Bottom of Screen, Bottom of Well, and Bottom of Borehole.



* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 2 columns: Measurement, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



Site #: _____ County: _____ Well #: TR32

Site Name: Coffeen Power Station Borehole #: TR32

State _____
Plan 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

Elevations **Depths** (0.01 ft.)
(MSL)* (BGS)

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: _____

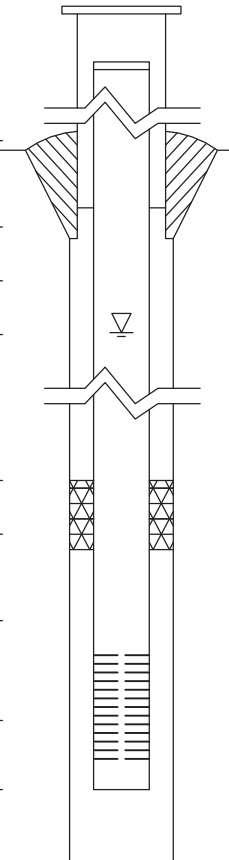
Type of Sand Pack: Quartz Sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a
(if applicable)

Installation Method: _____



<u>621.97</u>	<u>-2.69</u>	Top of Protective Casing
<u>621.68</u>	<u>-2.40</u>	Top of Riser Pipe
<u>619.28</u>	<u>0.00</u>	Ground Surface
<u>616.28</u>	<u>3.00</u>	Top of Annular Sealant
_____	_____	Static Water Level (After Completion)
<u>n/a</u>	<u>n/a</u>	Top of Seal
<u>609.77</u>	<u>9.51</u>	Top of Sand Pack
<u>608.28</u>	<u>11.00</u>	Top of Screen
<u>603.60</u>	<u>15.68</u>	Bottom of Screen
<u>603.11</u>	<u>16.17</u>	Bottom of Well
<u>603.11</u>	<u>16.17</u>	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: <input checked="" type="radio"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input type="radio"/> PVC	OTHER: _____
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input type="radio"/> PVC	OTHER: _____
Screen	SS304	SS316	PTFE	<input type="radio"/> PVC	OTHER: _____

CASING MEASUREMENTS

Diameter of Borehole	(inches)	<u>8.0</u>
ID of Riser Pipe	(inches)	<u>2.0</u>
Protective Casing Length	(feet)	<u>5.0</u>
Riser Pipe Length	(feet)	<u>13.40</u>
Bottom of Screen to End Cap	(feet)	<u>0.49</u>
Screen Length (1st slot to last slot)	(feet)	<u>4.68</u>
Total Length of Casing	(feet)	<u>18.57</u>
Screen Slot Size **	(inches)	<u>0.010</u>



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

Table with 3 columns: Elevations (MSL)*, Depths (BGS), and (0.01 ft.)
Rows include: Top of Protective Casing (625.29, -2.78), Top of Riser Pipe (624.88, -2.37), Ground Surface (622.51, 0.00), Top of Annular Sealant (621.51, 1.00), Static Water Level (After Completion), Top of Seal (575.51, 47.00), Top of Sand Pack (574.51, 48.00), Top of Screen (573.53, 48.98), Bottom of Screen (563.76, 58.75), Bottom of Well (562.91, 59.60), Bottom of Borehole (562.51, 60.00)
Includes a central diagram of a well casing and screen assembly.

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value
Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (51.85 feet), Bottom of Screen to End Cap (0.35 feet), Screen Length (9.77 feet), Total Length of Casing (61.97 feet), Screen Slot Size (0.010 inches)

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER
Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC)



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, sand pack, and screen.

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

Table with 3 columns: Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (626.20, -3.43), Top of Riser Pipe (625.88, -3.11), Ground Surface (622.77, 0.00), Top of Annular Sealant (622.27, 0.50), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (610.77, 12.00), Top of Screen (609.80, 12.97), Bottom of Screen (605.02, 17.75), Bottom of Well (604.67, 18.10), Bottom of Borehole (604.67, 18.10).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 2 columns: Measurement and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (16.08 feet), Bottom of Screen to End Cap (0.35 feet), Screen Length (4.78 feet), Total Length of Casing (21.21 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 2 columns: Material Type and Material Selection. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Rows include: Top of Protective Casing (623.32, -3.43), Top of Riser Pipe (622.87, -2.98), Ground Surface (619.89, 0.00), Top of Annular Sealant (619.39, 0.50), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (610.69, 9.20), Top of Screen (609.65, 10.24), Bottom of Screen (604.86, 15.03), Bottom of Well (604.51, 15.38), Bottom of Borehole (603.99, 15.90).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 2 columns: Measurement and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (13.22 feet), Bottom of Screen to End Cap (0.35 feet), Screen Length (1st slot to last slot) (4.79 feet), Total Length of Casing (18.36 feet), Screen Slot Size ** (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, sand pack, and screen.

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

Diagram of well construction with elevations and depths table. Includes details for surface seal, annular sealant, bentonite seal, sand pack, and screen.

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, and Screen Slot Size.



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Rows include: Top of Protective Casing (620.11, -3.19), Top of Riser Pipe (619.78, -2.86), Ground Surface (616.92, 0.00), Top of Annular Sealant (615.92, 1.00), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (608.92, 8.00), Top of Screen (607.13, 9.79), Bottom of Screen (602.34, 14.58), Bottom of Well (601.99, 14.93), Bottom of Borehole (601.67, 15.25).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (12.65 feet), Bottom of Screen to End Cap (0.35 feet), Screen Length (4.79 feet), Total Length of Casing (17.79 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 3 columns: Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (614.62, -3.11), Top of Riser Pipe (614.30, -2.79), Ground Surface (611.51, 0.00), Top of Annular Sealant (611.11, 0.40), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (606.51, 5.00), Top of Screen (605.21, 6.30), Bottom of Screen (600.40, 11.11), Bottom of Well (600.05, 11.46), Bottom of Borehole (599.51, 12.00).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 2 columns: Measurement and Value. Measurements include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (9.09 feet), Bottom of Screen to End Cap (0.35 feet), Screen Length (4.81 feet), Total Length of Casing (14.25 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 2 columns: Material Type and Material Selection. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (614.28 MSL, -3.17 BGS), Top of Riser Pipe (613.88 MSL, -2.77 BGS), Ground Surface (611.11 MSL, 0.00 BGS), Top of Annular Sealant (609.11 MSL, 2.00 BGS), Top of Seal (n/a MSL, n/a BGS), Top of Sand Pack (597.61 MSL, 13.50 BGS), Top of Screen (596.55 MSL, 14.56 BGS), Bottom of Screen (591.53 MSL, 19.58 BGS), Bottom of Well (591.09 MSL, 20.02 BGS), Bottom of Borehole (591.06 MSL, 20.05 BGS).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

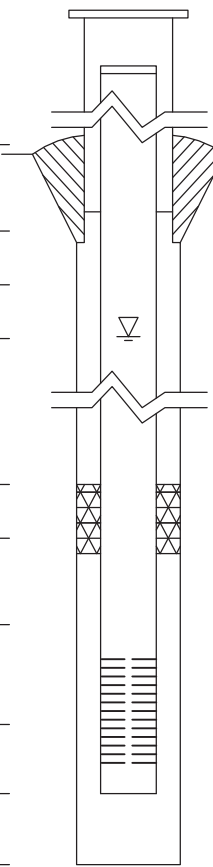
Table with 3 columns: Measurement, Unit, Value. Measurements include Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (17.30 feet), Bottom of Screen to End Cap (0.47 feet), Screen Length (5.02 feet), Total Length of Casing (22.79 feet), and Screen Slot Size (0.010 inches).



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

Table with 3 columns: Elevations (MSL)*, Depths (BGS), and (0.01 ft.)
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: _____



WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material type, SS304, SS316, PTFE, PVC, OTHER: (Steel, PVC)

CASING MEASUREMENTS

Table with 3 columns: Measurement, (inches/feet), Value



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Data points include: Top of Protective Casing (623.89 MSL, -2.95 BGS), Top of Riser Pipe (623.52 MSL, -2.58 BGS), Ground Surface (620.94 MSL, 0.00 BGS), Top of Annular Sealant (620.54 MSL, 0.40 BGS), Static Water Level (After Completion), Top of Seal (n/a MSL, n/a BGS), Top of Sand Pack (612.64 MSL, 8.30 BGS), Top of Screen (611.25 MSL, 9.69 BGS), Bottom of Screen (606.46 MSL, 14.48 BGS), Bottom of Well (606.09 MSL, 14.85 BGS), Bottom of Borehole (605.04 MSL, 15.90 BGS).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (OTHER: Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (12.27 feet), Bottom of Screen to End Cap (0.37 feet), Screen Length (1st slot to last slot) (4.79 feet), Total Length of Casing (17.43 feet), Screen Slot Size ** (0.010 inches).



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

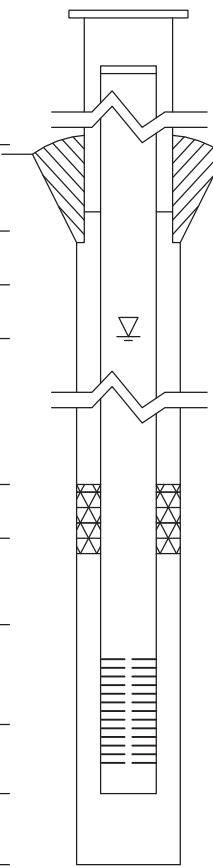
Drilling Method: Hollow stem auger Drilling Fluid (Type): None

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

	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	<u>603.06</u>	<u>-3.42</u>	Top of Protective Casing
	<u>602.59</u>	<u>-2.95</u>	Top of Riser Pipe
Type of Surface Seal: <u>Concrete</u>	<u>599.64</u>	<u>0.00</u>	Ground Surface
Type of Annular Sealant: <u>Bentonite chips</u>	<u>598.84</u>	<u>0.80</u>	Top of Annular Sealant
Installation Method: <u>Gravity</u>			
Setting Time: <u>>24 hours</u>			
Type of Bentonite Seal -- Granular Pellet Slurry (choose one)			Static Water Level (After Completion)
Installation Method: _____	<u>n/a</u>	<u>n/a</u>	Top of Seal
Setting Time: _____	<u>590.64</u>	<u>9.00</u>	Top of Sand Pack
Type of Sand Pack: <u>Quartz sand</u>	<u>589.62</u>	<u>10.02</u>	Top of Screen
Grain Size: <u>10-20</u> (sieve size)	<u>584.82</u>	<u>14.82</u>	Bottom of Screen
Installation Method: <u>Gravity</u>	<u>584.48</u>	<u>15.16</u>	Bottom of Well
Type of Backfill Material: <u>N/A</u> (if applicable)			
Installation Method: _____	<u>583.89</u>	<u>15.75</u>	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: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> 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



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well cross-section. Rows include: Top of Protective Casing (642.26, -3.41), Top of Riser Pipe (641.93, -3.08), Ground Surface (638.85, 0.00), Top of Annular Sealant (638.05, 0.80), Static Water Level (After Completion), Top of Seal (612.55, 26.30), Top of Sand Pack (609.75, 29.10), Top of Screen (608.71, 30.14), Bottom of Screen (603.92, 34.93), Bottom of Well (603.57, 35.28), Bottom of Borehole (602.85, 36.00).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (OTHER: Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (33.22 feet), Bottom of Screen to End Cap (0.35 feet), Screen Length (4.79 feet), Total Length of Casing (38.36 feet), Screen Slot Size (0.010 inches).



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

Table with 3 columns: Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well cross-section. Data points include: Top of Protective Casing (634.92, -3.07), Top of Riser Pipe (634.57, -2.72), Ground Surface (631.85, 0.00), Top of Annular Sealant (631.15, 0.70), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (624.85, 7.00), Top of Screen (623.64, 8.21), Bottom of Screen (618.87, 12.98), Bottom of Well (618.49, 13.36), Bottom of Borehole (617.85, 14.00).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., and Screen.

CASING MEASUREMENTS

Table with 2 columns: Measurement and Value. Measurements include Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (10.93 feet), Bottom of Screen to End Cap (0.38 feet), Screen Length (4.77 feet), Total Length of Casing (16.08 feet), and Screen Slot Size (0.010 inches).



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

Table with 4 columns: Description, Elevations (MSL)*, Depths (BGS), and (0.01 ft.). Includes a central diagram of a well casing and screen assembly. Rows include: Top of Protective Casing (640.02, -3.38), Top of Riser Pipe (639.69, -3.05), Ground Surface (636.64, 0.00), Top of Annular Sealant (636.04, 0.60), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (629.64, 7.00), Top of Screen (628.59, 8.05), Bottom of Screen (618.79, 17.85), Bottom of Well (618.44, 18.20), Bottom of Borehole (618.44, 18.20).

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (11.10 feet), Bottom of Screen to End Cap (0.35 feet), Screen Length (9.80 feet), Total Length of Casing (21.25 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

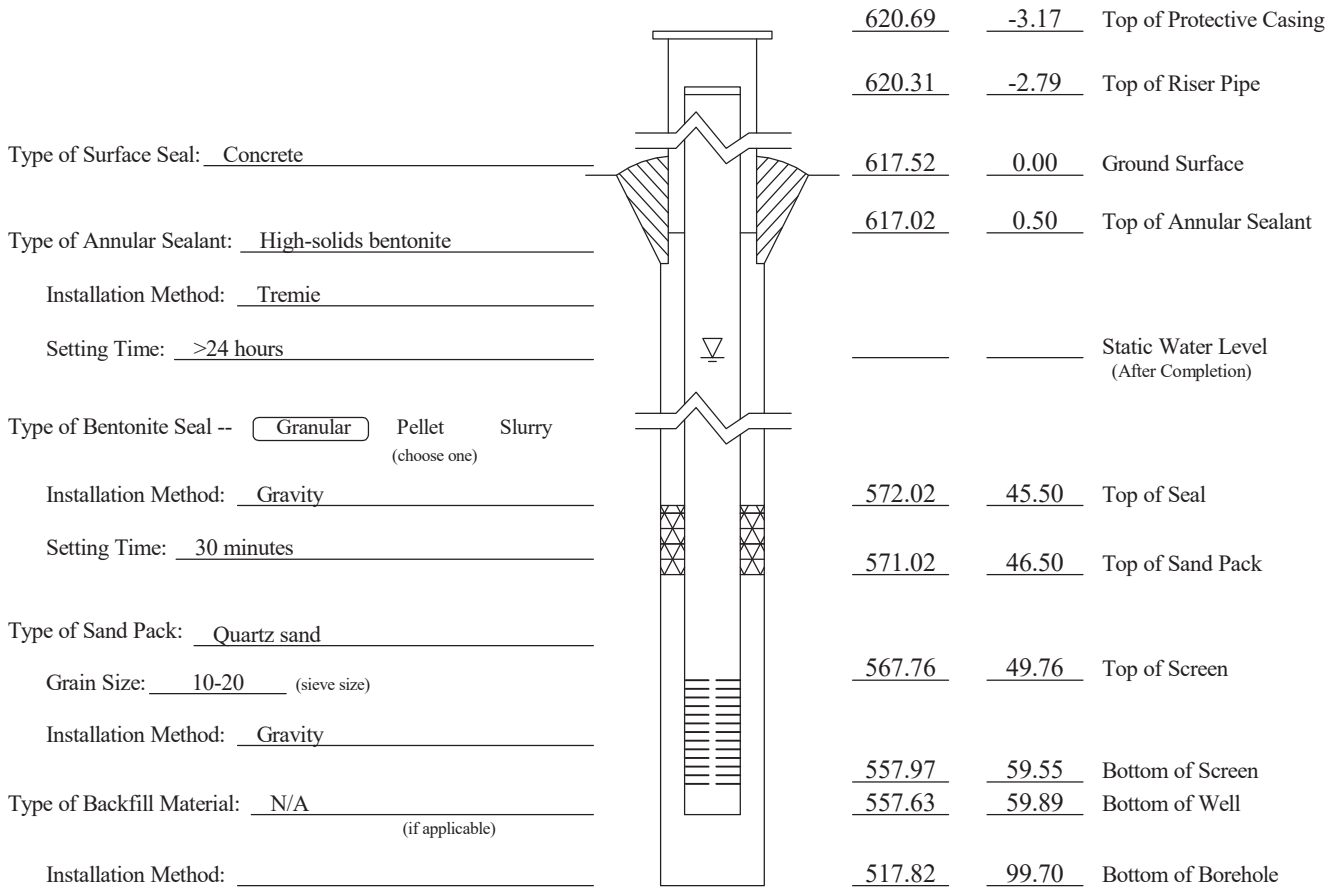
Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Vertical Well Construction

Well Completion Elevations (0.01 ft.)



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:

Table with 3 columns: Elevation (MSL)*, Elevation (BGS), and Description. Rows include Top of Protective Casing, Top of Riser Pipe, Ground Surface, Top of Annular Sealant, Static Water Level, Top of Seal, Top of Sand Pack, Top of Screen, Bottom of Screen, Bottom of Well, and Bottom of Borehole.

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, and Value. Rows include Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (52.55 feet), Bottom of Screen to End Cap (0.34 feet), Screen Length (9.79 feet), Total Length of Casing (62.68 feet), and Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Table with 6 columns: Component, SS304, SS316, PTFE, PVC, OTHER. Rows include Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), and Screen (PVC).



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

Vertical Well Construction

Well Completion (MSL)* Riser Pipe (BGS) (0.01 ft.)

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: _____

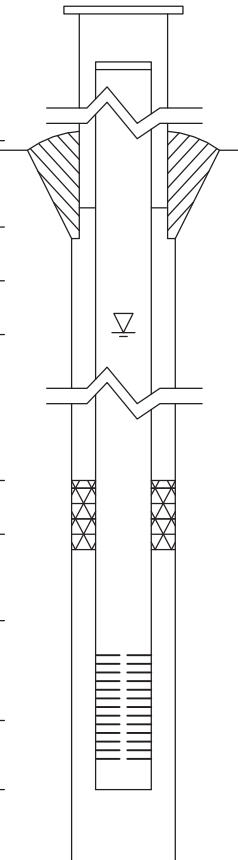


Table with 3 columns: Well Completion (MSL)*, Riser Pipe (BGS), and (0.01 ft.)

<u>634.35</u>	<u>-2.94</u>	Top of Protective Casing
<u>634.14</u>	<u>-2.73</u>	Top of Riser Pipe
<u>631.41</u>	<u>0.00</u>	Ground Surface
<u>631.11</u>	<u>0.30</u>	Top of Annular Sealant
_____	_____	Static Water Level (After Completion)
<u>585.81</u>	<u>45.60</u>	Top of Seal
<u>583.41</u>	<u>48.00</u>	Top of Sand Pack
<u>582.21</u>	<u>49.20</u>	Top of Screen
<u>572.41</u>	<u>59.00</u>	Bottom of Screen
<u>572.02</u>	<u>59.39</u>	Bottom of Well
<u>571.41</u>	<u>60.00</u>	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material type, SS304, SS316, PTFE, PVC, OTHER

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value

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

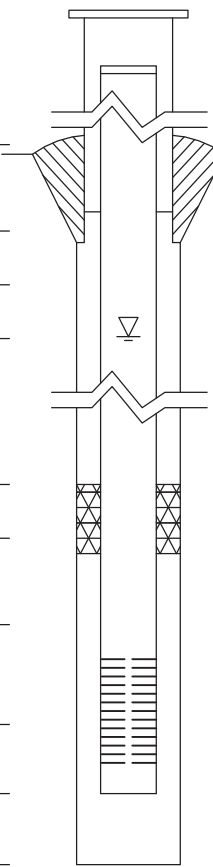


Site #: _____ County: Montgomery Well #: G283
Site Name: Coffeen Part 845 Groundwater Borehole #: G283
State _____
Plane Coordinate: X 2,516,503.0 Y 874,113.0 (or) Latitude: _____ Longitude: _____
Surveyed By: Michael J. Graminski IL Registration #: 035-003919
Drilling Contractor: Roberts Driller: Matt
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

Vertical Well Construction

Well Completion (MSL)* Riser Pipe (BGS) (0.01 ft.)

Table with 3 columns: Description, Well Completion (MSL)*, Riser Pipe (BGS). Rows include: Top of Protective Casing (611.07, -2.77), Top of Riser Pipe (610.75, -2.45), Ground Surface (608.30, 0.00), Top of Annular Sealant (607.70, 0.60), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (600.80, 7.50), Top of Screen (599.91, 8.39), Bottom of Screen (590.13, 18.17), Bottom of Well (589.94, 18.36), Bottom of Borehole (589.94, 18.36).



* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 2 columns: Measurement, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (10.84 feet), Bottom of Screen to End Cap (0.38 feet), Screen Length (9.78 feet), Total Length of Casing (21.00 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Table with 2 columns: Material Type, Material Selection. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Vertical Well Construction

Well Completion (MSL)* Riser Pipe (BGS) (0.01 ft.)

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: _____

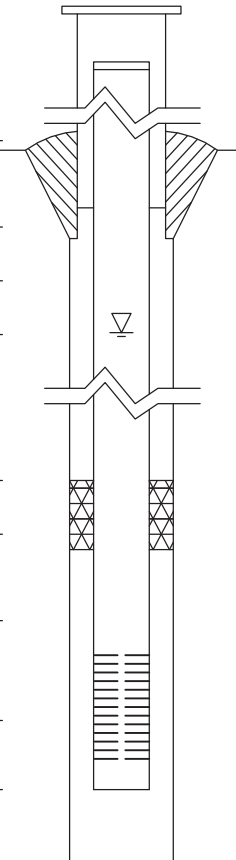


Table with 3 columns: Well Completion (MSL)*, Riser Pipe (BGS), and (0.01 ft.). Rows include: Top of Protective Casing (618.66, -3.33), Top of Riser Pipe (618.42, -3.09), Ground Surface (615.33, 0.00), Top of Annular Sealant (614.33, 1.00), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (608.33, 7.00), Top of Screen (607.25, 8.08), Bottom of Screen (602.48, 12.85), Bottom of Well (602.10, 13.23), Bottom of Borehole (601.33, 14.00).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material type (Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., Screen) and 5 options (SS304, SS316, PTFE, PVC, OTHER: Steel/PVC).

CASING MEASUREMENTS

Table with 3 columns: Measurement (Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, Screen Slot Size), Unit, and Value.



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

Vertical Well Completion Data

Well Completion (MSL)* (0.01 ft.)
Riser Pipe (BGS)

Table with 3 columns: Description, Well Completion (MSL)*, Riser Pipe (BGS). Rows include: Top of Protective Casing (613.90, -3.36), Top of Riser Pipe (613.52, -2.98), Ground Surface (610.54, 0.00), Top of Annular Sealant (610.24, 0.30), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (598.24, 12.30), Top of Screen (596.86, 13.68), Bottom of Screen (587.09, 23.45), Bottom of Well (586.71, 23.83), Bottom of Borehole (584.54, 26.00). Includes a well diagram and various material selection fields.

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 3 columns: Measurement, Unit, Value. Rows include: Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (16.66 feet), Bottom of Screen to End Cap (0.38 feet), Screen Length (9.77 feet), Total Length of Casing (26.81 feet), Screen Slot Size (0.010 inches).

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Table with 6 columns: Material Type, SS304, SS316, PTFE, PVC, OTHER. Rows include: Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).



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

Vertical Well Construction

Well Completion (MSL)* Riser Pipe (BGS) (0.01 ft.)

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: _____

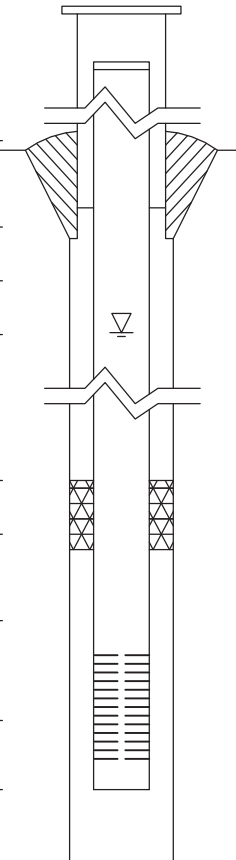


Table with 3 columns: Well Completion (MSL)*, Riser Pipe (BGS), and (0.01 ft.). Rows include: Top of Protective Casing (613.57, -3.60), Top of Riser Pipe (613.13, -3.16), Ground Surface (609.97, 0.00), Top of Annular Sealant (609.47, 0.50), Static Water Level (After Completion), Top of Seal (n/a, n/a), Top of Sand Pack (607.27, 2.70), Top of Screen (606.60, 3.37), Bottom of Screen (601.81, 8.16), Bottom of Well (601.47, 8.50), Bottom of Borehole (599.97, 10.00).

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS (Choose one type of material for each area)

Table with 6 columns: Material type (Protective Casing, Riser Pipe Above W.T., Riser Pipe Below W.T., Screen) and 5 options (SS304, SS316, PTFE, PVC, OTHER: Steel/PVC).

CASING MEASUREMENTS

Table with 2 columns: Measurement (Diameter of Borehole, ID of Riser Pipe, Protective Casing Length, Riser Pipe Length, Bottom of Screen to End Cap, Screen Length, Total Length of Casing, Screen Slot Size) and Value (8.0, 2.0, 5.0, 6.53, 0.34, 4.79, 11.66, 0.010).

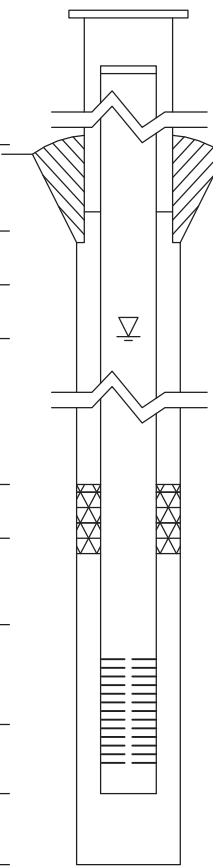


Site #: _____ County: Montgomery Well #: G287
 Site Name: Coffeen Part 845 Groundwater Borehole #: G287
 State _____
 Plane Coordinate: X 2,516,415.5 Y 875,442.8 (or) Latitude: _____ Longitude: _____
 Surveyed By: Michael J. Graminski IL Registration #: 035-002901
 Drilling Contractor: Roberts Driller: 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

Vertical Well Construction

Well Completion Elevations (0.01 ft.)

Well Completion Elevation (MSL)*	Riser Pipe Elevation (BGS)	Description
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



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: _____

* 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

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: <input checked="" type="checkbox"/> Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:
Screen	SS304	SS316	PTFE	<input checked="" type="checkbox"/> PVC	OTHER:



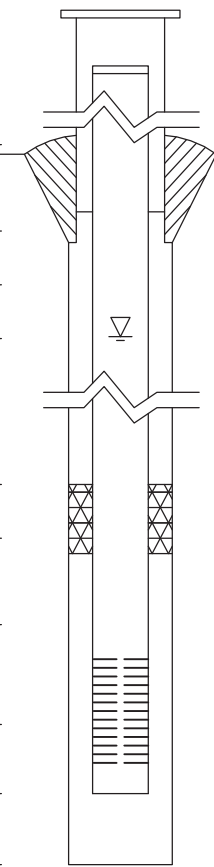
Site #: _____ County: Montgomery Well #: G288
Site Name: Coffeen Part 845 Groundwater Borehole #: G288
State _____
Plane Coordinate: X 2,517,071.4 Y 875,279.6 (or) Latitude: _____ Longitude: _____
Surveyed By: Michael J. Graminski IL Registration #: 035-002901
Drilling Contractor: Roberts Driller: Matt
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

Vertical Well Construction

Well Completion (MSL)* Riser Pipe (BGS) (0.01 ft.)

Table with 3 columns: Description, Well Completion (MSL)*, Riser Pipe (BGS). Includes rows for Top of Protective Casing, Top of Riser Pipe, Ground Surface, Top of Annular Sealant, Static Water Level, Top of Seal, Top of Sand Pack, Top of Screen, Bottom of Screen, Bottom of Well, Bottom of Borehole.

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: _____



* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Table with 2 columns: Measurement, Value. Includes Diameter of Borehole (8.0 inches), ID of Riser Pipe (2.0 inches), Protective Casing Length (5.0 feet), Riser Pipe Length (10.58 feet), Bottom of Screen to End Cap (0.49 feet), Screen Length (4.67 feet), Total Length of Casing (15.74 feet), Screen Slot Size (0.010 inches).

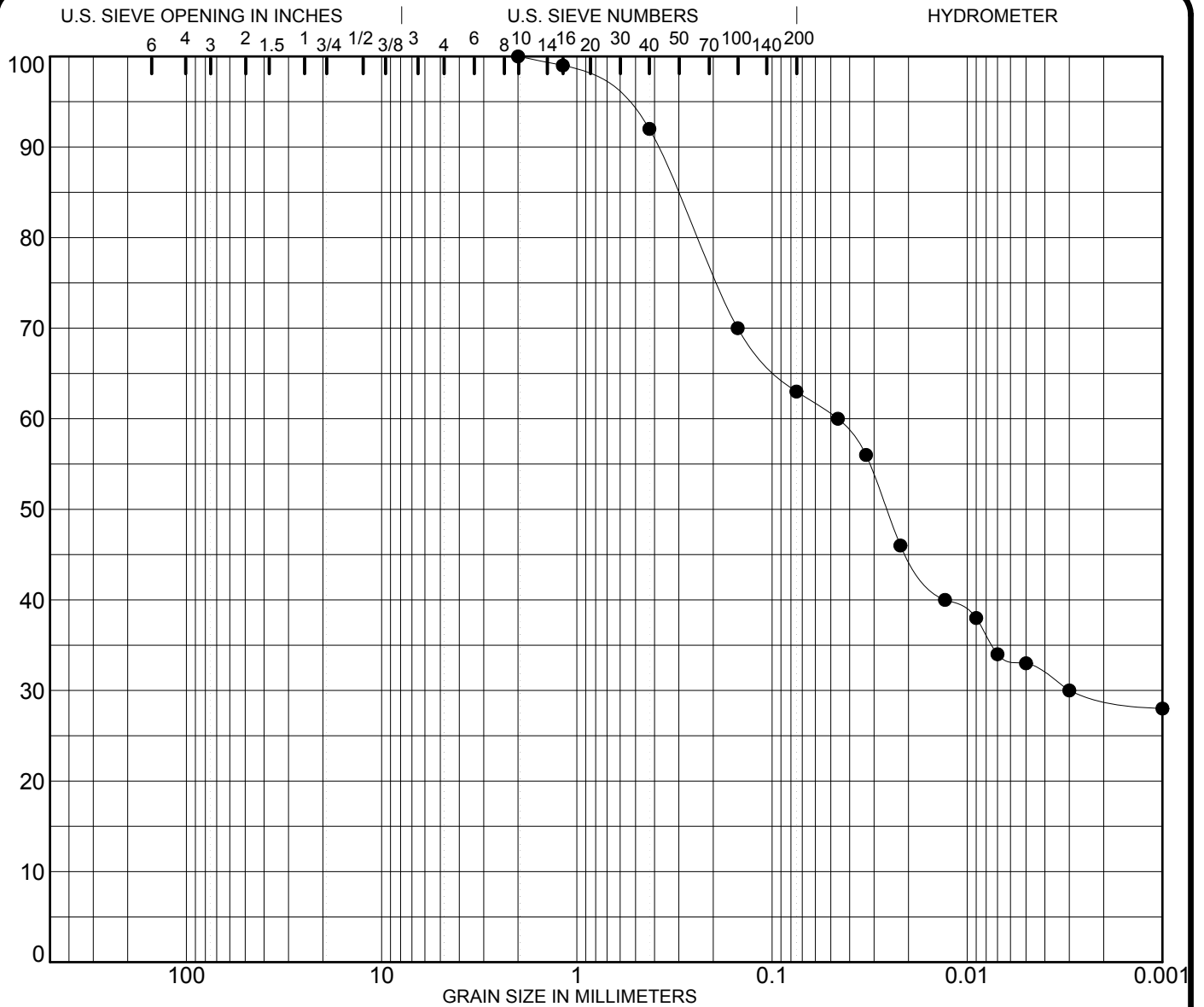
WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Table with 2 columns: Material Type, Selection. Includes Protective Casing (Steel), Riser Pipe Above W.T. (PVC), Riser Pipe Below W.T. (PVC), Screen (PVC).

APPENDIX D
GEOTECHNICAL LABORATORY REPORTS

RAMSEY GEOTECHNICAL REPORT



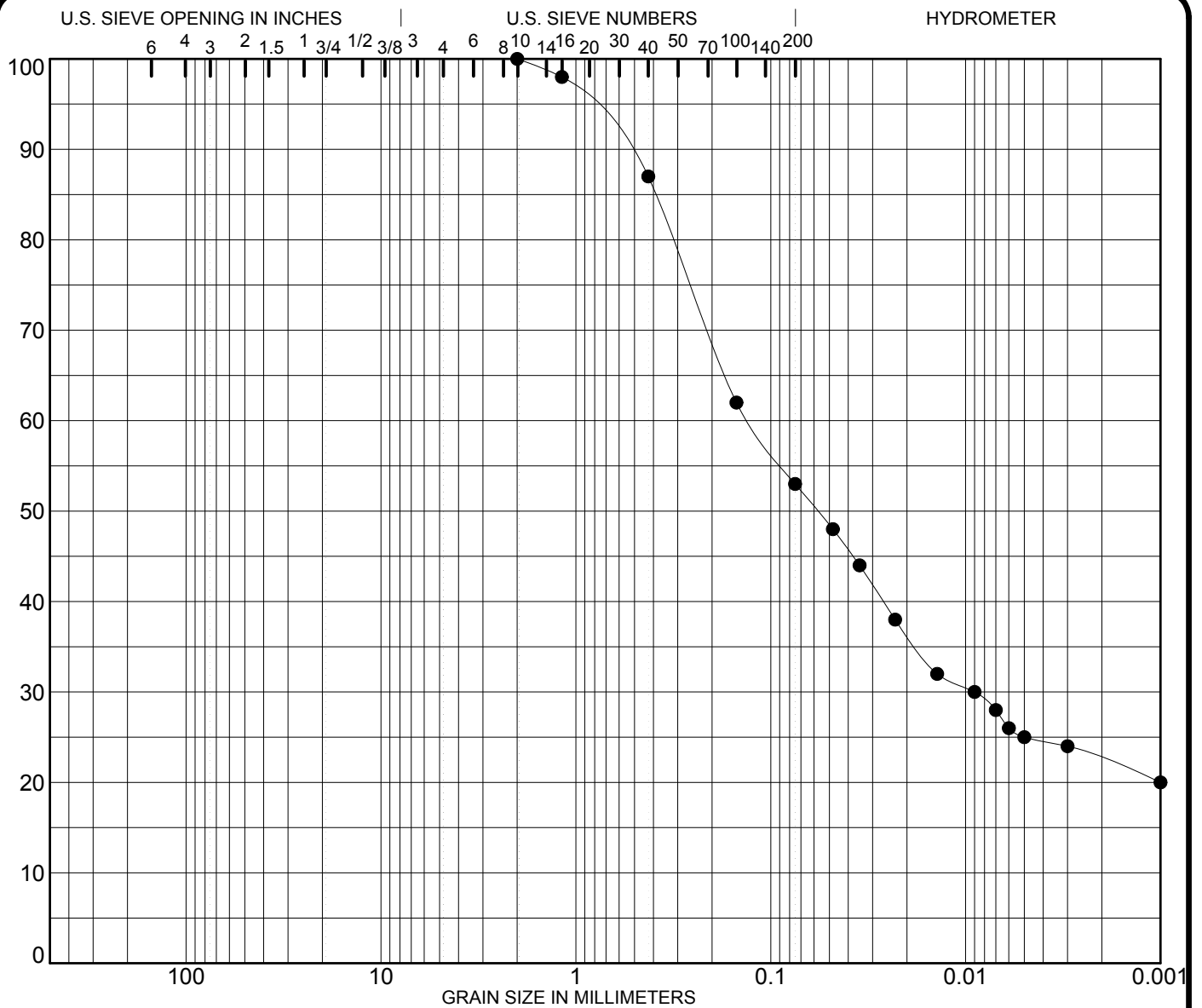
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G275D/Comp1	3/8	100.0	Lean Clay, with sand				
	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
	#16	99.0	0	37	34	29	
NOTES:	#30						
Specific Gravity - 2.66	#40	92.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	#50		18.3	110.8	33	16	17
	#80						
	#100	70.0	Density/Moisture Relationship: Standard				
	#200	63.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois** JOB NO. **21-055**
 DATE **March 23, 2021**

G275D/Comp1

SOIL DATA SHEET
Ramsey Geotechnical Engineering
 Bloomington, IL 61701

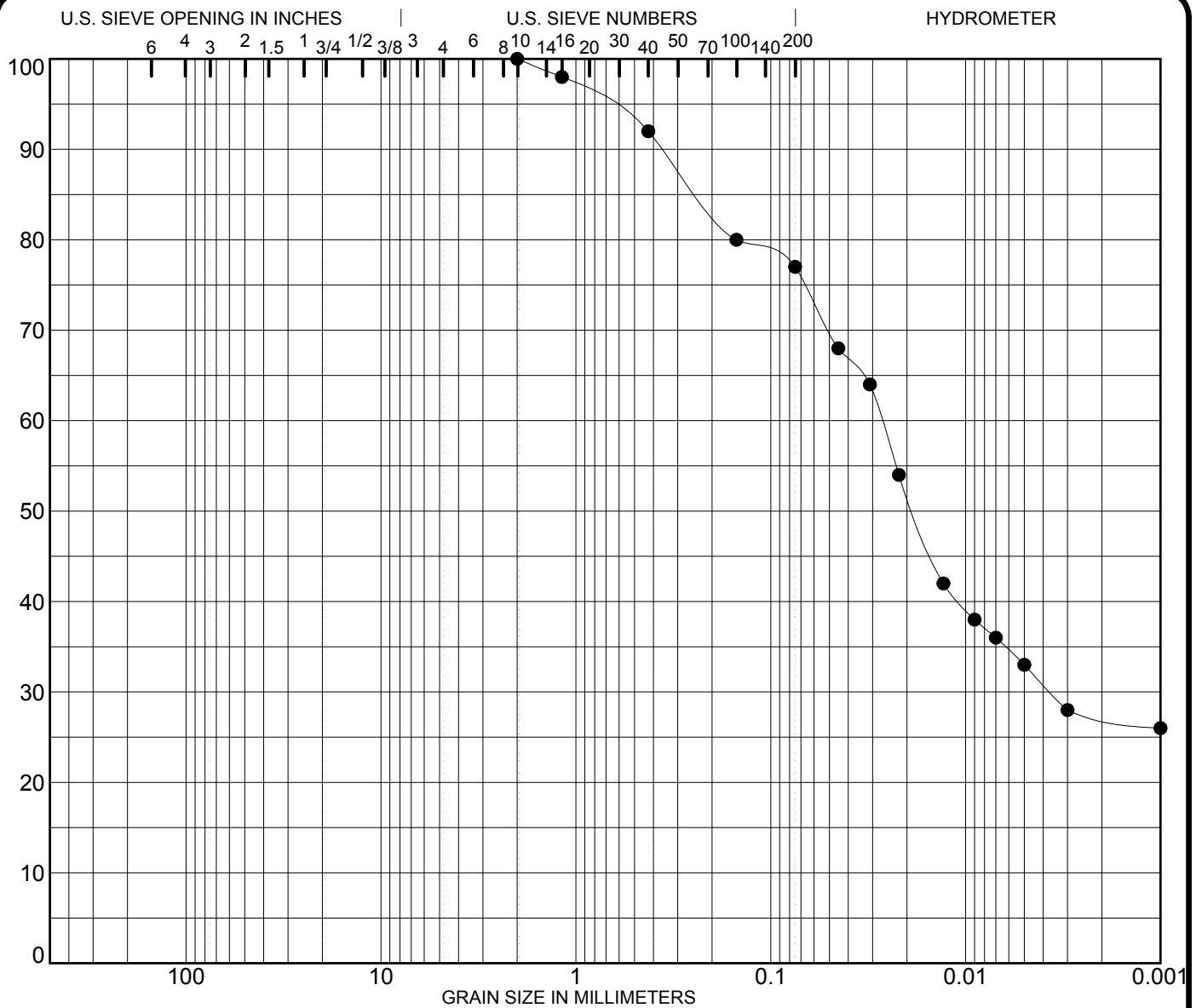


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G275D/Comp2	3/8	100.0	Sandy Lean Clay				
	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
	# 16	98.0	0	47	31	22	
NOTES: Specific Gravity - 2.57	# 30						
	# 40	87.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	# 50		20.4	102.5	32	17	15
	# 80						
	# 100	62.0	Density/Moisture Relationship: Standard				
	# 200	53.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility -** JOB NO. **21-055**
Montgomery County, Illinois DATE **March 23, 2021**
 G275D/Comp2

SOIL DATA SHEET
Ramsey Geotechnical Engineering
 Bloomington, IL 61701



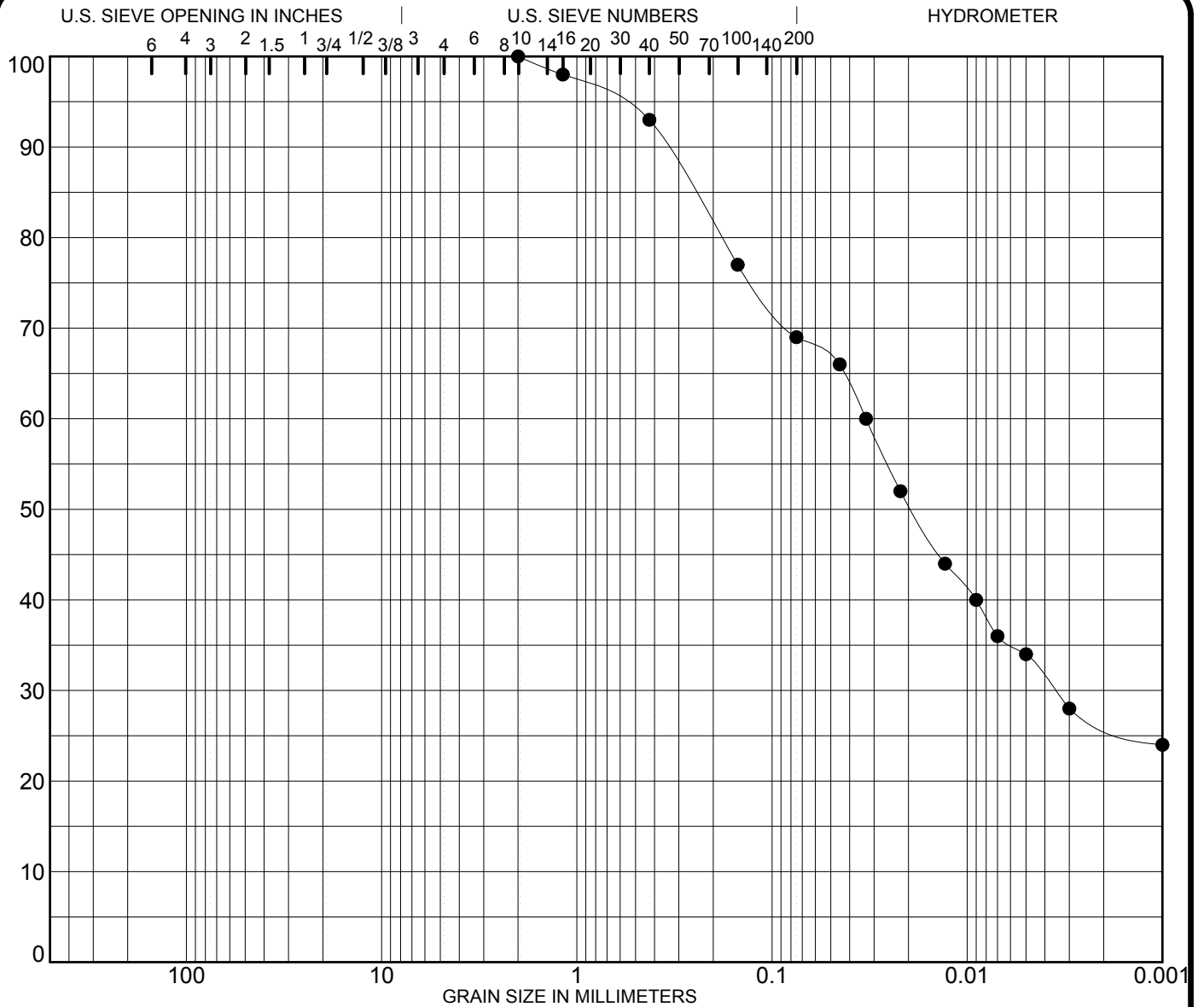
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G275D/Comp3	3/8	100.0	Lean Clay, with sand				
	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
	#16	98.0	0	23	50	27	
NOTES: Specific Gravity - 2.64	#30						
	#40	92.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	#50		13.2	121.6	39	15	24
	#80						
	#100	80.0	Density/Moisture Relationship: Standard				
	#200	77.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois** JOB NO. **21-055**
 DATE **March 23, 2021**

G275D/Comp3

SOIL DATA SHEET
Ramsey Geotechnical Engineering
 Bloomington, IL 61701

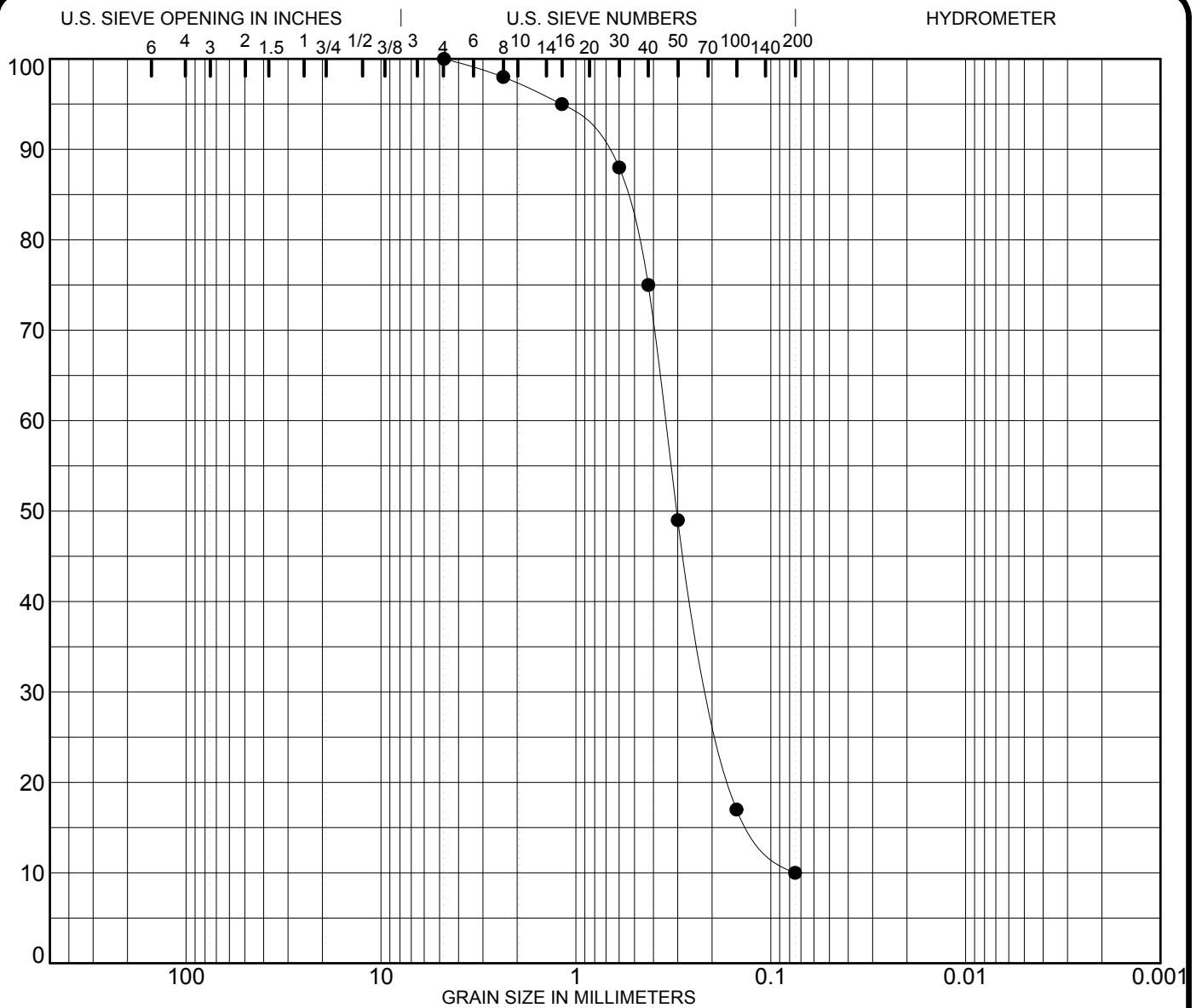


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G275D/Comp4	3/8	100.0	Sandy Lean Clay				
	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
	#16	98.0	0	31	43	26	
NOTES: Specific Gravity - 2.64	#30						
	#40	93.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	#50		13.3	122.0	30	15	15
	#80						
	#100	77.0	Density/Moisture Relationship: Standard				
	#200	69.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility -** JOB NO. **21-055**
Montgomery County, Illinois DATE **March 23, 2021**
 G275D/Comp4

SOIL DATA SHEET
Ramsey Geotechnical Engineering
 Bloomington, IL 61701



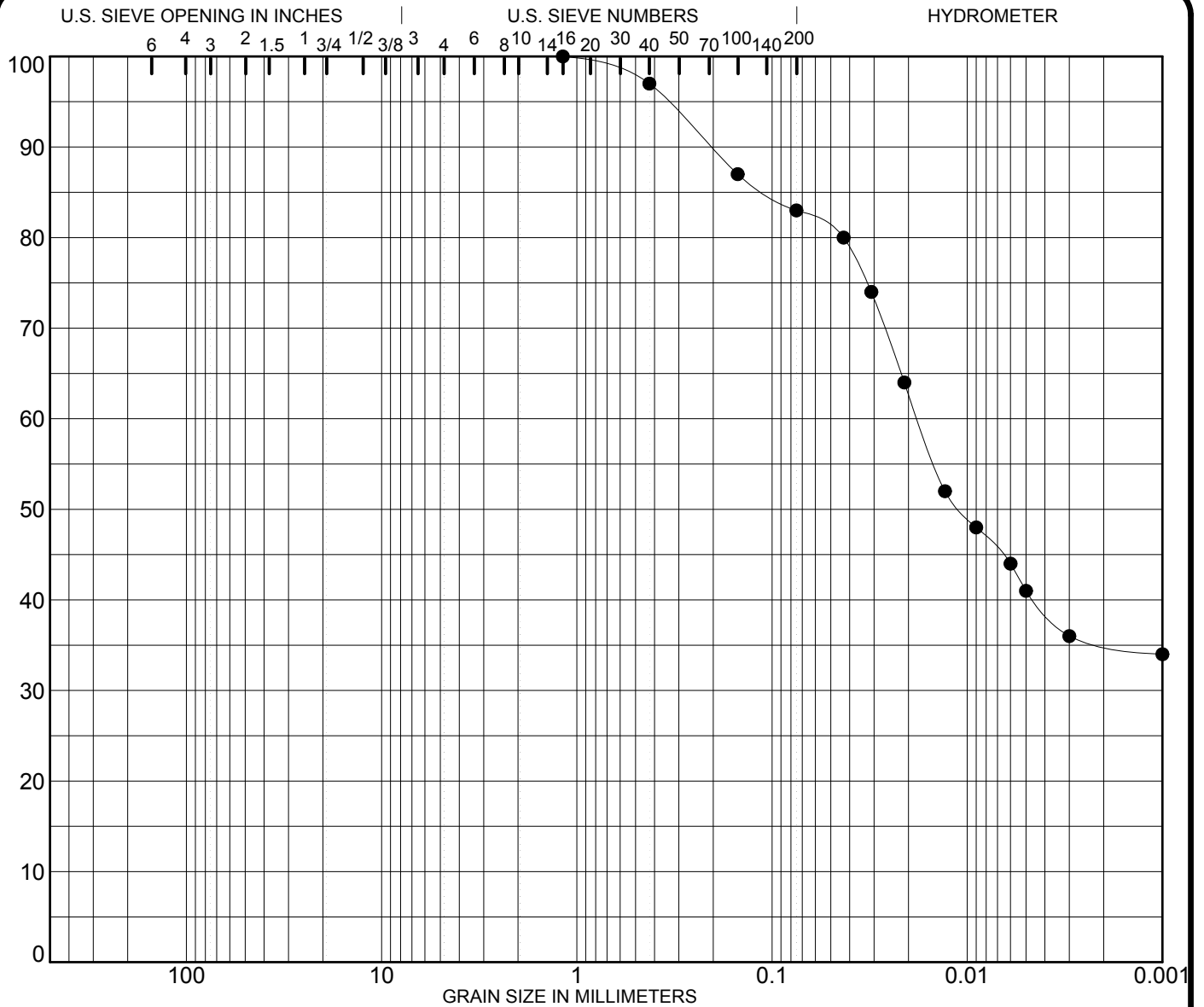
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G275D/Comp5	3/8	100.0	Fine to Medium Sand, with silt				
	#4	100.0					
	#8	98.0					
	#10		%GRAVEL	%SAND	%SILT	%CLAY	
NOTES:	# 16	95.0	0	90	10		
Specific Gravity - 2.59	# 30	88.0					
	# 40	75.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	# 50	49.0	10.2		NP	NP	NP
	# 80						
	# 100	17.0	Density/Moisture Relationship: Standard				
	# 200	10.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility -** JOB NO. **21-055**
Montgomery County, Illinois DATE **April 8, 2021**

G275D/Comp5

SOIL DATA SHEET
Ramsey Geotechnical Engineering
 Bloomington, IL 61701



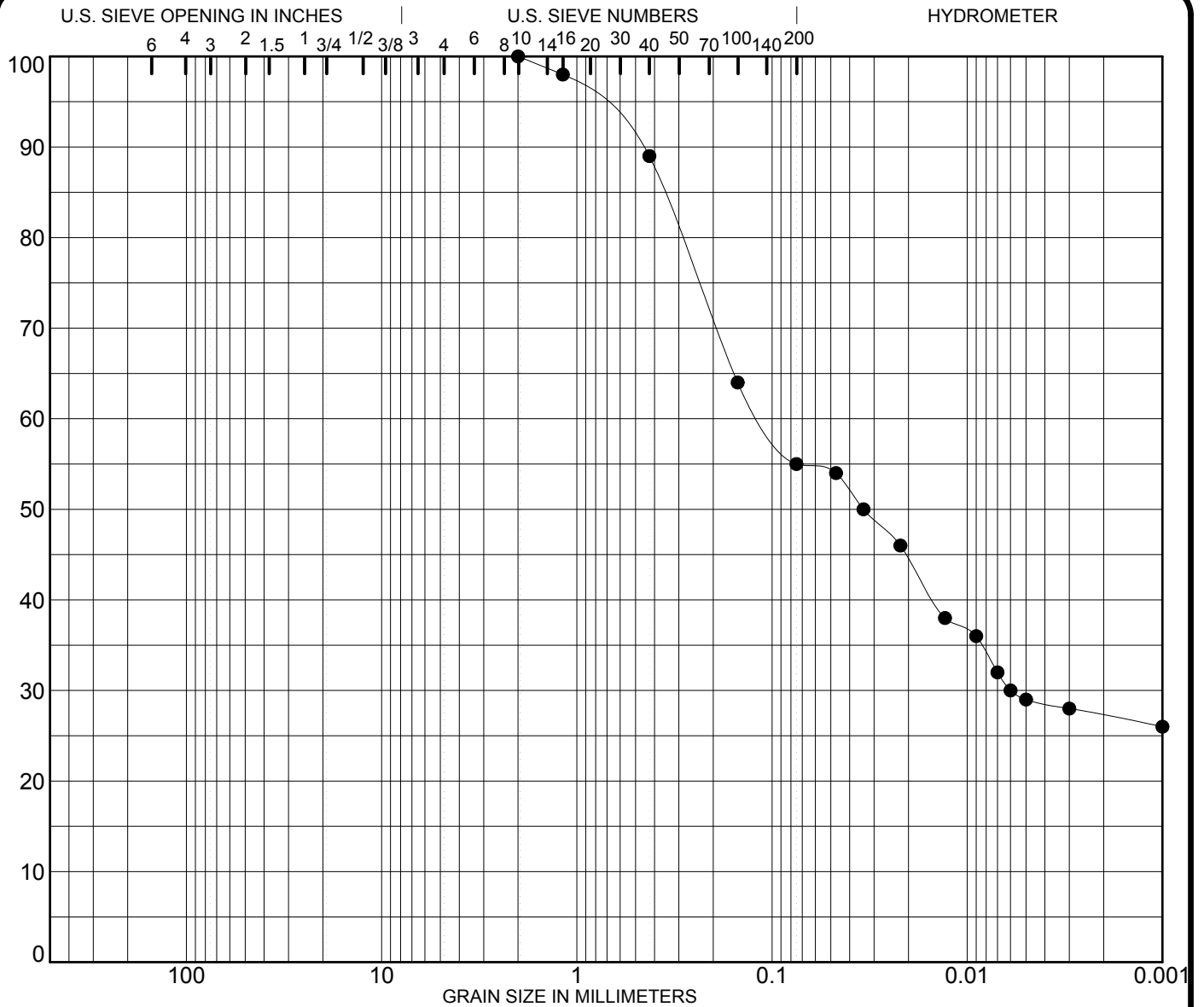
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G275D/Comp6	3/8	100.0	Lean Clay, with sand				
	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
	#16	100.0	0	17	48	35	
NOTES: Specific Gravity - 2.66	#30						
	#40	97.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	#50		20.6	106.3	39	16	23
	#80						
	#100	87.0	Density/Moisture Relationship: Standard				
	#200	83.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois** JOB NO. **21-055**
 DATE **March 18, 2021**

G275D/Comp6

SOIL DATA SHEET
Ramsey Geotechnical Engineering
 Bloomington, IL 61701



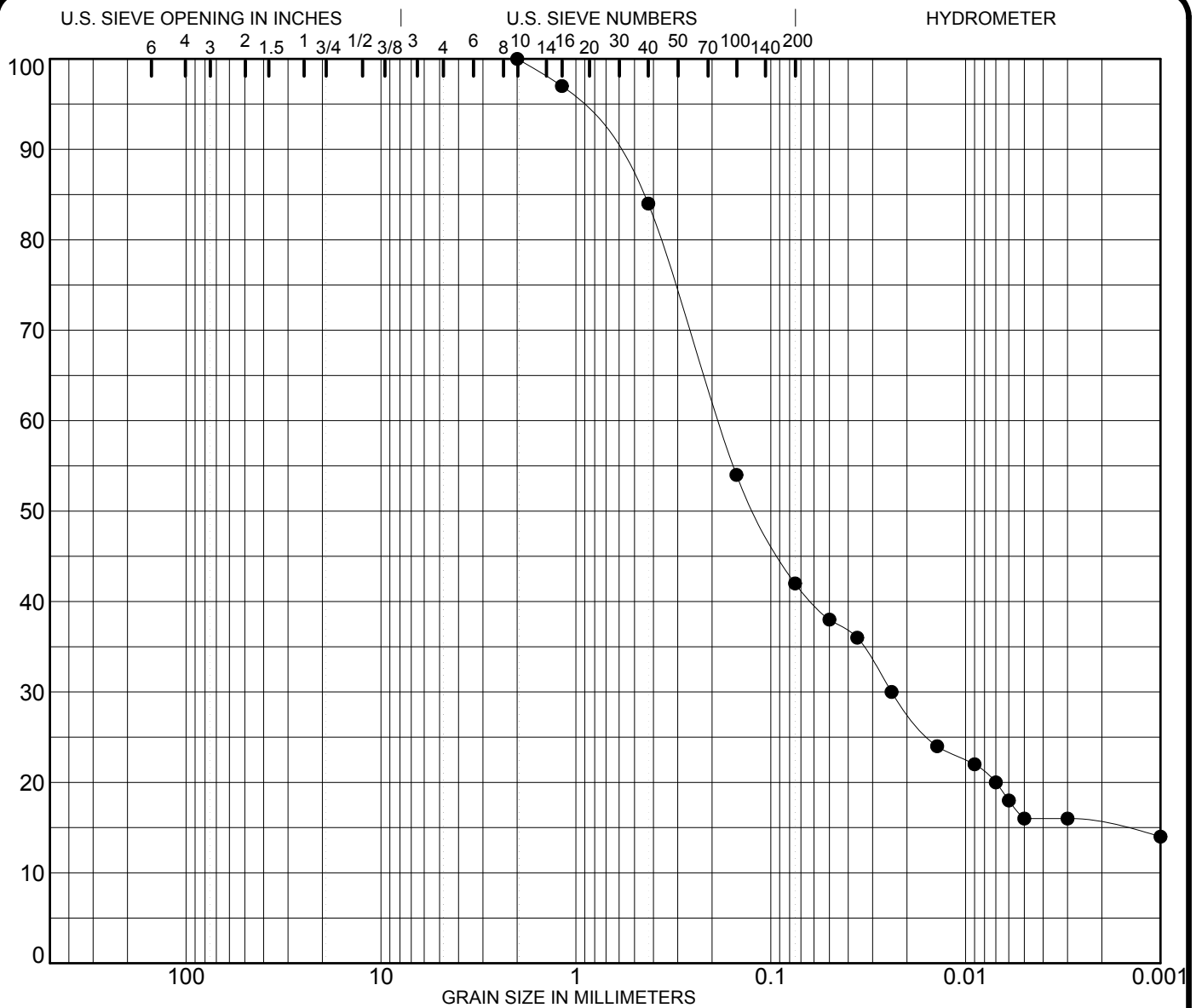
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G284/Comp1	3/8	100.0	Sandy Lean Clay				
	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
	#16	98.0	0	45	28	27	
NOTES: Specific Gravity - 2.56	#30						
	#40	89.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	#50		15.5	110.4	30	14	16
	#80						
	#100	64.0	Density/Moisture Relationship: Standard				
	#200	55.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility -** JOB NO. **21-055**
Montgomery County, Illinois DATE **March 17, 2021**

G284/Comp1

SOIL DATA SHEET
Ramsey Geotechnical Engineering
 Bloomington, IL 61701



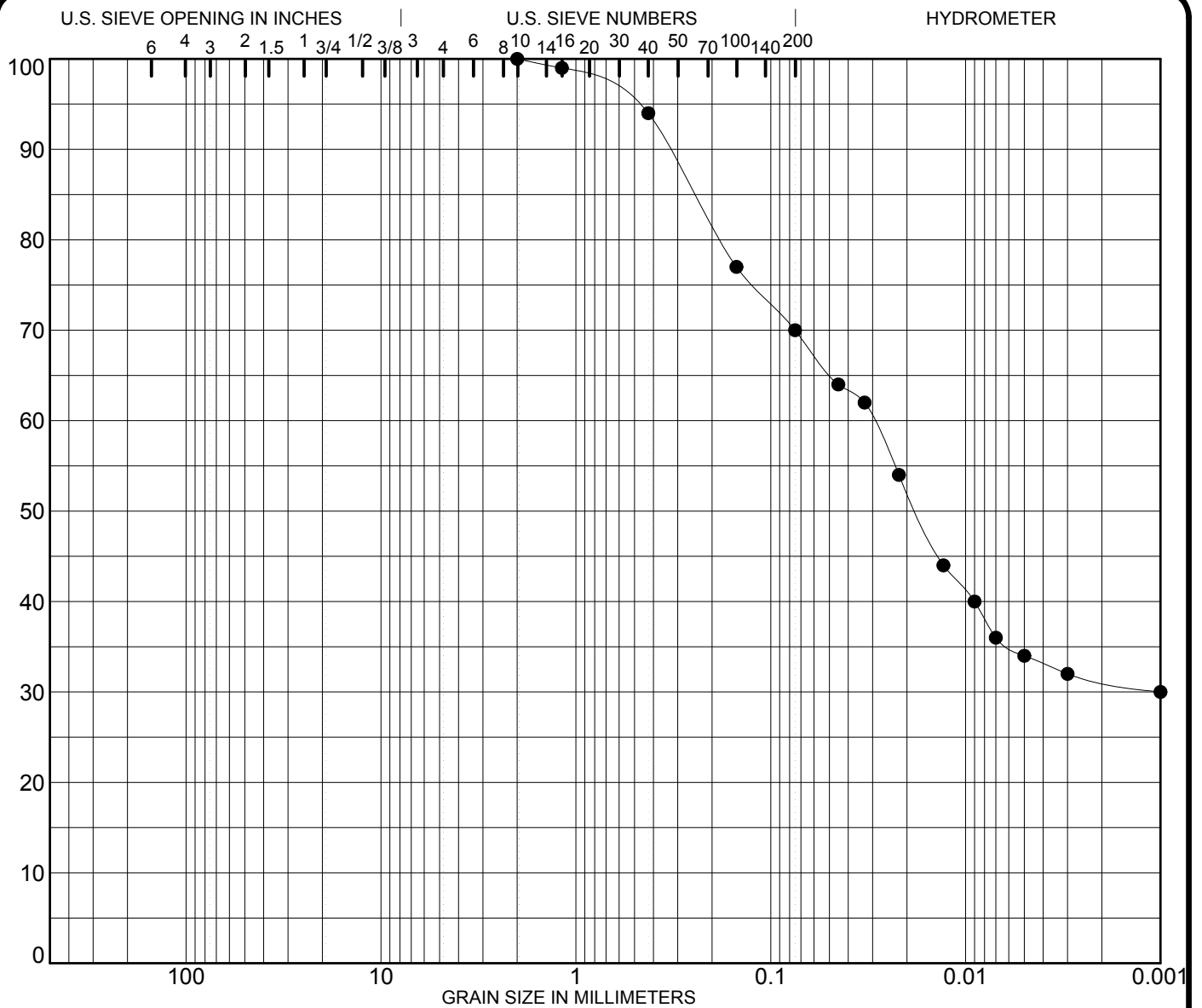
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G284/Comp2	3/8	100.0	Silty Fine to Medium Sand				
	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
NOTES:	# 16	97.0	0	58	27	15	
Specific Gravity - 2.63	# 30						
	# 40	84.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	# 50		12.7	122.2	18	12	6
	# 80						
	# 100	54.0	Density/Moisture Relationship: Standard				
	# 200	42.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility -** JOB NO. **21-055**
Montgomery County, Illinois DATE **March 17, 2021**

G284/Comp2

SOIL DATA SHEET
Ramsey Geotechnical Engineering
 Bloomington, IL 61701



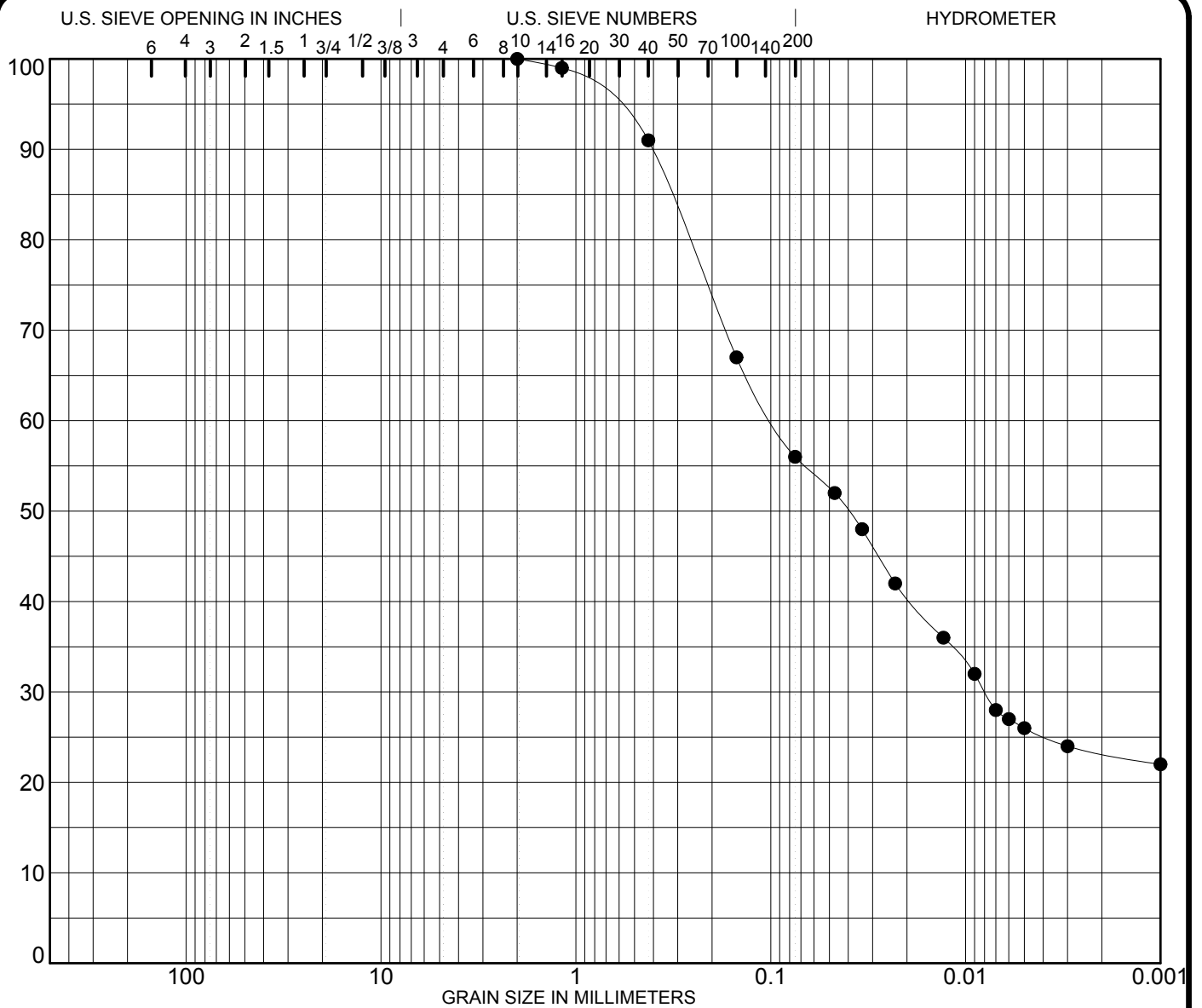
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G288/Comp1	3/8	100.0	Sandy Lean Clay				
	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
	#16	99.0	0	30	39	31	
NOTES:	#30						
Specific Gravity - 2.55	#40	94.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	#50		20.2	104.6	40	19	21
	#80						
	#100	77.0	Density/Moisture Relationship: Standard				
	#200	70.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility -** JOB NO. **21-055**
Montgomery County, Illinois DATE **March 17, 2021**

G288/Comp1

SOIL DATA SHEET
Ramsey Geotechnical Engineering
 Bloomington, IL 61701



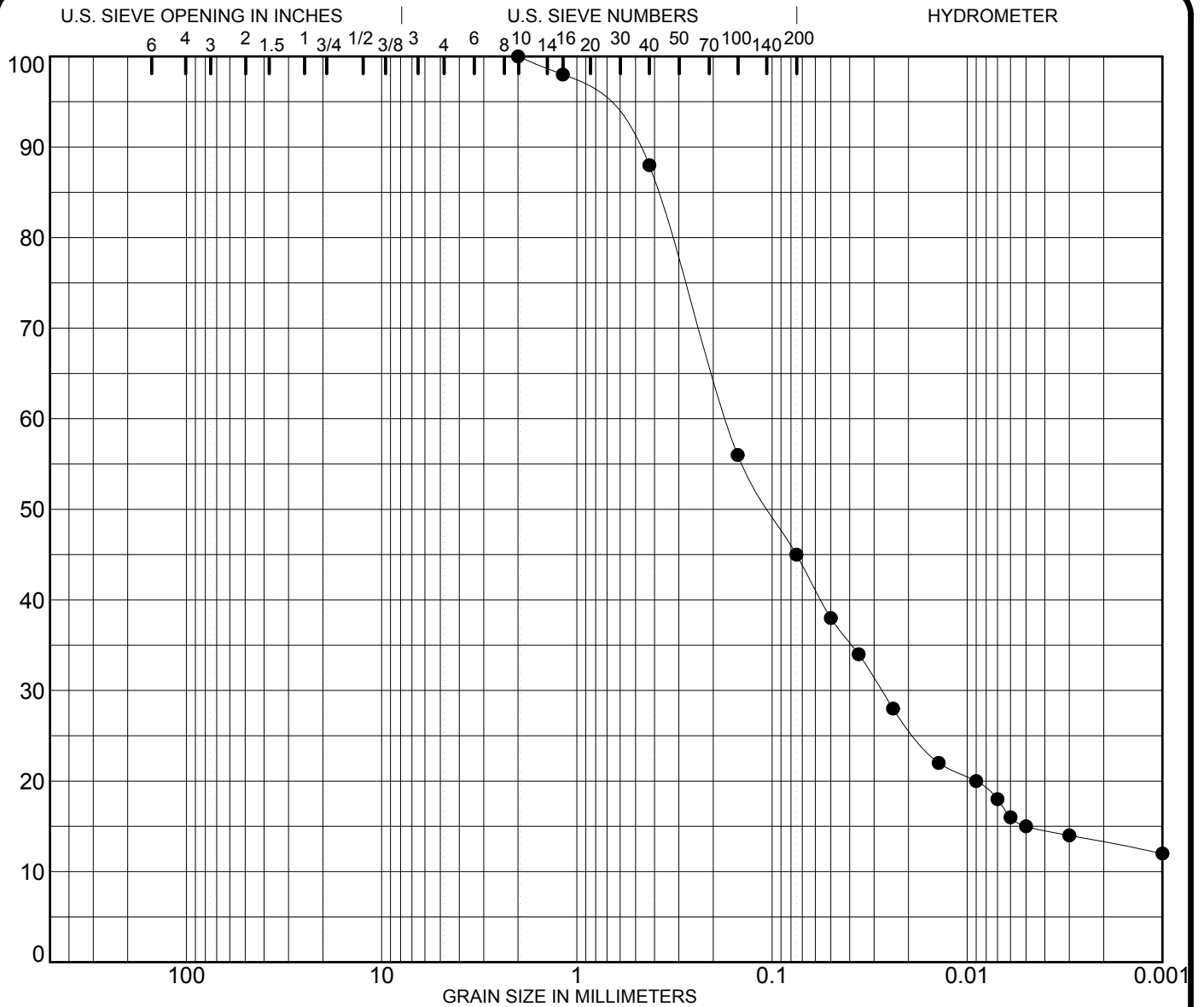
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G288/Comp2	3/8	100.0	Sandy Lean Clay				
	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
	#16	99.0	0	44	33	23	
NOTES:	#30						
Specific Gravity - 2.54	#40	91.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	#50		16.4	111.6	27	14	13
	#80						
	#100	67.0	Density/Moisture Relationship: Standard				
	#200	56.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility -** JOB NO. **21-055**
Montgomery County, Illinois DATE **March 18, 2021**

G288/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				
G288/Comp3	3/8	100.0	Sandy Silt				
	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
	#16	98.0	0	55	42	13	
NOTES:	#30						
Specific Gravity - 2.56	#40	88.0	MC%	γ _{dry} (pcf)	LL	PL	PI
	#50		15.7	112.0	16	11	5
	#80						
	#100	56.0	Density/Moisture Relationship: Standard				
	#200	45.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility -** JOB NO. **21-055**
Montgomery County, Illinois DATE **March 18, 2021**

G288/Comp3

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.

<u>Test to Determine</u>	<u>Method of Test</u>
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**

Boring Number	Sample Number	Depth, feet	ASTM D2216	ASTM D7263	ASTM D5084	
			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

Boring Number	Sample Number	Depth, feet	ASTM D2488
			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

HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084)

JOB NO.:	J037264.01.6002	<u>Initial Unit Weight</u>	WET UNIT WEIGHT, pcf:	134.2	<u>Unit Weight as Tested</u>	WET UNIT WEIGHT, pcf:	135.6
BORING NO.:	G275D		DRY UNIT WEIGHT, pcf:	115.9		DRY UNIT WEIGHT, pcf:	118.1
SAMPLE NO.:	ST-7; LSN-3784						
DEPTH (Feet):	12.0-14.0						

	Initial	As Tested**		Initial	As Tested	<u>INITIAL MOISTURE CONTENT</u>	<u>FINAL MOISTURE CONTENT</u>	
LENGTH, in.:	5.099	5.058	LENGTH, cm:	12.951	12.847	WET WT SPLE+TARE	1422.48	
DIAMETER, in.:	2.858	2.848	DIAMETER, cm:	7.259	7.234	DRY WT SPLE+TARE	1275.37	
WET WT., gms.:	1152.52	1146.76				TARE WEIGHT	279.96	
AREA, sq.in.:	6.415	6.370	AREA, sq cm:	41.389	41.100	% MOISTURE	15.8	
							% MOISTURE	14.8

B VALUE (before Permeation): 97% Cell / Back Pressure, psi: 45 / 40

<u>HEAD</u>	<u>DATE</u>	<u>TIME</u>	<u>TEMP</u>	<u>ELAPSED</u>	<u>BOTTOM</u>	<u>TOP</u>	<u>Q</u>	<u>K</u>	<u>HYDRAULIC</u>	<u>HYDRAULIC</u>	<u>HEAD</u>	<u>k</u>
<u>(PSI)</u>	<u>(YR,MO,DY)</u>	<u>(HR,MN,SC)</u>	<u>°C</u>	<u>MINUTES</u>	<u>BURETTE</u>	<u>BURETTE</u>	<u>(CC)</u>	<u>CM/SEC</u>	<u>GRADIENT</u>	<u>HEAD</u>	<u>LOSS,%</u>	<u>(in/sec)</u>
0.0	19-Mar-21	10:06 AM	19.2	0	3.76	23.62			1.53	19.86		
0.0	19-Mar-21	10:20 AM	19.6	14	9.00	18.38	5.24	1.5E-04	0.72	9.38	52.77	5.8E-05
0.0	19-Mar-21	10:41 AM	19.5	21	12.23	15.13	3.23	1.5E-04	0.22	2.90	69.08	6.0E-05
0.0	19-Mar-21	11:17 AM	19.4	36	13.50	13.84	1.27	1.6E-04	0.03	0.34	88.28	6.4E-05
0.0	19-Mar-21	11:18 AM	19.4	0	5.25	23.35			1.40	18.10		
0.0	19-Mar-21	11:38 AM	19.5	20	11.90	17.10	6.65	1.7E-04	0.40	5.20	71.27	6.7E-05

Average Temp. = 19.4

AVERAGE K = 1.6E-04
Corrected K for 20°C = 1.6E-04

AVERAGE K = 6.2E-05
Corrected K for 20°C = 6.3E-05

** Measurements at end of test

Note: It was noticed at the end of test that specimen contained a piece of gravel > 1-inch.

HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084, Method F)

JOB NO.:	J037264.01.6002				<u>Initial Unit Weight</u>			<u>Unit Weight as Tested</u>	
BORING NO.:	G289D				WET UNIT WEIGHT, pcf:	127.3		WET UNIT WEIGHT, pcf:	127.2
SAMPLE NO.:	ST-5; LSN-3785				DRY UNIT WEIGHT, pcf:	105.9		DRY UNIT WEIGHT, pcf:	105.1
DEPTH (Feet):	8.0-10.0								

	Initial	As Tested**		Initial	As Tested	<u>INITIAL MOISTURE CONTENT</u>		<u>FINAL MOISTURE CONTENT</u>	
LENGTH, in.:	5.173	5.185	LENGTH, cm:	13.139	13.170	WET WT SPLE+TARE	1377.69	WET WT SPLE+TARE	1385.05
DIAMETER, in.:	2.851	2.859	DIAMETER, cm:	7.242	7.262	DRY WT SPLE+TARE	1191.99	DRY WT SPLE+TARE	1191.99
WET WT., gms.:	1103.39	1111.44	AREA, sq cm:	41.186	41.418	TARE WEIGHT	274.30	TARE WEIGHT	274.3
AREA, sq.in.:	6.384	6.420				% MOISTURE	20.2	% MOISTURE	21.0

B VALUE (before Permeation): 95% Cell / Back Pressure, psi: 55 / 50

Manometer Constants M₁ 0.0302 M₂ 1.0410 Sample Constant (L/A) 0.3180

DATE	TIME	TEMP	ELAPSED	PIPET	ANNULUS	SPECIFIC	C	T	K	HYDRAULIC	HYDRAULIC	k
<u>(YR,MO,DY)</u>	<u>(HR,MN,SC)</u>	<u>°C</u>	<u>MINUTES</u>	<u>READING</u>	<u>READING</u>	<u>GRAVITY</u>	<u>TEST</u>	<u>TRIAL</u>	<u>CM/SEC</u>	<u>GRADIENT</u>	<u>HEAD</u>	<u>(in/sec)</u>
17-Mar-21	03:12 PM	22.0	0	21.10	0.87	12.570	0.000763	0.0515		19.31	254.29	
17-Mar-21	03:46 PM	22.4	34	20.42	0.92	12.570	0.000763	0.0534	1.4E-08	18.61	245.12	5.4E-09
17-Mar-21	04:35 PM	22.1	49	19.69	0.95	12.570	0.000763	0.0555	1.1E-08	17.89	235.56	4.2E-09
17-Mar-21	05:24 PM	21.8	49	19.00	0.97	12.570	0.000763	0.0577	1.1E-08	17.21	226.64	4.2E-09
18-Mar-21	08:22 AM	21.6	898	12.80	1.22	12.570	0.000763	0.0899	1.2E-08	11.05	145.56	4.5E-09

Average Temp. = 22.0

AVERAGE K = 1.2E-08
Corrected K for 20°C = 1.1E-08

AVERAGE K = 4.6E-09
Corrected K for 20°C = 4.4E-09

** Measurements at end of test

HYDRAULIC CONDUCTIVITY TEST DATA
(ASTM D 5084)

JOB NO.:	J037264.01.6002	ASTM D698 Results		<u>Initial Unit Weight</u>		<u>Unit Weight as Tested</u>	
PROJECT:	Coffeen Gypsum Management Facility	Maximum Dry Unit Weight, pcf	85.8	WET UNIT WEIGHT, pcf:	97.7	WET UNIT WEIGHT, pcf:	97.7
SAMPLE NO.:	LSN-3783	Optimum Water Content, %	24.1	DRY UNIT WEIGHT, pcf:	78.0	DRY UNIT WEIGHT, pcf:	74.2
MATERIAL:	Gypsum			Percent Compact:	90.9%		

	Initial	After Test**	Initial	As Tested	<u>INITIAL MOISTURE CONTENT</u>	<u>FINAL MOISTURE CONTENT</u>		
LENGTH, in.:	2.898		LENGTH, cm:	7.361	WET WT SPLE+TARE	772.01	WET WT SPLE+TARE	796.65
DIAMETER, in.:	2.880		DIAMETER, cm:	7.315	DRY WT SPLE+TARE	674.28	DRY WT SPLE+TARE	674.28
WET WT., gms.:	484.07				TARE WEIGHT	287.94	TARE WEIGHT	287.94
AREA, sq.in.:	6.514		AREA, sq cm:	42.028	% MOISTURE	25.3	% MOISTURE	31.7

B VALUE (before Permeation): 95% Cell / Back Pressure, psi: 93 / 90 **Percent Wet of Optimum: 1.2**

<u>HEAD</u> <u>(PSI)</u>	<u>DATE</u> <u>(YR,MO,DY)</u>	<u>TIME</u> <u>(HR,MN,SC)</u>	<u>TEMP</u> <u>°C</u>	<u>ELAPSED</u> <u>MINUTES</u>	<u>BOTTOM</u> <u>BURETTE</u>	<u>TOP</u> <u>BURETTE</u>	<u>Q</u> <u>(CC)</u>	<u>K</u> <u>CM/SEC</u>	<u>HYDRAULIC</u> <u>GRADIENT</u>	<u>HYDRAULIC</u> <u>HEAD</u>	<u>HEAD</u> <u>LOSS,%</u>	<u>k</u> <u>(in/sec)</u>
0.0	30-Mar-21	11:15 AM	20.8	0	8.09	22.80			2.00	14.71		
0.0	30-Mar-21	11:15 AM	20.8	0.5	10.00	20.84	1.91	9.4E-04	1.47	10.84	26.31	3.7E-04
0.0	30-Mar-21	11:16 AM	20.8	0.5	11.40	19.43	1.40	9.2E-04	1.09	8.03	25.92	3.6E-04
0.0	30-Mar-21	11:16 AM	20.8	0.5	12.45	18.35	1.05	9.4E-04	0.80	5.90	26.53	3.7E-04
0.0	30-Mar-21	11:17 AM	20.8	0.5	13.22	17.58	0.77	9.3E-04	0.59	4.36	26.10	3.6E-04
0.0	30-Mar-21	11:18 AM	20.8	1	14.18	16.63	0.96	8.8E-04	0.33	2.45	43.81	3.5E-04
0.0	30-Mar-21	11:19 AM	20.8	1	14.70	16.13	0.52	8.3E-04	0.19	1.43	41.63	3.2E-04
0.0	30-Mar-21	11:25 AM	20.8	0	11.32	21.57			1.39	10.25		
0.0	30-Mar-21	11:26 AM	20.8	0.5	12.67	20.23	1.35	9.3E-04	1.03	7.56	26.24	3.7E-04
0.0	30-Mar-21	11:27 AM	20.8	1	14.36	18.54	1.69	9.1E-04	0.57	4.18	44.71	3.6E-04
0.0	30-Mar-21	11:28 AM	20.8	1	15.26	17.63	0.90	8.7E-04	0.32	2.37	43.30	3.4E-04

Average Temp. = 20.8

AVERAGE K = 9.1E-04
Corrected K for 20°C = 8.9E-04

AVERAGE K = 3.6E-04
Corrected K for 20°C = 3.5E-04

** Measurements not available at end of test.

LABORATORY LOG OF TUBE SAMPLE

Project No.: 1037264.01.6002 Project Name.: Coffeen Date Opened: 3/18/2021 By: JMM

Boring No.: G 275D Sample No.: LSN-3784
ST-7 Depth (ft): 12 to 14

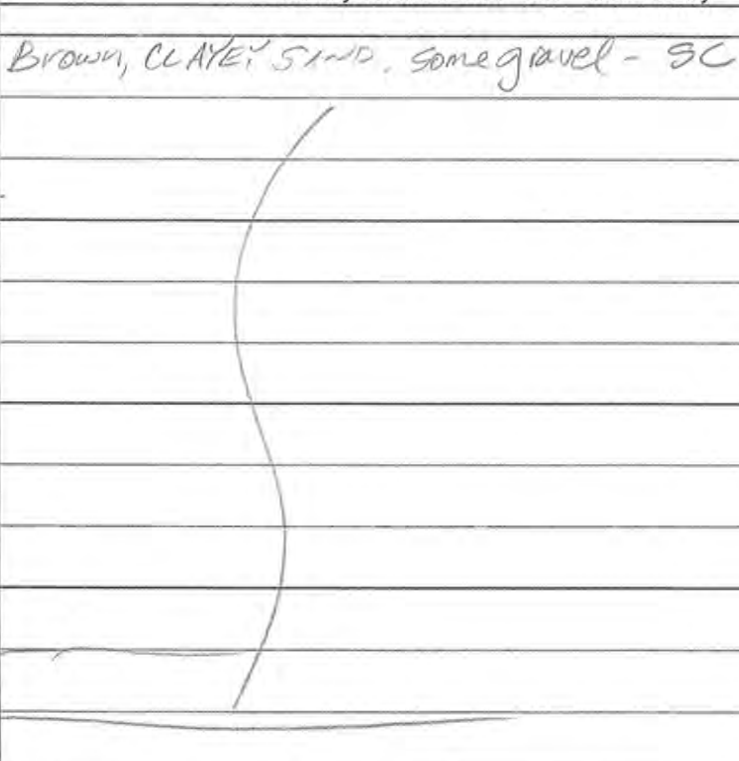
Type Std. "Shelby" Other: _____

Tube Dimensions: Outside Diameter (in): 3 Recovery (in): 20

Tube Condition:	Dented	End(s) not sealed	Other:

Sample Condition	Good	Fair	Poor	Disturbed
		✓		

Remarks: Bottom of tube crimped; Tube cut 2 3" from bottom.

Tube Scale (in)	Sample Use (Test Type)	Soil Identification and Processing Remarks
		(Draw lines to indicate top and bottom of soil's surface and where sample was taken. Identify cut lines with: "Cut" "Date: m/d/y" "Your Initials")
0.0		<u>Brown, CLAYEY SAND. some gravel - SC</u> 
2.0		
4.0		
6.0		
8.0		
10.0		
12.0		
14.0		
16.0		
18.0		
20.0		
22.0		
24.0		

Ave. Height (in.): _____ Ave. Diameter (in.): _____ Specimen Wt. (gms): _____

Natural Moisture Content				
Tare Number	Wet Mass + Tare (g)	Dry Mass+ Tare (g)	Tare Mass (g)	Water Content (%)

Wet Unit Weight: _____ pcf Dry Unit Weight _____ pcf

Tested By: _____ Calculated By: _____ Checked By: _____
 Date: _____ Date: _____ Date: _____

LABORATORY LOG OF TUBE SAMPLE

Project No.: 1037264.01.6002 Project Name.: Coffeen Date Opened: 3/15/2021 By: JMM

Boring No.: G289D Sample No.: LSN-3785
SH-5 Depth (ft): 8 to 10

Type Std. "Shelby" Other: _____

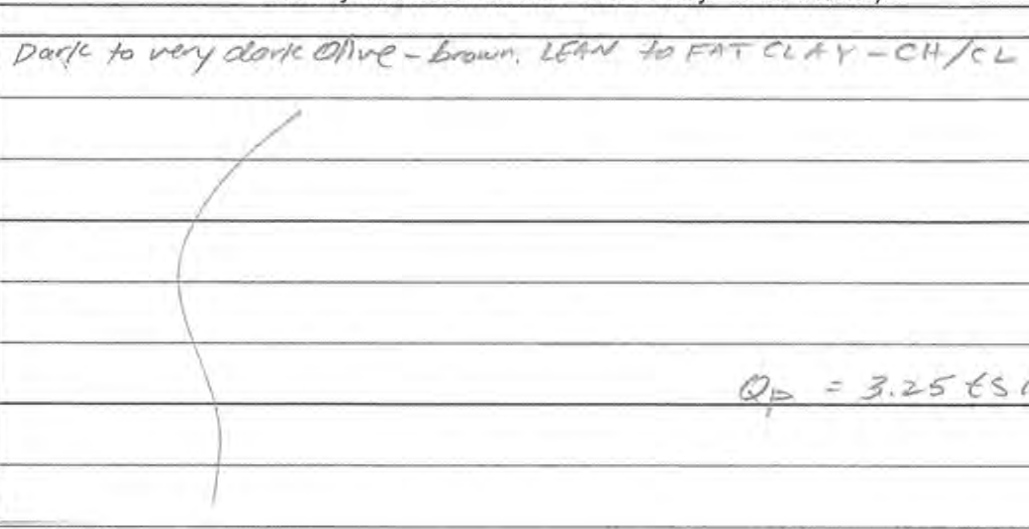
Tube Dimensions: Outside Diameter (in): 3

Recovery (in): 16

Tube Condition:	Dented	End(s) not sealed	Other:

Sample Condition	Good	Fair	Poor	Disturbed
	✓			

Remarks: _____

Tube Scale (in)	Sample Use (Test Type)	Soil Identification and Processing Remarks (Draw lines to indicate top and bottom of soil's surface and where sample was taken. Identify cut lines with: "Cut" "Date: m/d/y" "Your Initials")	
0.0		<i>Dark to very dark Olive - brown. LEAN to FAT CLAY - CH/CL</i> 	
2.0			
4.0			
6.0			
8.0			
10.0			
12.0			
14.0			
16.0			
18.0			
20.0			
22.0			
24.0			
			<i>Q_p = 3.25 tsf</i>

Ave. Height (in.): _____ Ave. Diameter (in.): _____ Specimen Wt. (gms): _____

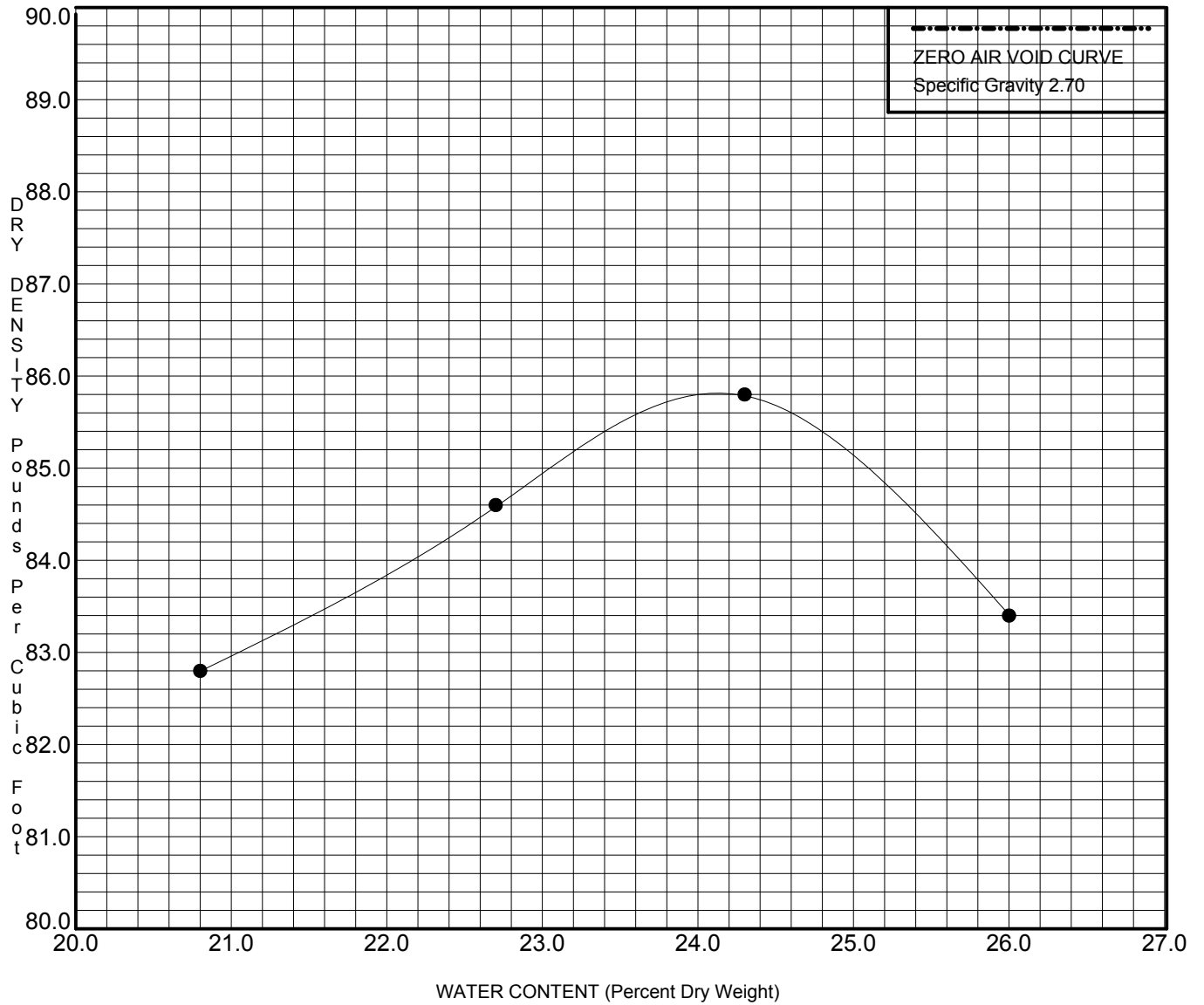
Natural Moisture Content				
Tare Number	Wet Mass + Tare (g)	Dry Mass + Tare (g)	Tare Mass (g)	Water Content (%)

Wet Unit Weight: _____ pcf Dry Unit Weight: _____ pcf

Tested By: _____
Date: _____

Calculated By: _____
Date: _____

Checked By: _____
Date: _____



SPECIMEN IDENTIFICATION			CLASSIFICATION
Gypsum			Gypsum
MOISTURE/DENSITY RELATIONSHIP			NOTES :
x	Standard ASTM D698/AASHTO T99		
	Modified ASTM D1557/AASHTO T180		
Maximum Dry Density (PCF)	85.8		
Optimum Water Content (%)	24.1		

PROJECT Coffeen Gypsum Management Facility JOB NO. 21-055
 LOCATION Montgomery County, Illinois DATE March 18, 2021
 Gypsum

MOISTURE-DENSITY RELATIONSHIP

Ramsey Geotechnical Engineering

Bloomington, IL 61701

J037264.02 6002

GEO JOB SHEET

RGE Job: 21-055

Client: Mr. Rhon Hasenyager
Hanson Professional Services Inc.
1525 South Sixth Street
Springfield, IL 62703

Project: Coffeen Gypsum Management
Montgomery County, IL

SCHEDULE OF LABORATORY TESTING

Sample ID	Routine Testing						Complex Testing											Analytical Testing																			
	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 Triaxial Comp Strength	CD Direct Shear Strength	Swell Test for Soil	Collapse Test for Soil	Permeability Granular Soil	Hyd Conduct Cohesive Soil	Shrinkage 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 Matter				
G282D																																					
10B																																					
<i>Comp2</i>				x	x			x									x																				
11A																																					
12A																																					
13A																																					
14A																																					
15A																																					
16A																																					
<i>Comp3</i>				x	x			x									x																				
18A																																					
19A																																					
20A																																					
21A																																					
22A																																					
23A																																					
24A																																					
25A																																					
26A																																					
<i>Comp4</i>				x	x			x									x																				
28A																																					
29A																																					
<i>Comp5</i>				x	x			x									x																				
G289D																																					
3A																																					
4A																																					
5A																																					
7A																																					
8A																																					
<i>Comp1</i>				x	x			x									x																				
ST5																																					

SCHEDULE OF LABORATORY TESTING

Sample ID	Routine Testing										Complex Testing										Analytical Testing														
	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 Triaxial Comp Strength	CD Direct Shear Strength	Swell Test for Soil	Collapse Test for Soil	Permeability Granular Soil	Hyd Conduct Cohesive Soil	Shrinkage 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 Matter		
G289D																																			
10A																																			
11A																																			
<i>Comp2</i>				x	x			x			x			x																					
12A																																			
13A																																			
14A																																			
15A																																			
16A																																			
17A																																			
<i>Comp3</i>				x	x			x			x			x																					
18A																																			
19A																																			
20A																																			
21A																																			
22A																																			
23A																																			
24A																																			
25A																																			
26A																																			
<i>Comp4</i>				x	x			x			x			x																					
28A																																			
29A																																			
30A																																			
<i>Comp5</i>				x	x			x			x			x																					
G275D																																			
3A																																			
4A																																			
5A																																			
<i>Comp1</i>				x	x			x			x			x																					

SCHEDULE OF LABORATORY TESTING

Sample ID	Routine Testing										Complex Testing										Analytical Testing															
	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 Triaxial Comp Strength	CD Direct Shear Strength	Swell Test for Soil	Collapse Test for Soil	Permeability Granular Soil	Hyd Conduct Cohesive Soil	Shrinkage 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 Matter			
G275D																																				
5B																																				
6A																																				
Comp2				x	x		x			x			x																							
ST7																					x															
9A																																				
10A																																				
11A																																				
12A																																				
13A																																				
14A																																				
15A																																				
16A																																				
17A																																				
19A																																				
20A																																				
21A																																				
22A																																				
23A																																				
Comp3				x	x		x			x			x																							
24A																																				
25A																																				
26A																																				
Comp4				x	x		x			x			x																							
27A																																				
Comp5				x	x		x			x			x																							
28A																																				
29A																																				
30A																																				
31A																																				
32A																																				
Comp6				x	x		x			x			x																							
Gypsum				x	x		x	x		x			x																							x* Remolded permeability

BUCKET SAMPLE

Subcontract Agreement: RGE2014

Task Order No. 20E0111A/2000B

SCHEDULE OF LABORATORY TESTING

Sample ID	QC: KLT 7/21/21 Top Depth (Info taken from boring logs by Ramboll)	QC: KLT 7/21/21 Bottom Depth (Info taken from boring logs by Ramboll)	Routine Testing ¹											Complex Testing ¹														Analytical Testing ¹										
			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 Triaxial Comp Strength	CD Direct Shear Strength	Swell Test for Soil	Collapse Test for Soil	Permeability Granular Soil	Hyd Conduct Cohesive Soil	Shrinkage 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 Matter			
			G284																																			
3A	4	6																																				
4A	6	8																																				
5A	8	8.9																																				
Comp1	4	8.9				x	x		x		x																											
6A	10	12																																				
7A	12	14																																				
Comp2	10	14				x	x		x		x																											
G288																																						
2B	3.3	4																																				
3A	4	6																																				
Comp1	3.3	6				x	x		x		x																											
4A	6	8																																				
5A	8	10																																				
6A	10	11.2																																				
Comp2	6	11.2				x	x		x		x																											
6B	11.2	12																																				
Comp3	11.2	12				x	x		x		x																											
G275D																																						
3A	4	6																																				
4A	6	8																																				
5A	8	9.5																																				
Comp1	4	9.5				x	x		x		x																											

SCHEDULE OF LABORATORY TESTING

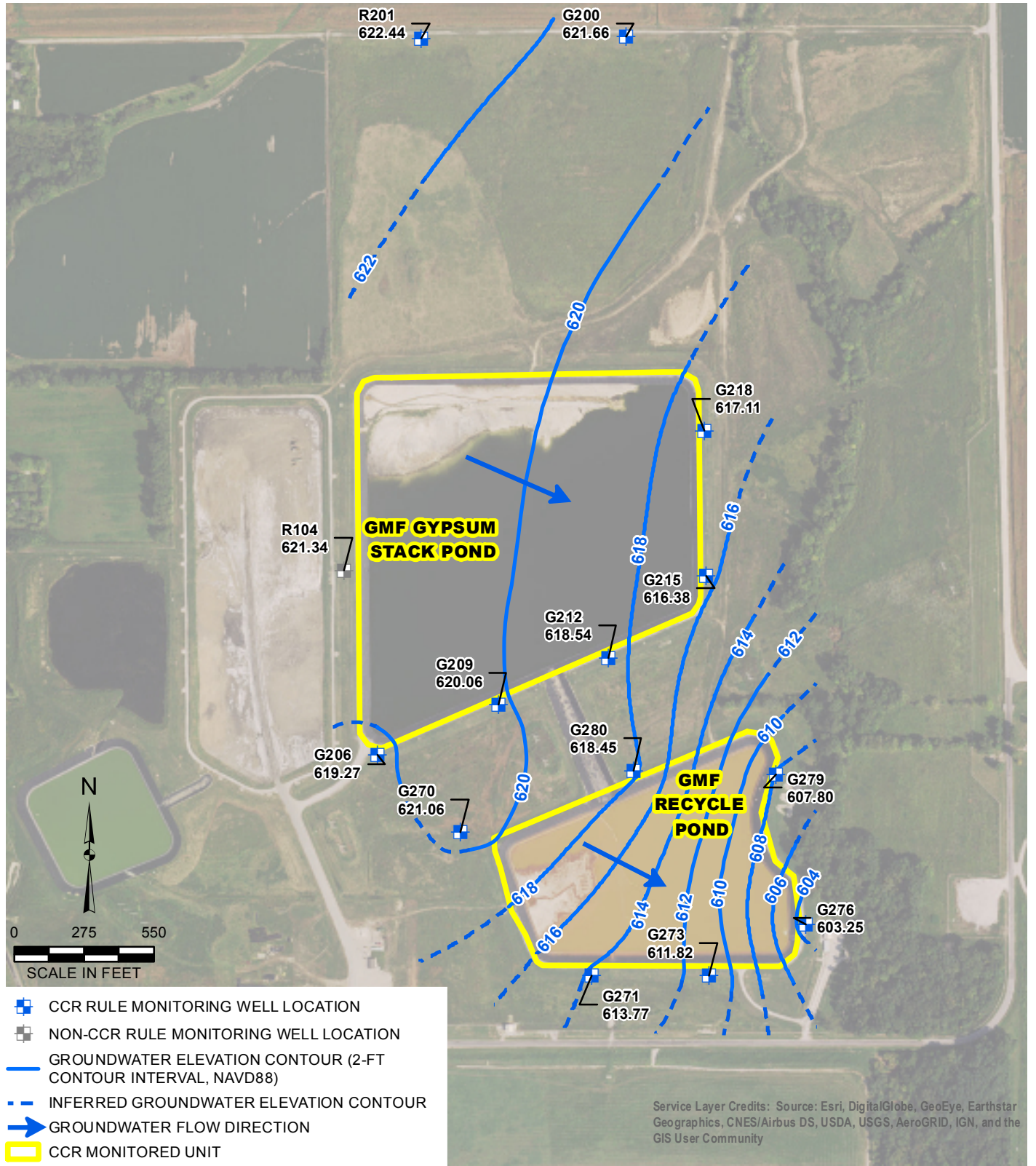
Sample ID	QC: KLT 7/21/21	QC: KLT 7/21/21	Routine Testing										Complex Testing										Analytical Testing																
	Top Depth (Info taken from boring logs by Ramboll)	Bottom Depth (Info taken from boring logs by Ramboll)	Rimac Comp Strength	Visual-Manual Classification	Unified Classification	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 Triaxial Comp Strength	CD Direct Shear Strength	Swell Test for Soil	Collapse Test for Soil	Permeability Granular Soil	Hyd Conduct Cohesive Soil	Shrinkage 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 Matter				
G275D	(Info taken	(Info taken																																					
5B	9.5	10																																					
6A	10	10.9																																					
Comp2	9.5	10.9				x	x		x			x			x																								
ST7	12	14																																					
9A	16	18																																					
10A	18	20																																					
11A	20	22																																					
12A	22	24																																					
13A	24	26																																					
14A	26	28																																					
15A	28	30																																					
16A	30	32																																					
17A	32	34																																					
19A	36	38																																					
20A	38	40																																					
21A	40	42																																					
22A	42	44																																					
23A	44	46																																					
Comp3	16	46				x	x		x			x			x																								
24A	46	48																																					
25A	48	50																																					
26A	50	52																																					
Comp4	46	52				x	x		x			x			x																								
27A	52	54																																					
Comp5	52	54				x	x		x			x			x																								
28A	54	56																																					
29A	56	58																																					
30A	58	60																																					
31A	60	62																																					
32A	62	64																																					
Comp6	54	64				x	x		x			x			x																								

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

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_01\RI1_CoffeenGMF_GSP_GW_Contours.mxd Author: sstolz Date/Time: 3/2/2017, 2:40:46 PM



**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**

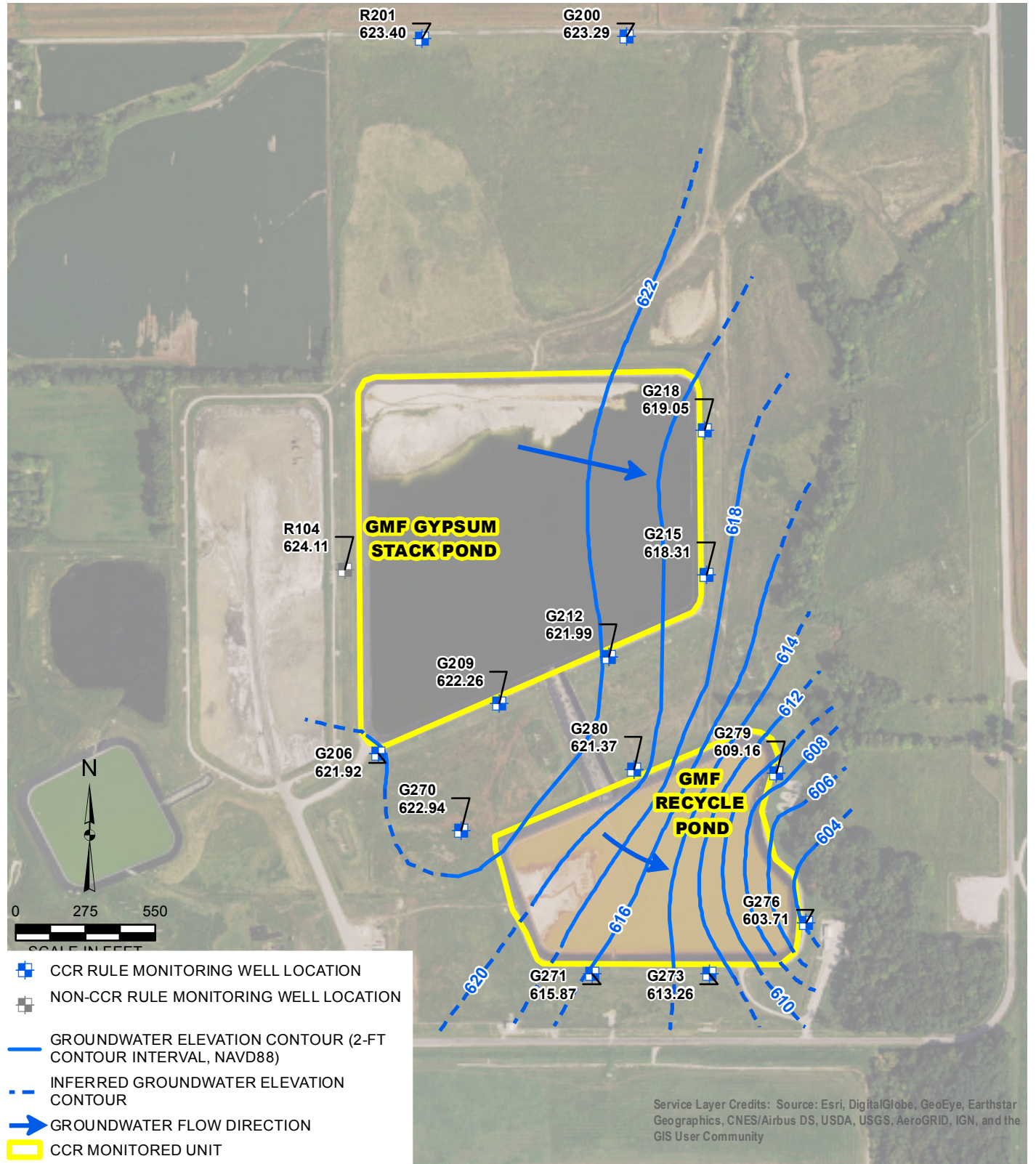
PROJECT NO: 2285
FIGURE NO: 1

DRAWN BY/DATE:
SDS 1/23/17
REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/7/17

DYNEGY CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS



Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_02\R2_CoffeenGMF_GSP_GW_Contours.mxd Author: sstolz Date/Time: 3/2/2017, 3:26:24 PM



- 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

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

**COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103)
AND COFFEEN GMF RECYCLE POND (UNIT ID: 104)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 2: FEBRUARY 8, 2016**

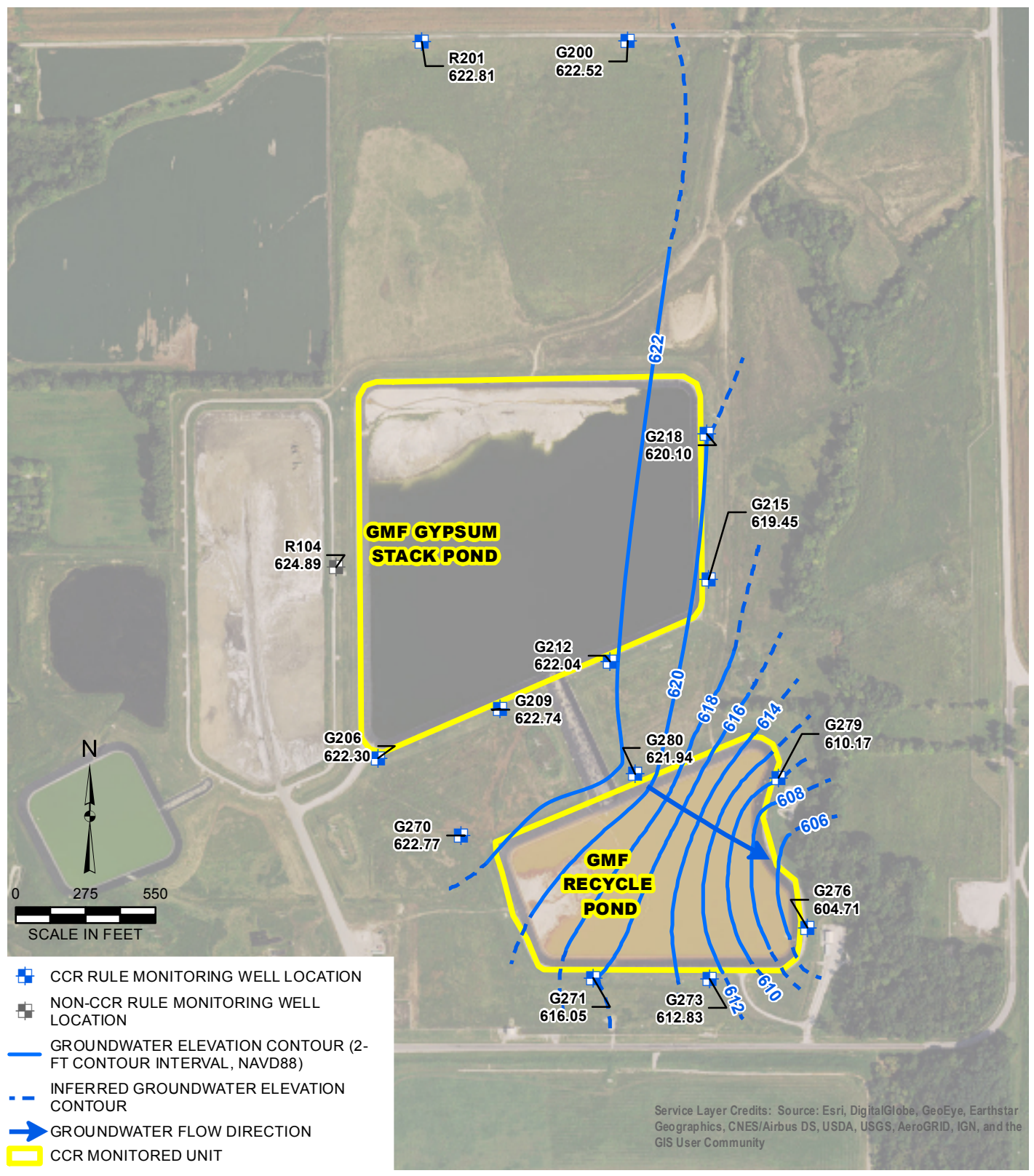
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REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

DYNEGY CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

PROJECT NO: 2285
FIGURE NO: 1



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**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**

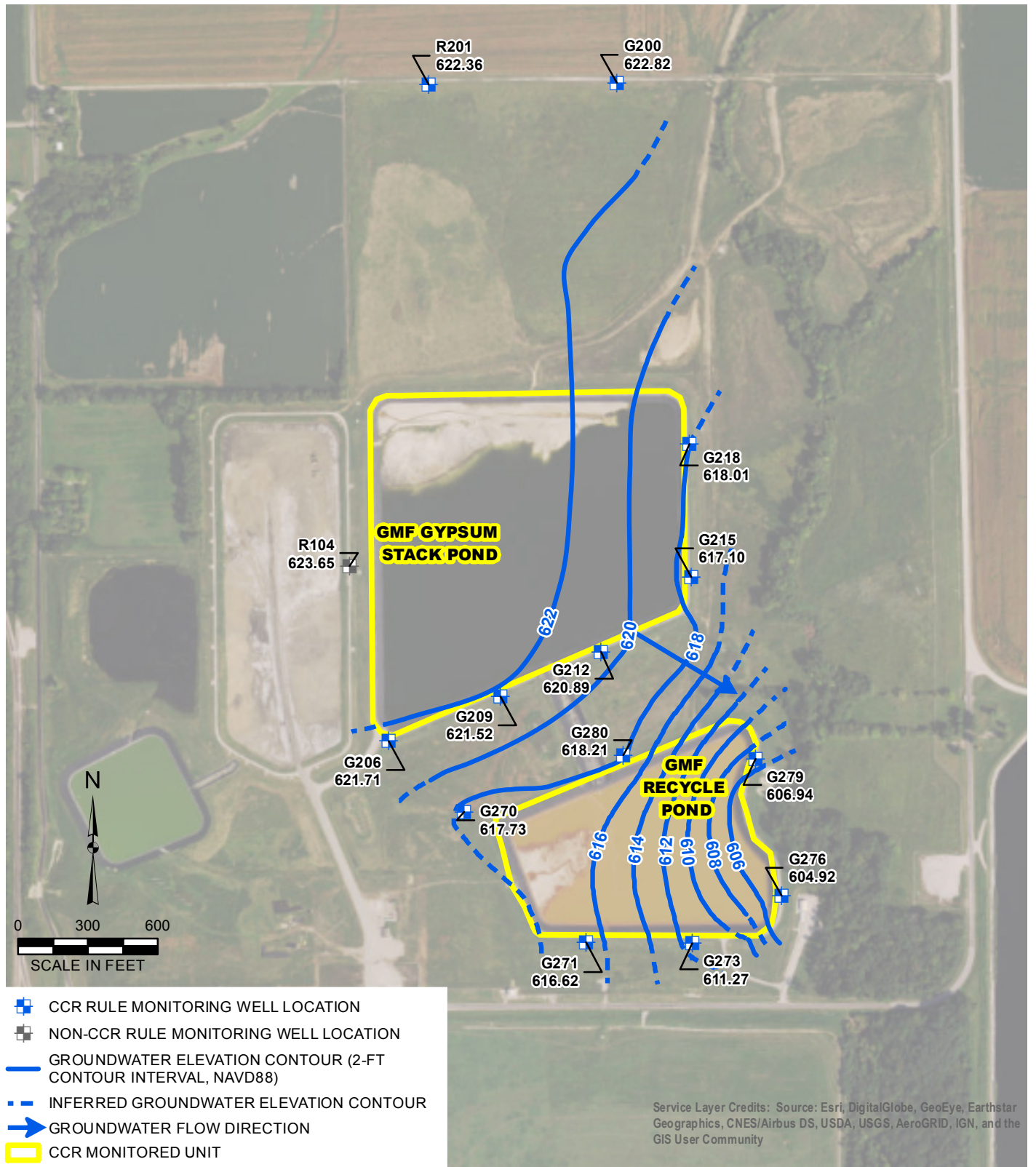
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SDS 1/23/17
REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

DYNEGY CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

PROJECT NO: 2285
FIGURE NO: 1



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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

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

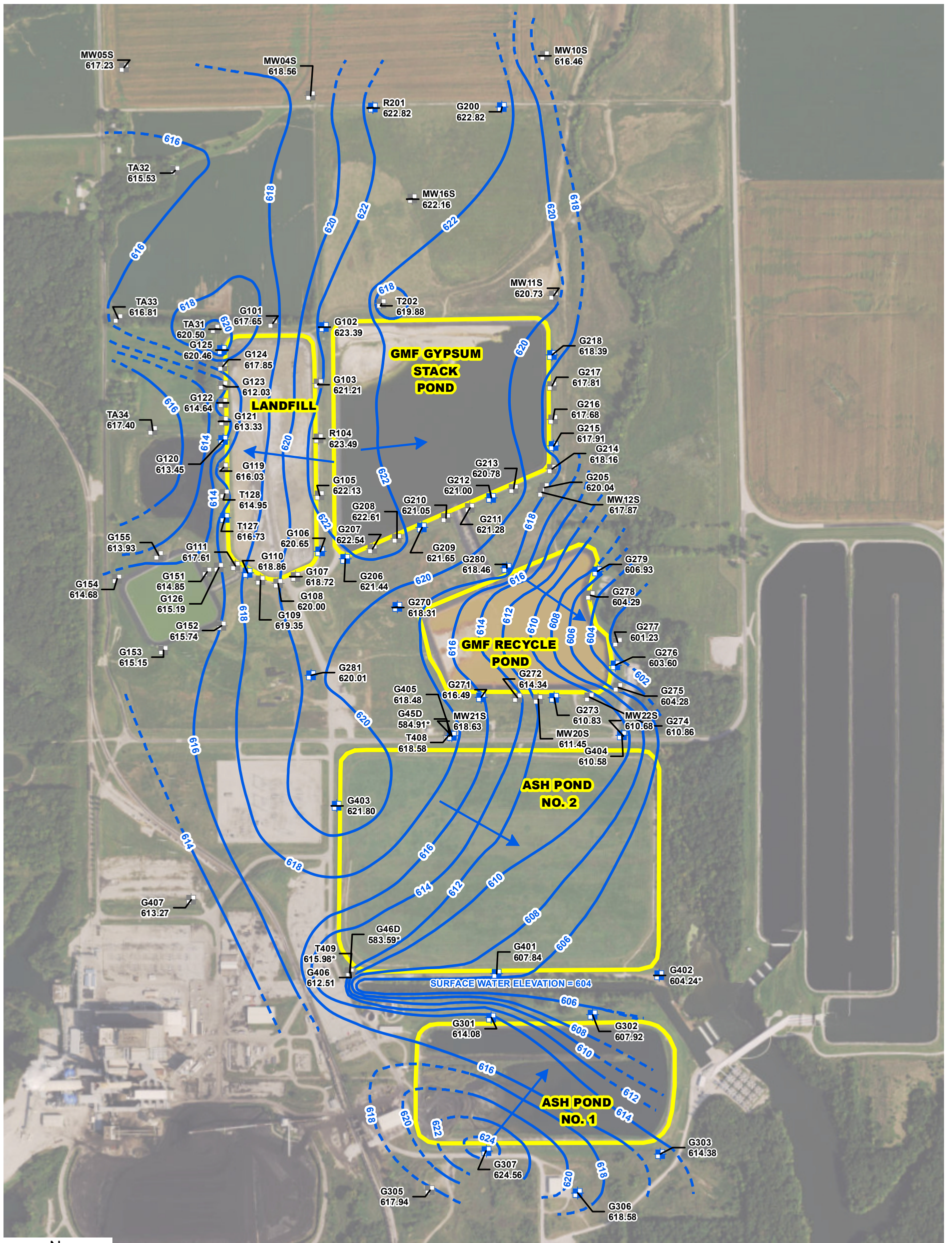
**COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103)
AND COFFEEN GMF RECYCLE POND (UNIT ID: 104)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 4: JULY 25, 2016**

PROJECT NO: 2285
FIGURE NO: 1

DRAWN BY/DATE:
SDS 1/23/17
REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

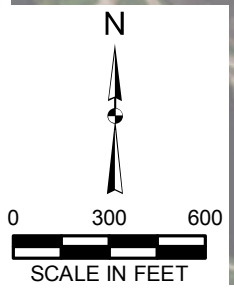
DYNEGY CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS





NOTE:
* = NOT USED FOR CONTOURING

- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- CCR MONITORED UNIT
- POTENTIOMETRIC SURFACE CONTOUR
- INFERRED POTENTIOMETRIC SURFACE CONTOUR
- GROUNDWATER FLOW DIRECTION



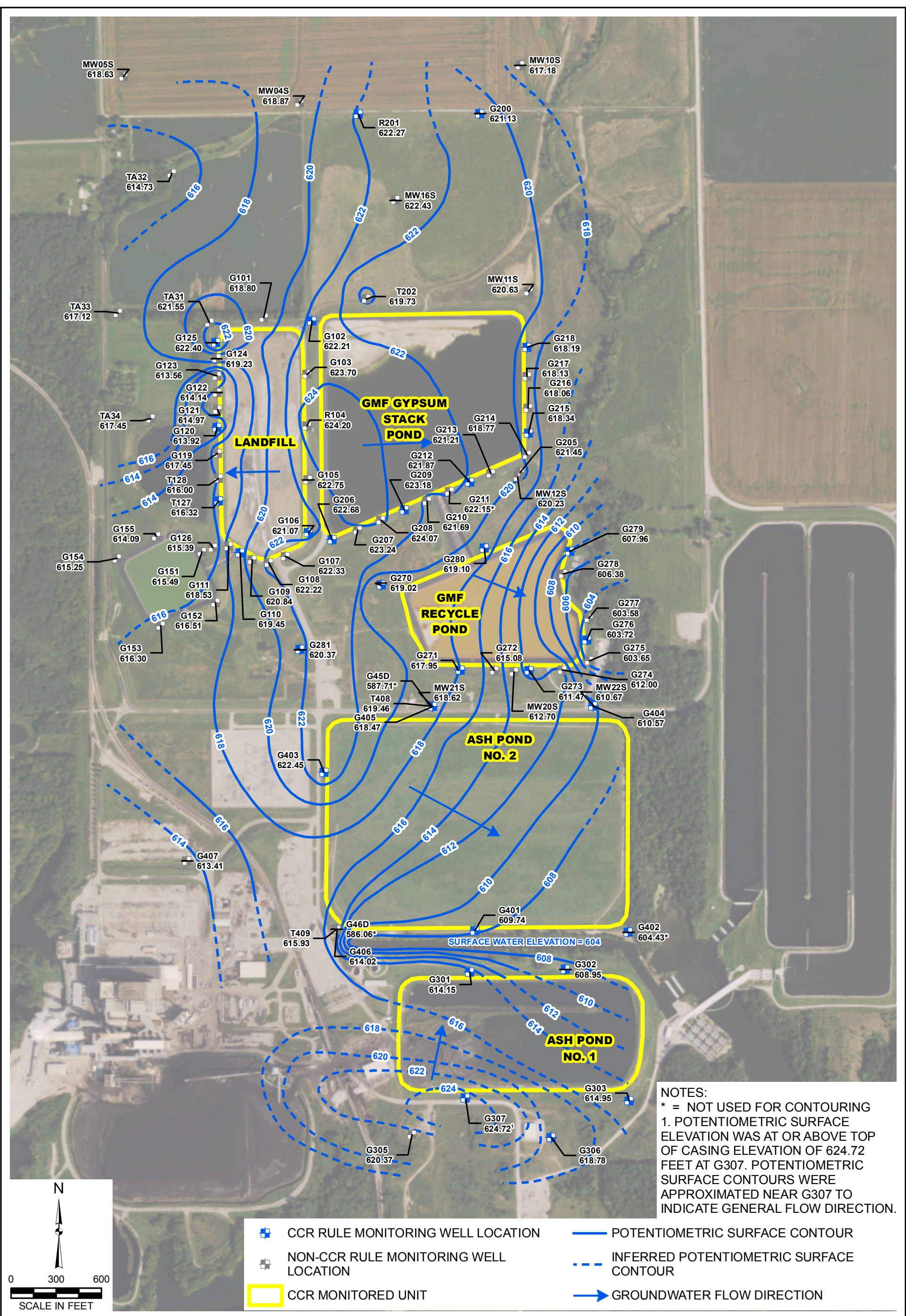
**COFFEEN ASH POND NO. 1 (UNIT ID: 101), COFFEEN ASH POND NO. 2 (UNIT ID: 102),
COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103), COFFEEN GMF RECYCLE POND
(UNIT ID: 104) AND COFFEEN LANDFILL (UNIT ID: 105) UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 5: NOVEMBER 12, 2016
DYNEGY CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS**

DRAWN BY/DATE:
SDS 3/3/17
REVIEWED BY/DATE:
TBN 3/3/17
APPROVED BY/DATE:
JJW 8/30/17

PROJECT NO: 2285
FIGURE NO: 1
 Natural Resource Technology
AN OBG COMPANY

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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.

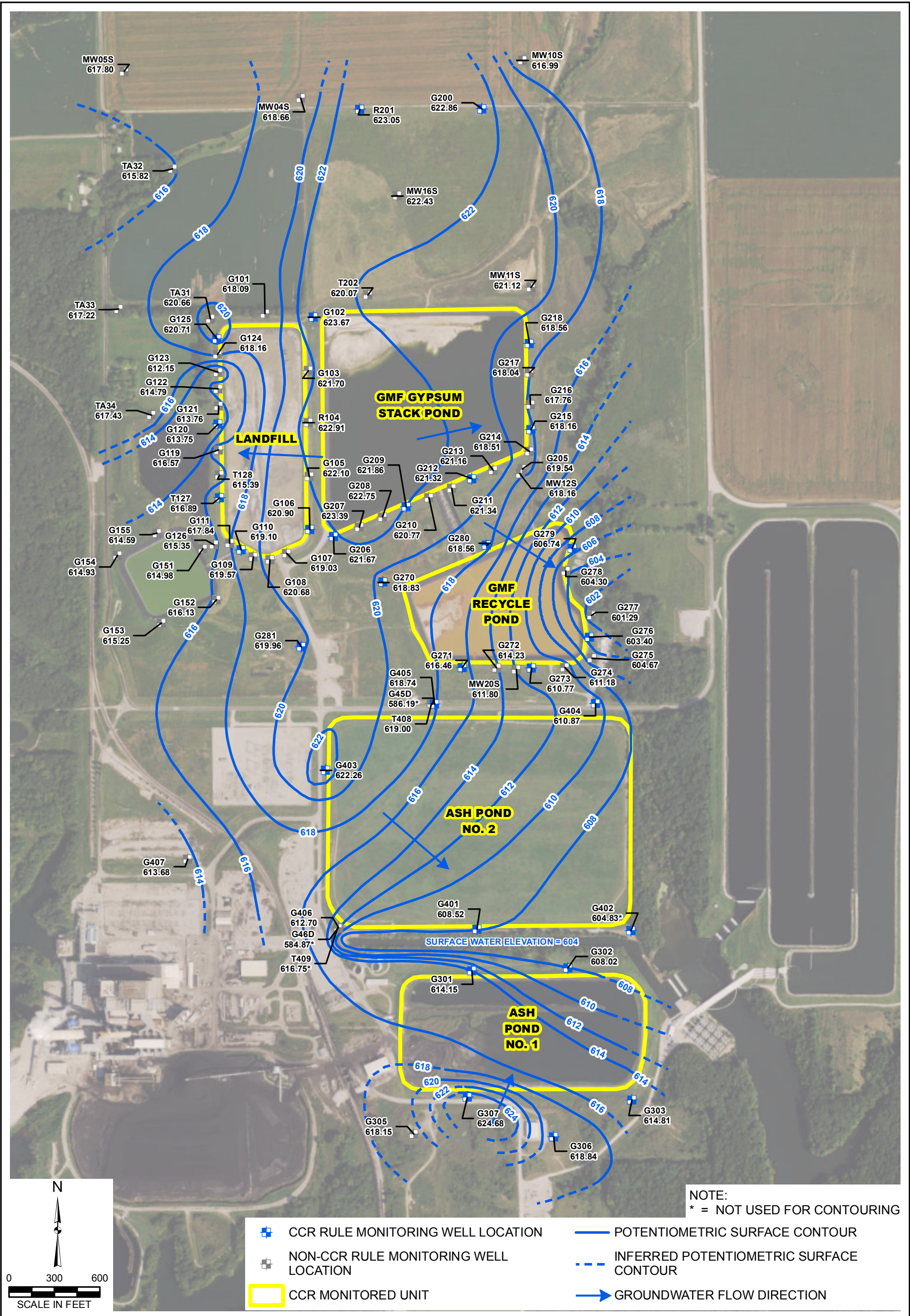
- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- CCR MONITORED UNIT
- POTENTIOMETRIC SURFACE CONTOUR
- INFERRED POTENTIOMETRIC SURFACE CONTOUR
- GROUNDWATER FLOW DIRECTION

DRAWN BY/DATE:
 SDS 4/14/17
 REVIEWED BY/DATE:
 TBN 4/14/17
 APPROVED BY/DATE:
 JJW 8/30/17

**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) UPPERMOST AQUIFER UNIT
 GROUNDWATER ELEVATION CONTOUR MAP
 ROUND 6: FEBRUARY 4, 2017
 DYNEGY CCR RULE GROUNDWATER MONITORING
 COFFEEN POWER STATION
 COFFEEN, ILLINOIS**

PROJECT NO: 2285
 FIGURE NO: 1


 AN OBG COMPANY

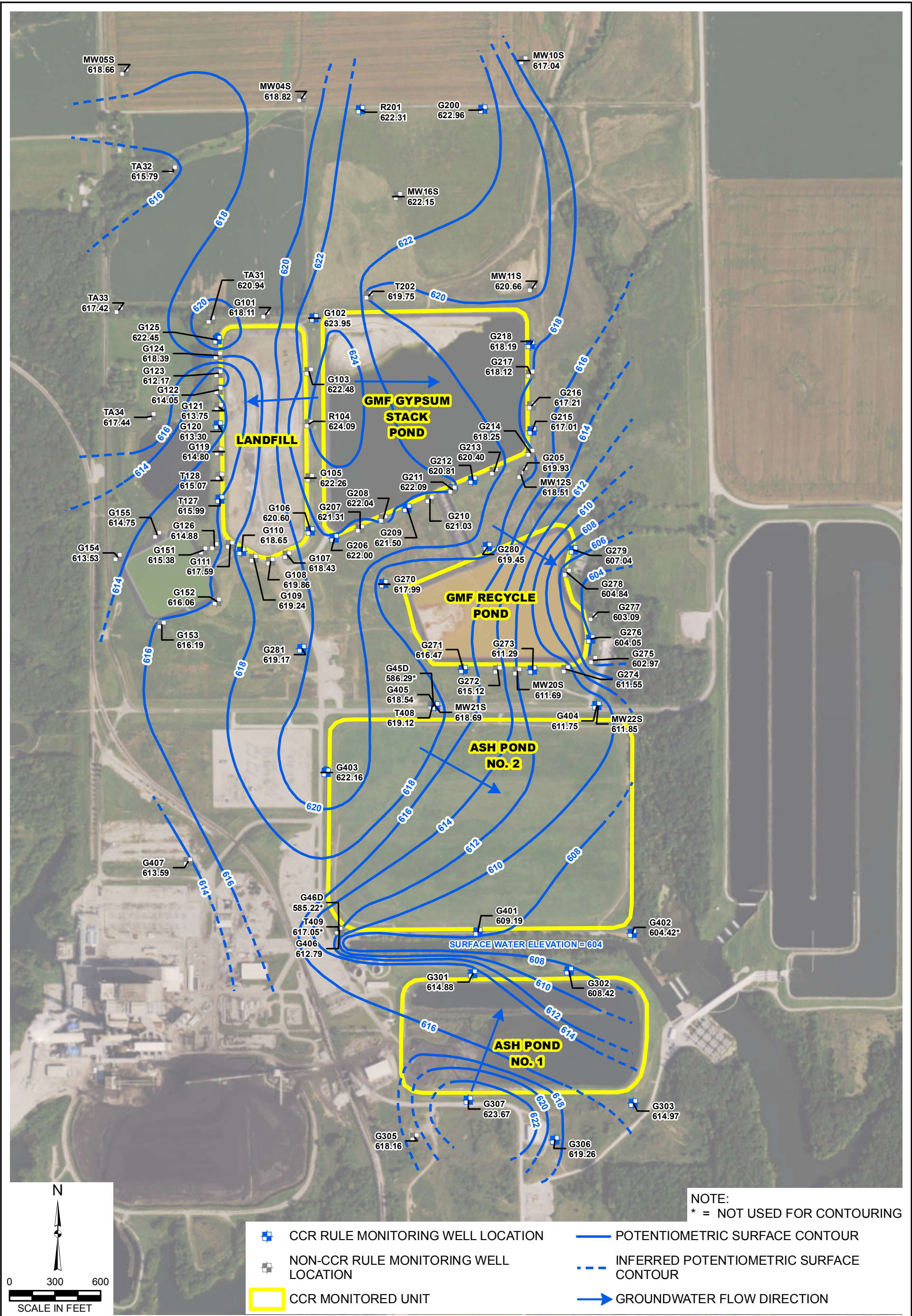


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DRAWN BY/DATE:
SDS 7/12/17
REVIEWED BY/DATE:
TBN 7/12/17
APPROVED BY/DATE:
JJW 8/30/17

**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) UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 7: MAY 13, 2017
DYNEGY CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS**

PROJECT NO: 2285
FIGURE NO: 1

AN OBG COMPANY



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NOTE:
* = NOT USED FOR CONTOURING

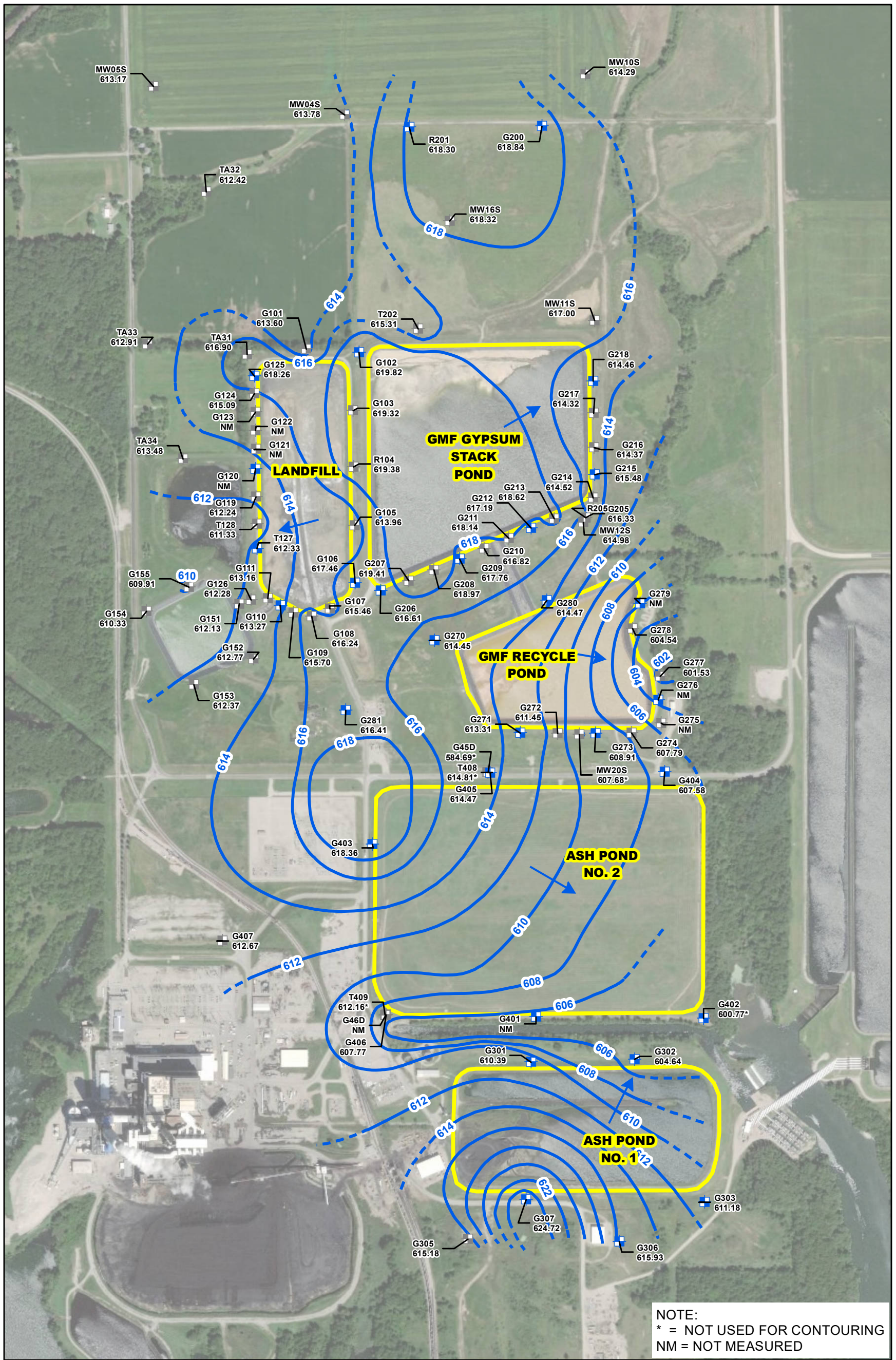
- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- CCR MONITORED UNIT
- POTENTIOMETRIC SURFACE CONTOUR
- INFERRED POTENTIOMETRIC SURFACE CONTOUR
- GROUNDWATER FLOW DIRECTION

DRAWN BY/DATE:
SDS 8/12/17
REVIEWED BY/DATE:
TBN 8/10/17
APPROVED BY/DATE:
JJW 8/30/17

**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) UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 8: JULY 8, 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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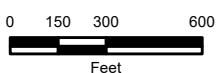


LEGEND

- 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

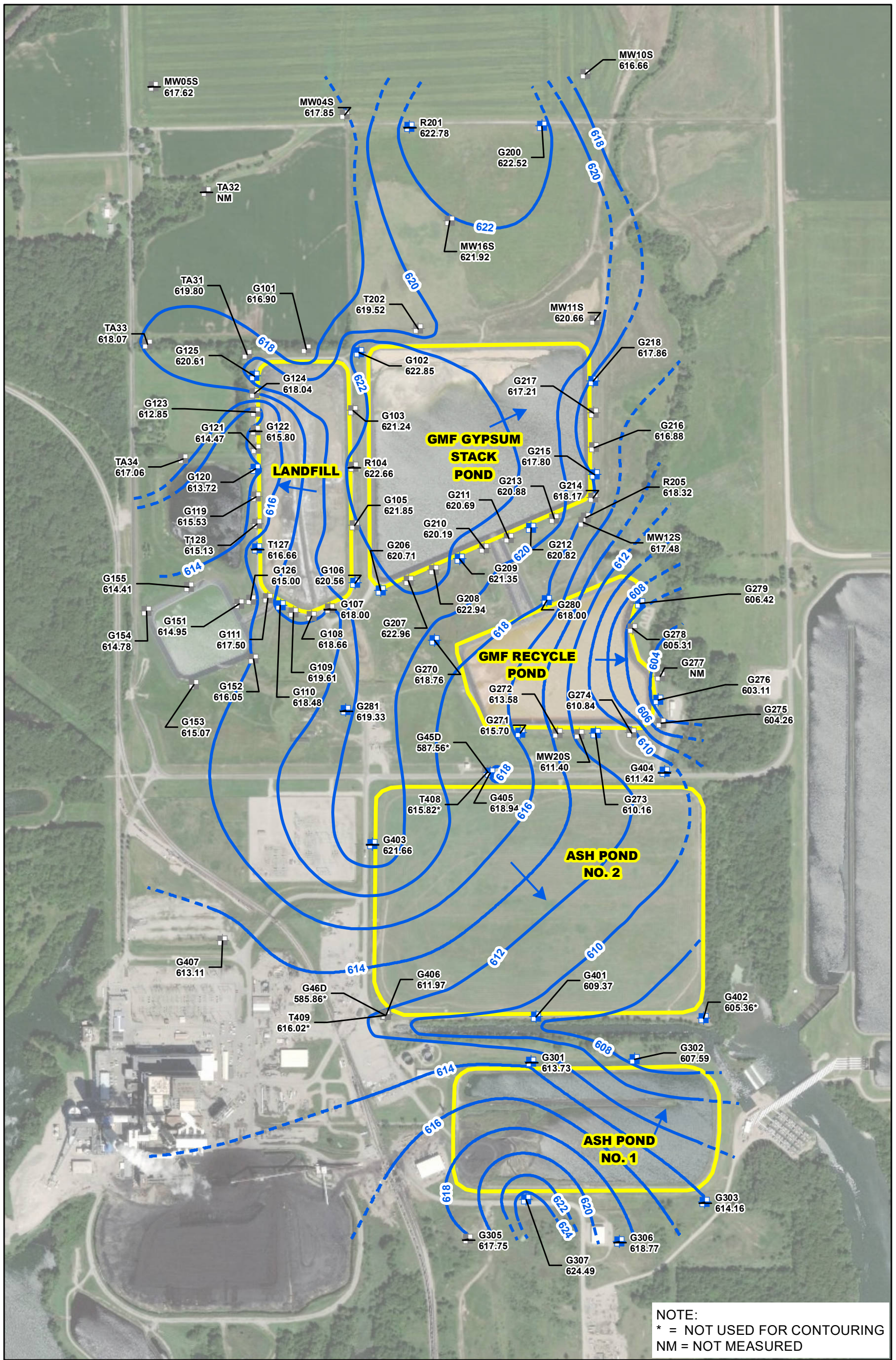


O'BRIEN & GERE ENGINEERS, INC.

FILE NO. 70099
 DATE 8/1/2018



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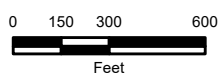
NOTE:
 * = NOT USED FOR CONTOURING
 NM = NOT MEASURED

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

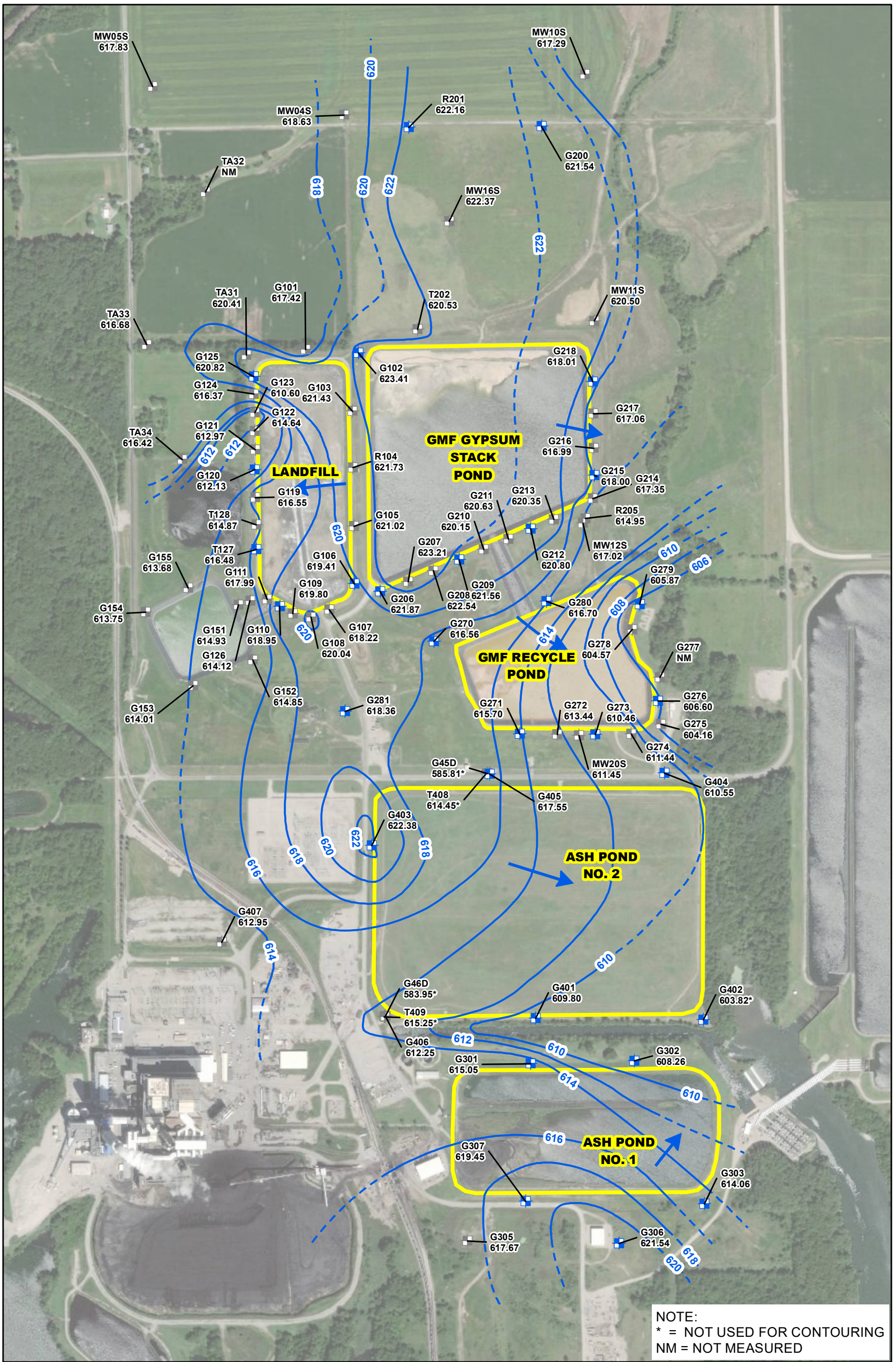
CCR RULE GROUNDWATER MONITORING
 COFFEEN POWER STATION
 COFFEEN, ILLINOIS



O'BRIEN & GERE ENGINEERS, INC.

FILE NO. 70099
 DATE 8/1/2018

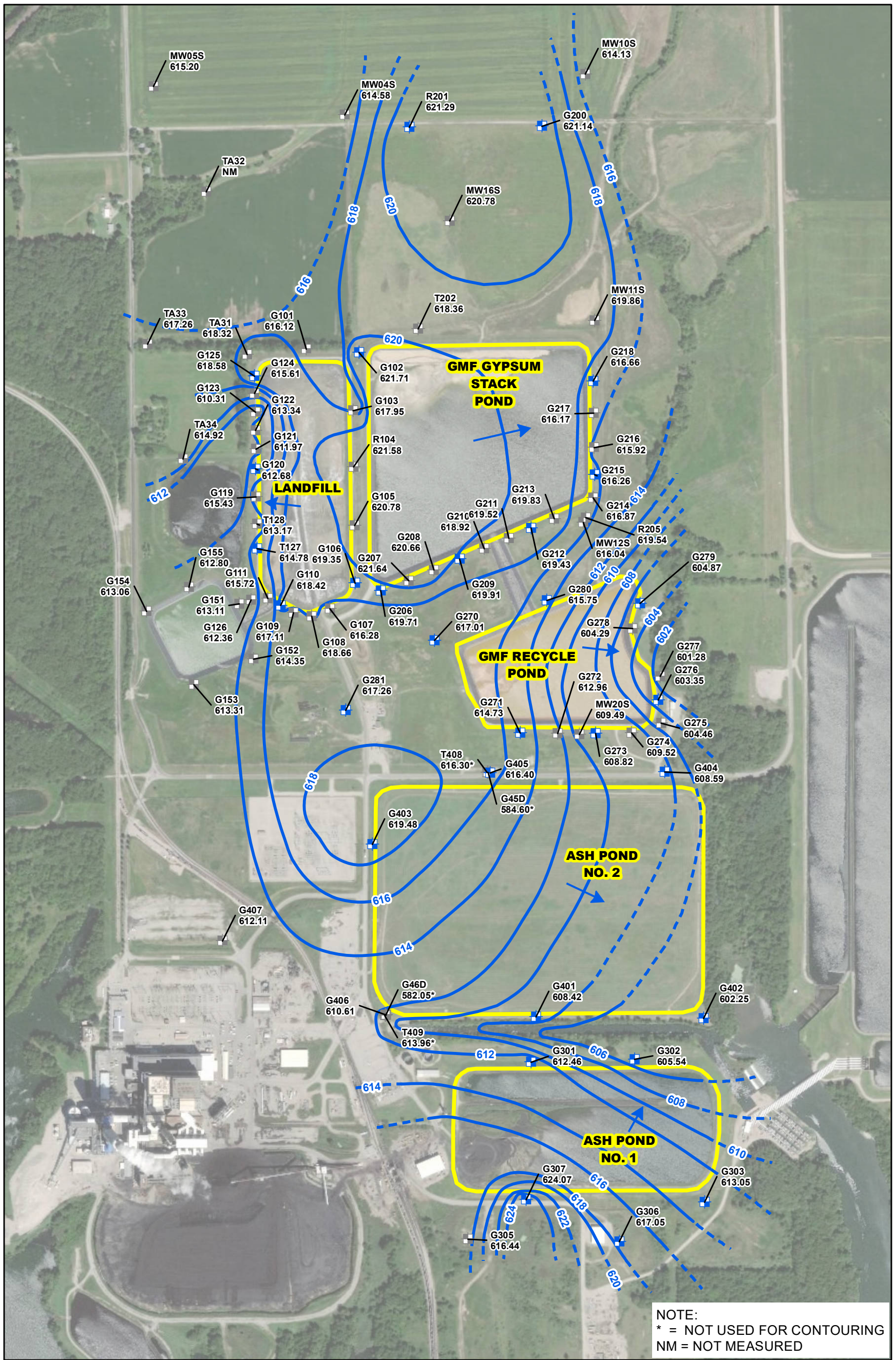




NOTE:
 * = NOT USED FOR CONTOURING
 NM = NOT MEASURED

- 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





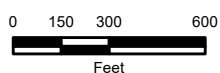
NOTE:
 * = NOT USED FOR CONTOURING
 NM = NOT MEASURED

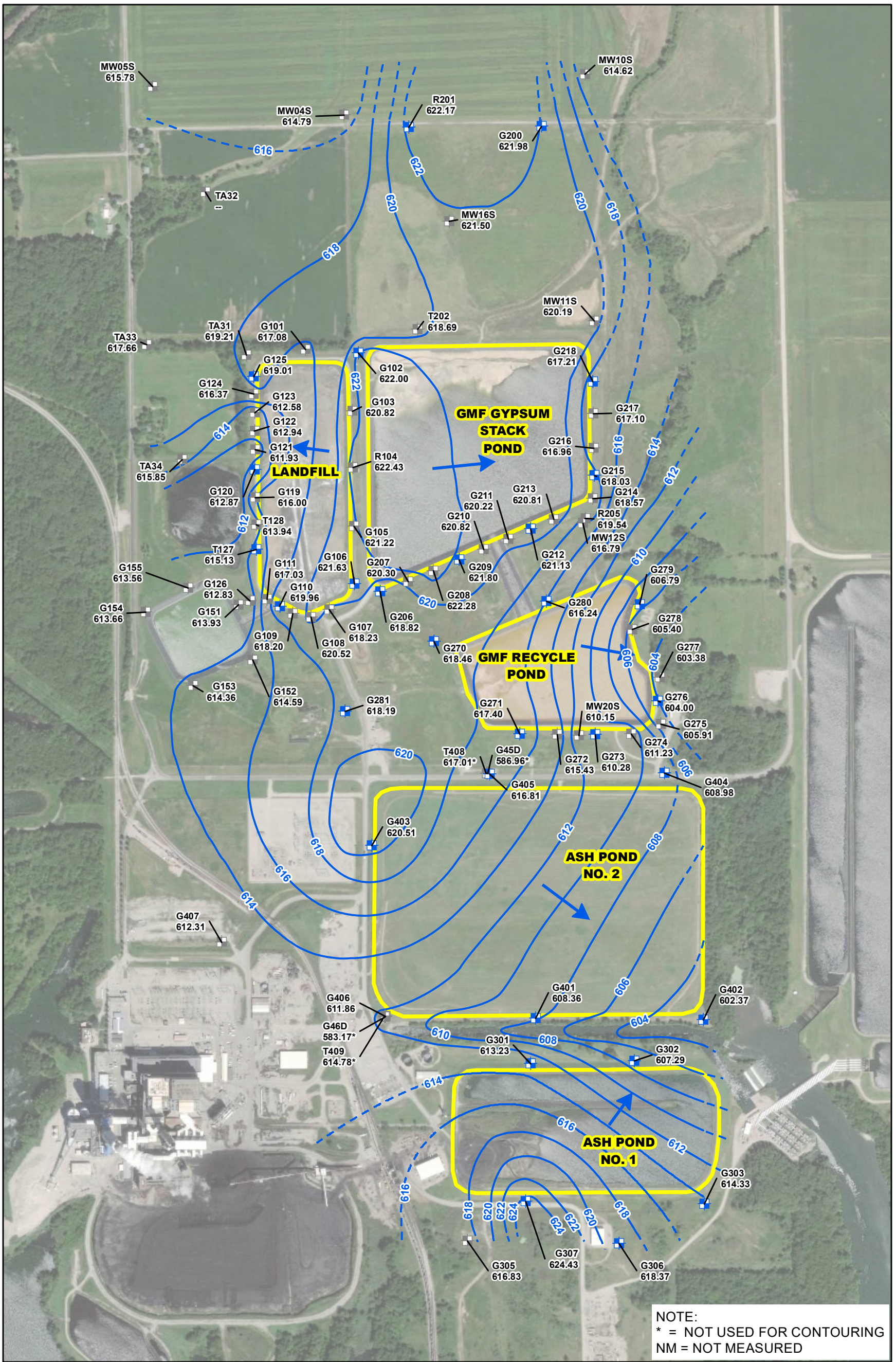
LEGEND

- 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





NOTE:
 * = NOT USED FOR CONTOURING
 NM = NOT MEASURED

■ 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

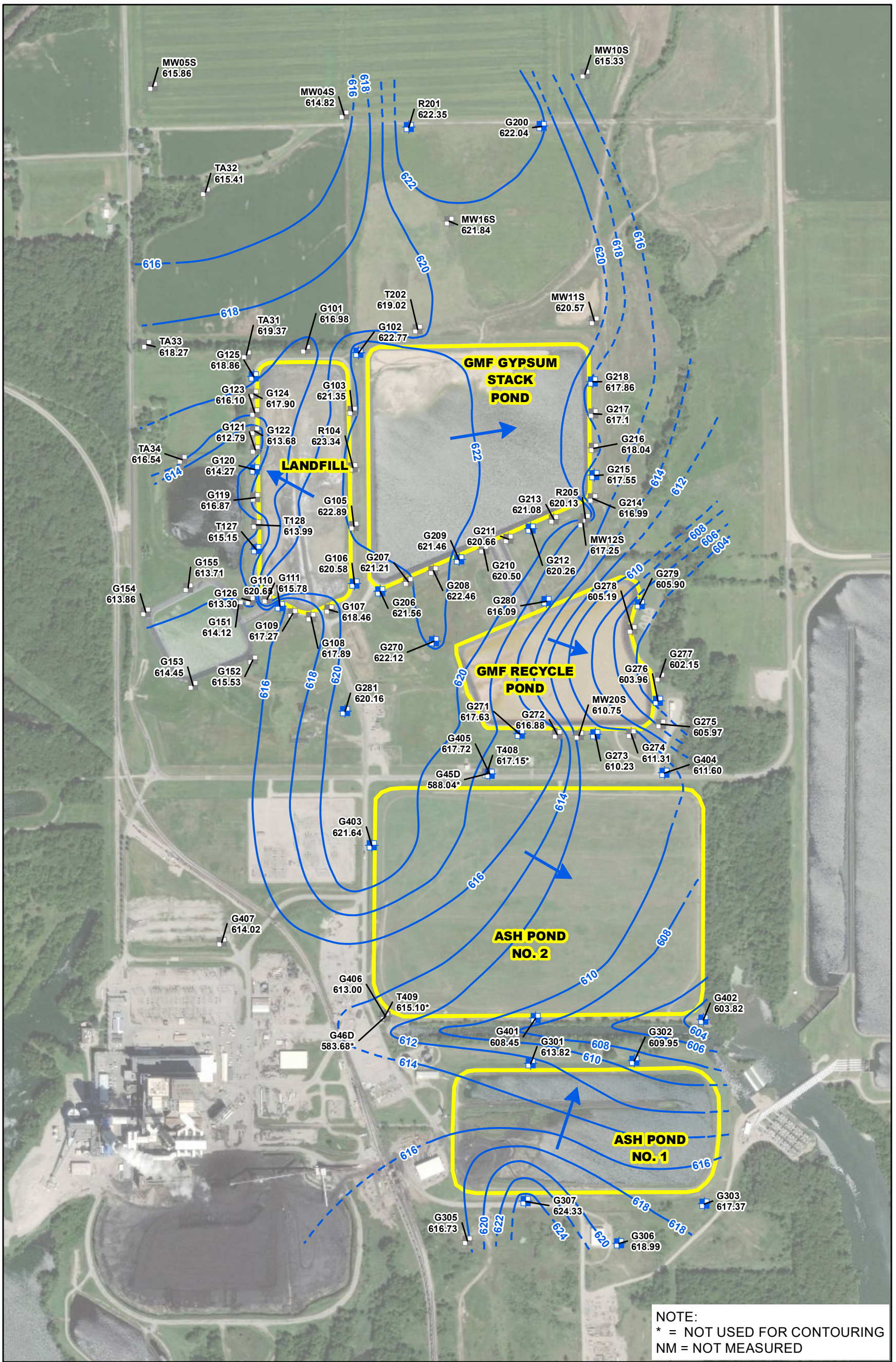
COFFEEN ASH POND NO. 1 (UNIT ID: 101), COFFEEN ASH POND NO. 2 (UNIT ID: 102),
 COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103), COFFEEN GMF RECYCLE POND
 (UNIT ID: 104) AND COFFEEN LANDFILL (UNIT ID: 105)
 GROUNDWATER ELEVATION CONTOUR MAP
 JANUARY 15, 2019

CCR RULE GROUNDWATER MONITORING
 COFFEEN POWER STATION
 COFFEEN, ILLINOIS

0 150 300 600
 Feet

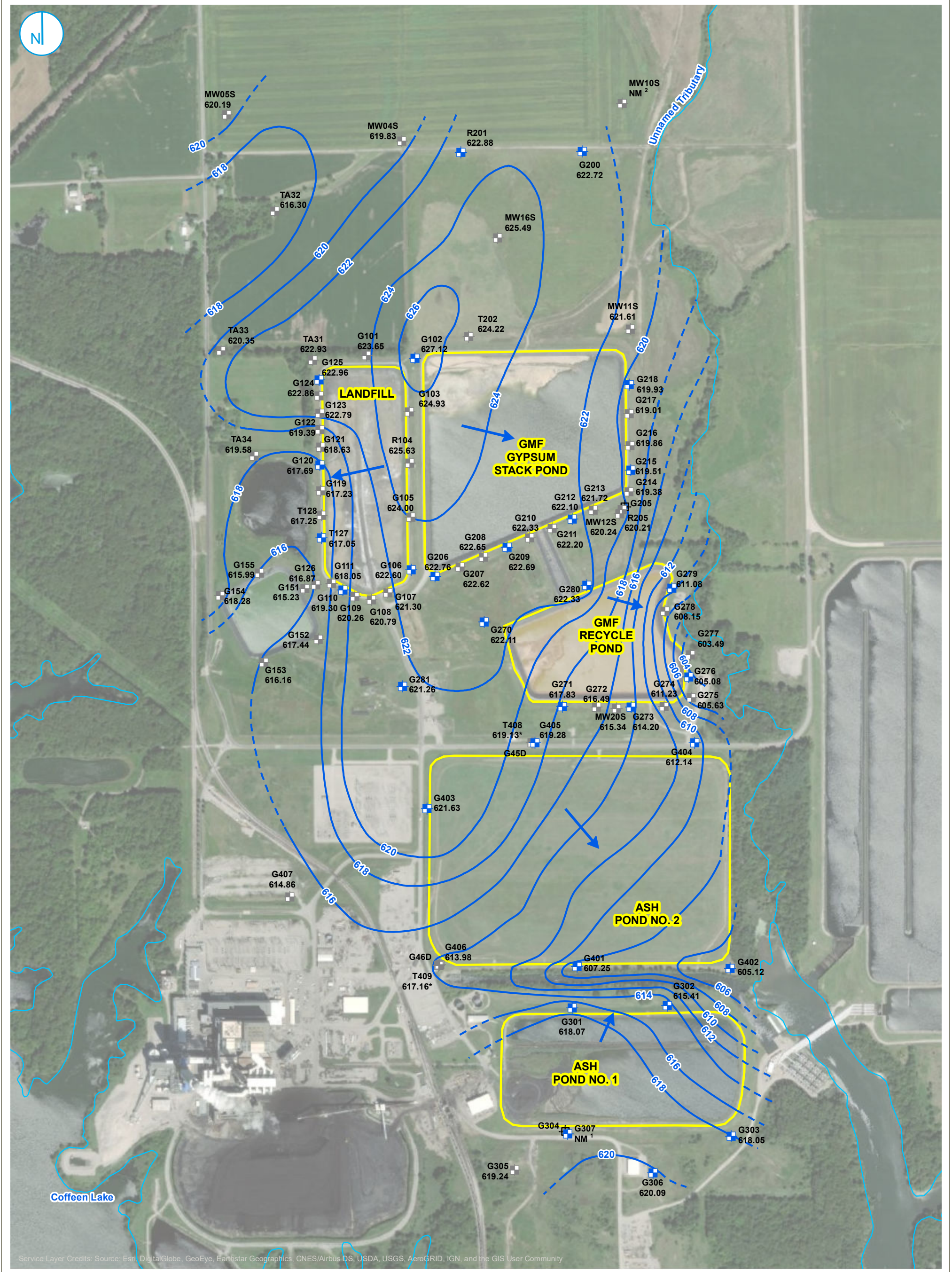


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- CCR RULE MONITORING WELL LOCATION
 - NON-CCR RULE MONITORING WELL LOCATION
 - GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
 - - - INFERRED GROUNDWATER ELEVATION CONTOUR
 - ➔ GROUNDWATER FLOW DIRECTION
 - CCR MONITORED UNIT
- COFFEEN 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

NOTE:
 * = NOT USED FOR CONTOURING
 NM = NOT MEASURED



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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.

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 RECYCLE 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 RECYCLE 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 RECYCLE 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

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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 RECYCLE 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 RECYCLE 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

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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 RECYCLE 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 RECYCLE 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

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE 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 RECYCLE POND
COFFEEN, ILLINOIS

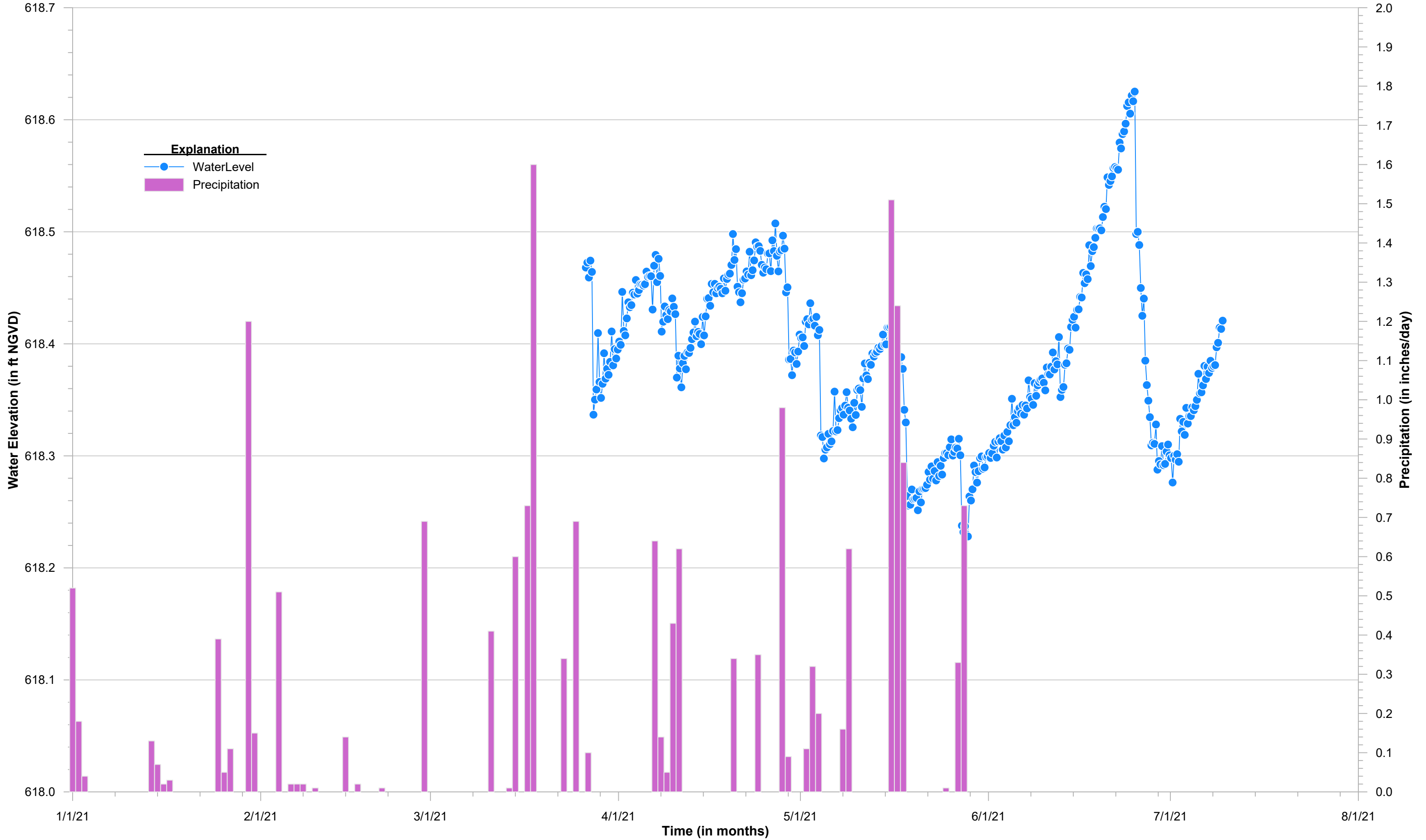
Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
TA34	07/26/2021	617.18
TA34	08/16/2021	617.42
TR32	08/05/2019	615.67
TR32	01/20/2020	616.56
TR32	08/10/2020	614.92
TR32	01/20/2021	614.50
TR32	04/20/2021	615.59
TR32	07/26/2021	616.09
TR32	08/16/2021	616.18
SG-02	03/29/2021	598.75
SG-02	04/20/2021	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

generated 10/12/2021, 9:28:12 AM CDT

Coffeen Recycle Pond - X201 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	

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	

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 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

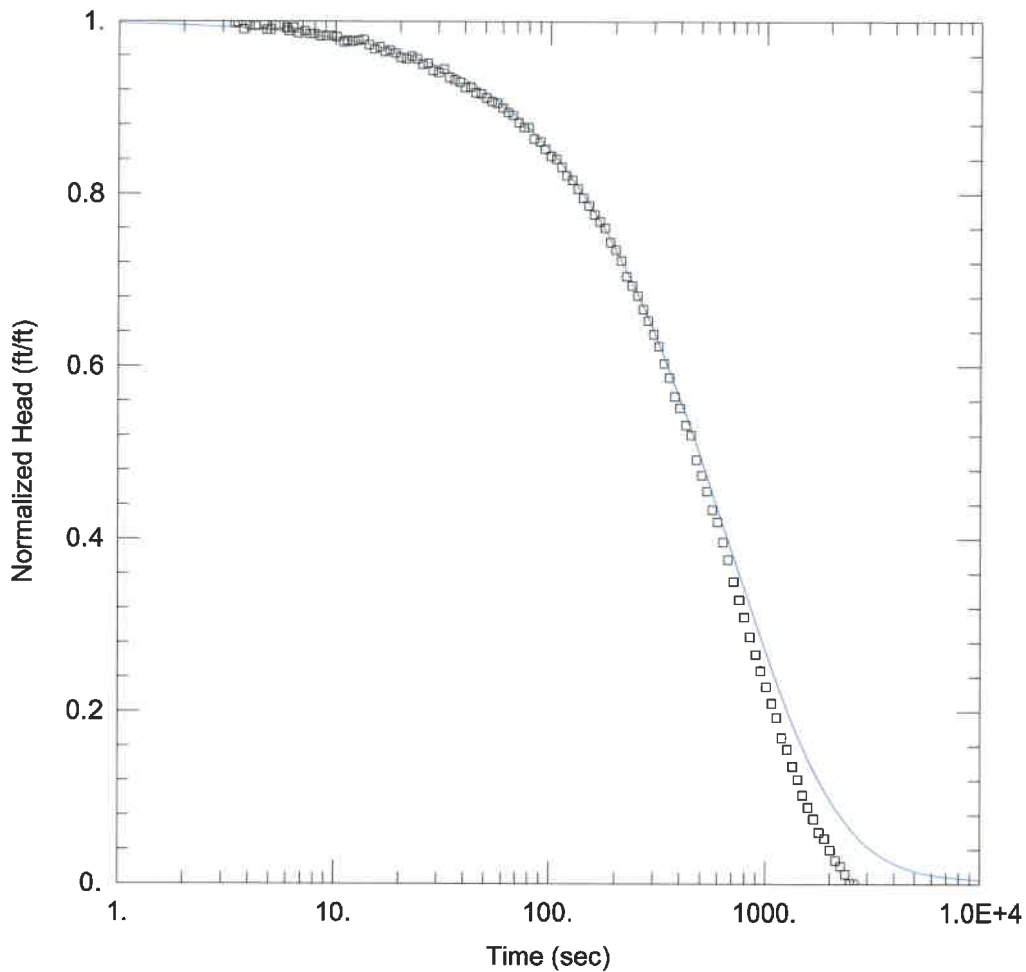
ft = foot/feet

NAVD88 = North American Vertical Datum of 1988

PMP = potential migration pathway

UA = uppermost aquifer

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

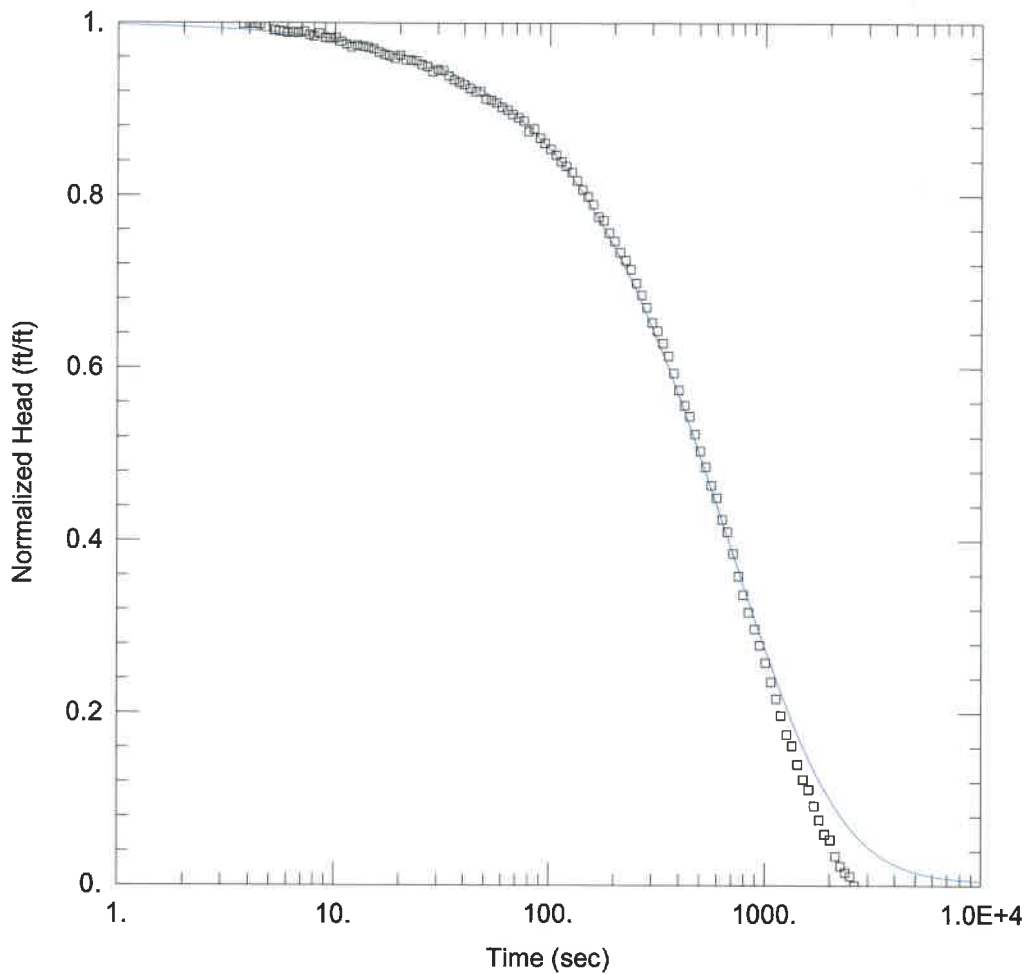
Saturated Thickness: 2.3 ft

WELL DATA (G206)

Initial Displacement: 1.5 ft Static Water Column Height: 14.47 ft
 Total Well Penetration Depth: 13.97 ft Screen Length: 4.41 ft
 Casing Radius: 0.08333 ft Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined Solution Method: KGS Model
 $K_r = 0.0005$ cm/sec $S_s = 1.0E-6$ ft⁻¹
 $K_z/K_r = 1.$



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

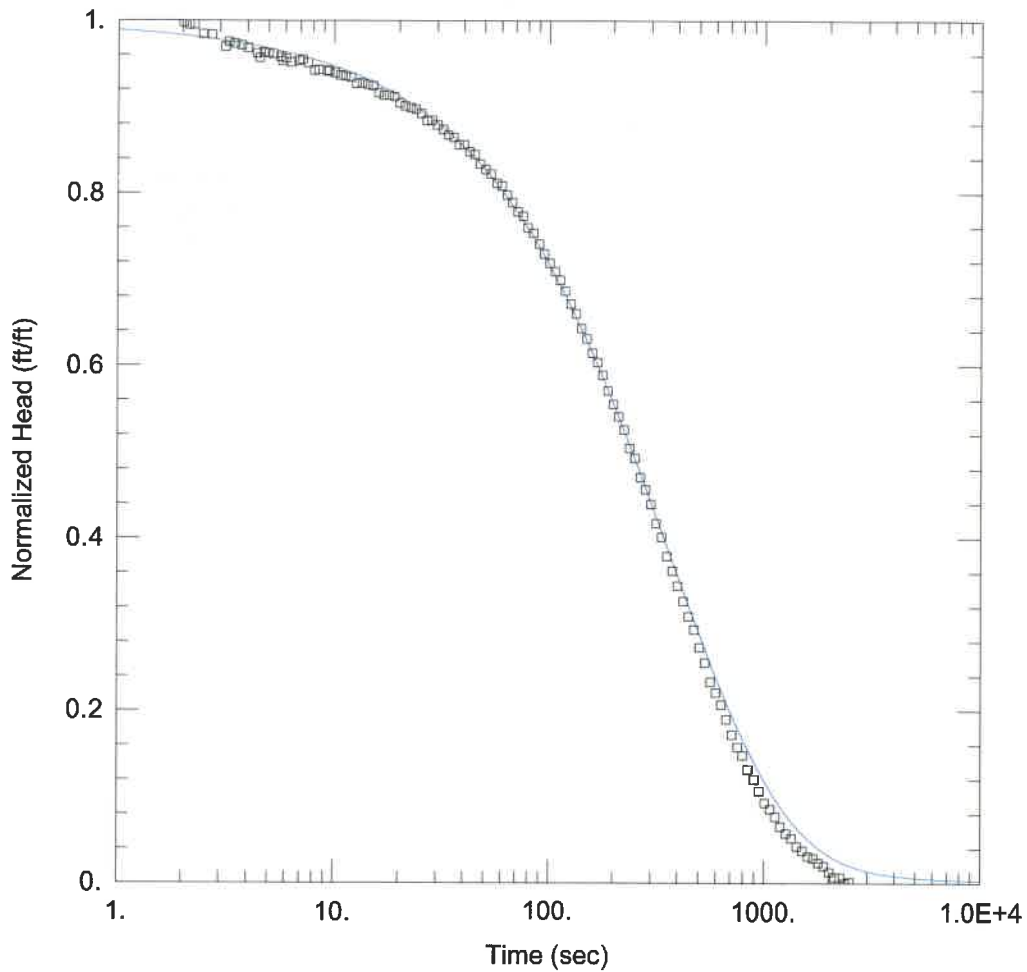
Saturated Thickness: 2.3 ft

WELL DATA (G206)

Initial Displacement: <u>1.385 ft</u>	Static Water Column Height: <u>14.47 ft</u>
Total Well Penetration Depth: <u>13.97 ft</u>	Screen Length: <u>4.41 ft</u>
Casing Radius: <u>0.08333 ft</u>	Well Radius: <u>0.08333 ft</u>

SOLUTION

Aquifer Model: <u>Confined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>0.00049 cm/sec</u>	Ss = <u>1.0E-6 ft⁻¹</u>
Kz/Kr = <u>1.</u>	



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

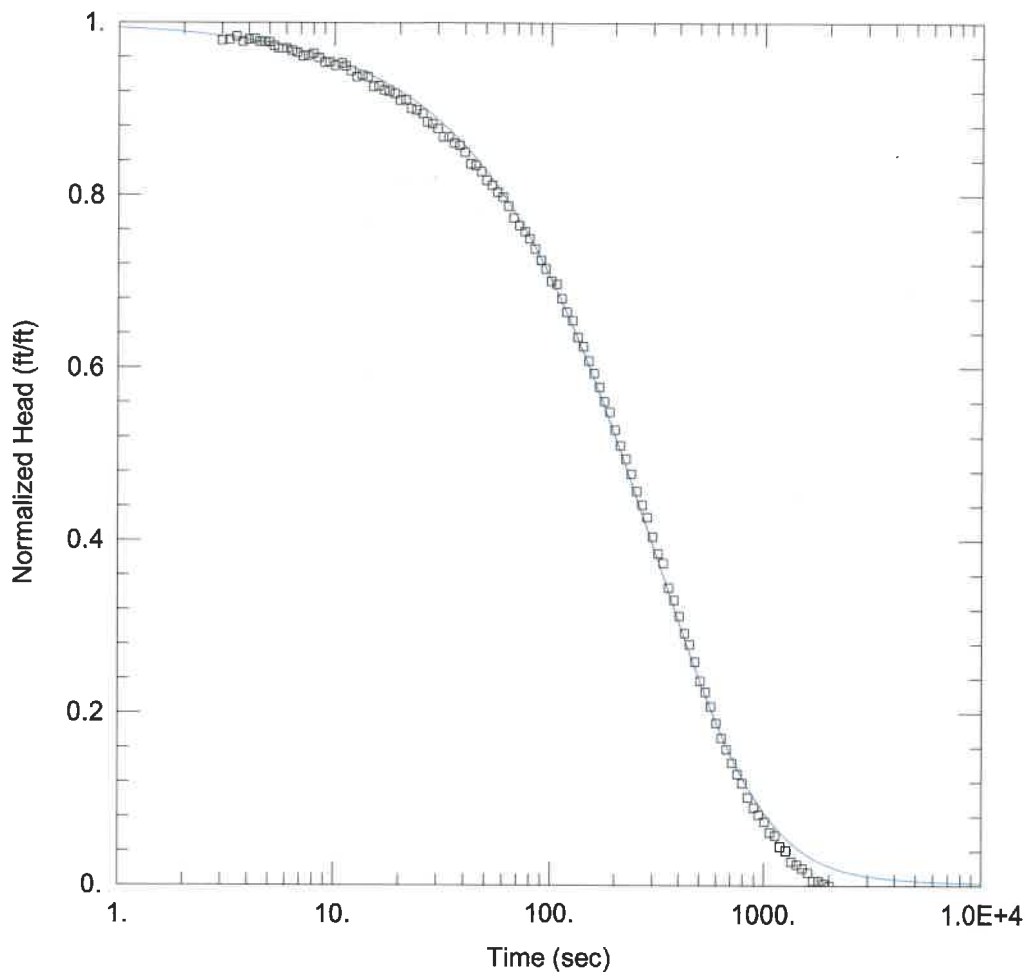
Saturated Thickness: 8. ft

WELL DATA (G209)

Initial Displacement: 1.575 ft Static Water Column Height: 14.76 ft
 Total Well Penetration Depth: 11.89 ft Screen Length: 4.54 ft
 Casing Radius: 0.08333 ft Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined Solution Method: KGS Model
 $K_r = \underline{0.00025}$ cm/sec $S_s = \underline{0.0007}$ ft⁻¹
 $K_z/K_r = \underline{1.}$



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

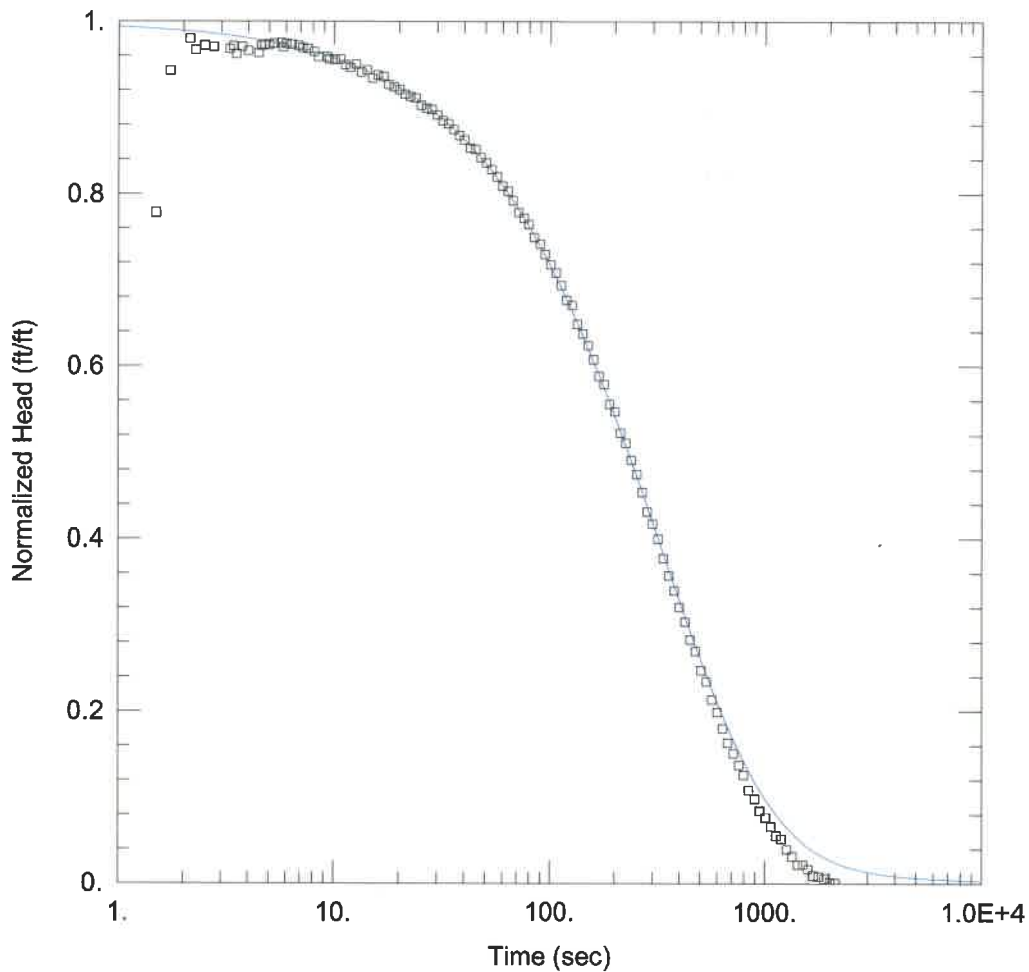
Saturated Thickness: 1. ft

WELL DATA (G212)

Initial Displacement: <u>1.45 ft</u>	Static Water Column Height: <u>13.14 ft</u>
Total Well Penetration Depth: <u>12.62 ft</u>	Screen Length: <u>4.55 ft</u>
Casing Radius: <u>0.08333 ft</u>	Well Radius: <u>0.08333 ft</u>

SOLUTION

Aquifer Model: <u>Confined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>0.0021 cm/sec</u>	Ss = <u>1.5E-5 ft⁻¹</u>
Kz/Kr = <u>1.</u>	



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

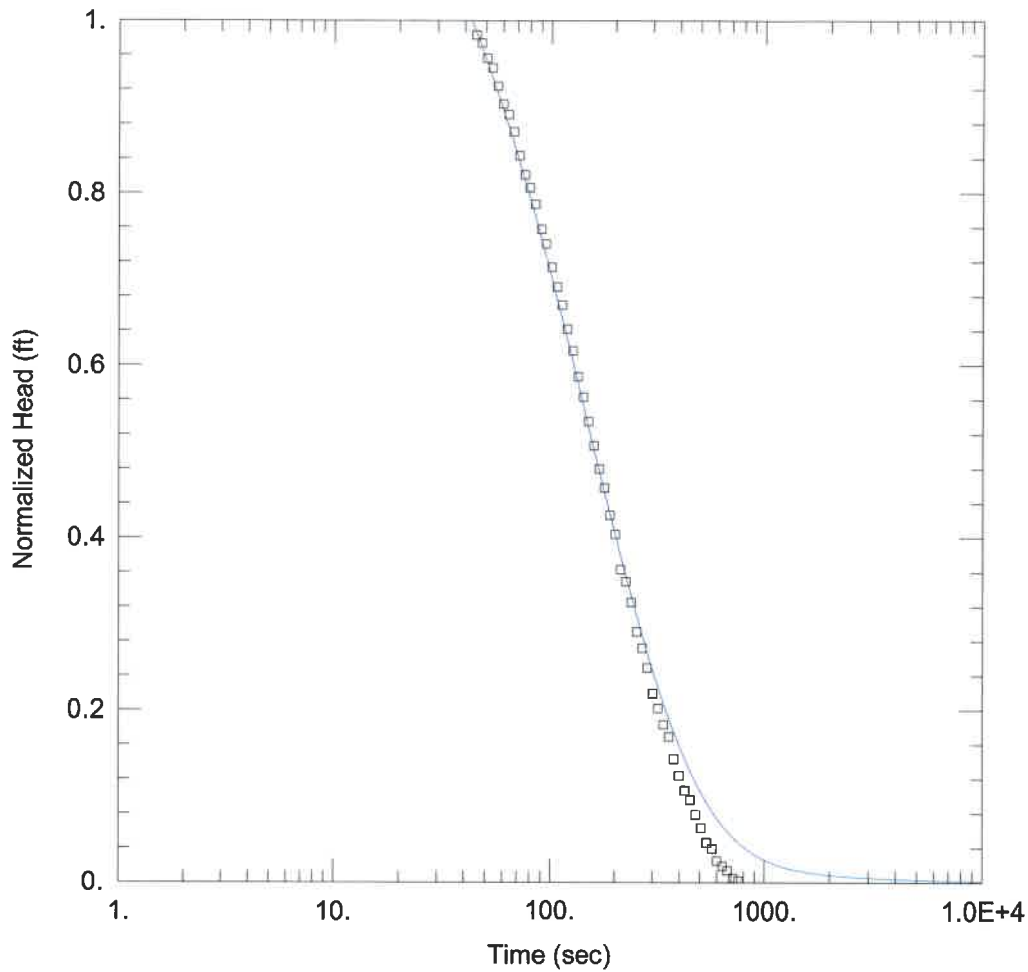
Saturated Thickness: 1. ft

WELL DATA (G212)

Initial Displacement: <u>1.525 ft</u>	Static Water Column Height: <u>13.14 ft</u>
Total Well Penetration Depth: <u>12.62 ft</u>	Screen Length: <u>4.55 ft</u>
Casing Radius: <u>0.08333 ft</u>	Well Radius: <u>0.08333 ft</u>

SOLUTION

Aquifer Model: <u>Confined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>0.0018 cm/sec</u>	Ss = <u>4.0E-5 ft⁻¹</u>
Kz/Kr = <u>1.</u>	



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

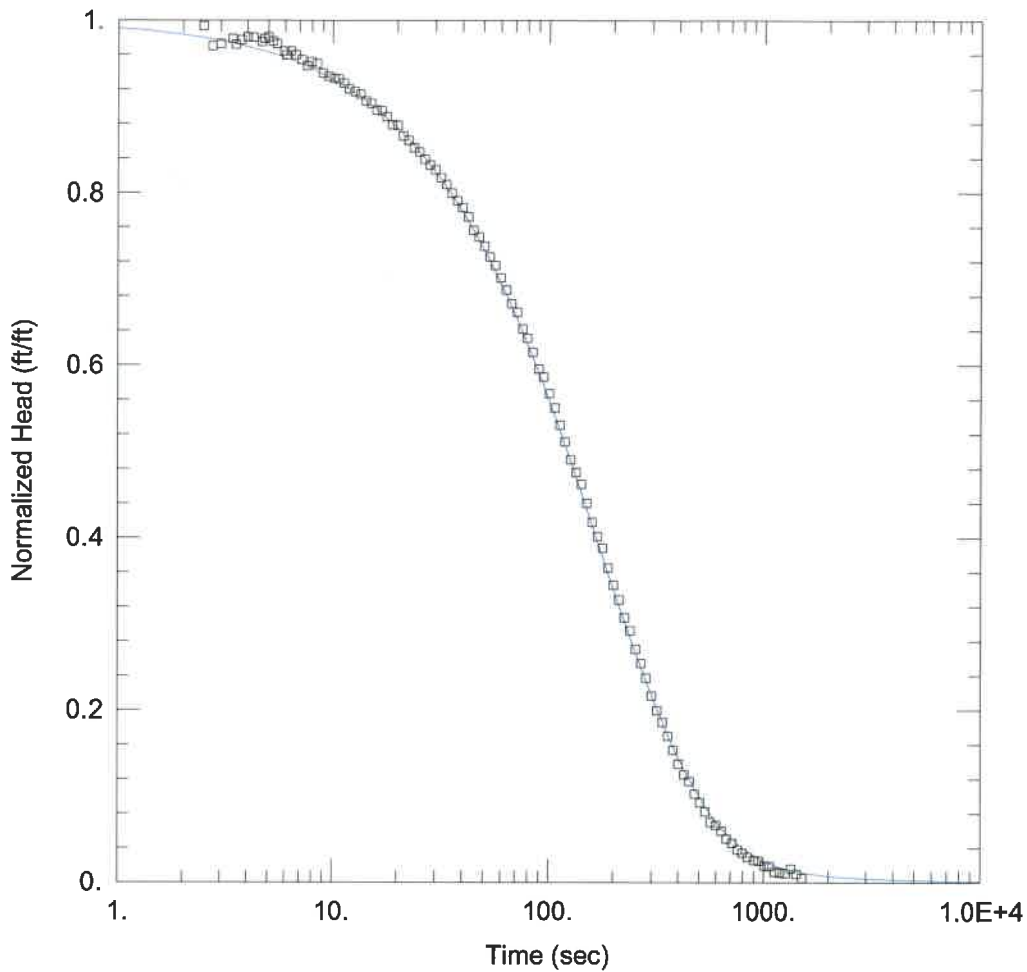
Saturated Thickness: 1.2 ft

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
 $K_r = 0.004 \text{ cm/sec}$ $S_s = 1.0E-5 \text{ ft}^{-1}$
 $K_z/K_r = 1.$



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

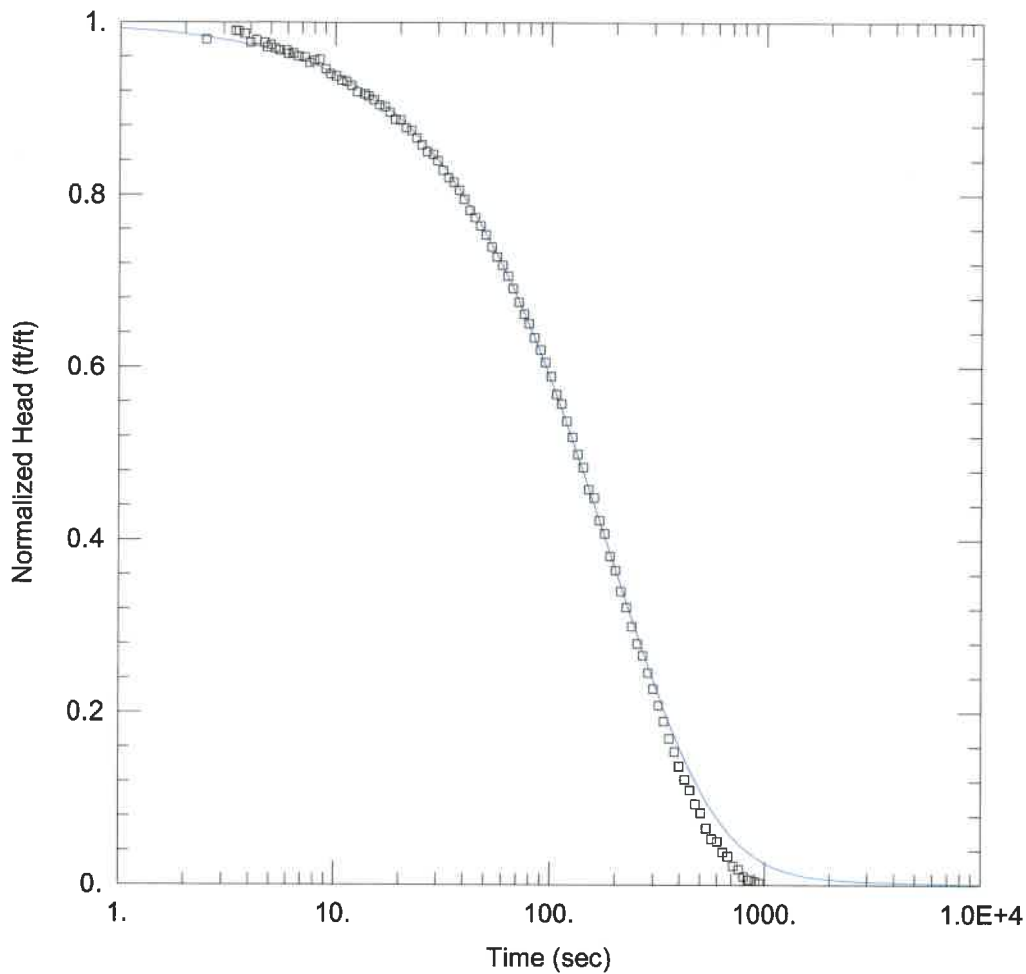
Saturated Thickness: 1.2 ft

WELL DATA (G215)

Initial Displacement: 1.4 ft 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
 $K_r = 0.0035 \text{ cm/sec}$ $S_s = 1.0E-5 \text{ ft}^{-1}$
 $K_z/K_r = 1.$



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

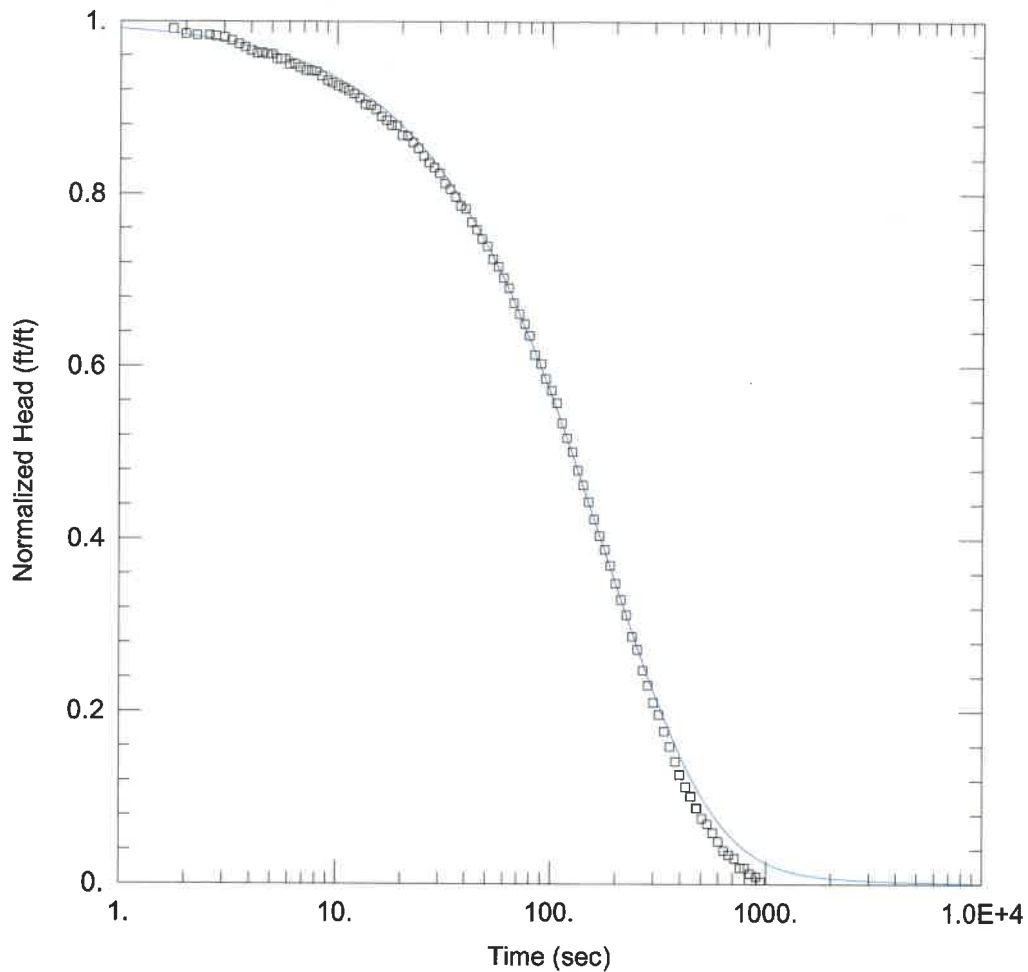
Saturated Thickness: 1.9 ft

WELL DATA (G218)

Initial Displacement: 1.45 ft Static Water Column Height: 20.86 ft
 Total Well Penetration Depth: 12.86 ft Screen Length: 4.44 ft
 Casing Radius: 0.08333 ft Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined Solution Method: KGS Model
 $K_r = 0.0026 \text{ cm/sec}$ $S_s = 1.0E-6 \text{ ft}^{-1}$
 $K_z/K_r = 1.$



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

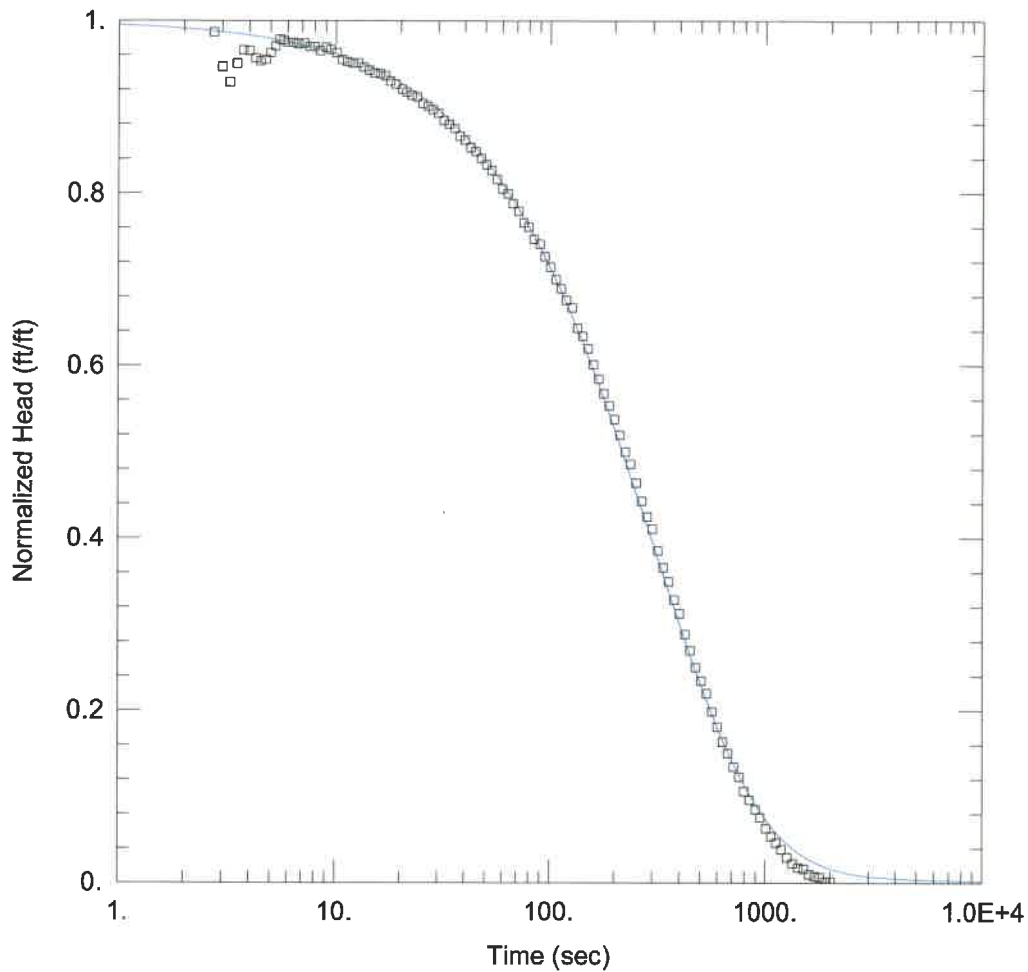
Saturated Thickness: 1.9 ft

WELL DATA (G218)

Initial Displacement: <u>1.5 ft</u>	Static Water Column Height: <u>20.86 ft</u>
Total Well Penetration Depth: <u>12.86 ft</u>	Screen Length: <u>4.44 ft</u>
Casing Radius: <u>0.08333 ft</u>	Well Radius: <u>0.08333 ft</u>

SOLUTION

Aquifer Model: <u>Confined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>0.0024 cm/sec</u>	Ss = <u>1.0E-5 ft⁻¹</u>
Kz/Kr = <u>1.</u>	



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

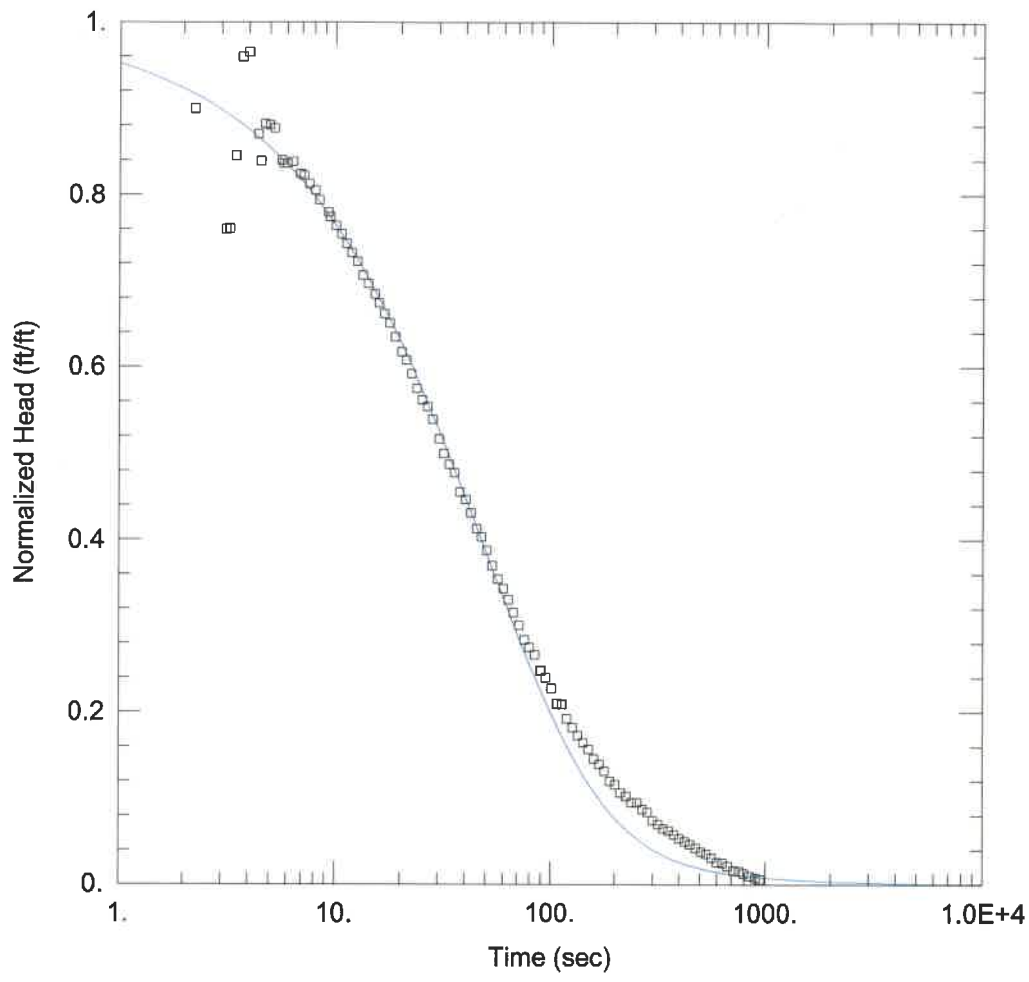
Saturated Thickness: 1.7 ft

WELL DATA (G272)

Initial Displacement: <u>1.425 ft</u>	Static Water Column Height: <u>7.22 ft</u>
Total Well Penetration Depth: <u>7.7 ft</u>	Screen Length: <u>4.87 ft</u>
Casing Radius: <u>0.08333 ft</u>	Well Radius: <u>0.08333 ft</u>

SOLUTION

Aquifer Model: <u>Confined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>0.0017 cm/sec</u>	Ss = <u>1.0E-6 ft⁻¹</u>
Kz/Kr = <u>1.</u>	



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

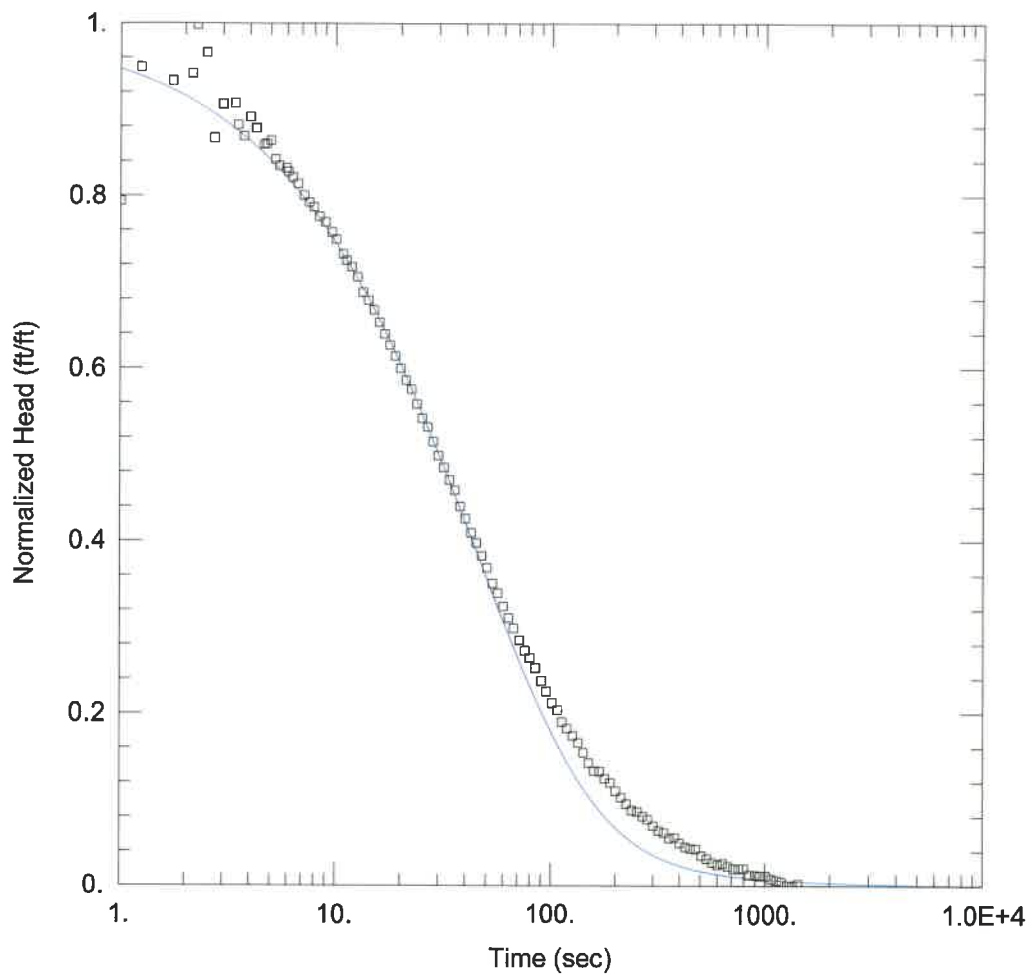
Saturated Thickness: 1.8 ft

WELL DATA (G283)

Initial Displacement: 1.55 ft Static Water Column Height: 16.77 ft
 Total Well Penetration Depth: 16.58 ft Screen Length: 9.78 ft
 Casing Radius: 0.08333 ft Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined Solution Method: KGS Model
 Kr = 0.0042 cm/sec Ss = 0.005 ft⁻¹
 Kz/Kr = 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

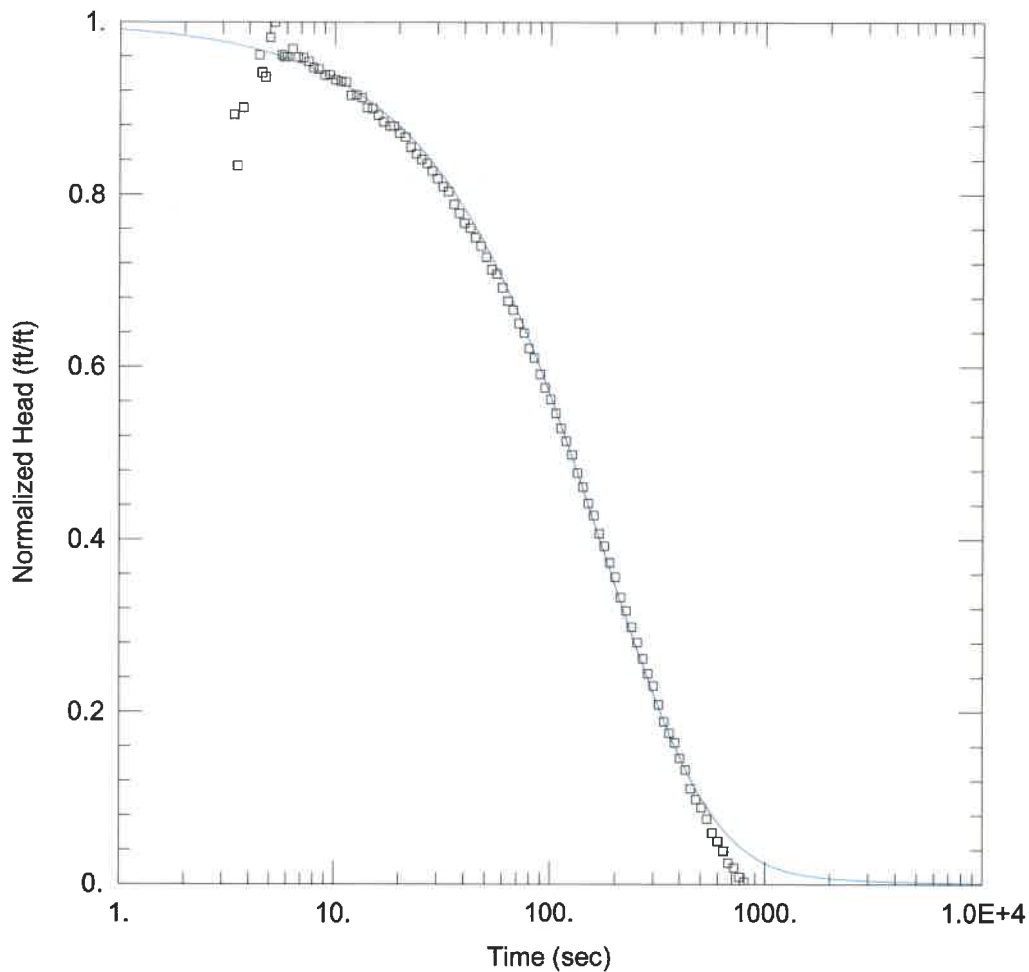
Saturated Thickness: 1.8 ft

WELL DATA (G283)

Initial Displacement: <u>1.6 ft</u>	Static Water Column Height: <u>16.77 ft</u>
Total Well Penetration Depth: <u>16.58 ft</u>	Screen Length: <u>9.78 ft</u>
Casing Radius: <u>0.08333 ft</u>	Well Radius: <u>0.08333 ft</u>

SOLUTION

Aquifer Model: <u>Confined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>0.0045 cm/sec</u>	Ss = <u>0.006 ft⁻¹</u>
Kz/Kr = <u>1.</u>	



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

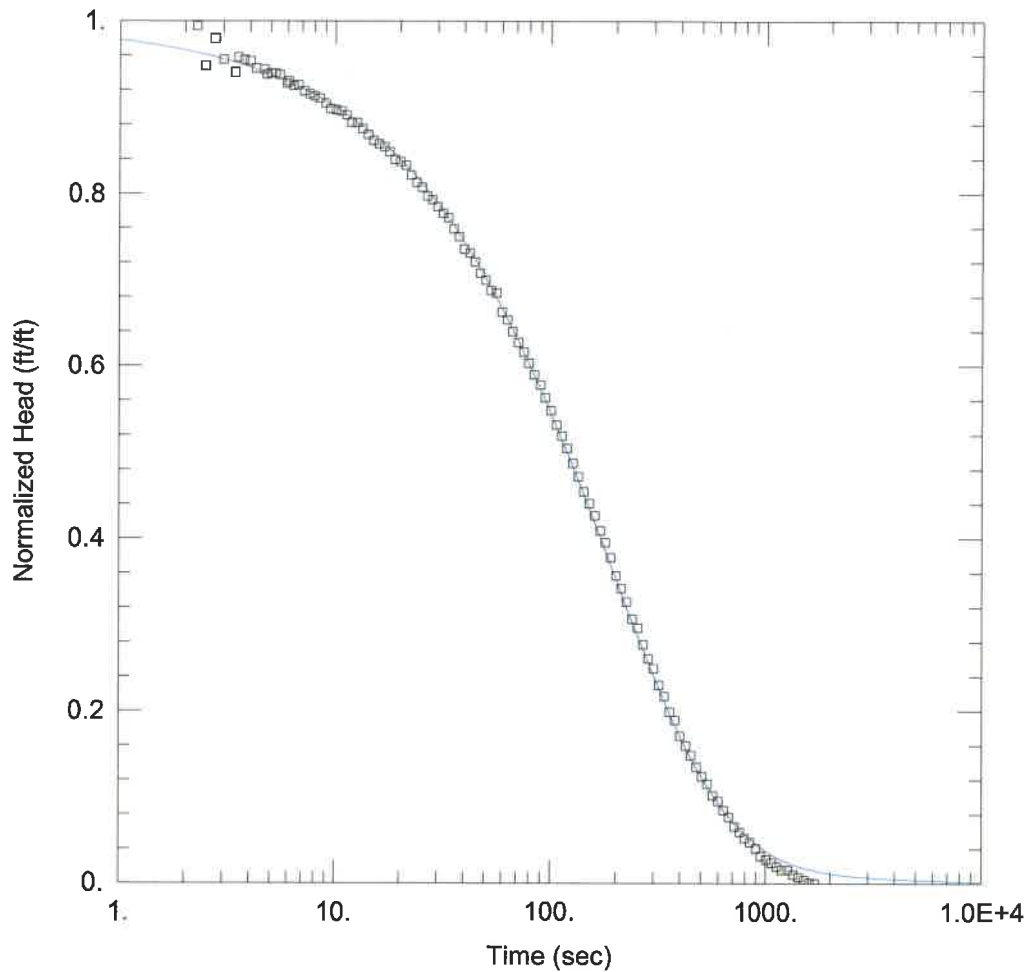
Saturated Thickness: 3.8 ft

WELL DATA (G284)

Initial Displacement: 1.425 ft	Static Water Column Height: 7.05 ft
Total Well Penetration Depth: 6.67 ft	Screen Length: 4.77 ft
Casing Radius: 0.08333 ft	Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined	Solution Method: KGS Model
Kr = 0.0012 cm/sec	Ss = 2.5E-5 ft ⁻¹
Kz/Kr = 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

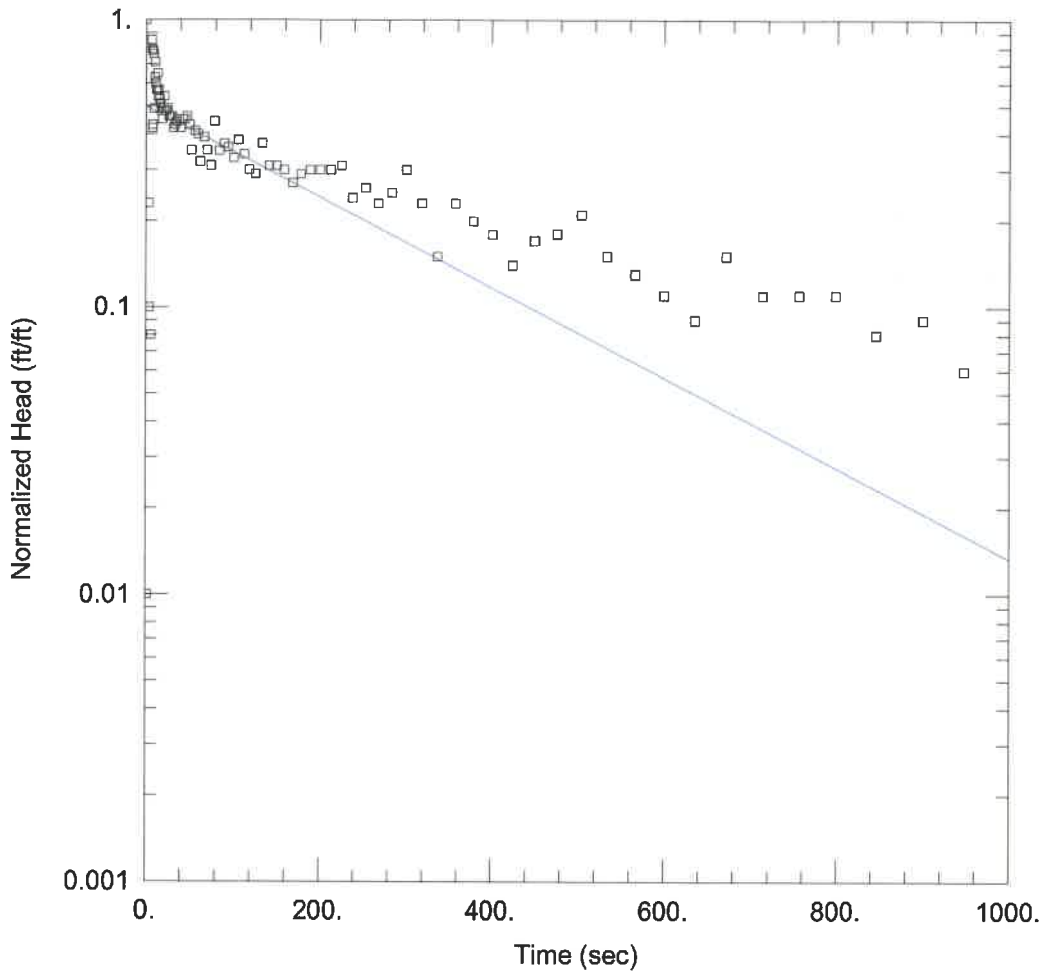
Saturated Thickness: 3.8 ft

WELL DATA (G284)

Initial Displacement: 1.55 ft Static Water Column Height: 7.05 ft
 Total Well Penetration Depth: 6.67 ft Screen Length: 4.77 ft
 Casing Radius: 0.08333 ft Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined Solution Method: KGS Model
 $K_r = 0.00078 \text{ cm/sec}$ $S_s = 0.0037 \text{ ft}^{-1}$
 $K_z/K_r = 1.$



G285 FALLING HEAD TEST

Data Set: I:\20\jobs\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

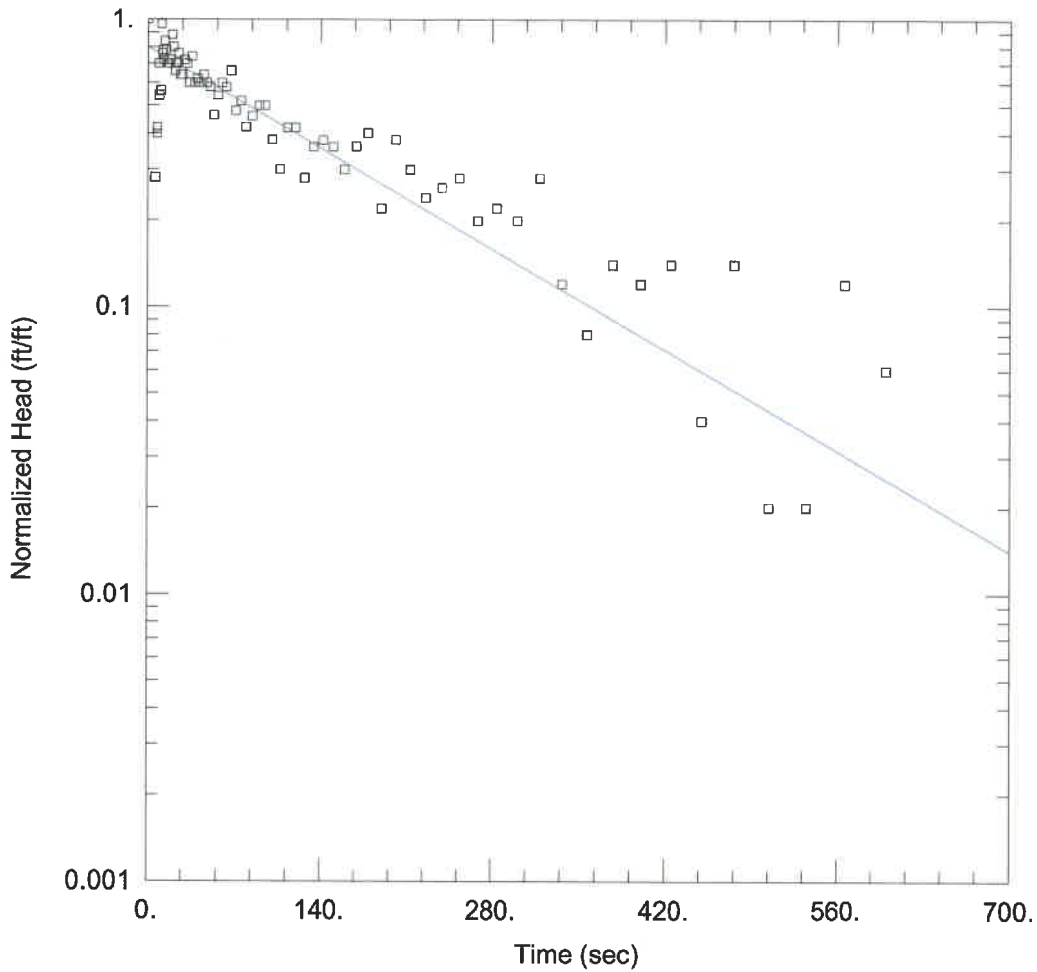
Saturated Thickness: 5.6 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G285)

Initial Displacement: 0.1 ft Static Water Column Height: 18.11 ft
 Total Well Penetration Depth: 17.73 ft Screen Length: 9.77 ft
 Casing Radius: 0.08333 ft Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bower-Rice
 K = 0.00027 cm/sec 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

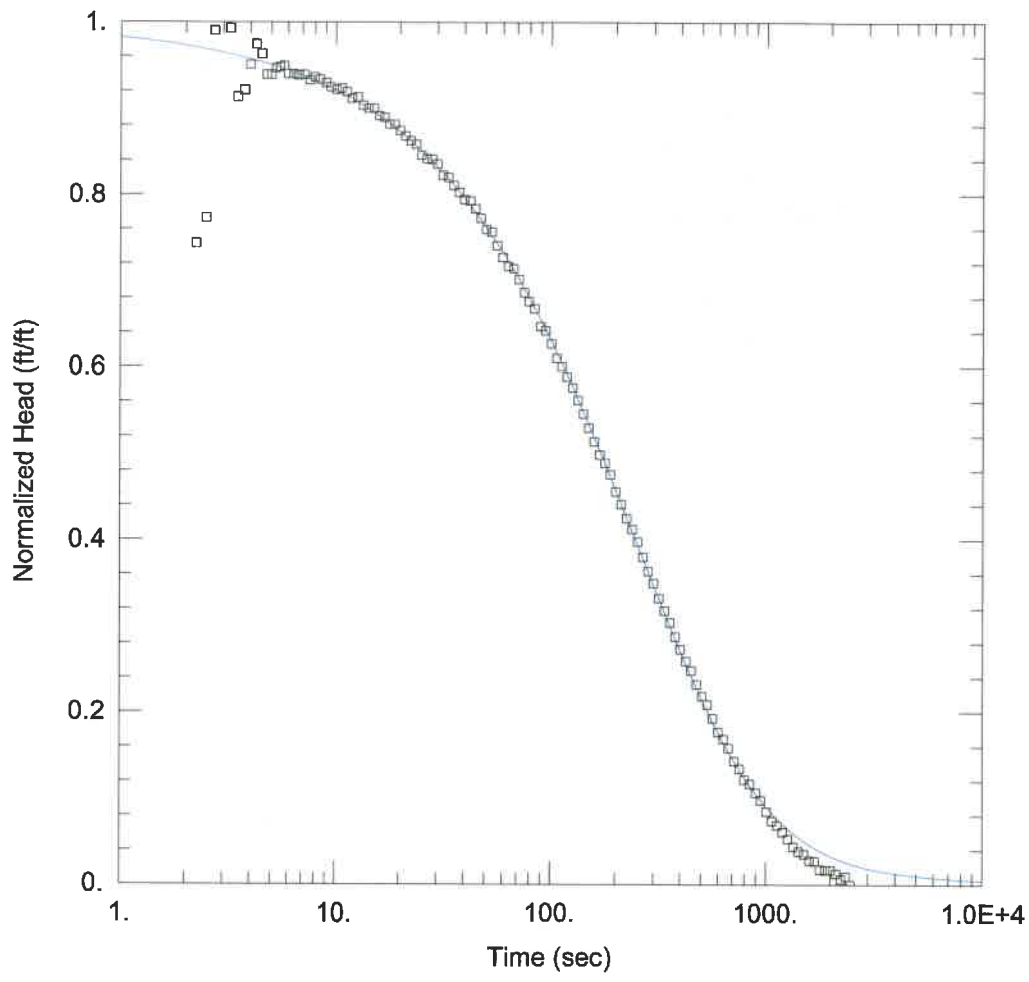
Saturated Thickness: 5.6 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G285)

Initial Displacement: 0.05 ft Static Water Column Height: 18.11 ft
 Total Well Penetration Depth: 17.73 ft Screen Length: 9.77 ft
 Casing Radius: 0.08333 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

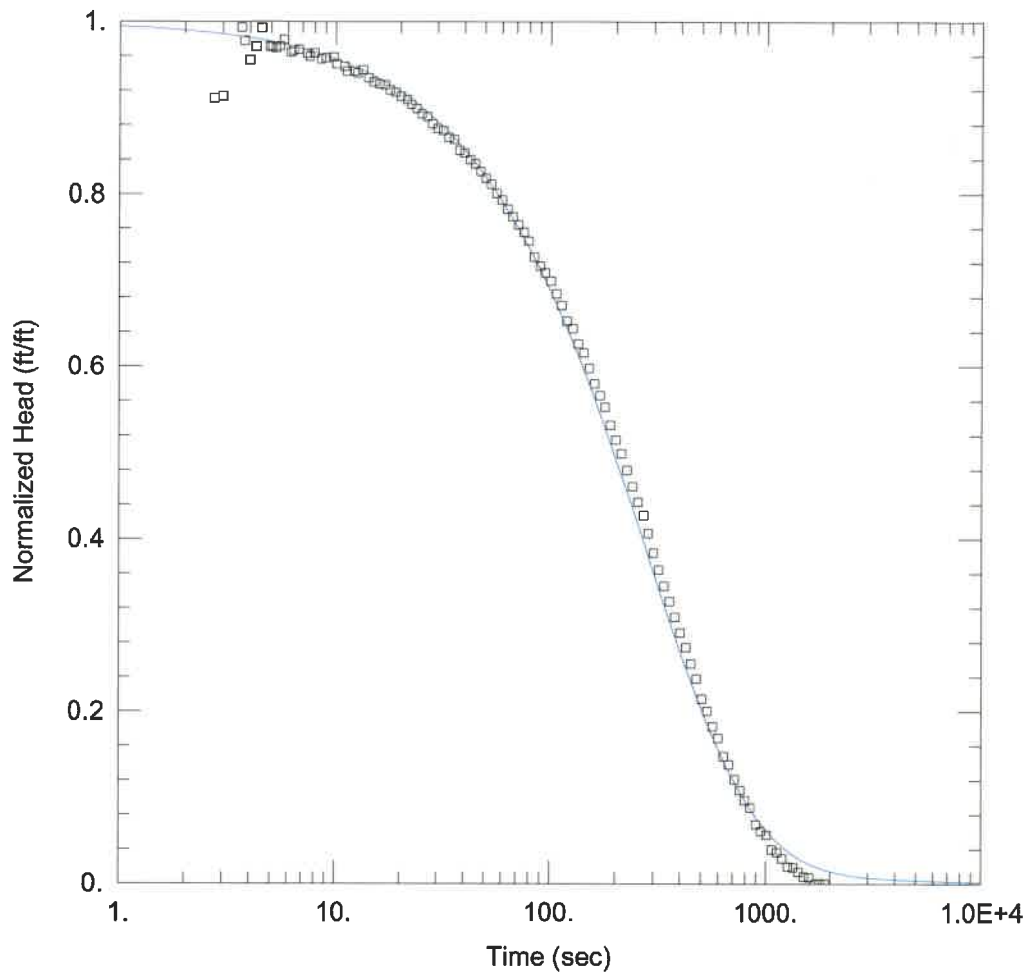
Saturated Thickness: 1. ft

WELL DATA (G286)

Initial Displacement: 1.25 ft Static Water Column Height: 6.26 ft
 Total Well Penetration Depth: 5.92 ft Screen Length: 4.79 ft
 Casing Radius: 0.08333 ft Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined Solution Method: KGS Model
 Kr = 0.0012 cm/sec Ss = 0.01 ft⁻¹
 Kz/Kr = 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

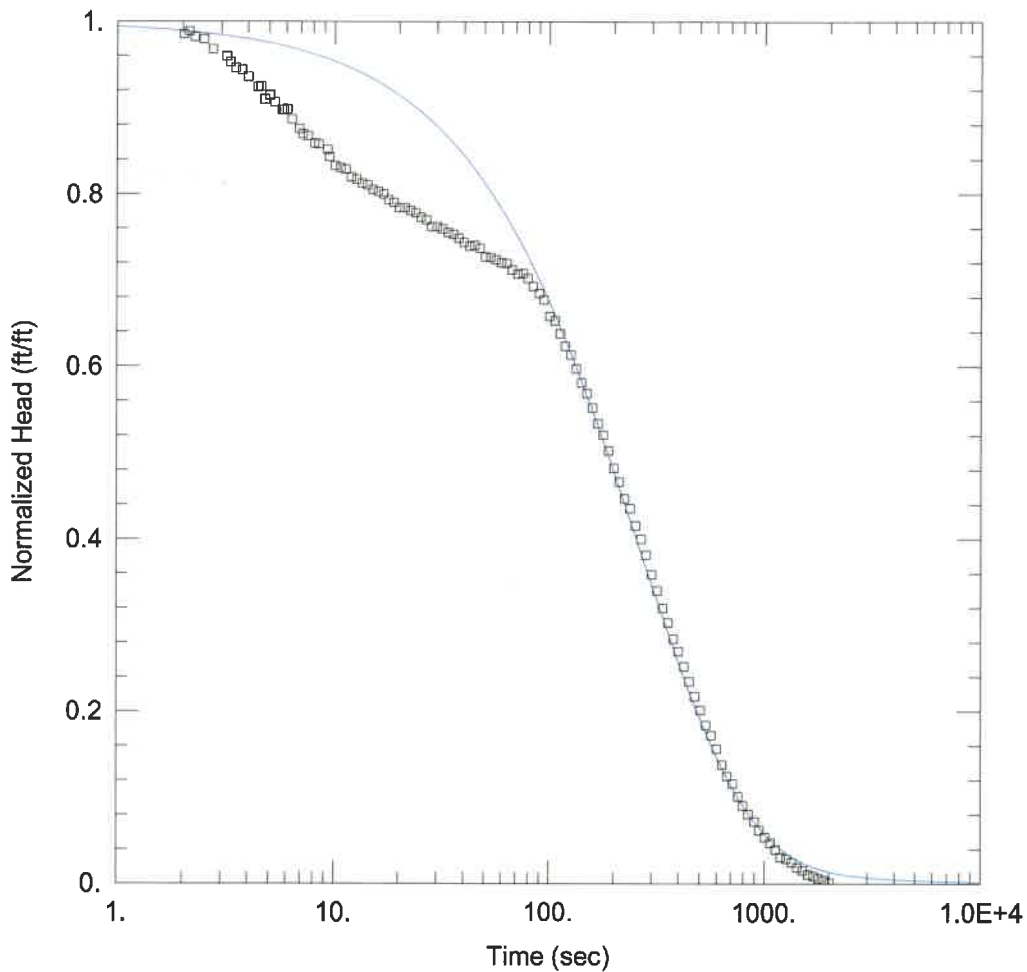
Saturated Thickness: 2.7 ft

WELL DATA (G287)

Initial Displacement: <u>1.425 ft</u>	Static Water Column Height: <u>6.05 ft</u>
Total Well Penetration Depth: <u>5.71 ft</u>	Screen Length: <u>4.82 ft</u>
Casing Radius: <u>0.08333 ft</u>	Well Radius: <u>0.08333 ft</u>

SOLUTION

Aquifer Model: <u>Confined</u>	Solution Method: <u>KGS Model</u>
Kr = <u>0.0011 cm/sec</u>	Ss = <u>3.5E-6 ft⁻¹</u>
Kz/Kr = <u>1.</u>	



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 Static Water Column Height: 6.05 ft
 Total Well Penetration Depth: 5.71 ft Screen Length: 4.82 ft
 Casing Radius: 0.08333 ft Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined Solution Method: KGS Model
 $K_r = \underline{0.0011}$ cm/sec $S_s = \underline{7.0E-6}$ ft⁻¹
 $K_z/K_r = \underline{1}$

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 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]

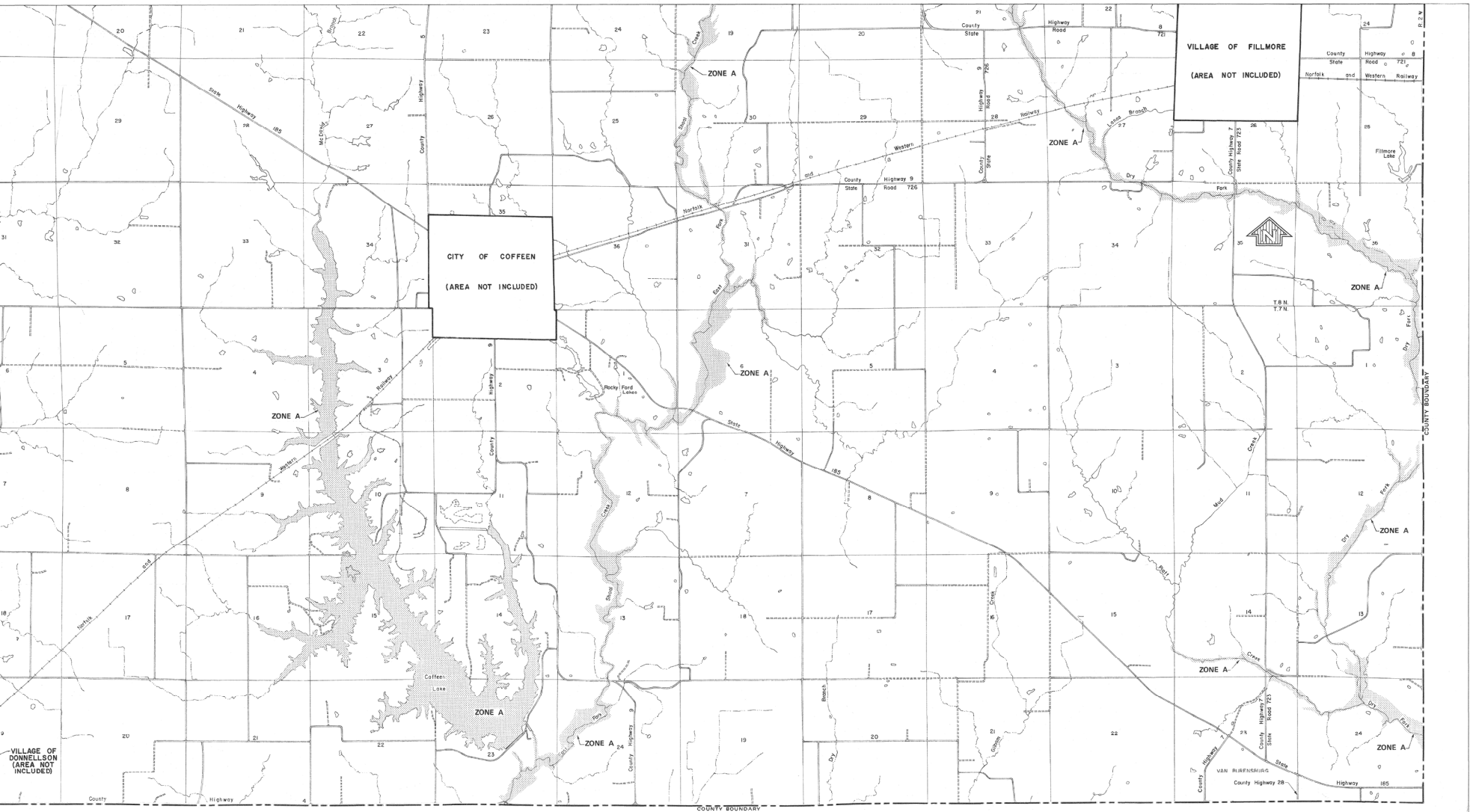
Notes:

- 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

APPENDIX G
FEMA FLOOD HAZARD MAP



NATIONAL FLOOD INSURANCE PROGRAM

FHBM
FLOOD HAZARD MAP

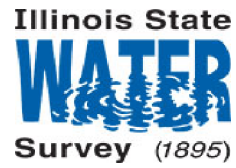
MONTGOMERY COUNTY, ILLINOIS
UNINCORPORATED AREAS

PANEL 9 OF 10
(SEE MAP INDEX)

COMMUNITY

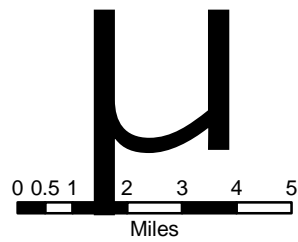


federal emergency management
federal insurance



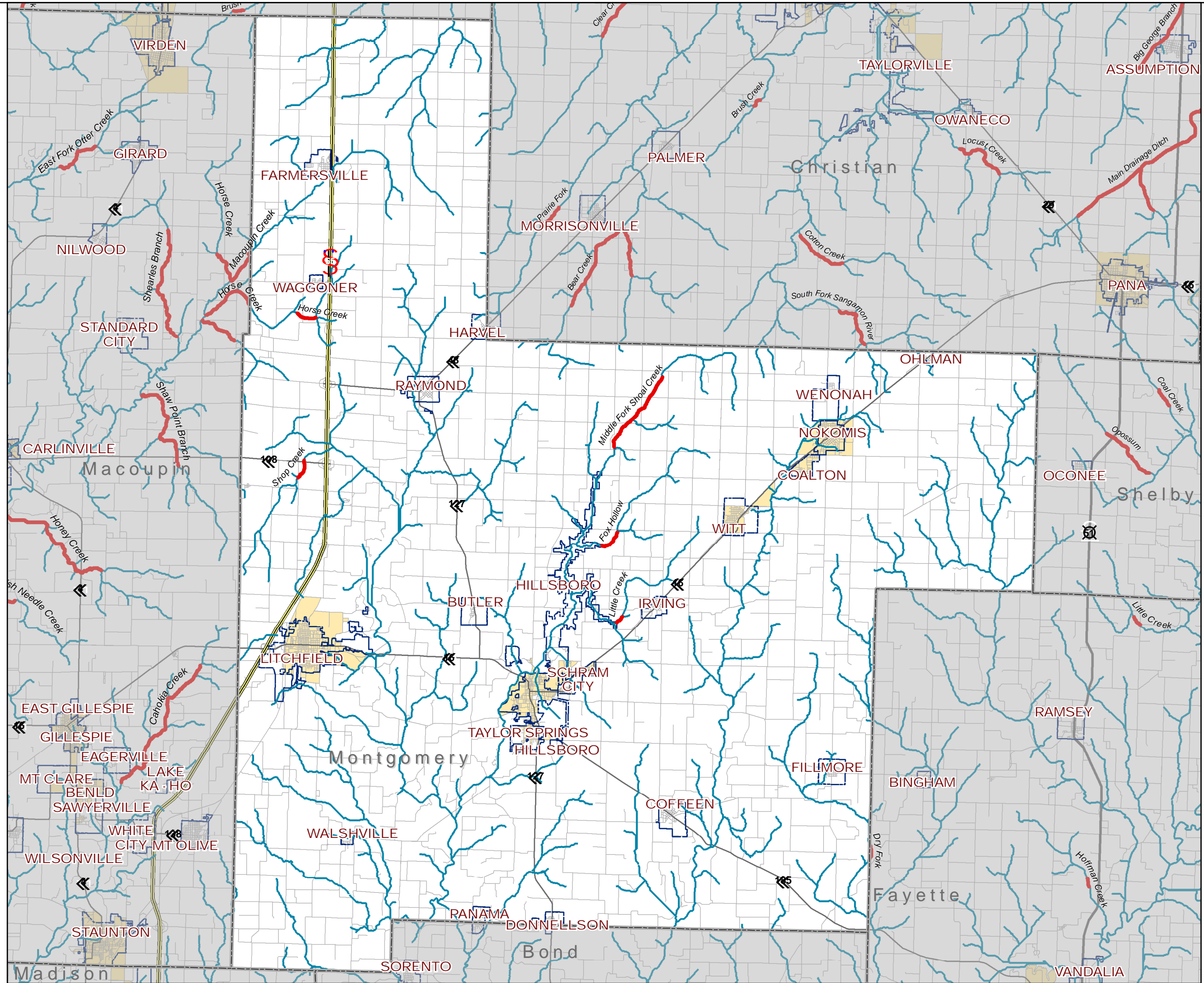
This map illustrates stream reaches at risk for potential flooding that were not designated as Special Flood Hazard Areas (SFHAs) and were not shown on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps as of July 1, 2007. Also shown are areas of Risk Class A (high), B (medium), and 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.



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



Streams Classified by Risk: Montgomery County, Illinois

ATTACHMENT I

Intended for
Illinois Power Generating Company

Date
October 25, 2021

Project No.
1940100806-002

GROUNDWATER MONITORING PLAN

GMF RECYCLE POND COFFEEN POWER PLANT COFFEEN, ILLINOIS

GROUNDWATER MONITORING PLAN COFFEEN POWER PLANT GMF RECYCLE POND

Project Name **Coffeen Power Plant GMF Recycle Pond**
Project No. **1940100806-002**
Recipient **Illinois Power Generating Company**
Document Type **Groundwater Monitoring Plan**
Revision **FINAL**
Date **October 25, 2021**

Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
USA

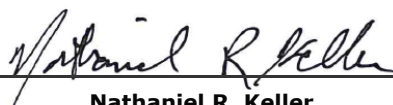
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F 414-837-3608
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Brian G. Hennings, PG
Senior Managing Hydrogeologist



Eric J. Tlachac, PE
Senior Managing Engineer



Nathaniel R. Keller
Senior Hydrogeologist



Chase J. Christenson, PG
Hydrogeologist

LICENSED PROFESSIONAL CERTIFICATIONS

35 I.A.C. § 845.630 Groundwater Monitoring Systems (PE)

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the groundwater monitoring system described in this document (Groundwater Monitoring Plan, Coffeen Power Plant GMF Recycle 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 Recycle 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



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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
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ACRONYMS AND ABBREVIATIONS

§	section
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
NA	not applicable
NID	National Inventory of Dams
No.	number
NRT/OBG	Natural Resource Technology, an OBG Company
Part 845	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.) Section (§) 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 Unit referred to as the Gypsum Management Facility (GMF) Recycle Pond (RP; Vistra identification [ID] number [No.] 104, IEPA ID No. W1350150004-04, and National Inventory of Dams [NID] No. IL50578). 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 RP 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 RP 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 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 Gypsum Stack Pond (GSP) and the 17-acre GMF RP, 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) 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 RP prior to April 11, 2021. **Figure 1-2** is a site map showing the location of the GMF RP.

1.3 Conceptual Model

Extensive site investigation has been completed at the CPP to characterize the geology, hydrogeology, and groundwater quality. Based on extensive investigation and monitoring, the Site 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 RP 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 RP required the excavation and removal of this layer within the unit footprint and the UCU has been eroded east of the GMF RP, 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 RP 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 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.

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. These locations monitor the DA and the LCU in locations where the Hagarstown Member is absent.

Flow of groundwater from central portions of the Site 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 site (**Figure 1-3**). Phreatic surfaces 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 RP 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 greater than the applicable 35 I.A.C. § 845.600 groundwater protection standards (GWPSs) and are considered potential exceedances:

- Boron in compliance uppermost aquifer wells G271 and G275.

- Chloride in compliance uppermost aquifer well G279.
- Lead in compliance uppermost aquifer wells G275 and G276. Lead was also detected in background uppermost aquifer well G280.
- Sulfate in compliance uppermost aquifer wells G271, G273, G275, and G279; in background uppermost aquifer well G288; and in compliance LCU (PMP) well G285.
- Thallium in compliance uppermost aquifer well G271.
- Total dissolved solids (TDS) in compliance uppermost aquifer wells G273, G275, G276, and G279; in background uppermost aquifer well G288; and in compliance LCU (PMP) well G285.

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 RP 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 RP, specifically the IEPA WPCP monitoring network, 40 C.F.R. § 257 network, and the proposed Part 845 monitoring network.

2.1.1 IEPA Groundwater Monitoring

Routine quarterly groundwater monitoring is completed for a monitoring well network that combines 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 Parameters¹			
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.

¹Dissolved 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 RP consists of six monitoring wells installed nearby or adjacent to the GMF RP within the uppermost aquifer. The GMF RP 40 C.F.R. § 257 well network consists of two background monitoring wells (G270 and G280) and four compliance monitoring wells (G271, G273, G276, and G279). The boring logs, well construction forms, and other related monitoring well forms are available in the Operating Records as required by 40 C.F.R. § 257.91 for each monitored CCR Unit or CCR Multi-Unit, and are included in Appendix C of the HCR (included in the Operating Permit to which this Plan is attached). The well locations are shown on **Figure 2-1**.

Assessment monitoring in accordance with 40 C.F.R. § 257.95 was initiated on April 9, 2018. 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 the GMF RP (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 and Appendix IV of 40 C.F.R. § 257, summarized in **Table B** below.

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

Field Parameters¹			
Groundwater Elevation	pH		
Appendix III Parameters (Total, except TDS)			
Boron	Chloride	Sulfate	
Calcium	Fluoride	TDS	
Appendix IV Parameters (Total)			
Antimony	Cadmium	Lithium	Selenium
Arsenic	Chromium	Mercury	Thallium
Barium	Cobalt	Molybdenum	Radium 226 and 228
Beryllium	Lead	combined	

¹Dissolved oxygen, temperature, specific conductance, oxidation/reduction potential, and turbidity were 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, seven additional monitoring wells (G275D, G283, G284, G285, G286, G287, and G288), one CCR source sample collection point (X201), and one surface water staff gage (SG04) were installed at the GMF RP 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 between March and August 2021 and the results were assessed for selection of the GMF RP 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 Parameters¹			
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 RP. 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 (G270, G271, G273, G275, G276, G277, G279, G280, and G284), two monitoring wells in the LCU (G283¹ and G285¹), one monitoring well in the DA (G275D¹), one temporary water level only well (X201), 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**. Twelve wells (two background and ten compliance) will be used to monitor groundwater concentrations within the hydrostratigraphic units.

The groundwater samples collected from the twelve 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.

¹ Wells 275D, G283, and G285 are screened in the LCU or DA and have been identified to monitor the PMP.

Table D. Proposed Part 845 Monitoring Well Network

Well ID	Monitored Unit	Well Screen Interval (feet bgs)	Well Type ¹
G270	UA	13.1 – 17.9	Background
G271	UA	10.0 – 14.3	Compliance
G273	UA	9.1 – 14.6	Compliance
G275	UA	8.2 – 12.6	Compliance
G275D*	DA	49.8 – 59.6	Compliance
G276	UA	22.4 – 27.2	Compliance
G277	UA	14.3 – 18.8	Compliance
G279	UA	22.4 – 26.8	Compliance
G280	UA	12.8 – 17.6	Background
G283*	LCU	8.4 – 18.2	Compliance
G284	UA	8.1 – 12.9	Compliance
G285*	LCU	13.7 – 23.5	Compliance
X201^{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.

* Well in the LCU or DA that has been identified to monitor a PMP.

NA = Not Applicable

UA = uppermost aquifer

WLO = water level only

2.3 Well Abandonment

No wells are currently proposed for abandonment.

3. APPLICABLE GROUNDWATER QUALITY STANDARDS

3.1 Groundwater Classification

Groundwater within the uppermost aquifer at GMF RP 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 1.2×10^{-3} cm/s, exceeding the 1×10^{-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, LCU, 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 lead, where the background concentration is greater than the 35 I.A.C. § 845.600(a)(1) standard (0.012 milligrams per liter [mg/L] versus 0.0075 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 RP exist: the IEPA WPCP monitoring program, the 40 C.F.R. § 257 monitoring program, and the proposed Part 845 monitoring program. These programs will continue to be monitored as specified in IEPA approvals or 40 C.F.R. § 257. Upon approval of the Operating Permit applications (and by extension the GMPs) for the GMF RP and GSP, the monitoring program required by the IEPA WPCP will be discontinued following approval of a future permit modification submittal and will be replaced by the proposed 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 Groundwater Monitoring

The existing IEPA monitoring program was discussed in detail in **Section 2.1.1**. Thirty-one monitoring wells are sampled on a 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 as required by the WPCP until IEPA approves this GMP and the GMP prepared for the GMF GSP.

4.1.2 40 C.F.R. § 257 Groundwater Monitoring

The existing 40 C.F.R. § 257 monitoring program was discussed in detail in **Section 2.1.2**. Six wells (two background and four compliance) are sampled for Appendix III and Appendix IV 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 (G270 and 280), ten compliance monitoring wells (G271, G273, 275, 275D, G276, 277, G279, G283, G284, and G285), one temporary water level only well (X201), and one temporary water level only surface water staff gage (SG-04) to monitor potential impacts from GMF RP (**Figure 2-1**). These monitoring wells are screened within the uppermost aquifer (G270, G271, G273, 275, G276, 277, G279, G280, and G284), the LCU (283² and 285²), and the DA (G275D²) at the GMF RP. Groundwater samples will be collected and analyzed for the laboratory and field parameters in **Table E** below.

² Wells 275D, G283, and G285 are screened in the LCU or DA and have been identified to monitor the PMP.

Table E. Part 845 Groundwater Monitoring Program Parameters

Field Parameters¹			
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 report will include the status of the groundwater monitoring and any required corrective action plan for the GMF RP 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.

If one or more constituents are detected and confirmed by an immediate resample, to be greater than the GWPS in any sampling event, 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 RP caused the contamination and the GMF RP 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 Recycle 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 Recycle 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 RECYCLE 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 RECYCLE 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 (X201)
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 09/07/21; 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 RECYCLE 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)
G270	B	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	C	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
G273	C	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
G275	C	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	C	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	C	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	C	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
G279	C	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	B	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
G283	C	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	C	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	C	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
X201	WLO	S	--	--	618.47	--	--	--	--	--	--	--	--	--	--	39.065278	-89.3925
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
 LCU = lower confining 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 RECYCLE POND
 COFFEEN, ILLINOIS

Parameter	Background Concentration	845 Limit	Groundwater Protection Standard	Unit
Antimony, total	0.003	0.006	0.006	mg/L
Arsenic, total	0.0066	0.010	0.010	mg/L
Barium, total	0.11	2.0	2.0	mg/L
Beryllium, total	0.001	0.004	0.004	mg/L
Boron, total	1	2	2	mg/L
Cadmium, total	0.001	0.005	0.005	mg/L
Chloride, total	67	200	200	mg/L
Chromium, total	0.019	0.1	0.1	mg/L
Cobalt, total	0.0059	0.006	0.006	mg/L
Fluoride, total	0.536	4.0	4.0	mg/L
Lead, total	0.012	0.0075	0.012	mg/L
Lithium, total	0.019	0.04	0.04	mg/L
Mercury, total	0.0002	0.002	0.002	mg/L
Molybdenum, total	0.0045	0.1	0.1	mg/L
pH (field)	7.6 / 6.7	9.0 / 6.5	9.0 / 6.5	SU
Radium 226 and 228 combined	1.6	5	5	pCi/L
Selenium, total	0.0048	0.05	0.05	mg/L
Sulfate, total	94	400	400	mg/L
Thallium, total	0.001	0.002	0.002	mg/L
Total Dissolved Solids	551	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 RECYCLE 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	12	2	0	0	1	15	plastic	600 mL	HNO ₃ to pH<2	6 months
Mercury	7470A or 6020	12	2	0	0	1	15	plastic	400 mL	HNO ₃ to pH<2	28 days
Inorganic Parameters											
Fluoride	9214 or EPA 300	12	2	0	0	1	15	plastic	300 mL	Cool to 4 °C	28 days
Chloride	9251 or EPA 300	12	2	0	0	1	15	plastic	100 mL	Cool to 4 °C	28 days
Sulfate	9036 or EPA 300	12	2	0	0	1	15	plastic	50 mL	Cool to 4 °C	28 days
Total Dissolved Solids	SM 2540 C	12	2	0	0	1	15	plastic	200 mL	Cool to 4 °C	7 days
Radium											
Radium 226	9315 or EPA 903	12	0	0	0	0	12	plastic	1000 mL	HNO ₃ to pH<2	6 months
Radium 228	9320 or EPA 904	12	0	0	0	0	12	plastic	1000 mL	HNO ₃ to pH<2	6 months
Field Parameters											
pH	SM 4500-H+ B	12	NA	NA	NA	NA	12	flow-through cell	NA	none	immediately
Dissolved Oxygen ⁸	SM 4500-O/405.1	12	NA	NA	NA	NA	12	flow-through cell	NA	none	immediately
Temperature ⁸	SM 2550	12	NA	NA	NA	NA	12	flow-through cell	NA	none	immediately
Oxidation/Reduction Potential ⁸	SM 2580 B	12	NA	NA	NA	NA	12	flow-through cell	NA	none	immediately
Specific Conductance ⁸	SM 2510 B	12	NA	NA	NA	NA	12	flow-through cell	NA	none	immediately
Turbidity ⁷	SM 2130 B	12	NA	NA	NA	NA	12	flow-through cell or hand-held turbidity meter	NA	none	immediately

[O: CJC 09/07/21; 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

HNO₃ = 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 RECYCLE 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 RECYCLE 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 09/07/21; 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

NA = Not applicable

NS = No standard

NTU = nephelometric turbidity unit

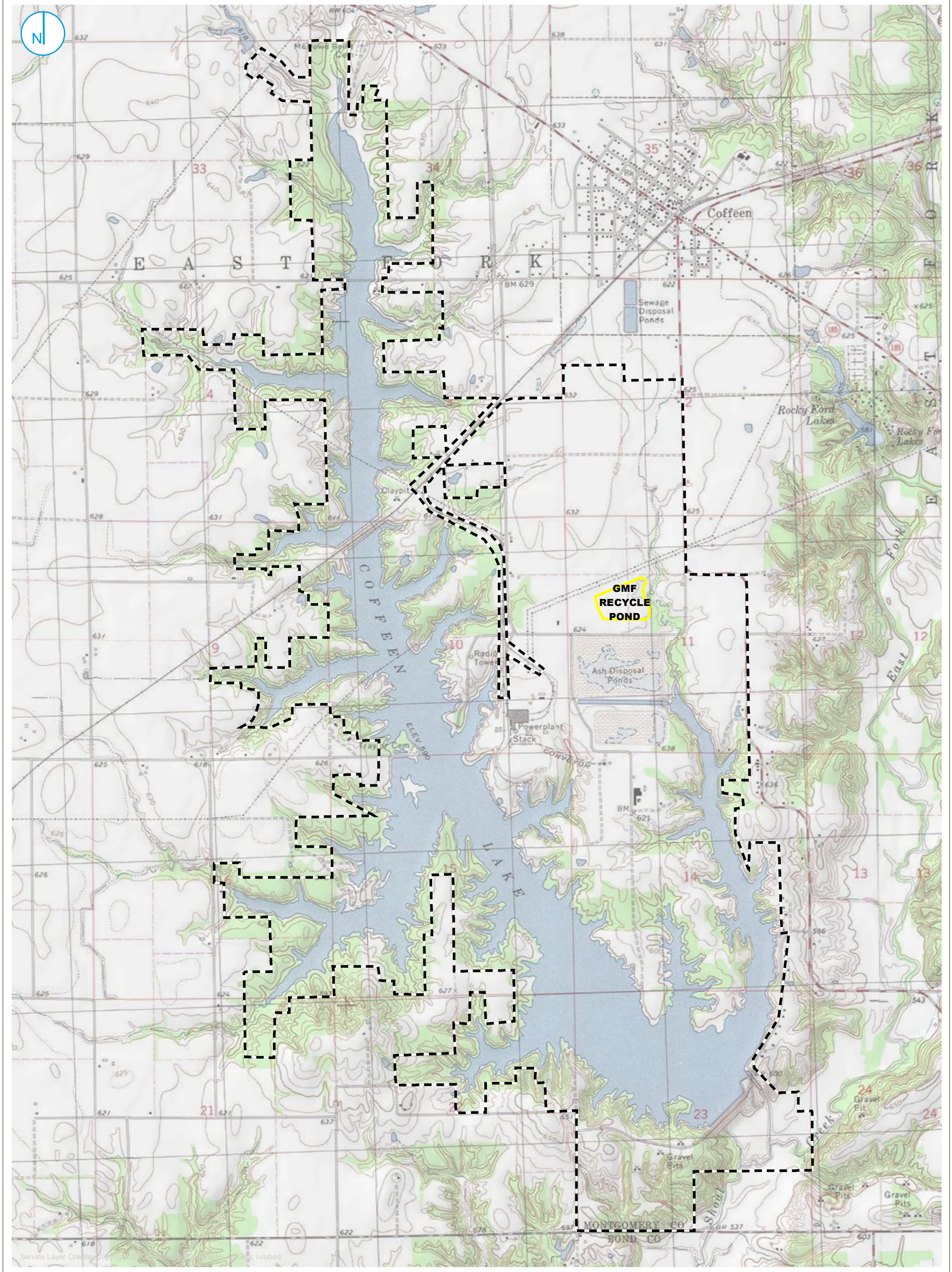
pCi/L = picoCuries per liter

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

SITE LOCATION MAP

FIGURE 1-1

0 1,000 2,000
Feet

GROUNDWATER MONITORING PLAN
GMF RECYCLE POND
 COFFEEN POWER PLANT
 COFFEEN, ILLINOIS

RAMBOLL AMERICAS
 ENGINEERING SOLUTIONS, INC.





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

- COAL MINE SHAFT
- PART 845 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- LIMITS OF FINAL COVER
- PROPERTY BOUNDARY

0 275 550
 Feet

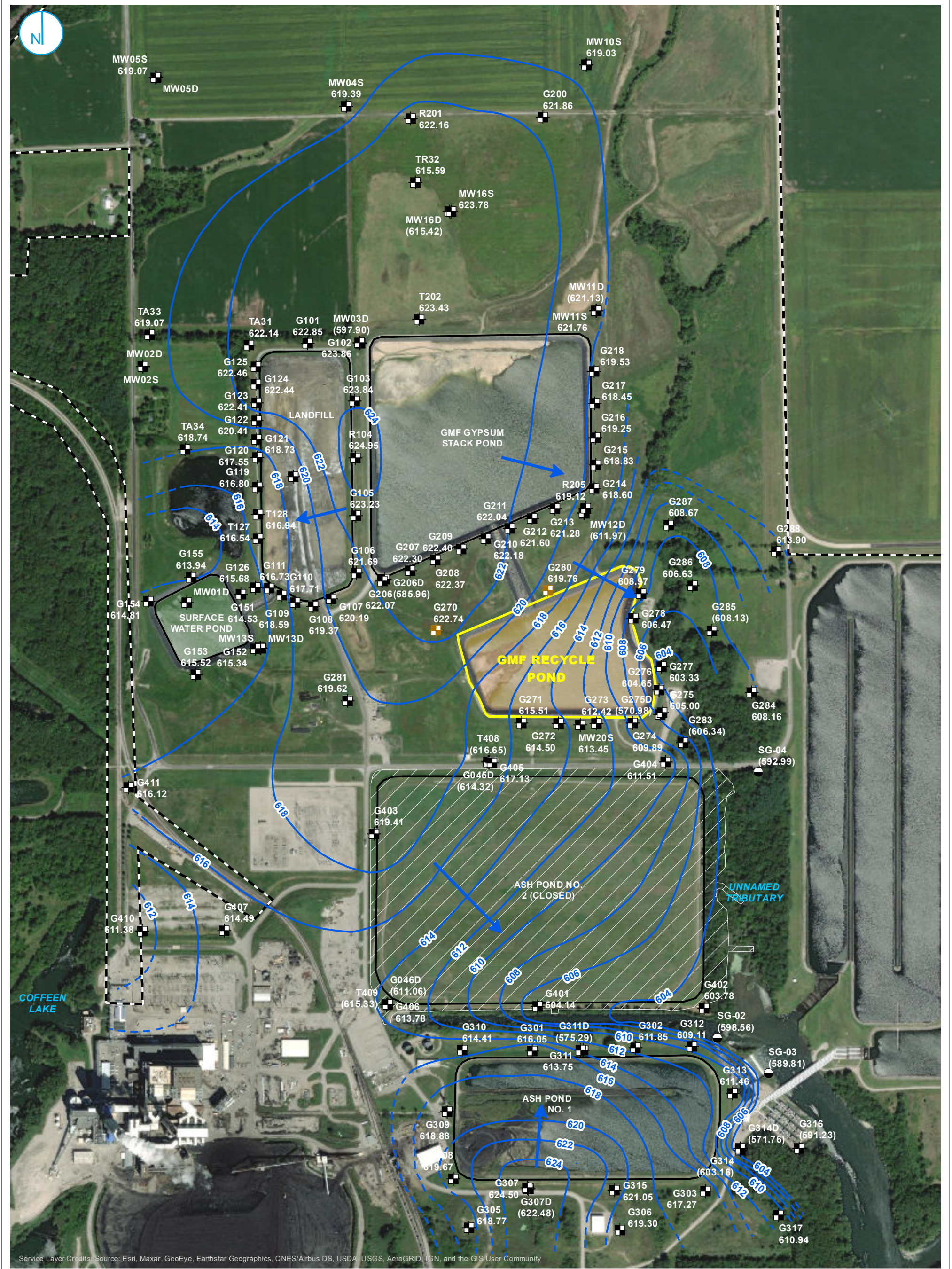
SITE MAP

FIGURE 1-2

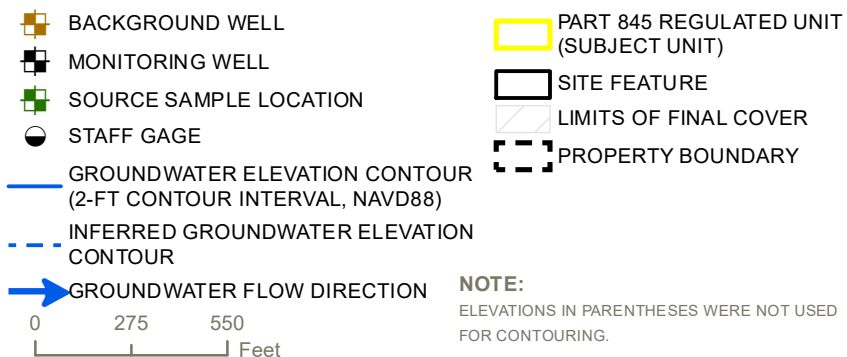
GROUNDWATER MONITORING PLAN
GMF RECYCLE POND
 COFFEEN POWER PLANT
 COFFEEN, ILLINOIS

RAMBOLL AMERICAS
 ENGINEERING SOLUTIONS, INC.





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UPPERMOST AQUIFER GROUNDWATER ELEVATION CONTOURS
APRIL 20, 2021

FIGURE 1-3

GROUNDWATER MONITORING PLAN
GMF RECYCLE POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.



PROJECT: 169000XXXXX | DATED: 10/15/2021 | DESIGNER: STOLZSD
Y:\Mapping\Projects\22\2285\MXD\1845_Operating_Permit\Coffeen\GMF_RP\GMF\Figure 2-1_Proposed Monitoring Well Network.mxd



- BACKGROUND WELL
- COMPLIANCE WELL
- SOURCE SAMPLE LOCATION
- STAFF GAGE
- PART 845 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- LIMITS OF FINAL COVER
- PROPERTY BOUNDARY



PROPOSED PART 845 GROUNDWATER MONITORING WELL NETWORK

GROUNDWATER MONITORING PLAN
GMF RECYCLE 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 RECYCLE POND COFFEEN POWER PLANT COFFEEN, ILLINOIS

STATISTICAL ANALYSIS PLAN COFFEEN POWER PLANT GMF RECYCLE POND

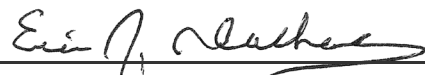
Project Name **Coffeen Power Plant GMF Recycle Pond**
Project No. **1940100806-002**
Recipient **Illinois Power Generating Company**
Document Type **Statistical Analysis Plan**
Version **FINAL**
Date **October 25, 2021**

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Senior Managing Engineer



Rachel A. Banoff, EIT
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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 Recycle 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 Recycle 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



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 Recycle 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.

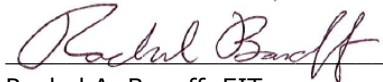


Brian G. Hennings
Professional Geologist
196.001482
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Date: October 25, 2021



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 Recycle 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

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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
<i>Unified Guidance</i>	<i>Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance (USEPA, 2009)</i>
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:

$$UTL = \bar{x} + \kappa(n, \gamma, \alpha - 1) \cdot s$$

\bar{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 ($\alpha - 1$) 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 \bar{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:

$$UTL = \exp[\bar{y} + \kappa(n, \gamma, \alpha - 1) \cdot s_y]$$

\bar{y} = background sample log-mean

s_y = background sample log-standard deviation

When the GWPS is based on the 35 I.A.C. § 845.600(a)(1) constituent concentrations or a UTL derived from the background dataset, an exceedance in compliance wells relative to the GWPS will be evaluated using confidence intervals. A confidence interval defines the upper and lower bound of the true mean of a constituent concentration in groundwater within a specified confidence range.

- Non-detects in compliance data will be handled similarly to upgradient analyses, with half the RL substituted for non-detects when the frequency is 15 percent or less.
- The Kaplan-Meier, or the ROS method, will be used when the detection frequency is between 15 percent and 50 percent to compute estimates of the mean and standard deviation adjusted for the presence of left-censored values. These estimates will then be substituted for the sample mean and standard deviation.

Once the GWPS is established for background data using the UTL, either parametric or non-parametric confidence intervals will be computed for each constituent in compliance wells to identify GWPS exceedances.

3.1.2 Parametric Confidence Intervals around a Mean

If compliance data are approximately normal, one-sided parametric confidence intervals around a sample mean will be constructed for each constituent and well pair. The lower confidence limit (LCL) will be calculated as:

$$LCL_{1-\alpha} = \bar{x} - t_{1-\alpha, n-1} \cdot \frac{s}{\sqrt{n}}$$

\bar{x} = compliance sample mean

s = compliance sample standard deviation

n = compliance sample size

$t_{1-\alpha, n-1}$ = obtained from a Student's t-table with (n-1) degrees of freedom (Table 16-1 in Appendix D of the *Unified Guidance*)

The chosen t value will aim to achieve both a low false-positive rate, and high statistical power. Minimum α values are tabulated in Table 22-2 of Appendix D of the *Unified Guidance*. The selected minimum α value, from which the t value will be derived, will have at least 80 percent power ($1-\beta = 0.8$) when the underlying mean concentration is twice the GWPS.

If compliance data are distributed lognormally, the LCL will be computed around the lognormal geometric mean as:

$$LCL_{1-\alpha} = \exp\left(\bar{y} - t_{1-\alpha, n-1} \cdot \frac{s_y}{\sqrt{n}}\right)$$

\bar{y} = compliance sample log-mean

s_y = compliance sample log-standard deviation

3.1.3 Non-Parametric Confidence Intervals around a Median

Non-parametric confidence intervals around the median will be computed if the compliance data contain greater than 50 percent non-detects or are not normally distributed. The mathematical algorithm used to construct non-parametric confidence intervals is based on the probability (P) that any randomly selected measurement in a sample of n concentration measurements will be less than an unknown $P \times 100^{\text{th}}$ percentile of interest (where P is between 0 and 1). Then the probability that the measurement will exceed the $P \times 100^{\text{th}}$ percentile is $(1-P)$. The number of sample values falling below the $P \times 100^{\text{th}}$ 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 $P \times 100^{\text{th}}$ 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 $(n+1) \times 0.50$. If the result of $(n+1) \times 0.50$ 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 $(n+1) \times 0.50$ 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:

$$1 - \alpha = \text{Bin}(L^* - 1; n, 0.50) = \sum_{x=L^*}^n \binom{n}{x} \left(\frac{1}{2}\right)^n$$

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:

$$UPL_{1-\alpha} = \bar{x} + \kappa s$$

\bar{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 (a_{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:

$$\hat{x} = \bar{x} + \hat{b} \cdot (t - \bar{t})$$

\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:

$$LCL_{1-\alpha} = \hat{x}_0 - \sqrt{2s_e^2 \cdot F_{1-2\alpha,2,n-1} \cdot \left[\frac{1}{n} + \frac{(t_0 - \bar{t})^2}{(n-1) \cdot s_t^2} \right]}$$

$$UCL_{1-\alpha} = \hat{x}_0 + \sqrt{2s_e^2 \cdot F_{1-2\alpha,2,n-2} \cdot \left[\frac{1}{n} + \frac{(t_0 - \bar{t})^2}{(n-1) \cdot s_t^2} \right]}$$

\hat{x}_0 = estimated mean concentration from the regression equation at time t_0

$F_{1-2\alpha,2,n-2}$ = upper (1-2 α)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 x_1, x_2, \dots, x_n . 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 $m(1), m(2), \dots, m(N)$). 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:

$$Q = \begin{cases} m_{([N+1]/2)} & \text{if } N \text{ is odd} \\ (m_{(N/2)} + m_{([N+2]/2)})/2 & \text{if } N \text{ is even} \end{cases}$$

The sample concentration magnitude will be ordered from least to greatest, $x(1), x(2), \dots, x(n)$ and the median concentration will be calculated as follows:

$$\tilde{x} = \begin{cases} x_{([n+1]/2)} & \text{if } n \text{ is odd} \\ (x_{(n/2)} + x_{([n+2]/2)})/2 & \text{if } n \text{ is even} \end{cases}$$

The median sampling date (\tilde{t}) with ordered times ($t(1), t(2), \dots, t(n)$) 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:

$$x = \tilde{x} + Q \cdot (t - \tilde{t}) = (\tilde{x} - Q \cdot \tilde{t}) + Q \cdot t$$

To construct a confidence band around the Thiel-Sen line, sample pairs (t_i, x_i) will be formed with a sample date (t_i) and the concentration measurement from that date (x_i). 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 (t_j) 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 (t_j). For a UCL, compute the upper $(1-\alpha)^{\text{th}}$ percentile, $\hat{x}_j^{[1-\alpha]}$ at each time point (t_j).

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 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 Recycle 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.	<p>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.</p> <p>Under 35 I.A.C. 845.780(c)(2), the post-closure care period will be extended until the 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.</p>
40 C.F.R. § 257.104(d)(1)(i) and 35 I.A.C. 845.780(d)(1)(A) – A description of the monitoring and maintenance activities required in 40 C.F.R. § 257.104(b) and 35 I.A.C. 845.780(b), and the frequency at which these activities will be performed, to maintain the integrity and effectiveness of the final cover system, maintain the groundwater monitoring system and monitor the groundwater.	<p>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.</p> <p>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.</p> <p>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.</p> <p>Pursuant to § 257.104(b)(3) and 35 I.A.C. 845.780(b)(3), the</p>

	<p>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).</p>
<p>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.</p>	<p>Illinois Power Generating Company 6555 Sierra Drive Irving, Texas 75039 800.633.4704 ccr@dynegy.com</p>
<p>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.</p>	<p>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.</p> <p>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.</p> <p>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).</p>

<p>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.</p>	<p>Pursuant to 40 C.F.R. § 257.104(d), the initial post closure care plan for the Coffeen GMF Recycle 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).</p> <p>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.</p> <p>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.</p>
<p>40 C.F.R. § 257.104(d)(4) and 35 I.A.C. 845.780(d)(4) – Qualified professional engineering certification.</p>	<p>Certification by a qualified professional engineer will be appended to this plan and any amendment of this plan.</p>
<p>35 I.A.C. 845.780(e) – Termination of post-closure care</p>	<p>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.</p>
<p>40 C.F.R. § 257.104(e) and 35 I.A.C. 845.780(f) – Notification of completion of the post-closure care period.</p>	<p>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).</p> <p>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).</p>

**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 Recycle Pond

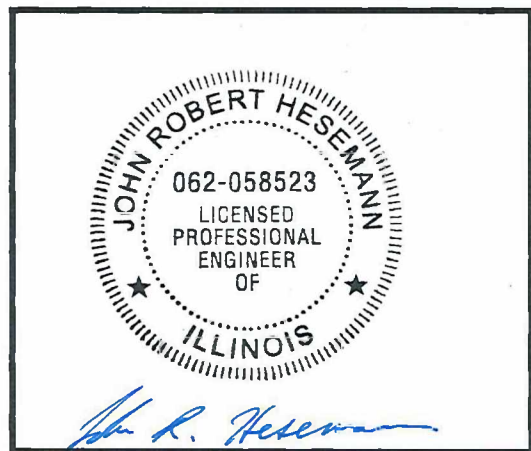
I, John R. Hesemann, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. 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 R. Hesemann
Exp. : 11/30/2021

ATTACHMENT M

HISTORY OF POTENTIAL EXCEEDANCES

This presentation of the History of Potential Exceedances, and any corrective action taken to remediate groundwater, is provided to meet the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.230(d)(2)(M) for the Coffeen Power Plant GMF Recycle Pond, Illinois Environmental Protection Agency (IEPA) ID No. W1350150004-04.

Note

Groundwater concentrations from 2015 to 2021 presented in the Hydrogeologic Site Characterization Report (HCR) Table 4-1, and evaluated and summarized in the following tables, are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan (Appendix A to Groundwater Monitoring Plan [GMP]), which has not been reviewed or approved by IEPA at the time of submittal of the 35 I.A.C. § 845 Operating Permit application.

Alternate sources for potential exceedances as allowed by 35 I.A.C. § 845.650(e) have not yet been evaluated. These will be evaluated and presented in future submittals to IEPA as appropriate.

Table 1 summarizes how the potential exceedances were determined. Table 2 is a summary of all potential exceedances.

Background Concentrations

Background monitoring wells identified in the GMP include G270 and G280.

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 RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G271	UA	257	Antimony, total	mg/L	04/10/2015 - 02/01/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G271	UA	257	Arsenic, total	mg/L	01/21/2015 - 02/01/2021	CI around median	0.001	0.010	0.0066	0.01	Standard
G271	UA	257	Barium, total	mg/L	04/10/2015 - 02/01/2021	CI around mean	0.025	2.0	0.11	2	Standard
G271	UA	257	Beryllium, total	mg/L	04/10/2015 - 02/01/2021	CI around median	0.001	0.004	0.001	0.004	Standard
G271	UA	257	Boron, total	mg/L	01/21/2015 - 02/01/2021	CB around linear reg	1.2	2.0	0.029	2	Standard
G271	UA	257	Cadmium, total	mg/L	01/21/2015 - 02/01/2021	CI around median	0.001	0.005	0.001	0.005	Standard
G271	UA	257	Chloride, total	mg/L	01/21/2015 - 02/01/2021	CI around mean	30	200	54	200	Standard
G271	UA	257	Chromium, total	mg/L	04/10/2015 - 02/01/2021	CI around median	0.004	0.10	0.019	0.1	Standard
G271	UA	257	Cobalt, total	mg/L	04/10/2015 - 02/01/2021	CI around median	0.002	0.006	0.0059	0.006	Standard
G271	UA	257	Fluoride, total	mg/L	04/10/2015 - 02/01/2021	CI around mean	0.33	4.0	0.50	4	Standard
G271	UA	257	Lead, total	mg/L	01/21/2015 - 02/01/2021	Future median	0.001	0.012	0.012	0.0075	Background
G271	UA	257	Lithium, total	mg/L	11/23/2015 - 02/01/2021	All ND - Last	0.020	0.040	0.019	0.04	Standard
G271	UA	257	Mercury, total	mg/L	04/10/2015 - 02/01/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G271	UA	257	Molybdenum, total	mg/L	07/22/2015 - 02/01/2021	CI around median	0.001	0.10	0.0045	0.1	Standard
G271	UA	257	pH (field)	SU	01/21/2015 - 02/01/2021	CI around mean	7.2	6.5/9.0	6.6/7.5	6.5/9	Standard/Standard
G271	UA	257	Radium-226 + Radium 228, tot	pCi/L	11/23/2015 - 02/01/2021	CI around mean	0.42	5.0	1.9	5	Standard
G271	UA	257	Selenium, total	mg/L	04/10/2015 - 02/01/2021	CB around linear reg	0.00019	0.050	0.0048	0.05	Standard
G271	UA	257	Sulfate, total	mg/L	01/21/2015 - 02/01/2021	CI around mean	389	400	104	400	Standard
G271	UA	257	Thallium, total	mg/L	04/10/2015 - 02/01/2021	CI around median	0.001	0.002	0.001	0.002	Standard
G271	UA	257	Total Dissolved Solids	mg/L	01/21/2015 - 02/01/2021	CI around mean	856	1200	476	1200	Standard
G272	UA	845	Antimony, total	mg/L	04/10/2015 - 10/08/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G272	UA	845	Arsenic, total	mg/L	01/21/2015 - 10/08/2015	All ND - Last	0.001	0.010	0.0066	0.01	Standard
G272	UA	845	Barium, total	mg/L	04/10/2015 - 10/08/2015	Most recent sample	0.058	2.0	0.11	2	Standard
G272	UA	845	Beryllium, total	mg/L	04/10/2015 - 10/08/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G272	UA	845	Boron, total	mg/L	01/21/2015 - 10/08/2015	CI around mean	-0.0156	2.0	1.0	2	Standard
G272	UA	845	Cadmium, total	mg/L	01/21/2015 - 10/08/2015	All ND - Last	0.001	0.005	0.001	0.005	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES
 COFFEEN POWER PLANT
 GMF RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G272	UA	845	Chloride, total	mg/L	01/21/2015 - 10/08/2015	CI around mean	25	200	67	200	Standard
G272	UA	845	Chromium, total	mg/L	04/10/2015 - 10/08/2015	Most recent sample	0.004	0.10	0.019	0.1	Standard
G272	UA	845	Cobalt, total	mg/L	04/10/2015 - 10/08/2015	Most recent sample	0.002	0.006	0.0059	0.006	Standard
G272	UA	845	Fluoride, total	mg/L	04/10/2015 - 10/08/2015	Most recent sample	0.36	4.0	0.56	4	Standard
G272	UA	845	Lead, total	mg/L	01/21/2015 - 10/08/2015	Future median	0.001	0.012	0.012	0.0075	Background
G272	UA	845	Mercury, total	mg/L	04/10/2015 - 10/08/2015	Most recent sample	0.0002	0.002	0.0002	0.002	Standard
G272	UA	845	Molybdenum, total	mg/L	07/23/2015 - 10/08/2015	Most recent sample	0.0024	0.10	0.0045	0.1	Standard
G272	UA	845	pH (field)	SU	01/21/2015 - 10/08/2015	CI around mean	6.8	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
G272	UA	845	Selenium, total	mg/L	04/10/2015 - 10/08/2015	Most recent sample	0.0016	0.050	0.0048	0.05	Standard
G272	UA	845	Sulfate, total	mg/L	01/21/2015 - 10/08/2015	CI around mean	229	400	94	400	Standard
G272	UA	845	Thallium, total	mg/L	04/10/2015 - 10/08/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G272	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 10/08/2015	CI around mean	595	1200	551	1200	Standard
G273	UA	257	Antimony, total	mg/L	04/13/2015 - 02/01/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G273	UA	257	Arsenic, total	mg/L	01/21/2015 - 02/01/2021	CI around median	0.001	0.010	0.0066	0.01	Standard
G273	UA	257	Barium, total	mg/L	04/13/2015 - 02/01/2021	CI around geomean	0.030	2.0	0.11	2	Standard
G273	UA	257	Beryllium, total	mg/L	04/13/2015 - 02/01/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
G273	UA	257	Boron, total	mg/L	01/21/2015 - 02/01/2021	CI around geomean	0.12	2.0	0.029	2	Standard
G273	UA	257	Cadmium, total	mg/L	01/21/2015 - 02/01/2021	CI around median	0.001	0.005	0.001	0.005	Standard
G273	UA	257	Chloride, total	mg/L	01/21/2015 - 02/01/2021	CB around T-S line	57	200	54	200	Standard
G273	UA	257	Chromium, total	mg/L	04/13/2015 - 02/01/2021	All ND - Last	0.004	0.10	0.019	0.1	Standard
G273	UA	257	Cobalt, total	mg/L	04/13/2015 - 02/01/2021	CI around median	0.002	0.006	0.0059	0.006	Standard
G273	UA	257	Fluoride, total	mg/L	04/13/2015 - 02/01/2021	CI around mean	0.29	4.0	0.50	4	Standard
G273	UA	257	Lead, total	mg/L	01/21/2015 - 02/01/2021	Future median	0.001	0.012	0.012	0.0075	Background
G273	UA	257	Lithium, total	mg/L	11/24/2015 - 02/01/2021	CB around linear reg	0.014	0.040	0.019	0.04	Standard
G273	UA	257	Mercury, total	mg/L	04/13/2015 - 02/01/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G273	UA	257	Molybdenum, total	mg/L	07/23/2015 - 02/01/2021	CI around median	0.001	0.10	0.0045	0.1	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES
 COFFEEN POWER PLANT
 GMF RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G273	UA	257	pH (field)	SU	01/21/2015 - 02/01/2021	CI around mean	7.0	6.5/9.0	6.6/7.5	6.5/9	Standard/Standard
G273	UA	257	Radium-226 + Radium 228, tot	pCi/L	11/24/2015 - 02/01/2021	CI around mean	0.35	5.0	1.9	5	Standard
G273	UA	257	Selenium, total	mg/L	04/13/2015 - 02/01/2021	CI around median	0.001	0.050	0.0048	0.05	Standard
G273	UA	257	Sulfate, total	mg/L	01/21/2015 - 02/01/2021	CI around mean	424	400	104	400	Standard
G273	UA	257	Thallium, total	mg/L	04/13/2015 - 02/01/2021	CI around median	0.001	0.002	0.001	0.002	Standard
G273	UA	257	Total Dissolved Solids	mg/L	01/21/2015 - 02/01/2021	CI around mean	934	1200	476	1200	Standard
G274	UA	845	Antimony, total	mg/L	04/13/2015 - 10/08/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G274	UA	845	Arsenic, total	mg/L	01/21/2015 - 10/08/2015	CI around median	0	0.010	0.0066	0.01	Standard
G274	UA	845	Barium, total	mg/L	04/13/2015 - 10/08/2015	Most recent sample	0.061	2.0	0.11	2	Standard
G274	UA	845	Beryllium, total	mg/L	04/13/2015 - 10/08/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G274	UA	845	Boron, total	mg/L	01/21/2015 - 10/08/2015	CI around mean	0.30	2.0	1.0	2	Standard
G274	UA	845	Cadmium, total	mg/L	01/21/2015 - 10/08/2015	All ND - Last	0.001	0.005	0.001	0.005	Standard
G274	UA	845	Chloride, total	mg/L	01/21/2015 - 10/08/2015	CI around mean	17	200	67	200	Standard
G274	UA	845	Chromium, total	mg/L	04/13/2015 - 10/08/2015	Most recent sample	0.004	0.10	0.019	0.1	Standard
G274	UA	845	Cobalt, total	mg/L	04/13/2015 - 10/08/2015	Most recent sample	0.002	0.006	0.0059	0.006	Standard
G274	UA	845	Fluoride, total	mg/L	04/13/2015 - 10/08/2015	Most recent sample	0.26	4.0	0.56	4	Standard
G274	UA	845	Lead, total	mg/L	01/21/2015 - 10/08/2015	Future median	0.001	0.012	0.012	0.0075	Background
G274	UA	845	Mercury, total	mg/L	04/13/2015 - 10/08/2015	Most recent sample	0.0002	0.002	0.0002	0.002	Standard
G274	UA	845	Molybdenum, total	mg/L	07/23/2015 - 10/08/2015	Most recent sample	0.0012	0.10	0.0045	0.1	Standard
G274	UA	845	pH (field)	SU	01/21/2015 - 10/08/2015	CI around mean	6.7	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
G274	UA	845	Selenium, total	mg/L	04/13/2015 - 10/08/2015	Most recent sample	0.001	0.050	0.0048	0.05	Standard
G274	UA	845	Sulfate, total	mg/L	01/21/2015 - 10/08/2015	CI around mean	202	400	94	400	Standard
G274	UA	845	Thallium, total	mg/L	04/13/2015 - 10/08/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G274	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 10/08/2015	CI around median	0	1200	551	1200	Standard
G275	UA	845	Antimony, total	mg/L	04/13/2015 - 07/23/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G275	UA	845	Arsenic, total	mg/L	01/21/2015 - 07/23/2015	Most recent sample	0.001	0.010	0.0066	0.01	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES
 COFFEEN POWER PLANT
 GMF RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G275	UA	845	Barium, total	mg/L	04/13/2015 - 07/23/2015	Most recent sample	0.035	2.0	0.11	2	Standard
G275	UA	845	Beryllium, total	mg/L	04/13/2015 - 07/23/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G275	UA	845	Boron, total	mg/L	01/21/2015 - 07/23/2015	Most recent sample	4.0	2.0	1.0	2	Standard
G275	UA	845	Cadmium, total	mg/L	01/21/2015 - 07/23/2015	Most recent sample	0.001	0.005	0.001	0.005	Standard
G275	UA	845	Chloride, total	mg/L	01/21/2015 - 07/23/2015	Most recent sample	30	200	67	200	Standard
G275	UA	845	Chromium, total	mg/L	04/13/2015 - 07/23/2015	Most recent sample	0.004	0.10	0.019	0.1	Standard
G275	UA	845	Cobalt, total	mg/L	04/13/2015 - 07/23/2015	Most recent sample	0.002	0.006	0.0059	0.006	Standard
G275	UA	845	Fluoride, total	mg/L	04/13/2015 - 07/23/2015	Most recent sample	0.31	4.0	0.56	4	Standard
G275	UA	845	Lead, total	mg/L	01/21/2015 - 07/23/2015	Most recent sample	0.001	0.012	0.012	0.0075	Background
G275	UA	845	Mercury, total	mg/L	04/13/2015 - 07/23/2015	Most recent sample	0.0002	0.002	0.0002	0.002	Standard
G275	UA	845	Molybdenum, total	mg/L	07/23/2015 - 07/23/2015	Most recent sample	0.0014	0.10	0.0045	0.1	Standard
G275	UA	845	pH (field)	SU	01/21/2015 - 07/23/2015	Most recent sample	7.1	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
G275	UA	845	Selenium, total	mg/L	04/13/2015 - 07/23/2015	Most recent sample	0.0014	0.050	0.0048	0.05	Standard
G275	UA	845	Sulfate, total	mg/L	01/21/2015 - 07/23/2015	Most recent sample	750	400	94	400	Standard
G275	UA	845	Thallium, total	mg/L	04/13/2015 - 07/23/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G275	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 07/23/2015	Most recent sample	1500	1200	551	1200	Standard
G275D	DA	845	Antimony, total	mg/L	03/30/2021 - 07/28/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G275D	DA	845	Arsenic, total	mg/L	03/30/2021 - 07/28/2021	CI around mean	0.00261	0.010	0.0066	0.01	Standard
G275D	DA	845	Barium, total	mg/L	03/30/2021 - 07/28/2021	CI around mean	0.28	2.0	0.11	2	Standard
G275D	DA	845	Beryllium, total	mg/L	03/30/2021 - 07/28/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
G275D	DA	845	Boron, total	mg/L	03/30/2021 - 07/28/2021	CI around mean	0.28	2.0	1.0	2	Standard
G275D	DA	845	Cadmium, total	mg/L	03/30/2021 - 07/28/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
G275D	DA	845	Chloride, total	mg/L	03/30/2021 - 07/28/2021	CI around mean	26	200	67	200	Standard
G275D	DA	845	Chromium, total	mg/L	03/30/2021 - 07/28/2021	CI around median	0	0.10	0.019	0.1	Standard
G275D	DA	845	Cobalt, total	mg/L	03/30/2021 - 07/28/2021	CI around mean	0.000968	0.006	0.0059	0.006	Standard
G275D	DA	845	Fluoride, total	mg/L	03/30/2021 - 07/28/2021	CI around mean	0.33	4.0	0.56	4	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES
 COFFEEN POWER PLANT
 GMF RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G275D	DA	845	Lead, total	mg/L	03/30/2021 - 07/28/2021	Future median	0.001	0.012	0.012	0.0075	Background
G275D	DA	845	Lithium, total	mg/L	03/30/2021 - 07/28/2021	All ND - Last	0.020	0.040	0.019	0.04	Standard
G275D	DA	845	Mercury, total	mg/L	03/30/2021 - 07/28/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G275D	DA	845	Molybdenum, total	mg/L	03/30/2021 - 07/28/2021	CI around mean	0.020	0.10	0.0045	0.1	Standard
G275D	DA	845	pH (field)	SU	03/30/2021 - 07/28/2021	CI around mean	7.0	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
G275D	DA	845	Radium-226 + Radium 228, tot	pCi/L	03/30/2021 - 07/28/2021	CI around mean	0.016	5.0	1.6	5	Standard
G275D	DA	845	Selenium, total	mg/L	03/30/2021 - 07/28/2021	All ND - Last	0.001	0.050	0.0048	0.05	Standard
G275D	DA	845	Sulfate, total	mg/L	03/30/2021 - 07/28/2021	CI around mean	208	400	94	400	Standard
G275D	DA	845	Thallium, total	mg/L	03/30/2021 - 07/28/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
G275D	DA	845	Total Dissolved Solids	mg/L	03/30/2021 - 07/28/2021	CI around mean	877	1200	551	1200	Standard
G276	UA	257	Antimony, total	mg/L	04/13/2015 - 06/28/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G276	UA	257	Arsenic, total	mg/L	01/21/2015 - 06/28/2021	CI around median	0.001	0.010	0.0066	0.01	Standard
G276	UA	257	Barium, total	mg/L	04/13/2015 - 06/28/2021	CB around T-S line	0.032	2.0	0.11	2	Standard
G276	UA	257	Beryllium, total	mg/L	04/13/2015 - 06/28/2021	CI around median	0.001	0.004	0.001	0.004	Standard
G276	UA	257	Boron, total	mg/L	01/21/2015 - 06/28/2021	CI around mean	0.016	2.0	0.029	2	Standard
G276	UA	257	Cadmium, total	mg/L	01/21/2015 - 06/28/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
G276	UA	257	Chloride, total	mg/L	01/21/2015 - 06/28/2021	CI around mean	23	200	54	200	Standard
G276	UA	257	Chromium, total	mg/L	04/13/2015 - 06/28/2021	CI around median	0.004	0.10	0.019	0.1	Standard
G276	UA	257	Cobalt, total	mg/L	04/13/2015 - 06/28/2021	CI around median	0.002	0.006	0.0059	0.006	Standard
G276	UA	257	Fluoride, total	mg/L	04/13/2015 - 06/28/2021	CI around median	0.36	4.0	0.50	4	Standard
G276	UA	257	Lead, total	mg/L	01/21/2015 - 06/28/2021	Future median	0.001	0.012	0.012	0.0075	Background
G276	UA	257	Lithium, total	mg/L	11/24/2015 - 06/28/2021	CI around mean	0.012	0.040	0.019	0.04	Standard
G276	UA	257	Mercury, total	mg/L	04/13/2015 - 06/28/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G276	UA	257	Molybdenum, total	mg/L	07/23/2015 - 06/28/2021	CI around median	0.001	0.10	0.0045	0.1	Standard
G276	UA	257	pH (field)	SU	01/21/2015 - 06/28/2021	CB around linear reg	6.8	6.5/9.0	6.6/7.5	6.5/9	Standard/Standard
G276	UA	257	Radium-226 + Radium 228, tot	pCi/L	11/24/2015 - 06/28/2021	CI around mean	0.47	5.0	1.9	5	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF RECYCLE POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G276	UA	257	Selenium, total	mg/L	04/13/2015 - 06/28/2021	CI around mean	0.0013	0.050	0.0048	0.05	Standard
G276	UA	257	Sulfate, total	mg/L	01/21/2015 - 06/28/2021	CI around median	210	400	104	400	Standard
G276	UA	257	Thallium, total	mg/L	04/13/2015 - 06/28/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
G276	UA	257	Total Dissolved Solids	mg/L	01/21/2015 - 06/28/2021	CB around T-S line	726	1200	476	1200	Standard
G279	UA	257	Antimony, total	mg/L	04/13/2015 - 01/28/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G279	UA	257	Arsenic, total	mg/L	01/21/2015 - 01/28/2021	CI around median	0.001	0.010	0.0066	0.01	Standard
G279	UA	257	Barium, total	mg/L	04/13/2015 - 01/28/2021	CI around mean	0.048	2.0	0.11	2	Standard
G279	UA	257	Beryllium, total	mg/L	04/13/2015 - 01/28/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
G279	UA	257	Boron, total	mg/L	01/21/2015 - 01/28/2021	CI around geomean	0.076	2.0	0.029	2	Standard
G279	UA	257	Cadmium, total	mg/L	01/21/2015 - 01/28/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
G279	UA	257	Chloride, total	mg/L	01/21/2015 - 01/28/2021	CI around median	46	200	54	200	Standard
G279	UA	257	Chromium, total	mg/L	04/13/2015 - 01/28/2021	CI around median	0.004	0.10	0.019	0.1	Standard
G279	UA	257	Cobalt, total	mg/L	04/13/2015 - 01/28/2021	CI around median	0.002	0.006	0.0059	0.006	Standard
G279	UA	257	Fluoride, total	mg/L	04/13/2015 - 01/28/2021	CI around mean	0.33	4.0	0.50	4	Standard
G279	UA	257	Lead, total	mg/L	01/21/2015 - 01/28/2021	Future median	0.001	0.012	0.012	0.0075	Background
G279	UA	257	Lithium, total	mg/L	11/24/2015 - 01/28/2021	CI around median	0.010	0.040	0.019	0.04	Standard
G279	UA	257	Mercury, total	mg/L	04/13/2015 - 01/28/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
G279	UA	257	Molybdenum, total	mg/L	07/23/2015 - 01/28/2021	CB around T-S line	-0.0183	0.10	0.0045	0.1	Standard
G279	UA	257	pH (field)	SU	01/21/2015 - 01/28/2021	CI around mean	7.0	6.5/9.0	6.6/7.5	6.5/9	Standard/Standard
G279	UA	257	Radium-226 + Radium 228, tot	pCi/L	11/24/2015 - 01/28/2021	CI around mean	0.67	5.0	1.9	5	Standard
G279	UA	257	Selenium, total	mg/L	04/13/2015 - 01/28/2021	CI around mean	0.00543	0.050	0.0048	0.05	Standard
G279	UA	257	Sulfate, total	mg/L	01/21/2015 - 01/28/2021	CI around mean	378	400	104	400	Standard
G279	UA	257	Thallium, total	mg/L	04/13/2015 - 01/28/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
G279	UA	257	Total Dissolved Solids	mg/L	01/21/2015 - 01/28/2021	CI around mean	909	1200	476	1200	Standard
G283	LCU	845	Antimony, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G283	LCU	845	Arsenic, total	mg/L	03/31/2021 - 07/27/2021	CI around median	0.001	0.010	0.0066	0.01	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF RECYCLE POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G283	LCU	845	Barium, total	mg/L	03/31/2021 - 07/27/2021	CI around median	0.16	2.0	0.11	2	Standard
G283	LCU	845	Beryllium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
G283	LCU	845	Boron, total	mg/L	03/31/2021 - 07/27/2021	CI around mean	0.033	2.0	1.0	2	Standard
G283	LCU	845	Cadmium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
G283	LCU	845	Chloride, total	mg/L	03/31/2021 - 07/27/2021	CI around mean	37	200	67	200	Standard
G283	LCU	845	Chromium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.004	0.10	0.019	0.1	Standard
G283	LCU	845	Cobalt, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.002	0.006	0.0059	0.006	Standard
G283	LCU	845	Fluoride, total	mg/L	03/31/2021 - 07/27/2021	CI around mean	0.27	4.0	0.56	4	Standard
G283	LCU	845	Lead, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.001	0.012	0.012	0.0075	Background
G283	LCU	845	Lithium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.020	0.040	0.019	0.04	Standard
G283	LCU	845	Mercury, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G283	LCU	845	Molybdenum, total	mg/L	03/31/2021 - 07/27/2021	CB around linear reg	0.000614	0.10	0.0045	0.1	Standard
G283	LCU	845	pH (field)	SU	03/31/2021 - 07/27/2021	CI around mean	7.0	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
G283	LCU	845	Radium-226 + Radium 228, tot	pCi/L	03/31/2021 - 07/27/2021	CI around mean	0.42	5.0	1.6	5	Standard
G283	LCU	845	Selenium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.001	0.050	0.0048	0.05	Standard
G283	LCU	845	Sulfate, total	mg/L	03/31/2021 - 07/27/2021	CI around mean	235	400	94	400	Standard
G283	LCU	845	Thallium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
G283	LCU	845	Total Dissolved Solids	mg/L	03/31/2021 - 07/27/2021	CI around mean	760	1200	551	1200	Standard
G284	UA	845	Antimony, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G284	UA	845	Arsenic, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.010	0.0066	0.01	Standard
G284	UA	845	Barium, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.062	2.0	0.11	2	Standard
G284	UA	845	Beryllium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
G284	UA	845	Boron, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.038	2.0	1.0	2	Standard
G284	UA	845	Cadmium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
G284	UA	845	Chloride, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	37	200	67	200	Standard
G284	UA	845	Chromium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.004	0.10	0.019	0.1	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF RECYCLE POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G284	UA	845	Cobalt, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.002	0.006	0.0059	0.006	Standard
G284	UA	845	Fluoride, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.46	4.0	0.56	4	Standard
G284	UA	845	Lead, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.012	0.012	0.0075	Background
G284	UA	845	Lithium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.020	0.040	0.019	0.04	Standard
G284	UA	845	Mercury, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G284	UA	845	Molybdenum, total	mg/L	03/30/2021 - 07/27/2021	CI around geomean	0.000972	0.10	0.0045	0.1	Standard
G284	UA	845	pH (field)	SU	03/30/2021 - 07/27/2021	CI around mean	7.0	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
G284	UA	845	Radium-226 + Radium 228, tot	pCi/L	03/30/2021 - 07/27/2021	CI around geomean	0.053	5.0	1.6	5	Standard
G284	UA	845	Selenium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.050	0.0048	0.05	Standard
G284	UA	845	Sulfate, total	mg/L	03/30/2021 - 07/27/2021	CI around geomean	59	400	94	400	Standard
G284	UA	845	Thallium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
G284	UA	845	Total Dissolved Solids	mg/L	03/30/2021 - 07/27/2021	CI around mean	430	1200	551	1200	Standard
G285	LCU	845	Antimony, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G285	LCU	845	Arsenic, total	mg/L	03/30/2021 - 07/27/2021	CI around median	0.001	0.010	0.0066	0.01	Standard
G285	LCU	845	Barium, total	mg/L	03/30/2021 - 07/27/2021	CB around linear reg	0.058	2.0	0.11	2	Standard
G285	LCU	845	Beryllium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
G285	LCU	845	Boron, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.11	2.0	1.0	2	Standard
G285	LCU	845	Cadmium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
G285	LCU	845	Chloride, total	mg/L	03/30/2021 - 07/27/2021	CB around linear reg	39	200	67	200	Standard
G285	LCU	845	Chromium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.004	0.10	0.019	0.1	Standard
G285	LCU	845	Cobalt, total	mg/L	03/30/2021 - 07/27/2021	CB around linear reg	0.00409	0.006	0.0059	0.006	Standard
G285	LCU	845	Fluoride, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.25	4.0	0.56	4	Standard
G285	LCU	845	Lead, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.012	0.012	0.0075	Background
G285	LCU	845	Lithium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.020	0.040	0.019	0.04	Standard
G285	LCU	845	Mercury, total	mg/L	03/30/2021 - 07/27/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
G285	LCU	845	Molybdenum, total	mg/L	03/30/2021 - 07/27/2021	CB around linear reg	0.00428	0.10	0.0045	0.1	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES
 COFFEEN POWER PLANT
 GMF RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G285	LCU	845	pH (field)	SU	03/30/2021 - 07/27/2021	CI around median	6.7	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
G285	LCU	845	Radium-226 + Radium 228, tot	pCi/L	03/30/2021 - 07/27/2021	CI around mean	1.1	5.0	1.6	5	Standard
G285	LCU	845	Selenium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.050	0.0048	0.05	Standard
G285	LCU	845	Sulfate, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	528	400	94	400	Standard
G285	LCU	845	Thallium, total	mg/L	03/30/2021 - 07/27/2021	CI around median	0.001	0.002	0.001	0.002	Standard
G285	LCU	845	Total Dissolved Solids	mg/L	03/30/2021 - 07/27/2021	CI around mean	1410	1200	551	1200	Standard
G286	UA	845	Antimony, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G286	UA	845	Arsenic, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.001	0.010	0.0066	0.01	Standard
G286	UA	845	Barium, total	mg/L	03/31/2021 - 07/27/2021	CI around mean	0.034	2.0	0.11	2	Standard
G286	UA	845	Beryllium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
G286	UA	845	Boron, total	mg/L	03/31/2021 - 07/27/2021	CI around mean	0.033	2.0	1.0	2	Standard
G286	UA	845	Cadmium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
G286	UA	845	Chloride, total	mg/L	03/31/2021 - 07/27/2021	CI around mean	2.0	200	67	200	Standard
G286	UA	845	Chromium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.004	0.10	0.019	0.1	Standard
G286	UA	845	Cobalt, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.002	0.006	0.0059	0.006	Standard
G286	UA	845	Fluoride, total	mg/L	03/31/2021 - 07/27/2021	CI around median	0.25	4.0	0.56	4	Standard
G286	UA	845	Lead, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.001	0.012	0.012	0.0075	Background
G286	UA	845	Lithium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.020	0.040	0.019	0.04	Standard
G286	UA	845	Mercury, total	mg/L	03/31/2021 - 07/27/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
G286	UA	845	Molybdenum, total	mg/L	03/31/2021 - 07/27/2021	CI around mean	0.000822	0.10	0.0045	0.1	Standard
G286	UA	845	pH (field)	SU	03/31/2021 - 07/27/2021	CI around mean	6.9	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
G286	UA	845	Radium-226 + Radium 228, tot	pCi/L	03/31/2021 - 07/27/2021	CI around mean	-0.0602	5.0	1.6	5	Standard
G286	UA	845	Selenium, total	mg/L	03/31/2021 - 07/27/2021	CI around median	0.001	0.050	0.0048	0.05	Standard
G286	UA	845	Sulfate, total	mg/L	03/31/2021 - 07/27/2021	CI around mean	11	400	94	400	Standard
G286	UA	845	Thallium, total	mg/L	03/31/2021 - 07/27/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
G286	UA	845	Total Dissolved Solids	mg/L	03/31/2021 - 07/27/2021	CI around mean	253	1200	551	1200	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES
 COFFEEN POWER PLANT
 GMF RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G287	UA	845	Antimony, total	mg/L	03/29/2021 - 07/27/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G287	UA	845	Arsenic, total	mg/L	03/29/2021 - 07/27/2021	All ND - Last	0.001	0.010	0.0066	0.01	Standard
G287	UA	845	Barium, total	mg/L	03/29/2021 - 07/27/2021	CI around mean	0.058	2.0	0.11	2	Standard
G287	UA	845	Beryllium, total	mg/L	03/29/2021 - 07/27/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
G287	UA	845	Boron, total	mg/L	03/29/2021 - 07/27/2021	CI around median	0.010	2.0	1.0	2	Standard
G287	UA	845	Cadmium, total	mg/L	03/29/2021 - 07/27/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
G287	UA	845	Chloride, total	mg/L	03/29/2021 - 07/27/2021	CI around mean	21	200	67	200	Standard
G287	UA	845	Chromium, total	mg/L	03/29/2021 - 07/27/2021	All ND - Last	0.004	0.10	0.019	0.1	Standard
G287	UA	845	Cobalt, total	mg/L	03/29/2021 - 07/27/2021	All ND - Last	0.002	0.006	0.0059	0.006	Standard
G287	UA	845	Fluoride, total	mg/L	03/29/2021 - 07/27/2021	CI around mean	0.37	4.0	0.56	4	Standard
G287	UA	845	Lead, total	mg/L	03/29/2021 - 07/27/2021	Most recent sample	0.001	0.012	0.012	0.0075	Background
G287	UA	845	Lithium, total	mg/L	03/29/2021 - 07/27/2021	All ND - Last	0.020	0.040	0.019	0.04	Standard
G287	UA	845	Mercury, total	mg/L	03/29/2021 - 07/27/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
G287	UA	845	Molybdenum, total	mg/L	03/29/2021 - 07/27/2021	CI around median	0.001	0.10	0.0045	0.1	Standard
G287	UA	845	pH (field)	SU	03/29/2021 - 07/27/2021	CI around mean	7.1	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
G287	UA	845	Radium-226 + Radium 228, tot	pCi/L	03/29/2021 - 07/27/2021	CI around mean	-0.0345	5.0	1.6	5	Standard
G287	UA	845	Selenium, total	mg/L	03/29/2021 - 07/27/2021	All ND - Last	0.001	0.050	0.0048	0.05	Standard
G287	UA	845	Sulfate, total	mg/L	03/29/2021 - 07/27/2021	CI around mean	42	400	94	400	Standard
G287	UA	845	Thallium, total	mg/L	03/29/2021 - 07/27/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
G287	UA	845	Total Dissolved Solids	mg/L	03/29/2021 - 07/27/2021	CI around mean	390	1200	551	1200	Standard
G288	UA	845	Antimony, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G288	UA	845	Arsenic, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.00174	0.010	0.0066	0.01	Standard
G288	UA	845	Barium, total	mg/L	03/30/2021 - 07/27/2021	CB around linear reg	0.066	2.0	0.11	2	Standard
G288	UA	845	Beryllium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
G288	UA	845	Boron, total	mg/L	03/30/2021 - 07/27/2021	CI around median	0.005	2.0	1.0	2	Standard
G288	UA	845	Cadmium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES
 COFFEEN POWER PLANT
 GMF RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G288	UA	845	Chloride, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	22	200	67	200	Standard
G288	UA	845	Chromium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.004	0.10	0.019	0.1	Standard
G288	UA	845	Cobalt, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.002	0.006	0.0059	0.006	Standard
G288	UA	845	Fluoride, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.38	4.0	0.56	4	Standard
G288	UA	845	Lead, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.012	0.012	0.0075	Background
G288	UA	845	Lithium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.020	0.040	0.019	0.04	Standard
G288	UA	845	Mercury, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G288	UA	845	Molybdenum, total	mg/L	03/30/2021 - 07/27/2021	CI around median	0.0013	0.10	0.0045	0.1	Standard
G288	UA	845	pH (field)	SU	03/30/2021 - 07/27/2021	CB around linear reg	7.2	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
G288	UA	845	Radium-226 + Radium 228, tot	pCi/L	03/30/2021 - 07/27/2021	CI around mean	0.14	5.0	1.6	5	Standard
G288	UA	845	Selenium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.050	0.0048	0.05	Standard
G288	UA	845	Sulfate, total	mg/L	03/30/2021 - 07/27/2021	CI around median	29	400	94	400	Standard
G288	UA	845	Thallium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
G288	UA	845	Total Dissolved Solids	mg/L	03/30/2021 - 07/27/2021	CI around median	310	1200	551	1200	Standard
R201	UA	845	Antimony, total	mg/L	04/10/2015 - 07/28/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
R201	UA	845	Arsenic, total	mg/L	01/20/2015 - 07/28/2021	CI around median	0.001	0.010	0.0066	0.01	Standard
R201	UA	845	Barium, total	mg/L	04/10/2015 - 07/28/2021	CI around median	0.078	2.0	0.11	2	Standard
R201	UA	845	Beryllium, total	mg/L	04/10/2015 - 07/28/2021	CI around median	0.001	0.004	0.001	0.004	Standard
R201	UA	845	Boron, total	mg/L	01/20/2015 - 07/28/2021	CI around median	0.010	2.0	1.0	2	Standard
R201	UA	845	Cadmium, total	mg/L	01/20/2015 - 07/28/2021	CI around median	0.001	0.005	0.001	0.005	Standard
R201	UA	845	Chloride, total	mg/L	01/20/2015 - 07/28/2021	CI around mean	55	200	67	200	Standard
R201	UA	845	Chromium, total	mg/L	04/10/2015 - 07/28/2021	CI around median	0.004	0.10	0.019	0.1	Standard
R201	UA	845	Cobalt, total	mg/L	04/10/2015 - 07/28/2021	CI around median	0.002	0.006	0.0059	0.006	Standard
R201	UA	845	Fluoride, total	mg/L	04/10/2015 - 07/28/2021	CI around mean	0.30	4.0	0.56	4	Standard
R201	UA	845	Lead, total	mg/L	01/20/2015 - 07/28/2021	Future median	0.001	0.012	0.012	0.0075	Background
R201	UA	845	Lithium, total	mg/L	11/23/2015 - 07/28/2021	All ND - Last	0.020	0.040	0.019	0.04	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES
 COFFEEN POWER PLANT
 GMF RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
R201	UA	845	Mercury, total	mg/L	04/10/2015 - 07/28/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
R201	UA	845	Molybdenum, total	mg/L	07/22/2015 - 07/28/2021	CI around median	0.001	0.10	0.0045	0.1	Standard
R201	UA	845	pH (field)	SU	01/20/2015 - 07/28/2021	CI around mean	7.0	6.5/9.0	6.6/7.6	6.5/9	Standard/Standard
R201	UA	845	Radium-226 + Radium 228, tot	pCi/L	11/23/2015 - 07/28/2021	CI around mean	0.40	5.0	1.6	5	Standard
R201	UA	845	Selenium, total	mg/L	04/10/2015 - 07/28/2021	CI around median	0.001	0.050	0.0048	0.05	Standard
R201	UA	845	Sulfate, total	mg/L	01/20/2015 - 07/28/2021	CI around mean	185	400	94	400	Standard
R201	UA	845	Thallium, total	mg/L	04/10/2015 - 07/28/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
R201	UA	845	Total Dissolved Solids	mg/L	01/20/2015 - 07/28/2021	CI around mean	689	1200	551	1200	Standard

Notes:

Potential exceedance of GWPS

HSU = hydrostratigraphic unit:

- DA = deep aquifer
- LCU = lower confining unit
- 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)

TABLE 2. SUMMARY OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES
 COFFEEN POWER PLANT
 GMF RECYCLE POND
 COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G273	UA	257	Sulfate, total	mg/L	01/21/2015 - 02/01/2021	CI around mean	424	400	104	400	Standard
G275	UA	845	Boron, total	mg/L	01/21/2015 - 07/23/2015	Most recent sample	4.0	2.0	1.0	2	Standard
G275	UA	845	Sulfate, total	mg/L	01/21/2015 - 07/23/2015	Most recent sample	750	400	94	400	Standard
G275	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 07/23/2015	Most recent sample	1500	1200	551	1200	Standard
G285	LCU	845	Sulfate, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	528	400	94	400	Standard
G285	LCU	845	Total Dissolved Solids	mg/L	03/30/2021 - 07/27/2021	CI around mean	1410	1200	551	1200	Standard

Notes:

HSU = hydrostratigraphic unit:

LCU = lower confining unit

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:

CI around mean = Confidence interval around the mean

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.



Matthew A. Goering
Senior Vice President
Illinois Power Generating Company

¹In 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_022_175666013_certification
Revision 0

Initial Hazard Potential Classification Assessment
EPA Final CCR Rule
GMF Recycle 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 Recycle Pond.

40 CFR 257.73(a)(2) requires the owner or operator of an existing CCR surface impoundment to conduct an initial hazard potential classification assessment and document the hazard potential classification, and the basis for the classification, of the CCR unit as either a high hazard potential CCR surface impoundment, a significant hazard potential CCR surface impoundment, or a low hazard potential CCR surface impoundment.

2.0 FINDINGS

A breach analysis was performed to evaluate potential hazards associated with a failure of the GMF Recycle Pond's perimeter containment dike. A breach failure scenario was modeled along the eastern embankment of the containment dike. The breach was modeled to discharge eastward into an unnamed creek that flows south into the eastern cove of Coffeen Lake. The breach scenario was simulated using water volumes corresponding to the maximum water surface elevation calculated within the GMF Recycle Pond during the Probable Maximum Precipitation (PMP) storm event.

Model results indicate that the resultant breach discharge would flow into the unnamed creek and overtop County Road 450 N at an approximate maximum depth and velocity of 3 feet and 15 feet per second, respectively. This roadway is intermittently used and the at-risk populations are considered transient. In accordance with Federal guidelines, probable loss of life does not exist for scenarios where persons are only temporarily in the potential inundation area. Per these findings, it was concluded that a breach failure of the GMF Recycle Pond containment dike will result in no probable loss of human life. However, it is anticipated that a breach failure of the containment dike will result in the release of the stored CCR materials into Coffeen Lake and cause environmental damage.

40 CFR 257.53 defines a "significant hazard potential CCR surface impoundment" as a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Design with community in mind



Based on the results of the analysis summarized above, the GMF Recycle Pond was assigned a Significant hazard potential classification per 40 CFR 257.53.

3.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

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

1. the information contained in this report and the underlying data in the operating record was prepared in accordance with the accepted practice of engineering and is accurate as of the date of my signature below; and
2. the initial hazard potential classification assessment for the Coffeen Power Station GMF Recycle 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



Design with community in mind

ATTACHMENT P

CCR Rule Report:
**Initial Structural Stability
Assessment**

GMF Recycle Pond
Coffeen Power Station
Montgomery County, Illinois

*Submitted to Illinois Power Generating Company
October 2016*

1. Introduction

The GMF Recycle Pond at the Coffeen Power Station is located in the NW 1/4 of Section 11, Township 7 North, Range 3 West of the Third Principal Meridian in Montgomery County, Illinois, approximately 1.5 miles south of Coffeen, Illinois.

The GMF Recycle Pond is lined with a 60-mil, high-density polyethylene (HDPE) geomembrane, has a maximum embankment height of 16 feet and has a maximum impounding capacity of 243 acre-feet (measured at the top elevation 629.0 feet). There is an additional 99 acre-feet of incised storage.

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).

2. Initial Structural Stability Assessment

40 CFR 257.73(d)(1) Periodic structural stability assessments.

(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: 40 CFR 257.73(d)(1)(i)-(vii)

An initial structural stability assessment has been performed in accordance with 40 CFR 257.73(d)(1)(i)-(vii), documenting that the design, construction, operation, and maintenance of the GMF Recycle Pond is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater, which can be impounded therein.

2.1 Stable Foundations and Abutments

40 CFR 257.73(d)(1)(i) - CCR unit designed, constructed, operated, and maintained with stable foundations and abutments.

The GMF Recycle Pond foundation soils are grayish brown to brown, firm, silty clay, having Standard Penetration Test (SPT) blow counts ranging from 4-7 blows/foot and unconfined compressive strengths of approximately 1.3 tons per square foot. The GMF Recycle Pond has no abutments. The structural stability of the foundation soils and embankment was assessed and found to meet the structural stability requirements of 40 CFR 257.73(e). Information related to this assessment is found in the CCR Rule Report: Initial Safety Factor Assessment for the GMF Recycle Pond, dated October 2016. Procedures are in place to maintain and operate the foundations in a stable manner. Therefore, the GMF Recycle Pond meets the requirements of 40 CFR 257.73(d)(1)(i).

2.2 Adequate Slope Protection

40 CFR 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 interior slopes of the GMF Recycle Pond are designed and constructed using a high-density polyethylene (HDPE) geomembrane, which is not susceptible to surface erosion or wave action. The exterior slopes were designed and constructed with a 4H:1V slope and vegetation to protect against

surface erosion. The operational condition of the interior and exterior slopes were visually evaluated during the annual inspection performed per 40 CFR 257.83 on September 27, 2016, and found to be intact. Procedures are in place to maintain and operate the slope protection features.

Even though it is highly unlikely that the GMF Recycle Pond interior slopes will be subjected to a rapid drawdown condition because they are lined with an HDPE geomembrane, slope stability analyses of the critical cross section of the slope indicate that sudden drawdown will have no adverse effects.

Therefore, the GMF Recycle Pond meets the requirements in 40 CFR 257.73(d)(1)(ii).

2.3 Dike Compaction

40 CFR 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.

Construction records for the GMF Recycle Pond indicate that the dike was constructed of sandy silty clay fill materials, having a maximum compacted lift thickness of 8 inches. Fill materials were compacted to a dry density equal to or greater than 95 percent of the maximum dry density obtained from the Standard Proctor Test, ASTM D698. Fill was compacted at a moisture content that is no more than 2 percent below and no more than 2 percent above optimum moisture content. In-place compacted densities range from 105.1 to 112.7 pounds per cubic foot.

These in-place parameters meet the criteria of the original slope stability analyses found in the design record. Procedures are in place to maintain and operate the dikes to withstand the range of loading conditions. Therefore, the GMF Recycle Pond meets the requirements in 40 CFR 257.73(d)(1)(iii).

2.4 Vegetated Slopes

40 CFR 257.73(d)(1)(iv) - 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 GMF Recycle Pond exterior slopes were designed and constructed with vegetated slopes capable of providing protection against surface erosion. The interior slopes of the GMF Recycle Pond were designed and constructed using a HDPE geomembrane liner for slope protection. Operational and maintenance procedures are in place to operate and maintain the vegetation on the slopes. The operational condition of the exterior slopes was evaluated and found to be intact. Procedures are in place to maintain and operate the vegetated slopes and alternate slope protection. Therefore, the GMF Recycle Pond meets the requirements in 40 CFR 257.73(d)(1)(iv).

2.5 Spillways

40 CFR 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 emergency spillway for the GMF Recycle Pond consists of three 6-foot-by-6-foot precast reinforced concrete risers (drop inlets) each with a top elevation of 624 feet (5 feet below the top of the dam). The GMF Recycle Pond HDPE liner is attached to the exterior sides of each riser. A 4-foot-diameter HDPE outlet conduit that returns water to the power station was constructed at each riser, with an upstream invert of 615.0 feet and a downstream invert of 613.0 feet. Assuming a maximum normal pool elevation of 624.0 feet (control elevation of the risers), the emergency spillway has been designed to pass the 24-hour PMF storm event of 34 inches of precipitation, based on NOAA Hydrometeorological Report No. 51, with adequate freeboard to prevent overtopping of the GMF Recycle Pond crest by wind-generated waves. By contrast, the regulatory 1,000-year flood event was estimated to be 9.13 inches in 24 hours, based on NOAA Atlas 14, which is much less than the PMF. The downstream end of the emergency spillway is protected from scour by a riprap stilling basin. The emergency spillway is regularly inspected and maintained in accordance with the gypsum management facility operation and maintenance manual found in the Coffeen Power Station GMF Recycle Pond Documentation Report.

Therefore, the GMF Recycle Pond spillway meets the requirements in 40 CFR 257.73(d)(1)(v).

2.6 Stability and Structural Integrity of Hydraulic Structures

40 CFR 257.73(d)(1)(vi) - CCR unit designed, constructed, operated, and maintained with hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure.

The emergency spillway drop inlet structures were constructed on structural soil fill materials. Discharge piping is composed of non-erodible butt-fusion HDPE piping, and a flowable backfill plug was installed at the location where the pipes exit the drop inlet structures to prevent seepage. Compacted structural soil backfill was installed around the discharge pipes as they pass through the GMF Recycle Pond dike. A riprap stilling basin was installed on the downstream end of the discharge pipes to prohibit scour.

The process water decant pipes that feed water to the GMF Recycle Pond pumphouse are composed of non-erodible butt-fusion HDPE piping. Compacted structural soil backfill was installed around the decant pipes as they pass through the GMF Recycle Pond dike. The pipes are booted through the HDPE geomembrane to prevent leakage.

A pond riser pipe that hydraulically connects the GMF Recycle Pond to the ultrasonic transducer manhole for the purpose of water level monitoring is composed of non-erodible butt-fusion HDPE piping. Compacted structural soil backfill was installed around the pipes beneath the GMF Recycle Pond dike. The pipe is booted through the HDPE geomembrane to prevent leakage.

A decant pipe that transfers water from the GMF Pond to the GMF Recycle Pond is composed of non-erodible butt-fusion HDPE piping. Flowable backfill was installed around the decant pipe as it passes beneath the process water transfer channel. The pipe is booted through the HDPE geomembrane to prevent leakage.

A slurry pipe that can transfer FGD slurry from the plant scrubber system to the GMF Recycle Pond is composed of non-erodible butt-fusion HDPE piping. This pipe passes through the west dike of the GMF Recycle Pond and is not in operation. Compacted structural soil backfill was installed around the decant pipe as it passes through the dike. The pipe is booted through the HDPE geomembrane to prevent leakage.

The emergency spillway was visually inspected during the annual inspection on September 27, 2016, and no deficiencies were observed. Therefore, the stability and structural integrity of the emergency spillway was designed, constructed, operated and maintained to meet the requirements of 40 CFR 257.73(d)(1)(vi).

The September 27, 2016, inspection did not identify any observable deficiencies with the process water decant pipes, the pond riser pipe, the transfer channel decant pipe or the slurry pipe that may negatively affect operation of those hydraulic structures. However, thorough inspections of those pipes have not yet been performed to confirm the current condition of the pipes as free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris per 40 CFR 257.73(d)(1)(vi). Thus, while the design and construction of the process water decant pipes, the pond riser pipe, the transfer channel decant pipe and the slurry pipe meets the requirements of 40 CFR 257.73(d)(1)(vi), in accordance with 40 CFR 257.73(d)(2), Hanson recommends that a nondestructive inspection of these pipes be performed as soon as feasible and that this report be updated with inspection documentation at that time.

2.7 Downstream Slope Inundation/Stability

40 CFR 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.

A review of Federal Emergency Management Agency flood hazard maps indicates that adjacent water bodies, more specifically the intermittent stream east of the GMF Recycle Pond, are not prone to flooding. Therefore, the GMF Recycle Pond downstream slopes would not be inundated by the pool of an adjacent water body.

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3. Certification Statement

**COFFEEN POWER STATION - GMF RECYCLE POND
ILLINOIS POWER GENERATING COMPANY
INITIAL STRUCTURAL STABILITY ASSESSMENT CERTIFICATION**

As a Qualified Professional Engineer as defined by 40 CFR 257 Subpart D, I certify that I have personally examined and am familiar with the design information referenced below, 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.

The **Coffeen Power Station GMF Recycle Pond** Initial Structural Stability Assessment, as supported by the Coffeen Power Station GMF Recycle Pond Documentation Report in the operating record was conducted in accordance with the requirements set forth by 40 CFR 257.73 as published on April 17, 2015.

Steven M. Bishoff, P.E.
Hanson Professional Services Inc.
1525 South Sixth Street
Springfield, IL 62703-2886
(217) 788-2450
Registration No. 062-040449

Seal:



Signature: _____

A handwritten signature in blue ink, appearing to be "S. Bishoff", written over a horizontal line.

Date: _____

10-13-2016

ATTACHMENT Q

CCR Rule Report:
**Initial Safety Factor
Assessment**
GMF Recycle Pond
Coffeen Power Station
Montgomery County, Illinois

*Submitted to Illinois Power Generating Company
October 2016*



1. Introduction

The GMF Recycle Pond at the Coffeen Power Station is located in the NW 1/4 of Section 11, Township 7 North, Range 3 West of the Third Principal Meridian in Montgomery County, Illinois, approximately 1.5 miles south of Coffeen, Illinois.

The GMF Recycle Pond is lined with a 60-mil, high-density polyethylene (HDPE) geomembrane, has a maximum embankment height of 16 feet, and has a maximum impounding capacity of 243 acre-feet (measured at the top elevation 629.0 feet). There is an additional 99 acre-feet of incised storage.

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).

2. 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.*

The fundamental design criteria of the GMF Recycle Pond is based on the need to provide for safe operation and maintenance of the embankment and the minimization of potential failure mechanisms common to earthen surface impoundments. Additionally, the design must also incorporate hydrologic and hydraulic evaluations to determine that the dimensions of the embankment and appurtenances are adequate to prevent damage to the surface impoundment during normal operations and extreme rainfall events.

Stability analyses were performed for the GMF Recycle Pond design. The analyses were performed using the program PCSTABL5, which was developed at Purdue University, and SlopeW, developed by Geo Studio international. At the location of the GMF Recycle Pond, the critical elements for stability are the earthen berms.

The soil parameters used for the preliminary stability analyses were selected using data obtained during the geotechnical investigation of the GMF Recycle Pond. Soil parameters for the interfaces between manufactured lining materials and soils, at the interfaces between layers of manufactured lining materials, and within lining materials were selected based on values obtained from engineering literature.

During the analyses for the GMF Recycle Pond, the location of the phreatic surface was modeled assuming that there is no synthetic lining within the construction (a highly conservative assumption

because the GMF Recycle Pond is lined with highly impermeable synthetic materials). For this assumption, the phreatic surface would develop through the embankment sections over time.

At the GMF Recycle Pond location, a cross section of the embankment with the highest embankment height was judged to be the critical cross section. Analyses were performed for a long-term, steady-state-seepage condition using drained soil parameters (Maximum Storage Pool Loading using an elevation of 624.0 and Maximum Surcharge Pool Loading using an elevation of 627.4), and a seismic loading condition using rapid load soil parameters and a pool elevation of 624.0 for the downstream slope. Based on evaluation of the engineering characteristic of the embankment and foundation soils, it was determined that the embankment is not susceptible to liquefiable during the design seismic event.

The results of the analyses required by 40 CFR 257.73(e)(1) are provided in the table below. Based on this evaluation, the GMF Recycle Pond meets the safety factor requirements in 40 CFR 257.73(e)(1)(i) though (iv).

Loading Conditions	40 CFR 257.73(e)(1) Subsection	Minimum Required Factor of Safety	Calculated Factor of Safety
Maximum Storage Pool Loading	(i)	1.50	1.55
Maximum Surcharge Pool Loading	(ii)	1.40	1.51
Seismic	(iii)	1.00	1.80
Soils Susceptible to Liquefaction	(iv)	1.20	Not Applicable

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3. Certification Statement

**COFFEEN POWER STATION - GMF RECYCLE POND
ILLINOIS POWER GENERATING COMPANY
INITIAL SAFETY FACTOR ASSESSMENT CERTIFICATION**

As a Qualified Professional Engineer as defined by 40 CFR 257 Subpart D, I certify that I have personally examined and am familiar with the design information referenced below, 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.

The **Coffeen Power Station GMF Recycle Pond** Initial Safety Factor Assessment, as supported by the Coffeen Power Station GMF Recycle Pond Documentation Report in the operating record was conducted in accordance with the requirements set forth by 40 CFR 257.73 as published on April 17, 2015.

Steven M. Bishoff, P.E.
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(217) 788-2450
Registration No. 062-040449

Seal:



Signature: _____

A handwritten signature in blue ink, appearing to be "SMB", written over a horizontal line.

Date: _____

10-13-2016

ATTACHMENT R

CCR Rule Report:
**Initial Inflow Design Flood
Control System Plan**

GMF Recycle Pond
Coffeen Power Station
Montgomery County, Illinois

*Submitted to Illinois Power Generating Company
October 2016*

1. Introduction

The GMF Recycle Pond at the Coffeen Power Station is located in the NW 1/4 of Section 11, Township 7 North, Range 3 West of the Third Principal Meridian in Montgomery County, Illinois, approximately 1.5 miles south of Coffeen, Illinois.

The GMF Recycle Pond is lined with a 60-mil, high-density polyethylene (HDPE) geomembrane, has a maximum embankment height of 16 feet and has a maximum impounding capacity of 243 acre-feet (measured at the top elevation 629 feet). There is an additional 99 acre-feet of incised storage.

The owner or operator of the CCR surface impoundment must obtain a certification from a qualified professional engineer stating that the inflow design flood control system plan meets the requirements of 40 CFR 257.82.

2. Initial Inflow Design Flood Control System Plan

40 CFR 257.82(a)

The owner or operator of an existing or new CCR surface impoundment or any lateral expansion of a 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.

40 CFR 257.82(a)(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.

40 CFR 257.82(a)(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.

40 CFR 257.82(a)(3)

The inflow design flood is:

- i. For a high hazard potential CCR surface impoundment, as determined under 257.73(a)(2) or 257.74(a)(2), the probable maximum flood;*
- ii. For a significant hazard potential CCR surface impoundment, as determined under 257.73(a)(2) or 257.74(a)(2), the 1,000-year flood;*
- iii. For a low hazard potential CCR surface impoundment, as determined under 257.73(a)(2) or 257.74(a)(2), the 100-year flood; or*
- iv. For an incised CCR surface impoundment, the 25-year flood.*

40 CFR 257.82(b)

Discharge from the CCR unit must be handled in accordance with the surface water requirements under 257.3-3.

At this time, as determined under 40 CFR 257.73(a)(2) by Stantec in 2016, the GMF Recycle Pond has a significant hazard potential. The inflow design flood for a significant hazard potential is the 1,000-year flood. However, the GMF Recycle Pond was designed to meet state agency criteria above and beyond the 1,000-year flood requirements for a significant hazard potential CCR surface impoundment per 40 CFR 257.73(a)(2)(ii).

2.1 Initial Inflow Design Flood Control Systems

The U.S. Army Corps of Engineers, Hydrologic Engineer Center's Hydrologic Modeling System (HEC-HMS) was used to analyze runoff during various storm events. The runoff rates computed by the model are dependent on the watershed drainage area, precipitation amounts, precipitation distribution, unit hydrograph methodology and rainfall loss rates on the ground. The GMF Recycle Pond has a total watershed drainage area of approximately 57.5 acres, including the GMF Pond, the GMF Recycle Pond and the transfer channel connecting the two. However, it is important to note that the design of the spillway system is based on the capacity required for a possible future expansion of the gypsum management facility (GMF) to include an additional gypsum storage cell. Therefore, a total watershed drainage area of 77.3 acres was used in the design computations and modeling, which is more conservative.

Based on the hazard potential assessment, the required regulatory 1,000-year flood event was estimated to be 9.1 inches in 24 hours, using NOAA Atlas 14. Consequently, the GMF Recycle Pond was designed to accommodate a precipitation event much larger than required. Frequency precipitation values and distributions were obtained from the Illinois State Water Survey (ISWS) Circular 172 "Frequency Distributions of Heavy Rainstorms in Illinois" and Circular 173 "Time Distributions of Heavy Rainstorms in Illinois." The probable maximum precipitation was estimated to be 34 inches, based on NOAA Hydrometeorological Report No. 51. The Soil Conservation Service (SCS) Dimensionless Unit Hydrograph was used to establish the runoff unit hydrograph and the SCS Curve Number Method was used to establish the loss rate. Based on Chapter 7, Hydrologic Soil Groups, of Part 630 of the USDA/NRCS National Engineering Handbook, gypsum was categorized as hydrologic soil group C. In accordance with USDA/NRCS TR-55, Urban Hydrology for Small Watersheds, a curve number of 91 was assigned to the gypsum to define the loss rate, and a lag time of 7 minutes was computed to develop the runoff unit hydrograph.

The HEC-HMS generated rainfall runoff hydrographs for the GMF watershed were routed through the GMF Pond and transfer channel using the unsteady flow module of the U.S. Army Corps of Engineers, Hydrologic Engineer Center's River Analysis System (HEC-RAS). The time-variable pool elevation of the GMF Recycle Pond, as generated by HEC-HMS, was used as the downstream control in the HEC-RAS models. Because the pool elevation of the GMF Recycle Pond is dependent on the inflow from the GMF Pond, the HEC-HMS models must be run both before and after the HEC-RAS models.

The CulvertMaster software package was used to determine the depth of flow and outlet velocity in the outlet conduit from the GMF Recycle Pond emergency spillway. This information was then used in the design of the riprap stilling basin for energy dissipation.

Table 1 identifies the computed water surface elevation results for the GMF Recycle Pond, assuming that the stop logs were installed up to elevation 625.0 feet in the transfer channel and that the starting pool elevation in the GMF Recycle Pond is at elevation 624.0 feet (the spillway control elevation). Note that these are conservative estimates, because the stop log portion of the spillway was never constructed. Consequently, the actual water surface in the GMF Pond is assumed to be no greater than 623.0 feet, and the water surface in the GMF Recycle Pond can be assumed to be no higher than 622.0 feet.

Table 1: Peak Water Surface Elevations and Freeboard

	100-Year Peak Discharge (cfs)	PMF Peak Discharge (cfs)	100-Year Peak WSEL (ft.)	PMF Peak WSEL (ft.)	Top of Embankment (ft.)
GMF Recycle Pond	95.8	586.9	624.6	627.4	629.0

In all cases, maximum wave runup is less than the calculated freeboard; therefore, water will not overtop the GMF Recycle Pond embankment for all storm events up to and including the Probable Maximum Flood. Based on this evaluation, the GMF Recycle Pond meets the requirements in 40 CFR 257.82(a).

2.2 Discharge from the CCR Unit

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 Coffeen GMF is operated as a closed loop, in which the only discharge is water returned to the plant for operational use. The normal pool in the GMF Recycle Pond is normally maintained at a lower water level in order to prevent discharges over the spillway. The pump house decant was designed to allow the operator to control the water level in the GMF Recycle Pond. If the GMF Pond is operated at a normal pool water surface elevation at or below 623.0 feet and the GMF Recycle Pond subsequently operated at a normal pool water surface elevation at or below 616.0 feet, the run-off from a PMF will be absorbed without discharge from the system. Therefore, discharge into waters of the United States is not expected, and the GMF Recycle Pond meets the requirements in 40 CFR 257.82(b).

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3. Certification Statement

**COFFEEN POWER STATION - GMF RECYCLE POND
ILLINOIS POWER GENERATING COMPANY
INITIAL INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN CERTIFICATION**

As a Qualified Professional Engineer as defined by 40 CFR 257 Subpart D, I certify that I have personally examined and am familiar with the design information referenced below, 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.

The **Coffeen Power Station GMF Recycle Pond** Initial Inflow Design Flood Control System Plan, as supported by the Coffeen Power Station GMF Recycle Pond Documentation Report in the operating record was conducted in accordance with the requirements set forth by 40 CFR 257.82 as published on April 17, 2015.

Steven M. Bishoff, P.E.
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10-13-2016

ATTACHMENT S

PART 845 SAFETY AND HEALTH PLAN

**COFFEEN POWER PLANT
GMF GYPSUM STACK
POND, GMF RECYCLE
POND, AND ASH POND
NO. 1**

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APPENDICES

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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

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.

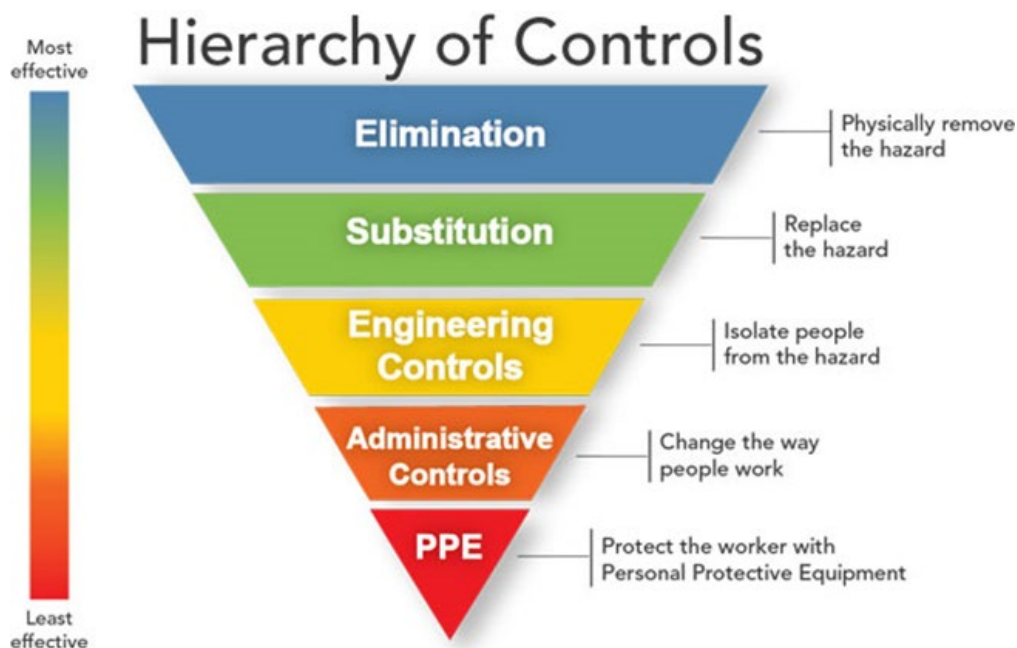
3.10 Industrial Hygiene Sampling Records

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 of 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 chill temperature requiring dry clothing to maintain core body temperature 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.

Chemical	Percentage	PEL	IDLH	ACGIH TLV	Symptoms of Exposure & Health Effects
Crystalline Silica	20-60% (total)	0.05 mg/m ³ (respirable)	25 mg/m ³ (respirable)	0.025 mg/m ³ (respirable)	Cough, dyspnoea (breathing difficulty), wheezing; decreased pulmonary function, progressive respiratory symptoms (silicosis); irritation eyes; [potential occupational carcinogen]
Iron oxide	1-10%	5 mg/m ³	2500 mg/m ³	5 mg/m ³	Benign pneumoconiosis with X-ray shadows indistinguishable from fibrotic pneumoconiosis (siderosis)
Calcium oxide	10-30%	5 mg/m ³	25 mg/m ³	2 mg/m ³	irritation eyes, skin, upper respiratory tract; ulcer, perforation nasal septum; pneumonitis; dermatitis
Titanium dioxide	<3%	15 mg/m ³	ND	10 mg/m ³	Lung fibrosis; [potential occupational carcinogen]
Aluminosilicates	10-60%				irritation eyes, skin, throat, upper respiratory system
Magnesium oxide	2-10%	15 mg/m ³ (PNOR)	ND	10 mg/m ³ (PNOR)	
Magnesium dioxide	<2%				
Phosphorous pentoxide	≤2%				
Sodium oxide	1-10%				
Potassium oxide	≤1%				
Bromide salt	<0.1%				

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/m³ = 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.

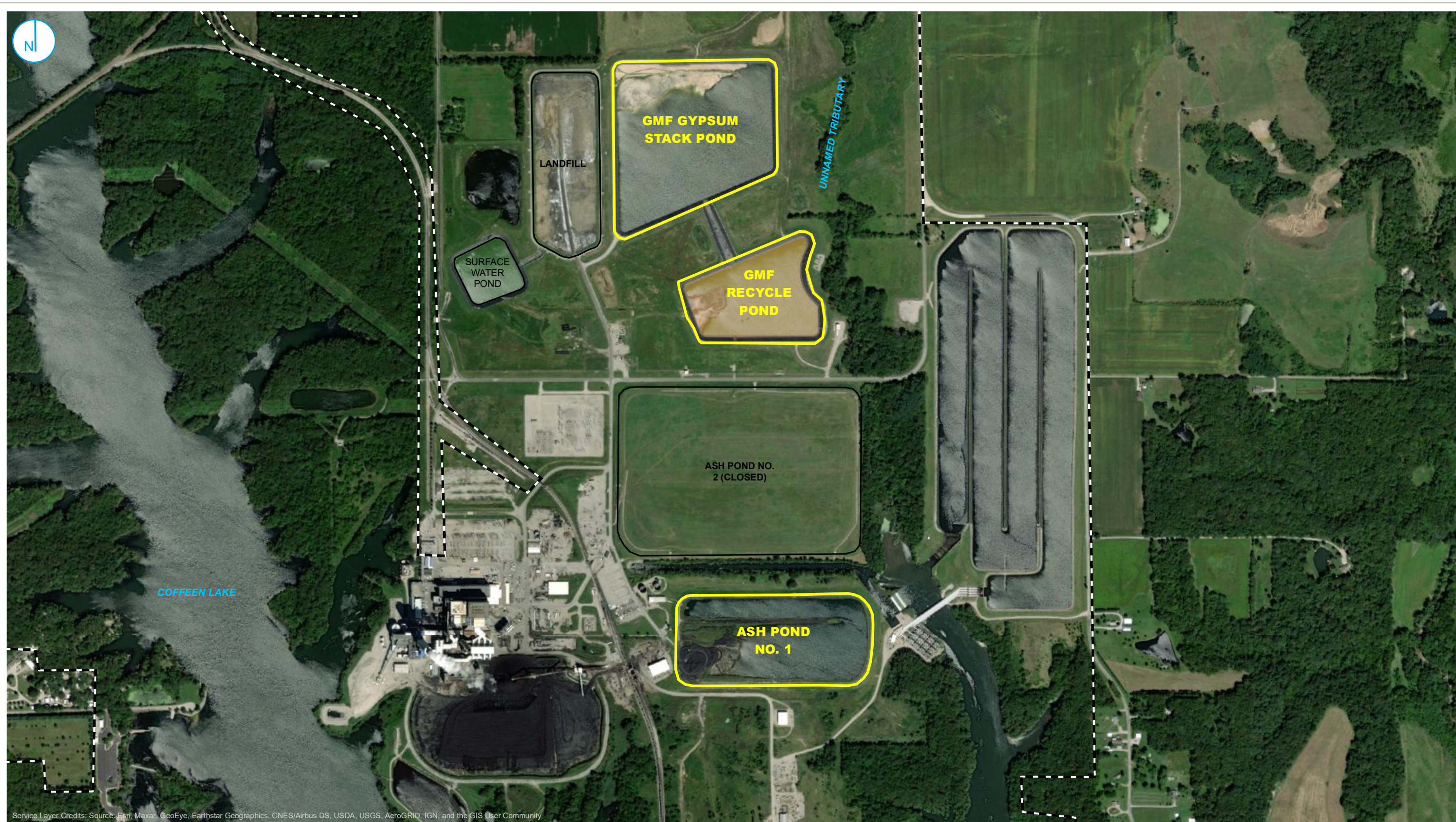
6.9 Ash Pond Rescue

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



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- PART 845 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- PROPERTY BOUNDARY



SITE MAP

APPENDIX A

PART 845 SAFETY AND HEALTH PLAN
 COFFEEN POWER PLANT
 COFFEEN, ILLINOIS

RAMBOLL AMERICAS
 ENGINEERING SOLUTIONS, INC.



APPENDIX B
SAFETY AND HEALTH PLAN ACKNOWLEDGMENT FORM

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 than \$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 Contractor, or any employee or other person performing the Work, is not or may not be performing the Work in compliance with applicable Environmental Laws. Contractor will provide Company with written notice to Company of such actual or potential non-compliance within three (3) days following the discovery thereof. Contractor will take immediate steps to ensure compliance with all applicable Environmental Laws and will, if directed by Company, cease all Work until authorized by Company to resume the Work.
- 5.7 Contractor will report to Company all accidents involving personal injuries (including death) and damage to property occurring directly or indirectly as a result of the Work performed by Contractor hereunder immediately, but in no event, no later than 24 hours after the occurrence of any such accident. Any accident or incident occurring directly or indirectly as a result of the Work which Contractor must report to a regulatory agency (e.g. OSHA, MSHA, TCEQ) must also be reported to Company immediately following notification to the regulatory agency.

6. WORK SITE PERMITS AND LICENSES

- 6.1 Subject to the following two paragraphs, Contractor will obtain, prior to the commencement of the Work, and provide to Company upon request, all permits, licenses and governmental authorizations, at its sole expense, required for the performance of the Work. Contractor will be solely responsible for maintaining compliance with such permits, licenses and governmental authorizations.
- 6.2 In the event that a storm water discharge permit is required for the performance of the Work, (i) Contractor will be responsible for filing a Notice of Intent with respect to the Work, in addition to any Notice of Intent that Company may be required to file, and (ii) Contractor will coordinate with

Company in the preparation and execution of a Storm Water Pollution Prevention Plan for the Work Site.

- 6.3 In the event that the performance of the Work involves the handling or abatement of asbestos-containing materials, Contractor will coordinate with Company in the preparation and filing of all required notification forms.
7. **ACCESS.** Should Contractor desire access to the Work Site over any land not controlled by Company, it will, at its sole expense, obtain all proper permits or written permission necessary for that access.
8. **COMPANY FACILITIES.** Contractor will not use Company's sanitary facilities, changehouses, shops, parks, storage buildings, tools, equipment or other facilities unless so directed by Company. Contractor will not discharge, without Company's prior written authorization, any product or waste used or generated in connection with the Work through any (i) Company-permitted outfall, (ii) Company-owned or operated pollution control equipment, or (iii) storm or sanitary sewer located at or in the vicinity of the Work Site. Any request for authorization to discharge will include, at a minimum, either a copy of the Material Safety Data Sheet for the product or a written description of the waste, including a list of the constituents of the waste and the relative concentrations thereof.

9. ENVIRONMENTAL

- 9.1 In the event that Contractor discovers during the performance of the Work any substance at the Work Site that is not the subject of the Work or has not otherwise been identified by Company for Contractor, which substance Contractor has reason to believe is or may be a Hazardous Substance that (i) has been or may be released or spilled into the soil, surface water, or groundwater or in a building or structure, or (ii) consists of asbestos-containing materials, lead-based paint, batteries, thermostats, lighting equipment, or equipment containing polychlorinated biphenyls, Contractor will immediately stop Work and notify Company of the discovery. Contractor will not resume the Work until receiving authorization from Company to do so.
- 9.2 The term "**Hazardous Substance**" means any product, waste, emission or substance defined, listed or designated as a hazardous or toxic substance, hazardous waste, hazardous material or pollutant by or pursuant to any Environmental Law and includes, but is not limited to, any petroleum-based product, substance or waste, including any additives associated therewith, pesticides, fertilizers, solvents, polychlorinated biphenyls, mercury, lead, lead-based paint, asbestos-containing material or explosives.
- 9.3 Contractor will immediately notify Company in the event of a spill or release of any material which Contractor knows or has reason to believe is a Hazardous Substance, whether onto the ground, into any body of water, a storm or sanitary sewer, or the air, or anywhere on property owned or controlled by Company, including within any building or structure. Contractor will be solely responsible, as may be required by applicable Environmental Laws, for, in consultation with Company, (i) notifying the appropriate governmental agencies of such spill or release caused or permitted by the acts or omissions of Contractor and (ii) for the cleanup and remediation of such spill or release.
10. **PROTECTION OF HIGHWAYS AND RAILROADS.** Contractor will make suitable arrangements with governmental authorities and railroads for the construction of all structures, whether underneath or over roads, railroads or rights-of-way to protect the public from accident or delay. Contractor will repair, at its

own expense, to the satisfaction of the governmental authorities or other owners, all roads, railroads and bridges that may be damaged by, or given undue wear due to the Work.

11. CLEANING UP

11.1 Contractor will at all times keep the Work Site free of waste materials or rubbish caused by the Work. After completing the Work, Contractor will remove all its waste materials, rubbish, tools, supplies, equipment and surplus materials from and about the Work Site.

11.2 If Contractor fails to keep the Work Site clean or to clean up after completing the Work, Company may do so and charge all costs of cleaning up to Contractor. Those costs may be deducted from the final payment to Contractor.

12. COLLATERAL WORK. Company and other contractors may be working at the Work Site. Company reserves the right to coordinate the performance of Contractor's Work with the work of others. Contractor will cooperate with and will not delay, impede or otherwise impair the work of others. Company does not guarantee Contractor continuous uninterrupted access to the Work Site, but will provide such access as good construction practices will allow, considering the other activities in the area.

13. ALCOHOLIC BEVERAGES, DRUGS AND WEAPONS. Contractor will inform all members of Contractor Group who may be involved in the performance of any Work of the following Company rules relating to alcoholic beverages, drugs and weapons, with which all personnel are expected to comply:

13.1 Bringing, attempting to bring, possessing, using or being under the influence of intoxicants, drugs, or narcotics while on any Company Property, including but not limited to parking areas, is prohibited. Possessing alcoholic beverages in sealed containers is permitted, however, in designated parking areas.

13.2 Prescription or over-the-counter medications that could affect the performance of safety-sensitive work are allowed on Company Property only if they have been previously cleared by Contractor. Contractor must confirm that the medication and dosage do not impair an individual's ability to perform safety-sensitive work before clearing the individual to perform such work while under the influence of the medication.

13.3 Bringing, attempting to bring, possessing or using firearms, whether classified as legal or illegal, while on any Company Property, including but not limited to buildings, parking areas, recreation facilities, equipment and vehicles, is prohibited, unless otherwise required by applicable law. Use or possession of firearms for specific situations is permitted if approved by function or higher level management of Company.

13.4 Off-the-job involvement with intoxicants, illegal drugs, or illegal narcotics that adversely affects Company's business, to include impairing the individual's ability to perform his job or the public trust in the safe operation of Company, is prohibited.

13.5 Any conduct on any Company Property which is in violation of any state or federal law or regulation is considered a violation of these rules and a breach of any agreement to which these policies are attached.

- 13.6** In order to enforce these rules, all individuals with access to any Company Property as well as the vehicles, offices, lockers and any personal belongings of such individuals on any Company Property are subject to search by Company and its agents, to include security representatives appointed or employed by Company. Individuals may be required to take a blood, urinalysis or Breathalyzer test, or submit to other recognized investigatory tests or procedures as are deemed appropriate or necessary by Company in the investigation of a violation of these rules.
- 14. TITLE AND RIGHT.** Nothing in the Agreement will vest Contractor with any right of property in materials used after they have been attached to or incorporated into the Work, nor materials for which Contractor has received full or partial payment. All those materials, upon being so attached, incorporated or paid for, will become the property of Company. Any gravel, sand, stone, minerals, timber or other materials excavated, uncovered, developed or obtained in the Work, or on any land belonging to Company may be used, in the performance of the Work, provided such materials meet the requirements of this Agreement. Any objects or natural materials or animals excavated or exposed that may have historical significance or constitute a threatened or endangered species must be brought to the attention of Company.

15. PROTECTION AGAINST LIENS AND ENCUMBRANCES

- 15.1** Contractor will not at any time permit any lien, attachment or other encumbrance ("**Encumbrance**") by any person or persons whosoever or by reason of any claim or demand against Contractor to be placed or remain on the property of Company, including, but not limited to, the Work Site upon which Work is being performed or equipment and materials that are being furnished. To prevent an Encumbrance from being placed on the property of Company, Contractor will furnish during the progress of any Work, as requested from time to time, verified statements showing Contractor's total outstanding indebtedness in connection with the Work.
- 15.2** If Contractor allows any indebtedness to accrue to subcontractors or others and fails to pay or discharge that indebtedness within five (5) days after demand, then Company may withhold any money due Contractor until that indebtedness is paid or pay the indebtedness and apply that amount against the money due Contractor.
- 15.3** If Contractor allows any Encumbrances, whether valid or invalid to be placed on the property of Company, any and all claims or demands for payment to Contractor will be denied by Company until the Encumbrance is removed. If the Encumbrance is not removed immediately, Company may pay that claim or demand and deduct the amount paid, together with all related expenses, including attorneys' fees, from any further payment due Contractor, or at Company's election, Contractor will, upon demand, reimburse Company for the amount paid and all related expenses. Any payment made in good faith by Company will be binding on Contractor.

16. TERMINATION FOR DEFAULT

- 16.1** If a petition in bankruptcy should be filed by Contractor, or if Contractor should make a general assignment for the benefit of creditors, or if a receiver should be appointed due to the insolvency of Contractor, or if Contractor should refuse or fail to supply enough properly skilled workmen or proper equipment, materials or services or should fail to make prompt payment to subcontractors, or to pay promptly for materials or labor, or disregard laws, ordinances or the instruction of Company's Contract Coordinator, or if Contractor should refuse or fail to abide by the SOW Construction Schedule or otherwise violate any provisions of the Agreement or SOW, then Company, upon a

determination by Company's Contract Coordinator that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy available to it after giving Contractor seven (7) days' written notice, terminate the Agreement or the SOW and take possession of the Work Site. In the event of such a termination, Company may use all or part of Contractor's equipment and materials and may finish the Work by whatever method Company may deem expedient. In such event, Contractor will not be entitled to receive any further payment hereunder until the Work is finished. If the unpaid balance of the SOW fees will exceed the expense of finishing the Work, including compensation of Company's Contract Coordinator, other Company personnel, third party engineering companies, or other contractors for additional services, such excess will be paid to Contractor. If the expense of finishing the Work will exceed such unpaid balance, Contractor will pay the difference to Company within fifteen (15) days of receiving an invoice for same. The expenses incurred by Company herein, and the damage incurred through Contractor's default, will be determined by Company's Contract Coordinator, in its sole discretion, and such determination will be binding as between the parties.

- 16.2** In the event of a termination under the provisions of this Section 3, Contractor will transfer and assign to Company, in accordance with Company's instructions, all Work, all construction records, reports, permits, data and information, other materials (including all Company-supplied materials), supplies, Work in progress and other goods for which Contractor is entitled to receive reimbursement hereunder, and any and all plans, drawings, sketches, specifications, and information in connection with the Work, and will take such action as may be necessary to secure Company, at Company's sole election, the rights of Contractor under any or all orders and subcontracts made in connection with the Work.
- 16.3** In the event that Company so directs or authorizes, Contractor will sell at a price approved by Company, or retain at a mutually agreeable price, any such materials, supplies, Work in progress, or other goods as referred to in the preceding paragraph. In any event, Company will receive any and all records, plans, drawings, data, permits, specifications, sketches, reports, or other information relating to the Work. The proceeds of any such sale or the agreed price will be paid or credited to Company in such manner as Company may direct so as to reduce the amount payable by Company under this Section 3.

APPENDIX D
COVID-19 SITE ENTRY GUIDELINES



COVID-19 Vistra Site Entry Guidelines – Effective: June 17, 2021

These guidelines are applicable to ALL PERSONNEL entering Vistra work sites.

To enter a Vistra work site, each person must answer the following three questions with a “no” answer *and* pass the required temperature testing *unless* they display their Vistra vaccination sticker on their employee badge or hardhat:

Site Entry Questions:

1. In the past 10 days, have you tested positive for COVID-19 or are you currently waiting on test results?
2. In the past 10 days, have you been within six feet of someone, where masks were not worn, who:
 - a. has tested positive for COVID-19,
 - b. is known to be waiting on test results for COVID-19, or
 - c. is under a quarantine order?
3. In the past 10 days, have you or someone who has been within six feet of you where masks were not worn had:
 - a. flu-like symptoms,
 - b. a deep, dry cough,
 - c. recent shortness of breath or difficulty breathing,
 - d. new loss of taste or smell, and/or
 - e. fever of 100 degrees or above?

Temperature Testing:

You must register a temperature between 96- and 100-degrees Fahrenheit as described in the temperature procedures. (see next page for testing procedures)

- If your temperature is below 96 degrees, retest with a different device.
- If your temperature is 100-degrees Fahrenheit or above, retest on another device preferably an ear thermometer, if your temperature still registers 100-degrees Fahrenheit or above you may not enter the site.

Clearance to enter the site:

- If you have answered “no” to all three questions *and* passed the temperature test, you may enter the site.
- *If you have an approved Vistra vaccination sticker, you are cleared to enter the site without the temperature test or answering COVID screening questions.*
- If you passed the temperature test *and* answered “Yes” to any of the questions, but have been cleared through VistraTravelerSafety (HR clearance) to enter the Vistra work site for that instance of exposure, testing, or symptoms, you may enter the site.

Anyone *not* cleared to enter the work site must immediately leave the work site and notify their supervisor who will notify HR at VistraTravelerSafety@vistracorp.com for next steps.

Any symptomatic employee, unvaccinated employee exposed to COVID-19 or any employee tested for COVID-19 as described above must be cleared through VistraTravelerSafety prior to returning to work.

Required Temperature Testing Procedures:

All persons entering the site without a Vistra vaccination sticker, who have cleared all questions above, will also submit to temperature testing or self-administer a temperature test as required by the facility management. If a self-administered test is required, then a member of the management team or their designee will witness the testing; however, where that is not practicable, each person must attest that they are only entering the site premises because they have passed the screening questions and temperature test required for entry. Also:

- a. Hats may cause false high temperatures and should not be worn for five minutes immediately preceding a forehead temperature test.
- b. Each person is responsible for ensuring all self-testing materials and areas touched during testing are sanitized.
- c. All personnel should maintain a **distance of at least six feet** from other people during this process or wear required masks.

Temperature Testing Requirements:

1. **All persons entering the site without a Vistra vaccination sticker must register a temperature between 96- and 100-degrees Fahrenheit. Any such person who has a temperature not within that range or who triggers an alarm on a thermal camera must retest with a different device**, preferably an **ear thermometer**, if available. If the second test registers a temperature of 100 degrees or above:
 - a. That person **may not enter** the Vistra work site and must notify their supervisor, who will notify HR at VistraTravelerSafety@vistracorp.com for next steps.
 - b. If there is significant inconsistency between the two tests, repeat another temperature test and use the two closest readings.
2. **Anyone who registers a temperature between 96- and 100-degrees Fahrenheit may proceed to their work site.**
 - **If temperature is below 96 degrees, wait a few minutes and retest with a different device.**

Control rooms and communal areas:

All persons entering the site without a Vistra vaccination sticker should maintain at least six-foot distance from other people as much as possible and should wear face coverings when six-foot 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

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

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

** 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 ₂ O 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 ₂ O)	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

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

²Aluminosilicates (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.

³Analytical 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.
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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.
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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.
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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.
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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

¹The 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 <i>Daphnia magna</i> (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

- o TSCA Inventory Status

All components are listed on the TSCA Inventory.

- o 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

- o State Right-to-Know (RTK)

Component	CAS	MA^{1,2}	NJ^{3,4}	PA⁵	RI⁶
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.

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

* 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 ₂ O 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 ₂ O)	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.
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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.
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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.
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6.3 Methods and Material for Containment and Cleaning Up

Methods and materials for containment and cleaning up:	<p>Do not use brooms or compressed air to clean surfaces. Use dust collection vacuum and extraction systems.</p> <p>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.</p>
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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

¹The 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	<p>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.</p> <p>Inorganic bromide salts have been shown to have adverse effects on reproductive parameters in some animal studies.</p>
STOT-SE	CCPs when present as a nuisance dust may result in respiratory irritation.
STOT-RE	<p>In a 180-day inhalation study with fly ash dust, no effects were observed at the highest dose tested. NOEC = 4.2 mg/m³; it is not possible to assess the level at which toxicologically significant effects may occur.</p> <p>Repeated inhalation exposures to high levels of respirable crystalline silica may result in lung damage (i.e., silicosis).</p>
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 <i>Daphnia magna</i> (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

- o TSCA Inventory Status

All components are listed on the TSCA Inventory.

- o California Proposition 65.

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

- Respirable crystalline silica

- o 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 (SiO ₂), quartz	14808-60-7	Yes	Yes	Yes	No
Sodium oxide	1313-59-3	No	Yes	No	No
Titanium dioxide	13463-67-7	Yes	Yes	Yes	Yes

¹ Massachusetts Department of Public Health, no date

² 189th General Court of The Commonwealth of Massachusetts, no date

³ New Jersey Department of Health and Senior Services, 2010a

⁴ New Jersey Department of Health, 2010b

⁵ Pennsylvania Code, 1986

⁶ Rhode Island Department of Labor and Training, no date

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

16.1 Indication of Changes

Date of preparation or last revision: February 23, 2018

16.2 Abbreviations and Acronyms

- ACGIH: American Conference of Industrial Hygienists
- CA: California
- CAS: Chemical Abstract Services
- CCP: Coal Combustion Product
- CFR: Code of Federal Regulations
- EPA: Environmental Protection Agency

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

16.3 Other Hazards

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

* Chronic Health Effects

** Appropriate personal protection is defined by the activity to be performed.

See Section 8 for additional information.

DISCLAIMER:

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

ATTACHMENT 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,

A handwritten signature in black ink, appearing to read 'Phil Morris', is written over a light blue horizontal line.

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.

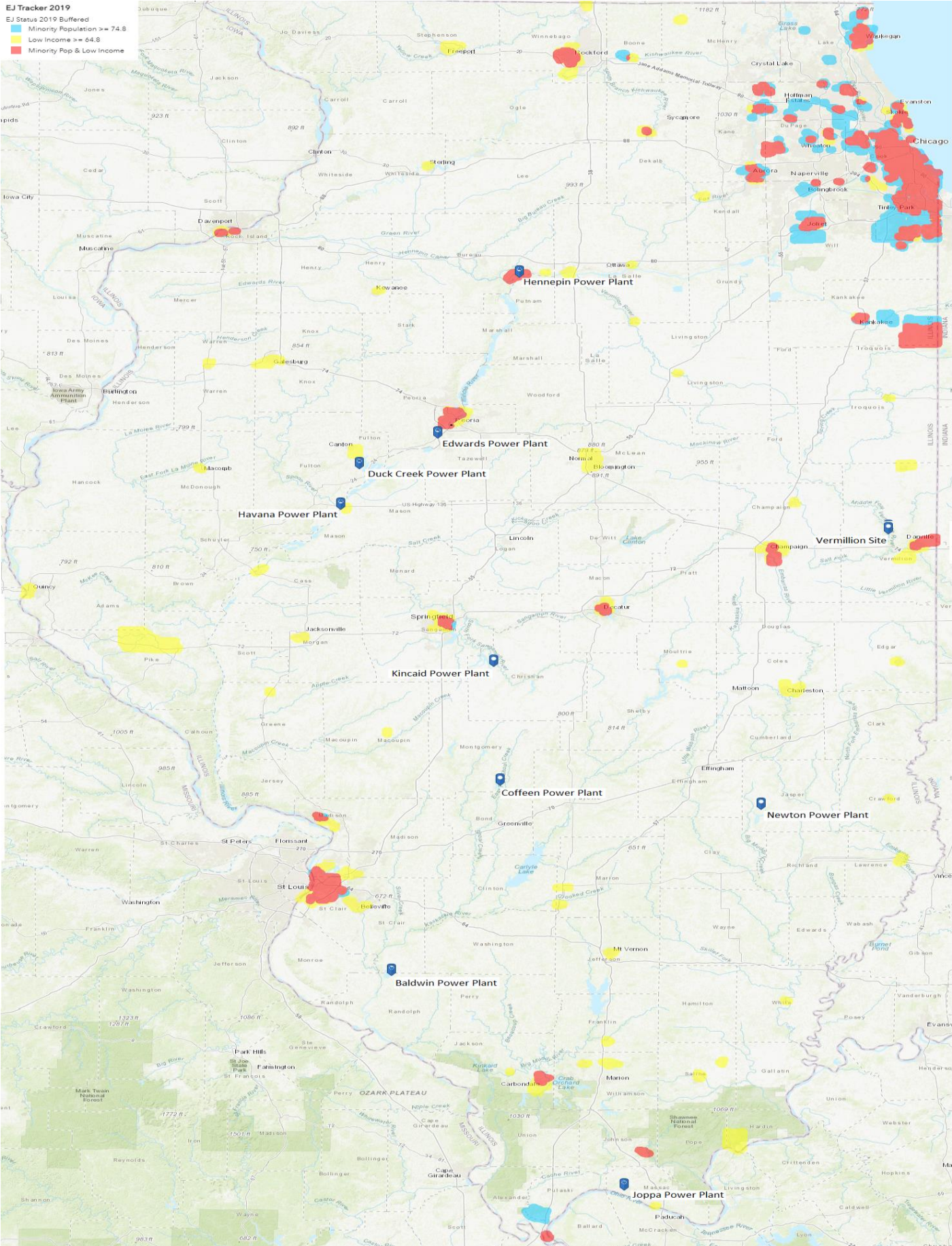
Table 2: Impacts to Potable Water Supply¹

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

EJ Tracker 2019
EJ Status 2019 Buffered
Minority Population ≥ 74.8
Low Income ≥ 64.8
Minority Pop & Low Income



ATTACHMENT U

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 Recycle 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 Rule¹ and the state-specific Illinois Environmental Protection Agency (IEPA) Part 845 Rule². Specific sections of the report and the applicable sections of the USEPA CCR Rule and Illinois Part 845 Rule are cross-referenced in **Table 1**. A certification from a Qualified Professional Engineer for each of the CCR Rule sections listed in **Table 1** is provided in Section 10 of the attached Report. This certification statement is also applicable to each section of the Part 845 Rule listed in **Table 1**.

Table 1 – USEPA CCR Rule and Illinois Part 845 Rule Cross-Reference

Report Section	USEPA CCR Rule		Illinois Part 845 Rule	
3	§257.73 (a)(2)	Hazard Potential Classification	845.440	Hazard Potential Classification Assessment ³
4	§257.73 (c)(1)	History of Construction	845.220(a)	Design and Construction Plans (Construction History)
5	§257.73 (d)(1)	Structural Stability Assessment	845.450 (a) and (c)	Structural Stability Assessment
6	§257.73 (e)(1)	Safety Factor Assessment	845.460 (a-b)	Safety Factor Assessment
7	§257.82 (a)(1-3)	Adequacy of Inflow Design Control System Plan	845.510(a), (c)(1), (c)(3)	Hydrologic and Hydraulic Capacity Requirements / Inflow Design Flood Control System Plan
	§257.82 (b)	Discharge from CCR Unit	845.510(b)	Discharge from CCR Surface Impoundment

¹ United States 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 Rule¹, are equivalent to Class II and Class I hazard potential, respectively, per Part 845².

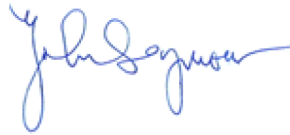
CLOSING

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 CERTIFICATION
REPORT
§257.73(a)(2), (c), (d), (e) and §257.82
GMF RECYCLE 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
Chesterfield, Missouri 63005

October 11, 2021

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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 GMF Recycle Pond (GMF RP)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 ([2], [7], [3], [4], [5], [6]) were independently reviewed by Geosyntec. Additionally, field observations, interviews with plant staff, updated engineering analyses, and evaluations were performed to compare conditions in 2021 at the GMF RP 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, updated were required and were performed for the:

- History of Construction Report,
- Initial Structural Stability Assessment,
- Initial Safety Factor Assessment, and
- Initial Inflow Design Flood Control System Plan.

Table 1 provides a summary of the initial 2016 certifications and the updated 2021 periodic certifications.

¹ The GMF RP is also referred to as ID Number W4350150004-04, GMF Recycle Pond, by the Illinois Environmental Protection Agency (IEPA); CCR Unit ID 104 by IPGC; and IL50578 within the National Inventory of Dams (NID) maintained by the Illinois Department of Natural Resources. Within this document it is referred to as the GMF RP.

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 Significant hazard potential classification [2].	Yes	No changes were identified that may affect this requirement.
History of Construction						
4	§257.73(c)(1)	Compile a history of construction	Yes	A History of Construction report was prepared for the GMF RP, Ash Pond 1, Ash Pond 2, and the GMF Gypsum Stack 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 [4].	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 [4].	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 [4].	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) [4].	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 [4].	Yes	Spillways were found to be adequately designed and constructed and are expected to adequately manage flow during the 1,000-year design flood, as long as the starting water surface elevation is maintained at El. 622.1 ft or below.
	§257.73(d)(1)(vi)	Structural integrity of hydraulic structures	Yes	Hydraulic structures are non-erodible, booted, and surrounded by compacted fill [4].	Yes	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 [4].	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 1.55 and higher [5].	Yes	Safety factors from updated slope stability analyses were calculated to be 2.40 and higher.
	§257.73(e)(1)(ii)	Maximum surcharge pool safety factor must be at least 1.40	Yes	Safety factors were calculated to be 1.51 and higher [5].	Yes	Safety factors from updated slope stability analyses were calculated to be 2.39 and higher.
	§257.73(e)(1)(iii)	Seismic safety factor must be at least 1.00	Yes	Safety factors were calculated to be 1.80 and higher [5].	Yes	Safety factors from updated slope stability analyses were calculated to be 1.05 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 [5].	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 PMP, 24-hr Inflow Design Flood [6].	Yes	The flood control system was found to adequately manage inflow and peak discharge during the 1,000-year, 24-hour Inflow Design Flood, after performing updated hydrologic and hydraulic analyses, as long as the starting water surface elevation is maintained at El. 622.1 ft or below.
	§257.82(b)	Discharge from CCR Unit	Yes	Discharges into Waters of the United States were not expected to occur during normal and 1,000-year, 24-hr, Inflow Design Flood conditions [6].	Yes	Discharge into Waters of the United States were not expected to occur during both normal and 1,000-year, 24-hour Inflow Design Flood conditions, after performing updated hydrologic and hydraulic analyses, as long as the starting water surface elevation is maintained at El. 622.1 ft or below.

SECTION 1

INTRODUCTION AND BACKGROUND

This Periodic United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule [1] Certification Report was prepared by Geosyntec Consultants (Geosyntec) for Illinois Power Generating Company (IPGC) to document the re-certification of the GMF Recycle Pond 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 RP, among other closed and active CCR units and non-CCR surface impoundments, is provided in **Figure 2**.

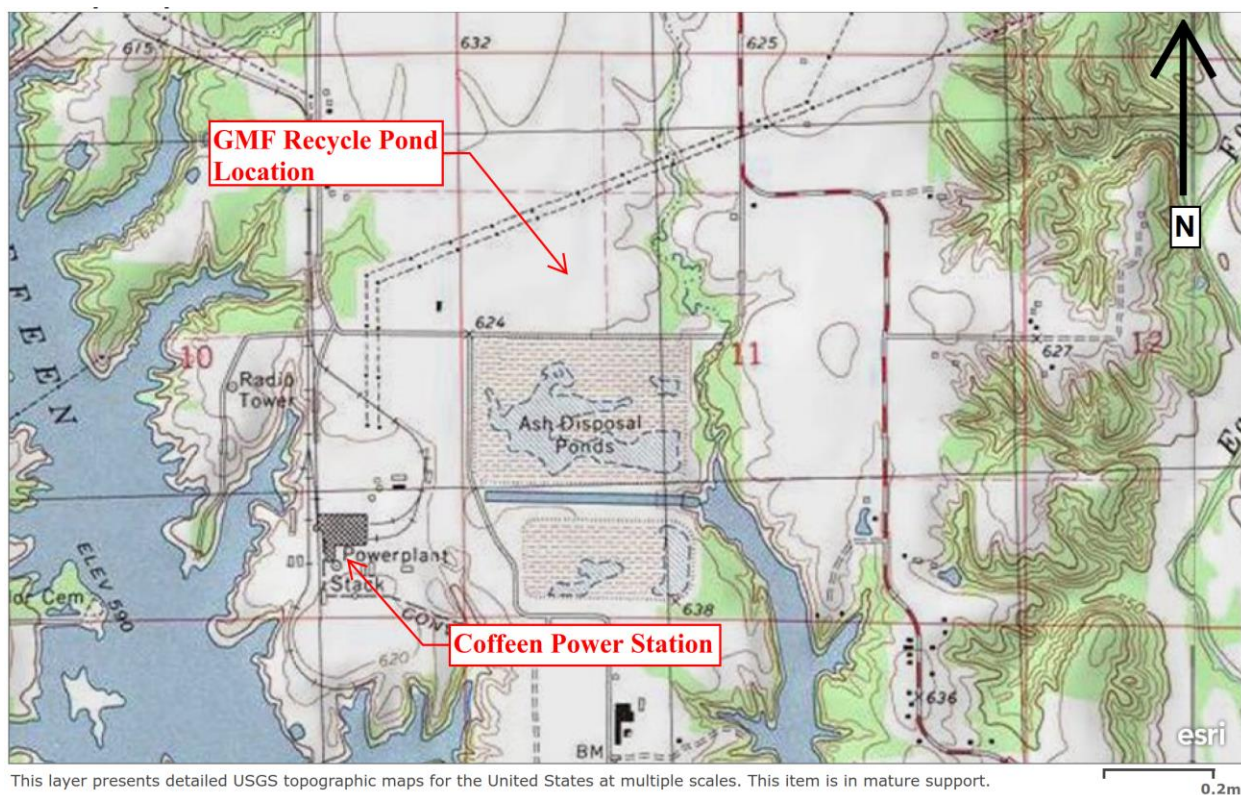


Figure 1 – Site Location Map (from esri.com, 2021)



Figure 2 – Site Plan (adapted from AECOM, 2016)

1.1 GMF RP Description

CPP was retired in 2019. Prior to retirement, three active CCR surface impoundments – the GMF RP, the GMF Gypsum Stack Pond (GMF GSP), and AP1 – and one CCR landfill – were used for managing CCRs generated at CPP. This certification report only pertains to the GMF RP. The GMF RP has a Significant hazard potential, based on the initial hazard potential classification assessment performed by Stantec in 2017 in accordance with §257.73(a)(2) ([2], [7]).

The GMF RP formerly served as the primary polishing pond for process water associated with gypsum produced by the wet scrubber system at CPP [8]. The GMF RP received clear water outflow from the GMF GSP via a lined channel (transfer channel) that connected the two ponds. Water was pumped out from the GMF RP via the pump house and transmitted back to the CPP for recycling. The GMF RP was operated in a closed-loop (e.g., zero discharge) fashion. Approximately 43,000 cubic yards (CY) of gypsum was sluiced directly into the GMF RP prior to construction completion for the GMF GSP circa 2009, although the GMF RP has not since been used for the primary disposal of gypsum [9]. This gypsum has remained within the GMF RP.

The GMF RP has a 60-mil high-density polyethylene (HDPE) single liner system that extends up to elevation 629.0 ft and is present beneath the entire footprint of the pond. The geomembrane liner is exposed at the pond bottom and side slopes [10].

As formerly operated, the maximum operating pool elevation of the GMF RP was elevation (El). 624.0 ft, based on the invert elevation of the emergency spillway system [10], which was intended only to discharge under emergency high-water conditions. The water elevation in the GMF RP was 617.6 ft in the periodic survey conducted in December of 2020 [11], after retirement of the CPP, the cessation of regular inflow and outflow pumping, and the construction of a berm in the transfer channel leading from the GMF GSP to the GMF RP [12]. Normal outflow from the GMF RP was formerly controlled by a decant structure and pump house located at the southeast corner of the embankment, in addition to an emergency spillway consisting of three drop inlets and three, 48-in. diameter HDPE pipes leading to a riprap-lined stilling basin [10]. Valves were installed and closed on the intake pipes leading to the pump house after closure of CPP. As currently operated, the GMF RP and GMF GSP only receive inflow from direct precipitation, and do not outflow, although outflow could occur from the GMF RP emergency spillways if the level were to rise above El. 624 ft. Water levels vary seasonably based on precipitation and evaporation.

The GMF RP is approximately 18.3 acres in size and was formed with a continuous embankment, a ring dike, which has a total length of approximately 3,600 ft. The perimeter dike has a crest width of approximately 30 ft and 5H:1V orientations on both the interior and exterior side slopes. The embankment crest elevation is El. 629 ft [11] and the maximum height above exterior grades is approximately 16 ft [13].

Initial certifications for the GMF RP for Hazard Potential Classification (§257.73(a)(2)), History of Construction (§257.73(c)), Structural Stability Assessment (§257.73(d)), Safety Factor Assessment (§257.73(e)(1)), and Inflow Design Flood Control System Plan (§257.82) were completed by Stantec, AECOM, and Hanson 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 Hanson [13]. 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], [13]), Safety Factor Assessment ([5], [13]), and Inflow Design Flood Control System Plan ([6], [13]) to determine if updates may be required based on technical considerations.
 - The History of Construction report [3] was not independently reviewed for technical considerations as this report contained historical information primarily developed prior to promulgation of the CCR Rule [1] for the CCR units at 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 RP meets all of the requirements associated with §257.73(a)(2)-(3), (c), (d), (e), and §257.82, or, if the GMF RP does not meet all requirements, provide recommendations for compliance with these sections of the CCR Rule [1].

SECTION 2

COMPARISION OF INITIAL AND PERIODIC SITE CONDITIONS

2.1 Overview

This section describes the comparison of conditions at the GMF RP 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

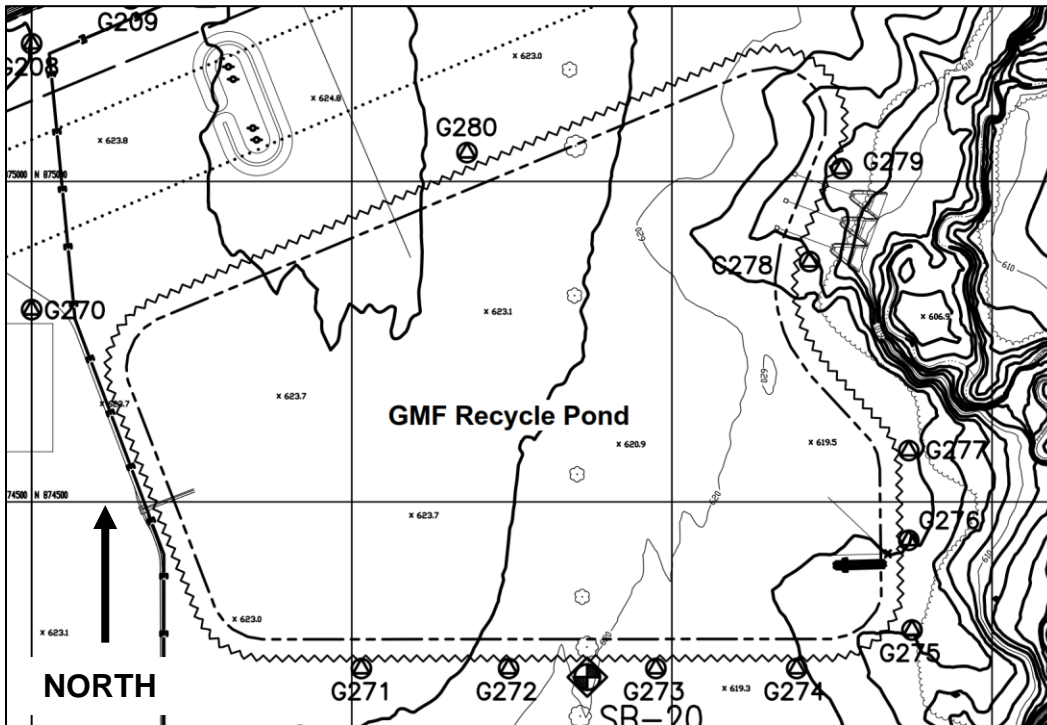
Annual onsite inspections of the GMF RP were performed between 2016 and 2020 ([14], [15], [16], [17], [18]) and were certified by a licensed professional engineer in accordance with §257.83(b). Each inspection report stated the following information, relative to the previous inspection:

- 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 RP between 2015 and 2020. No signs of instability, structural weakness, or changes which may have affected the operation or stability of the GMF RP were noted in the inspection reports.

2.3 Review of Instrumentation Data

Eleven groundwater monitoring wells (G270, G271, G272, G273, G274, G275, G276, G277, G278, G279, and G280) are present around the GMF RP. Groundwater level readings were collected generally on a quarterly basis and provided from February 17, 2016 to January 27, 2021. Geosyntec reviewed the groundwater level data to evaluate if significant fluctuations, particularly increases in phreatic levels, may have occurred after development of the initial structural stability and factor of safety certifications ([4], [5], [13]) Available water level readings are plotted in **Attachment A**, and **Figure 3** provides approximate locations of the monitoring wells.



**Figure 3 – GMF RP Monitoring Well Locations
(Not to Scale, adapted from Hanson, 2021)**

In summary, groundwater levels in the monitoring well network were observed to be up to 20 ft different between individual wells. Seasonal fluctuations were relatively consistent between the wells, typically increasing or decreasing by 5 to 7 ft. These water levels are approximately 10 ft lower than water levels utilized in the slope stability analyses prepared to support the initial structural stability and safety factor assessments ([4], [5], [13]), therefore the water levels in the initial slope stability analyses are conservative relative to current conditions.

2.4 Comparison of Initial to Periodic Surveys

The initial survey of the GMF RP, conducted at the site by Hanson Professional Services Inc. (Hanson) in 2016 [19] and included a bathymetric but not a topographic survey. This survey was compared to the periodic topographic and bathymetric survey of the GMF RP, conducted by IngenAE, LLC (IngenAE) in 2020 [11], using AutoCAD Civil3D 2021 software.

The comparison quantified changes in the volume of CCR placed within the GMF RP 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], [13]). 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

Periodic Surveyed Pool Elevation (ft)	617.5
Initial §257.82 Starting Water Surface Elevation (SWSE) (ft)	624.0
Total Change in CCR Volume (CY)	+1,200
Change in CCR Volume Above SWSE (CY)	0
Change in CCR Volume Below SWSE (CY)	+1,200

The comparison indicated that approximately 1,200 CY of CCR may have been placed in the GMF RP between 2015 and 2020, with all of the CCR placed below the SWSE. However, reportedly no CCR was placed in the GMF RP between collection of the initial and periodic surveys, so it may be possible that the estimate change in CCR volume is due to minor differences in the initial and periodic bathymetric surveys. The indicated changes in CCR volumes are below the SWSE and are therefore unlikely to affect area-capacity curve of the GMF RP.

2.5 Comparison of Initial to Periodic Aerial Photography

Initial aerial photographs of the GMF RP collected by Weaver Consultants, Inc. (Weaver) in 2015 [20] were compared to periodic aerial photographs collected by IngenAE in 2020 [11] 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**. No significant changes were identified as part of this comparison.

2.6 Comparison of Initial to Periodic Site Visits

An initial site visit to the GMF RP was conducted by AECOM in 2015 and documented with a Site Visit Summary and corresponding photographs [21]. A periodic site visit was conducted by Geosyntec on May 28, 2021, with Mr. Lucas P. Carr, P.E. conducting the site visit. The periodic site visit was intended to evaluate potential changes at the site since 2015 (i.e., modification to the embankment, outlet structures or other appurtenances, limits of CCR, maintenance programs, repairs), and to perform visual observations of the GMF RP to evaluate if the structural stability requirements (§257.73(d)) were still met. The site visit included driving the perimeter of the GMF RP, periodically stopping to exist the vehicle and visually observe conditions, recording field notes, and collecting photographs. The site visit is documented in a photographic log provided in **Appendix B**. No significant changes were identified as part of this comparison.

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, at the time of the interview, had been 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 RP since development of the initial certifications ([2], [7], [3], [4], [5], [6], [13]). A summary of the interview is provided below.

- Were any construction projects completed for the GMF RP between 2015 and 2021, and, if so, are design drawings and/or details available?
 - A berm was constructed in the transfer channel leading from the GMF GSP to the GMF RP.
 - Shutoff valves were installed and closed on the intake pipes leading to the outfall pump house, as part of power plant closure.
- Were there any changes to the purpose of the GMF RP between 2015 and 2017?
 - CPP was retired and plant inflows or outflows no longer occur into or out of the GMF RP.
 - Outflow from dewatering wells in Ash Pond No. 2 (AP2) were formerly discharged into the GMF RP. This discharge was ceased upon closure of AP2 in 2020.
- Were there any changes to the to the instrumentation program and/or physical instruments for the GMF RP between 2015 and 2021?
 - No instruments are present at the GMF RP.
- Were there any changes to spillways and/or diversion features for the GMF RP completed between 2015 and 2021?
 - No changes occurred.
- Have any area-capacity curves been developed for the GMF RP since 2015?
 - No known curves have been developed.
- Were there any changes to construction specifications, surveillance, maintenance, and repair procedures for the GMF RP between 2015 and 2021?
 - No.
- Were there any instances of dike and/or structural instability for the GMF RP 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:

- Performing two breach analysis using HEC-HMS software, using pool levels estimated within the GMF RP during the Probable Maximum Precipitation (PMP) rainfall event, for a single breach occurring at the eastern side of the GMF RP, where the embankment is at its maximum height.
- Evaluating potential effects of flooding in multiple areas, including breach flood wave velocities, flood depths, and/or pool increases, or the following locations:
 - County Road 450 N,
 - The eastern cove of Coffeen Lake,
 - Coffeen Lake Dam, and
 - Coffeen Lake itself.
- 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) [22].

The breach analysis concluded that a breach of the GMF RP would impact intermittently used County Road 450N, but that a loss of life was not probable due to the only transient occupation of the roadway. County Road 450N is paved but is a dead-end road leading to a supplemental entry to CPP, as of 2016. After closure of the CPP, Country Road 450N became the primary entry to CPP, however use of the road is still considered transient due to CPP having a reduced onsite staff, typically consisting of two personnel, although contractors or other visitors may also visit the site on an intermittent basis. The Initial HPC concluded that the breach would be unlikely to result in a probable loss of human life, although the breach could cause CCR to be released into the Coffeen Lake, thereby causing environmental damage. The Initial HPC therefore recommended a “Significant” hazard potential classification for the GMF RP [2].

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 [1].

No significant technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations was not performed.

3.3 Summary of Site Changes Affecting the Initial HPC

Geosyntec performed a visual assessment to evaluate if any new structures, infrastructure, frequently occupied facilities/areas, or waterways were present within mapped breach areas for the GMF RP, as identified in the Initial Emergency Action Plan [22], in addition to evaluating if downstream site topography in the probable breach area may have changed. The visual assessment considered a comparison of the 2015 to 2020 aerial imagery (**Drawing 3**) and photographs collected by Geosyntec in May of 2021 (**Attachment B**).

Geosyntec did not identify any changes at the site that may affect the HPC. No new structures, infrastructure, frequently occupied facilities/areas, or waterways were present in the probable breach area indicated in the Initial EmAP [22]. Additionally, no significant changes to the topography in the probable breach were identified.

3.4 Periodic HPC

Geosyntec recommends retaining the “Significant” hazard potential classification for the GMF RP, per §257.73(a)(2), based on the lack of site changes potentially affecting the Initial HPC occurring since the Initial HPC was developed, as described in **Section 3.3** and the lack of significant technical review comments, as described in **Section 3.2**. Updates to the Initial HPC reports ([2], [7]) are not recommended at this time.

SECTION 4

HISTORY OF CONSTRUCTION REPORT - §257.73(C)

4.1 Overview of Initial HoC

The Initial History of Construction report (Initial HoC) was prepared by AECOM in 2016 [3], following the requirements of §257.73(c), and included information on all CCR surface impoundments at CPP, including the GMF RP, the GMF GSP, AP1, and AP2. The Initial HoC included the following information for the GMF RP:

- 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,
- A statement that area-capacity curves for the GMF RP were not readily available,
- 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 RP.

4.2 Summary of Site Changes Affecting the Initial HoC

Several significant changes were identified at the site that occurred after development of the Initial HoC [3] report and are described below:

- A state identification number (ID) of W1350150004-04 was assigned to the GMF RP by the Illinois Environmental Protection Agency (IEPA).
- Electricity generation at the CPP ceased in 2019. The purpose of the GMF RP changed as it no actively longer receives process water from the CPP and GMF RP and water is no longer pumped from the GMF RP back to the CPP.
- Valves were installed on the intake pipes for the outfall structure and the valves were closed due to the cessation of power generation at CPP.
- Dewatering discharge from AP2 into the GMF RP was ceased due to closure of AP2.
- Revised area-capacity curves and spillway design calculations for the GMF RP were prepared as part of the updated periodic Inflow Design Flood Control System Plan, as described in **Section 7**.

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 Hanson in 2016 ([4], [13]), 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; and
- An evaluation to determine if downstream water bodies that could induce a sudden drawdown condition to the exterior slopes could be present.

The Initial SSA concluded that the GMF RP 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], [13]), 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], [13]) 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.
- Completeness and technical approach used to evaluate the stability of hydraulic structures, per §257.73(d)(1)(vi).

Several review comments and corresponding recommended technical updates were identified during review of the geotechnical analyses supporting the sufficiency of dike compaction and foundation and abutment stability portions of the Initial SSA. Review comments were also identified during review of the hydrologic and hydraulic analyses supporting the adequacy of the spillway management system. Specific review comments and associated with these analyses are discussed in **Sections 6.2** and **7.2**.

5.3 Summary of Site Changes Affecting Initial SSA

Several changes at the site that occurred after development of the Initial SSA were identified. These changes required updates to the Initial SSA and are described below.

- The Initial SSA utilized the results of the Initial Inflow Design Flood Control System Plan (IDF) to demonstrate compliance with the adequacy of spillway design and management (§257.73(d)(1)(v)(A)-(B)). The Initial IDF was subsequently updated to develop a Periodic IDF, based on site changes and review comments, 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 were subsequently updated to develop a Periodic SFA, based on site changes and review comments, as discussed in **Section 6**.

5.4 Periodic SSA

The Periodic SFA (**Section 6**) indicates that the 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 met for the Periodic SSA.

The Periodic IDF (**Section 7**) indicates that spillways are adequately designed and constructed to adequately manage flow during the 1,000-year design flood, as the spillways can adequately manager flow during peak discharge from the 1,000-year design flood without overtopping of the embankments, as long as the normal operating pool (e.g., SWSE) within the GMF RP is maintained

at El. 622.1 and below. 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 Hanson in 2016 ([5], [13]), following the requirements of §257.73(e)(1). The Initial SFA included the following information:

- A geotechnical investigation program laboratory testing used to support the initial design of the GMF RP;
- An assessment of the potential for liquefaction in the dike and foundation soils;
- The development of one (1) slope stability cross-sections for limit equilibrium stability analysis utilizing GeoStudio SLOPE/W and PCSTABL5 software;
- The analysis of each cross-sections for maximum storage pool, maximum surcharge pool, and seismic loading conditions.
 - Liquefaction loading conditions were not evaluated as liquefaction-susceptible soil layers were not identified in the embankments' soils.

The Initial SFA concluded that the GMF Recycle Pond 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], [13]) 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;

- Comparison of geotechnical parameters selected by Hanson with geotechnical investigations performed by and subsequent parameters developed by AECOM in 2015 and 2016 for Ash Pond No. 1 (AP1), Ash Pond No. 2 (AP2), and the GMF GSP at Coffeen ([8], [23]) as these ponds are located adjacent to the GMF RP on the north and the south and subsurface conditions are relatively consistent across the CPP site; and
- Phreatic conditions assumed in the analyses relative to available monitoring well groundwater level data collected from 2016 through 2021, as discussed in **Section 2.3**.

Several comments were identified during review of the Initial SFA. Each comment required updates to the Initial SFA is described below:

- The geotechnical investigation program utilized to develop subsurface stratigraphy at the GMF RP consisted of 6 borings used to support the initial design of the GMF RP. Only one of the borings was located along the perimeter embankment of the GMF RP. Subsurface stratigraphic data from the eleven monitoring wells located around the GMF RP perimeter were not utilized to support the geotechnical investigation. Additionally, laboratory testing and CPT data collected for Ash Pond No. 1, Ash Pond No. 2, and the GMF GSP the CPP site by AECOM in 2015 ([8], [23]) were not considered in the investigation and assessment; the AECOM data included refined shear strength testing.
- Geotechnical analyses used to support the Initial SSA, which were contained within the Initial SFA, concluded that the soils at the site were not susceptible to liquefaction based on fines content and blowcounts. However, the 2015 and 2016 AECOM Initial SFAs for AP1 and the GMF GSP identified the presence of a low-strength soft clay layer at the transition between overburden loess soils and underlying glacial till and identified that this material may be susceptible to cyclic softening. A review of available borings for the GMF RP indicated that this layer is present beneath the GMF RP based on low blowcounts in the transition zone.
- The Initial SFA evaluated sudden drawdown and end-of-construction loading conditions, however the sudden drawdown loading condition is not applicable as the interior slopes are lined and a downstream water body is not present on the exterior slopes. Additionally, the Initial SFA included end-of-construction conditions, which are not currently applicable for the GMF RP as the pond was constructed approximately 12 years ago, as of the date of this report.
- Groundwater levels utilized in the Initial SFA were approximately 10 ft higher than groundwater levels measured from the monitoring wells.

6.3 Summary of Site Changes Affecting Initial SFA

Several changes at the site that occurred after development of the Initial SFA were identified. These changes required updates to the Initial SFA and are described below:

- The normal pool levels within the GMF RP decreased from 623.0 ft to 622.1 ft, due to the construction of a berm in the transfer channel and the cessation of process water pumping (**Section 7**), resulting in 1.9 ft of lower 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 RP during the PMP design flood event decreased from 627.5 ft to 623.9 ft, per the updated Periodic IDF (**Section 7**), resulting in 3.6 ft of lower water loading on the embankment dikes for the maximum surcharge pool loading conditions (§257.73(e)(1)(iv)), relative to the initial SFA.

6.4 Periodic SFA

Following review of the Initial SFA ([5], [13]), Geosyntec developed a new slope stability analysis cross-section (C) at the northeast corner of the GMF RP embankment. This cross-section was selected as the critical cross-section based on the maximum height of the embankment and the location and thickness of the soft clay layer within the foundation soils. The cross-section was developed and analyzed utilizing the following approach and input data:

- Ground surface geometry was obtained from the 2020 survey of the GMF RP [11].
- Subsurface stratigraphy was obtained from the available well boring logs at the vicinity of the cross-section [10] and the Initial SFA for the GMF GSP [8], as the GMF GSP is adjacent to the GMF RP and also considered data collected at AP1 and AP2 [23]. Geosyntec evaluated the boring data and concluded that soil shear strength parameters were similar to those used by Initial SFA for the GMF GSP. Therefore, the soil properties (i.e., strength, unit weight) from the Initial SFA of GMF GSP were utilized for cross-section C.
- Piezometric levels in the foundation soils were assumed to follow the ground surface past the embankment toe, per providing readings from the available monitoring wells (see **Section 2.3**).
- The low-strength soft clay layer at the transition between overburden loess soils and underlying glacial till was assumed to be susceptible to seismically-induced strength losses (i.e., liquefaction and or cyclic softening) and post-liquefaction slope stability model was analyzed to support the Periodic SSA (§257.73(d)(1)(i)) using post-liquefaction shear strength utilized in the Initial SFA for the GMF GSP [8].

- Water levels in the GMF RP for the maximum storage pool, and seismic slope stability analysis loading conditions were considered at El. 622.1 ft, based on the Periodic IDF (**Section 7.4**).
- Water levels in the GMF RP for the maximum surcharge pool slope stability analysis loading conditions were considered at El. 623.9 ft based on the Periodic IDF (**Section 7.4**).
- The cross-section was analyzed using GeoStudio SLOPE/W 2012 software, with analysis settings including, but not limited to software package and version, slip surface search routines and methods, and pseudostatic seismic coefficients, selected to be consistent with the Initial SFA for the adjacent GMF GSP [8].

Factors of safety from the Periodic SFA are summarized in **Table 3** and confirm that the GMF RP meets the requirements of §257.73(e)(1). The location of critical cross-section C in plan and analysis output data is provided in **Attachment D**.

Table 3 – Factors of Safety from Periodic SFA

Cross-Section	Structural Stability Assessment (§257.73(d)) and Safety Factor Assessment (§257.73(e))				Structural Stability Assessment (§257.73(d))
	Maximum Storage Pool §257.73(e)(1)(i) Minimum Required = 1.50	Maximum Surcharge Pool §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
C	2.40*	2.39*	1.05*	N/A	1.42*

Notes:

N/A – Loading condition is not applicable.

* - Denotes critical cross-section for each loading condition

SECTION 7

INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN - §257.82

7.1 Overview of 2016 Inflow Design Flood Control System Plan

The Initial Inflow Design Flood Control System Plan (Initial IDF) was prepared by Hanson in 2016 ([6], [13]), following the requirements of §257.82. The Initial IDF included the following information:

- A hydraulic and hydrologic analysis, performed for the Probable Maximum Flood (PMF) design flood event and the 100-year, 12-hour storm event. Specific rainfall depths associated with both flood events were not indicated in the Initial IDF.
- The Initial IDF utilized a HEC-HMS model to evaluate spillway flows and pool level increases during the design flood, with a SWSE of 624.0 ft.

The Initial IDF concluded that AP1 met the requirements of §257.82, as the peak water surface estimated by the HEC-HMS model was El. 627.45 ft, relative to the minimum GMF RP dike crest elevation of 629.0 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 during normal operations, as the GMF RP was operated as a closed-loop system with no discharges during normal conditions.

7.2 Review of Initial IDF

Geosyntec performed a review of the Initial IDF ([6], [13]) 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 or appropriateness.
- Performing a high-level review of the inputs to the hydrologic modeling.
- Reviewing 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].

Several comments were identified during review of the Initial IDF. The comment is described below:

- The Initial IDF considered the PMF and 100-year flood events, as opposed to the 1,000-year flood event that would typically be utilized for a Significant hazard potential CCR Surface Impoundment, per the CCR Rule.
- The Initial IDF utilized the National Resource Conservation Service (NRCS) Type II rainfall distribution type [24]. Geosyntec recommends utilizing the Huff 3rd Quartile distribution for areas less than 10 square miles [25] for the reasons listed below.
 - Huff 3rd Quartile distribution was identified to be a more appropriate representation of a 1,000-year, 24-hour storm event per the Illinois State Water Survey (ISWS) Circular 173 [25] which developed standardized rainfall distributions from compiled rainfall data at sites throughout Illinois.
 - Illinois Department of Natural Resources, Office of Water Resources (IDNR-OWR) [26] recommends use of the Huff Quartile distributions in Circular 173 when using frequency events to determine the spillway design flood inflow hydrograph, *“The suggested method to distribute this rainfall is described in the ISWS publication, Circular 173, “Time Distributions of Heavy Rainstorms in Illinois”.*

7.3 Summary of Site Changes Affecting the Initial IDF

Several 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 RP and the upstream GMF GSP [27].
- Approximately 30,000 CY of gypsum were placed above the SWSE in the upstream GMF GSP, thereby altering the stage-storage curve of the upstream pond relative to the Initial IDF [27].
- Due to closure of the CPP, the cessation of process water pumping activities, and the construction of a berm in the transfer channel, the surveyed water surface elevation in the GMF RP 2020 [11] was lower than the SWSE utilized in the Initial IDF.

7.4 Periodic IDF

Geosyntec revised the Initial IDF to account for the technical review comments and stie changes, as described in **Section 7.2** and **Section 7.3**. The Periodic IDF was prepared using HydroCAD software [28] for consistency with other studies and certifications performed at CPP.

The HydroCAD model for the GMF RP is based on the updated model used for the periodic IDF certification of the GMF GSP [27] . Both models include the GMF RP, the GMF GSP, the transfer channel between the two ponds, and the drainage areas of both ponds.

For the purposes of analyzing the GMF RP, updates to the model included the following:

- The Runoff Method was selected to be “SCS TR-20” [29] for consistency with other models at CPP.
- The Reach Routing Method and the Pond Routing Method for the model were both selected to be “Dynamic Storage Indication” for consistency with other models at CPP and to more accurately account for routing between the connected ponds. Due to the selected routing methods, all tailwater conditions were automated.
- The rainfall depth was updated from the probable maximum precipitation (PMP), 24-hour rainfall depth to the 1,000-year, 24-hour rainfall depth, which is consistent with the Significant hazard potential for of the GMF RP. This rainfall depth is 9.13 inches based on NOAA Atlas 14 [30].
- The rainfall distribution type was updated to the “Huff 3rd Quartile” storm type provided by HydroCAD [28].
- The stage-storage curve was updated for both the GMF RP and GMF GSP based on the 2020 site survey [11].
 - Revised stage-volume curves for the GMF RP and GMF GSP were prepared based on measuring the storage volume of the impoundments 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 24.9 ac-ft of storage volume at the GMF RP, with a 2.34 ac-ft decrease above the previous SWSE of 624.0 ft from the storage used in the 2016 Initial IDF Certification.
- The SWSE within the GMF GSP was updated from 621.2 ft to 625.2 ft to reflect the 2020 site survey [11]. The discharge structure invert elevation is 619.0 ft; however, the greater elevation of the invert structure and the surveyed WSE was used as the SWSE to provide conservatism in the model if the level increases seasonally due to precipitation inflow.
- The subcatchment area draining to the GMF RP was updated from 17.12 ac to 18.3 ac to reflect the 2020 site survey [11]. The Curve Number (CN) of the subcatchment area was increased from 91 to 98 to reflect that the majority of the drainage area is water.
- The subcatchment area draining to the GMF GSP was updated from 33.8 ac to 36.2 ac to reflect the 2020 site survey [11].
- The time of concentration (ToC) for drainage areas to the GMF GSP and GMF RP was updated from 5 minutes to 6 minutes to reflect direct run-on inflow in accordance with TR-20 [29].

- 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 GSP to the transfer channel between the GMF GSP and the GMF RP was raised from 625 ft to 626 ft per the 2020 site survey [11]. The geometry of the outlet was updated as follows based on the 2020 site survey, as listed in **Table 4**.

Table 4 – GMF GSP Outlet Geometry Attributes in Periodic IDF

Head (ft)	Channel Width (ft)
0	45
2	60
4	75

- The transfer channel geometry was updated as follows based on the 2020 site survey, as listed in **Table 5**.

Table 5 – Transfer Channel Attributes 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.

The results of the Periodic IDF are summarized in **Table 6** and confirm that the GMF RP meets the requirements of §257.82(a)-(b), as the peak water surface elevation does not exceed the minimum perimeter dike crest elevations. Additionally, discharge from the GMF RP is not expected to activate the existing spillway system during both normal and IDF conditions, as long as the SWSE is maintained at El. 622.1 ft or below. Updated area-capacity curves and HydroCAD model output are provided in **Attachment E**.

Table 6 – Water Levels from Periodic IDF

Analysis	Starting Water Surface Elevation (ft)	Peak Water Surface Elevation (ft)	Invert Elevation of Emergency Spillway (ft)	Minimum Dike Crest Elevation (ft)
Initial IDF	624.0	627.5	624.0	629.0
Periodic IDF Update	622.1	623.9	624.0	629.0
Initial to Periodic Change ¹	-1.9	-3.6		

Notes:

¹Postive 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 RP 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).

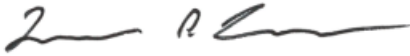
Based on the evaluations presented herein, the referenced requirements are satisfied, as long as the starting water surface elevation in the GMF RP is maintained at El. 622.1 ft or lower.

SECTION 9

CERTIFICATION STATEMENT

CCR Unit: Illinois Power Generating Company, Coffeen Power Plant, GMF RP

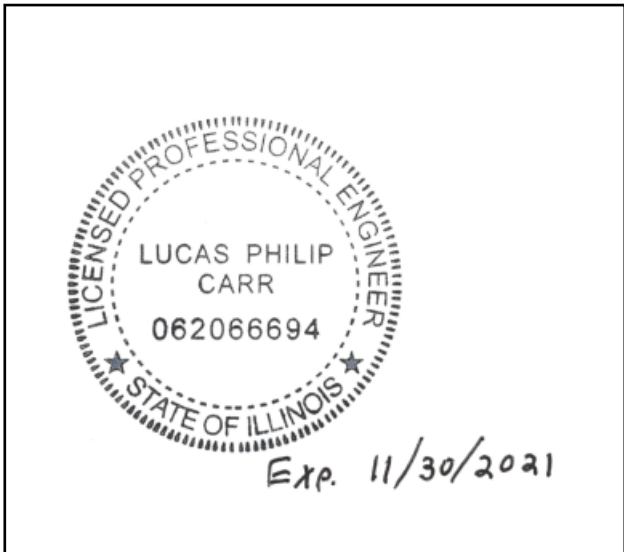
I, Lucas P. Carr, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this 2021 USEPA CCR Rule Periodic Certification Report, has been prepared in accordance with 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 2016, 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



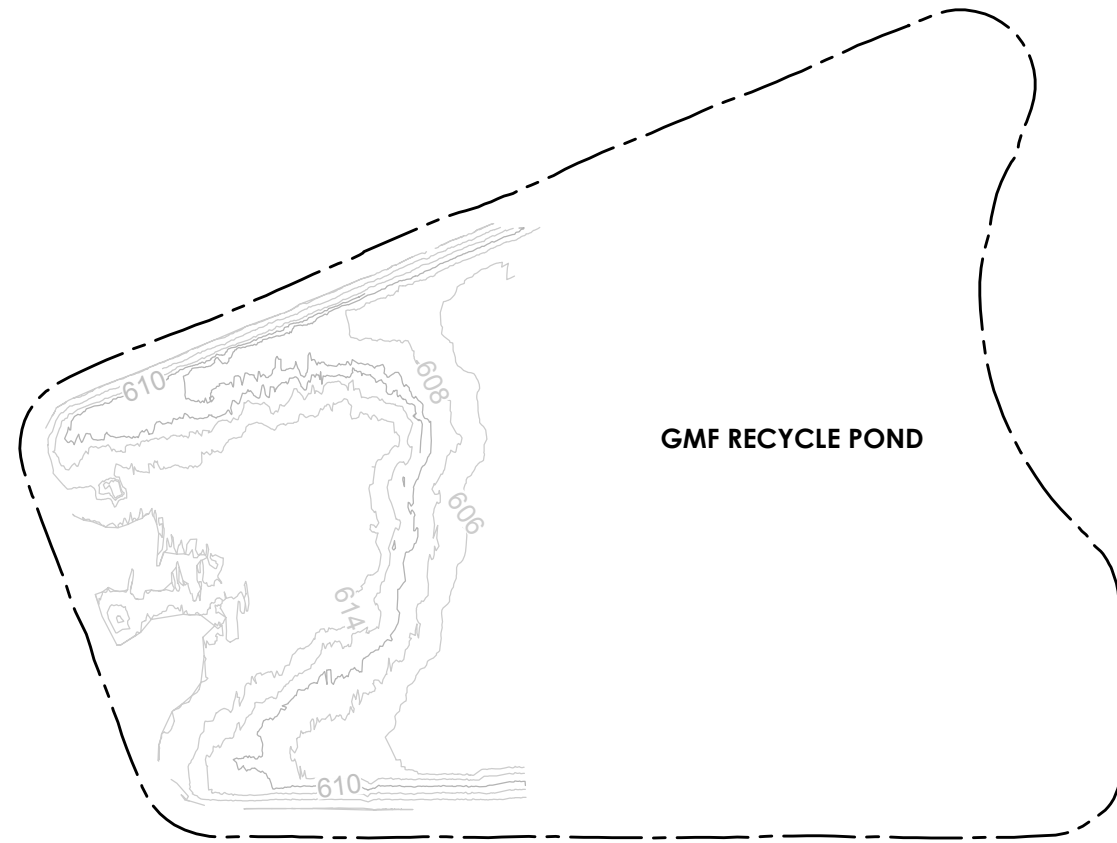
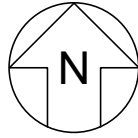
SECTION 10

REFERENCES

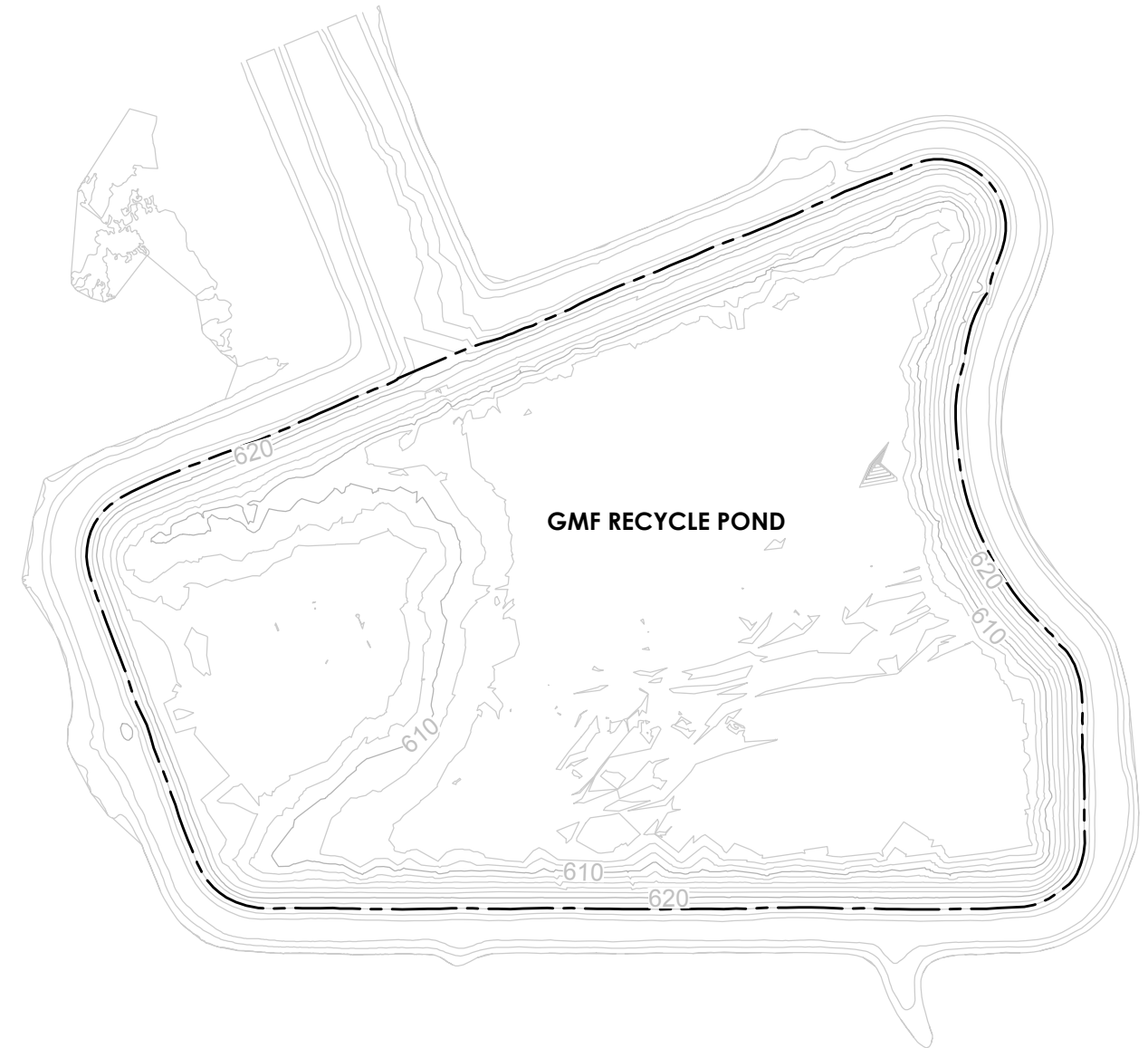
- [1] United States Environmental Protection Agency, 40 CFR Parts 257 and 261; Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, 2015.
- [2] Stantec Consulting Services, Inc., "Initial Hazard Potential Classification Assessment, EPA Final CCR Rule, GMF Recycle 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] Hanson Professional Services, Inc., "CCR Rule Report: Initial Structural Stability Assessment, GMF Recycle Pond, Coffeen Power Station, Montgomery County, Illinois," October 2016.
- [5] Hanson Professional Services, Inc., "CCR Rule Report: Initial Safety Factor Assessment, GMF Recycle Pond, Coffeen Power Station, Montgomery County, Illinois," October 2016.
- [6] 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.
- [7] Stantec Consulting Services, Inc., "Documentation of Initial Hazard Potential Classification Assessment, GMF Recycle 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] Hanson Professional Services, Inc., "Coffeen Recycle Pond - Considerations for Gypsum Removal," Undated.
- [10] Hanson Professional Services, Inc., *Application for Permit, Water Treatment Devices, CCB Management Facility, Montgomery County, Illinois*, Springfield, Illinois, January 9, 2008.
- [11] IngenAE, "Luminant, Illinois Power Generating Company, Coffeen Power Station, December 2020 Topography," February 26, 2021.
- [12] Geosyntec Consultants, "DRAFT 2021 USEPA CCR Rule Operating Record Periodic Certification Report, §257.73(a)(2), (c), (d), (e) and §257.82, GMF Gypsum Stack Pond, Coffeen Power Plant, Coffeen Illinois," Chesterfield, MO, 2021.
- [13] 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.
- [14] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2))*, Coffeen Power Station, Recycle Pond, January 18, 2017.

- [15] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Coffeen Power Station, Recycle Pond*, February 7, 2018.
- [16] J. Knutelski, *Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Coffeen Power Station, Gypsum Recycle Pond*, December 28, 2018.
- [17] J. Knutelski, *Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Coffeen Power Station, Gypsum Recycle Pond*, January 8, 2020.
- [18] J. Knutelski, *Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Coffeen Power Station, Gypsum Recycle Pond*, January 6, 2021.
- [19] Hanson Professional Services, Inc., *Gypsum Bathymetric Survey, Gypsum Management Facility Recycle Pond, Coffeen Power Station*, Springfield, Illinois, July 18, 2016.
- [20] Weaver Consultants Group, "Dynegy, Collinsville, IL, 2015 - Coffeen Topography," December 1, 2015.
- [21] AECOM, "Initial Site Visit CCR Unit Summary, Dynegy CCR Compliance Program, Coffeen Power Station - GMF Recycle Pond," June 12, 2015.
- [22] Stantec Consulting Services, Inc., "Illinois Power Generating Company, Coffeen Power Station, Montgomery County, Illinois, Emergency Action Plan (EAP)," Fenton, MO, April 13, 2017.
- [23] AECOM, "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan for Ash Pond No. 1 at Coffeen Power Station," St. Louis, MO, October 2016.
- [24] Natural Resource Conservation Service, Conservation Engineering Division, "Urban Hydrology for Small Watersheds (TR-55)," United States Department of Agriculture, 1985.
- [25] State of Illinois Department of Energy and Natural Resources, "Time Distributions of Heavy Rainstorms in Illinois," State Water Survey Division, Champaign, Illinois, 1990.
- [26] State of Illinois Department of Natural Resources, "Procedural Guidelines for Preparation of Technical Data to be Included in Applications for Permits for Construction and Maintenance of Dams," Springfield, Illinois.
- [27] Geosyntec Consultants, "Final Draft 2021 USEPA CCR Rule Periodic Certification Report, §257.73(a)(2), (c), (d), (e), and §257.82, GMF Gypsum Stack Pond, Coffeen Power Plant, Coffeen, Illinois," Chesterfield, Missouri, September 15, 2021.
- [28] HydroCad™ Software Solutions, LLC, "HydroCad™ Stormwater Modeling System, Version 10," Chocorua, New Hampshire, 2016.
- [29] USDA Natural Resources Conservation Service, "WinTR-20 Project Formulation Hydrology, Version 3.20".
- [30] National Oceanic and Atmospheric Administration, "NOAA Atlas 14: Precipitation-Frequency Atlas of the United States," U.S. Department of Commerce, Silver Spring, Maryland, 2006.

DRAWINGS



INITIAL SURVEY
07-18-2016 TOPOGRAPHY



PERIODIC SURVEY
02-26-2021 TOPOGRAPHY

NOTES:

1. THE INITIAL SURVEY WAS TAKEN FROM THE DRAWING TITLED GYPSUM BATHYMETRIC SURVEY, GYPSUM MANAGEMENT FACILITY RECYCLE POND, COFFEEN POWER STATION", PREPARED BY HANSON PROFESSIONAL SERVICES INC., DATED JULY 18, 2016. A CAD FILE WAS NOT PROVIDED FOR THIS SURVEY; CONTOURS WERE APPROXIMATE DIGITIZED AND GEOREFERENCED BY GEOSYNTEC. THE INITIAL SURVEY LIMITS DO NOT ENCOMPASS THE ENTIRE GMF RECYCLE POND AND ONLY ENCOMPASS CCR THAT WAS OBSERVED IN THE GMF POND AT THE TIME OF THE INITIAL SURVEY. GEOSYNTEC HAS ASSUMED THAT NO ADDITIONAL CCR WAS PLACED OUTSIDE OF THE LIMITS OF THE INITIAL SURVEY.
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 RECYCLE POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

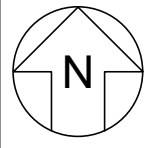


DRAWING

1

GLP8027.02

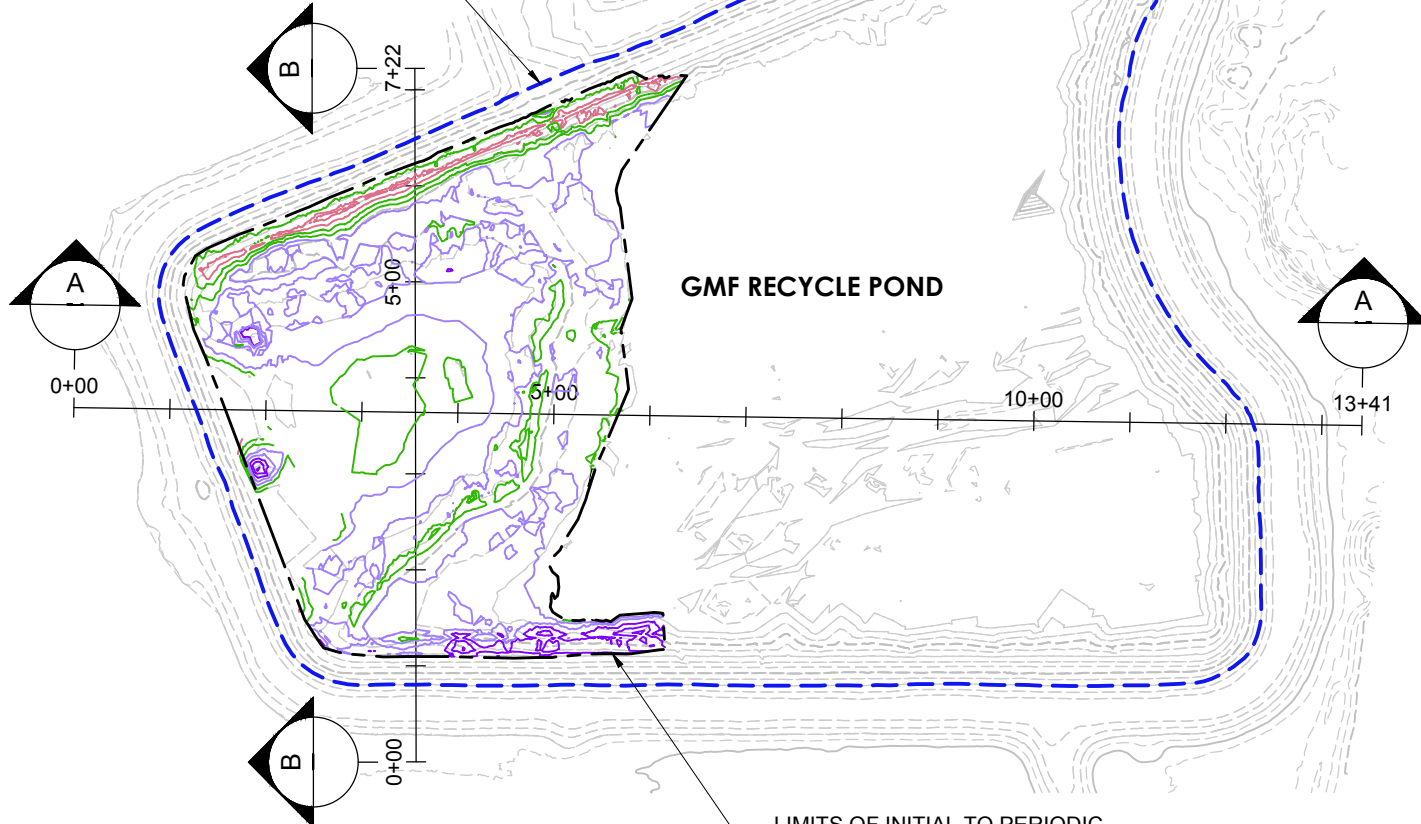
MAY 2021



LEGEND

--- PERIODIC SURVEY CONTOURS

LIMITS OF SWSE IN PERIODIC SURVEY



GMF RECYCLE POND

LIMITS OF INITIAL TO PERIODIC SURVEY COMPARISON, GMF RECYCLE POND

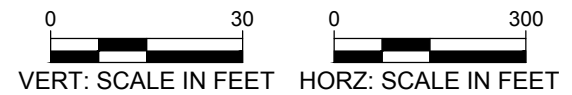
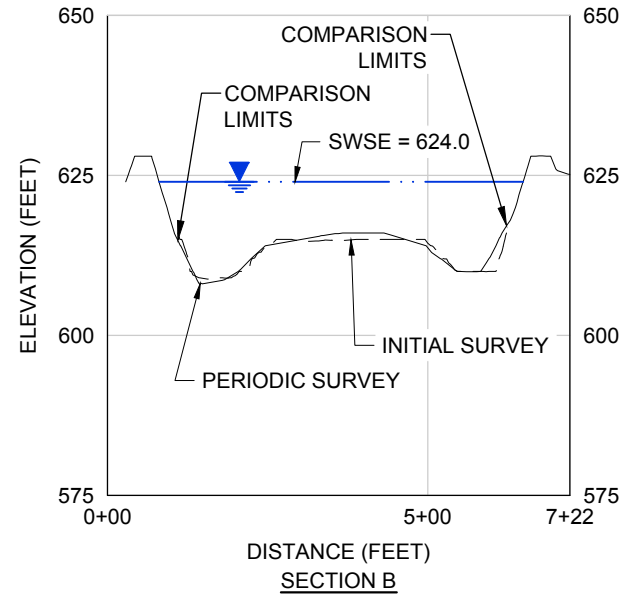
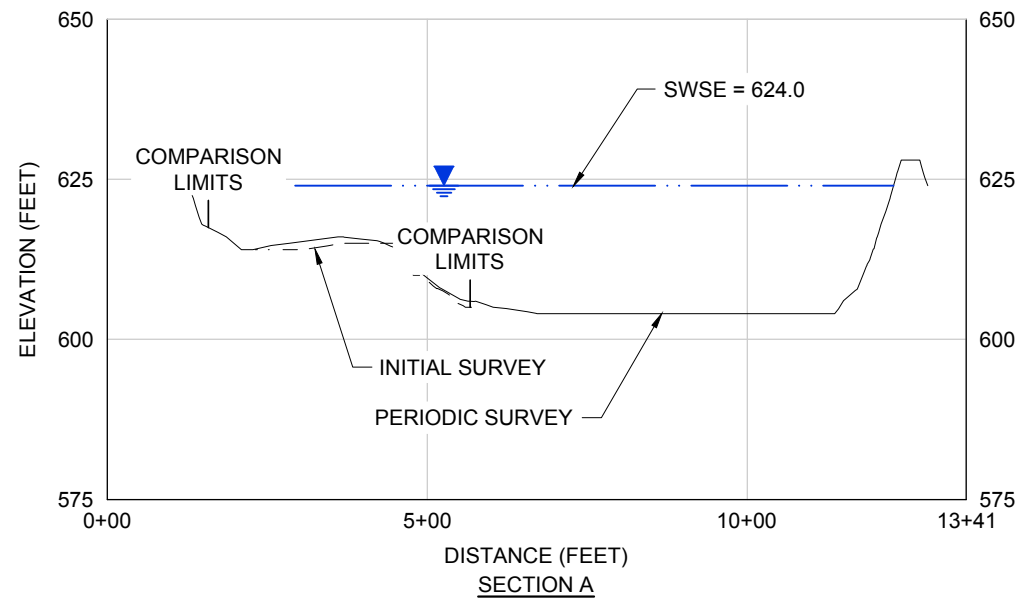


NOTES:

1. THE INITIAL SURVEY WAS TAKEN FROM THE DRAWING TITLED GYPSUM BATHYMETRIC SURVEY, GYPSUM MANAGEMENT FACILITY RECYCLE POND, COFFEEN POWER STATION", PREPARED BY HANSON PROFESSIONAL SERVICES INC., DATED JULY 18, 2016. A CAD FILE WAS NOT PROVIDED FOR THIS SURVEY; CONTOURS WERE APPROXIMATE DIGITIZED AND GEOREFERENCED BY GEOSYNTEC. THE INITIAL SURVEY LIMITS DO NOT ENCOMPASS THE ENTIRE GMF RECYCLE POND AND ONLY ENCOMPASS CCR THAT WAS OBSERVED IN THE GMF POND AT THE TIME OF THE INITIAL SURVEY. GEOSYNTEC HAS ASSUMED THAT NO ADDITIONAL CCR WAS PLACED OUTSIDE OF THE LIMITS OF THE INITIAL SURVEY.
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 RECYCLE POND IS EL. 624.0 FT, AS NOTED IN THE REPORT TITLED "CCR RULE REPORT: INITIAL INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN, GMF RECYCLE POND, COFFEEN POWER STATION", PREPARED BY HANSON PROFESSIONAL SERVICES INC, DATED OCTOBER 2016.

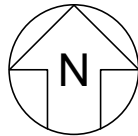
ISOPACH CONTOUR KEY		
COLOR	MIN ELEV	MAX ELEV
Blue	-4	-2
Light Blue	-2	0
Green	0	2
Pink	2	4
Red	4	6

INITIAL TO PERIODIC SURVEY COMPARISON SUMMARY			
SURFACE IMPOUNDMENT	CUT	FILL	NET (CU. YD.)
GMF POND	2,210	3,410	1,200 (FILL)
ABOVE SWSE	0	0	0
BELOW SWSE	2,210	3,410	1,200 (FILL)



SURVEY COMPARISON ISOPACH GMF RECYCLE POND COFFEEN POWER PLANT COFFEEN, ILLINOIS	
	DRAWING 2
GLP8027.02	MAY 2021

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GMF RECYCLE POND

INITIAL AERIAL
07-18-2016 IMAGERY



GMF RECYCLE POND

PERIODIC AERIAL
02-26-2021 IMAGERY



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 RECYCLE POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS



DRAWING

3

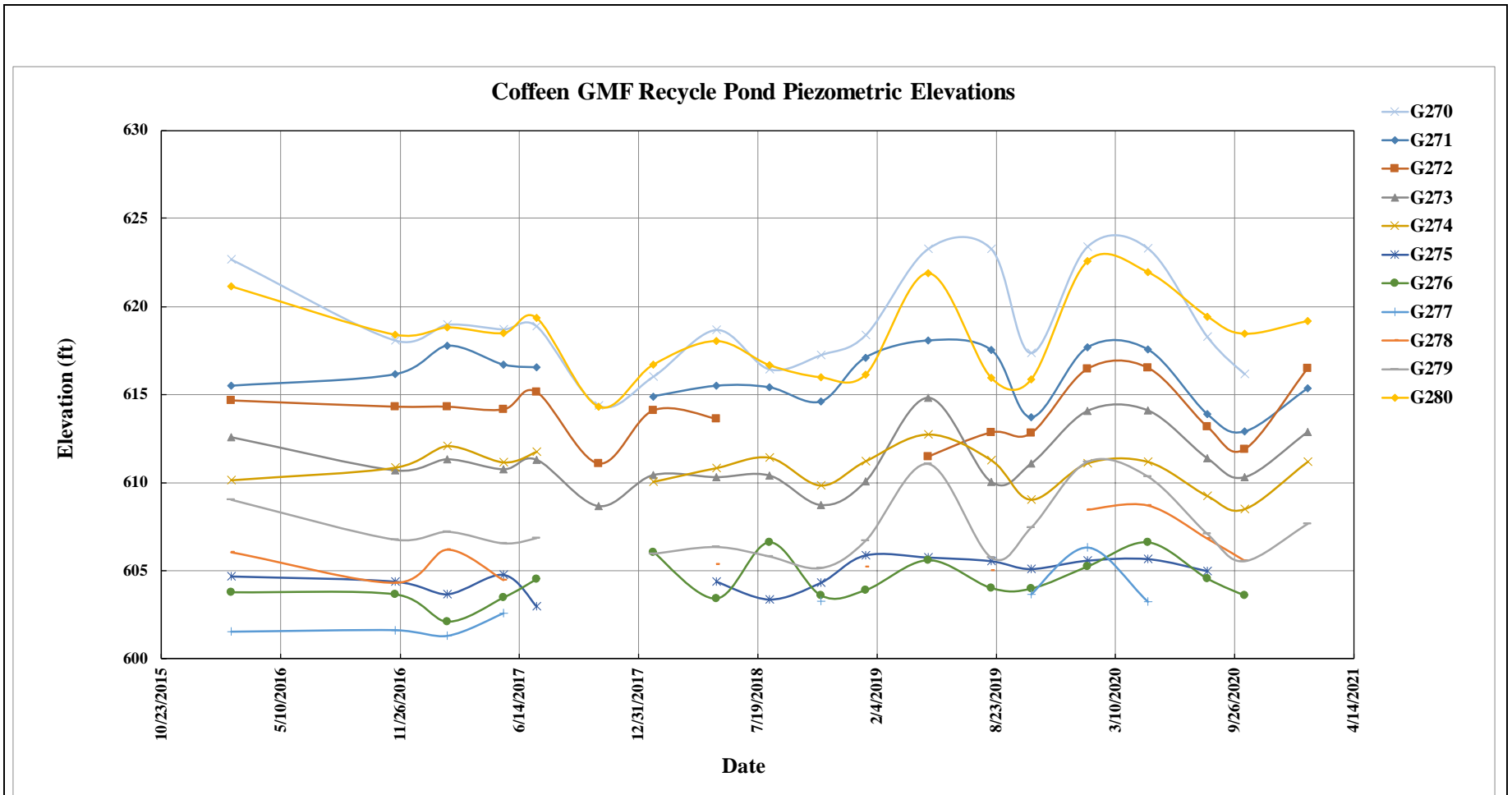
GLP8027.02

MAY 2021

ATTACHMENTS

Attachment A

GMF RP 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 RECYCLE POND COFFEEN POWER PLANT COFFEEN, ILLINOIS		Figure A-1
GLP8027	7/8/2021	

Attachment B

GMF RP Site Visit Photolog

GEOSYNTEC CONSULTANTS
Photographic Record



Site Owner: Illinois Power Generating Company **Project Number:** GLP8027

CCR Unit: GMF Recycle Pond (GMF RP) **Site:** Coffeen Power Plant

Photo: 01

Date: 05/28/2021

Direction Facing:
SW

Comments:
Transfer channel
overview at
discharge location
into GMF RP.



Photo: 02

Date: 05/28/2021

Direction Facing:
E

Comments:
Interior slope
overview



GEOSYNTEC CONSULTANTS
Photographic Record



Site Owner: Illinois Power Generating Company

Project Number: GLP8027

CCR Unit: GMF Recycle Pond (GMF RP)

Site: Coffeen Power Plant

Photo: 03

Date: 05/28/2021

Direction Facing:
SW

Comments:
Interior slope
overview



Photo: 04

Date: 05/28/2021

Direction Facing:
SE

Comments:
Interior slope
overview



Site Owner: Illinois Power Generating Company

Project Number: GLP8027

CCR Unit: GMF Recycle Pond (GMF RP)

Site: Coffeen Power Plant

Photo: 05

Date: 05/28/2021

Direction Facing:
NW

Comments:
NE interior slope
overview



Photo: 06

Date: 05/28/2021

Direction Facing:
NE

Comments:
NE exterior slope
overview



GEOSYNTEC CONSULTANTS
Photographic Record



Site Owner: Illinois Power Generating Company **Project Number:** GLP8027

CCR Unit: GMF Recycle Pond (GMF RP) **Site:** Coffeen Power Plant

Photo: 07

Date: 05/28/2021

Direction Facing:
SE

Comments:
Emergency
spillway aprons



Photo: 08

Date: 05/28/2021

Direction Facing:
N

Comments:
North emergency
spillway apron.



Site Owner: Illinois Power Generating Company

Project Number: GLP8027

CCR Unit: GMF Recycle Pond (GMF RP)

Site: Coffeen Power Plant

Photo: 09

Date: 05/28/2021

Direction Facing:
W

Comments:
Interior of north
emergency
spillway pipe. No
obstructions or
deterioration were
observed.



Photo: 10

Date: 05/28/2021

Direction Facing:
S

Comments:
Middle emergency
spillway apron.



GEOSYNTEC CONSULTANTS
Photographic Record



Site Owner: Illinois Power Generating Company **Project Number:** GLP8027

CCR Unit: GMF Recycle Pond (GMF RP) **Site:** Coffeen Power Plant

Photo: 11

Date: 05/28/2021

Direction Facing:
W

Comments:
Interior of middle emergency spillway pipe. No obstructions or deterioration were observed.

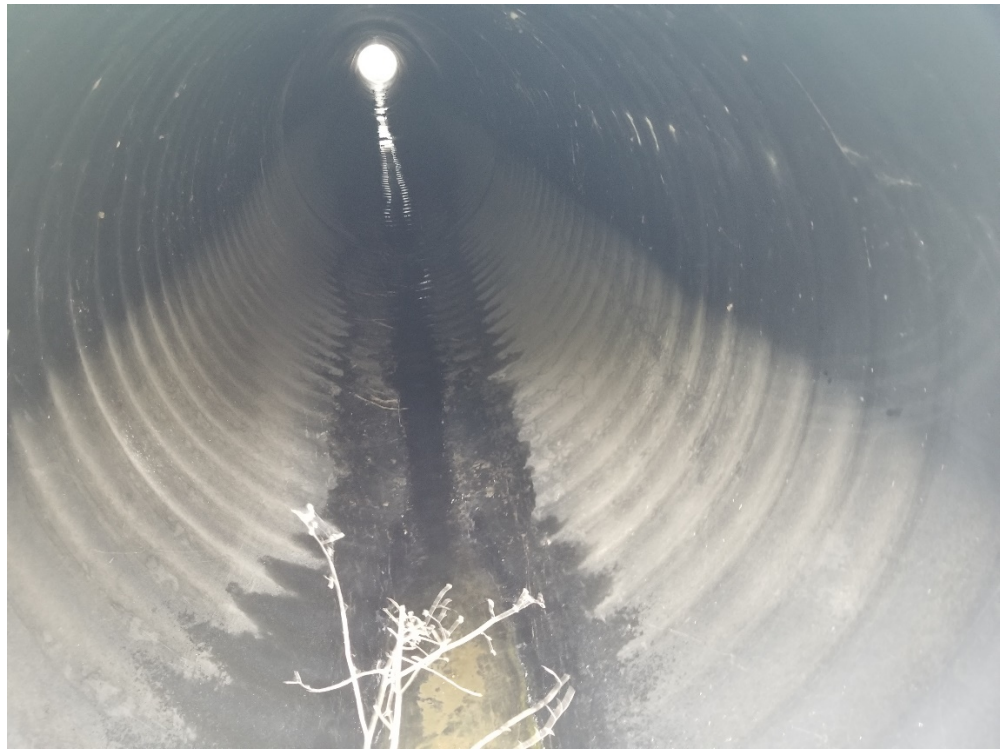


Photo: 12

Date: 05/28/2021

Direction Facing:
S

Comments:
South emergency spillway apron.



Site Owner: Illinois Power Generating Company

Project Number: GLP8027

CCR Unit: GMF Recycle Pond (GMF RP)

Site: Coffeen Power Plant

Photo: 13

Date: 05/28/2021

Direction Facing:
W

Comments:
Interior of middle
emergency
spillway pipe. No
obstructions or
deterioration were
observed.



Photo: 14

Date: 05/28/2021

Direction Facing:
Down

Comments:
North emergency
spillway drop inlet



GEOSYNTEC CONSULTANTS
Photographic Record



Site Owner: Illinois Power Generating Company **Project Number:** GLP8027

CCR Unit: GMF Recycle Pond (GMF RP) **Site:** Coffeen Power Plant

Photo: 15

Date: 05/28/2021

Direction Facing:
Down

Comments:
Middle emergency
spillway drop inlet



Photo: 16

Date: 05/28/2021

Direction Facing:
Down

Comments:
North emergency
spillway drop inlet



Site Owner: Illinois Power Generating Company

Project Number: GLP8027

CCR Unit: GMF Recycle Pond (GMF RP)

Site: Coffeen Power Plant

Photo: 17

Date: 05/28/2021

Direction Facing:

NE

Comments:

East exterior embankment overview.



Photo: 18

Date: 05/28/2021

Direction Facing:

SW

Comments:

Recycle pump intake structure



GEOSYNTEC CONSULTANTS
Photographic Record



Site Owner: Illinois Power Generating Company **Project Number:** GLP8027

CCR Unit: GMF Recycle Pond (GMF RP) **Site:** Coffeen Power Plant

Photo: 19

Date: 05/28/2021

Direction Facing:
SE

Comments:
Recycle pump
house overview



Photo: 20

Date: 05/28/2021

Direction Facing:
E

Comments:
Recycle pump
house overview



Site Owner: Illinois Power Generating Company

Project Number: GLP8027

CCR Unit: GMF Recycle Pond (GMF RP)

Site: Coffeen Power Plant

Photo: 21

Date: 05/28/2021

Direction Facing:
W

Comments:
South exterior dike
overview



Photo: 22

Date: 05/28/2021

Direction Facing:
NW

Comments:
South dike interior
overview



GEOSYNTEC CONSULTANTS
Photographic Record



Site Owner: Illinois Power Generating Company **Project Number:** GLP8027

CCR Unit: GMF Recycle Pond (GMF RP) **Site:** Coffeen Power Plant

Photo: 23

Date: 05/28/2021

Direction Facing:
SW

Comments:
South dike exterior
overview



Photo: 24

Date: 05/28/2021

Direction Facing:
NW

Comments:
Former AP#2
dewatering well
discharge.



Site Owner: Illinois Power Generating Company

Project Number: GLP8027

CCR Unit: GMF Recycle Pond (GMF RP)

Site: Coffeen Power Plant

Photo: 25

Date: 05/28/2021

Direction Facing:
NE

Comments:
West dike interior slope and gypsum sluice line discharge.



Photo: 26

Date: 05/28/2021

Direction Facing:
NW

Comments:
West dike exterior overview



GEOSYNTEC CONSULTANTS
Photographic Record



Site Owner: Illinois Power Generating Company **Project Number:** GLP8027

CCR Unit: GMF Recycle Pond (GMF RP) **Site:** Coffeen Power Plant

Photo: 27

Date: 05/28/2021

Direction Facing:
E

Comments:
Northwest dike
interior overview



Photo: 28

Date: 05/28/2021

Direction Facing:
NE

Comments:
Northwest dike
exterior overview



Attachment C

Periodic History of Construction Report Update Letter

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 IPRG'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 compiled in the Initial HoC report, as listed below:

§ 257.73(c)(2): If there is a significant change to any information compiled 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.

Ash Pond No. 1

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].

Ash Pond No. 2

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.

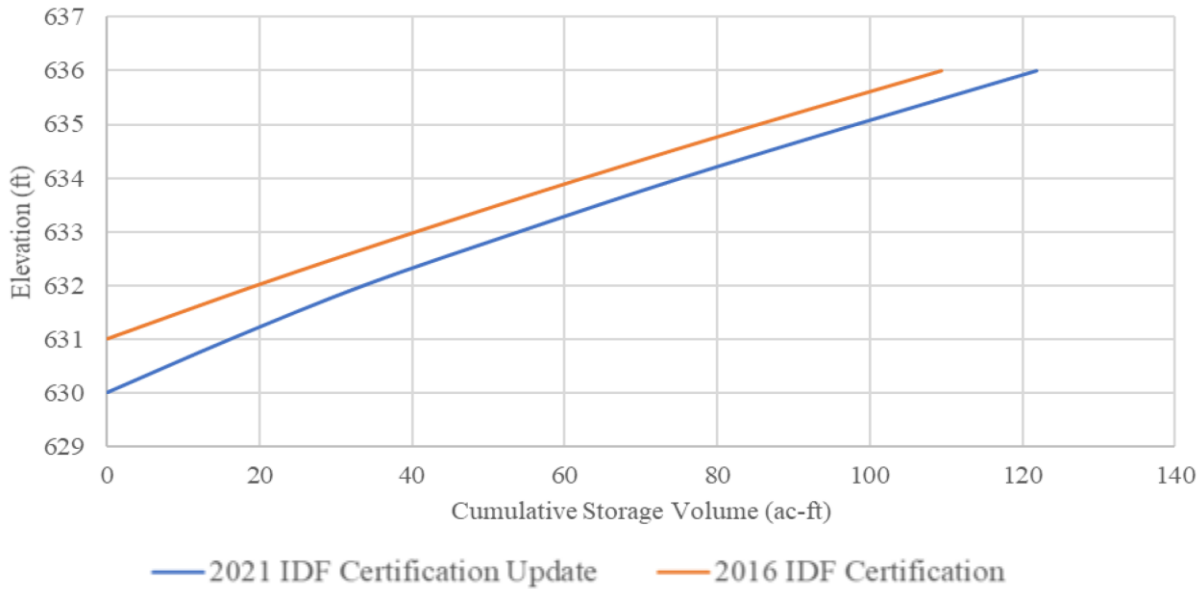


Figure 1 – Area-Capacity Curve for AP1

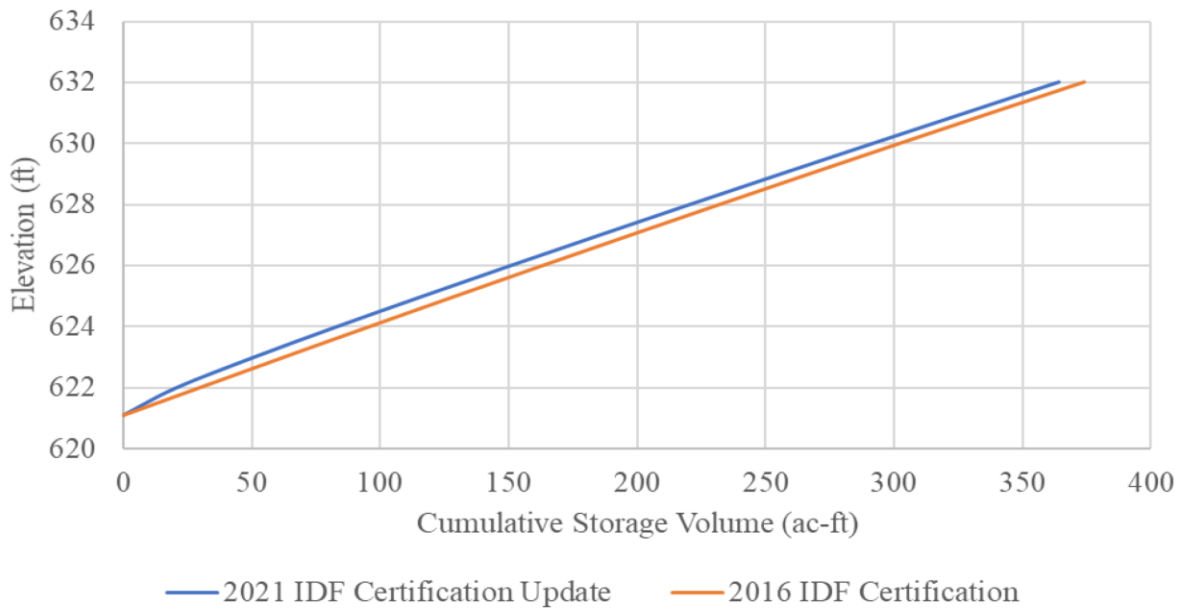


Figure 2 – Area-Capacity Curve for GMF GSP

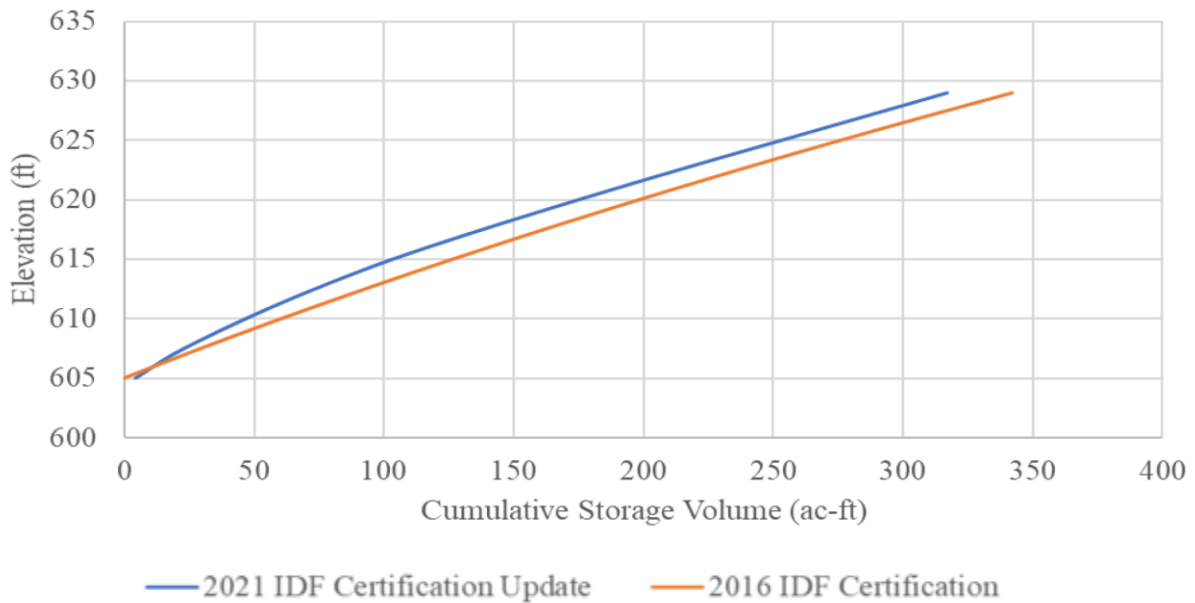


Figure 3 – Area-Capacity Curve for GMF RP

§ 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 Elevation¹, ft	636.0	632.0	629.0
Approximate Emergency Spillway Elevation¹, ft	Not Present	Not Present	624.0
Starting Water Surface Elevation¹ (SWSE), ft	630.2	625.2	622.1
Peak Water Surface Elevation¹ (PWSE), ft	631.4	626.7	623.9
Time to Peak, hr	No Discharge	10.6	No Discharge
Surface Area², ac	18.1	34.8	16.1
Storage³, ac-ft	19.5	52.9	29.0

Notes:

¹Elevations are based on the NAVD88 datum

²Surface area is defined as the water surface area at the PWSE

³Storage 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



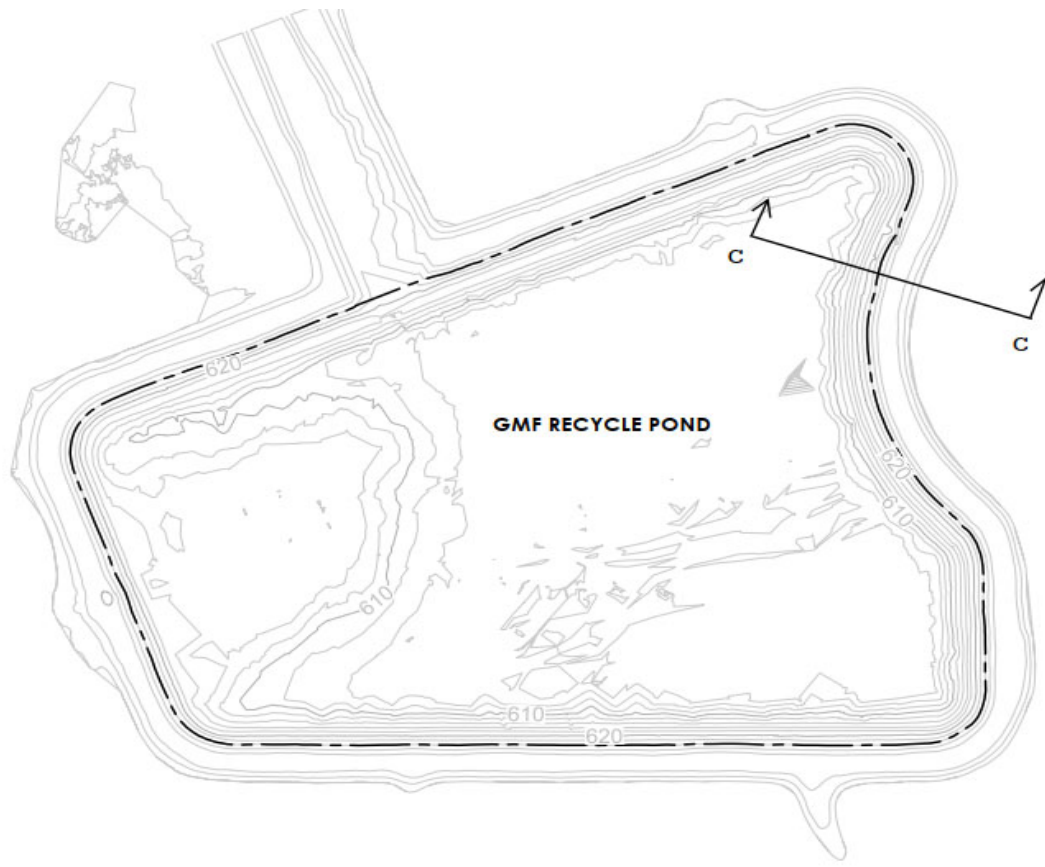
John Seymour, P.E.
Senior Principal

REFERENCES

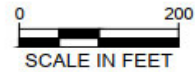
- [1] AECOM, "History of Construction, USEPA Final CCR Rule, 40 CFR § 257.73(c), Coffeen Power Station, Coffeen, Illinois," October 2016.
- [2] United States Environmental Protection Agency, "40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities, Final Rule, 2015," 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



PERIODIC SURVEY
02-26-2021 TOPOGRAPHY



NOTES:

1. The cross-sections are shown on the periodic topography of GMF RP Pond, prepared by IngenAE, dated February 26, 2021.

CROSS-SECTION LOCATION PERIODIC CERTIFICATION COFFEEN POWER PLANT- GMF RP POND COFFEEN, ILLINOIS	
Geosyntec consultants	
GLP8027	9/16/2021
Figure D-1	

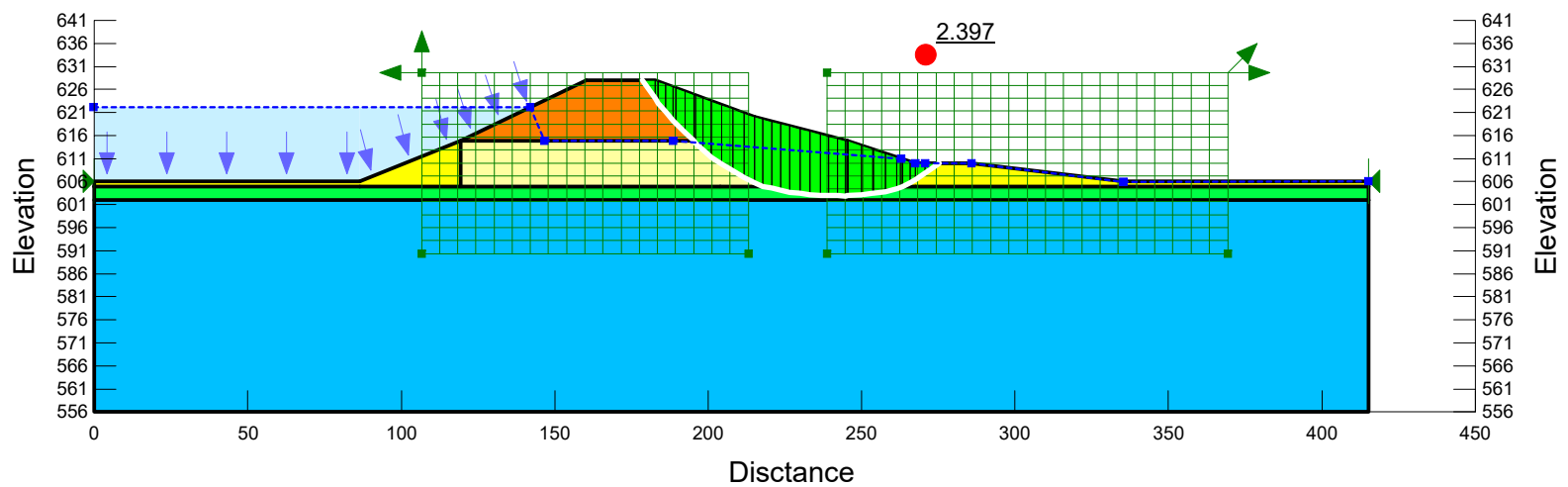
Coffeen Power Plant
 GMF Recycle Pond
 Section C
 Static Drained - Block-Failure

Designed by: Pourya Kargar
 Checked by: Lucas Carr & Zachary Fallert
 Date: 09/15/2021

Name: Embankment Fill Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion: 0 psf Phi: 31 ° Phi-B: 0 ° Piezometric Line: 1
 Name: Foundation Clay (Below Embankment - CIU) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion: 0 psf Phi: 32 ° 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

Materials

- Embankment Fill
- Foundation Clay (Below Embankment - CIU)
- Foundation Clay (Free Field - DSS)
- Soft Clay Foundation
- Till



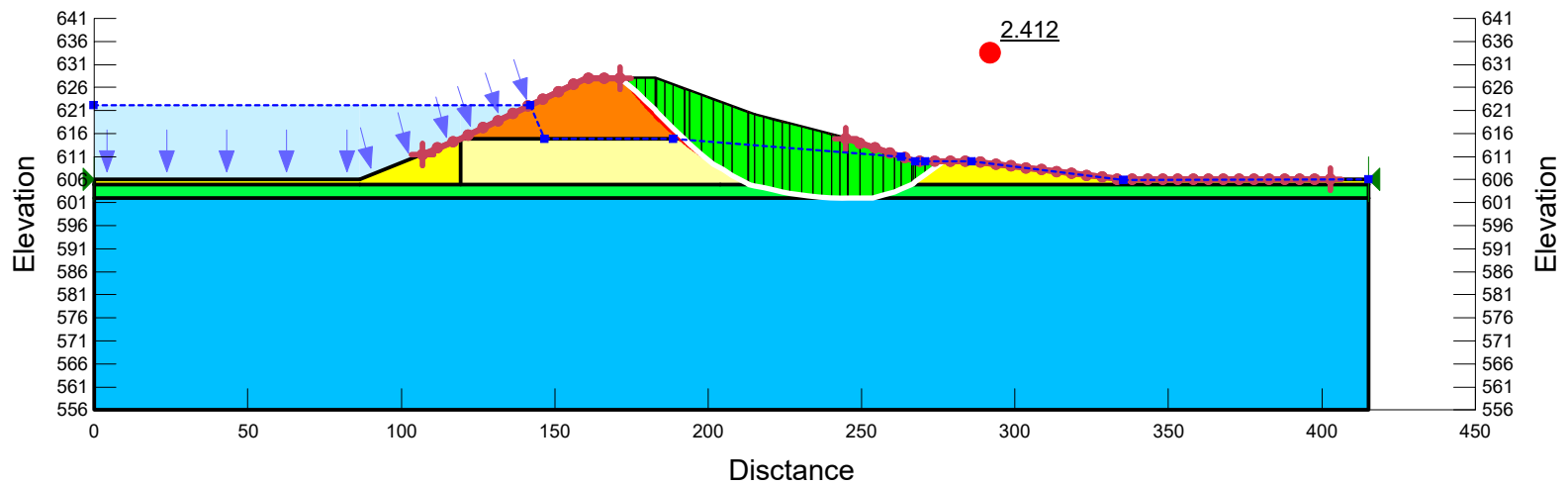
Coffeen Power Plant
 GMF Recycle Pond
 Section C
 Static Drained - Entry-Exit

Designed by: Pourya Kargar
 Checked by: Lucas Carr & Zachary Fallert
 Date: 09/15/2021

Name: Embankment Fill Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 31 ° Phi-B: 0 ° Piezometric Line: 1
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Materials

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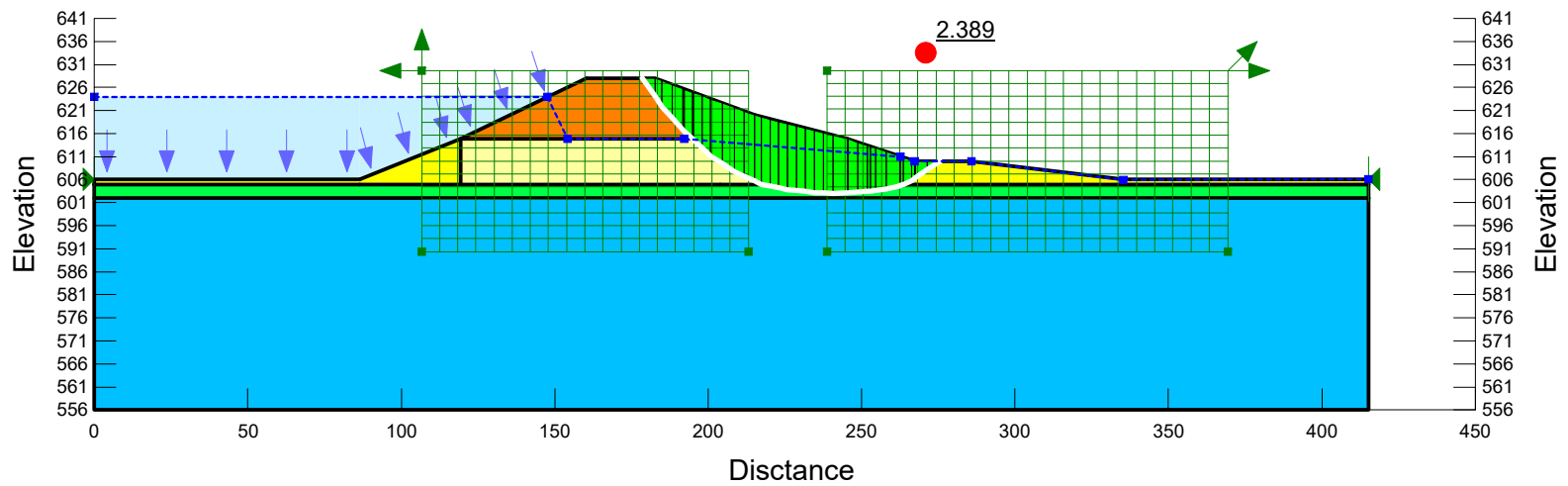
Coffeen Power Plant
 GMF Recycle Pond
 Section C
 Static Drained - Block Failure

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Materials

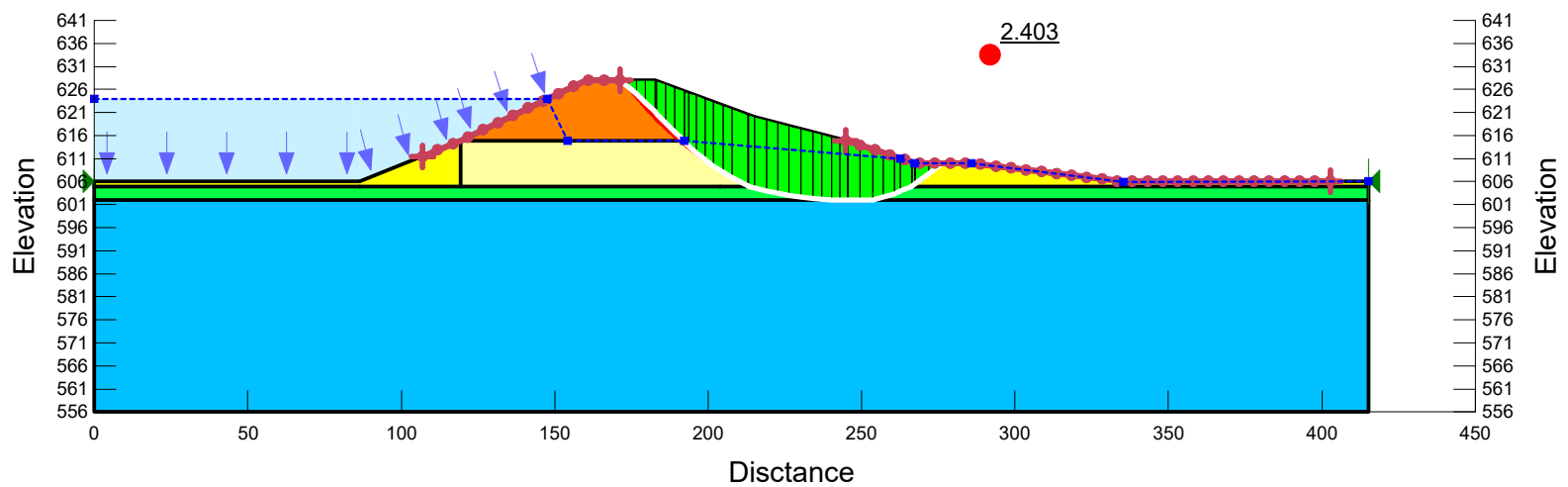
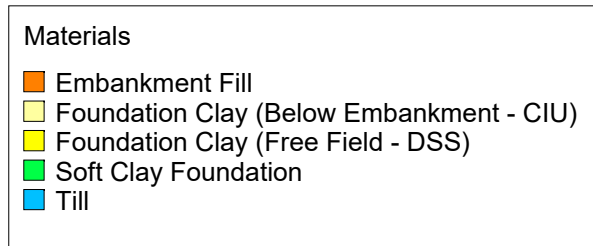
- Embankment Fill
- Foundation Clay (Below Embankment - CIU)
- Foundation Clay (Free Field - DSS)
- Soft Clay Foundation
- Till



Coffeen Power Plant
 GMF Recycle Pond
 Section C
 Static Drained - Entry-Exit

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 Checked by: Lucas Carr & Zachary Fallert
 Date: 09/15/2021

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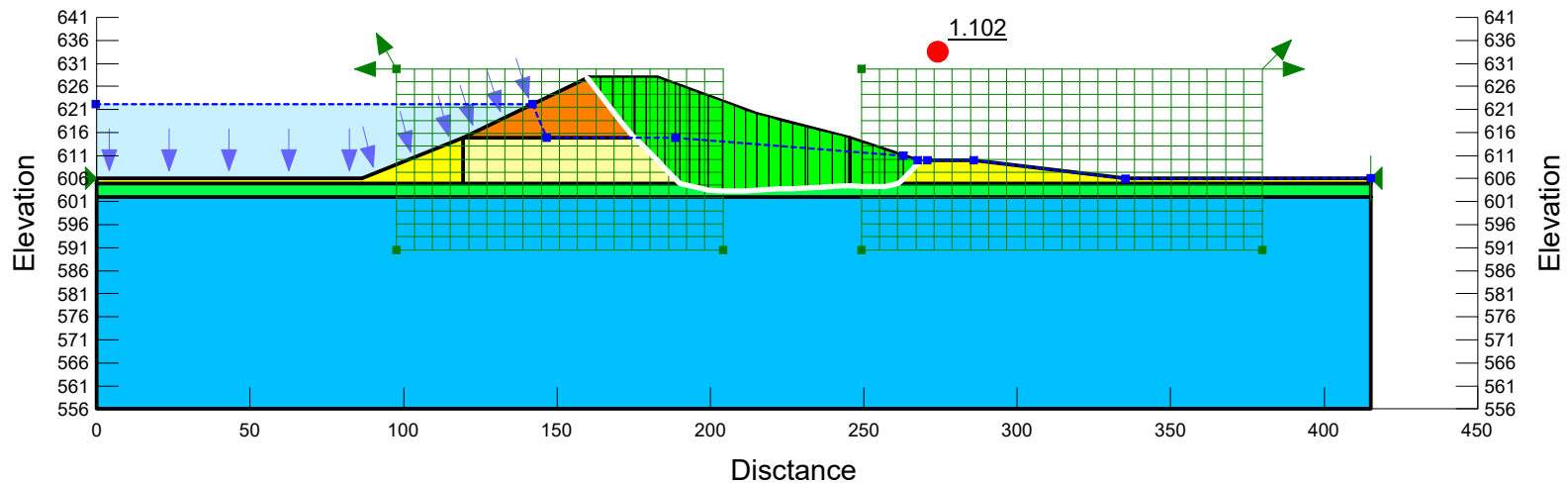
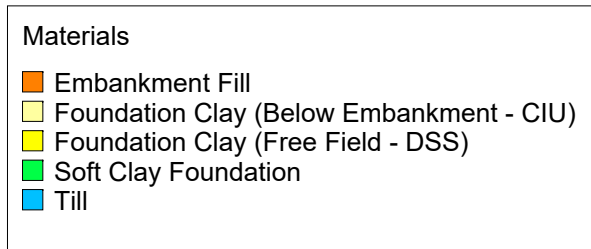


Coffeen Power Plant
 GMF Recycle Pond
 Section C
 Static Drained - Block Failure

Designed by: Pourya Kargar
 Checked by: Lucas Carr & Zachary Fallert
 Date: 09/15/2021

Name: Embankment Fill Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.6 Minimum Strength: 450 psf Piezometric Line: 1
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 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
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 Name: Till Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1

Seismic Coefficient : 0.13 g

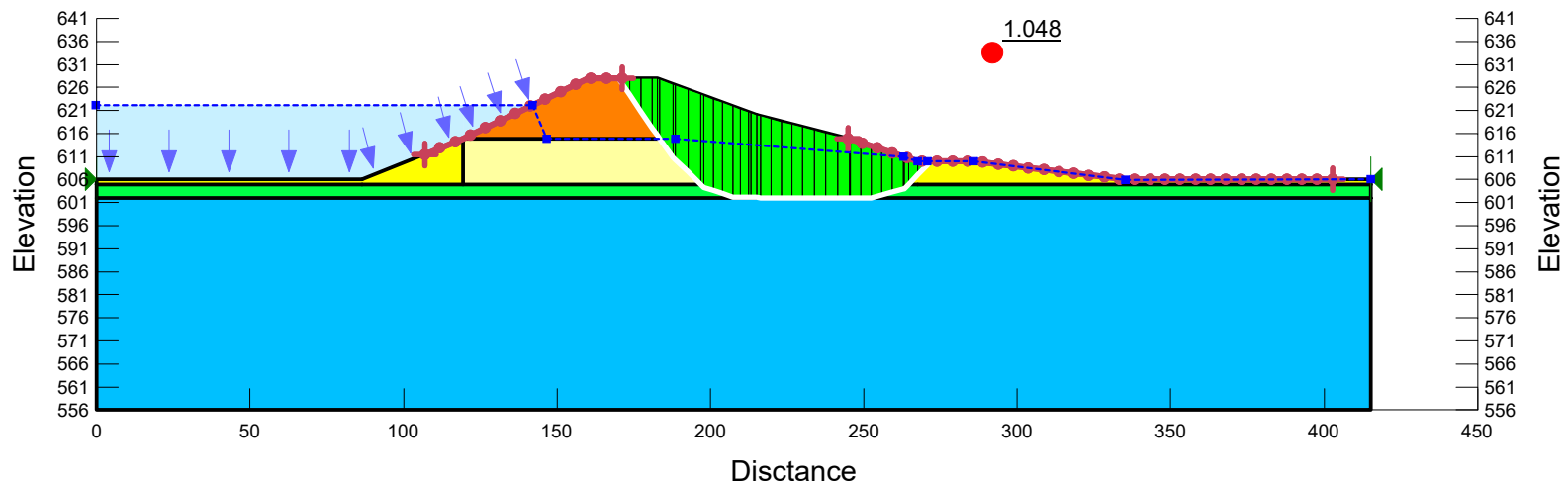
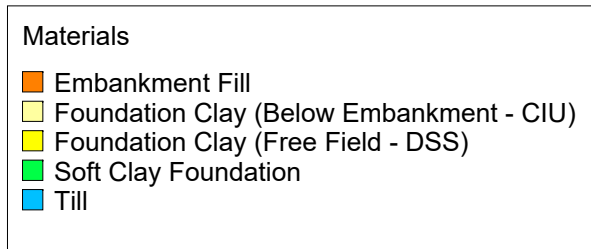


Coffeen Power Plant
 GMF Recycle Pond
 Section C
 Static Drained - Entry-Exit

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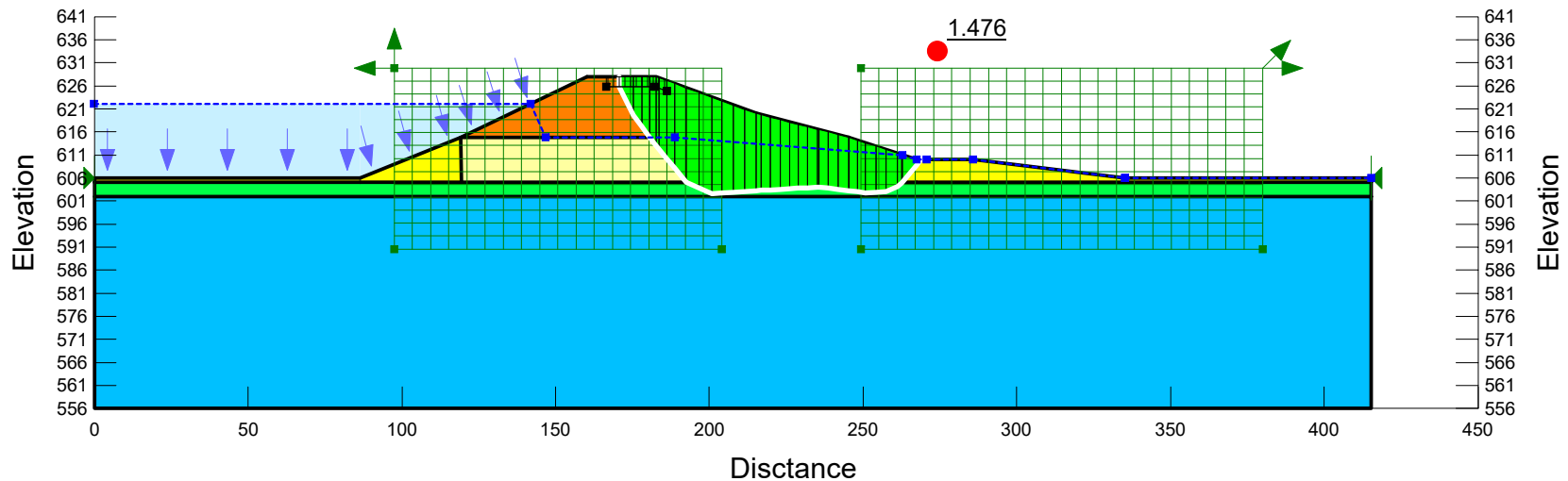
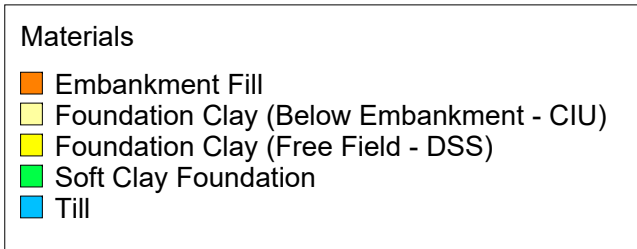
Seismic Coefficient : 0.13 g



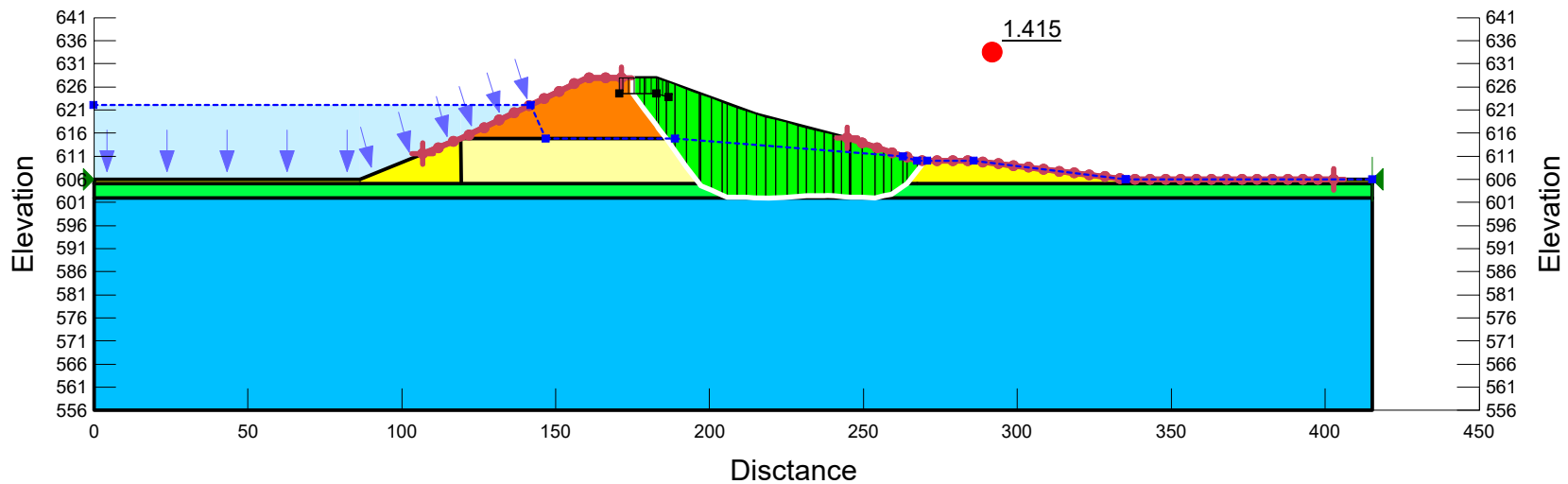
Coffeen Power Plant
 GMF Recycle Pond
 Section C
 Post Earthquake - Block Failure

Designed by: Pourya Kargar
 Checked by: Lucas Carr & Zachary Fallert
 Date: 09/15/2021

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 Name: Till Model: $S=f(\text{overburden})$ Unit Weight: 135 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1



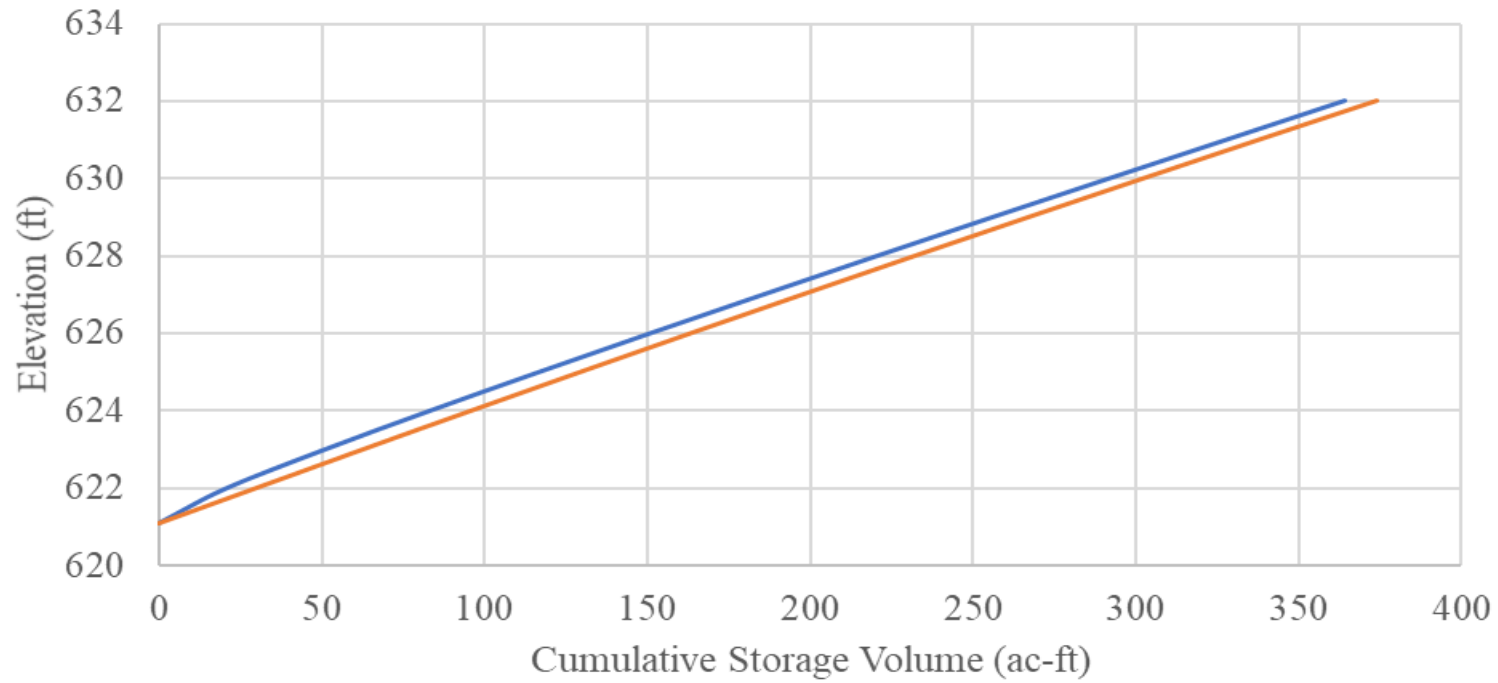
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Attachment E

Periodic Inflow Design Flood Control System Plan Analyses

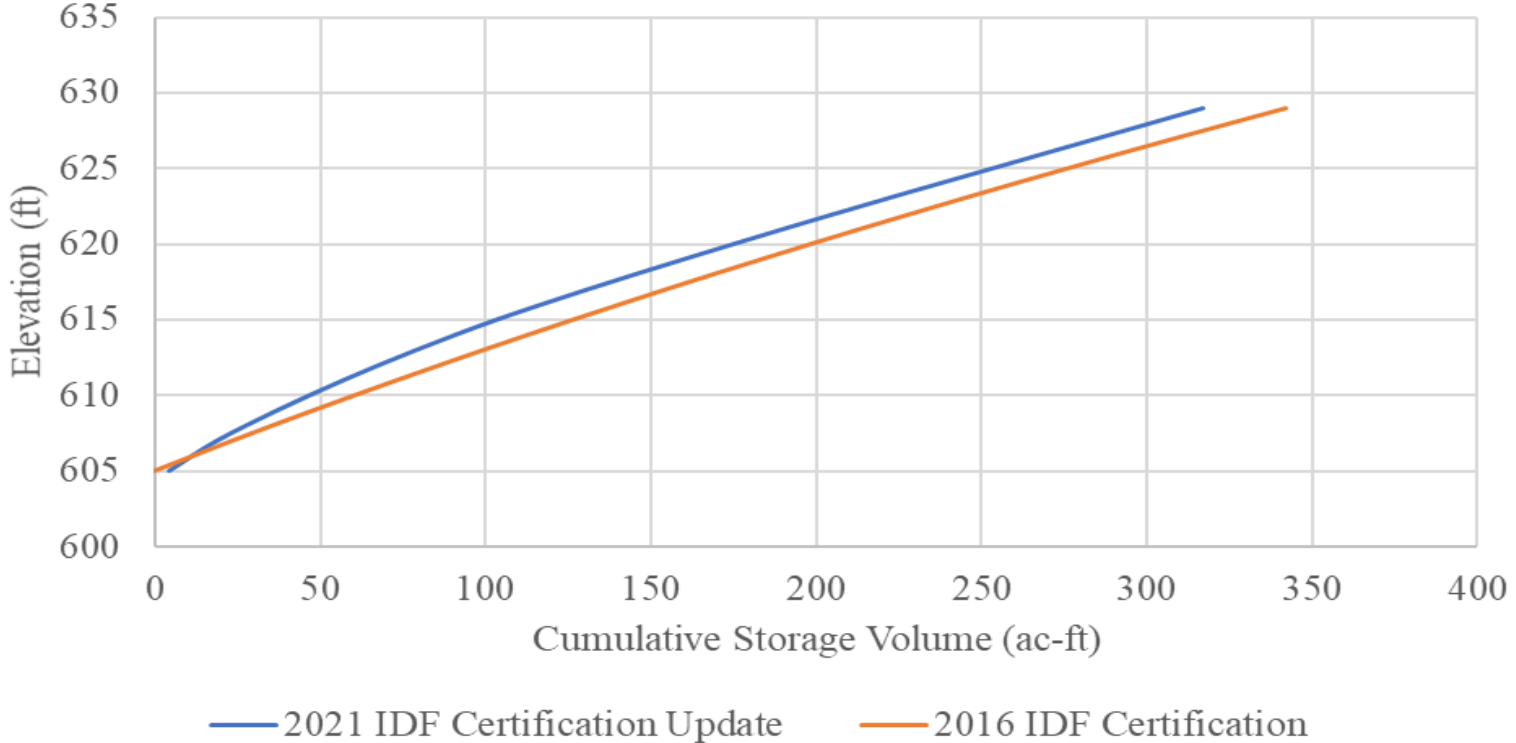
Coffeen GMF Pond - Cumulative Storage



— 2021 IDF Certification Update — 2016 IDF Certification

COFFEEN GMF GSP CUMULATIVE STORAGE PERIODIC CERTIFICATION COFFEEN POWER PLANT COFFEEN, ILLINOIS	
	
GLP8027	9/14/2021
Figure E-1	

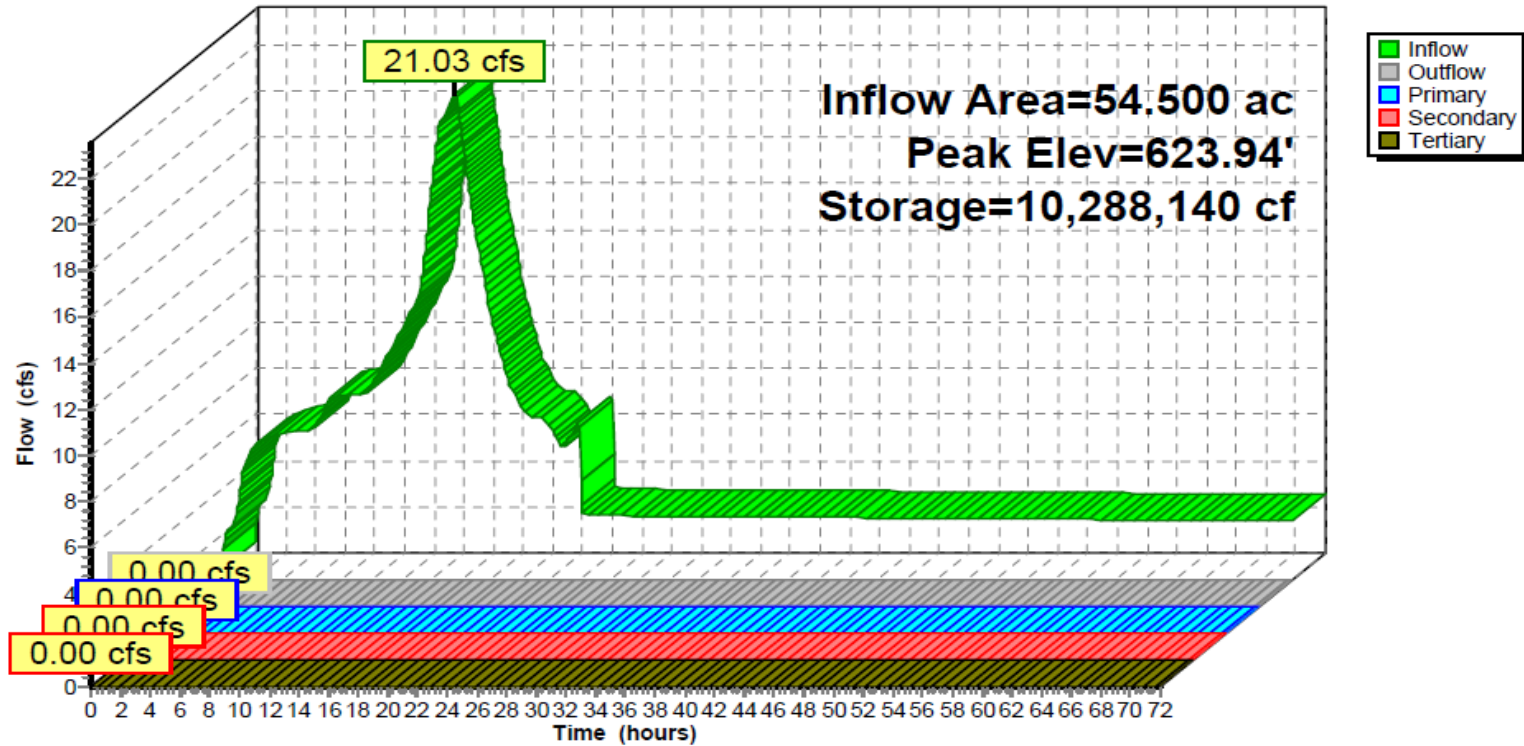
Coffeen GMFR Pond - Cumulative Storage



COFFEEN GMF RECYCLE POND CUMULATIVE STORAGE PERIODIC CERTIFICATION COFFEEN POWER PLANT COFFEEN, ILLINOIS	
GLP8027	9/14/2021
Figure E-2	

Pond 3P: Recycle Pond

Hydrograph



GMF GSP IDF HYDROGRAPH
 PERIODIC CERTIFICATION
 COFFEEN POWER PLANT
 COFFEEN, ILLINOIS

Geosyntec
 consultants

Figure

E-3

GLP8027

9/14/2021

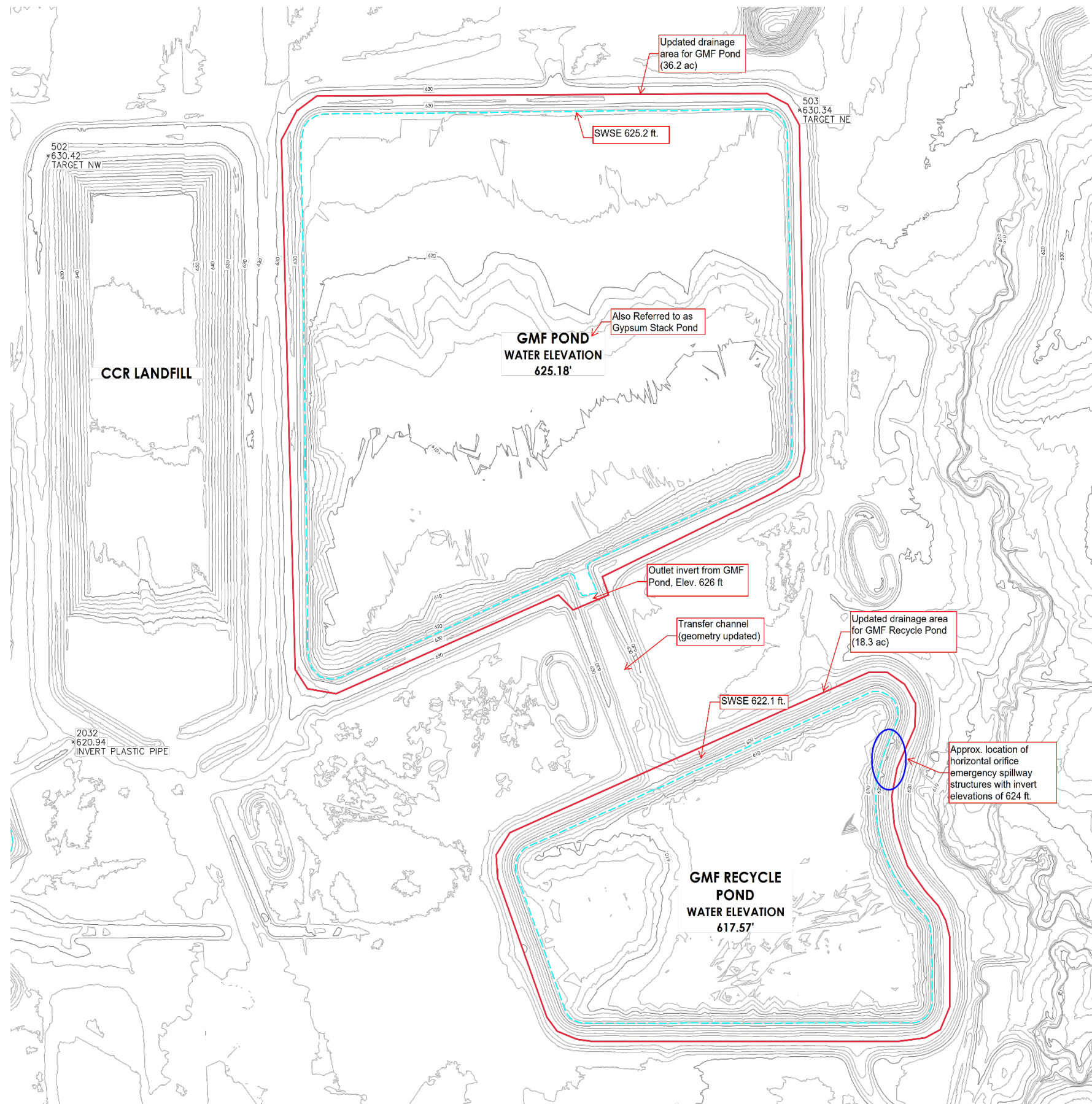

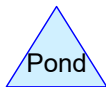
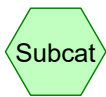
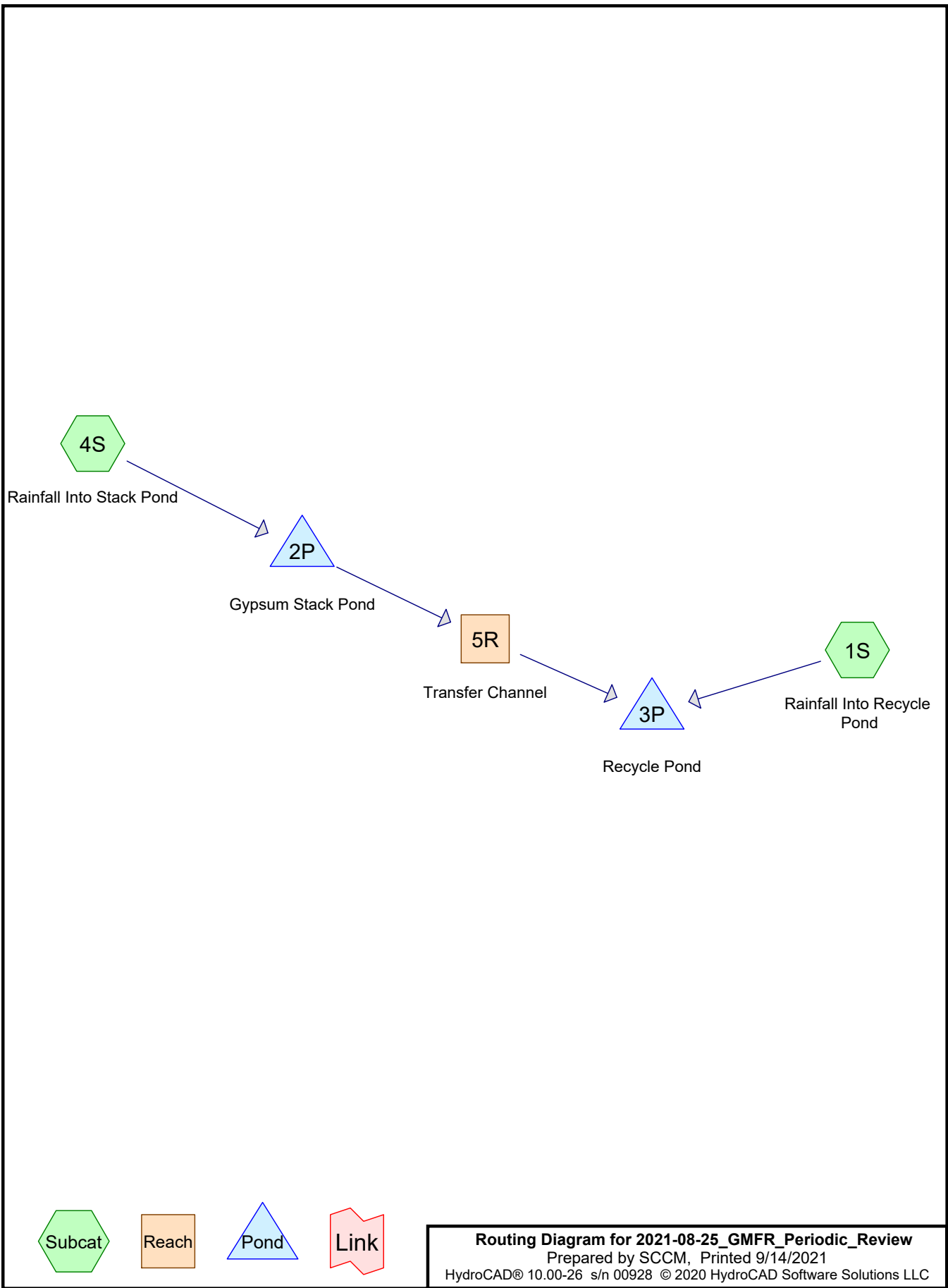


Figure based on IngenAE 2020 Site Topo

NOT FOR CONSTRUCTION - NOT TO SCALE

Coffeen Power Plant GMF and GMFR Pond Hydrologic Workmap	
	
GLP8027	September 2021
Figure	
E-4	



Routing Diagram for 2021-08-25_GMFR_Periodic_Review
Prepared by SCCM, Printed 9/14/2021
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
54.500	98	Water Surface, HSG C (1S, 4S)
54.500	98	TOTAL AREA

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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

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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	

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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=8.89"
Tc=6.0 min CN=98 Runoff=18.44 cfs 13.557 af

Subcatchment 4S: Rainfall Into Stack Runoff Area=36.200 ac 100.00% Impervious Runoff Depth=8.89"
Tc=6.0 min CN=98 Runoff=36.48 cfs 26.817 af

Reach 5R: Transfer Channel Avg. Flow Depth=0.06' Max Vel=1.51 fps Inflow=2.79 cfs 15.479 af
n=0.010 L=450.0' S=0.0044 '/' Capacity=7,454.18 cfs Outflow=2.78 cfs 15.461 af

Pond 2P: Gypsum Stack Pond Peak Elev=625.82' Storage=6,306,475 cf Inflow=36.48 cfs 26.817 af
Outflow=2.79 cfs 15.479 af

Pond 3P: Recycle Pond Peak Elev=623.94' Storage=10,288,140 cf Inflow=21.03 cfs 29.018 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 54.500 ac Runoff Volume = 40.374 af Average Runoff Depth = 8.89"
0.00% Pervious = 0.000 ac 100.00% Impervious = 54.500 ac

Summary for Subcatchment 1S: Rainfall Into Recycle Pond

Runoff = 18.44 cfs @ 15.65 hrs, Volume= 13.557 af, Depth= 8.89"

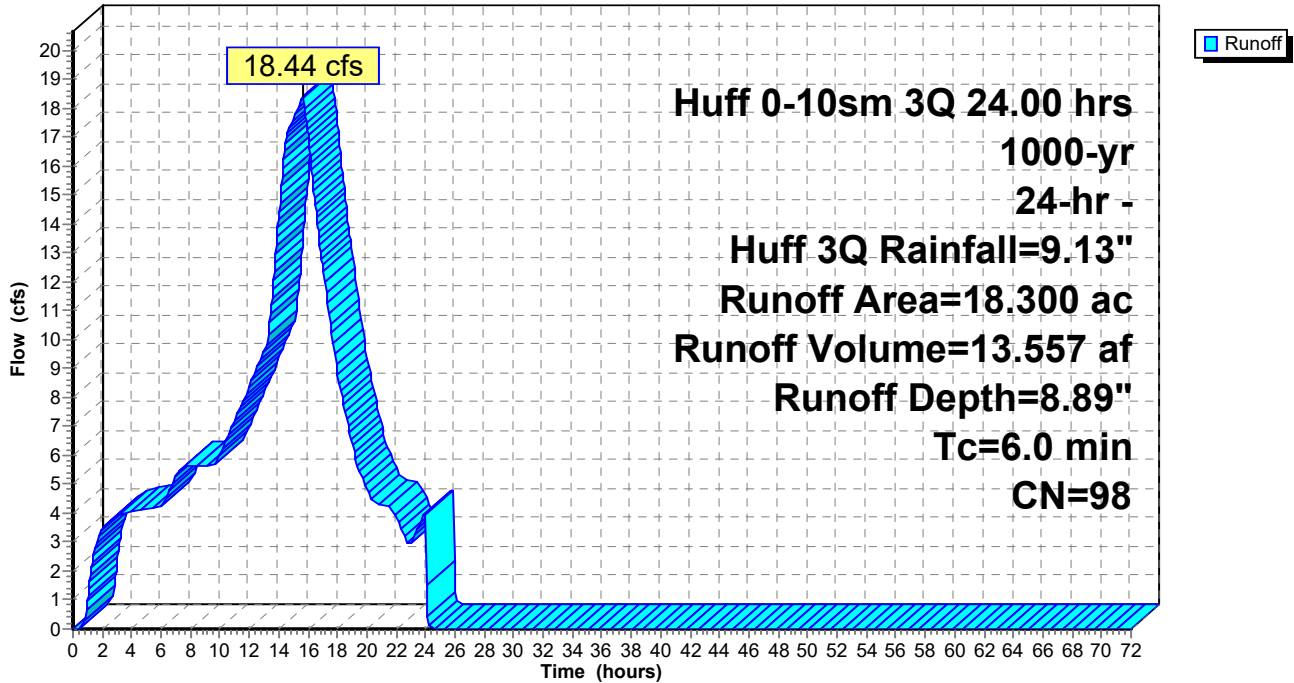
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Huff 0-10sm 3Q 24.00 hrs 1000-yr, 24-hr - Huff 3Q Rainfall=9.13"

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

Hydrograph



Summary for Subcatchment 4S: Rainfall Into Stack Pond

Runoff = 36.48 cfs @ 15.65 hrs, Volume= 26.817 af, Depth= 8.89"

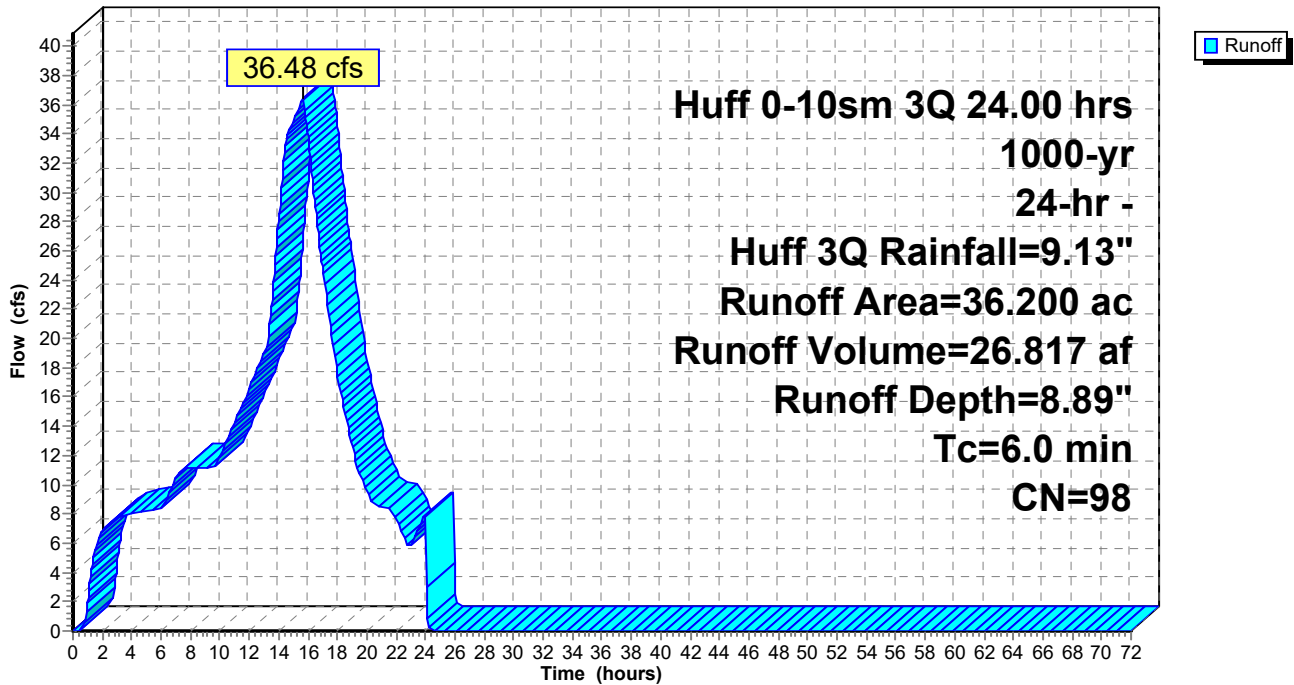
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Huff 0-10sm 3Q 24.00 hrs 1000-yr, 24-hr - Huff 3Q Rainfall=9.13"

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

Hydrograph



Summary for Reach 5R: Transfer Channel

Inflow Area = 36.200 ac, 100.00% Impervious, Inflow Depth > 5.13" for 1000-yr, 24-hr - Huff 3Q event
 Inflow = 2.79 cfs @ 24.11 hrs, Volume= 15.479 af
 Outflow = 2.78 cfs @ 24.20 hrs, Volume= 15.461 af, Atten= 0%, Lag= 5.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.51 fps, Min. Travel Time= 5.0 min
 Avg. Velocity = 1.51 fps, Avg. Travel Time= 5.0 min

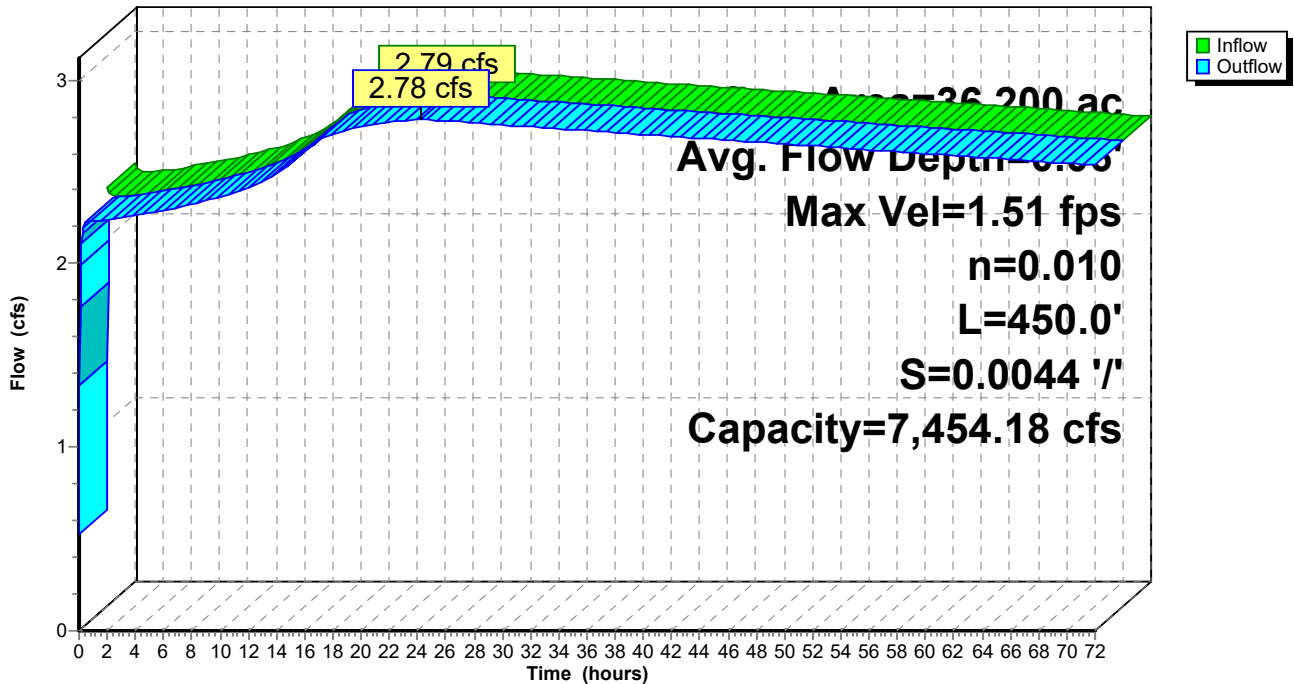
Peak Storage= 828 cf @ 24.20 hrs
 Average Depth at Peak Storage= 0.06'
 Bank-Full Depth= 6.00' Flow Area= 279.0 sf, Capacity= 7,454.18 cfs

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

Hydrograph



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 = 8.89" for 1000-yr, 24-hr - Huff 3Q event
 Inflow = 36.48 cfs @ 15.65 hrs, Volume= 26.817 af
 Outflow = 2.79 cfs @ 24.11 hrs, Volume= 15.479 af, Atten= 92%, Lag= 507.8 min
 Primary = 2.79 cfs @ 24.11 hrs, Volume= 15.479 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= 625.82' @ 24.11 hrs Surf.Area= 0 sf Storage= 6,306,475 cf (952,565 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 1,379.1 min (2,188.8 - 809.6)

Volume	Invert	Avail.Storage	Storage Description
#1	621.10'	15,871,813 cf	Custom Stage Data Listed below

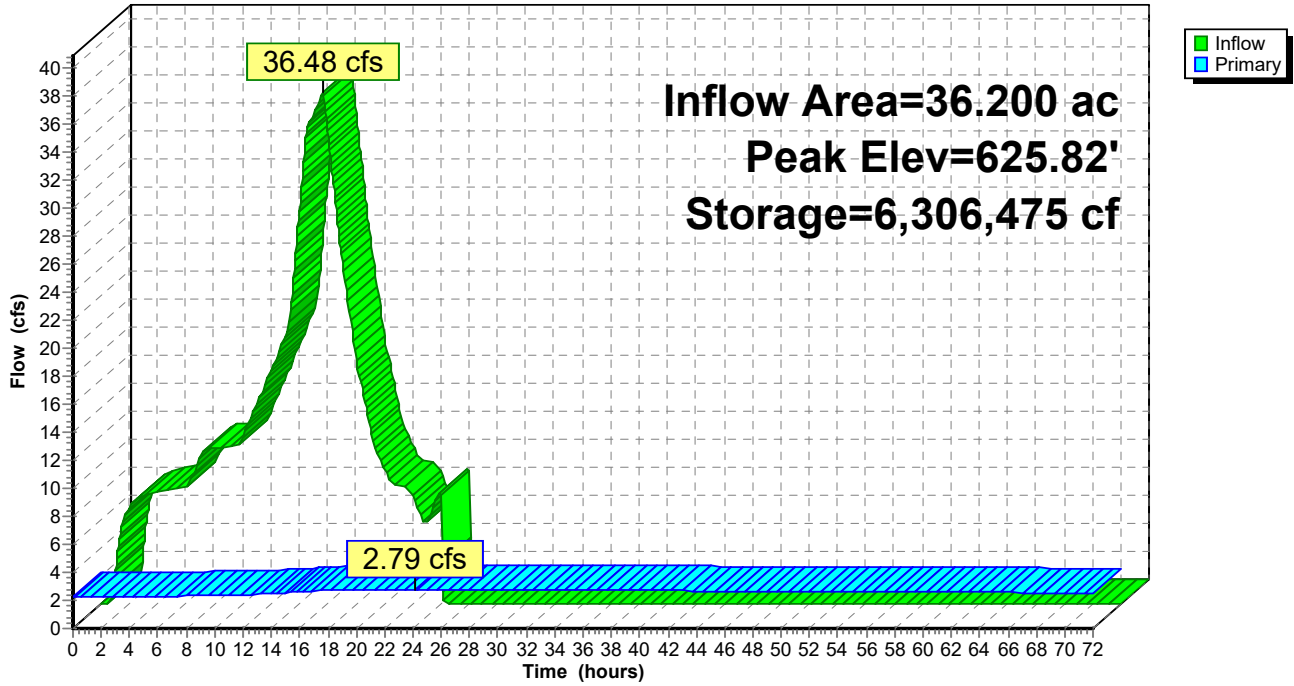
Elevation (feet)	Cum.Store (cubic-feet)
621.10	0
622.00	898,355
623.00	2,215,071
624.00	3,622,761
625.00	5,085,824
626.00	6,575,189
627.00	8,086,603
628.00	9,615,334
629.00	11,161,695
630.00	12,725,625
631.00	14,298,658
632.00	15,871,813

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=2.79 cfs @ 24.11 hrs HW=625.82' TW=624.06' (Dynamic Tailwater)
 1=Custom Weir/Orifice (Controls 0.00 cfs)
 2=Culvert (Outlet Controls 2.79 cfs @ 2.61 fps)

Pond 2P: Gypsum Stack Pond

Hydrograph



Summary for Pond 3P: Recycle Pond

[62] Hint: Exceeded Reach 5R OUTLET depth by 1.89' @ 71.95 hrs

Inflow Area = 54.500 ac, 100.00% Impervious, Inflow Depth > 6.39" for 1000-yr, 24-hr - Huff 3Q event
 Inflow = 21.03 cfs @ 15.65 hrs, Volume= 29.018 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 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= 623.94' @ 72.00 hrs Surf.Area= 0 sf Storage= 10,288,140 cf (1,263,793 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

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=0.00 cfs @ 0.00 hrs HW=622.10' (Free Discharge)

- ↑1=Culvert (Passes 0.00 cfs of 121.56 cfs potential flow)
- ↑4=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=622.10' (Free Discharge)

- ↑2=Culvert (Passes 0.00 cfs of 121.56 cfs potential flow)
- ↑5=Orifice/Grate (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=622.10' (Free Discharge)

- ↑3=Culvert (Passes 0.00 cfs of 121.56 cfs potential flow)
- ↑6=Orifice/Grate (Controls 0.00 cfs)

Pond 3P: Recycle Pond

Hydrograph

