Form CCR 1

Illinois Environmental Protection Agency

CCR Residual Surface Impoundment Permit Application

CCR Form 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 IAC 845.210(b))

Facility, Operator, and Owner Information

1.1	Facility Name		
	Powerton Generating Station		
1.2	Illinois EPA CCR Permit Number (if applicable)		
1.3	Facility Contact Information		
	Name (first and last): Joseph Kotas	Title: Environmental Specialist	Phone Number: 309-477-5216
	Email address: Joseph.Kotas@NRG.com		
1.4	Facility Mailing Address		
	Street or P.O. box: 13082 East Manito Road		
	City or town: Pekin	State: IL	Zip Code: 61554
1.5	Facility Location		
	Street, route number, or other specific identifier: 13082 East Manito Road		
	County name: Tazwell	County code (if known):	
	City or town: Pekin	State: IL	Zip Code: 61554
1.6	Name of Owner/Operator		
	Midwest Generation, LLC		

Facility, Operator, and Owner Info				
	1.7	Owner/Operator Contact Information		
		Name (first and last) Dale Green	Title Plant Manager	Phone Number 309-477-5212
		Email address Dale.Green@NRG.com		
	1.8	Owner/Operator Mailing Address		
		Street or P.O. box 804 Carnegie Center		
		City or town Princeton	State New Jersey	Zip Code 08540

SECTION 2: LEGAL DESCRIPTION (35 IAC 845.210(c))

Legal Description		
	2.1	Legal Description of the facility boundary
		SEC 9 T24N R5W LYING W OF RR IN W 1/2 & W 50 X 2220.46 OF ADJ RR (EXC 2.05 AC TRACT) NW 1/4 300.7 AC

SECTION 3: PUBLICLY ACCESSIBLE INTERNET SITE REQUIREMENTS (35 IAC 845.810)

Internet Site		
	3.1	Web Address(es) to publicly accessible internet site(s) (CCR website)
		https://midwestgenerationllc.com/illinois-ccr-rule-compliance-data-and-information/
	3.2	Is/are the website(s) titled "Illinois CCR Rule Compliance Data and Information"
		(Yes) [circled] 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.		
		W1798010008-01	☑	Attached written description
		W179801000-04	☑	Attached written description
		W1798010008-05	☑	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 Colum 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
Dale Green	Plant Manager
Signature	**Date Signed**
[signature]	10-25-21

Form CCR 2E

Illinois Environmental Protection Agency

CCR Surface Impoundment Permit Application

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

Bureau of Water ID Number:

CCR Permit Number:

Facility Name:
Powerton Generating Station

For IEPA Use Only

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

Construction History

1.1	CCR surface impoundment name.	Ash Surge Basin
1.2	Identification number of the CCR surface impoundment (if one has been assigned by the Agency).	W1798010008-01
1.3	Description of the boundaries of the CCR surface impoundment (35 Ill. Adm. Code 845.210(c)).	SEC 8 T24N R5W E 1/2 OF NE 1/4 (EXC RIVER) & E 1/2 OF SE 1/4 (EXC RIVER & EXC TRACT) 111.65 AC
1.4	State the purpose for which the CCR surface impoundment is being used.	Used as the primary settling basin for sluiced CCR and other process waters related to electrical power generation
1.5	How long has the CCR surface impoundment been in operation?	43 years
1.6	List the types of CCR that have been placed in the CCR surface impoundment.	Bottom ash

Construction History (Continued)			
	1.7	List name of the watershed within which the CCR surface impoundment is located.	
		Pekin Lake-Illinois River watershed	
	1.8	Size in acres of the watershed within which the CCR surface impoundment is located.	
		28,834 acres	
	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).

Form CCR 2E

Illinois Environmental Protection Agency

CCR Surface Impoundment Permit Application

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

Bureau of Water ID Number:	For IEPA Use Only
CCR Permit Number:	
Facility Name: Powerton Generating Station	

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.
	Ash Bypass Basin
1.2	Identification number of the CCR surface impoundment (if one has been assigned by the Agency).
	W1798010008-04
1.3	Description of the boundaries of the CCR surface impoundment (35 Ill. Adm. Code 845.210(c)).
	SEC 8 T24N R5W E 1/2 OF NE 1/4 (EXC RIVER) & E 1/2 OF SE 1/4 (EXC RIVER & EXC TRACT) 111.65 AC
1.4	State the purpose for which the CCR surface impoundment is being used.
	The basin was previously used as a settling pond. As of April 11, 2021, the basin is No longer in service.
1.5	How long has the CCR surface impoundment been in operation?
	43 years
1.6	List the types of CCR that have been placed in the CCR surface impoundment.
	Bottom ash which has since been removed.

Construction History (Continued)

1.7	List name of the watershed within which the CCR surface impoundment is located.
	Pekin Lake-Illinois River watershed
1.8	Size in acres of the watershed within which the CCR surface impoundment is located.
	28,834 acres
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).

Form CCR 2E

Illinois Environmental Protection Agency

CCR Surface Impoundment Permit Application

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

Bureau of Water ID Number: **CCR Permit Number:** **Facility Name:** Powerton Generating Station	For IEPA Use Only

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

Construction History

1.1	CCR surface impoundment name.	
	Former Ash Basin	
1.2	Identification number of the CCR surface impoundment (if one has been assigned by the Agency).	
	W1798010008-05	
1.3	Description of the boundaries of the CCR surface impoundment (35 Ill. Adm. Code 845.210(c)).	
	SEC 8 T24N R5W E 1/2 OF NE 1/4 (EXC RIVER) & E 1/2 OF SE 1/4 (EXC RIVER & EXC TRACT) 111.65 AC	
1.4	State the purpose for which the CCR surface impoundment is being used.	
	Not in service.	
1.5	How long has the CCR surface impoundment been in operation?	
	Mostly unknown due to age but approximately 40-50 years	
1.6	List the types of CCR that have been placed in the CCR surface impoundment.	
	Not documented due to age.	

Construction History (Continued)

1.7	List name of the watershed within which the CCR surface impoundment is located.
	Pekin Lake-Illinois River watershed
1.8	Size in acres of the watershed within which the CCR surface impoundment is located.
	28,834 acres
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.
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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:

Section		Demonstration		Explanation
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.
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☑	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:

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☑	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).

K P R G

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

APPLICATION FOR INITIAL OPERATING PERMIT

POWERTON GENERATING STATION
MIDWEST GENERATION, LLC
PEKIN, ILLINOIS

Illinois EPA Site No. 1798010008

October 29, 2021

Submitted To:

Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62702

Prepared For:

Midwest Generation, LLC
13082 East Manito Rd.
Pekin, IL 61554

Prepared By:

KPRG and Associates, Inc.
14665 West Lisbon Road, Suite 1A
Brookfield, WI 53005

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Introduction

Midwest Generation, LLC (Midwest Generation) currently operates the coal-fired generating station, referred to as Powerton Station, located in Pekin, Illinois ("site" or "generating station"). As part of generating electricity and managing the coal combustion residuals (CCR), the station operates two active CCR surface impoundments (the Ash Surge Basin (ASB) and Ash Bypass Basin (ABB.)).As part of the earlier historical operations at the station, the Former Ash Basin (FAB) was used for the management/storage of CCR and has been identified as an inactive CCR surface impoundment subject to Federal and State regulation.

The objective of this submittal is to apply for the initial operating permit for the ASB, ABB and FAB at the Powerton Generating Station. Midwest Generation seeks to receive the operating permit to continue operating the existing CCR surface impoundments to manage CCR as part of operating the coal-fired generating station to generate electricity. The station also operates the Metal Cleaning Basin (MCB), a CCR surface impoundment that is only subject to the state CCR regulations. Per Variance Request PCB 21-109, Midwest Generation was granted an extension to submit the initial operating permit for the MCB until March 31, 2022 by the Illinois Pollution Control Board.

This submittal provides the information as required in accordance 35 Ill. Adm. Code 845.230. This permit application is organized to discuss each section of 35 Ill. Adm. Code 845.230, as necessary.

This permit application is organized with supporting Tables and Figures that are referenced in the discussions being provided at the end of the full Permit text with the table numbers and figures tied to the Section number within which they are referenced with sequential numbering (e.g., Tables referenced in Section 9 are numbered 9-1, 9-2, etc. Figures referenced in Section 9 are numbered Figure 9-1, 9-2, etc.). Specific Attachments referenced within each Section are provided in a similar fashion (e.g., Attachment 1 information is tied to Section 1 of the Permit text, Attachment 2 information is tied to Section 2 of the Permit text, etc.). It should be noted that if a Section does not reference an Attachment then that Attachment number is not included as part of the permit application. For example, Section 13 does not reference an Attachment; therefore, there is no Attachment 13 in this permit application.

1.0 History of Construction, 845.230(d)(2)(A)

The history of construction of the CCR surface impoundment as specified in Section 845.220(a)(1) is presented below.

1.1 CCR Surface Impoundment Identifying Information

The identifying information associated with the CCR surface impoundments at the generating station are listed in the table below.

Name	Owner/Operator	Impoundment ID Number
Ash Surge Basin	Midwest Generation 804 Carnegie Center Princeton, NJ 08540	W1798010008-01
Ash Bypass Basin	Midwest Generation 804 Carnegie Center Princeton, NJ 08540	W1798010008-04
Former Ash Basin	Midwest Generation 804 Carnegie Center Princeton, NJ 08540	W1798010008-05

1.2 Purpose of CCR Impoundment

1.2.1 Ash Surge Basin
The Ash Surge Basin (ASB) is used as the primary settling basin for sluiced CCR and other process waters related to electrical power generation at the station.

1.2.2 Ash Bypass Basin
The Ash Bypass Basin (ABB) was a settling pond for sluiced CCR and other process waters related to power generation at the site when the ASB is not in use due to maintenance. As of April 11, 2021, the ABB is not in service.

1.2.3 Former Ash Basin
The Former Ash Basin (FAB) is an inactive surface impoundment that was previously used for bottom ash disposal. It is estimated that the FAB stopped receiving CCR by circa 1970’s.

1.3 CCR Impoundment Length of Operation

1.3.1 Ash Surge Basin
The ASB was constructed in 1978 and has been operating since. The pond has been operating for about 43 years.

1.3.2 Ash Bypass Basin
The ABB was constructed in 1978 and has been in operation until April 11, 2021. The pond has been operating for about 43 years.

1.3.3 Former Ash Basin
Due to the age of the FAB, there is no documentation of when it was constructed. The Powerton Station began operating its first generating unit in 1928 and the FAB was used previously as a CCR impoundment. It is unknown if the FAB was used as the first area for CCR disposal. Midwest Generation has not sent coal ash to this basin since purchasing the station in 1999. Based on available information, it is estimated that the FAB stopped receiving CCR by the 1970's. If the FAB was used for CCR management since the station began operating, then the FAB operated for approximately 40-50 years.

1.4 Type of CCR in Impoundment

1.4.1 Ash Surge Basin
The types of CCR in the ASB is bottom ash. The chemical constituents that make up the CCR is discussed in further detail in Section 2.1.

1.4.2 Ash Bypass Basin
The CCR was removed from the ABB. The types of CCR that were in the ABB is bottom ash. The chemical constituents that make up the CCR is discussed in further detail in Section 2.2.

1.4.3 Former Ash Basin
The FAB is currently inactive and was historically used for CCR disposal, however, the types of CCR placed into the FAB is not documented. According to Geosyntec's History of Construction, it has been estimated that it stopped receiving CCR in the 1970's. The chemical constituents that make up the CCR is discussed in further detail in Section 2.3.

1.5 Name and Size of the Watershed

The ASB, ABB, and FAB are located within the Pekin Lake-Illinois River watershed (HUC12 071300030304), which is approximately 28,834 acres (USGS 2015). This watershed is located within the larger Lower Illinois watershed.

It should be noted that surface water run-on for the ASB and the ABB is limited to the area within the embankment crests because they are constructed with elevated embankments in relation to the surrounding ground surface.

1.6 Description of CCR Impoundment Foundation

The following description of the ASB and the ABB's foundation is provided in the History of Construction created by Geosyntec:

The ASB and the ABB were constructed with fill embankments on all sides. Because no formational materials provide lateral structural support for the embankments, the basins do not contain abutments.

The following description of the FAB's foundation is provided in the History of Construction created by Geosyntec.

The FAB was constructed with fill embankments on the north, east, and west sides. The south side of the FAB is currently incised. Because no in-situ or native materials provide lateral structural support for the embankments, the basins do not contain abutments.

The railroad berm added in 2010 that bisects the FAB was constructed using CCR material.

The following sections discuss the foundation materials' physical and engineering properties.

1.6.1 Physical Properties of Foundation Materials

1.6.1.1 Ash Surge Basin

The physical properties of the foundation materials in the vicinity generally consists of interlayering of sandy and clayey units. Soil borings performed in 2005 as part of a KPRG site investigation identified layers of sand with silt and gravel, silty sand with traces of clay from the ground surface to a depth of about 20 feet. Approximately 100 to 125 feet of alluvial sands and gravels with some minor clay underlies the Station based on publicly available geologic information. Silt and clay layers were observed beneath the fill material used to construct the basin's embankments based on logs from monitoring wells installed in the basin's embankments as well as borings and cone penetration test (CPT) soundings performed in the vicinity of the basin. This information was obtained from site investigation work performed by Patrick Engineering in 2011 and Geosyntec in 2016. The logs and CPT soundings show that the silt and clay layers range from 16 to 20 feet thick and these layers are underlain by approximately 34 to 43 feet of medium dense sand and gravel that is poorly graded. Geosyntec performed a soil boring and a CPT sounding east of the ASB that identified a layer of very hard lean clay below the above-mentioned poorly graded sand and gravel. No abutments are present.

1.6.1.2 Ash Bypass Basin

The physical properties of the foundation materials of the ABB are the same as the materials of the ASB, mentioned in Section 1.6.1.1. The ABB is located directly southeast of the ASB and the same type of materials underlain this basin as does the ASB. The north embankment of the ABB is the southeast embankment of the ASB.

1.6.1.3 Former Ash Basin

The foundation materials in the vicinity of the FAB consists generally of layering of sand and clay units. Publicly available geologic information shows that the Powerton Station is underlain with approximately 100 to 125 feet of alluvial sand and gravel with some clay. Logs from monitoring wells installed in the FAB's embankment identified layers of sand and clay under the fill used to construct the embankments. Investigation activities performed in 2011 and 2016 identified the silt and clay layers ranged from 16 to 20 feet, underlain with approximately 34 to 43 feet of medium dense poorly graded sand and gravel.

1.6.2 Engineering Properties of Foundation Materials

1.6.2.1 Ash Surge Basin

The foundation materials for the ASB were determined to be clay or sand as indicated in Section 1.6.1.1. The engineering properties for the foundation materials are from the periodic structural stability and safety factor assessments performed by Geosyntec for the ASB and the ABB. The properties were determined from site investigations, published correlations, and laboratory testing of samples collected during the site investigations. The engineering properties are presented in the below table.

Material	Unit Weight (pcf)	Drained Friction Angle (degrees)	Effective Cohesion (psf)	Undrained Shear Strength (psf)
Clay	115	32	25	600
Sand	125	32	0	-

The very hard lean clay mentioned in Section 1.6.1.1 that underlays the poorly graded sand and gravel did not have engineering properties determined for it. This was because of its depth below ground surface in relation to the basins and its negligible contribution to the slope stability analyses as determined by Geosyntec.

1.6.2.2 Ash Bypass Basin

The ABB is located directly southeast of the ASB and the same type of materials underlain this basin as does the ASB. The north embankment of the ABB is the southeast embankment of the ASB. The engineering properties for the ABB's foundation materials are the same as the properties of the ASB, mentioned in Section 1.6.2.1.

1.6.2.3 Former Ash Basin

Due to the age of the FAB, the engineering properties of the foundation materials are not available. Construction as-built drawings or construction completion reports were not available at the time of completing this operating permit application. No documentation of the actual materials and methods used to construct the FAB were available at the time of this operating permit application.

1.7 Description of the Construction Materials, Methods, and Dates

The descriptions of the construction materials, methods, and dates are based on the construction drawings created by NUS in 1978 and 1980, and site investigations. The drawings discussed in the following sections are located in Attachment 1. As-built construction drawings or construction completion reports were not available detailing the actual methods and materials used to construct the basins.

1.7.1 Physical and Engineering Properties of Construction Materials

1.7.1.1 Ash Surge Basin

Based on construction documents available from NUS dated 1978, the embankments were designed to be constructed using compacted fill. Engineering properties for the fill used for the construction of the ASBn were not available. Engineering properties for the embankment fill were estimated by Geosyntec for use in the factor of safety assessment for the ASB. These estimated properties were based on site investigations, published data and laboratory testing of embankment materials. Those engineering properties for the embankment fill from the factor of safety assessment are listed in the following table:

Material	Unit Weight (pcf)	Drained friction angle (degrees)	Effective cohesion (psf)
Embankment fill	125	35	25

1.7.1.2 Ash Bypass Basin

The ABB is located directly southeast of the ASB and constructed using the same type of material as the ASB. The north embankment of the ABB is the southeast embankment of the ASB. The engineering properties for the foundation materials for the ABB are the same as for the ASB, which are discussed in Section 1.7.1.1.

1.7.1.3 Former Ash Basin

There is no historical documentation available regarding the construction materials for the FAB. Site investigations identified that fill material was present in the embankments of the FAB and that sand and clay layers were present in the subsurface in the vicinity of the FAB.

1.7.2 Construction Methods

1.7.2.1 Ash Surge Basin

Based on construction documents available from NUS dated 1978, the existing grade where the basins are located was leveled and the embankments surrounding the basin were constructed using compacted fill. The top of the embankment was designed to be approximately 20 feet wide with a gravel-surfaced access road on top. The interior embankments were designed with a 3H:1V slope and specified to be lined with a Hypalon geomembrane liner. The exterior slopes were designed at 3H:1V or shallower. The bottom of the basin and the lower portion of the embankments were designed with a Poz-O-Pac liner system that was designed to be installed in two 6-inch lifts for a total thickness of 12 inches. In 2013, the Hypalon liner on the embankments and the Poz-O-Pac liner near the outlet weir were removed (the rest of the Poz-O-Pac liner remained) and a new high-density polyethylene (HDPE) geomembrane liner was placed on the embankments and the outlet weir. The HDPE geomembrane liner was continued from the embankments and placed on the base of the ASB over the existing Poz-O-Pac liner. Based on the as-built drawings created during the liner replacement in 2013, the interior side slopes were determined to be inclined at approximately 4H:1V.

1.7.2.2 Ash Bypass Basin

Based on construction documents available from NUS dated 1980, the basin bottom was leveled for the liner placement and the south and east embankments surrounding the basin were constructed using fill materials. The northern and western embankments were already present because these embankments are shared with other surface impoundments. The northern embankment is shared with the ASB's southern embankment and the west embankment is shared with the East Roof and Yard Runoff (ERYR) Basin's east embankment. The ERYR Basin is a non-CCR surface impoundment.

According to the construction documents, the fill material was to be placed and compacted in loose lifts not to exceed 9 inches and compacted to 95% relative compaction when compared to a maximum dry density obtained from a modified proctor test. The design width for the top of the embankment ranged from 12 to 18 feet and the maximum embankment slope height is about 24 feet on the west embankment that is shared by the ERYR Basin. The Interior embankments were designed with a slope of 3H:1V and originally lined with a Hypalon membrane liner. The exterior slopes of the embankment were designed at 2.5H:1V or shallower. The base of the basin was lined with a Poz-O-Pac liner system, which is the same liner system used in the ASB. The original Poz-O-Pac liner on the base of the ABB was removed and replaced in 2010 with a HDPE geomembrane liner.

1.7.2.3 Former Ash Basin

Due to the age of the FAB, no documents related to its construction are available for review. Prior to 2010, the FAB was one containment area with embankments on the north, west, and east sides and the south side is currently incised. In 2010, a railroad spur was constructed that split the FAB into two sections, north-half and south-half. The railroad spur was placed on top of the embankment that was constructed using CCR material. Based on the available construction document from Cornette Engineering Services dated 2008, the side slopes for the rail spur embankment were designed at 2H:1V. The embankment was designed to be approximately 20 to 25 feet tall in relation to the surrounding site elevations with a crest width of approximately 23 feet.

1.7.3 Construction Dates

1.7.3.1 Ash Surge Basin

The actual construction dates for the ASB are unknown. The available construction drawings by NUS were approved in 1978, and the basin was constructed with a Poz-O-Pac liner on the base and Hypalon liner on the side slopes. As stated above, a new HDPE geomembrane liner was installed in 2013 over the original Poz-O-Pac liner on the base of the ASB.

1.7.3.2 Ash Bypass Basin

The actual construction dates for the ABB are unknown. The available construction drawings were approved in 1980. As stated above, the original Poz-O-Pac liner on the base of the ABB was removed and replaced in 2010 with a HDPE geomembrane liner.

1.7.3.3 Former Ash Basin

The construction dates for the FAB are unknown and no known construction documents are available. The available construction document for the railroad berm is dated 2010. A drawing dated 2019 showing the proposed closure of the FAB and the existing conditions of the basin shows the railroad spur bisecting the basin.

1.8 Detailed Dimensional Drawings

1.8.1 Ash Surge Basin

Construction documents prepared by NUS, dated 1978, are included in Attachment 1-1. The as-built drawings for the liner replacement prepared by NRT, dated 2014, are included in Attachment 1-2.

1.8.2 Ash Bypass Basin
Construction documents prepared by NUS, dated 1978, are included in Attachment 1-3. The as-built drawings for the liner replacement prepared by NRT, dated 2011, are also included in Attachment 1-4.

1.8.3 Former Ash Basin
Construction documents for the railway crossing prepared by Cornette Engineering Services, dated 2008, are included in Attachment 1-5. There are no other construction documents available for the FAB.

1.9 Instrumentation

1.9.1 Ash Surge Basin
A water level monitoring system is used as part of the operation of the ASB. This system includes an ultrasonic level detector that is present in the pump house sump north of the ASB, which control the pumps that maintain the operational water level in the ASB. The water level monitoring system does not determine the water level in the ASB. Instrumentation within the ASB footprint is not present.

A staff gauge is also being installed in the basin to determine the water level visually.

1.9.2 Ash Bypass Basin
The same water level monitoring system used for the ASB is also used as part of the operation of the ABB. The outlet structure for the ABB drains to the same pump house sump as the ASB. When the ABB was in use, the pumps in the sump maintain the operational water level in the ABB. The water level monitoring system does not determine the water level in the ABB. Instrumentation within the ABB footprint is not present. This instrumentation does not determine the water level in the ABB. Because the ABB is not in service, wastewater is not directed to it and the water in the pond is either rainfall or runoff.

A staff gauge is also being installed in the basin to determine the water level visually.

1.9.3 Former Ash Basin
There is no instrumentation present at the FAB. A staff gauge is also being installed in the basin to determine the water level visually.

1.10 Area-Capacity Curve

1.10.1 Ash Surge Basin
An area-capacity curve for the ASB and ABB created by Geosyntec is provided on Figure 1-1.

1.10.2 Ash Bypass Basin
An area-capacity curve for the ASB and ABB created by Geosyntec is provided on Figure 1-2.

1.10.3 Former Ash Basin
An area-capacity curve for the FAB created by Geosyntec is provided on Figure 1-3. It should be noted that without the original construction documents, the curve could not be developed for the estimated in-place 500,000 cubic yards of CCR.

1.11 Spillway and Diversion Capacities and Calculations

1.11.1 Ash Surge Basin
The ASB utilizes a concrete spillway along the eastern perimeter. The spillway was constructed of two 4.5-foot wide concrete box culverts beneath the perimeter access road. A concrete apron is located east of the box culvert and riprap is located downstream of the apron. No calculations for the original design are available; however, the ASB has operated properly without any issues.

1.11.2 Ash Bypass Basin
When the ABB was in service, it utilized a corrugated metal overflow pipe located along the northern interior slope of the basin. The overflow pipe extends approximately 40 feet northward beneath the access road into the ASB and includes a 5-foot diameter corrugated metal pipe vertical riser. The vertical riser connects to a 30-inch diameter concrete pipe that extends northward within the embankment between the ABB and ASB and discharges onto the concrete apron on the southern slope of the ASB. No calculations for the original design are available. However, the ABB has operated properly without any issues.

1.11.3 Former Ash Basin
The FAB does not contain spillways.

1.12 Surveillance, Maintenance, and Repair Construction Specifications

As previously noted, specifications for the original construction of the FAB are not available. The specifications available are from the 2010 and 2013 liner replacement projects for the Ash Bypass and ASB, respectively. The specifications for the ASB are included as part of this application in Attachment 1-6. The specifications for the ABB are included as part of this application in Attachment 1-7.

1.13 Record of Structural Instability

There is no record or knowledge of structural instability associated with the ASB, ABB, or FAB.

2.0 CCR Chemical Constituents Analysis, 845.230(d)(2)(B)

2.1 Ash Surge Basin

The CCR in the ASB are bottom ash and economizer ash. The CCR that was sluiced to the ASB was sampled and analyzed for the parameters listed in Section 845.600(a) except for total dissolved solids. The results of those analyses are presented in Table 2-1. The laboratory data package is included in Attachment 2.

2.2 Ash Bypass Basin

The ABB no longer contains CCR. The CCR that was in the ABB was bottom ash and economizer ash, which is the same CCR that would be present within the ASB. As mentioned in Section 2.1, the CCR from the ASB was sampled and analyzed for the parameters listed in Section 845.600(a) except for total dissolved solids. The results of those analyses are presented in Table 2-1. The laboratory data package is included in Attachment 2.

2.3 Former Ash Basin

The CCR in the FAB consist of ash, however, there is no documentation available on the types of ash placed into this unit. The FAB is an inactive surface impoundment and is no longer used for CCR disposal. The CCR materials were sampled and analyzed for the parameters listed in Section 845.600(a) except for total dissolved solids. The results of those analyses are presented in Table 2-2. The laboratory data package is included in Attachment 2.

3.0 Chemical Constituents Analysis of Other Waste Streams, 845.230(d)(2)(C)

According to the Demonstration for a Site-Specific Alternative Deadline to Initiate Closure prepared by Sargent and Lundy, L.L.C. on November 30, 2020 (“Alternate Closure Demonstrations” or “ACD”), Powerton has not sent CCR or non-CCR waste streams to the Bypass Basin as of April 11, 2021 and does not plan on sending any waste streams to that basin in the interim. Currently, the Powerton Station is sending the following low-volume non-CCR waste streams to the ASB:

- Overflow from the Unit 5 and 6 slag tanks
- Overflow from the Station’s East Yard Runoff Basin
- Effluent from the Station’s Makeup Treatment Plant
- Effluent from the Station’s Metal Cleaning Waste Treatment System

The above listed waste streams are treated for suspended solids removal prior to being discharged to the Illinois River. The waste streams are currently regulated by NPDES Permit No. IL0002232. The Powerton Flow Diagram is included in Attachment 3. The FAB has been inactive and has not received CCR waste since the 1970’s.

4.0 Location Standards Demonstration

4.1 Placement Above the Uppermost Aquifer

The base of the ASB is not separated from the upper limit of the uppermost aquifer by a minimum distance of five (5) feet. This determination was made based on groundwater elevations obtained from the monitoring wells around the ASB and the identified base elevation of the ASB. The groundwater elevation data included in Table 9-2 and the elevation of the ASB liner were compared to determine if a hydraulic connection was present. This comparison demonstrated that an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the ASB and the uppermost aquifer due to normal fluctuations in groundwater elevations is not present. Therefore, the location of the ASB complies with Section 845.300. This determination is included in Attachment 4-1.

According to the Locations Restrictions Compliance Demonstration performed by Geosyntec in October of 2018, the base of ABB is separated from the upper limit of the uppermost aquifer by a minimum distance of five (5) feet. Therefore, the location of the ABB complies with Section 845.300. This determination is included in Attachment 4-1. KPRG concurs with this determination.

According to the Locations Restrictions Compliance Demonstration performed by Geosyntec in April of 2020, the base elevation of the FAB is below the uppermost aquifer elevation. Therefore, the location of the FAB does not comply with Section 845.300. In accordance with Section 845.350, the FAB will be closed as required by Section 845.700. This determination is included in Attachment 4-2. KPRG concurs with this determination.

4.2 Wetlands

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in October of 2018, the ASB and ABB are not located in mapped wetlands included in the National Wetlands Inventory-Version 2 presented by the U.S. Fish and Wildlife Service (USFW) [USFW, 2018]. Therefore, the location of the ASB and ABB complies with Section 845.310. This determination is included in Attachment 4-1. KPRG concurs with this determination.

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in April of 2020, a portion of the FAB is located in a mapped wetland included in the National Wetlands Inventory – Version 2 present by the U.S Fish and Wildlife Service (USFW) [USFW, 2018]. Therefore, the location of the FAB does not comply with Section 845.310. In accordance with Section 845.350, the FAB will be closed as required by Section 845.700. This determination is included in Attachment 4-2. KPRG concurs with this determination.

4.3 Fault Areas

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in October of 2018, the ASB and the ABB are not located within 200 feet (60 meters) of a mapped Holocene-aged fault, as mapped by the United States Geological Survey (USGS) Quaternary Fault Database [USGS, 2018]. Therefore, the location of the ASB and ABB complies with Section 845.320. This determination is included in Attachment 4-1. KPRG concurs with this determination.

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in April of 2020, the FAB is not located within 200 feet (60 meters) of a mapped Holocene-aged fault, as mapped by the United States Geological Survey (USGS) Quaternary Fault Database [USGS, 2020]. Therefore, the location of the FAB complies with Section 845.320. This determination is included in Attachment 4-2. KPRG concurs with this determination.

4.4 Seismic Impact Zones

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in October of 2018, the ASB and the ABB are not located within a seismic impact zone, as defined in Section 845.120, and as mapped by the United States Geological Survey (USGS) [USGS, 2014]. Therefore, the location of the ASB and ABB complies with Section 845.330. This determination is included in Attachment 4-1. KPRG concurs with this determination.

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in April of 2020, the FAB is not located within a seismic impact zone, as defined in Section 845.120, and as mapped by the United States Geological Survey (USGS) [USGS, 2018]. Therefore, the location of the FAB complies with Section 845.330. This determination is included in Attachment 4-2. KPRG concurs with this determination.

4.5 Unstable Areas

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in October of 2018, the ASB and the ABB are not located in an unstable area [Geosyntec, 2016]. Therefore, the location of the ASB and ABB are in compliance Section 845.340. This determination is included in Attachment 4-1. KPRG concurs with this determination.

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in April of 2020, the FAB is not located in an unstable area [Geosyntec, 2016]. Therefore, the location of the FAB is in compliance Section 845.340. This determination is included in Attachment 4-2. KPRG concurs with this determination.

4.6 Floodplains

As determined by KPRG, the ASB and ABB are not located in a floodplain according to the National Flood Hazard Layer FIRMette Map No. 17179C0175E as mapped by the Federal Emergency Management Agency. Therefore, the locations of the ASB and the ABB comply with Section 845.340. The relevant FIRMette is located in Attachment 4-3.

As determined by KPRG, the FAB is located within Zone AE, which has a 1% annual chance flood hazard that corresponds to the 100-year flood according to the National Flood Hazard Layer FIRMette Map No. 17179C0175E as mapped by the Federal Emergency Management Agency. Therefore, the location of the FAB does not comply with Section 845.340. In accordance with Section 845.350, the FAB will be closed as required by Section 845.700. The relevant FIRMette is located in Attachment 4-3.

5.0 Permanent Markers, 845.230(d)(2)(E)

The permanent markers in accordance with 35 Ill. Adm Code 845.230(d)(2)(D) have been installed for the ABB, ASB, and FAB. Photographic documentation of this requirement is included in Attachment 5.

6.0 Incised/Slope Protection Documentation, 845.230(d)(2)(F)

6.1 Ash Surge Basin

The ASB was constructed with embankments on all sides. The interior slopes of the ASB are lined with a 60-mil high-density polyethylene geomembrane. This geomembrane protects the slopes from erosion, the effects of wave action, and mitigates effects of rapid drawdown. The exterior north slope has erosion protection because of established vegetation and the geomembrane-lined interior slope of the adjacent basin. The exterior east slope has erosion protection because of established vegetation and the geomembrane-lined interior slope of the adjacent basin. The exterior south slope has erosion protection because of established vegetation. The exterior west slope is covered with gravel providing erosion protection and the geomembrane-lined interior slope of the adjacent basin. Photo documentation is included in Attachment 6.

6.2 Ash Bypass Basin

The ABB was constructed with embankments on all sides. The interior slopes are lined with a 60-mil high-density polyethylene geomembrane. This geomembrane protects the slopes from erosion, the effects of wave action, and mitigates effects of rapid drawdown. The exterior north slope has erosion protection because of the ASB's geomembrane-lined interior slope. The exterior east and south slopes have erosion protection because of the established vegetation. The exterior west slope is covered with gravel that protects the slope from erosion. Photo documentation is included in Attachment 6.

6.3 Former Ash Basin

The FAB was constructed with fill embankments on the north, west, and east sides; the south side is currently incised. The upstream interior slopes of the FAB are protected by vegetation from erosion, the effects of wave action, and potential effects of rapid drawdown. The exterior north and east slopes are heavily vegetated, which provides for erosion protection. The exterior west slope has erosion protection from the adjacent basin's interior slope geomembrane liner and the ASB's interior slope geomembrane liner. Photo documentation is included in Attachment 6.

7.0 Emergency Action Plan, 845.230(d)(2)(G)

The Emergency Action Plans for the ASB, ABB, and the FAB were completed by Civil and Environmental Consultants, Inc. (CEC) to comply with 40 CFR Part 257 to identify safety emergencies and the proper responses in relation to each basin. KPRG reviewed the EAP's for their compliance with Section 845.520. KPRG's review ensured that all the necessary sections required by Section 845.520 are included within the EAP. This review neither accepts nor rejects the safety emergencies identified by CEC. The safety emergencies identified along with the responses are the product of CEC. KPRG has not altered the safety emergencies or the responses associated with each emergency.

7.1 Ash Surge Basin

The Emergency Action Plan (EAP) is included in Attachment 7-1. The plan was developed in April 2017 by CEC and was reviewed by KPRG for compliance with Section 845.520. The only update necessary was to revise the contacts list included in the EAP. The contacts list was updated based upon personnel changes that occurred. The updated contacts list is included in the EAP along with the original contacts list as to not misrepresent the EAP prepared by CEC. In accordance with 845.520(e), a certification of compliance is included in Attachment 7-1.

7.2 Ash Bypass Basin

The Emergency Action Plan (EAP) is included in Attachment 7-1. The plan was developed in April 2017 by CEC and was reviewed by KPRG for compliance with Section 845.520. The only update necessary was to revise the contacts list included in the EAP. The contacts list was updated based upon personnel changes that occurred. Not to misrepresent the EAP prepared by CEC, the updated contacts list is included in the EAP along with the original contacts list. In accordance with 845.520(e), a certification of compliance is included in Attachment 7-1.

7.3 Former Ash Basin

The Emergency Action Plan (EAP) is included in Attachment 7-2. The plan was created in August 2018 by CEC and was reviewed by KPRG for compliance with Section 845.520. The only update necessary was to revise the contacts list included in the EAP. The contacts list was updated based upon personnel changes that occurred. The updated contacts list is included in the EAP along with the original contacts list as to not misrepresent the EAP prepared by CEC. In accordance with 845.520(e), a certification of compliance is included in Attachment 7-2.

8.0 Fugitive Dust Control Plan, 845.230(d)(2)(H)

The Fugitive Dust Plan is included in Attachment 8. This plan covers the ASB, the ABB, the FAB, and the MCB. This plan was originally created in October 2015 and was revised in September 2021 by KPRG. This plan complies with Section 845.500(b).

9.0 Groundwater Monitoring Information, 845.230(d)(2)(I)

9.1 Hydrogeologic Site Characterization

The following subsections provide information on the geology and hydrogeology of the site as required under Section 845.620(b). Site geology and hydrogeology are discussed separately below. Referenced Tables and Figures are provided at the end of this section. Other supporting documentation is provided with the referenced Attachment.

9.1.1. Geology

The physiography of Tazewell County is made up of end moraines, plains (including flood plains), river terraces and valleys, alluvial fans and loess. The Illinois and Mackinaw River Valleys are the prominent landforms. Several small lakes are located near the western border of the county, which is bound by the Illinois River. Tazewell County is in the Till Plaines Section of the Central Lowland Province. Near surface soils in the vicinity of the subject impoundment have been grouped as Orthents, loamy and Urban Land. Urban Land units are primarily covered by pavement, railroad tracks, and buildings, which typically impede infiltration and are subject to surface runoff. The Orthents, loamy soils are fine to moderately coarse textured soils found in areas that have been modified by filling and leveling. Available water capacity is generally high, while permeability is typically high at the surface level and decreases with depth. Organic matter and plant nutrient content is low in the Orthents, loamy soils (Soil Survey of Tazewell County, Illinois).

Regionally, the stratigraphy in the area consists of approximately 100 to 125 feet of unconsolidated deposits consisting mainly of alluvial sands and gravels with some interspersed clays/silty clays. The unconsolidated deposits are underlain by alternating layers of limestone, shale, and coal of the Carbondale Formation. To evaluate local stratigraphy and as part of groundwater model development in support of the Construction Permit being submitted under separate cover, water and test well logs were obtained for wells in the general vicinity of the Powerton Generation Station. The stratigraphy data from these boring logs and the well locations are provided in Attachment 9-1. In addition, well logs from 21 monitoring wells that were installed in the vicinity of the subject surface impoundments were evaluated (MW-1 through MW-21; see Figure 9-1) with those borings ranging in depth from 30 feet to 41 feet. This information is also included in Attachment 9-1. Boring logs for these monitoring wells are included in Attachment 9-2. Based on an evaluation of this data, the following general site-specific stratigraphy is defined and geologic cross-sections are provided as Figures 9-2 through 9-7 based on the 21 on-site monitoring well boring logs:

- Fill (16’ to 24.5’ thick) – Consisting of tan, brown and black fine to medium sand/silty sand with some gravel and clay seams. Several locations also included black cinders and brick fragments.

- Clay/silty clay/silts (0’ to approximately 18’ thick) – Consisting of olive, brown and gray clays, silts and silty clays with some more organic rich layers. May locally contain fine silty sand and/or fine sand. This unit is not mappable across the site (i.e., discontinuous).

- Sand and gravel (thickness undetermined; borings terminate within unit) – Consisting of light brown, brown and/or gray medium to coarse sands and gravels.

Although no specific borings were extended into the sedimentary bedrock beneath this facility, water well logs obtained for water wells in the vicinity of the Powerton Generating Station indicate shale bedrock is encountered from approximately 35 to 140 feet bgs, depending on the location of the specific well. The boring logs indicate limestone was encountered from approximately 99 to 103 feet below grounds surface just northeast of the Powerton Generating Station and in close proximity to the Illinois River.

There are no underground mines beneath the subject CCR surface impoundment.

9.1.2 Hydrogeology

Based on information from the Soil Survey of Tazewell County, the average annual precipitation is approximately 36 inches with about 62% of that total falling between April and September of any given year. The average seasonal snowfall is approximately just over 26 inches. More site-specific precipitation data from a water station located in Peoria, Illinois, is provided in Table 9-1. The nearest natural surface water body is the Lost Creek which bends around the eastern edge of the FAB and property boundary. Lost Creek is an ephemeral stream that only flows during and after precipitation events. The Illinois River is located to the north of the subject CCR units. Powerton Lake is located to the west-northwest.

Groundwater beneath the Powerton Generating Station occurs under water table conditions. Saturated conditions are generally encountered between 18 to 32 feet bgs, depending on the well location. When appropriate, the ASB and the ABB are herein discussed separately from the FAB, as they have separate monitoring well networks. The ABB/ASB CCR monitoring well network consists of monitoring wells MW-01 [upgradient], MW-08, MW-09 [upgradient], MW-11, MW-12, MW-15, MW-17, MW-18 and MW-19 [upgradient]). CCR monitoring wells MW-08, MW-12, MW-15 and MW-17 are screened within the shallow, localized, saturated clay/silt unit. The remaining monitoring wells have deeper screens, within the more extensive sand and gravel unit. The FAB monitoring well network consists of monitoring wells (MW-01 [upgradient], MW-02, MW-03, MW-04, MW-05, and MW-10 [upgradient]). Unlike the CCR monitoring network for the ABB/ASB which includes monitoring wells within both a shallow localized clay/silty clay unit and a deeper more extensive sand unit, all wells associated with the FAB monitoring are screened within the extensive sand unit which underlies the area (i.e., the localized shallow clay/silty clay unit does not extend beneath the FAB). Tables 9-2 and 9-3 provide groundwater elevation measurements obtained for the on-site monitoring wells in the vicinity of the subject CCR surface impoundment which includes data for the monitoring wells associated specifically with the ABB/ASB (upgradient wells MW-01, MW-09 and MW-19 and downgradient wells MW-08, MW-11, MW-12, MW-15, MW-17 and MW-18) and FAB (upgradient wells MW-01 and MW-10 and downgradient wells MW-02 thru MW-05), respectively. ABB/ASB and FAB hydrographs of water levels are provided as Figures 9-8 and 9-9, respectively. A review of the hydrographs shows some temporal fluctuations with the highest water levels generally occurring within the first or second quarters of the year.

Groundwater flow maps for the four quarters from 3rd quarter 2020 through the 2nd quarter 2021 are provided as Figures 9-10 through 9-17. The maps include groundwater elevation data from all wells in the area, including the specific CCR monitoring wells associated with the subject ABB/ASB and FAB. The water levels from wells screened in the clay/silt unit and the water levels from monitoring wells screened within the sand unit were evaluated separately and used to generate groundwater flow maps for each unit. The water elevation data within the clay/silt unit indicates localized groundwater flow in a westerly direction. Groundwater flow within the more extensive sand unit shows some divergence with general flow in a northerly direction with flow components to the northwest and northeast towards the Illinois River. It is noted that MW-20 and MW-21 were installed in March 2021 and are therefore not shown on groundwater flow maps from prior to that time.

The horizontal hydraulic gradient is steeper within the silt/clay unit than within the deeper sandy gravel unit. Table 9-4 provides a summary of the flow direction, gradients and an estimated rate of groundwater flow for each sampling event. The flow rate was calculated using the following equation:

$$V_s = \frac{K\,dh}{n_e\,dl}$$

Where:

V_s is seepage velocity (distance/time)
K is hydraulic conductivity (distance/time)
dh/dl is hydraulic gradient (unitless)
n_e is effective porosity (unitless)

Hydraulic conductivity (K) values were initially estimated for monitor wells MW-2, -5, -8, -9, and -10 from slug tests (Patrick Engineering 2011). The geometric mean of the test data for these wells was approximately 350 feet per day (ft/d; 4.05×10^{-3} ft/sec) for each well, as calculated by Patrick Engineering in the Hydrogeologic Assessment Report – Powerton Generating Station, February 2011. The slug test data were reviewed as part of the modeling study being completed for the Construction Permit application and the data were reanalyzed using corrected input values for the well casing and borehole dimensions and effective porosity of the sand filter pack material. The revised geometric mean of the test data for these wells decreased to approximately 120 ft/d (1.39×10^{-3} ft/sec) for each well. The hydraulic conductivity estimate for MW-8 should be used with caution as this monitoring well was screened through site fill and native silty clay. The aquifer properties derived from this well have likely been impacted by the more porous non-native fill material in the upper portion of the well screen and are likely not indicative of the silty clay aquifer. As such, this data was grouped with the more porous sand/gravel materials.

The hydraulic conductivity of 1.39×10^{-3} ft/sec was used for the sandy unit in Table 9-4 as discussed above. The average hydraulic conductivities of 6.38×10^{-7} ft/sec (silt/clay unit) in Table 9-4 was is consistent with estimates from literature (Freeze and Cherry, 1979) and is the center of the range of conductivity values used in the modeling work (1.16×10^{-7} to 1.16×10^{-6} ft/sec). The estimated effective porosities of the silt/clay materials (0.40) and of the sandy materials (0.35) were obtained from literature (Applied Hydrogeology, Fetter, 1980).

At this time, based on the geology discussion in Section 9.1.1 and the site-specific hydrogeology discussion above, the groundwater beneath the CCR surface impoundments is considered as Class I Potable Resource Groundwater in accordance with Section 620.210. It is noted, however, that a Groundwater Management Zone (GMZ) and an Environmental Land Use Control ("ELUC") have been established where the CCR surface impoundments are located in as part of a Compliance Commitment Agreement (CCA) between Midwest Generation and Illinois EPA. The ELUC states that the groundwater shall not be used as potable water. The extent of the established and approved GMZ and ELUC are provided on Figure 9-18. The GMZ and ELUC occupy the same extent of the Powerton property.

A survey of all potable water sources within a 2,500 feet radius of the Midwest Generation Powerton Generating Station was completed by Natural Resources Technology (NRT) in 2009. The following databases and sources of information were utilized by NRT in order to determine community water source and water well locations and construction in the vicinity of the ash pond wastewater treatment systems:

- Illinois State Geological Survey (ISGS) -Water Well Database Query;
- Illinois State Water Survey (ISWS) Private Well Database and water well construction report request; and
- Illinois Division of Public Water Supply web-based Geographic System (GIS) files;

As part of this permit preparation, KPRG evaluated the NRT information and reviewed the new Illinois State Geological Survey database and interactive map references as "ILWATER". The survey results are provided on Figure 9-19. Twelve wells were identified within a 2,500-foot radius of the Station's subject CCR surface impoundments. The two wells off-site to the east are upgradient of the subject impoundments. There were eight wells identified on Powerton Station property on the ILWATER interactive map all of which were older construction wells installed by previous Ownership. Discussions with facility personnel indicate that all eight of these wells were taken out of service/abandoned. The two wells at the far western boundary of the 2,500 foot radius (identified as wells 9 and 10 from the NRT evaluation) are part of the six water wells currently on the Powerton Station property that are in use (the remaining four wells are located further west, outside the 2,500 foot search radius). These two wells are screened within the sand/gravel aquifer but are not directly downgradient of the surface impoundments and are separated from those units by the intake and outfall channels. They are regularly sampled and analyzed for potable water constituents. The sampling results consistently have been in compliance with potable water regulations.

A search of the Illinois Department of Natural Resources dedicated nature preserve database (https://www2.illinois.gov/dnr/INPC/Pages/NaturePreserveDirectory.aspx) was performed to determine whether there may be a nearby dedicated nature preserve. There were no identified dedicated nature preserves in the immediate vicinity of the subject surface impoundments.

Based on the geology of the site presented in Section 9.1.1 and the above hydrogeology discussions, the primary contaminant migration pathway for a potential release from the subject CCR surface impoundments would be downward migration to groundwater within the unconsolidated silty clay or sand/gravel aquifer. Due to the proximity to the Illinois River and/or plant intake channel, which are hydrogeologic flow boundaries, minimal to no downward vertical flow mixing would be anticipated. There are no other utility or man-made preferential pathway corridors that would act to potentially intercept the flow to move any contamination in a direction other than under natural groundwater flow conditions. There are no potable water wells between the impoundments and anticipated flow discharge boundaries. Also, as previously discussed, there are no potable surface water intakes on the Illinois River either along or within at least several miles downstream of the subject site.

There is quarterly groundwater quality data associated with the subject ABB/ASB and FAB surface impoundments dating back to December 2010. However, the parameter list was slightly different from that specified in Section 845.600 and included analysis of dissolved inorganic parameters rather than total inorganic parameters. That historical water quality data is provided in Attachment 9-3.

The ABB/ASB and FAB are subject to the federal requirements under Federal Register, Environmental Protection Agency, 40 CFR Parts 257.94, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule dated April 17, 2015 (Federal CCR Rule). As required under the Federal CCR Rule, eight rounds of background sampling were completed for the monitoring wells within the monitoring network for the subject CCR surface impoundments. This included the full list of Appendix III (detection monitoring) and IV (assessment monitoring) parameters. Since the effective date of the State CCR Rule, quarterly groundwater monitoring for the full list of parameters specified in Section 845.600, which includes all parameters in the Federal CCR Rule Appendix III/IV, has continued. This data is provided in Tables 9-5 and 9-6 for the ABB/ASB and FAB, respectively. In addition, it is noted that Illinois EPA added turbidity measurements to the list with a required eight rounds of background of that parameter for each well in the monitoring network for the subject CCR surface impoundment. This data is provided in Tables 9-7 and 9-8 for the ABB/ASB and FAB, respectively.

9.2 Groundwater Monitoring System Design and Construction Plans (845.230(d)(2)(H)(ii)

A comprehensive monitoring well network that includes other basins in the vicinity of the ABB/ASB and FAB was established 2010 and expanded pursuant to the CCA. The well spacing was developed as part of a previous hydrogeologic assessment. The well depths were determined based on depth to groundwater and the base elevations of the basins being monitored and were approved by Illinois EPA. Two separate groundwater monitoring networks have been established; one combined network for the ABB/ASB and a separate network for the FAB. These are as follows:

- Combined ABB/ASB monitoring network - upgradient wells MW-01, MW-09 and MW-19 and downgradient wells MW-08, MW-11, MW-12, MW-15, MW-17 and MW-18.

- FAB monitoring network - upgradient wells MW-01 and MW-10 and downgradient wells MW-02 thru MW-05.

Groundwater data from the upgradient wells will be evaluated to provide a statistically representative upgradient water quality for the associated CCR surface impoundments(s) prior to that water passing beneath the regulated units. The proposed monitoring well networks will be utilized for determining whether potential leakage from the regulated units may be causing or contributing to groundwater impacts in the vicinity of the units.

The monitoring wells MW-01 through MW-15 were installed in 2010 by Patrick Engineering, Inc. The remaining wells were installed by KPRG and Associates, Inc. at varying times since the initial 2010 well installations. Wells were drilled using 4.25-inch hollow stem augers. The wells were completed with standard 2-inch inner-diameter PVC casing with 10-feet of 0.010 slot PVC screen.

Filter sand pack around each screen was extended to approximately 2-feet above the top of the well screen. The remainder of the annulus was backfilled with bentonite. Surface completions include stick-up (above grade two to three feet) locking protector casings set in concrete aprons. The wells are further protected by traffic bollards, as necessary. Boring logs and well construction summaries for these wells are provided in Attachment 9-2. Ground surface and top-of-casing elevations were surveyed by an Illinois licensed surveyor and are included in the previously referenced groundwater elevation table.

Each of the monitoring wells within the sampling network is outfitted with a dedicated sampling system. Specifically, each well has a QED Environmental Systems (QED) Well Wizard Model P1101M dedicated sampling pump with Model No. 37789 intake screens (0.010-inch slot). The screens are set within approximately one-foot of the base of the monitoring well.

In accordance with requirements under Section 845.630(g), Attachment 9-4 includes an Illinois licensed Professional Engineer certification of the above-defined monitoring system.

9.3 Groundwater Sampling and Analysis Program (845.230)(d)(2)(I)(iii)

9.3.1 Sample Frequency

The ABB/ASB and FAB are regulated under the Federal CCR Rule. As such all of the above defined monitoring wells (upgradient and down-gradient) have been sampled on a quarterly basis starting the 4th quarter of 2015 for eight consecutive quarters for both Appendix III and Appendix IV parameters specified in the Federal CCR Rule which is the same parameter listing as provided under the State CCR Rule Section 845.600(a) plus calcium. This dataset will facilitate the development of proper statistical evaluation procedures for the site and use in development of applicable GWPSs for each constituent pursuant to Section 845.600(b). Additional monitoring data collected since the initial eight rounds of background sampling will also be evaluated to determine whether an expanded dataset can be used in developing an appropriate and representative background for the State CCR Rule compliance. Illinois EPA added turbidity as an additional parameter that will require development of a statistical background. Since this parameter was not included within the Federal CCR Rule, eight rounds of turbidity measurements were obtained within the 180-day period since the effective date of the State Rule. However, this restricted period of background data collection does not facilitate evaluation of potential seasonal variations during the development of statistical background for this parameter.

Currently, all wells within this CCR monitoring network are being sampled on a quarterly basis for all parameters specified in Section 845.600(a) plus calcium and turbidity. Between quarterly monitoring events, groundwater level measurements from all designated CCR monitoring wells will be also obtained and recorded on a monthly basis. During the initial rounds of monthly groundwater level measurements after the enactment of the State CCR Rule, surface impoundment measurements were not collected because the instrumentation for these measurements was not yet in-place and available for recording the data.

Quarterly groundwater monitoring will continue during the active life of the impoundment and the post-closure care period or, if closure is by removal, then in accordance with monitoring frequency requirements under Section 845.740(b). It is noted that if after 5 years of quarterly monitoring it can be demonstrated that the facility meets the requirements specified in Section 845.650(b)(4), the owner can petition Illinois EPA to shift the monitoring frequency to semi-annual.

9.3.2 Sampling Preparation and Calibrations
Prior to any sampling event, the Station's designated Environmental Specialist shall be notified in advance of sampling crew arrival so that any arrangements can be made, including security clearance and training.

Prior to sampling activities, and at intervals recommended by the manufacturer, all non-dedicated equipment shall be cleaned and calibrated. Specifically, the field parameter water quality meter to be used for pH, specific conductance, turbidity and temperature will be calibrated using standard reference solutions. In addition, an operational check of the electronic water level probe will also be performed by placing the probe into a bucket of water and ensuring that the audio signal is triggered when the sensor meets the water interface. The associated tape measure of the probe will also be checked for wear.

The monitoring network consists of all dedicated sampling equipment (QED Well Wizard P1101M). The controller used to operate individual bladder pumps will be checked and maintained prior to arrival at the site based on manufacturer specifications.

All lab ware shall be obtained directly from an Illinois certified laboratory. Upon arrival to the site, the monitoring wells will be assessed for structural integrity. Each well cover (either stick-up or flush mount) will be inspected for proper labels, locks, any damage and be cleared of any flora or fauna that may be on the well or in the vicinity that would affect the sample or the sampling operation. In addition to any other notable observations, all of the above shall be entered on the sampling sheets. Once the well is uncovered and unlocked, and the well casing inspected, the well head shall be inspected for damage and cleanliness. At that point, the well will be considered ready for sampling per procedures described below.

9.3.3 Groundwater Sample Collection
Prior to initiating sampling, a round of groundwater levels will be collected from each monitoring well using an electronic water level probe. The timeframe over which these water levels are collected should be minimized and should not exceed 8 hours. The depth to water will be measured to the nearest one-hundredth of a foot from the top of casing using an electronic water level meter. The water level probe should be properly decontaminated between each reading using procedures specified in Section 9.3.4.

All of the monitoring wells at this Station are equipped with dedicated, down-hole, bladder pumps. At the top of casing for each well is a manifold with air and water quick connects and a port for a water level meter probe to fit so that an undisturbed water level can be obtained. Immediately prior to sampling, the depth to water will be measured again to the nearest one-hundredth of a foot from the top of casing using an electronic water level indicator and recorded onto the sampling sheets. Once recorded, an air compressor and flow controller will be attached to the air side quick connect and disposable tubing attached to the discharge connection. The discharge tubing will be run to a flow-through cell of the water quality meter. A discharge line from the flow-through cell will be placed into a vessel to allow for the measurement of the volume of groundwater removed. The water quality meter will be attached within the flow-through cell that allows for real time readings of pH, specific conductivity and temperature. It is noted that a calibration check of the water quality meter should be performed at the start and end of each day of sampling and recorded in the field notes. If the meter calibration-check shows drift outside of manufacturer specifications, the meter should be recalibrated in the field using standard solutions per manufacturer requirements.

The air controller will be set to the necessary pressure and to the slowest pumping interval, approximately 50 second refill and 10 second pump (flow rates at this setting tend to be less than 100 milliliters/minute), and the compressor will be started. The intent of the low flow pumping will be to minimize drawdown in the well with an ideal goal of keeping the drawdown to 0.30 feet or less. Once the water has filled the flow-through cell, a reading of the parameters will be recorded. Readings will continue to be recorded until such time as all parameters are deemed stable for three consecutive measurements at which point a sample will be collected from the tubing prior to the flow-through cell. An unfiltered groundwater sample shall be collected directly from the water tubing after it is disconnected from the flow-through cell. The laboratory provided bottles shall be properly filled. Once the sample is collected, the bottles shall be properly labeled and placed on ice as necessary.

If the well would pump dry prior to stabilized field parameter readings, the well will be allowed to recover for up to 24-hours at which point water sample collection will be initiated.

In the event that a dedicated bladder pump fails to work, the following procedures should be implemented:

- Pull the dedicated tubing and pump from the well and ensure that the tubing does not come in contact with the ground.

- Visually inspect the intake of the pump for clogging from sedimentation. If clogging is noted, clean the intake with distilled water. If there is no clogging, dismantle the pump casing and inspect the bladder for any holes, cracks or tears.

- If the bladder is determined to be compromised (i.e., wear has resulted in cracking or tearing), remove the bladder and replace it with a new bladder. Properly clean all parts of the pump using procedures described in Section 9.3.4, reassemble the pump and slowly lower it back down hole. Continue sampling as described above.

- If the entire pump is determined to have failed, a new pump will need to be ordered for replacement and a modified sampling procedure will be implemented as described below.

In the case of bladder pump failure, at a specific well during a sampling event, the alternate sampling method will be the use of a portable peristaltic pump (the pump itself does not go down-hole) assuming depth to water is less than 23 feet bgs. Clean disposable polyethylene tubing will be attached to the pump and the tubing will be slowly lowered down hole along with the water level probe. The pump will be operated at the lowest rate possible to achieve the same goals as for sampling described above (generally below 300 milliliters/minute which is within the range of standard low flow protocols). Water will be collected in a clean glass jar for field parameter readings. Once stable field parameters are recorded, the sample will be collected directly onto laboratory prepared containers for analysis. Upon completion of sample collection, the water level meter and tubing should be removed from the well. The polyethylene tubing should be disconnected from the pump and discarded. The water level meter should be properly decontaminated as specified in Section 9.3.4. If depth to water is such that a peristaltic pump cannot be used, a submersible pump will need to be used. The submersible pump must be properly cleaned as specified in Section 9.3.4 prior to placement down the well. All subsequent procedures will be the same as above. The alternate sampling pump use will be recorded on the field data sheet for that well and noted in any subsequent reporting summary.

9.3.4 Equipment Decontamination

Any equipment that is used down-hole at more than one sampling location must be thoroughly decontaminated between uses. Based on procedures described above, only the water level meter is anticipated to be in this category, however, if a submersible pump needs to be used during a particular sampling event due to dedicated pump failure (see Section 9.3.3), these procedures will also apply. The water level meter probe and any measuring tape, or any other non-dedicated equipment that may need to be placed down the well that extended below the water surface will need to be cleaned with an Alconox solution, or equivalent, wash followed by a double rinse with distilled water. Any pump tubing that is not dedicated should be discarded and only clean tubing should be used down-hole.

9.3.5 Sample Preservation, Chain-of-Custody and Shipment

Since measurement of total recoverable metals is required by the State CCR Rule, the samples will not be filtered prior to collection. This will facilitate the analysis to capture both the particulate fraction and dissolved fraction of metals in natural groundwater. Groundwater samples will be collected directly into Illinois certified laboratory provided containers. Those containers will be prepared by the laboratory to contain any necessary chemical preservation. The samples shall be stored at temperatures required by the lab following sample collection. Table 9-9 includes a summary of sample bottle requirements, preservatives and holding times

All groundwater samples collected shall be transferred to the laboratory under proper COC procedures. The laboratory provided COC, completed with all pertinent information, shall be maintained from sample collection through receipt by the laboratory. The information shall include, but is not limited to, the following:

- Project name and number, state samples collected in, sample name and type, time and date collected, analysis requested, and printed name and signatures of person(s) sampling.

The COC shall be completed and properly relinquished by the field sampler(s) with all samples clearly printed or typed.

All samples will be either delivered directly to the laboratory or be shipped using Federal Express or a similar overnight service. It should be noted that Total Dissolved Solids (TDS) analysis has a 7-day holding time. TDS samples should be shipped to the laboratory within 72 hours after collection. All other holding times for the specified parameters are long enough to facilitate one shipment after the full round of sampling is complete.

9.3.6 Analytical Methods
A list of the analytical methods to be used by the laboratory for each specified parameter is included in the above referenced Table 9-9. Individual detection limits for the parameters may change slightly from sample to sample depending on potential matrix interferences with a sample (e.g., amount of suspended solids/sediment) and/or the concentration of the constituent in the sample. However, the base detection limits will be set below the applicable Illinois Class I Drinking Water Standards as defined in Section 845.600(a)(1) for that compound which are also provided in Table 9-9.

9.3.7 Quality Assurance and Quality Control
Laboratory

Only an Illinois certified analytical laboratory will be used for sample analysis. The laboratory will be conducting their work under their specific approved Quality Assurance and Quality Control (QA/QC) program. A copy of their program can be available upon request. A standard Level II data documentation package will be included in all subsequent reporting, however, the lab will be requested to also provide a Level IV data documentation package (i.e., U.S. EPA Contract Laboratory Protocol equivalent) in the event more detailed data validation/evaluation is deemed necessary.

Field

The QA/QC program for fieldwork will include the collection of blind duplicates and the use of a laboratory supplied trip blank. The blind duplicate will be collected from a random well during every sampling event in which more than three (3) samples are collected. The duplicate will be blind in the manner that there will be no way for the laboratory to determine from which well or point the sample was collected.

Upon receipt of the analytical data, a determination will be made if the duplicate is consistent with the sample collected from the well/point. A generally acceptable range for groundwater samples is +/- 30 percent. If outside the acceptable range, a resample may be determined to be necessary and reanalyzed. The trip blank analytical data will be reviewed for any values other than non-detect. If there are any questions regarding the duplicate, trip blank, or other reported analytical QA/QC runs, the laboratory will be contacted to determine the effect on data quality, if any, and usability. If necessary, a specific well may need to be re-sampled.

9.3.8 Statistical Methods
A proposed statistical evaluation plan meeting the requirements specified in Section 845.640(f) is provided in Attachment 9-5 along with a certification of the plan by an Illinois licensed Professional Engineer.

9.4 Groundwater Monitoring Program, (845.230(d)(2)(I)(iv)

The groundwater sample and water level collection frequency is discussed in Section 9.3.1 above.

As previously noted, the monitoring well system for the subject surface impoundments consists of the following monitoring wells:

- Combined ABB/ASB monitoring network - upgradient wells MW-01, MW-09 and MW-19 and downgradient wells MW-08, MW-11, MW-12, MW-15, MW-17 and MW-18.

- FAB monitoring network - upgradient wells MW-01 and MW-10 and downgradient wells MW-02 thru MW-05

Eight rounds of background sampling for the purposes of statistical evaluation and background determination is available from the initial groundwater sampling which occurred starting in 2015 in compliance with the Federal CCR Rule requirements. Subsequent groundwater sampling has also occurred under the Federal CCR Rule detection and assessment monitoring requirements. All available CCR monitoring data through the end of the second quarter 2021 is summarized in Tables 9-5 and 9-6 and the eight rounds of turbidity data collected since the enactment of the State CCR Rule in April 2021 in Tables 9-7 and 9-8.

Using the currently available data for the subject CCR surface impoundment, proposed site specific Groundwater Protection Standards (GWPSs) have been established in accordance with Section 845.600(b) and are summarized in Tables 9-10 and 9-11 for the ABB/ASB and FAB, respectively. The background concentrations noted in these tables were calculated using the statistical evaluation approach noted in Section 9.3.8 and provided in Attachment 9-5. A presentation of the statistical evaluations which resulted in the background concentration calculations is provided in Attachment 9-6.

Once the proposed GWPSs presented in this permit application are approved by Illinois EPA, these values will be used for all subsequent groundwater monitoring data comparisons. Monitoring will continue on a quarterly basis for all constituents specified in Section 845.600(a)(1) plus calcium and turbidity. In accordance with Section 845.610(b)(3)(D), a data summary report will be submitted to Illinois EPA within 60-days of receipt of all analytical data (including resample data if necessary as discussed below) which will include a groundwater flow map for the quarterly sampling event, summary of water level elevations collected during the reporting period (monthly measurements), and a data summary including summary data tables with a comparison against the established/approved GWPSs. This report will be placed the facility's operating record.

If during a monitoring event, a constituent(s) is/are detected above an established and approved GWPS, that well will be resampled for the specific constituent(s). If the resample data confirms that the constituent(s) concentration(s) is/are above the GWPS then the following will occur:

- Characterize the nature and extent of the potential release and any relevant site conditions that may affect the remedy evaluation/selection. This characterization must meet the requirements set forth under Section 845.650(d)(1).

- If groundwater impacts extend off-site, provide off-site landowner/resident notifications as specified under Section 845.650(d)(2) and place the notifications into the facility's operating record. This must occur within no more than 30-days of determination that a GWPS has been exceeded.

- An Alternate Source Demonstration (ASD) may be initiated and completed for submittal to Illinois EPA review/approval as allowed under Section 845.650(e). Place the ASD into the facility's operating record.

- Within 90-days of determining that a constituent(s) was detected above an established/approved GWPS at a downgradient waste boundary monitoring point, initiate an assessment of corrective measures meeting the requirements specified under Section 845.660 unless an ASD is submitted in accordance with Section 845.650(d)(2) and subsequently approved by the Illinois EPA.

By no later January 31st of each year, an Annual Groundwater Monitoring and Corrective Action Report will be prepared for inclusion as part of an Annual Consolidated Report for the facility. The Annual Groundwater Monitoring and Corrective Action Report will meet the requirements set forth under Section 845.610(e)(1 through 4). The Annual Consolidated Report will be placed into the facility's operating record.

10.0 Written Closure Plan, 845.230(d)(2)(J)

10.1 Ash Surge Basin

According to the written closure plan completed by Sargent & Lundy, LLC, dated October 29, 2021, the ASB will be closed through removal of CCR in accordance with 845.740. The written closure plan has been completed in accordance with 845.720(a) and is included in Attachment 10-1.

10.2 Ash Bypass Basin

According to the written closure plan completed by Sargent & Lundy, LLC, dated October 29, 2021, the ABB will be closed through removal of CCR in accordance with 845.740. The written closure plan has been completed in accordance with 845.720(a) and is included in Attachment 10-2.

10.3 Former Ash Basin

The Closure Plan for the FAB was prepared by Patrick Engineering in May 2019. The closure of the FAB will be accomplished by the in-place closure of CCR in both the north and south portions of the FAB and capping each portion with a Final Cover System in accordance with Section 845.750. The Plan is included as part of this application in Attachment 10-3.

11.0 Post-Closure Care Plan, 845.230(d)(2)(K)

11.1 Ash Surge Basin

As stated in Section 10.1, the ASB will be closed through the removal of CCR; therefore, the post-closure care requirements in Section 845.780 are not applicable. However, groundwater monitoring will continue in accordance with Section 845.740.

11.2 Ash Bypass Basin

As stated in Section 10.2, the ABB will be closed through the removal of CCR; therefore, the post-closure requirements in Section 845.780 are not applicable. However, groundwater monitoring will continue in accordance with Section 845.740.

11.3 Former Ash Basin

The Post Closure Plan for the FAB has been developed in accordance with Section 845.780(d)(1). This Plan is included as part of this application in Attachment 11.

12.0 Liner Certification, 845.230(d)(2)(L)

12.1 Ash Surge Basin

As part of the ACD, it was identified that the existing liner for the ASB does not comply with the liner requirements of Section 845.400. The upper liner component for the ASB consists of white 60-mil high-density polyethylene (HDPE) topped with 12-inches of limestone screenings, which is then covered with 6-inches of sand. The lower liner component below the 60-mil HDPE geomembrane is the existing 12-inch Poz-O-Pac liner system and an estimated two feet of sand with silt and gravel. This composition of the liner components of the ASB was evaluated against the liner design criteria using the process outlined in Section 845.400(c) to determine if the ASB is considered lined or unlined. The calculations showing the flow rate calculations and comparison are provided in Attachment 12. The calculations indicate that the liner components for the ASB do not comply with the requirements of Section 845.400 and the surface impoundment is considered unlined.

12.2 Ash Bypass Basin

As part of the Alternative Closure Demonstration, it was identified that the existing liner for the ABB does not comply with the liner requirements of Section 845.400. The upper liner component for the ABB consists of white 60-mil HDPE topped with 12-inches of limestone screenings, which is in turn covered with 6-inches of sand. The lower liner component below the 60-mil HDPE geomembrane is fill material consisting of cinders, black silty sand and traces of dark gray clay. This composition of the liner components of the ABB was evaluated against the liner design criteria using the process outlined in Section 845.400(c) to determine if the ABB is considered lined or unlined. The calculations showing the flow rate calculations and comparison are provided in Attachment 12. The calculations indicate that the liner components for the ABB do not comply with the requirements of Section 845.400 and the surface impoundment is considered unlined.

12.3 Former Ash Basin

The construction of the FAB is unknown and based on its age; it is believed to be unlined.

13.0 History of Known Exceedances, 845.230(d)(2)(M)

As previously noted in the introduction, there is no Attachment with supporting documentation for this Section since the referenced data is provided in Attachment 9 documentation. In the fourth quarter 2010, Midwest Generation voluntarily initiated groundwater monitoring in the vicinity of the ABB, ASB and FAB. As discussed in Section 9 of this permit application, the CCR groundwater monitoring networks for the combined ABB/ASB and the FAB are as follows:

- Combined ABB/ASB monitoring network - upgradient wells MW-01, MW-09 and MW-19 and downgradient wells MW-08, MW-11, MW-12, MW-15, MW-17 and MW-18.

- FAB monitoring network - upgradient wells MW-01 and MW-10 and downgradient wells MW-02 thru MW-05

The existing CCR data for the ABB/ASB groundwater monitoring network was also presented and discussed in Section 9 of this permit application. Relative to the most recent round of CCR groundwater monitoring data referenced in that Section (second quarter 2021), the following are noted above the standards provided in Section 845.600(a):

- MW-19 (upgradient): Boron.
- MW-11 (downgradient): Arsenic
- MW-15 (downgradient): Sulfate and TDS
- MW-17 (downgradient): Sulfate

The existing CCR data for the FAB groundwater monitoring network was also presented and discussed in Section 9 of this permit application. Relative to the most recent round of CCR groundwater monitoring data referenced in that Section (second quarter 2021); the following are noted above the standards provided in Section 845.600(a):

- MW-10 (upgradient): Cobalt

All of the above wells are within the existing GMZ and ELUC. Proposed GWPSs developed in accordance with Section 845.600(b), are presented in Section 9.4 above. Once Illinois EPA reviews and approves those proposed GWPSs, those values will be used for subsequent groundwater monitoring data comparisons.

Pursuant to Part 257.95(g)(3) of the Federal CCR Rule, MWG conducted Alternate Source Demonstrations (ASD) for the ASB and ABB, which demonstrated the initial ASD for potential statistically significant increases (SSIs) of several Federal CCR Rule Appendix III parameters it was concluded that both basins are not a source of the constituents. However, the data relative to the ABB was not definitive enough for a similar determination and the sampling was moved into assessment monitoring. A subsequent ASD for Federal CCR Rule Appendix IV assessment parameters at several well locations, which were above the federal GWPSs determined those impacts to be associated with other potential alternate sources and not a release from the regulated units.

An ASD was also completed for potential SSIs of several Federal CCR Rule Appendix III parameters associated with FAB detection monitoring. Based on the compound specific discussions in the groundwater. ASD and the observation that the FAB was not a lined impoundment when in operation, definitive alternate source statements could not be made and, therefore, FAB sampling was moved into assessment monitoring. Subsequent assessment monitoring indicated no concentrations above established Federal CCR Rule Appendix IV parameter GWPSs.

Because the GWPSs developed under the new State CCR Rule are under review, there are no approved GWPSs for the constituents in the groundwater and accordingly it cannot be determined if there is an exceedance of the groundwater protection standards in Section 845.600.

14.0 Financial Assurance, 845.230(d)(2)(N)

The financial assurance certification is included in Attachment 14.

15.0 Hazard Potential Classification Assessment, 845.230(d)(2)(O) & 845.440

The hazard potential classification has been completed by Sargent & Lundy, LLC and is included in Attachment 15.

16.0 Structural Stability Assessment, 845.230(d)(2)(P) & 845.450

The structural stability assessment has been completed by Sargent & Lundy, LLC in accordance with Section 845.540. The structural stability assessment is included in Attachment 16.

17.0 Safety Factor Assessment, 845.230(d)(2)(Q) & 845.460

The safety factor assessment has been completed by Sargent & Lundy, LLC in accordance with 845.460(b) and is included in Attachment 17.

18.0 Inflow Design Flood Control System Plan, 845.230(d)(2)(R) & 845.510

An Inflow Design Flood Control System Plan has been completed by Sargent & Lundy, LLC in accordance with 845.510 and is included in Attachment 18.

19.0 Safety and Health Plan, 845.230(d)(2)(S) & 845.530

A Safety and Health Plan in accordance with Section 845.530 has been completed and is provided in Attachment 19.

20.0 Closure Priority Categorization, 845.230(d)(2)(T)

20.1 Ash Surge Basin

Based on Section 845.700(g), the category designation for the ASB is Category 7. The Category 7 designation for the ASB is based on the following:

- The ASB is an active CCR surface impoundment.
- There are no potable water supply wells or setbacks of existing potable water supply wells downgradient of the ASB. As such, Midwest Generation is not aware of any imminent threat to human health or the environment.
- MWG used the Illinois EPA EJ Start tool found at https://illinois-epa.maps.arcgis.com/apps/webappviewer/index.html?id=f154845da68a4a3f837cd3b880b0233c to determine that the ASB is not within one mile of an area of environmental justice concern.
- Pursuant to Part 257.95(g)(3) of the Federal CCR Rule, MWG conducted an Alternate Source Demonstration for the ASB, which demonstrated that the ASB is not a source of the constituents in the groundwater.

20.2 Ash Bypass Basin

Based on Section 845.700(g), the category designation for the ABB is Category 7. The Category 5 designation for the ABB is based on the following:

- The ABB is an active CCR surface impoundment.
- There are no potable water supply wells or setbacks of existing potable water supply wells downgradient of the ABB. As such, Midwest Generation is not aware of any imminent threat to human health or the environment.

- The Illinois EPA EJ Start tool found at https://illinois-epa.maps.arcgis.com/apps/webappviewer/index.html?id=f154845da68a4a3f837cd3b880b0233c was used to determine that the ABB is not within one mile of an area of environmental justice concern.

- Pursuant to Part 257.95(g)(3) of the Federal CCR Rule, MWG conducted an Alternate Source Demonstration for the ABB, which demonstrated that the ABB is not a source of the constituents in the groundwater.

20.3 Former Ash Basin

Based on Section 845.700(g), the category designation for the FAB is Category 6. The Category 6 designation for the FAB is based on the following:

- The FAB is an inactive CCR surface impoundment.

- There are no potable water supply wells or setbacks of existing potable water supply wells downgradient of the FAB. As such, Midwest Generation is not aware of any imminent threat to human health or the environment.

- The Illinois EPA EJ Start tool found at https://illinois-epa.maps.arcgis.com/apps/webappviewer/index.html?id=f154845da68a4a3f837cd3b880b0233c was used to determine that the FAB is not within one mile of an area of environmental justice concern.

- Section 13 of this permit application has identified those groundwater concentrations downgradient of the FAB are not present above the standards provided in Section 845.600(a).

OPERATING PERMIT TABLES

Table 2-1 Ash Surge Basin and Ash Bypass Basin CCR Chemical Constituents Analytical Results
Powerton Generating Station

Parameter Name	Ash Sample 6/23/2021
Antimony	<8.6
Arsenic	2.2
Barium	1,800
Beryllium	0.90
Boron	46
Cadmium	<0.17
Calcium	39,000
Chloride	88
Chromium	16
Cobalt	<11
Fluoride	4.7
Lead	5.5
Lithium	12
Mercury	0.094
Molybdenum	1.0
Selenium	<0.86
Sulfate	230
Thallium	1.2

Notes:

All results are in milligrams per kilogram (mg/kg), except for percent solids, which is percent (%)

F1 - MS and/or MSD recovery exceeds control limits

V - Serial Dilution exceeds the control limits

Table 2-2 Former Ash Basin CCR Chemical Constituents Analytical Results
Powerton Generating Station

Parameter Name	Ash Sample 6/23/2021
Antimony	<2.0
Arsenic	1.8
Barium	88
Beryllium	1.9
Boron	64
Cadmium	<0.20
Calcium	13,000
Chloride	27
Chromium	34
Cobalt	5.2
Fluoride	1.3
Lead	4.1
Lithium	10
Mercury	0.032
Molybdenum	2.4
Selenium	<0.99
Sulfate	52
Thallium	<0.99

Notes:
All results are in milligrams per kilogram (mg/kg), except for percent solids, which is percent (%)
F1 - MS and/or MSD recovery exceeds control limits
V - Serial Dilution exceeds the control limits

Table 9-1. Summary of Local Precipitation Data - Midwest Generation, LLC, Powerton Generating Station, Pekin, Illinois.

Powerton Station	
Month	**Average Monthly Precipitation* (inches)**
January	2.02
February	1.90
March	2.56
April	3.98
May	4.65
June	3.76
July	3.66
August	3.44
September	3.52
October	3.16
November	2.79
December	2.20

Notes:
* - Historical precipitation data was obtained from the National Oceanic and Atmospheric Administration. Precipitation data was averaged from thirteen stations located in and within close proximity to Pekin, Illinois. Dates of precipitation data range from 1991-2020.

Table 9-2. Ash Bypass Basin and Ash Surge Basin Groundwater Elevations - Midwest Generation, LLC, Powerton Station, Pekin, IL

Well ID	Date	Top of Casing Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Groundwater Elevation (ft above MSL)
MW-01	11/16/2015	465.24	26.04	439.20
	2/22/2016	465.24	21.90	443.34
	5/16/2016	465.24	21.83	443.41
	8/15/2016	465.24	23.89	441.35
	11/14/2016	465.24	23.38	441.86
	2/13/2017	465.24	21.71	443.53
	5/1/2017	465.24	18.87	446.37
	6/20/2017	465.24	21.54	443.70
	8/25/2017	465.24	24.70	440.54
	11/8/2017	465.24	24.92	440.32
	5/17/2018	465.24	22.66	442.58
	8/8/2018	465.24	26.05	439.19
	10/30/2018	465.24	24.69	440.55
	4/29/2019	465.24	20.15	445.09
	11/11/2019	465.24	19.49	445.75
	4/27/2020	465.24	20.90	444.34
	12/7/2020	465.24	25.69	439.55
	4/7/2021	465.24	22.20	443.04
	5/10/2021	465.24	23.41	441.83
MW-08	11/16/2015	471.75	26.06	445.69
	2/22/2016	471.75	23.99	447.76
	5/16/2016	471.75	25.48	446.27
	8/15/2016	471.75	23.61	448.14
	11/14/2016	471.75	24.31	447.44
	2/13/2017	471.75	23.97	447.78
	5/1/2017	471.75	23.28	448.47
	6/20/2017	471.75	23.31	448.44
	8/29/2017	471.75	24.52	447.23
	11/8/2017	471.75	25.27	446.48
	5/17/2018	471.75	24.36	447.39
	8/8/2018	471.75	24.04	447.71
	10/31/2018	471.75	24.92	446.83
	4/29/2019	471.75	24.28	447.47
	11/11/2019	471.75	24.24	447.51
	4/27/2020	471.75	24.50	447.25
	12/7/2020	471.75	25.35	446.40
	4/7/2021	471.75	24.88	446.87
	5/10/2021	471.75	24.75	447.00
MW-09	11/16/2015	469.14	26.07	443.07
	2/22/2016	469.14	22.83	446.31
	5/16/2016	469.14	23.06	446.08
	8/15/2016	469.14	24.50	444.64
	11/14/2016	469.14	24.33	444.81
	2/13/2017	469.14	23.43	445.71
	5/1/2017	469.14	20.77	448.37
	6/20/2017	469.14	22.15	446.99
	8/25/2017	469.14	24.79	444.35
	11/8/2017	469.14	25.74	443.40
	5/16/2018	469.14	23.89	445.25
	8/8/2018	469.14	25.49	443.65
	11/1/2018	469.14	26.02	443.12
	4/29/2019	469.14	21.30	447.84
	11/11/2019	469.14	21.31	447.83
	4/27/2020	469.14	21.80	447.34
	12/7/2020	469.14	26.19	442.95
	4/7/2021	469.14	23.75	445.39
	5/10/2021	469.14	24.55	444.59

Table 9-2. Ash Bypass Basin and Ash Surge Basin Groundwater Elevations - Midwest Generation, LLC, Powerton Station, Pekin, IL

Well ID	Date	Top of Casing Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Groundwater Elevation (ft above MSL)
MW-11	11/16/2015	471.62	31.67	439.95
	2/22/2016	471.62	28.34	443.28
	5/16/2016	471.62	27.11	444.51
	8/15/2016	471.62	29.64	441.98
	11/14/2016	471.62	29.19	442.43
	2/13/2017	471.62	27.49	444.13
	5/1/2017	471.62	24.34	447.28
	6/20/2017	471.62	26.94	444.68
	8/29/2017	471.62	30.42	441.20
	11/9/2017	471.62	30.27	441.35
	5/16/2018	471.62	28.58	443.04
	8/9/2018	471.62	31.04	440.58
	11/1/2018	471.62	30.82	440.80
	4/29/2019	471.62	25.38	446.24
	11/11/2019	471.62	24.88	446.74
	4/27/2020	471.62	26.35	445.27
	12/7/2020	471.62	31.35	440.27
	4/7/2021	471.62	27.85	443.77
	5/10/2021	471.62	29.19	442.43
MW-12	11/16/2015	473.38	24.48	448.90
	2/22/2016	473.38	21.41	451.97
	5/16/2016	473.38	22.94	450.44
	8/15/2016	473.38	23.85	449.53
	11/14/2016	473.38	23.89	449.49
	2/13/2017	473.38	21.93	451.45
	5/1/2017	473.38	22.26	451.12
	6/20/2017	473.38	22.76	450.62
	8/26/2017	473.38	23.92	449.46
	11/10/2017	473.38	24.29	449.09
	5/16/2018	473.38	22.46	450.92
	8/9/2018	473.38	23.78	449.60
	11/1/2018	473.38	23.74	449.64
	4/29/2019	473.38	22.05	451.33
	11/11/2019	473.38	22.85	450.53
	4/27/2020	473.38	21.44	451.94
	12/7/2020	473.38	22.70	450.68
	4/7/2021	473.38	21.91	451.47
	5/10/2021	473.38	22.50	450.88
MW-15	11/16/2015	471.37	25.33	446.04
	2/22/2016	471.37	22.91	448.46
	5/16/2016	471.37	24.71	446.66
	8/15/2016	471.37	23.45	447.92
	11/14/2016	471.37	23.94	447.43
	2/13/2017	471.37	23.73	447.64
	5/1/2017	471.37	23.27	448.10
	6/20/2017	471.37	22.86	448.51
	8/29/2017	471.37	23.13	448.24
	11/10/2017	471.37	25.13	446.24
	5/17/2018	471.37	23.85	447.52
	8/9/2018	471.37	23.96	447.41
	10/31/2018	471.37	24.55	446.82
	4/29/2019	471.37	23.57	447.80
	11/11/2019	471.37	23.79	447.58
	4/27/2020	471.37	23.95	447.42
	12/7/2020	471.37	25.01	446.36
	4/7/2021	471.37	24.44	446.93
	5/10/2021	471.37	24.62	446.75

Table 9-2. Ash Bypass Basin and Ash Surge Basin Groundwater Elevations - Midwest Generation, LLC, Powerton Station, Pekin, IL

Well ID	Date	Top of Casing Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Groundwater Elevation (ft above MSL)
MW-17	11/16/2015	467.75	26.92	440.83
	2/22/2016	467.75	19.86	447.89
	5/16/2016	467.75	20.42	447.33
	8/15/2016	467.75	21.61	446.14
	11/14/2016	467.75	21.39	446.36
	2/13/2017	467.75	19.66	448.09
	5/1/2017	467.75	18.78	448.97
	6/20/2017	467.75	19.42	448.33
	8/29/2017	467.75	22.68	445.07
	11/6/2017	467.75	24.66	443.09
	5/14/2018	467.75	19.79	447.96
	8/6/2018	467.75	21.03	446.72
	10/29/2018	467.75	21.98	445.77
	4/29/2019	467.75	18.75	449.00
	11/11/2019	467.75	19.60	448.15
	4/27/2020	467.75	19.15	448.60
	12/7/2020	467.75	24.12	443.63
	4/7/2021	467.75	19.69	448.06
	5/10/2021	467.75	20.00	447.75
MW-18	11/16/2015	469.28	28.42	440.86
	2/22/2016	469.28	27.96	441.32
	5/16/2016	469.28	25.57	443.71
	8/15/2016	469.28	27.86	441.42
	11/14/2016	469.28	27.39	441.89
	2/13/2017	469.28	25.06	444.22
	5/1/2017	469.28	22.49	446.79
	6/20/2017	469.28	24.97	444.31
	8/28/2017	469.28	27.30	441.98
	11/6/2017	469.28	26.33	442.95
	5/14/2018	469.28	24.65	444.63
	8/6/2018	469.28	25.67	443.61
	10/29/2018	469.28	25.79	443.49
	4/29/2019	469.28	23.00	446.28
	11/11/2019	469.28	23.94	445.34
	4/27/2020	469.28	23.97	445.31
	12/7/2020	469.28	27.82	441.46
	4/7/2021	469.28	24.94	444.34
	5/10/2021	469.28	25.96	443.32
MW-19	11/14/2016	465.07	22.65	442.42
	2/13/2017	465.07	21.27	443.80
	5/1/2017	465.07	18.39	446.68
	6/20/2017	465.07	20.44	444.63
	8/28/2017	465.07	23.60	441.47
	11/9/2017	465.07	23.80	441.27
	5/14/2018	465.07	22.08	442.99
	8/6/2018	465.07	24.14	440.93
	10/29/2018	465.07	24.31	440.76
	4/29/2019	465.07	19.12	445.95
	11/11/2019	465.07	18.80	446.27
	4/27/2020	465.07	19.94	445.13
	12/7/2020	465.07	24.63	440.44
	4/7/2021	465.07	21.60	443.47
	5/10/2021	465.07	22.75	442.32

MSL - Mean Sea Level
TOC - Top of Casing

Table 9-3. Former Ash Basin Groundwater Elevations - Midwest Generation, LLC, Powerton Station, Pekin, IL

Well ID	Date	Top of Casing Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Groundwater Elevation (ft above MSL)
MW-01	11/16/2015	465.24	26.04	439.20
	2/22/2016	465.24	21.90	443.34
	5/16/2016	465.24	21.83	443.41
	8/15/2016	465.24	23.89	441.35
	11/14/2016	465.24	23.38	441.86
	2/13/2017	465.24	21.71	443.53
	5/1/2017	465.24	18.87	446.37
	6/20/2017	465.24	21.54	443.70
	8/25/2017	465.24	24.70	440.54
	11/8/2017	465.24	24.92	440.32
	5/17/2018	465.24	22.66	442.58
	8/8/2018	465.24	26.05	439.19
	10/30/2018	465.24	24.69	440.55
	2/25/2019	465.24	19.44	445.80
	4/29/2019	465.24	20.15	445.09
	8/26/2019	465.24	23.85	441.39
	2/24/2020	465.24	20.71	444.53
	4/27/2020	465.24	20.90	444.34
	12/7/2020	465.24	25.69	439.55
	4/7/2021	465.24	22.20	443.04
	5/10/2021	465.24	23.41	441.83
MW-02	6/20/2017	462.60	22.04	440.56
	8/23/2017	462.60	28.42	434.18
	11/7/2017	462.60	26.08	436.52
	5/17/2018	462.60	23.26	439.34
	8/7/2018	462.60	29.70	432.90
	10/30/2018	462.60	26.77	435.83
	2/25/2019	462.60	17.02	445.58
	4/29/2019	462.60	19.26	443.34
	8/26/2019	462.60	27.45	435.15
	2/24/2020	462.60	20.35	442.25
	4/27/2020	462.60	20.51	442.09
	12/7/2020	462.60	28.71	433.89
	4/7/2021	462.60	21.95	440.65
	5/10/2021	462.60	23.01	439.59
MW-03	6/20/2017	462.48	22.31	440.17
	8/23/2017	462.48	28.18	434.30
	11/7/2017	462.48	25.38	437.10
	5/17/2018	462.48	22.62	439.86
	8/7/2018	462.48	29.17	433.31
	10/30/2018	462.48	24.71	437.77
	2/25/2019	462.48	17.20	445.28
	4/29/2019	462.48	18.85	443.63
	8/26/2019	462.48	27.65	434.83
	2/24/2020	462.48	20.18	442.30
	4/27/2020	462.48	20.43	442.05
	12/7/2020	462.48	28.61	433.87
	4/7/2021	462.48	21.73	440.75
	5/10/2021	462.48	22.98	439.50

Table 9-3. Former Ash Basin Groundwater Elevations - Midwest Generation, LLC, Powerton Station, Pekin, IL

Well ID	Date	Top of Casing Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Groundwater Elevation (ft above MSL)
MW-04	6/20/2017	460.57	22.15	438.42
	8/28/2017	460.57	28.49	432.08
	11/7/2017	460.57	25.62	434.95
	5/17/2018	460.57	24.13	436.44
	8/7/2018	460.57	29.23	431.34
	10/30/2018	460.57	26.58	433.99
	2/25/2019	460.57	15.45	445.12
	4/29/2019	460.57	15.88	444.69
	8/26/2019	460.57	27.35	433.22
	2/24/2020	460.57	19.81	440.76
	4/27/2020	460.57	19.76	440.81
	12/7/2020	460.57	28.50	432.07
	4/7/2021	460.57	21.90	438.67
	5/10/2021	460.57	23.92	436.65
MW-05	11/16/2015	458.58	26.39	432.19
	2/22/2016	458.66	21.12	437.54
	5/16/2016	458.66	16.58	442.08
	8/15/2016	458.66	23.59	435.07
	11/14/2016	458.66	22.72	435.94
	2/13/2017	458.66	19.13	439.53
	5/1/2017	458.66	13.09	445.57
	6/20/2017	458.66	19.43	439.15
	8/28/2017	458.66	25.38	433.20
	11/7/2017	458.66	22.91	435.67
	5/17/2018	458.66	21.54	437.04
	8/7/2018	458.66	26.17	432.41
	10/30/2018	458.66	23.97	434.61
	2/25/2019	458.66	13.21	445.45
	4/29/2019	458.66	15.40	443.26
	8/26/2019	458.66	24.35	434.31
	2/24/2020	458.66	17.25	441.41
	4/27/2020	458.66	17.41	441.25
	12/7/2020	458.66	25.65	433.01
	4/7/2021	458.66	19.40	439.26
	5/10/2021	458.66	21.38	437.28
MW-10	6/22/2017	457.31	13.46	443.85
	8/24/2017	457.31	16.39	440.92
	11/9/2017	457.31	16.86	440.45
	5/16/2018	457.31	14.88	442.43
	8/8/2018	457.31	17.88	439.43
	10/30/2018	457.31	17.04	440.27
	2/25/2019	457.31	11.28	446.03
	4/29/2019	457.31	11.88	445.43
	8/26/2019	457.31	15.89	441.42
	2/24/2020	457.31	12.64	444.67
	4/27/2020	457.31	12.75	444.56
	12/7/2020	457.31	17.80	439.51
	4/7/2021	457.31	14.21	443.10
	5/10/2021	457.31	15.58	441.73

MSL - Mean Sea Level
TOC - Top of Casing

Table 9-4. Hydraulic Gradient, Direction and Seepage Velocity. Midwest Generation, LLC, Powerton Station, Pekin, IL.

DATE	Screened Unit	Groundwater Flow Direction	Kavg (ft/sec)*	Average Hydraulic Gradient (ft/ft)	Porosity (unitless)**	Estimated Seepage Velocity (ft/day)
11/16/2015	Silt/clay	Westerly	6.380E-07	0.0093	0.4	0.001
11/16/2015	Sandy	North-Northwest	1.390E-03	0.0026	0.35	0.87
2/22/2016	Silt/clay	Westerly	6.380E-07	0.0098	0.4	0.001
2/22/2016	Sandy	North-Northwest	1.390E-03	0.0030	0.35	1.03
5/16/2016	Silt/clay	Westerly	6.380E-07	0.0124	0.4	0.002
5/16/2016	Sandy	North-Northwest	1.390E-03	0.0021	0.35	0.72
8/15/2016	Silt/clay	Westerly	6.380E-07	0.0093	0.4	0.001
8/15/2016	Sandy	North-Northwest	1.390E-03	0.0014	0.35	0.48
11/14/2016	Silt/clay	Westerly	6.380E-07	0.0083	0.4	0.001
11/14/2016	Sandy	North-Northwest	1.390E-03	0.0014	0.35	0.48
2/13/2017	Silt/clay	Westerly	6.380E-07	0.0091	0.4	0.001
2/13/2017	Sandy	Northeasterly - Northwesterly	1.390E-03	0.0049	0.35	1.68
5/1/2017	Silt/clay	Westerly	6.380E-07	0.0100	0.4	0.001
5/1/2017	Sandy	Northeasterly - Northwesterly	1.390E-03	0.0021	0.35	0.72
6/20/2017	Silt/clay	Westerly	6.380E-07	0.0088	0.4	0.001
6/20/2017	Sandy	Northeasterly - Northwesterly	1.390E-03	0.0057	0.35	1.96
8/25/2017	Silt/clay	Westerly	6.380E-07	0.0214	0.4	0.003
8/25/2017	Sandy	North-Northwest	1.390E-03	0.0174	0.35	5.97
11/8/2017	Silt/clay	Westerly	6.380E-07	0.0267	0.4	0.004
11/8/2017	Sandy	North-Northwest	1.390E-03	0.0157	0.35	5.39
5/17/2018	Silt/clay	Westerly	6.380E-07	0.0070	0.4	0.0010
5/17/2018	Sandy	North-Northwest	1.390E-03	0.0042	0.35	1.44
8/7/2018	Silt/clay	Westerly	6.380E-07	0.0263	0.4	0.004
8/7/2018	Sandy	North-Northwest	1.390E-03	0.0037	0.35	1.27
4/29/2019	Silt/clay	Westerly	6.380E-07	0.0129	0.4	0.0018
4/29/2019	Sandy	North-Northwest	1.390E-03	0.0022	0.35	0.75
11/11/2019	Silt/clay	Westerly	6.380E-07	0.0114	0.4	0.0016
11/11/2019	Sandy	North-Northwest	1.390E-03	0.0008	0.35	0.27
4/27/2020	Silt/clay	Westerly	6.380E-07	0.0114	0.4	0.0016
4/27/2020	Sandy	Northeasterly - Northwesterly	1.390E-03	0.0023	0.35	0.79
12/7/2020	Silt/clay	Westerly	6.380E-07	0.0137	0.4	0.0019
12/7/2020	Sandy	Northeasterly - Northwesterly	1.390E-03	0.0037	0.35	1.27
5/10/2021	Silt/clay	Westerly	6.380E-07	0.0208	0.4	0.0029
5/10/2021	Sandy	North-Northwest	1.390E-03	0.0041	0.35	1.41

* Kavg - See text discussion in Section 9.1.2 for average hydraulic conductivity values used (feet/second).

** - Porosity estimates from Applied Hydrogeology, Fetter, 1980.

Table 9-5. Groundwater Analytical Results - Midwest Generation, LLC, Powerton Station, Pekin, IL. Ash By-Pass Basin Ash Surge Basin.

Well	Date	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Radium 226 + 228	Selenium	Thallium
MW-01 (S) up-gradient	11/16/2015	1.0	98	44	0.17	7.07	93	530	< 0.003	< 0.001	0.057	^ < 0.001	< 0.0005	< 0.005	< 0.001	* < 0.0005	< 0.01	< 0.0002	< 0.0050	0.744	< 0.0025	* < 0.002
	2/25/2016	0.2	110	42	0.16	7.23	54	460	< 0.003	0.0025	0.053	< 0.001	< 0.0005	< 0.005	0.0014	0.0019	< 0.01	< 0.0002	< 0.005	< 0.722	0.0029	< 0.002
	5/20/2016	0.34	100	44	0.17	6.95	65	430	< 0.003	0.0081	0.062	< 0.001	< 0.0005	0.007	0.0053	0.011	< 0.01	< 0.0002	< 0.005	< 0.953	< 0.0025	< 0.002
	8/17/2016	0.27	78	39	0.25	7.16	50	530	< 0.003	0.0014	0.048	< 0.001	< 0.0005	< 0.005	< 0.001	0.0014	< 0.010	< 0.0002	0.0057	< 0.491	< 0.0025	< 0.002
	11/16/2016	0.18	97	39	0.21	7.22	32	500	< 0.003	0.0051	0.056	< 0.001	< 0.0005	< 0.005	0.0044	0.0082	< 0.01	< 0.0002	0.0059	< 0.618	< 0.0025	< 0.002
	2/14/2017	0.18	120	55	0.17	7.30	60	550	< 0.003	0.0041	0.056	< 0.001	< 0.0005	< 0.005	0.0045	0.0076	< 0.01	< 0.0002	0.0056	< 0.837	< 0.0025	< 0.002
	5/3/2017	0.19	86	66	0.16	7.41	45	460	< 0.003	0.0015	0.045	< 0.001	< 0.0005	< 0.005	0.0033	0.0067	< 0.01	< 0.0002	< 0.005	0.574	< 0.0025	< 0.002
	6/21/2017	0.18	85	58	0.18	7.60	47	540	< 0.003	< 0.001	0.04	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0061	< 0.418	< 0.0025	< 0.002
	8/25/2017	0.56	86	41	0.18	7.41	63	490	< 0.003	< 0.001	0.049	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0059	0.775	< 0.0025	< 0.002
	11/8/2017	0.57	130	38	0.12	6.69	61	640	< 0.003	< 0.001	0.083	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.343	< 0.0025	< 0.002
	5/17/2018	0.15	88	50	0.12	6.7	48	540	< 0.003	< 0.001	0.045	< 0.001	< 0.0005	< 0.005	< 0.001	0.00068	< 0.01	< 0.0002	< 0.005	< 0.396	< 0.0025	< 0.002
	8/8/2018	0.14	86	48	0.13	6.8	43	430	< 0.003	< 0.001	0.051	<^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.579	< 0.0025	< 0.002
	4/30/2019	0.07	78	54	0.17	7.2	27	450	< 0.003	0.0014	0.039	< 0.001	< 0.0005	< 0.005	< 0.001	0.0017	< 0.01	< 0.0002	< 0.005	< 0.656	< 0.0025	< 0.002
	11/13/2019	0.52	95	47	0.18	7.51	41	390	NA	0.029	0.091	NA	0.00085	NA	0.016	0.034	0.012	< 0.0002	0.0079	0.884	< 0.0025	< 0.002
	12/26/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0021	0.0041	NA	NA	NA	NA	NA	NA
	4/28/2020	0.33	110	46	0.19	7.17	41	470	NA	< 0.001	0.051	NA	< 0.0005	NA	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.628	< 0.0025	< 0.002
	12/7/2020	0.6	100	54	0.25	7.22	55	490	NA	< 0.001	0.058	NA	< 0.0005	NA	< 0.001	0.00055	< ^ 0.01	< 0.0002	0.0051	0.724	< 0.0025	< 0.002
	5/11/2021	0.23	84	53	0.2	7.52	38	450	< 0.003	< 0.001	0.043	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.01	< 0.523	< 0.0025	< 0.002
MW-09 (S) up-gradient	11/18/2015	2.0	63	H 31	H 0.19	7.15	H 110	H 440	< 0.003	< 0.001	0.027	^ < 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	H < 0.0002	0.043	< 0.655	< 0.0025	< 0.002
	2/25/2016	2.3	77	36	0.19	7.34	120	500	< 0.003	0.0042	0.036	< 0.001	< 0.0005	< 0.005	0.0011	< 0.0005	< 0.01	< 0.0002	0.053	< 0.361	< 0.0025	< 0.002
	5/19/2016	2.0	73	38	0.17	7.30	100	520	< 0.003	< 0.001	0.029	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.042	< 0.394	0.0032	< 0.002
	8/17/2016	2.7	74	39	0.15	7.32	120	750	< 0.003	< 0.001	0.031	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.036	< 0.498	< 0.0025	< 0.002
	11/17/2016	4.5	85	38	0.13	7.37	110	630	< 0.003	0.0038	0.039	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.010	< 0.0002	0.036	0.646	0.0025	< 0.002
	2/15/2017	4.1	84	38	0.13	6.94	160	620	< 0.003	0.0032	0.043	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.010	< 0.0002	0.035	< 0.377	0.0062	< 0.002
	5/3/2017	3.5	85	38	0.17	7.48	170	680	< 0.003	0.0012	0.034	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.010	< 0.0002	0.034	< 0.445	0.011	< 0.002
	6/21/2017	3.3	82	38	0.14	7.63	180	760	< 0.003	< 0.001	0.037	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.010	< 0.0002	0.033	< 0.380	0.0072	< 0.002
	8/25/2017	3.8	85	36	0.14	7.30	150	630	< 0.003	< 0.001	0.044	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.010	< 0.0002	0.028	< 0.160	0.0043	< 0.002
	11/8/2017	4	89	37	0.13	6.92	190	650	< 0.003	0.0012	0.048	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.010	< 0.0002	0.026	0.344	< 0.0025	< 0.002
	5/16/2018	4.1	89	36	0.15	7.83	180	550	< 0.003	< 0.001	0.038	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.010	0.00029	0.031	< 0.424	0.006	< 0.002
	8/8/2018	4.3	86	39	0.14	7.31	180	690	< 0.003	< 0.001	0.037	<^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.010	< 0.0002	0.032	0.44	0.0078	< 0.002
	5/1/2019	4.6	79	37	0.17	7.11	170	640	< 0.003	< 0.001	0.038	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.010	< 0.0002	0.031	< 0.66	0.0036	< 0.002
	11/14/2019	2.5	85	36	0.18	7.49	82	500	NA	0.0056	0.057	NA	< 0.0005	NA	0.0032	0.00076	< 0.010	< 0.0002	0.026	< 0.457	< 0.0025	< 0.002
	4/29/2020	2	71	34	0.2	7.19	140	510	NA	0.0012	0.031	NA	< 0.0005	NA	< 0.001	< 0.0005	< 0.010	< 0.0002	0.028	0.698	< 0.0025	< 0.002
	12/8/2020	2.6	65	34	0.22	7.29	63	400	NA	0.0013	0.042	NA	< 0.0005	NA	< 0.001	< 0.0005	< 0.010	< 0.0002	0.025	< 0.479	< 0.0025	< 0.002
	5/13/2021	2	74	33	0.2	7.33	120	410	< 0.003	< 0.001	0.035	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.010	< 0.0002	0.025	< 0.612	< 0.0025	< 0.002
MW-19^ (S) up-gradient	11/18/2016	3.8	89	38	0.13	7.34	120	670	< 0.003	< 0.001	0.084	< 0.001	< 0.0005	< 0.005	0.001	0.00068	< 0.01	< 0.0002	0.035	< 0.476	0.0043	< 0.002
	2/15/2017	4.7	88	37	0.13	7.50	180	630	< 0.003	< 0.001	0.088	< 0.001	< 0.0005	< 0.005	< 0.001	0.00061	< 0.01	< 0.0002	0.046	< 0.482	0.0063	< 0.002
	5/5/2017	3.3	88	38	0.14	7.51	160	640	< 0.003	< 0.001	0.076	< 0.001	< 0.0005	< 0.005	0.0013	0.0012	< 0.01	< 0.0002	0.035	0.923	0.0068	< 0.002
	6/21/2017	2.3	110	35	0.12	7.30	170	690	< 0.003	< 0.001	0.089	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.024	< 0.334	0.0028	< 0.002
	8/28/2017	3.5	97	36	0.16	7.20	160	700	< 0.003	< 0.001	0.073	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.041	0.370	0.0035	< 0.002
	11/6/2017	4.5	86	35	0.17	7.26	190	640	< 0.003	< 0.001	0.071	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.042	0.360	< 0.0025	< 0.002
	5/14/2018	4.1	96	35	0.16	7.92	180	820	< 0.003	< 0.001	0.079	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.043	0.562	0.0044	< 0.002
	8/6/2018	3.8	100	37	0.13	7.57	170	720	< 0.003	< 0.001	0.078	<^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.032	0.835	0.0052	< 0.002
	5/2/2019	3.7	100	39	0.13	6.86	160	700	< 0.003	< 0.001	0.076	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.03	< 0.431	0.0035	< 0.002
	11/13/2019	2.5	130	53	0.15	7.51	140	740	NA	0.0014	0.100	NA	< 0.0005	NA	< 0.001	0.00056	< 0.01	< 0.0002	0.04	< 0.447	< 0.0025	< 0.002
	4/27/2020	2.3	100	43	0.17	6.87	110	570	NA	< 0.001	0.077	NA	< 0.0005	NA	< 0.001	< 0.0005	< 0.01	< 0.0002	0.04	0.630	< 0.0025	< 0.002
	12/7/2020	3.3	74	34	0.19	7.30	F1 76	420	NA	< 0.001	0.062	NA	< 0.0005	NA	< 0.001	< 0.0005	< ^ 0.01	< 0.0002	0.05	< 0.509	< 0.0025	< 0.002
	5/10/2021	2.3	68	33	0.17	7.36	110	420	< 0.003	< 0.001	0.060	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.05	< 0.524	< 0.0025	< 0.002
MW-08 (CL) down-gradient	11/18/2015	1.5	160	H 170	H 0.44	7.61	H 470	H 1300	< 0.003	0.0029	0.15	^ < 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.028	H < 0.0002	0.01	< 0.559	< 0.0025	< 0.002
	2/25/2016	1.7	160	200	0.30	7.00	280	1100	< 0.003	0.0018	0.11	< 0.001	0.00052	< 0.005	< 0.001	0.00072	0.015	< 0.0002	0.02	0.535	< 0.0025	< 0.002
	5/18/2016	1.7	160	140	0.34	7.67	300	1200	< 0.003	0.0029	0.16	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.036	< 0.0002	0.0069	0.417	< 0.0025	< 0.002
	8/17/2016	1.0	150	230	0.35	7.33	360	1400	< 0.003	0.0032	0.15	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.023	< 0.0002	0.013	< 0.519	< 0.0025	< 0.002
	11/15/2016	1.2	140	290	0.33	6.90	230	1300	< 0.003	0.0012	0.076	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.017	< 0.0002	0.016	0.583	< 0.0025	< 0.002
	2/16/2017	1.5	150	460	0.28	7.00	230	1500	< 0.003	0.003	0.086	< 0.001	< 0.0005	< 0.005	< 0.001	0.00087	< 0.01	< 0.0002	0.026	< 0.375	< 0.0025	< 0.002
	5/2/2017	0.55	140	300	0.33	7.30	320	1300	< 0.003	0.0029	0.13	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.022	< 0.0002	0.0083	< 0.480	< 0.0025	< 0.002
	6/21/2017	1.2	160	490	0.30	7.27	350	1700	< 0.003	0.0045	0.14	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.017	< 0.0002	0.031	< 0.439	< 0.0025	< 0.002
	8/29/2017	1.2	150	360	0.47	7.29	300	1500	< 0.003	0.0011	0.062	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.034	0.699	< 0.0025	< 0.002
	11/8/2017	0.68	130	260	0.45	7.27	270	1200	< 0.003	0.0027	0.10	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.019	< 0.0002	0.014	0.806	< 0.0025	< 0.002
	5/17/2018	1.2	130	200	0.37	6.79	170	1000	< 0.003	0.003	0.07	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.024	0.655	< 0.0025	< 0.002
	8/8/2018	1.1	140	270	0.32	6.93	190	1200	< 0.003	0.0055	0.07	<^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.019	< 0.410	< 0.0025	< 0.002
	5/1/2019	0.54	95	73	0.35	7.60	85	600	< 0.003	0.0018	0.07	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.021	< 0.0002	0.0069	0.892	< 0.0025	< 0.002
	11/13/2019	0.98	110	92	0.33	7.66	110	640	NA	0.0025	0.087	NA	< 0.0005	NA	< 0.001	0.00094	0.022	< 0.0002	0.013	< 0.498	< 0.0025	< 0.002
	4/28/2020	0.74	110	120	0.38	7.58	58	660	NA	0.0026	0.095	NA	< 0.0005	NA	< 0.001	< 0.0005	0.026	< 0.0002	0.011	< 0.450	< 0.0025	< 0.002
	12/14/2020	0.73	120	150	0.38	7.40	92	530	NA	0.0024	0.110	NA	< 0.0005	NA	< 0.001	0.00093	0.03	< 0.0002	0.012	1.310	< 0.0025	< 0.002
	5/11/2021	0.54	97	120	0.39	7.64	110	680	< 0.003	0.002	0.092	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.021	< 0.0002	0.011	< 0.695	< 0.0025	< 0.002

Notes: All units are in mg/l except pH is in standard units.
F1 - MS and/or MSD Recovery outside of limits.
H - Sample was prepped or analyzed beyond the specified holding time.
V- Serial dilution exceeds control limits.

* - LCS or LCSD is outside acceptance limits.
^ - Denotes instrument related QC exceeds the control limits
(R) - Resample Event
NA - Not Analyzed

Table 9-5. Groundwater Analytical Results - Midwest Generation, LLC, Powerton Station, Pekin, IL. Ash By-Pass Basin Ash Surge Basin.

Well	Date	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Radium 226 + 228	Selenium	Thallium
MW-11 (S) down-gradient	11/18/2015	1.7	110	H 54	H 0.55	7.06	H 160	H 670	< 0.003	0.017	0.18	^ < 0.001	< 0.0005	< 0.005	0.002	< 0.0005	< 0.01	H < 0.0002	0.0120	0.788	< 0.0025	< 0.002
	2/26/2016	1.5	140	120	0.55	7.25	220	850	< 0.003	0.023	0.23	< 0.001	< 0.0005	< 0.005	0.0023	< 0.0005	< 0.01	< 0.0002	0.013	0.562	< 0.0025	< 0.002
	5/20/2016	1.6	140	120	0.56	7.10	210	920	< 0.003	0.027	0.26	< 0.001	< 0.0005	< 0.005	0.0024	0.00076	< 0.01	< 0.0002	0.014	0.524	< 0.0025	< 0.002
	8/17/2016	1.0	130	93	0.67	7.08	180	910	< 0.003	F1 0.29	1.4	< 0.001	< 0.0005	< 0.005	0.0034	0.001	< 0.010	< 0.0002	0.011	1.130	< 0.0025	< 0.002
	11/17/2016	1.2	140	130	0.44	7.21	240	1100	< 0.003	0.071	0.44	< 0.001	< 0.0005	< 0.005	0.0037	0.0013	< 0.01	< 0.0002	0.0088	0.734	< 0.0025	< 0.002
	2/16/2017	1.6	140	110	0.40	6.62	260	910	< 0.003	0.04	0.3	< 0.001	< 0.0005	< 0.005	0.003	0.00094	< 0.01	< 0.0002	0.013	0.341	< 0.0025	< 0.002
	5/3/2017	1.3	160	160	0.42	7.36	440	1300	< 0.003	0.039	0.26	< 0.001	< 0.0005	< 0.005	0.0035	0.00093	< 0.01	< 0.0002	0.015	0.662	< 0.0025	< 0.002
	6/22/2017	1.2	140	120	0.60	7.21	260	1000	< 0.003	0.07	0.36	< 0.001	< 0.0005	< 0.005	0.0025	< 0.0005	< 0.01	< 0.0002	0.014	< 0.418	< 0.0025	< 0.002
	8/29/2017	2.2	130	83	0.52	7.23	310	1100	< 0.003	0.017	0.21	< 0.001	< 0.0005	< 0.005	0.0026	< 0.0005	< 0.01	< 0.0002	0.016	< 0.313	< 0.0025	< 0.002
	11/9/2017	1.5	140	100	0.59	6.96	230	970	< 0.003	0.092	0.54	< 0.001	< 0.0005	< 0.005	0.0034	< 0.0005	< 0.01	< 0.0002	0.014	1.24	< 0.0025	< 0.002
	5/16/2018	2.0	140	88	0.61	7.89	270	1000	< 0.003	0.089	0.47	< 0.001	< 0.0005	< 0.005	0.0041	< 0.0005	< 0.01	< 0.0002	0.014	1.12	< 0.0025	< 0.002
	8/9/2018	1.4	160	120	0.65	7.24	220	1000	< 0.003	0.68	3.0	<^ 0.0010	0.0008	< 0.005	0.0053	0.0012	< 0.01	< 0.0002	0.013	1.48	< 0.0025	< 0.002
	5/1/2019	2.3	110	60	0.62	7.08	200	730	< 0.003	0.11	0.6	< 0.001	< 0.0005	< 0.005	0.0026	0.0011	< 0.01	< 0.0002	0.014	1.59	< 0.0025	< 0.002
	11/14/2019	1.8	120	83	0.55	7.43	150	890	NA	0.14	0.72	NA	< 0.0005	NA	0.0041	0.0021	< 0.01	< 0.0002	0.02	2.64	< 0.0025	< 0.002
	4/29/2020	1.2	100	110	0.62	7.08	320	950	NA	0.019	0.21	NA	< 0.0005	NA	0.0019	< 0.0005	< 0.01	< 0.0002	0.024	0.47	< 0.0025	< 0.002
	12/8/2020	0.7	86	94	0.67	7.26	200	650	NA	0.027	0.26	NA	< 0.0005	NA	0.0021	< 0.0005	< 0.01	< 0.0002	0.03	< 0.523	< 0.0025	< 0.002
	5/11/2021	1.0	99	130	0.72	7.26	230	820	< 0.003	0.024	0.25	< 0.001	< 0.0005	< 0.005	0.0019	< 0.0005	0.012	< 0.0002	0.032	1.59	< 0.0025	< 0.002
MW-12 (CL) down-gradient	11/19/2015	0.94	160	H 220	H 0.57	7.12	H 650	H 1400	< 0.003	0.10	0.180	^ < 0.001	0.00068	< 0.005	< 0.001	0.00063	0.023	H < 0.0002	0.0280	< 0.685	< 0.0025	< 0.002
	2/26/2016	0.42	130	200	0.40	7.96	530	1200	< 0.003	0.077	0.130	< 0.001	0.0016	< 0.005	< 0.001	0.0014	0.014	< 0.0002	0.0150	1.11	< 0.0025	< 0.002
	5/20/2016	0.65	150	200	0.49	7.28	550	1400	< 0.003	0.065	0.16	F1 < 0.001	0.00077	< 0.005	< 0.001	0.0016	0.013	< 0.0002	0.028	0.576	< 0.0025	< 0.002
	8/18/2016	0.69	170	200	0.49	7.06	620	1600	< 0.003	0.33	0.88	0.0013	0.007	< 0.005	0.001	0.0011	0.015	< 0.0002	0.011	3.68	< 0.0025	< 0.002
	11/18/2016	0.83	140	180	0.46	7.34	340	1300	< 0.003	0.23	0.67	< 0.001	0.0028	< 0.005	< 0.001	< 0.0005	0.017	< 0.0002	< 0.01	1.86	< 0.0025	< 0.002
	2/16/2017	0.48	140	190	0.37	7.54	630	1300	< 0.003	0.29	0.26	< 0.001	0.0057	< 0.005	0.0013	0.0042	0.010	< 0.0002	0.015	1.15	< 0.0025	< 0.002
	5/3/2017	0.49	120	190	0.37	7.47	500	1200	< 0.003	0.10	0.17	< 0.001	0.0022	< 0.005	< 0.001	0.0038	0.011	< 0.0002	0.017	0.518	< 0.0025	< 0.002
	6/22/2017	0.50	130	190	0.48	7.36	580	1400	< 0.003	0.025	0.11	< 0.001	< 0.0005	< 0.005	< 0.001	0.00096	< 0.010	< 0.0002	0.028	0.376	< 0.0025	< 0.002
	8/29/2017	0.78	140	180	0.52	7.34	520	1400	< 0.003	0.02	0.095	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.014	< 0.0002	0.024	0.529	< 0.0025	< 0.002
	11/10/2017	0.94	130	170	0.48	7.38	370	1200	< 0.003	0.50	0.45	< 0.001	0.0015	< 0.005	< 0.001	0.00097	0.018	< 0.0002	0.023	1.67	< 0.0025	< 0.002
	5/16/2018	0.46	100	180	0.47	8.12	720	1500	< 0.003	0.09	0.1	< 0.001	0.00052	< 0.005	< 0.001	0.00067	0.012	< 0.0002	0.021	0.741	< 0.0025	< 0.002
	8/9/2018	0.61	120	190	0.44	7.42	480	1300	< 0.003	0.12	0.15	<^ 0.001	0.00084	< 0.005	< 0.001	0.00072	< 0.010	< 0.0002	0.026	0.735	< 0.0025	< 0.002
	5/1/2019	0.4	100	170	0.38	7.68	330	1000	< 0.003	0.04	0.13	< 0.001	0.00054	< 0.005	< 0.001	0.0012	0.014	< 0.0002	0.011	0.666	< 0.0025	< 0.002
	11/14/2019	0.74	120	160	0.45	7.61	280	1100	NA	0.026	0.072	NA	< 0.0005	NA	< 0.001	< 0.0005	0.014	< 0.0002	0.027	0.568	< 0.0025	< 0.002
	4/29/2020	0.34	71	150	0.34	7.96	360	980	NA	0.003	0.034	NA	< 0.0005	NA	< 0.001	< 0.0005	0.012	< 0.0002	0.015	0.578	< 0.0025	< 0.002
	12/8/2020	0.61	92	160	0.56	7.36	320	990	NA	0.025	0.069	NA	< 0.0005	NA	< 0.001	< 0.0005	0.012	< 0.0002	0.027	< 0.476	< 0.0025	< 0.002
	5/13/2021	0.4	89	140	0.23	7.39	350	990	< 0.003	0.0025	0.058	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.017	< 0.0002	0.016	0.563	< 0.0025	< 0.002
MW-15 (CL) down-gradient	11/18/2015	1.5	270	H 210	H 0.53	6.55	H 1400	H 2400	< 0.003	0.03	0.096	^ < 0.001	0.00061	< 0.005	< 0.001	< 0.0005	0.042	H < 0.0002	0.023	< 0.599	0.0065	< 0.002
	2/25/2016	2.0	240	110	0.61	6.84	640	1700	< 0.003	0.025	0.083	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.041	< 0.0002	0.035	0.870	0.045	< 0.002
	5/19/2016	2.7	320	240	0.53	6.83	1200	2800	< 0.003	0.04	0.097	< 0.001	0.00098	< 0.005	< 0.001	< 0.0005	0.044	< 0.0002	0.041	< 0.420	0.0067	< 0.002
	8/18/2016	1.5	200	F1 170	0.54	6.96	660	1900	< 0.003	0.13	0.11	< 0.001	0.0041	< 0.005	< 0.001	< 0.0005	0.028	< 0.0002	0.027	< 0.672	0.0061	< 0.002
	11/17/2016	1.3	120	180	0.47	6.91	560	1900	< 0.003	0.0033	0.031	< 0.001	< 0.0005	< 0.0050	< 0.0010	< 0.0005	0.016	< 0.0002	0.018	< 0.570	0.0078	< 0.002
	2/17/2017	1.9	200	190	0.43	7.24	670	1700	< 0.003	0.02	0.056	< 0.001	< 0.0005	< 0.0050	< 0.0010	< 0.0005	0.025	< 0.0002	0.027	< 0.392	0.0032	< 0.002
	5/4/2017	1.5	180	190	0.57	7.35	670	1700	< 0.003	0.011	0.049	< 0.001	< 0.0005	< 0.0050	< 0.0010	< 0.0005	0.023	< 0.0002	0.023	< 0.456	0.0034	< 0.002
	6/21/2017	1.6	180	200	0.56	7.30	530	1600	< 0.003	0.0093	0.054	< 0.001	< 0.0005	< 0.0050	< 0.0010	< 0.0005	0.027	< 0.0002	0.03	< 0.347	0.019	< 0.002
	8/29/2017	2.2	190	200	0.53	6.87	540	1800	< 0.003	0.0018	0.044	< 0.001	< 0.0005	< 0.0050	< 0.0010	< 0.0005	0.023	< 0.0002	0.032	0.377	0.0092	< 0.002
	11/10/2017	1.6	170	180	0.63	7.09	530	1500	< 0.003	0.0063	0.046	< 0.001	< 0.0005	< 0.0050	< 0.0010	< 0.0005	0.025	< 0.0002	0.02	< 0.313	0.016	< 0.002
	5/17/2018	2.3	200	160	0.5	6.75	680	1800	< 0.003	0.0081	0.05	< 0.001	< 0.0005	< 0.0050	< 0.0010	< 0.0005	0.029	< 0.0002	0.03	0.397	0.077	< 0.002
	8/9/2018	2.3	200	200	0.48	7.06	520	1700	< 0.003	0.0083	0.048	<^ 0.001	< 0.0005	< 0.0050	< 0.0010	< 0.0005	0.026	< 0.0002	0.033	0.566	0.06	< 0.002
	5/2/2019	1.5	180	200	0.52	6.89	420	1500	< 0.003	0.0045	0.052	< 0.001	< 0.0005	< 0.005	< 0.0010	< 0.0005	0.027	< 0.0002	0.023	< 0.424	< 0.0025	< 0.002
	11/14/2019	1.8	170	170	0.5	7.24	260	1300	NA	0.0044	0.053	NA	< 0.0005	NA	< 0.0010	< 0.0005	0.029	< 0.0002	0.025	< 0.475	< 0.0025	< 0.002
	4/29/2020	1.2	160	200	0.58	6.90	370	1300	NA	0.0036	0.06	NA	< 0.0005	NA	< 0.0010	< 0.0005	0.027	< 0.0002	0.023	0.578	< 0.0025	< 0.002
	12/8/2020	1.5	170	200	0.55	7.04	540	1400	NA	0.02	0.1	NA	0.00059	NA	0.0012	< 0.0005	0.035	< 0.0002	0.02	0.626	0.012	< 0.002
	5/12/2021	1.3	180	180	0.54	6.97	520	1500	< 0.003	0.0048	0.065	< 0.001	< 0.0005	< 0.0050	< 0.0010	< 0.0005	0.026	< 0.0002	0.014	< 0.648	0.0071	< 0.002
MW-17 (CL) down-gradient	11/19/2015	1.6	210	H 230	H 0.43	7.11	H 850	H 1800	< 0.003	0.0028	0.14	^ < 0.001	< 0.0005	< 0.005	0.0012	0.0012	0.019	H < 0.0002	0.035	< 0.790	< 0.0025	< 0.002
	2/22/2016	1.8	290	280	0.55	7.19	960	2100	< 0.003	0.021	0.051	< 0.001	< 0.0005	< 0.005	0.0012	< 0.0005	0.038	< 0.0002	0.093	1.07	< 0.0025	< 0.002
	5/18/2016	1.4	200	230	0.64	7.02	700	1800	< 0.003	0.32	0.12	< 0.001	0.0011	< 0.005	0.0015	< 0.0005	0.026	< 0.0002	0.12	8.27	< 0.0025	0.0028
	8/15/2016	1.1	220	220	0.60	7.08	860	2100	< 0.003	0.34	0.12	< 0.001	0.001	< 0.005	0.0016	< 0.0005	0.022	< 0.0002	0.1	0.606	< 0.0025	0.0031
	11/14/2016	1.5	200	210	0.56	7.26	560	2000	< 0.003	0.19	0.073	< 0.001	0.00051	< 0.005	0.0012	< 0.0005	0.022	< 0.0002	0.042	3.76	< 0.0025	0.0021
	2/13/2017	1.6	190	230	0.56	6.84	770	1600	< 0.003	0.35	0.16	< 0.001	0.00093	< 0.005	0.0014	0.00079	0.019	< 0.0002	0.088	2.08	< 0.0025	0.0025
	5/4/2017	1.2	170	210	0.61	7.29	720	1500	< 0.003	0.24	0.39	0.0013	0.0023	< 0.005	0.0023	0.00066	0.016	< 0.0002	0.036	1.91	< 0.0025	0.0065
	6/22/2017	0.95	150	230	0.72	7.38	580	1600	< 0.003	0.41	0.13	< 0.001	0.0007	< 0.005	0.0012	0.0011	0.022	< 0.0002	0.11	1.21	< 0.0025	0.0022
	8/29/2017	1.4	190	230	0.64	7.19	640	1900	< 0.003	0.24	0.092	< 0.001	< 0.0005	< 0.005	< 0.001	0.00058	0.021	< 0.0002	0.13	3.32	< 0.0025	0.0025
	11/6/2017	1.7	190	240	0.62	7.27	840	1800	< 0.003	0.17	0.38	< 0.001	0.0022	< 0.005	0.0015	< 0.0005	< 0.01	< 0.0002	0.019	2.54	< 0.0025	0.0075
	5/14/2018	1.6	170	220	0.6	7.79	800	1700	< 0.003	0.42	0.17	< 0.001	0.002	< 0.005	0.0029	0.0021	0.015	< 0.0002	0.13	2.03	< 0.0025	0.0068
	8/6/2018	1.3	170	230	0.6	7.12	620	1600	< 0.003	0.087	0.055	<^ 0.001	0.00094	< 0.005	0.0015	< 0.0005	0.019	< 0.0002	0.084	1.34	< 0.0025	0.0023
	4/29/2019	0.98	150	190	0.66	7.25	660	1500	< 0.003	0.042	0.04	< 0.001	0.00052	< 0.005	< 0.001	0.00069	0.015	< 0.0002	0.06	0.517	< 0.0025	< 0.002
	11/13/2019	1.9	230	600	0.55	7.16	730	2300	NA	0.088	0.1	NA	0.0015	NA	0.0011	0.00093	0.021	< 0.0002	0.058	0.643	< 0.0025	0.0029
	4/27/2020	1.2	150	170	0.79	7.27	520	1300	NA	0.026	0.036	NA	< 0.0005	NA	< 0.001	0.00081	0.021	< 0.0002	0.075	0.498	< 0.0025	< 0.002
	12/7/2020	1.3	140	160	0.8	7.22	430	1100	NA	0.08	0.05	NA	0.001	NA	< 0.001	0.0011	0.022	< 0.0002	0.056	< 0.438	< 0.0025	< 0.002
	5/12/2021	0.99	130	160	0.77	7.52	480	1200	< 0.003	0.0053	0.027	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.018	< 0.0002	0.049	< 0.478	< 0.0025	< 0.002
MW-18 (S) down-gradient	11/19/2015	0.80	140	H 220	H 0.66	7.62	H 310	H 1200	< 0.003	0.0014	0.14	^ < 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.017	H < 0.0002	0.0051	< 0.845	< 0.0025	< 0.002
	2/22/2016	0.76	150	220	0.68	7.06	310	1200	< 0.003	0.0012	0.15	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.022	< 0.0002	0.0055	1.88	< 0.0025	< 0.002
	5/18/2016	0.72	120	230	0.71	7.68	230	1200	< 0.003	< 0.001	0.13	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.014	< 0.0002	0.0052	< 0.493	< 0.0025	< 0.002
	8/15/2016	0.67	130	210	0.64	7.52	330	1300	< 0.003	< 0.001	0.14	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.012	< 0.0002	0.0059	0.836	< 0.0025	< 0.002
	11/18/2016	0.94	130	200	0.58	7.69	250	1300	< 0.003	< 0.001	0.14	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.013	< 0.0002	0.0053	0.488	< 0.0025	< 0.002
	2/15/2017	0.56	140	190	0.50	7.81	340	1200	< 0.003	< 0.001	0.14	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.014	< 0.0002	0.0058	< 0.347	< 0.0025	< 0.002
	5/5/2017	0.46	130	180	0.52	8.12	360	1100	< 0.003	0.0032	0.12	< 0.001	< 0.0005	< 0.005	< 0.001	0.00057	0.01	< 0.0002	< 0.005	0.612	< 0.0025	< 0.002
	6/21/2017	0.53	120	190	0.51	8.10	320	1200	< 0.003	< 0.001	0.12	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.014	< 0.0002	0.0051	0.629	< 0.0025	< 0.002
	8/28/2017	0.65	120	200	0.53	7.81	310	1200	< 0.003	< 0.001	0.12	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.012	< 0.0002	0.005	0.498	< 0.0025	< 0.002
	11/6/2017	0.67	120	190	0.57	7.74	400	1200	< 0.003	< 0.001	0.12	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.011	< 0.0002	0.0057	0.755	< 0.0025	< 0.002
	5/14/2018	0.57	130	180	0.59	8.27	440	1200	< 0.003	< 0.001	0.13	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.013	< 0.0002	0.0052	0.641	< 0.0025	< 0.002
	8/6/2018	0.58	120	230	0.57	7.88	270	1100	< 0.003	< 0.001	0.12	<^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.013	< 0.0002	0.0052	1.02	< 0.0025	< 0.002
	4/29/2019	0.54	120	180	0.61	7.77	170	1000	< 0.003	< 0.001	0.12	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.013	< 0.0002	< 0.005	< 0.445	< 0.0025	< 0.002
	11/13/2019	0.79	130	180	0.56	8.26	210	1100	NA	0.0013	0.12	NA	< 0.0005	NA	< 0.001	< 0.0005	0.014	< 0.0002	< 0.005	< 0.49	< 0.0025	< 0.002
	4/27/2020	0.60	120	170	0.69	7.90	180	1000	NA	< 0.001	0.12	NA	< 0.0005	NA	< 0.001	< 0.0005	0.016	< 0.0002	< 0.005	< 0.526	< 0.0025	< 0.002
	12/7/2020	0.75	110	F1 150	0.70	7.70	160	910	NA	0.0032	0.11	NA	< 0.0005	NA	< 0.001	< 0.0005	0.014	< 0.0002	0.061	< 0.497	< 0.0025	< 0.002
	5/10/2021	0.66	130	140	0.66	8.02	350	880	< 0.003	< 0.001	0.12	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	0.013	< 0.0002	0.005	< 0.544	< 0.0025	< 0.002

Notes: All units are in mg/l except pH is in standard units.
F1 - MS and/or MSD Recovery outside of limits.
H - Sample was prepped or analyzed beyond the specified holding time.
V- Serial dilution exceeds control limits.

* - LCS or LCSD is outside acceptance limits.
^ - Denotes instrument related QC exceeds the control limits
(R) - Resample Event
NA - Not Analyzed

Table 9-6. Groundwater Analytical Results - Midwest Generation, LLC, Powerton Station, Pekin, IL. Former Ash Basin.

Well	Date	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Radium 226 + 228	Selenium	Thallium
MW-01 up-gradient	11/16/2015	1.0	98	44	0.17	7.07	93	530	< 0.003	< 0.001	0.057	^ < 0.001	< 0.0005	< 0.005	< 0.001	* < 0.0005	< 0.01	< 0.0002	< 0.0050	0.744	< 0.0025	* < 0.002
	2/25/2016	0.2	110	42	0.16	7.23	54	460	< 0.003	0.0025	0.053	< 0.001	< 0.0005	< 0.005	0.0014	0.0019	< 0.01	< 0.0002	< 0.005	< 0.722	0.0029	< 0.002
	5/20/2016	0.34	100	44	0.17	6.95	65	430	< 0.003	0.0081	0.062	< 0.001	< 0.0005	0.007	0.0053	0.011	< 0.01	< 0.0002	< 0.005	< 0.953	< 0.0025	< 0.002
	8/17/2016	0.27	78	39	0.25	7.16	50	530	< 0.003	0.0014	0.048	< 0.001	< 0.0005	< 0.005	< 0.001	0.0014	< 0.01	< 0.0002	0.0057	< 0.491	< 0.0025	< 0.002
	11/16/2016	0.18	97	39	0.21	7.22	32	500	< 0.003	0.0051	0.056	< 0.001	< 0.0005	< 0.005	0.0044	0.0082	< 0.01	< 0.0002	0.0059	< 0.618	< 0.0025	< 0.002
	2/14/2017	0.18	120	55	0.17	7.30	60	550	< 0.003	0.0041	0.056	< 0.001	< 0.0005	< 0.005	0.0045	0.0076	< 0.01	< 0.0002	0.0056	< 0.837	< 0.0025	< 0.002
	5/3/2017	0.19	86	66	0.16	7.41	45	460	< 0.003	0.0015	0.045	< 0.001	< 0.0005	< 0.005	0.0033	0.0067	< 0.01	< 0.0002	< 0.005	0.574	< 0.0025	< 0.002
	6/21/2017	0.18	85	58	0.18	7.60	47	540	< 0.003	< 0.001	0.040	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0061	< 0.418	< 0.0025	< 0.002
	8/25/2017	0.56	86	41	0.18	7.41	63	490	< 0.003	< 0.001	0.049	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0059	0.775	< 0.0025	< 0.002
	11/8/2017	0.57	130	38	0.12	6.69	61	640	< 0.003	< 0.001	0.083	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.343	< 0.0025	< 0.002
	5/17/2018	0.15	88	50	0.12	6.70	48	540	< 0.003	< 0.001	0.045	< 0.001	< 0.0005	< 0.005	< 0.001	0.00068	< 0.01	< 0.0002	< 0.005	< 0.396	< 0.0025	< 0.002
	8/8/2018	0.14	86	48	0.13	6.80	43	430	< 0.003	< 0.001	0.051	<^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.579	< 0.0025	< 0.002
	4/30/2019	0.07	78	54	0.17	7.20	27	450	< 0.003	0.0014	0.039	< 0.001	< 0.0005	< 0.005	< 0.001	0.0017	< 0.01	< 0.0002	< 0.005	< 0.656	< 0.0025	< 0.002
	8/26/2019	0.57	100	39	0.13	7.15	71	550	< 0.003	< 0.001	0.053	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.802	< 0.0025	< 0.002
	2/24/2020	0.28	87	53	0.21	7.19	34	410	< 0.003	< 0.001	0.044	< ^ 0.001	< 0.0005	< 0.005	< 0.001	0.00057	< 0.01	< 0.0002	< 0.005	< 0.478	< 0.0025	< 0.002
	4/28/2020	0.33	110	46	0.19	7.17	41	470	NA	< 0.001	0.051	NA	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.628	< 0.0025	< 0.002
	12/7/2020	0.59	100	54	0.25	7.22	55	640	NA	< 0.001	0.058	NA	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0052	< 0.542	< 0.0025	< 0.002
	5/11/2021	0.21	85	51	0.21	7.52	37	450	< 0.003	< 0.001	0.043	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.01	0.521	< 0.0025	< 0.002
MW-10 up-gradient	6/22/2017	0.46	100	48	0.19	6.81	54	1.0	< 0.003	0.0023	0.250	< 0.001	< 0.0005	< 0.005	0.008	0.003	< 0.01	< 0.0002	< 0.005	0.408	0.0042	< 0.002
	8/24/2017	0.32	93	51	0.18	7.14	57	480	< 0.003	0.0020	0.220	< 0.001	< 0.0005	< 0.005	0.007	0.003	< 0.01	< 0.0002	< 0.005	0.564	0.0044	< 0.002
	11/9/2017	0.36	98	48	0.18	6.78	64	500	< 0.003	< 0.0010	0.220	< 0.001	< 0.0005	< 0.005	0.004	< 0.001	< 0.01	< 0.0002	< 0.005	1.020	0.0034	< 0.002
	5/16/2018	0.42	93	44	0.19	7.64	80	530	< 0.003	0.0010	0.220	< 0.001	< 0.0005	< 0.005	0.021	0.001	< 0.01	< 0.0002	< 0.005	1.550	0.0050	< 0.002
	8/8/2018	0.39	99	58	0.19	7.10	60	550	< 0.003	0.0012	0.220	<^ 0.001	< 0.0005	< 0.005	0.014	0.001	< 0.01	< 0.0002	< 0.005	< 0.551	0.0062	< 0.002
	10/30/2018	0.34	110	49	0.22	7.65	49	510	< 0.003	0.0110	0.410	< 0.001	0.0008	0.024	0.047	0.023	0.02	< 0.0002	< 0.005	3.00	0.0046	< 0.002
	2/26/2019	0.39	150	48	0.21	6.77	36	540	< 0.003	0.0220	0.590	< 0.005	0.0015	0.063	0.081	0.036	0.03	< 0.0002	0.007	4.130	0.0041	< 0.002
	5/1/2019	0.35	92	50	0.22	6.81	30	470	< 0.003	0.0023	0.270	< 0.001	< 0.0005	< 0.005	0.011	0.0028	< 0.01	< 0.0002	< 0.005	1.330	0.0037	< 0.002
	8/26/2019	0.30	84	48	0.19	7.09	30	410	< 0.003	0.0017	0.190	< 0.001	< 0.001	< 0.005	0.007	0.0016	< 0.01	< 0.0002	< 0.005	1.540	0.0050	< 0.002
	2/25/2020	1.40	110	45	0.23	6.82	59	500	< 0.003	0.0033	0.280	< ^ 0.001	< 0.0005	0.0086	0.011	0.0046	< 0.01	< 0.0002	< 0.005	1.07	0.0058	< 0.002
	4/28/2020	1.00	110	41	0.24	6.80	64	550	NA	0.0022	0.250	NA	NA	< 0.005	0.0065	0.0017	NA	NA	< 0.005	0.639	0.0054	NA
	12/8/2020	2.40	120	44	0.26	7.11	71	550	NA	0.0015	0.280	NA	NA	< 0.005	0.0089	0.0023	NA	< 0.0002	< 0.005	1.76	0.0031	NA
	5/11/2021	0.64	100	52	0.24	7.01	59	540	< 0.003	0.0011	0.260	< 0.001	< 0.001	< 0.005	0.008	0.0009	< 0.01	< 0.0002	< 0.005	1.42	0.0049	< 0.002
MW-02 down-gradient	6/20/2017	0.33	90	55	0.19	7.01	47	500	< 0.003	0.0012	0.075	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.341	< 0.0025	< 0.002
	8/23/2017	V 1.30	86	49	0.19	7.40	61	440	< 0.003	< 0.001	0.062	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.833	< 0.0025	< 0.002
	11/7/2017	3.70	98	46	0.17	7.10	88	550	< 0.003	0.0014	0.091	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.309	0.0027	< 0.002
	5/15/2018	0.22	80	45	0.23	7.71	54	500	< 0.003	0.0013	0.065	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	0.0004	< 0.005	< 0.408	< 0.0025	< 0.002
	8/7/2018	1.50	89	54	0.15	7.09	51	530	< 0.003	0.0016	0.067	<^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.622	< 0.0025	< 0.002
	10/30/2018	0.23	86	43	0.17	7.83	34	480	< 0.003	0.0015	0.067	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.564	< 0.0025	< 0.002
	2/26/2019	0.07	69	49	0.16	7.82	23	400	< 0.003	0.0026	0.041	< 0.001	< 0.0005	< 0.005	< 0.001	0.0013	< 0.01	< 0.0002	< 0.005	< 0.425	< 0.0025	< 0.002
	4/30/2019	0.12	79	48	0.16	7.60	30	440	< 0.003	0.0013	0.048	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.441	< 0.0025	< 0.002
	8/26/2019	0.51	86	50	0.18	7.13	32	400	< 0.003	0.0011	0.065	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	1.180	< 0.0025	< 0.002
	2/24/2020	0.33	89	53	0.20	7.43	37	410	< 0.003	0.0011	0.061	< ^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.485	< 0.0025	< 0.002
	4/28/2020	0.33	90	50	0.20	7.32	41	430	NA	0.0016	0.06	NA	NA	< 0.005	< 0.001	< 0.0005	NA	NA	< 0.005	< 0.54	< 0.0025	NA
	12/9/2020	0.66	100	41	0.15	7.78	64	430	NA	< 0.001	0.076	NA	NA	< 0.005	< 0.001	< 0.0005	NA	< 0.0002	0.0059	< 0.471	< 0.0025	NA
	5/11/2021	0.23	79	51	0.21	7.70	37	370	< 0.003	0.0015	0.057	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.010	< 0.528	< 0.0025	< 0.002

Notes: All units are in mg/l except pH is in standard units.
V- Serial dilution exceeds control limits.
H- Sample was prepped or analyzed beyond specified holding time

F1 - MS and/or MSD Recovery outside of limits.
* - LCS or LCSD is outside acceptance limits.
^ - Denotes instrument related QC exceeds the control limits

NA - Not Analyzed

Table 9-6. Groundwater Analytical Results - Midwest Generation, LLC, Powerton Station, Pekin, IL. Former Ash Basin.

Well	Date	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Radium 226 + 228	Selenium	Thallium
MW-03 down-gradient	6/20/2017	0.4	76	54	0.29	7.26	49	480	< 0.003	0.0013	0.066	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.325	< 0.0025	< 0.002
	8/23/2017	0.40	79	52	0.28	7.44	52	430	< 0.003	0.0010	0.066	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	1.200	< 0.0025	< 0.002
	11/7/2017	0.31	79	62	0.26	7.04	61	460	< 0.003	0.0013	0.068	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.588	< 0.0025	< 0.002
	5/15/2018	0.35	87	66	0.27	7.53	77	520	< 0.003	0.0010	0.059	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.489	< 0.0025	< 0.002
	8/7/2018	0.40	82	67	0.22	6.60	49	500	< 0.003	0.0015	0.067	<^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.341	< 0.0025	< 0.002
	10/30/2018	0.20	74	44	0.25	7.84	26	400	< 0.003	0.0014	0.056	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.354	< 0.0025	< 0.002
	2/26/2019	0.06	74	56	0.24	7.49	25	410	< 0.003	0.0013	0.054	< 0.001	< 0.0005	< 0.005	< 0.001	0.0007	< 0.01	< 0.0002	< 0.005	< 0.399	< 0.0025	< 0.002
	4/30/2019	0.28	74	49	0.22	7.17	38	390	< 0.003	< 0.001	0.060	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.668	< 0.0025	< 0.002
	8/26/2019	0.31	75	50	0.26	7.17	14	380	< 0.003	0.0014	0.069	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.444	< 0.0025	< 0.002
	2/24/2020	0.33	87	53	0.22	7.10	65	470	< 0.003	< 0.001	0.066	< ^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.400	< 0.0025	< 0.002
	4/28/2020	0.24	86	46	0.22	7.03	79	410	NA	0.0013	0.066	NA	NA	< 0.005	< 0.001	< 0.0005	NA	NA	< 0.005	< 0.498	0.0036	NA
	12/9/2020	0.86	92	45	0.28	7.46	60	390	NA	< 0.001	0.086	NA	NA	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.432	< 0.0025	NA
	5/11/2021	0.22	75	49	0.21	7.33	38	390	< 0.003	< 0.001	0.070	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.519	< 0.0025	< 0.002
MW-04 down-gradient	6/20/2017	0.5	77	55	0.29	7.45	53	480	< 0.003	< 0.001	0.0025	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.343	< 0.0025	< 0.002
	8/28/2017	V 0.73	90	89	0.33	7.13	110	680	< 0.003	< 0.001	0.028	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.013	< 0.246	< 0.0025	< 0.002
	11/7/2017	0.60	110	94	0.24	6.80	130	650	< 0.003	< 0.001	0.051	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.332	0.0092	< 0.002
	5/15/2018	0.68	87	66	0.27	7.63	100	630	< 0.003	< 0.001	0.037	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.661	< 0.0025	< 0.002
	8/7/2018	0.79	84	71	0.32	6.72	49	510	< 0.003	0.0011	0.031	<^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.006	< 0.334	< 0.0025	< 0.002
	10/30/2018	0.54	100	80	0.24	7.55	91	690	< 0.003	< 0.001	0.049	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.423	< 0.0025	< 0.002
	2/26/2019	0.38	79	55	0.25	7.18	52	490	< 0.003	0.0013	0.033	< 0.001	< 0.0005	< 0.005	0.001	0.0012	< 0.01	< 0.0002	< 0.005	0.366	< 0.0025	< 0.002
	4/30/2019	0.36	74	48	0.25	7.08	35	380	< 0.003	< 0.001	0.026	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.684	< 0.0025	< 0.002
	8/26/2019	0.64	91	60	0.24	7.08	14	490	< 0.003	< 0.001	0.032	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.008	1.090	< 0.0025	< 0.002
	2/24/2020	0.34	81	49	0.20	7.05	67	440	< 0.003	< 0.001	0.024	< ^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.595	< 0.0025	< 0.002
	4/28/2020	0.55	76	52	0.27	7.03	47	380	NA	< 0.001	0.025	NA	NA	< 0.005	< 0.001	< 0.0005	NA	NA	< 0.005	< 0.465	< 0.0025	NA
	12/9/2020	0.57	92	88	0.32	7.10	94	580	NA	< 0.001	0.034	NA	NA	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0076	< 0.411	< 0.0025	NA
	5/11/2021	0.61	77	44	0.33	7.22	76	410	< 0.003	< 0.001	0.025	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.533	< 0.0025	< 0.002
MW-05 down-gradient	5/17/2016	0.70	100	85	0.35	7.08	120	660	< 0.003	< 0.001	0.051	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.373	< 0.0025	< 0.002
	8/16/2016	0.69	110	97	0.30	6.85	150	830	< 0.003	< 0.001	0.060	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.452	< 0.0025	< 0.002
	11/15/2016	0.93	94	66	0.23	6.96	77	620	< 0.003	< 0.001	0.051	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	0.449	< 0.0025	< 0.002
	2/14/2017	0.79	100	100	0.25	7.25	170	760	< 0.003	< 0.001	0.062	< 0.001	< 0.0005	< 0.005	< 0.001	0.00091	< 0.01	< 0.0002	< 0.005	< 0.359	< 0.0025	< 0.002
	5/1/2017	0.70	100	92	0.28	7.60	170	710	< 0.003	< 0.001	0.059	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0066	< 0.439	< 0.0025	< 0.002
	6/20/2017	0.64	89	63	0.28	7.32	78	550	< 0.003	< 0.001	0.048	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0061	< 0.365	< 0.0025	< 0.002
	8/28/2017	0.62	110	120	0.33	7.05	210	870	< 0.003	< 0.001	0.064	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0085	0.381	< 0.0025	< 0.002
	11/7/2017	0.51	99	110	0.31	6.87	160	990	< 0.003	< 0.001	0.058	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.341	< 0.0025	< 0.002
	5/15/2018	0.61	130	89	0.29	7.70	210	910	< 0.003	< 0.001	0.062	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	< 0.005	< 0.390	< 0.0025	< 0.002
	8/7/2018	0.49	110	120	0.32	6.56	180	890	< 0.003	< 0.001	0.054	<^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0069	0.523	< 0.0025	< 0.002
	4/30/2019	0.56	84	73	0.36	6.96	120	590	< 0.003	< 0.001	0.041	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0061	< 0.709	< 0.0025	< 0.002
	8/26/2019	0.57	110	75	0.29	7.01	110	660	< 0.003	< 0.001	0.050	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0067	0.651	< 0.0025	< 0.002
	2/24/2020	0.54	110	70	0.36	6.90	120	H 700	< 0.003	< 0.001	0.057	< ^ 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0061	0.506	< 0.0025	< 0.002
	4/28/2020	0.49	110	56	0.37	6.87	130	620	NA	0.001	0.052	NA	NA	< 0.005	< 0.001	< 0.0005	NA	NA	0.0074	0.508	< 0.0025	NA
	12/9/2020	0.53	98	78	0.31	6.91	110	670	NA	< 0.001	0.05	NA	NA	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0072	0.569	< 0.0025	NA
	5/11/2021	0.5	83	52	0.38	7.20	100	530	< 0.003	< 0.001	0.04	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.0005	< 0.01	< 0.0002	0.0062	< 0.525	< 0.0025	< 0.002

Notes: All units are in mg/l except pH is in standard units.
V- Serial dilution exceeds control limits.
H- Sample was prepped or analyzed beyond specified holding time

F1 - MS and/or MSD Recovery outside of limits.
* - LCS or LCSD is outside acceptance limits.
^ - Denotes instrument related QC exceeds the control limits

NA - Not Analyzed

Table 9-7 Ash Bypass Basin and Ash Surge Basin Turbidity Measurement Data - Midwest Generation, LLC, Powerton Station.

Well	Date	Turbidity (NTU)
MW-01	2/23/2021	78.20
	4/9/2021	6.96
	5/11/2021	3.24
	6/2/2021	3.80
	6/28/2021	4.30
	7/19/2021	4.88
	8/24/2021	3.34
	9/30/2021	3.04
MW-09	2/24/2021	16.90
	4/9/2021	5.73
	5/13/2021	0.49
	6/2/2021	2.37
	6/29/2021	4.53
	7/19/2021	6.12
	8/25/2021	16.65
	9/30/2021	3.20
MW-19	2/22/2021	0.56
	4/9/2021	4.25
	5/10/2021	1.80
	6/2/2021	5.77
	6/29/2021	8.79
	7/19/2021	7.30
	8/26/2021	30.91
	9/30/2021	2.92
MW-08	2/23/2021	47.30
	4/9/2021	23.05
	5/11/2021	8.93
	6/3/2021	11.11
	6/29/2021	5.48
	7/19/2021	6.86
	8/25/2021	6.80
	9/30/2021	5.01
MW-11	2/25/2021	35.10
	4/9/2021	41.53
	5/13/2021	14.70
	6/3/2021	14.92
	6/29/2021	40.48
	7/19/2021	25.73
	8/25/2021	55.39
	9/30/2021	4.06
MW-12	2/25/2021	26.50
	4/9/2021	66.11
	5/13/2021	5.17
	6/3/2021	106.47
	6/29/2021	21.40
	7/19/2021	22.70
	8/25/2021	12.62
	9/30/2021	18.66
MW-15	2/24/2021	64.90
	4/9/2021	16.80
	5/12/2021	16.45
	6/3/2021	7.85
	6/29/2021	6.58
	7/20/2021	5.82
	8/23/2021	4.28
	10/1/2021	13.13
MW-17	2/24/2021	42.00
	4/8/2021	17.10
	5/12/2021	10.90
	6/3/2021	38.15
	6/28/2021	29.15
	7/20/2021	16.38
	8/23/2021	26.51
	10/1/2021	21.26
MW-18	2/22/2021	3.40
	4/9/2021	4.62
	5/10/2021	2.28
	6/3/2021	2.38
	6/29/2021	3.96
	7/19/2021	5.19
	8/26/2021	7.96
	9/30/2021	37.94

Table 9-8 Former Ash Basin Turbidity Measurement Data - Midwest Generation, LLC, Powerton Station.

Well	Date	Turbidity (NTU)
MW-01	2/23/2021	78.20
	4/9/2021	6.96
	5/10/2021	3.24
	6/2/2021	3.80
	6/28/2021	4.30
	7/19/2021	4.88
	8/24/2021	3.34
	9/30/2021	3.04
MW-10	2/23/2021	257.70
	4/9/2021	54.91
	5/11/2021	24.74
	6/2/2021	6.02
	6/28/2021	14.11
	7/19/2021	17.53
	8/24/2021	41.55
	9/30/2021	17.07
MW-02	2/22/2021	19.60
	4/8/2021	4.55
	5/11/2021	1.82
	6/2/2021	2.06
	6/28/2021	2.67
	7/19/2021	3.56
	8/24/2021	5.23
	10/1/2021	2.76
MW-03	2/22/2021	8.20
	4/8/2021	4.00
	5/11/2021	2.68
	6/2/2021	3.63
	6/28/2021	3.32
	7/19/2021	4.22
	8/24/2021	5.75
	10/1/2021	2.45
MW-04	2/22/2021	4.20
	4/8/2021	4.05
	5/11/2021	4.33
	6/2/2021	2.12
	6/28/2021	8.21
	7/19/2021	3.84
	8/24/2021	2.92
	10/1/2021	2.72
MW-05	2/22/2021	1.72
	4/8/2021	4.00
	5/11/2021	1.82
	6/2/2021	1.88
	6/28/2021	3.49
	7/19/2021	8.39
	8/24/2021	3.20
	10/1/2021	3.12

Table 9-9. Summary of Sample Bottles, Preservation Holding Time, and Analytical Methods. Midwest Generation, LLC, Powerton Station, Pekin, IL.

PARAMETER	ANALYTICAL METHOD	CONTAINER	PRESERVATION	HOLD TIME	METHOD DETECTION LIMIT (MG/L)	Section 845.600(a) Standards
Boron	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.0245	2
Calcium	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.106	NS
Chloride	SM4500 Cl-E	1 L plastic	None, < 6 °C	28 days	1.22	200
Fluoride	SM4500 F-C	1 L plastic	None, < 6 °C	28 days	0.019	4
pH	SM4500 H^+ -B	1 L plastic	None, < 6 °C	immediate *	Field Parameter	6.5 - 9.0 (secondary standard)
Sulfate	SM4500 SO_4 -E	1 L plastic	None, < 6 °C	28 days	2	400
Total Dissolved Solids	SM2400 C	1 L plastic	None, < 6 °C	7 days	6.1	1200
Antimony	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.00101	0.006
Arsenic	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.000439	0.01
Barium	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.000841	2
Beryllium	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.000237	0.004
Cadmium	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.00019	0.005
Chromium	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.000608	0.1
Cobalt	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.000189	0.006
Lead	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.000141	0.0075
Lithium	6010 C	250 mL plastic	HNO_3, < 6 °C	6 months	0.00215	0.04
Mercury	7470 A	250 mL plastic	HNO_3, < 6 °C	28 days	0.0000611	0.002
Molybdenum	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.00162	0.1
Selenium	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.000834	0.05
Thallium	6020 A	250 mL plastic	HNO_3, < 6 °C	6 months	0.000591	0.002
Radium 226	903.0	1 L plastic	HNO_3	180 days	1 pCi/L	5 pCi/L **
Radium 228	904.0	2 L plastic	HNO_3	180 days	1 pCi/L	5 pCi/L **

Notes: It is noted that some parameters may be combined with others within the same container.
* - The result for pH is obtained in the field and is not submitted to the laboratory.
** - Combined Radium 226/228
mL - milliliters
L - liters
°C - degrees Celsius
HNO_3 - Nitric Acid
NS- No Standard

Table 9-10. Proposed Site-Specific Groundwater Protection Standards - Powerton Ash By-pass Basin/Ash Surge Basin

Upgradient Well(s)	Parameter	Section 845.600 Standards	Interwell Background Prediction Limit	**Proposed GWPS**
MW-01, MW-09 & MW-19	Antimony	0.006	0.003	**0.006**
MW-01	Arsenic	0.01	0.029	**0.029**
MW-19	Barium	2	0.111	**2**
MW-01, MW-09 & MW-19	Beryllium	0.004	0.001	**0.004**
MW-09 & MW-19	Boron	2.0	4.7	**4.7**
MW-01, MW-09 & MW-19	Cadmium	0.005	0.00085	**0.005**
MW-09 & MW-19	Chloride	200	53	**200**
MW-01, MW-09 & MW-19	Chromium	0.1	0.025	**0.1**
MW-01, MW-09 & MW-19	Cobalt	0.006	0.016	**0.016**
MW-01 & MW-19	Combined Radium 226 + 228 (pCi/L)	5.0	0.953	**5.0**
MW-01 & MW-09	Fluoride	4.0	0.2526	**4.0**
MW-09 & MW-19	Lead	0.0075	0.0012	**0.0075**
MW-01, MW-09 & MW-19	Lithium	0.04	0.012	**0.040**
MW-01, MW-09 & MW-19	Mercury	0.002	0.00029	**0.002**
MW-19	Molybdenum	0.10	0.063	**0.10**
MW-01, MW-09 & MW-19	pH (standard units)	6.5-9.0	6.65-7.90	**6.5-9.0**
MW-01	Selenium	0.05	0.0029	**0.05**
MW-01	Sulfate	400	93.7	**400**
MW-01, MW-09 & MW-19	Thallium	0.002	0.002	**0.002**
MW-01	Total Dissolved Solids	1200	696	**1200**
MW-01 & MW-19	Calcium	NE	132.3	**132.3**
MW-01, MW-09 & MW-19	Turbidity (NTU)	NE	83.3	**83.3**

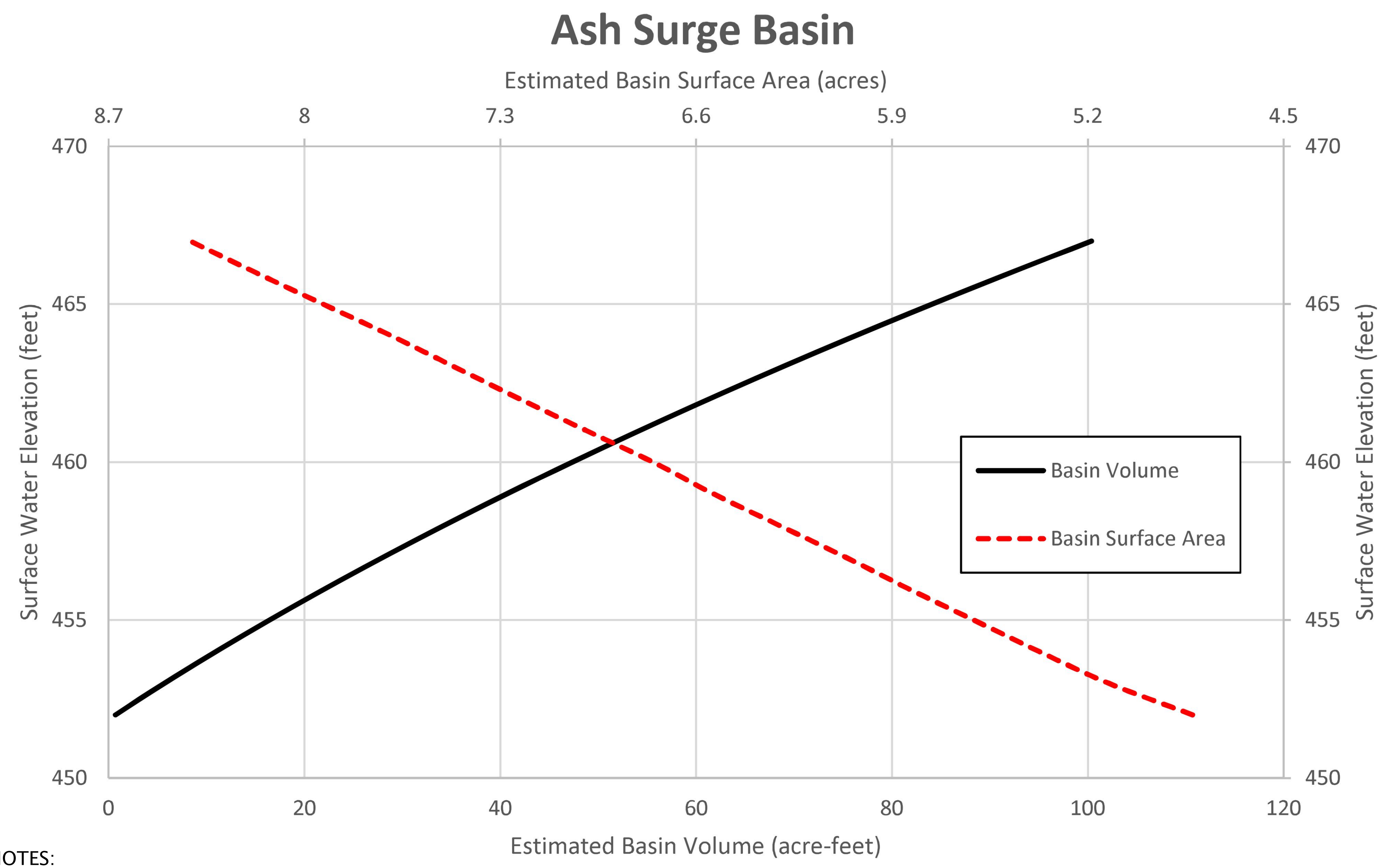
All values are in mg/L (ppm) unless otherwise noted.
NE - Not Established
Bold - Site-specific Groundwater Protection Standard based on Section 845.600(a)(2)

Table 9-11. Proposed Site-Specific Groundwater Protection Standards - Powerton Former Ash Basin

Upgradient Well(s)	Parameter	Section 845.600 Standards	Interwell Background Prediction Limit	**Proposed GWPS**
MW-01 & MW-10	Antimony	0.006	0.003	**0.006**
MW-10	Arsenic	0.01	0.04	**0.04**
MW-01	Barium	2	0.08	**2**
MW-01 & MW-10	Beryllium	0.004	0.001	**0.004**
MW-01	Boron	2.0	1.086	**2**
MW-01 & MW-10	Cadmium	0.005	0.0015	**0.005**
MW-01 & MW-10	Chloride	200	63.49	**200**
MW-01 & MW-10	Chromium	0.1	0.063	**0.1**
MW-10	Cobalt	0.006	0.143	**0.143**
MW-01	Combined Radium 226 + 228 (pCi/L)	5.0	0.953	**5.0**
MW-01	Fluoride	4.0	0.279	**4.0**
MW-10	Lead	0.0075	0.1164	**0.1164**
MW-01 & MW-10	Lithium	0.04	0.032	**0.04**
MW-01 & MW-10	Mercury	0.002	0.0002	**0.002**
MW-01 & MW-10	Molybdenum	0.10	0.01	**0.1**
MW-01 & MW-10	pH (standard units)	6.5-9.0	6.45 - 7.78	**6.5 - 9.0**
MW-10	Selenium	0.05	0.007	**0.05**
MW-01 & MW-10	Sulfate	400	89.86	**400**
MW-01 & MW-10	Thallium	0.002	0.002	**0.002**
MW-01 & MW-10	Total Dissolved Solids	1200	644.5	**1200**
MW-01 & MW-10	Calcium	NE	139	**139**
MW-10	Turbidity (NTU)	NE	581.2	**581.2**

All values are in mg/L (ppm) unless otherwise noted.
NE - Not Established
Bold - Site-specific Groundwater Protection Standard based on Section 845.600(a)(2)

OPERATING PERMIT FIGURES



NOTES:

1. SURFACE WATER ELEVATIONS ARE NAD83.
2. BASIN VOLUMES ARE ESTIMATED BASED ON AS-BUILT INFORMATION AND 2008 SITE TOPOGRAPHY.
3. AREA-CAPACITY CURVE CREATED BY GEOSYNTEC AS PART OF COMPLETING THE HISTORY OF CONSTRUCTION IN ACCORDANCE WITH 40 CFR PART 257.

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ASH SURGE BASIN AREA-CAPACITY CURVE

POWERTON GENERATING STATION
PEKIN, ILLINOIS

Scale: NTS	Date: September 15, 2021
KPRG Project No. 19520.1	FIGURE 1-1

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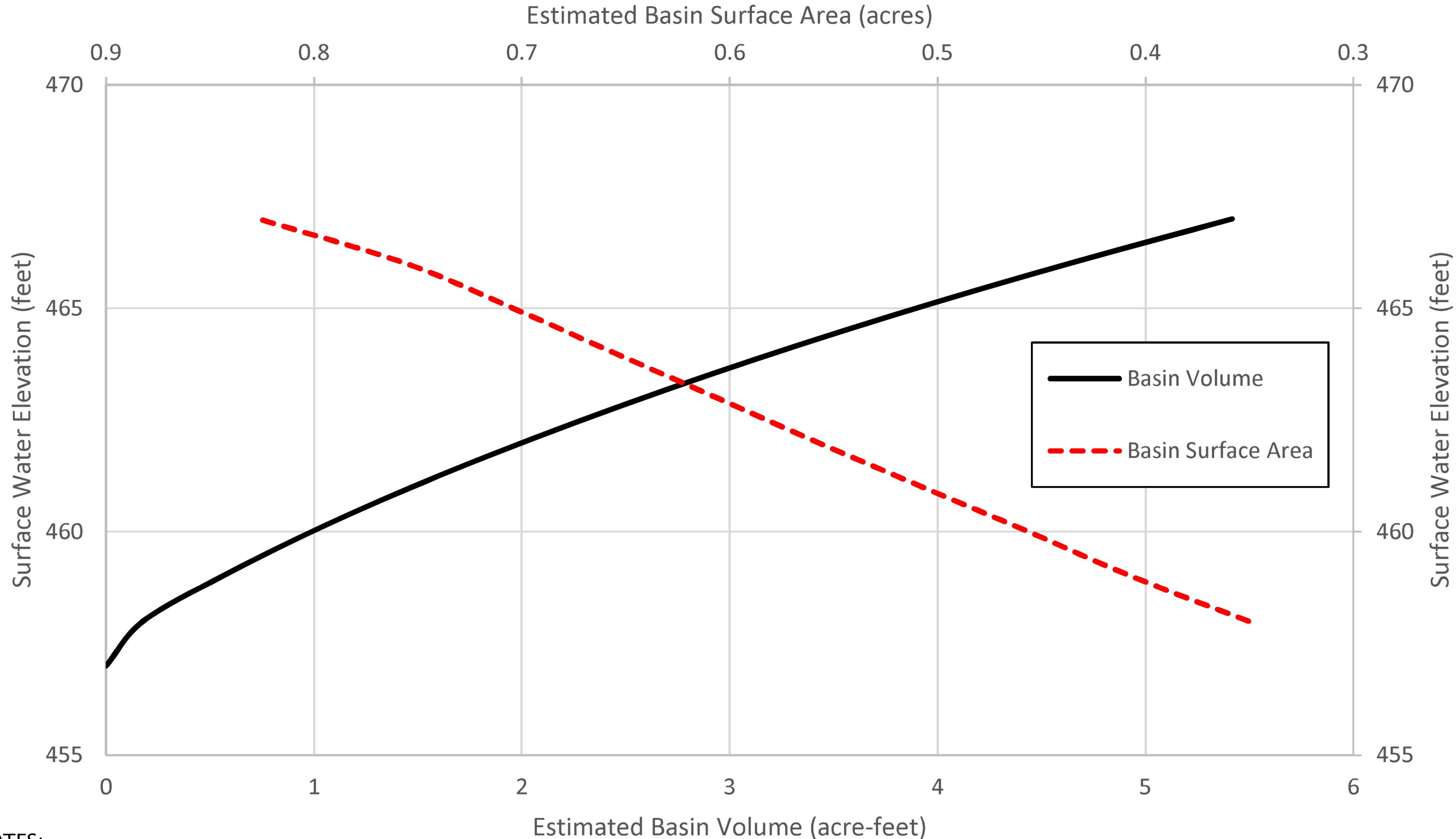
Bypass Basin



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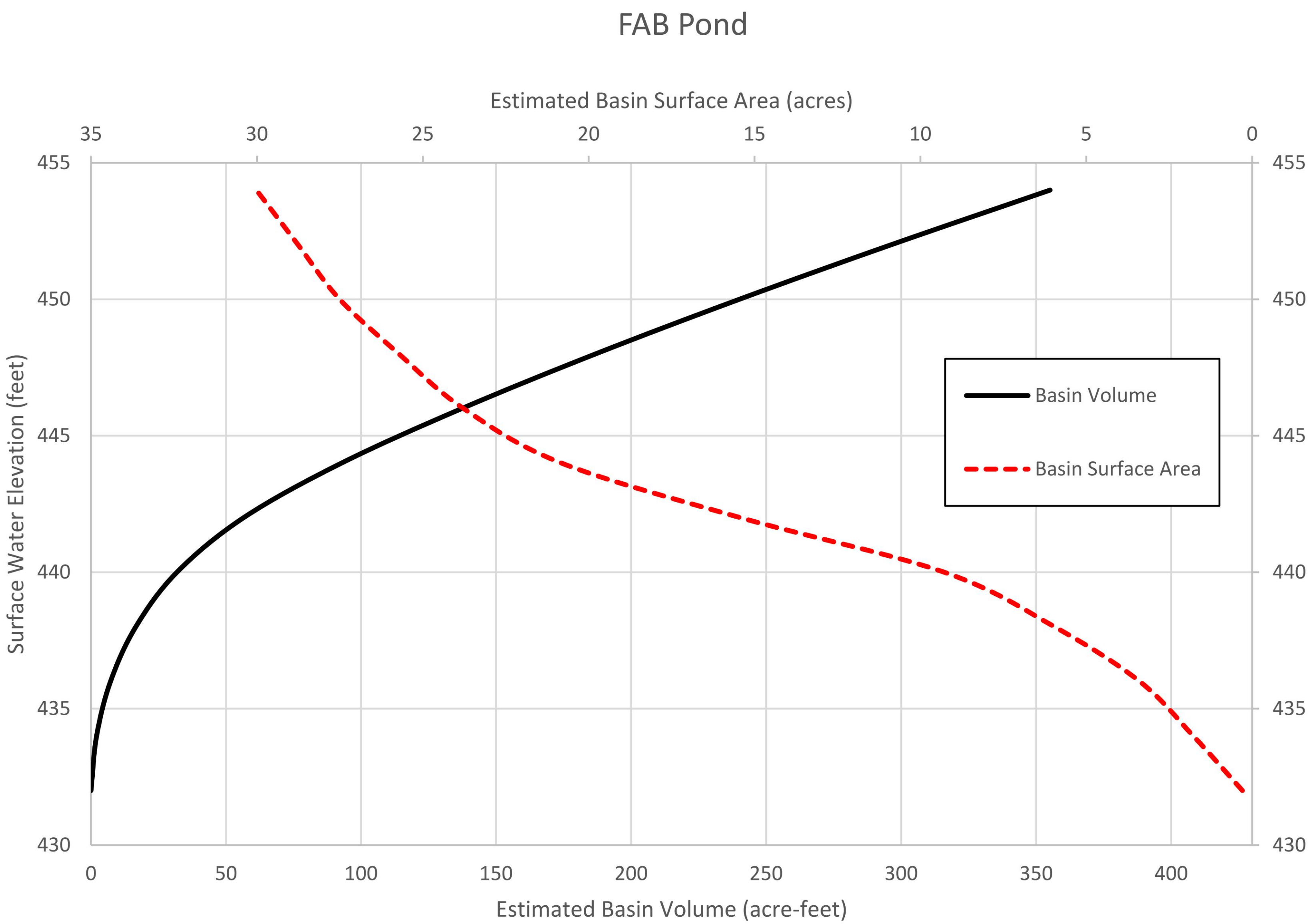
ASH BYPASS BASIN AREA-CAPACITY CURVE	
POWERTON GENERATING STATION PEKIN, ILLINOIS	
Scale: NTS	Date: September 15, 2021
KPRG Project No. 19520.1	FIGURE 1-2



NOTES:

1. BASIN VOLUME SHOWN IS REMAINING VOLUME ONLY. APPROX. 500,000 yd3 OF CCR IS PLACED BELOW NOTED ELEVATIONS.
2. AREA-CAPACITY CURVE CREATED BY GEOSYNTEC AS PART OF COMPLETING THE HISTORY OF CONSTRUCTION IN ACCORDANCE WITH 40 CFR PART 257.

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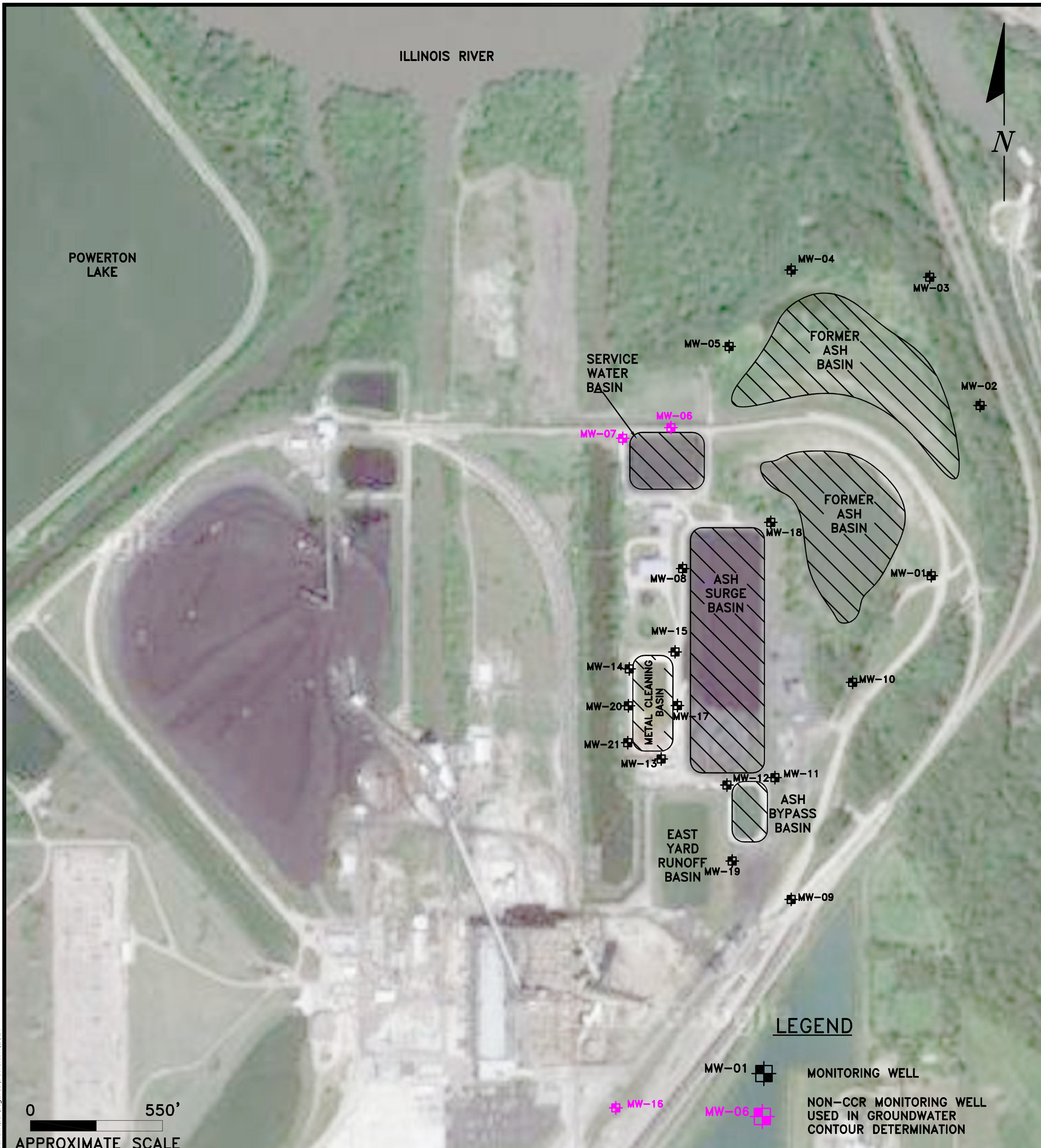
FORMER ASH BASIN AREA–CAPACITY CURVE

POWERTON GENERATING STATION
PEKIN, ILLINOIS

Scale: NTS	Date: September 15, 2021
KPRG Project No. 19520.1	FIGURE 1–3

W:\projects\midwest generation\operating-constructing permits\joliet 29\area-capacity curve.dwg



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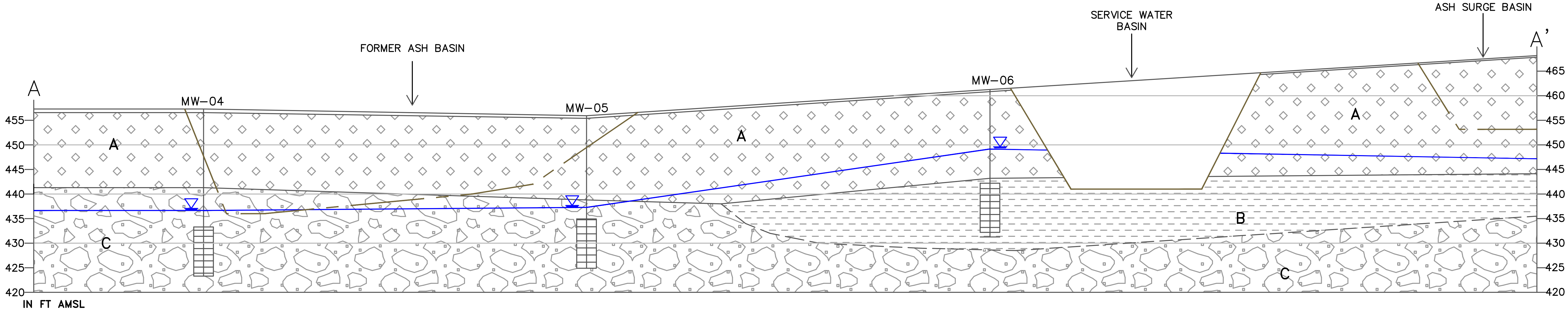
MONITORING WELL MAP

POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 550'	Date: August 31, 2021
KPRG Project No. 19520.1	FIGURE 9-1

W:\Projects\Midwest Generation\12313 Ash Pond Groundwater\Figures\Powerton\2021



A — FILL: CONSISTING OF TAN, BROWN AND BLACK FINE TO MEDIUM SAND WITH SOME GRAVEL AND CLAY SEAMS. SEVERAL LOCATIONS ALSO INCLUDED BLACK CINDERS AND BRICK FRAGMENTS.

B — CLAY/SILTY CLAY: CONSISTING OF OLIVE, BROWN AND GRAY CLAYS, SILTS AND SILTY CLAYS WITH SOME MORE ORGANIC RICH LAYERS/PEAT. MAY LOCALLY CONTAIN FINE SILTY SAND AND/OR FINE SAND. THIS UNIT IS NOT MAPPABLE ACROSS THE SITE (I.E. DISCONTINUOUS).

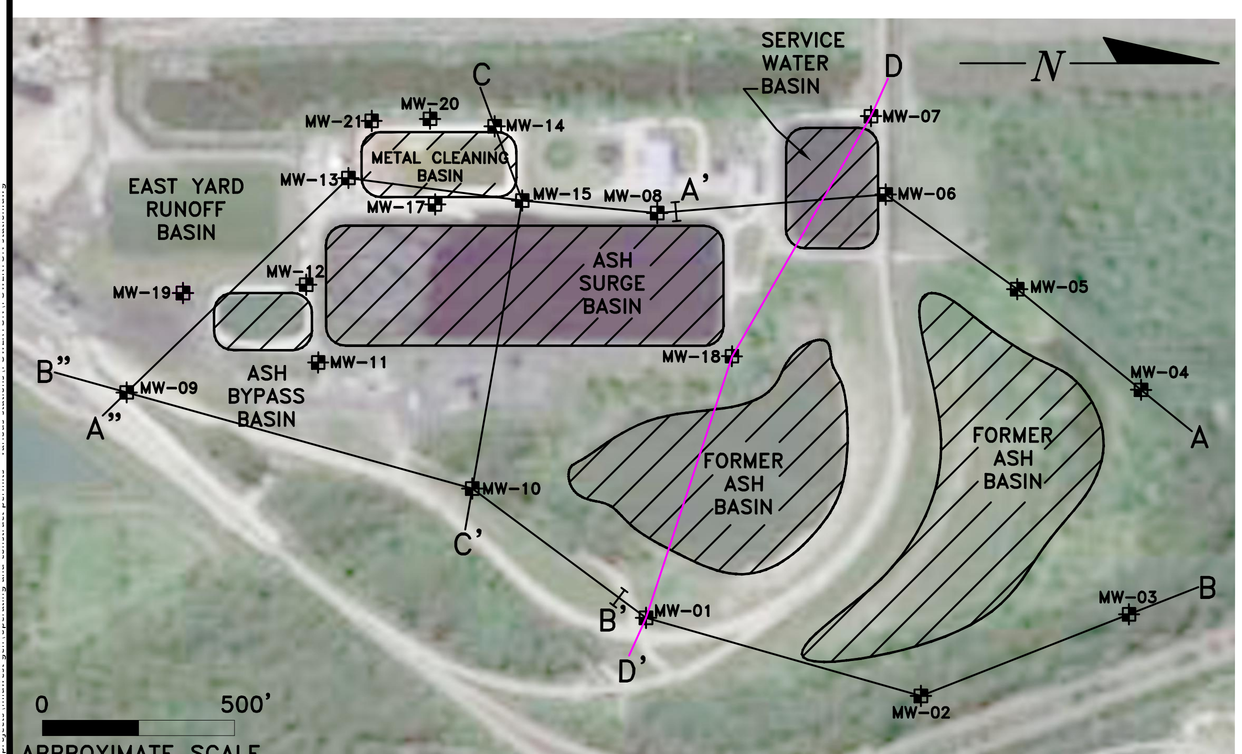
C — SAND AND GRAVEL: CONSISTING OF LIGHT BROWN, BROWN AND/OR GRAY MEDIUM TO COARSE SANDS AND GRAVELS.

WATER LEVEL (5/21)

PROJECTED POND OUTLINE

POND OUTLINE

20'
0
100'
APPROXIMATE SCALE



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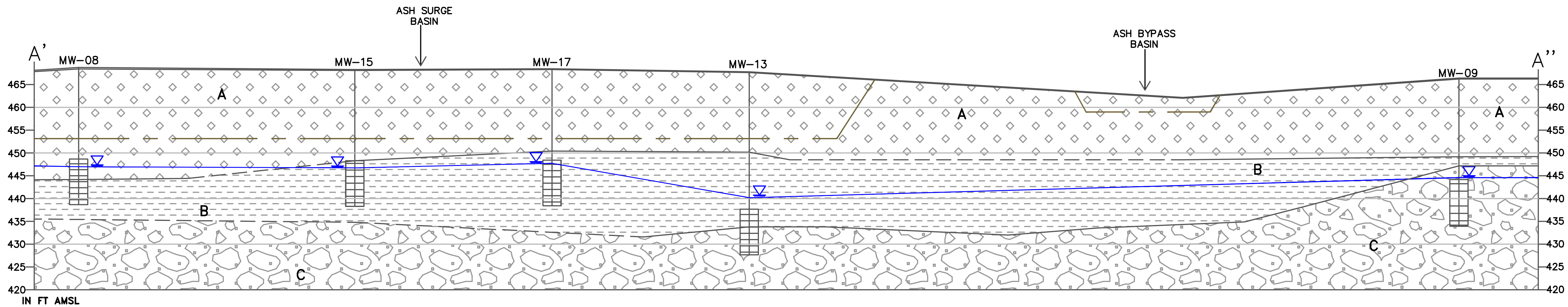
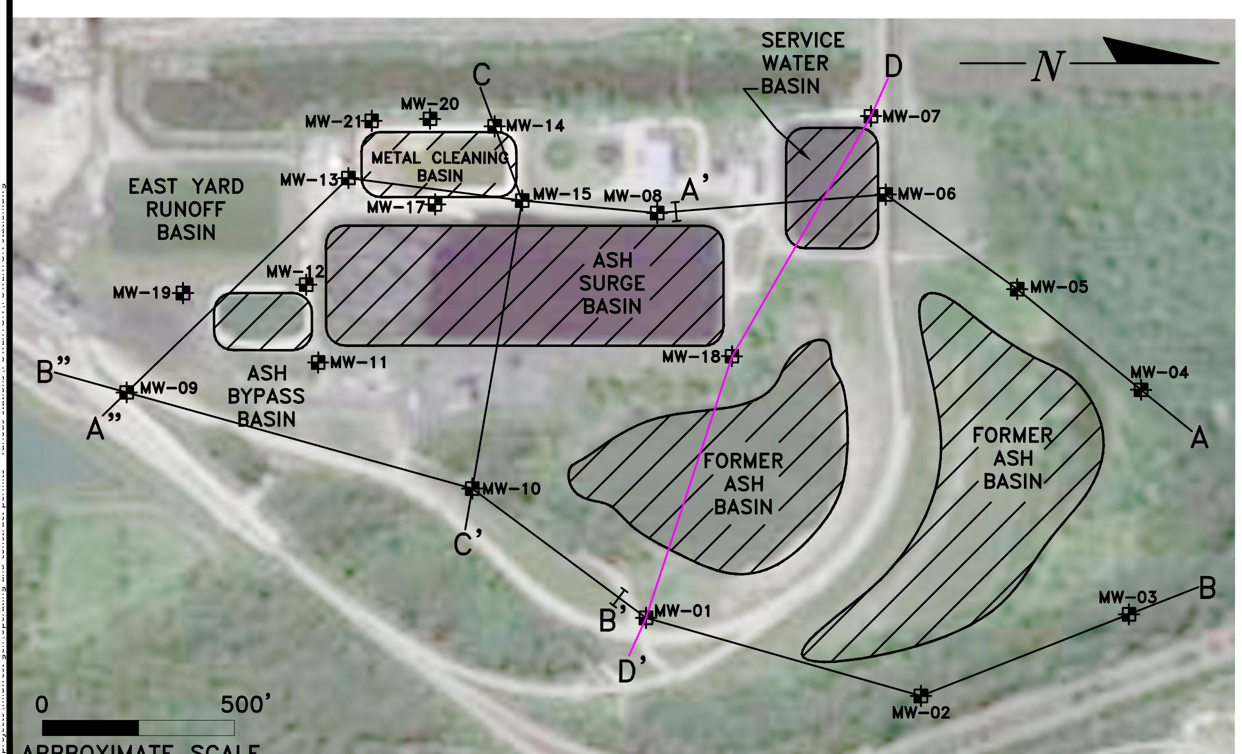
CROSS SECTION A–A'	
POWERTON STATION PEKIN, ILLINOIS	
SEE SCALE	Date: October 4, 2021
KPRG Project No. 19520.1	FIGURE 9–2



A	FILL: CONSISTING OF TAN, BROWN AND BLACK FINE TO MEDIUM SAND WITH SOME GRAVEL AND CLAY SEAMS. SEVERAL LOCATIONS ALSO INCLUDED BLACK CINDERS AND BRICK FRAGMENTS.
B	CLAY/SILTY CLAY: CONSISTING OF OLIVE, BROWN AND GRAY CLAYS, SILTS AND SILTY CLAYS WITH SOME MORE ORGANIC RICH LAYERS/PEAT. MAY LOCALLY CONTAIN FINE SILTY SAND AND/OR FINE SAND. THIS UNIT IS NOT MAPPABLE ACROSS THE SITE (I.E. DISCONTINUOUS).
C	SAND AND GRAVEL: CONSISTING OF LIGHT BROWN, BROWN AND/OR GRAY MEDIUM TO COARSE SANDS AND GRAVELS.
▽	WATER LEVEL (5/21)
— — —	PROJECTED POND OUTLINE

25'
125'
0
APPROXIMATE SCALE



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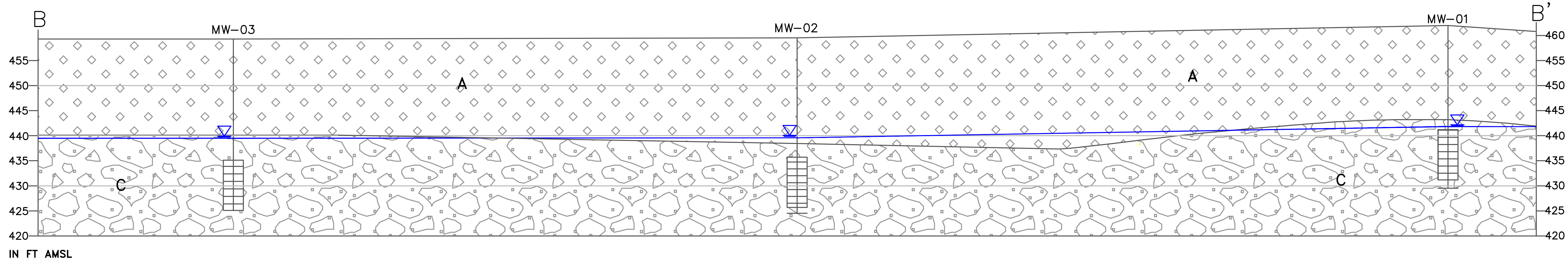
CROSS SECTION A'-A"	
POWERTON STATION PEKIN, ILLINOIS	
SEE SCALE	Date: October 4, 2021
KPRG Project No. 19520.1	FIGURE 9-3



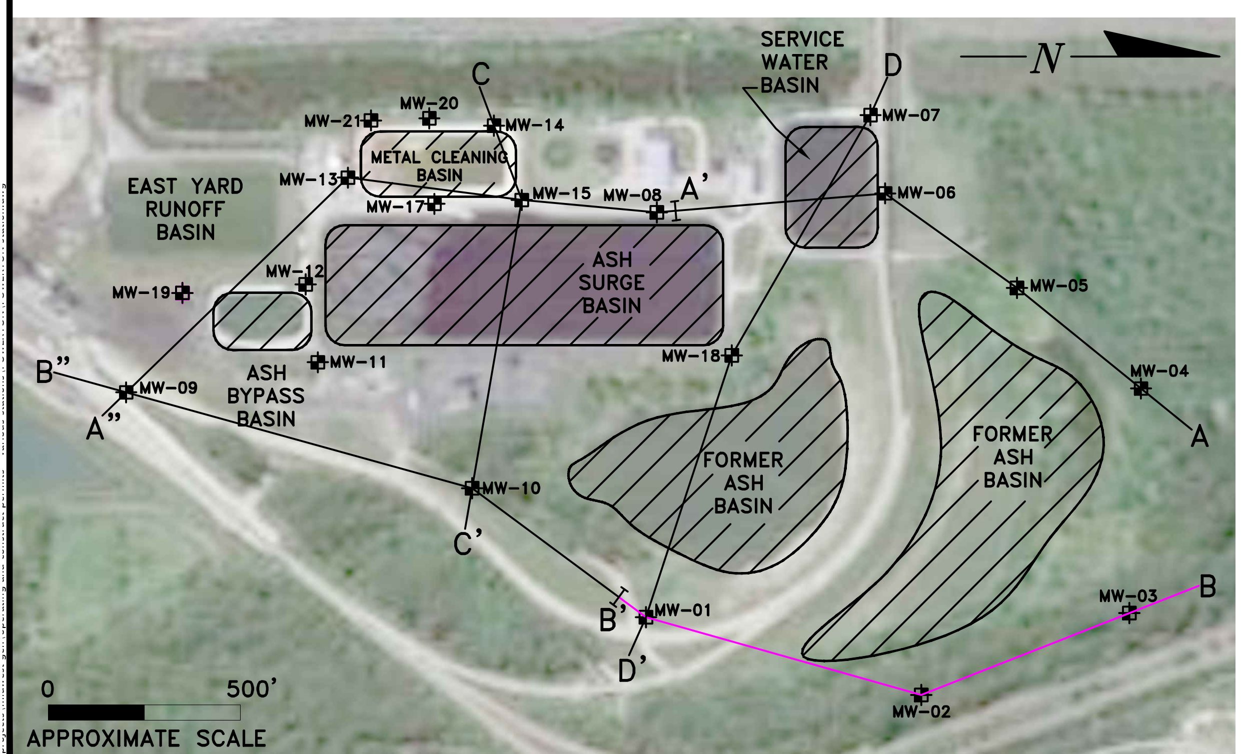
FILL: CONSISTING OF TAN, BROWN AND BLACK FINE TO MEDIUM SAND WITH SOME GRAVEL AND CLAY SEAMS. SEVERAL LOCATIONS ALSO INCLUDED BLACK CINDERS AND BRICK FRAGMENTS. (A)

CLAY/SILTY CLAY: CONSISTING OF OLIVE, BROWN AND GRAY CLAYS, SILTS AND SILTY CLAYS WITH SOME MORE ORGANIC RICH LAYERS/PEAT. MAY LOCALLY CONTAIN FINE SILTY SAND AND/OR FINE SAND. THIS UNIT IS NOT MAPPABLE ACROSS THE SITE (I.E. DISCONTINUOUS). (B)

SAND AND GRAVEL: CONSISTING OF LIGHT BROWN, BROWN AND/OR GRAY MEDIUM TO COARSE SANDS AND GRAVELS. (C)

WATER LEVEL (5/21)

20'
0
100'
APPROXIMATE SCALE



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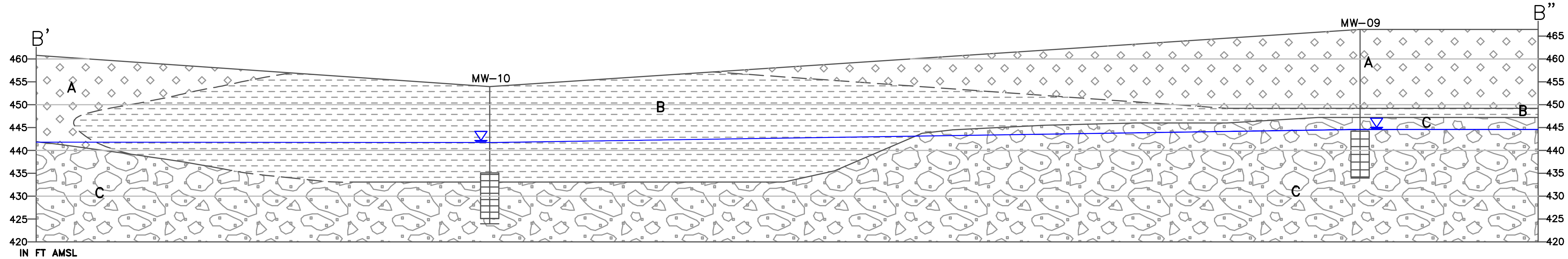
CROSS SECTION B–B'

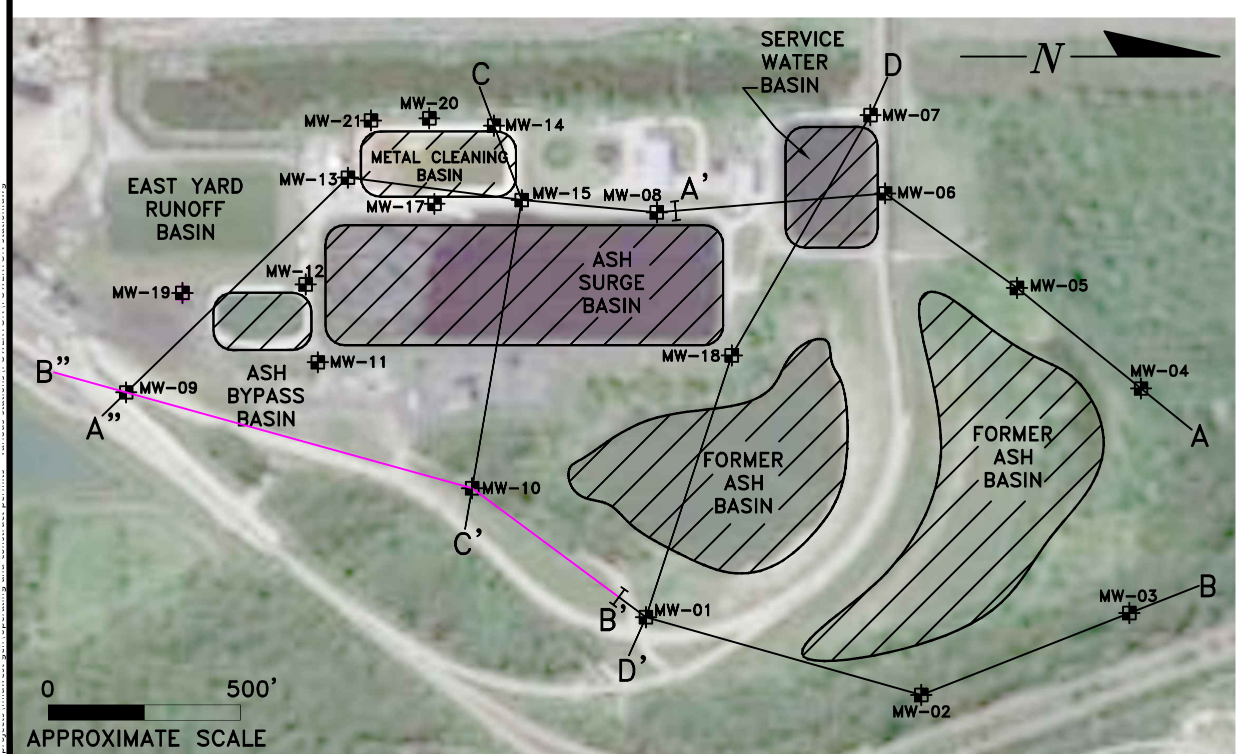
POWERTON STATION
PEKIN, ILLINOIS

SEE SCALE	Date: August 17, 2021
KPRG Project No. 19520.1	FIGURE 9–4



A	FILL: CONSISTING OF TAN, BROWN AND BLACK FINE TO MEDIUM SAND WITH SOME GRAVEL AND CLAY SEAMS. SEVERAL LOCATIONS ALSO INCLUDED BLACK CINDERS AND BRICK FRAGMENTS.
B	CLAY/SILTY CLAY: CONSISTING OF OLIVE, BROWN AND GRAY CLAYS, SILTS AND SILTY CLAYS WITH SOME MORE ORGANIC RICH LAYERS/PEAT. MAY LOCALLY CONTAIN FINE SILTY SAND AND/OR FINE SAND. THIS UNIT IS NOT MAPPABLE ACROSS THE SITE (I.E. DISCONTINUOUS).
C	SAND AND GRAVEL: CONSISTING OF LIGHT BROWN, BROWN AND/OR GRAY MEDIUM TO COARSE SANDS AND GRAVELS.
▽	WATER LEVEL (5/21)

25'
125'
0
APPROXIMATE SCALE



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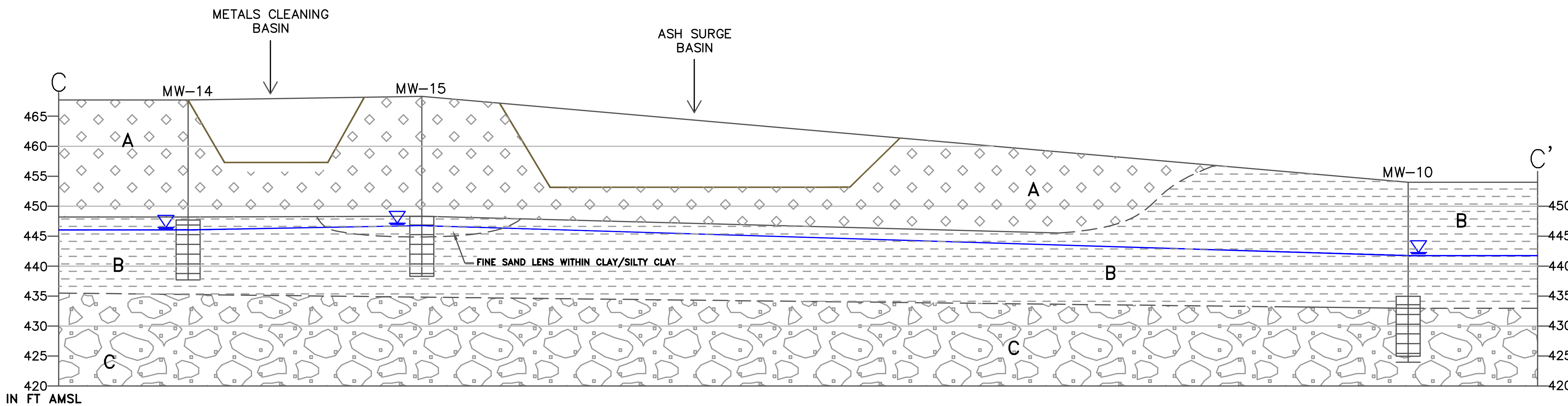
CROSS SECTION B'–B"	
POWERTON STATION PEKIN, ILLINOIS	
SEE SCALE	Date: August 17, 2021
KPRG Project No. 19520.1	FIGURE 9–5



FILL: CONSISTING OF TAN, BROWN AND BLACK FINE TO MEDIUM SAND WITH SOME GRAVEL AND CLAY SEAMS. SEVERAL LOCATIONS ALSO INCLUDED BLACK CINDERS AND BRICK FRAGMENTS. (A)

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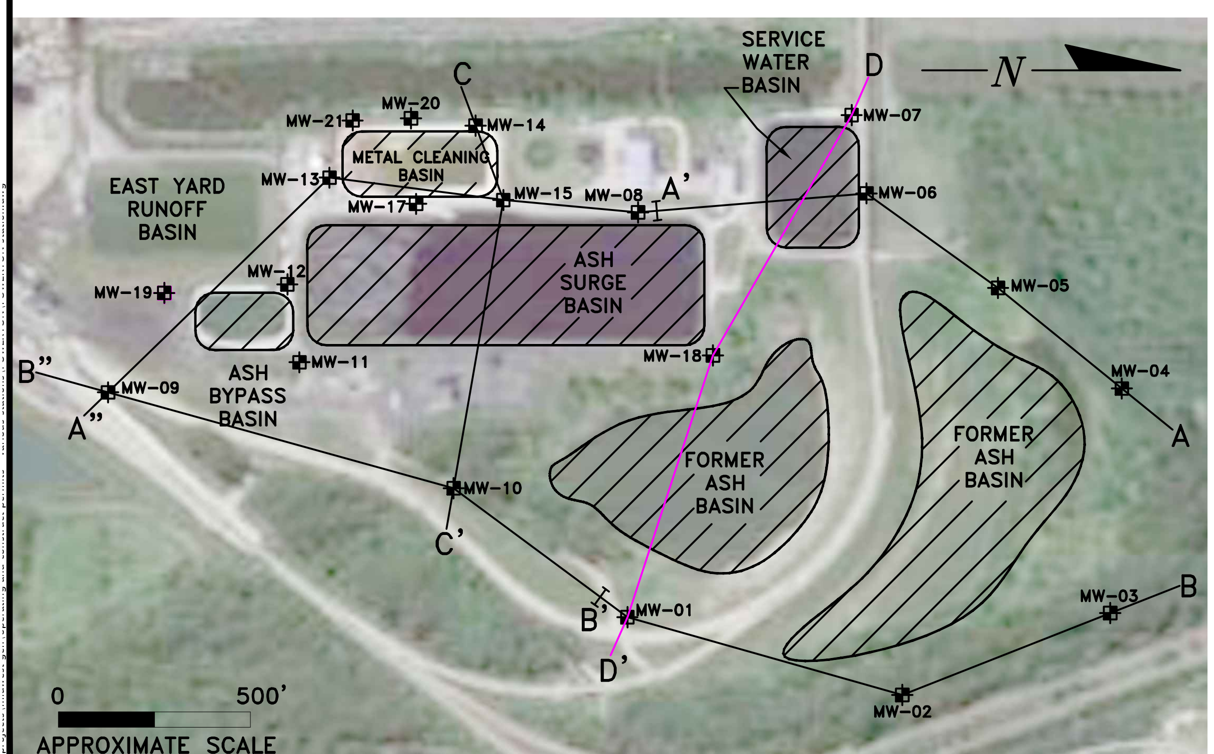
SAND AND GRAVEL: CONSISTING OF LIGHT BROWN, BROWN AND/OR GRAY MEDIUM TO COARSE SANDS AND GRAVELS. (C)

WATER LEVEL (5/21)

POND OUTLINE

20'
100'
0
APPROXIMATE SCALE



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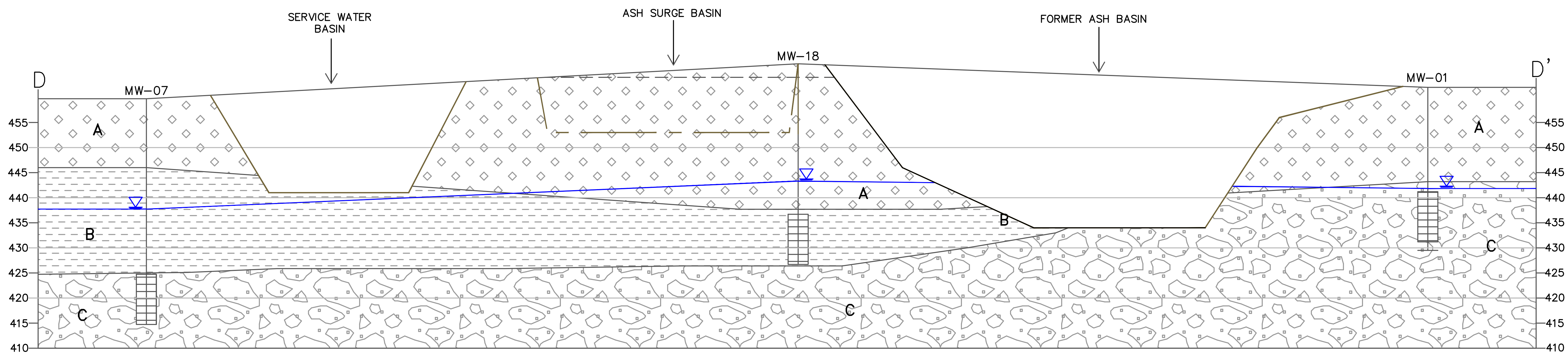
CROSS SECTION C-C'	
POWERTON STATION PEKIN, ILLINOIS	
SEE SCALE	Date: October 4, 2021
KPRG Project No. 19520.1	FIGURE 9-6



FILL: CONSISTING OF TAN, BROWN AND BLACK FINE TO MEDIUM SAND WITH SOME GRAVEL AND CLAY SEAMS. SEVERAL LOCATIONS ALSO INCLUDED BLACK CINDERS AND BRICK FRAGMENTS. (A)

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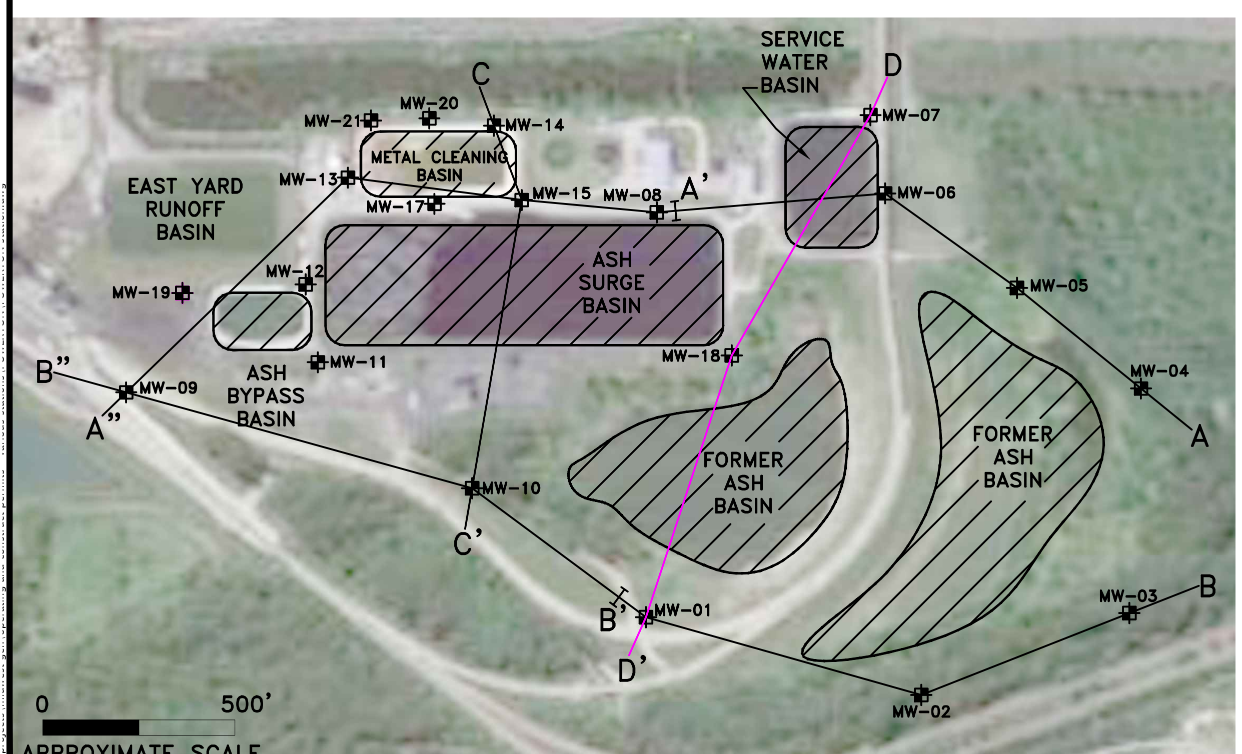
SAND AND GRAVEL: CONSISTING OF LIGHT BROWN, BROWN AND/OR GRAY MEDIUM TO COARSE SANDS AND GRAVELS. (C)

WATER LEVEL (5/21)

PROJECTED POND OUTLINE

POND OUTLINE

20'
0
100'
APPROXIMATE SCALE



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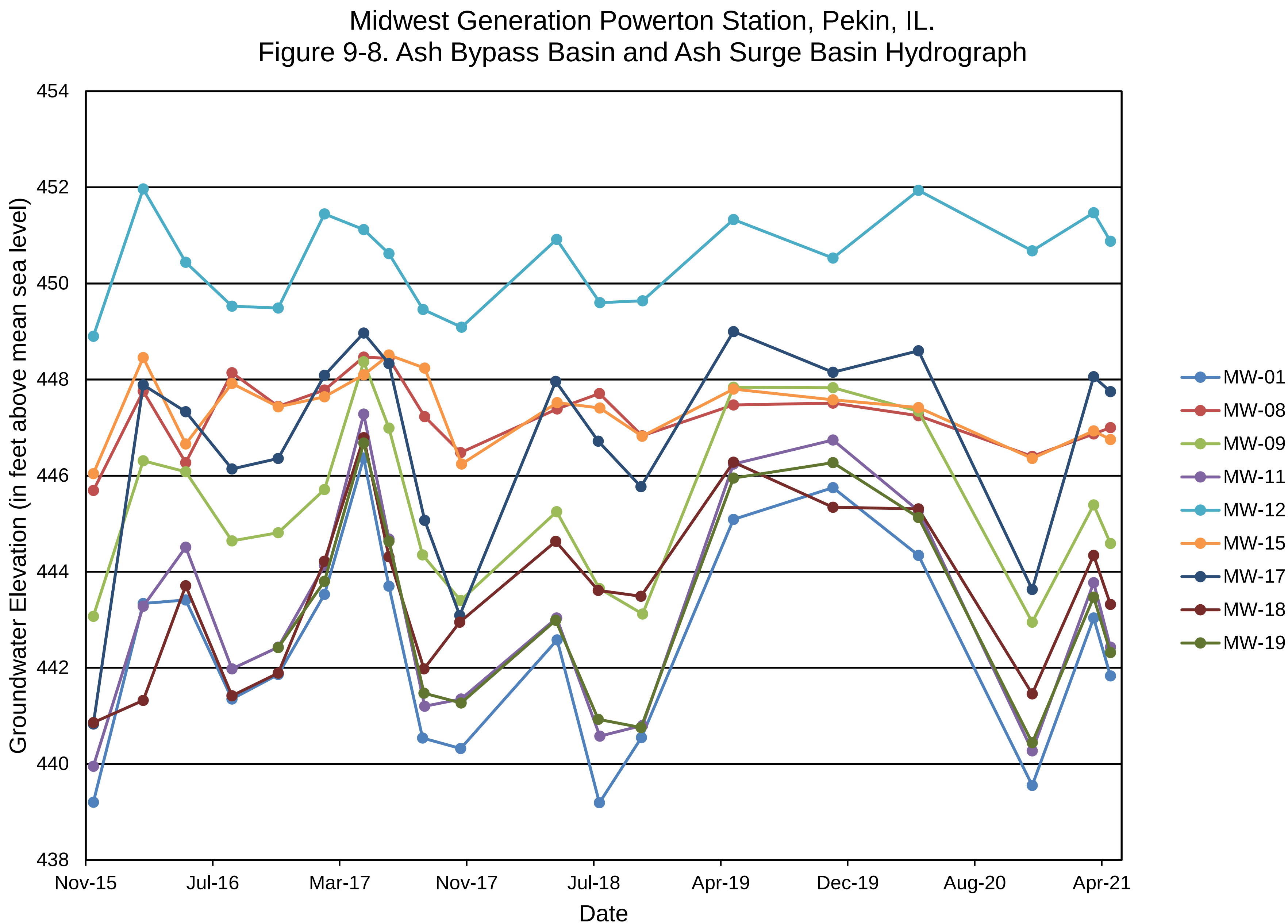
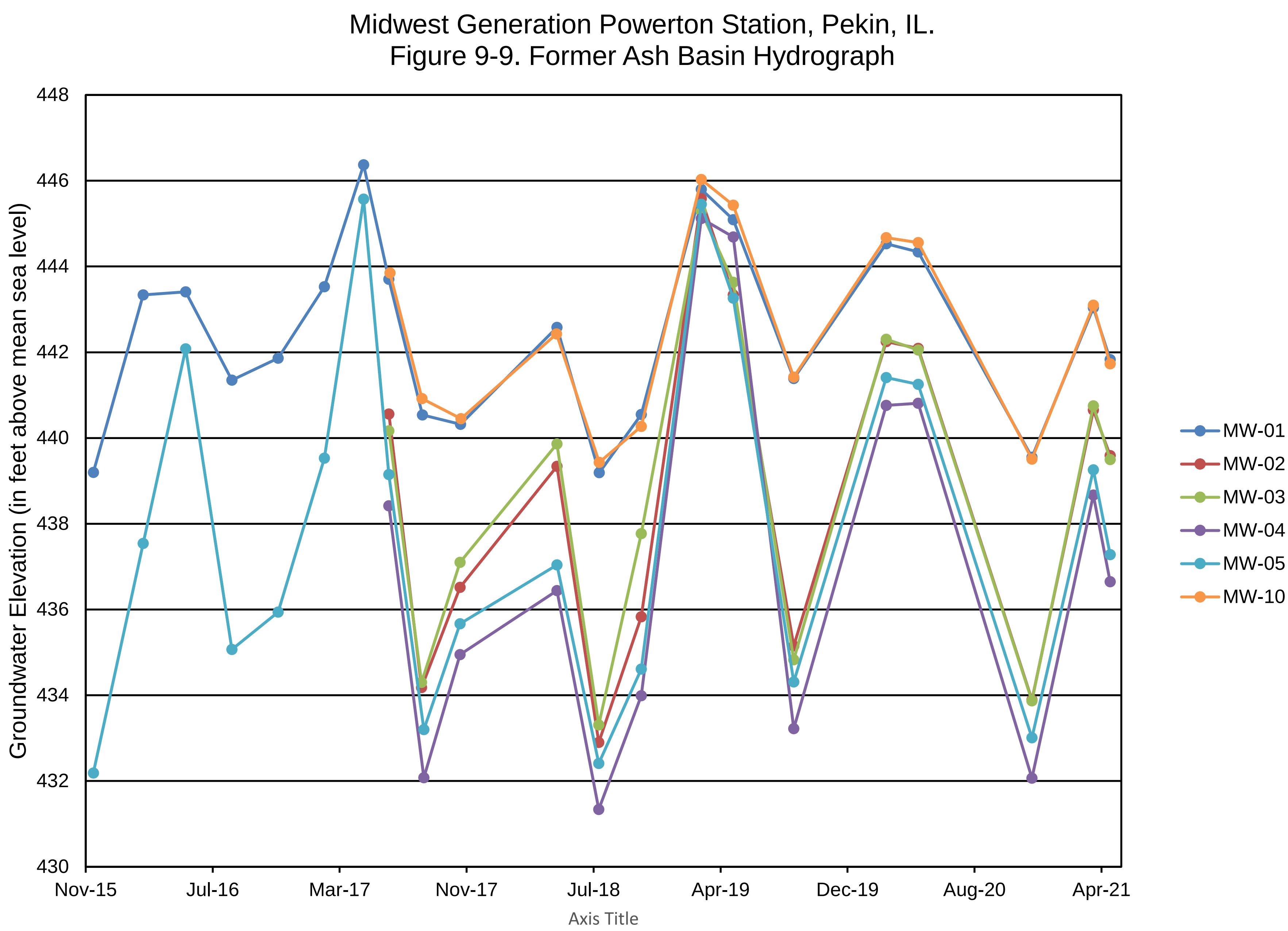
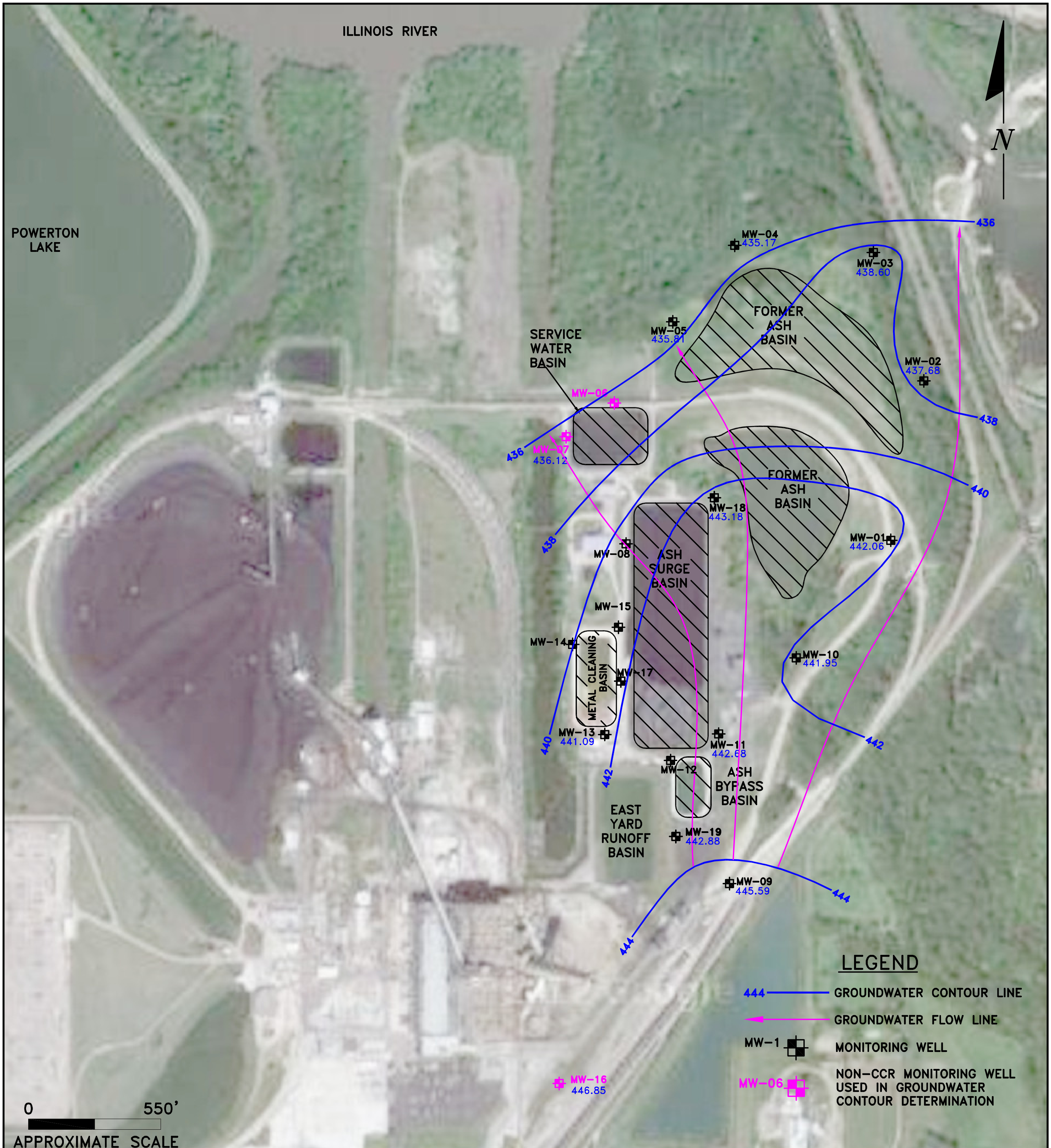
CROSS SECTION D–D'	
POWERTON STATION PEKIN, ILLINOIS	
SEE SCALE	Date: October 4, 2021
KPRG Project No. 19520.1	FIGURE 9-7



Midwest Generation Powerton Station, Pekin, IL.
Figure 9-8. Ash Bypass Basin and Ash Surge Basin Hydrograph
Groundwater Elevation (in feet above mean sea level)
454
452
450
448
446
444
442
440
438
Nov-15
Jul-16
Mar-17
Nov-17
Jul-18
Apr-19
Dec-19
Aug-20
Apr-21
Date
MW-01
MW-08
MW-09
MW-11
MW-12
MW-15
MW-17
MW-18
MW-19


Midwest Generation Powerton Station, Pekin, IL.
Figure 9-9. Former Ash Basin Hydrograph
Groundwater Elevation (in feet above mean sea level)
448
446
444
442
440
438
436
434
432
430
Nov-15
Jul-16
Mar-17
Nov-17
Jul-18
Apr-19
Dec-19
Aug-20
Apr-21
Axis Title
MW-01
MW-02
MW-03
MW-04
MW-05
MW-10



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GROUNDWATER CONTOUR MAP FOR GRAVELLY SAND UNIT 08/2020

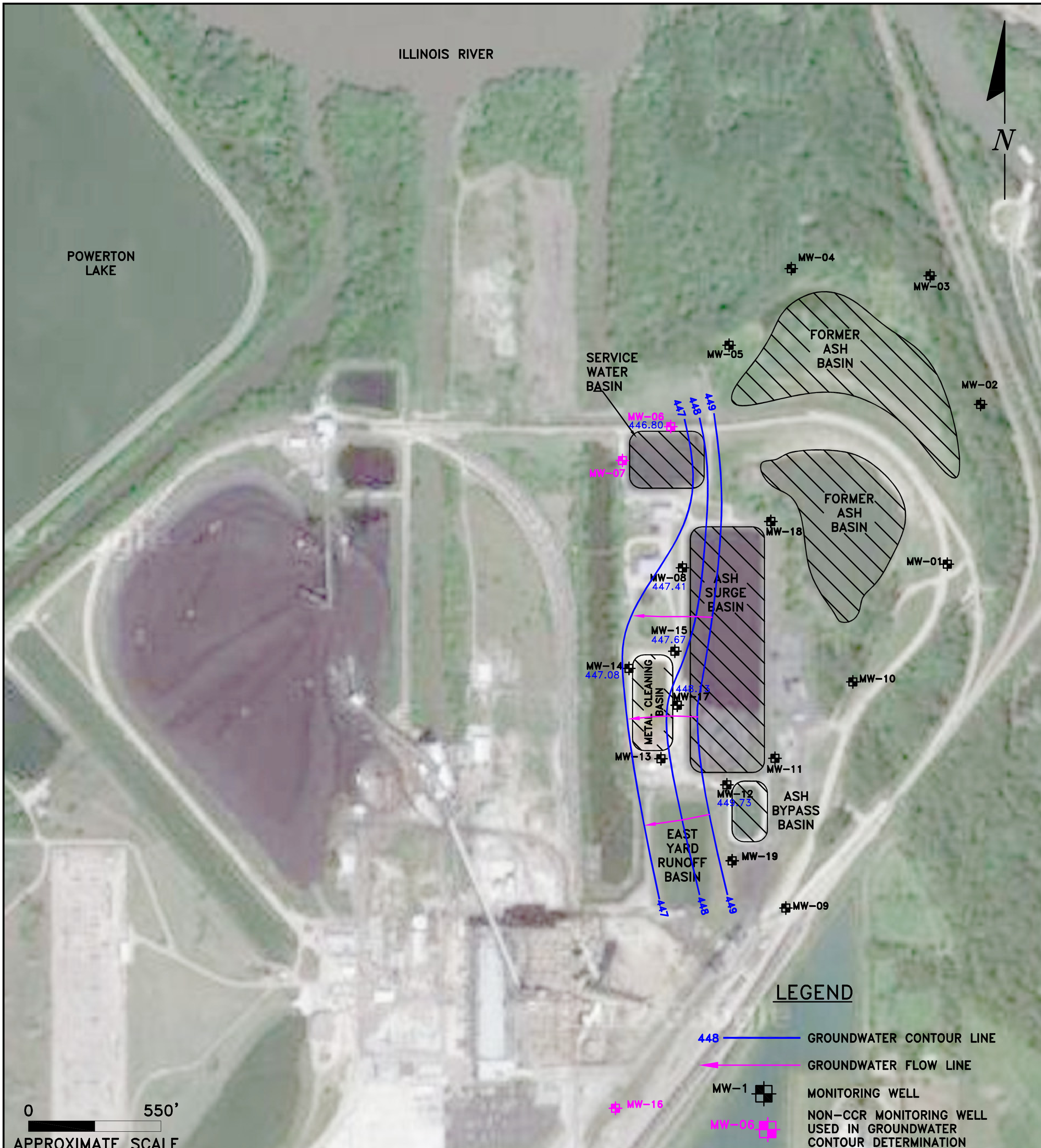
POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 550'

Date: August 31, 2021

KPRG Project No. 19520.1

FIGURE 9-10



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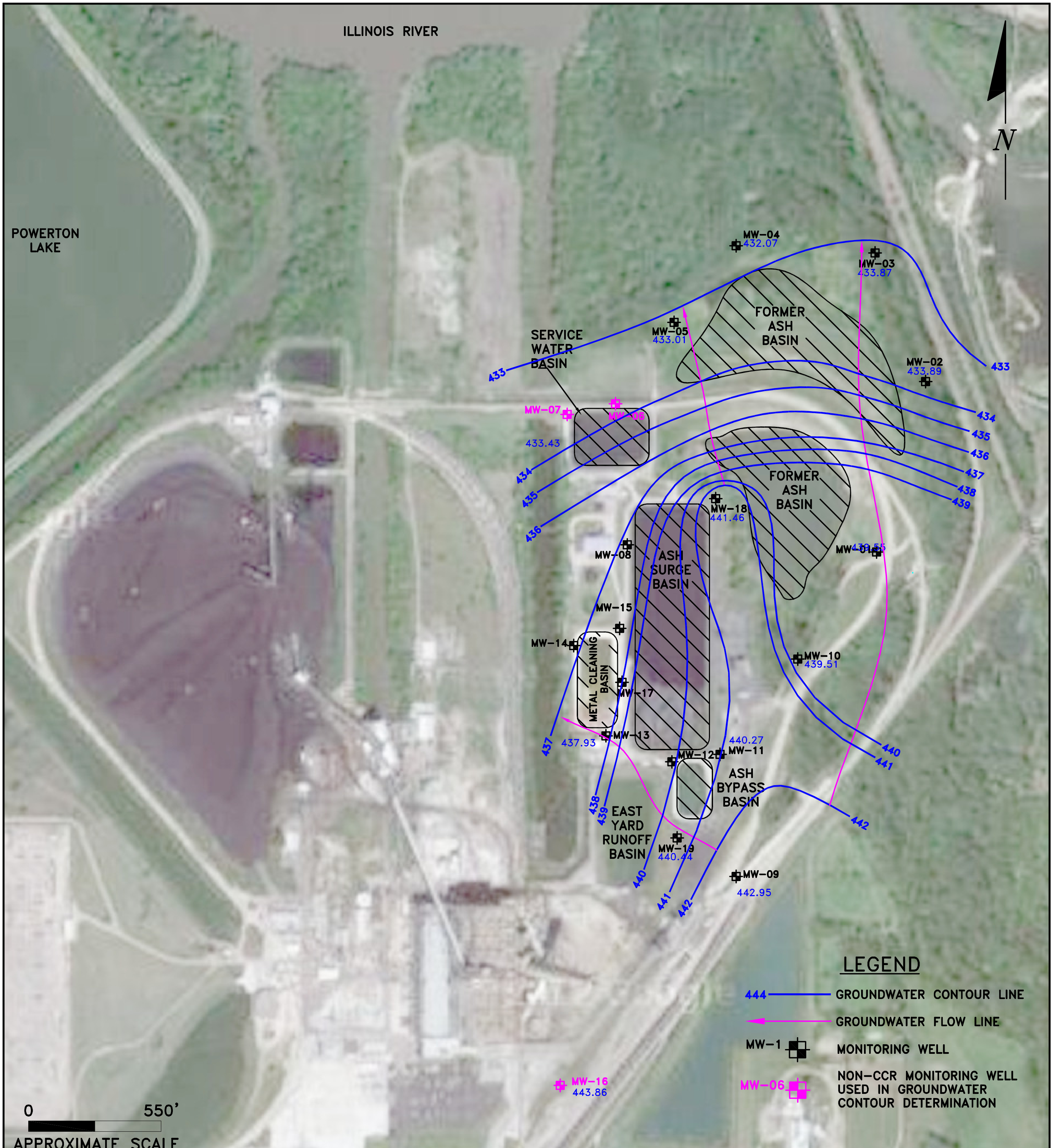
GROUNDWATER CONTOUR MAP FOR SILT/CLAY UNIT 08/2020

POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 550'	Date: August 31, 2021
KPRG Project No. 19520.1	FIGURE 9-11



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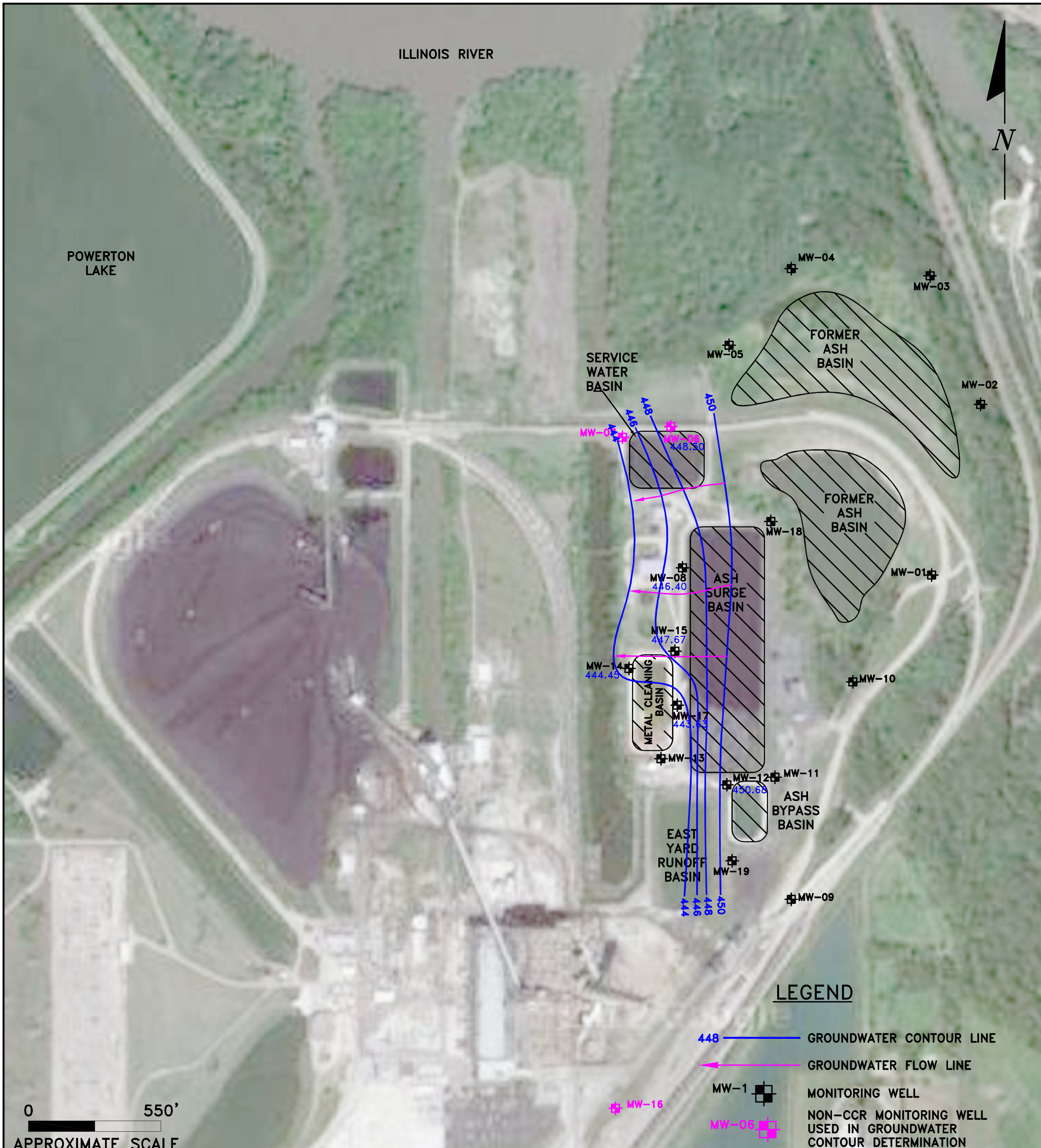
GROUNDWATER CONTOUR MAP FOR GRAVELLY SAND UNIT 12/2020

POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 550'	Date: August 31, 2021
KPRG Project No. 19520.1	FIGURE 9-12



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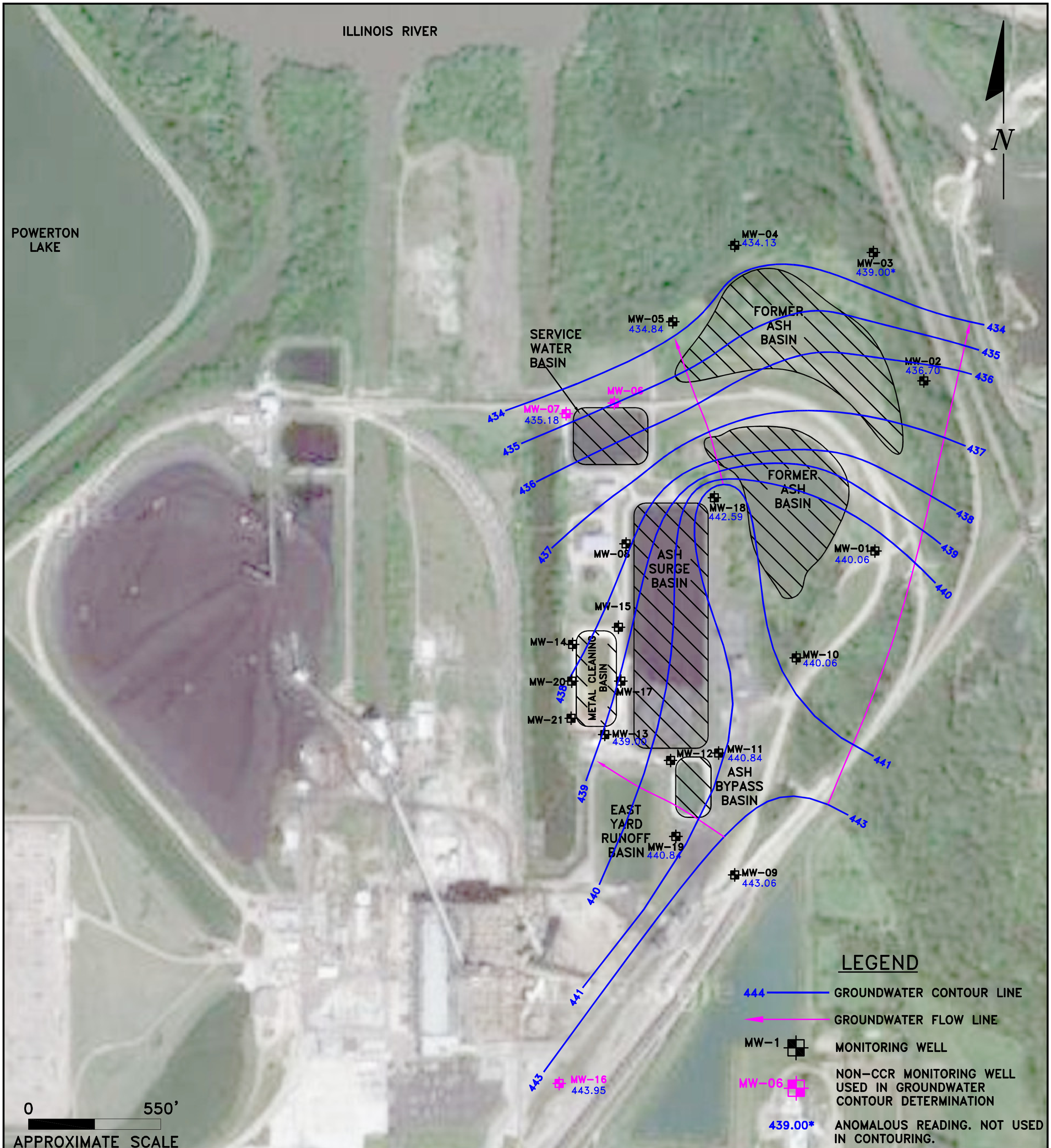
GROUNDWATER CONTOUR MAP FOR SILT/CLAY UNIT 12/2020

POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 550'	Date: August 31, 2021
KPRG Project No. 19520.1	FIGURE 9-13



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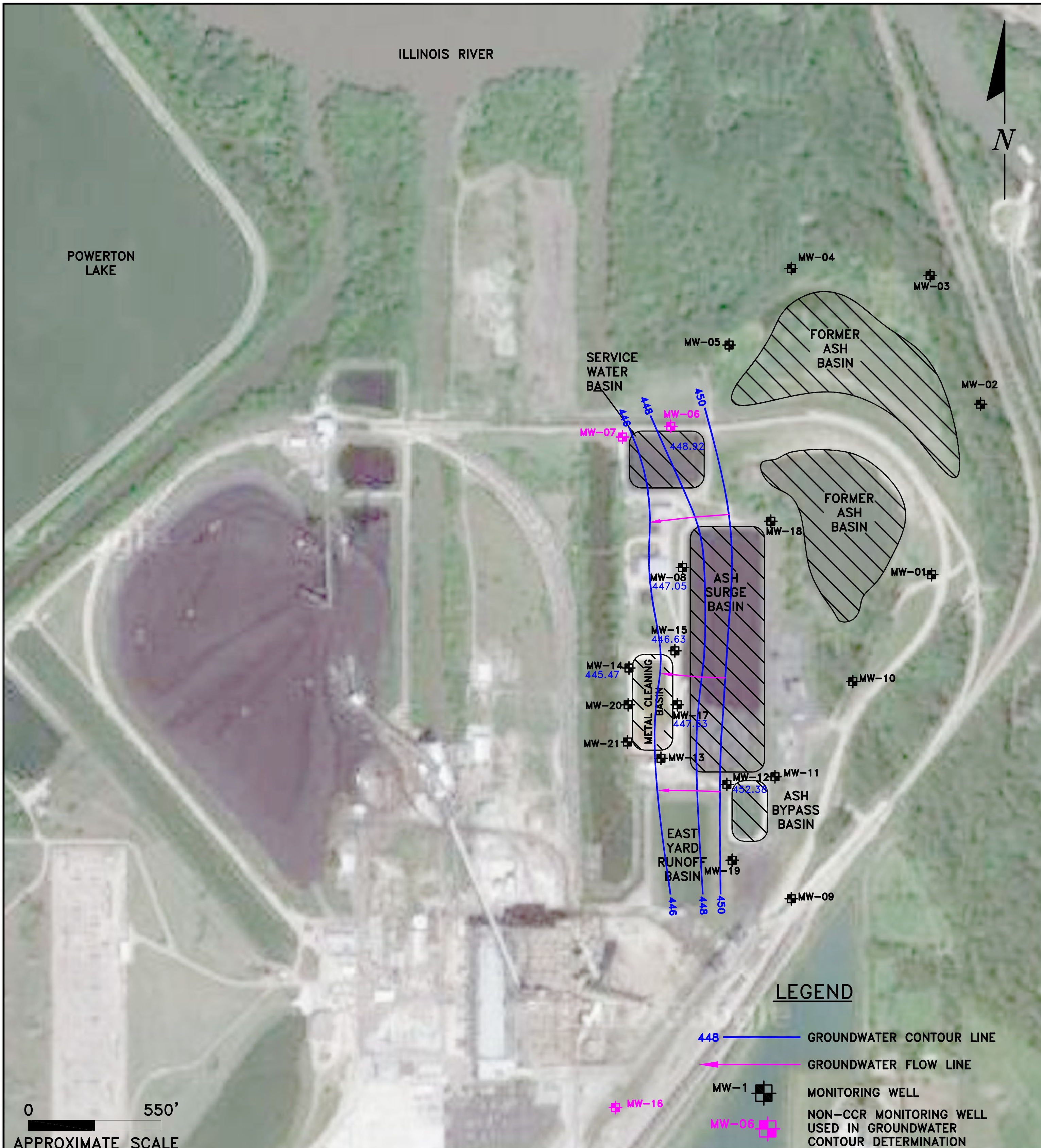
GROUNDWATER CONTOUR MAP FOR GRAVELLY SAND UNIT 02/2021

POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 550'	Date: August 31, 2021
KPRG Project No. 19520.1	FIGURE 9-14



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GROUNDWATER CONTOUR MAP FOR SILT/CLAY UNIT 02/2021

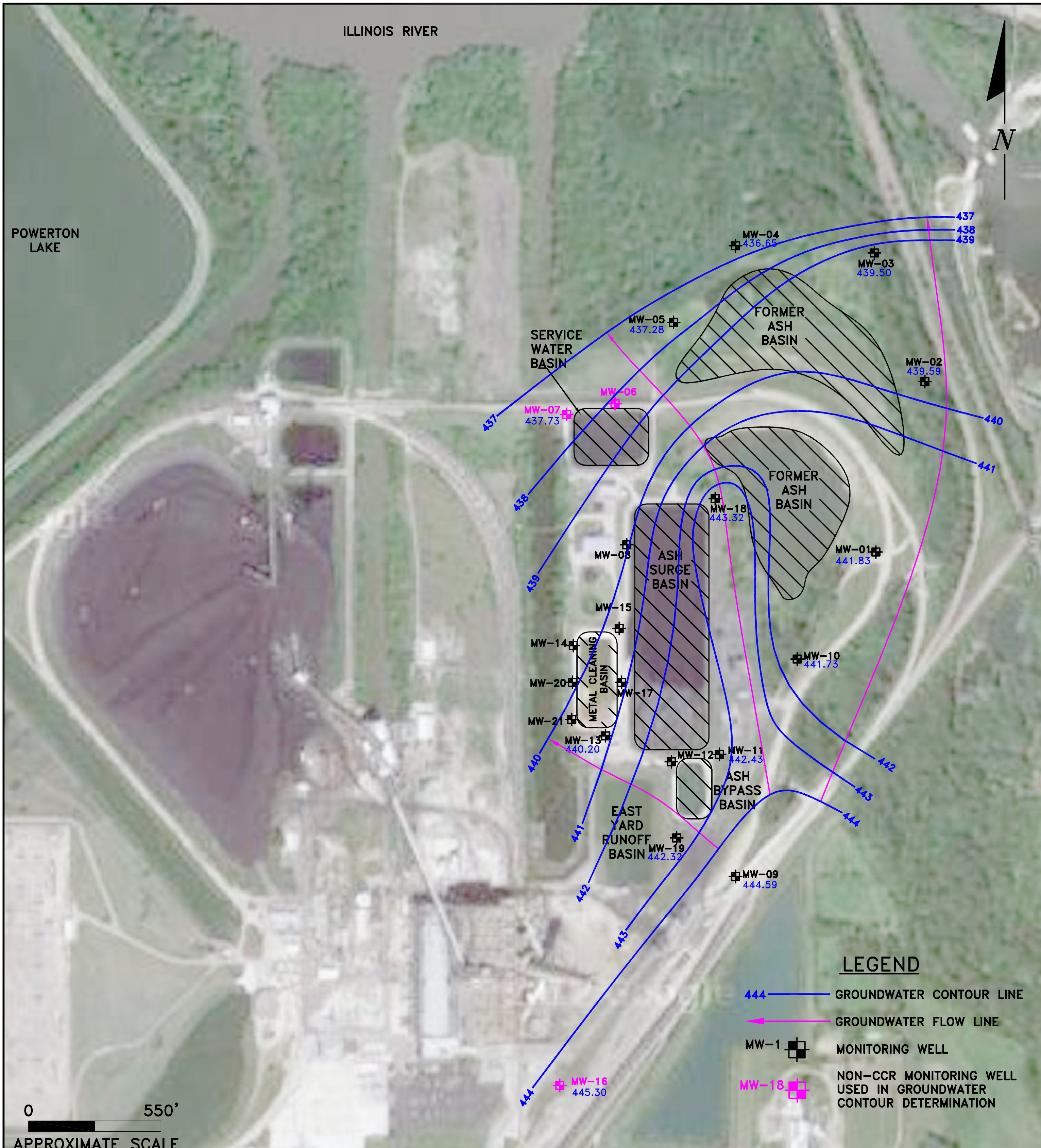
POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 550'

Date: August 31, 2021

KPRG Project No. 19520.1

FIGURE 9-15



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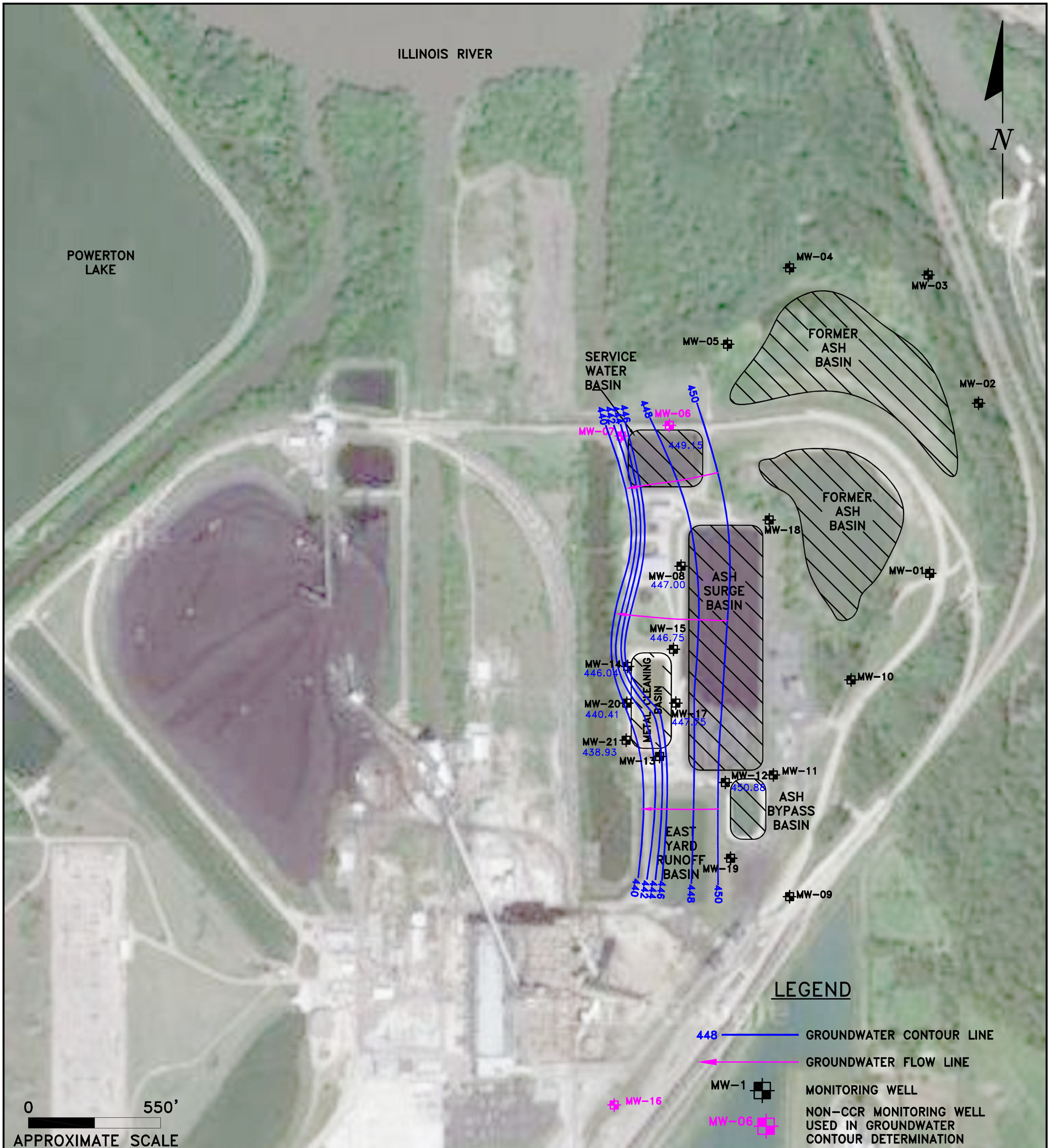
GROUNDWATER CONTOUR MAP FOR GRAVELLY SAND UNIT 05/2021

POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 550'	Date: August 31, 2021
KPRG Project No. 19520.1	FIGURE 9-16



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GROUNDWATER CONTOUR MAP FOR SILT/CLAY UNIT 05/2021

POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 550'	Date: August 31, 2021
KPRG Project No. 19520.1	FIGURE 9-17

E N V I R O N M E N T A L   C O N S U L T A T I O N & R E M E D I A T I O N

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GROUNDWATER MANAGEMENT ZONE FOR CCR SURFACE IMPOUNDMENTS

POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 550'	Date: September 17, 2021
KPRG Project No. 19520.1	Figure 9-18

W:\projects\midwest generation\ash pond issues\eluc & gmz\powerton station gmz--former ash basin.dwg(proposed gmz)

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2500' RADIUS POTABLE WELL MAP

POWERTON STATION
PEKIN, ILLINOIS

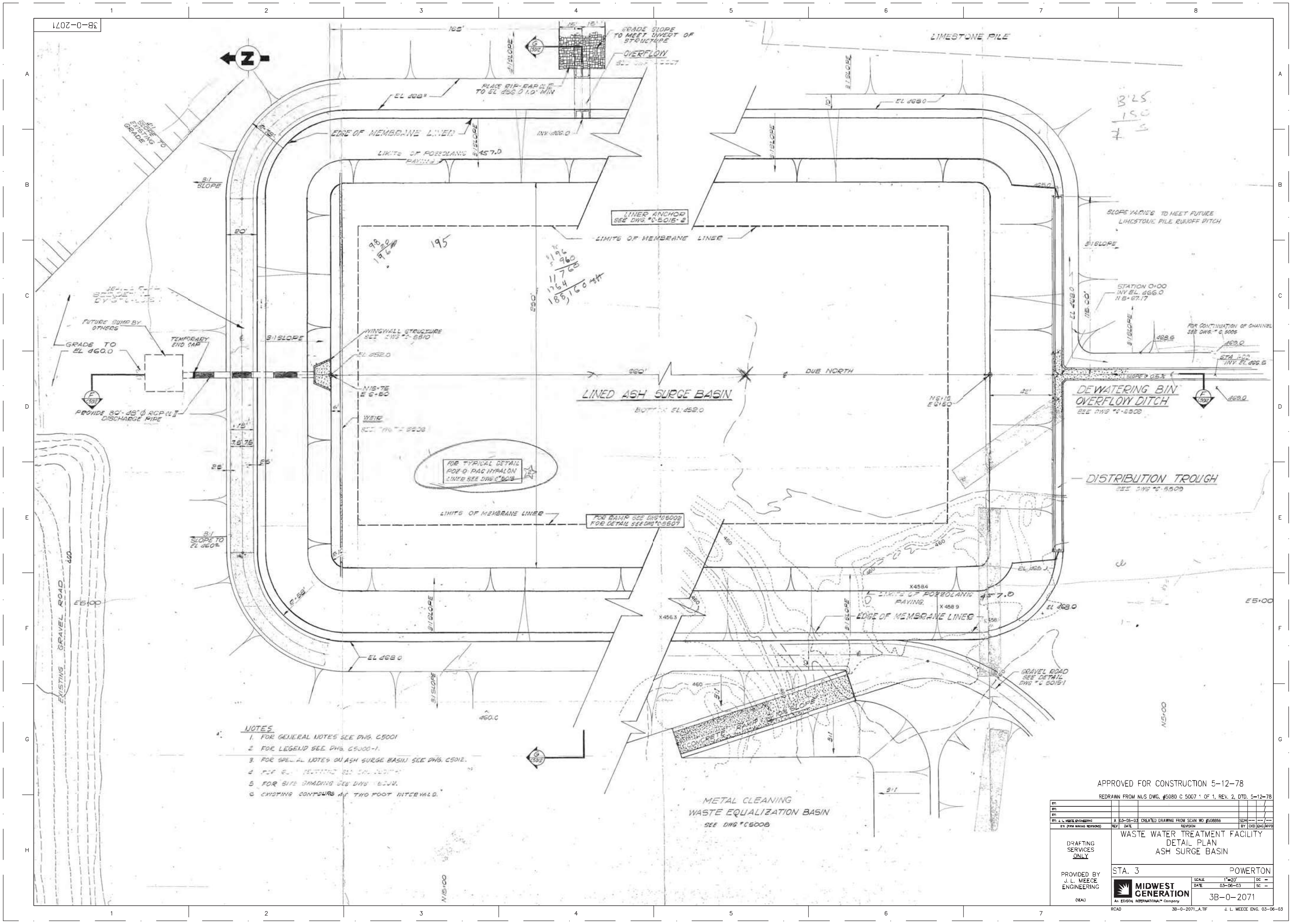
Scale: 1" = 800'	Date: August 31, 2021
KPRG Project No. 19520.1	FIGURE 9-19

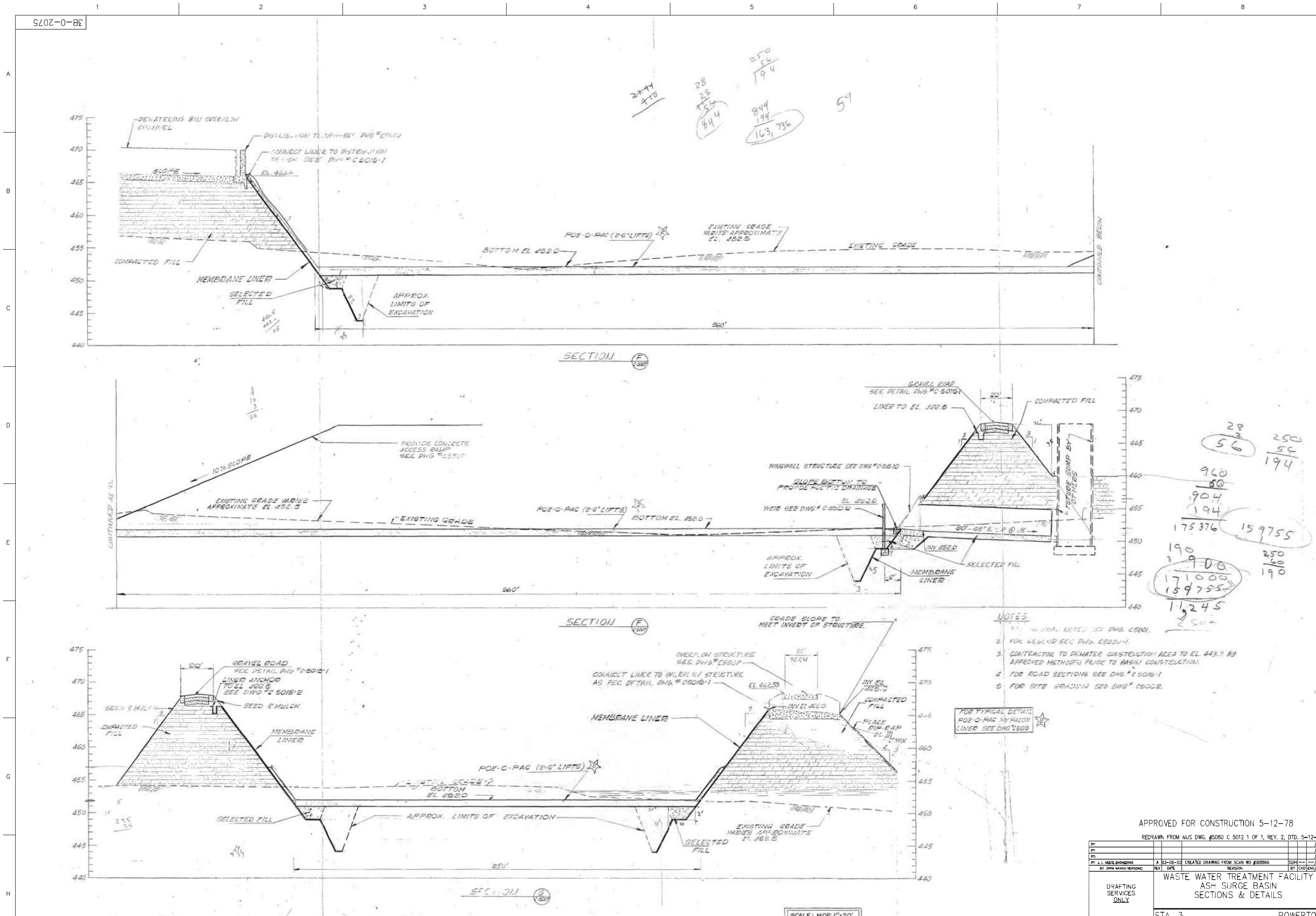
W:\projects\midwest gen\operating and construct permits - various stations\POWERTON\POWERTON station.dwg

<u>OPERATING PERMIT ATTACHMENTS</u>

ATTACHMENT 1
HISTORY OF CONSTRUCTION

Attachment 1-1 – ASB NUS Construction Drawings


3B-0-2071
LIMESTONE PILE
GRADE SLOPE TO MEET INVERT OF STRUCTURE
OVERFLOW
PLACE RIP-RAP TO EL 456.0 10' MIN
EDGE OF MEMBRANE LINER
LIMITS OF POZZOLANIC PAVING
LINER ANCHOR SEE DWG. C5015-2
LIMITS OF MEMBRANE LINER
SLOPE VARIES TO MEET FUTURE LIMESTONE PILE RUNOFF DITCH
STATION 0+00 INV EL 466.0 N 8+87.17
FOR CONTINUATION OF CHANNEL SEE DWG C5005
FUTURE PUMP BY OTHERS
GRADE TO EL 460.0
TEMPORARY END CAP
WINGWALL STRUCTURE
PROVIDE 30"-48"Ø RCP DISCHARGE PIPE
LINED ASH SURGE BASIN
DUE NORTH
DEWATERING BIN OVERFLOW DITCH
WEIR
FOR TYPICAL DETAIL POZ-O-PAC HYPALON LINER SEE DWG C5015
DISTRIBUTION TROUGH
LIMITS OF MEMBRANE LINER
FOR RAMP SEE DWG C5002 FOR DETAIL SEE DWG C5507
EXISTING GRAVEL ROAD
GRAVEL ROAD SEE DETAIL
METAL CLEANING WASTE EQUALIZATION BASIN SEE DWG C5008
NOTES
1. FOR GENERAL NOTES SEE DWG. C5001
2. FOR LEGEND SEE DWG. C5000-1.
3. FOR SPECIAL NOTES ON ASH SURGE BASIN SEE DWG. C5012.
5. FOR SITE GRADING SEE DWG.
6. EXISTING CONTOURS AT TWO FOOT INTERVALS.
APPROVED FOR CONSTRUCTION 5-12-78
REDRAWN FROM NUS DWG. #5080 C 5007 1 OF 1, REV. 2, DTD. 5-12-78
A 03-06-03 CREATED DRAWING FROM SCAN
DRAFTING SERVICES ONLY
PROVIDED BY J. L. MEECE ENGINEERING
WASTE WATER TREATMENT FACILITY
DETAIL PLAN
ASH SURGE BASIN
STA. 3
POWERTON
SCALE 1"=20'
DATE 03-06-03
MIDWEST GENERATION
An EDISON INTERNATIONAL Company
3B-0-2071
3B-0-2071_A.TIF
J. L. MEECE ENG. 03-06-03



NOTES

1. FOR GENERAL NOTES SEE DWG. C5001.
2. FOR LEGEND SEE DWG. C5002-1.
3. CONTRACTOR TO DEWATER CONSTRUCTION AREA TO EL. 443.0 BY APPROVED METHOD(S) PRIOR TO BASIN CONSTRUCTION.
4. FOR ROAD SECTIONS SEE DWG. # C5015-1
5. FOR SITE GRADING SEE DWG # C5008.

FOR TYPICAL DETAIL POZ-O-PAC HYPALON LINER SEE DWG # C5018

APPROVED FOR CONSTRUCTION 5-12-78

REDRAWN FROM NUS DWG. #5080 C 5012 1 OF 1, REV. 2, DTD. 5-12-78

BY: (FIRM MAKING REVISIONS)	REV	DATE	REVISION	BY	CKD	ENG/APPD
BY:						/
BY:						/
BY:						/
BY: J. L. MEECE ENGINEERING	A	03-06-03	CREATED DRAWING FROM SCAN WO #S08866	SDH	--	--/--

DRAFTING SERVICES ONLY

PROVIDED BY J. L. MEECE ENGINEERING

(SEAL)

WASTE WATER TREATMENT FACILITY
ASH SURGE BASIN
SECTIONS & DETAILS

STA. 3 POWERTON

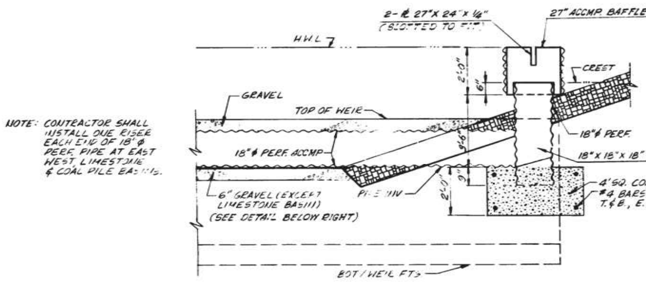
MIDWEST GENERATION
An EDISON INTERNATIONAL Company

SCALE AS SHOWN DC –
DATE 03-06-03 SC –

3B-0-2075

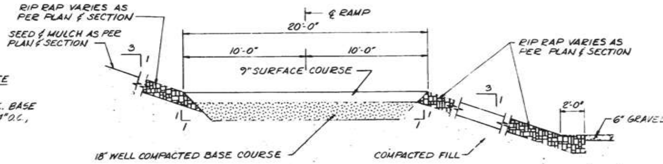
RCAD 3B-0-2075_A.TIF J. L. MEECE ENG. 03-06-03

	CONSTRUCTION
	ADDED RISER BAFFLE DETAIL



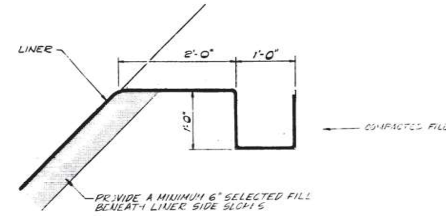
☆ TYP. SECTION-RISER & BAFFLE FOR PERF. PIPE

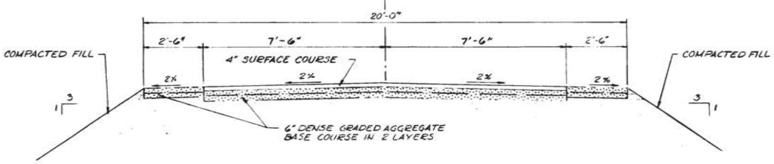
SCALE: 1/2"=1'-0"



TYPICAL SECTION
GRAVEL RAMP

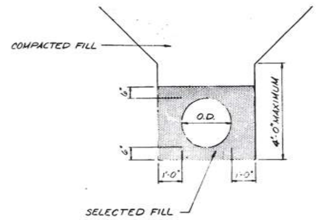
SCALE: 1"=4'





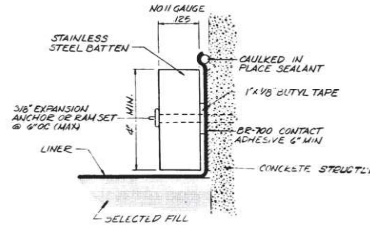
TYPICAL ROAD SECTION

SCALE: HOR. 1"=2' VERT. 1"=4'



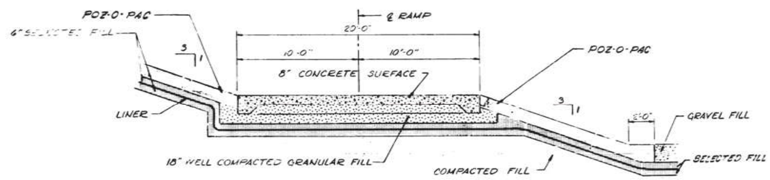
PIPE BEDDING DETAIL

SCALE 1"=2'

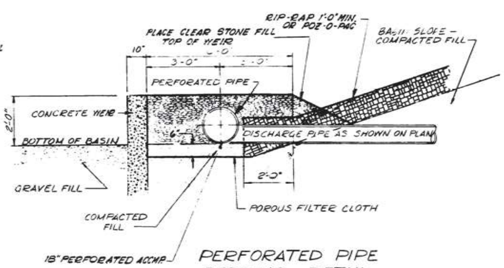


LINER ANCHOR DETAILS

NO SCALE

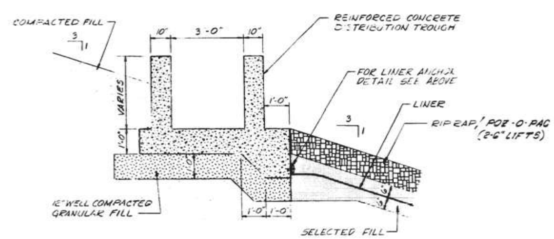


TYPICAL CONCRETE RAMP SECTION
LINER BELOW RAMP



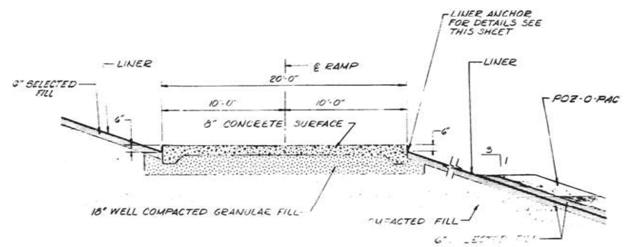
PERFORATED PIPE
BEDDING DETAIL

SCALE: 1"=2'



LINER ANCHORAGE FOR
DISTRIBUTION TROUGH

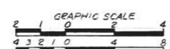
SCALE: 1"=2'



TYPICAL CONCRETE RAMP SECTION
LINER ON GRADE

SCALE 1"=4'
FOR TYPICAL SECTION SEE DWG #C55

NOTES:
1. FOR GENERAL NOTES SEE DWG. C-5001
2. FOR LEGEND SEE DWG. C-5000-1

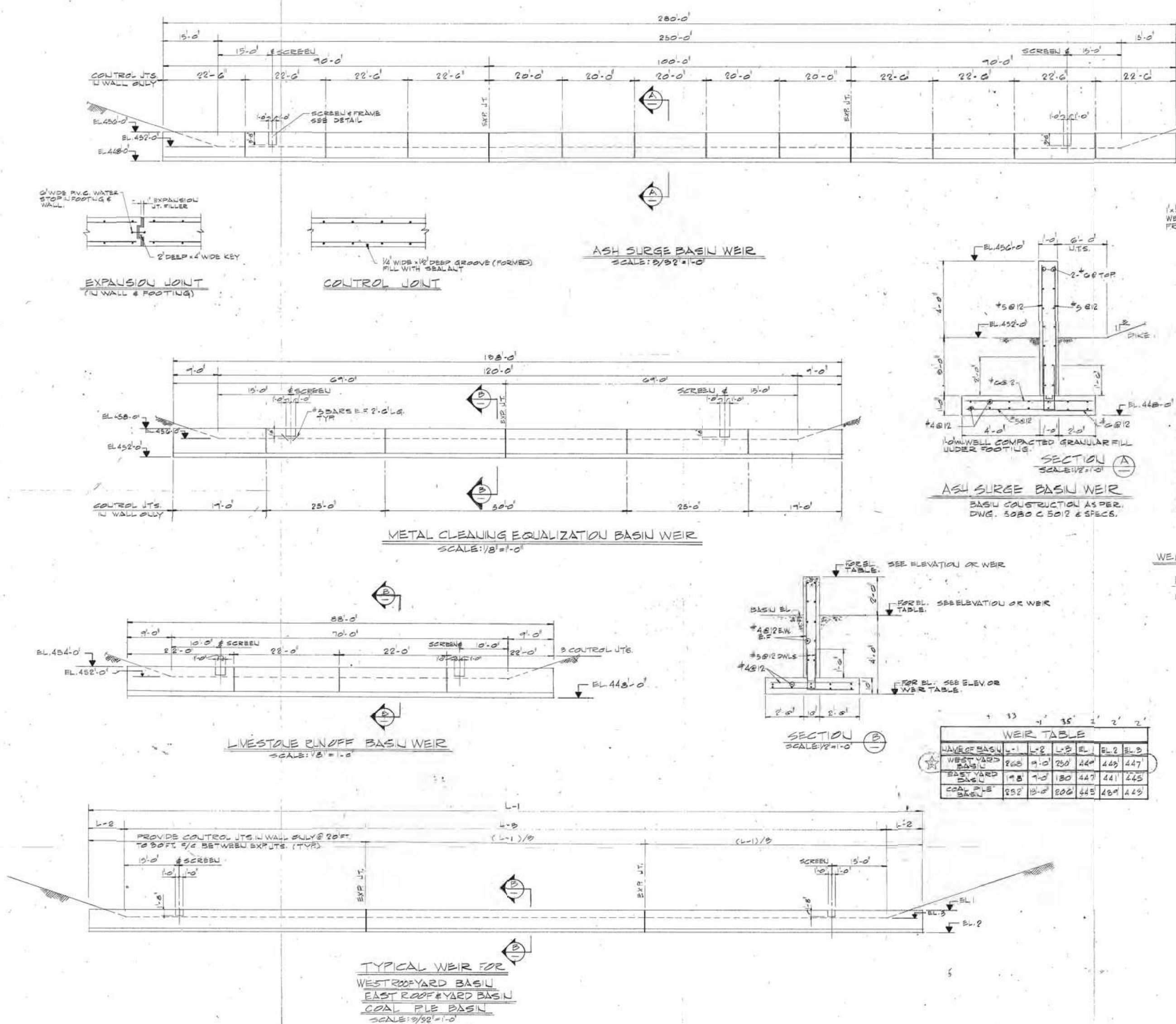


Sudhanar A. Verma 5/1/78

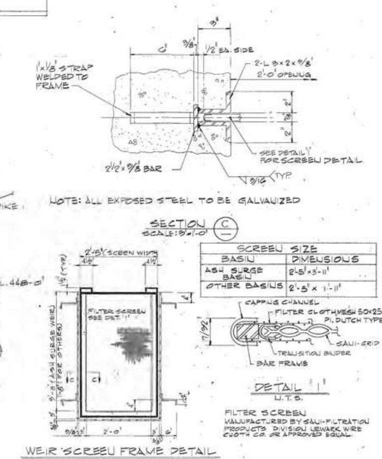
DRAWING STATUS: APPROVED FOR CONSTRUCTION 12/14/78

DRAWN	COMMONWEALTH EDISON COMPANY WASTE WATER TREATMENT FACILITIES POWERTON
CHECKED	
COG. ENGINEER	MISCELLANEOUS SECTIONS & DETAILS
DISCIP. MGR. APPVL.	
APPROVAL	CECO CONTRACT: 802467
APPROVAL, CLIENT	NUS CORPORATION ROCKVILLE, MD.
DRAWING NO.	5080 C 5015
SCALE	AS SHOWN
SHEET	1 OF 2

REFERENCE DRAWINGS	
WEIR LOCATION	CIVIL DWG. NO.
ASH SURGE BASIN	5080 C 5007
METAL CLEANING	5080 C 5008
LIMESTONE BASIN	5080 C 5008
WEST YARD BASIN	5080 C 5018
EAST ROOF & YARD BASIN	5080 C 5005
COAL PILE	5080 C 5006



WEIR TABLE						
NAME OF BASIN	L-1	L-2	L-3	EL 1	EL 2	EL 3
WEST YARD BASIN	268'	9'-0"	250'	449'	443'	447'
EAST YARD BASIN	198'	9'-0"	180	447'	441'	445'
COAL PILE BASIN	232'	13'-0"	206'	445'	439'	443'



SCREEN SIZE	
BASIN	DIMENSIONS
ASH SURGE BASIN	2'-5" x 3'-11"
OTHER BASINS	2'-5" x 1'-11"

NOTES:

1. FOR GENERAL NOTES SEE DWG. C5501

DRAWING STATUS

APPROVED FOR CONSTRUCTION

4/19/78 Date

REDRAWN FROM NUS DWG. #5080 C 5506 1 OF 1, REV. 2, DTD. 6-7-78

BY:	REV	DATE	REVISION	BY	CKD	ENG/APPD
BY:						
BY:						
BY:						
BY: J. L. MEECE ENGINEERING	A	03-06-03	CREATED DRAWING FROM SCAN WO #S08866	SDH	--	--/--
BY: (FIRM MAKING REVISIONS)	REV	DATE	REVISION	BY	CKD	ENG/APPD

DRAFTING SERVICES ONLY

PROVIDED BY J. L. MEECE ENGINEERING

(SEAL)

WASTE WATER TREATMENT FACILITY
SLUDGE WEIRS
SECTIONS & DETAILS

STA. 3 POWERTON

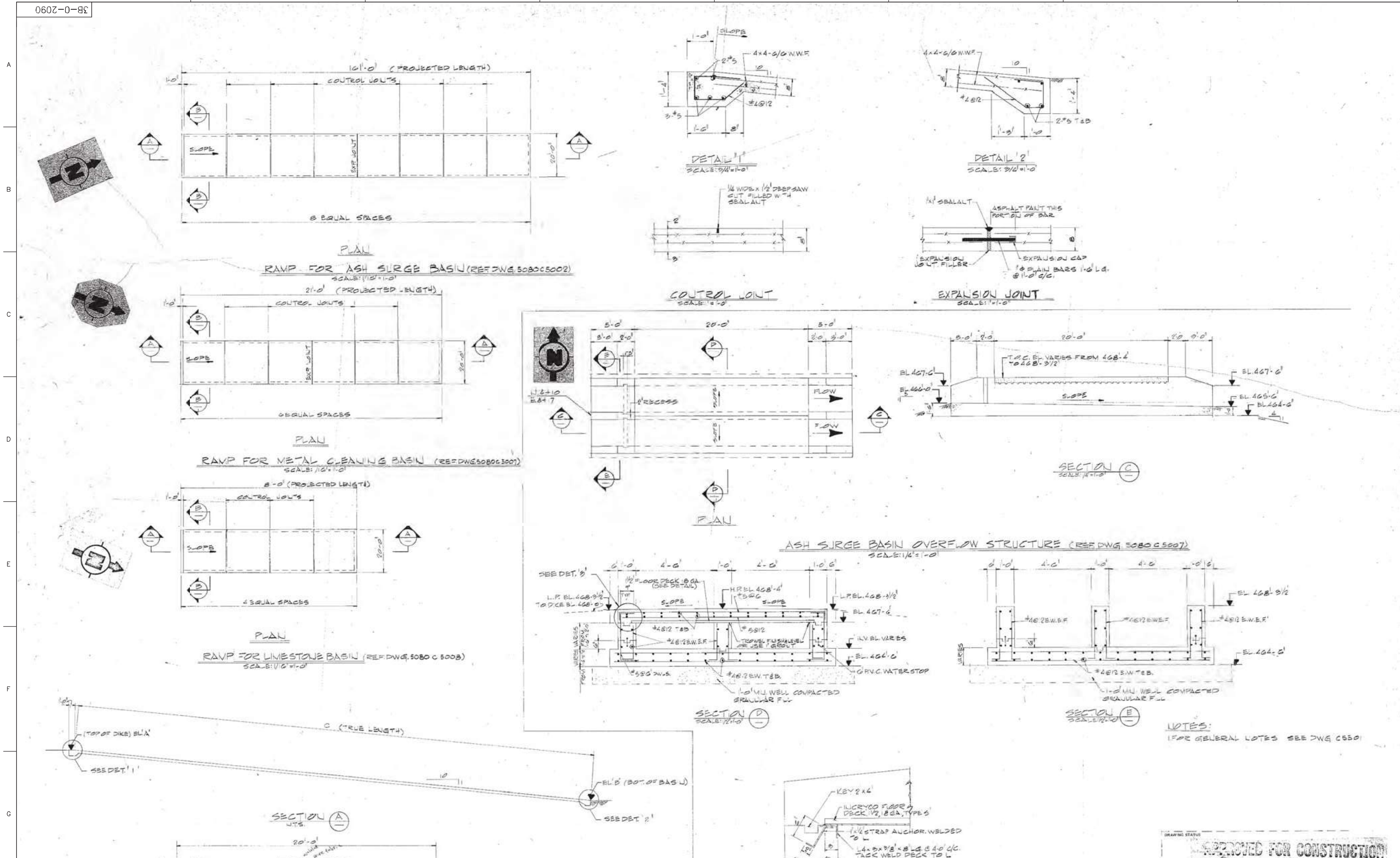
MIDWEST GENERATION
An EDISON INTERNATIONAL™ Company

SCALE AS SHOWN | DC –
DATE 03-06-03 | SC –

3B-0-2089

RCAD 3B-0-2089_A.TIF J. L. MEECE ENG. 03-06-03

3B-0-2090



ZAMP DATA

NAME OF BASIN	EL. 'A'	EL. 'B'	C	REMARKS
LIMESTONE BASIN	460'-0"	452'-0"	80'-4 3/4"	
METAL CLEANING BASIN	468'-0"	456'-0"	120'-7"	
ASH SURGE BASIN	468'-0"	452'-0"	160'-7 1/2"	

DRAWING STATUS
APPROVED FOR CONSTRUCTION
4/19/78 Date

REDRAWN FROM NUS DWG. #5080 C 5507 1 OF 1, REV. 1, DTD. 4-19-78

BY: (FIRM MAKING REVISIONS)	REV	DATE	REVISION	BY	CKD	ENG/APPD
BY:						/
BY:						/
BY:						/
BY: J. L. MEECE ENGINEERING	A	03-06-03	CREATED DRAWING FROM SCAN WO #S08866	SDH	--	--/--

DRAFTING SERVICES ONLY

PROVIDED BY J. L. MEECE ENGINEERING

(SEAL)

WASTE WATER TREATMENT FACILITY
RAMPS & ASH SURGE BASIN
OVERFLOW STRUCTURE

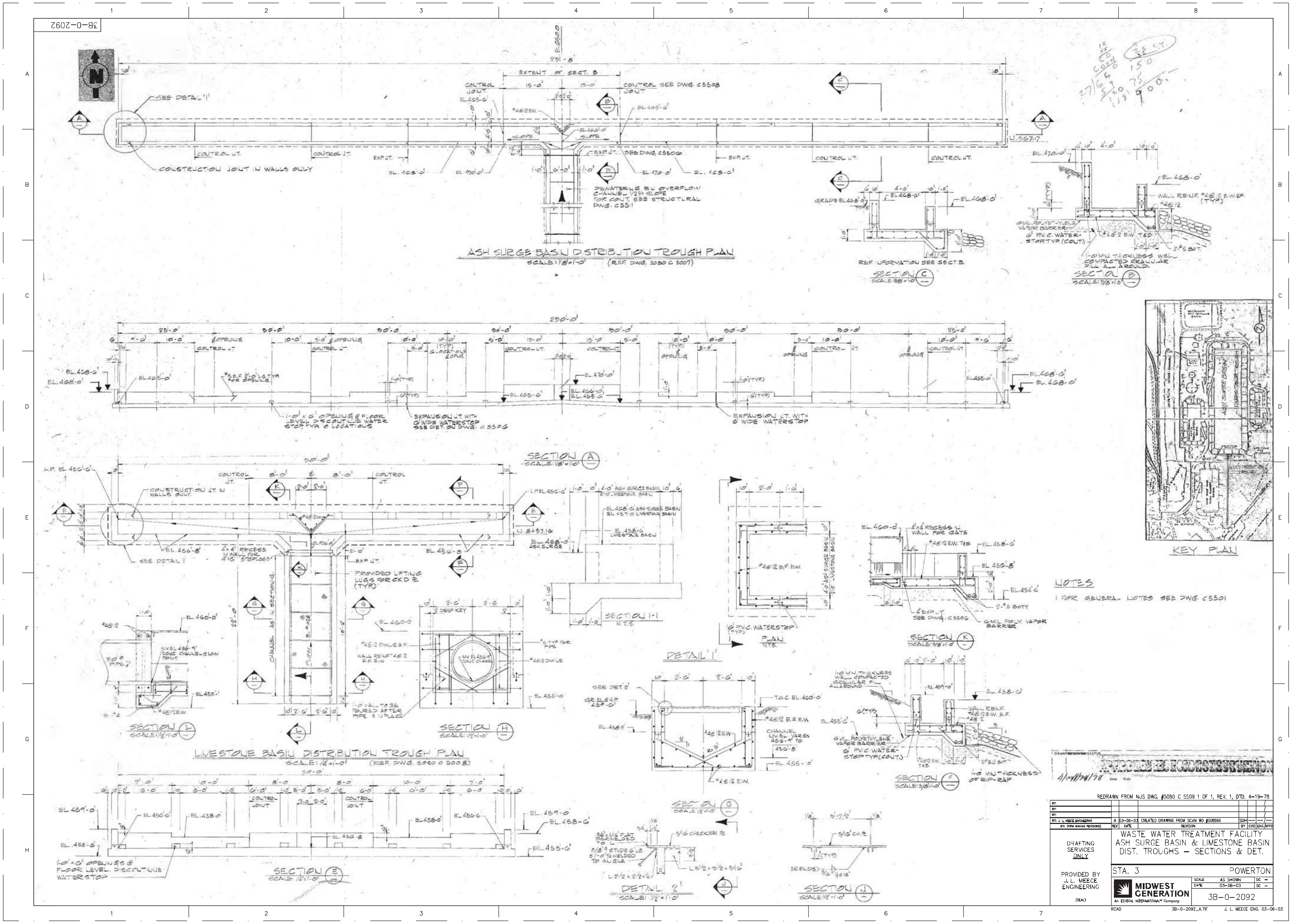
STA. 3 POWERTON

MIDWEST GENERATION
An EDISON INTERNATIONAL Company

SCALE AS SHOWN | DC –
DATE 03-06-03 | SC –

3B-0-2090

RCAD 3B-0-2090_A.TIF J. L. MEECE ENG. 03-06-03



REDRAWN FROM NJS DWG. #5080 C 5509 1 OF 1, REV. 1, DTD. 4-19-78

A 03-06-03 CREATED DRAWING FROM SCAN NO. #508886

DRAFTING SERVICES ONLY

PROVIDED BY J.L. MEECE ENGINEERING

WASTE WATER TREATMENT FACILITY
ASH SURGE BASIN & LIMESTONE BASIN
DIST. TROUGHS – SECTIONS & DET.

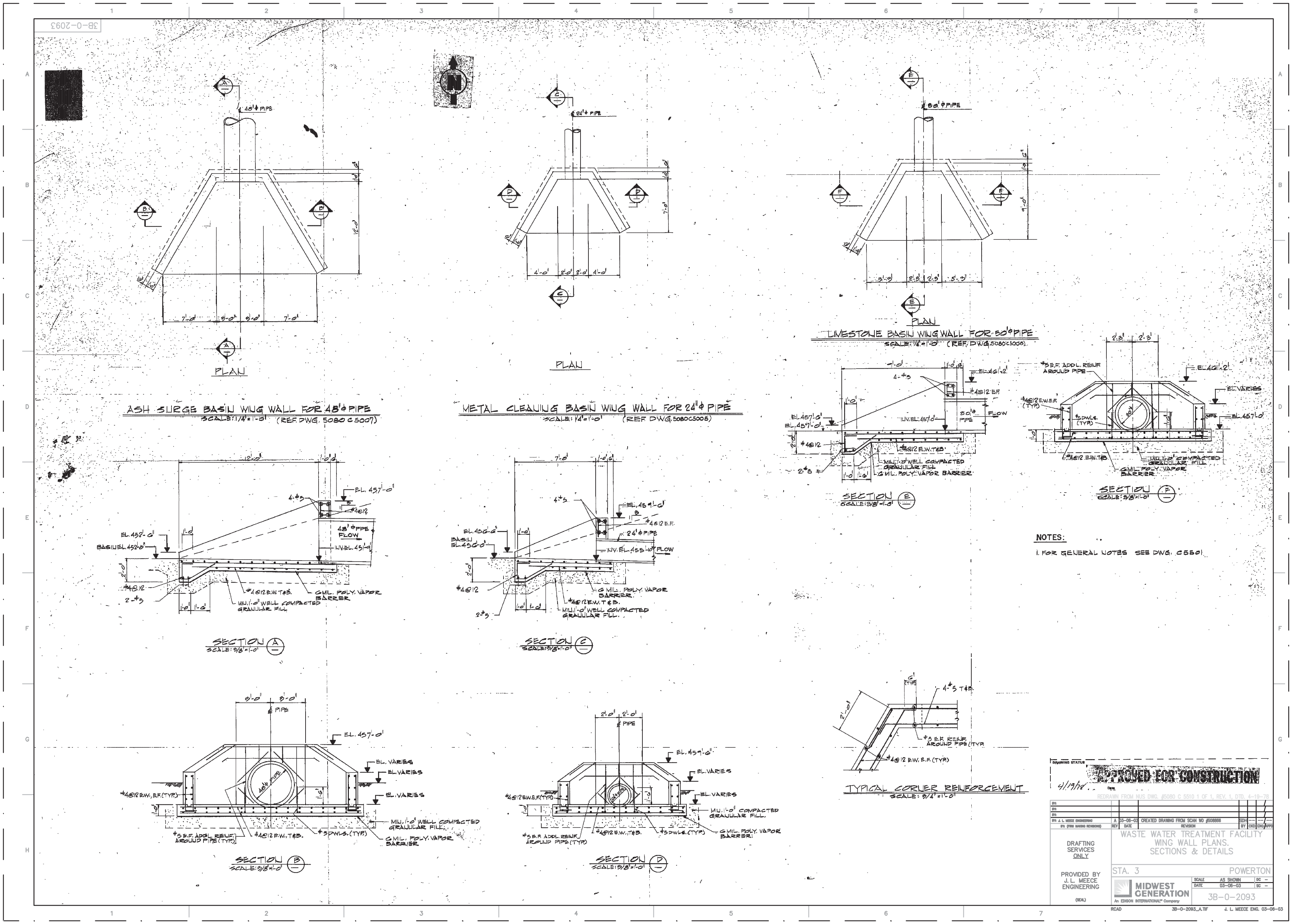
STA. 3 POWERTON

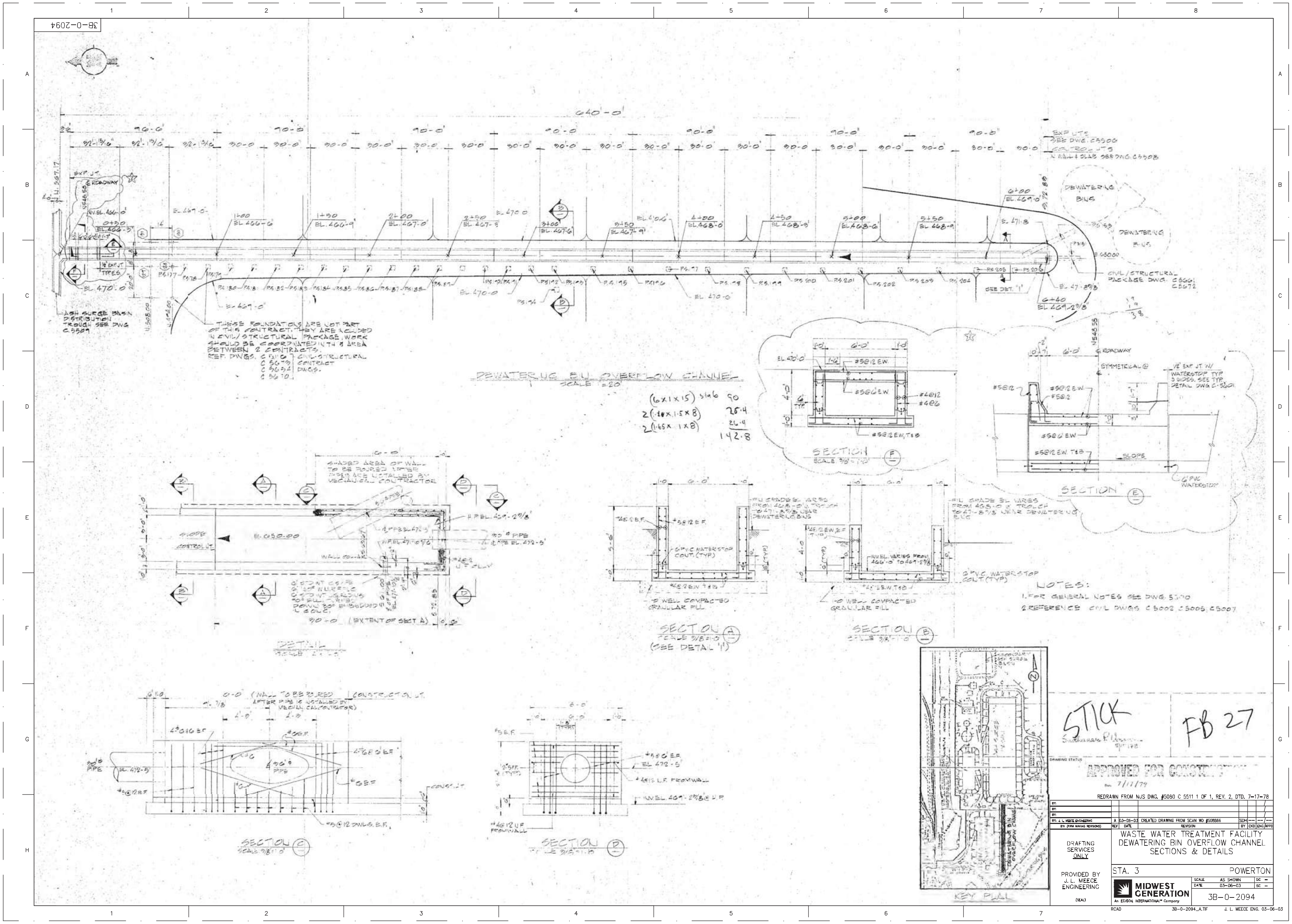
SCALE AS SHOWN
DATE 03-06-03

MIDWEST GENERATION
An EDISON INTERNATIONAL Company

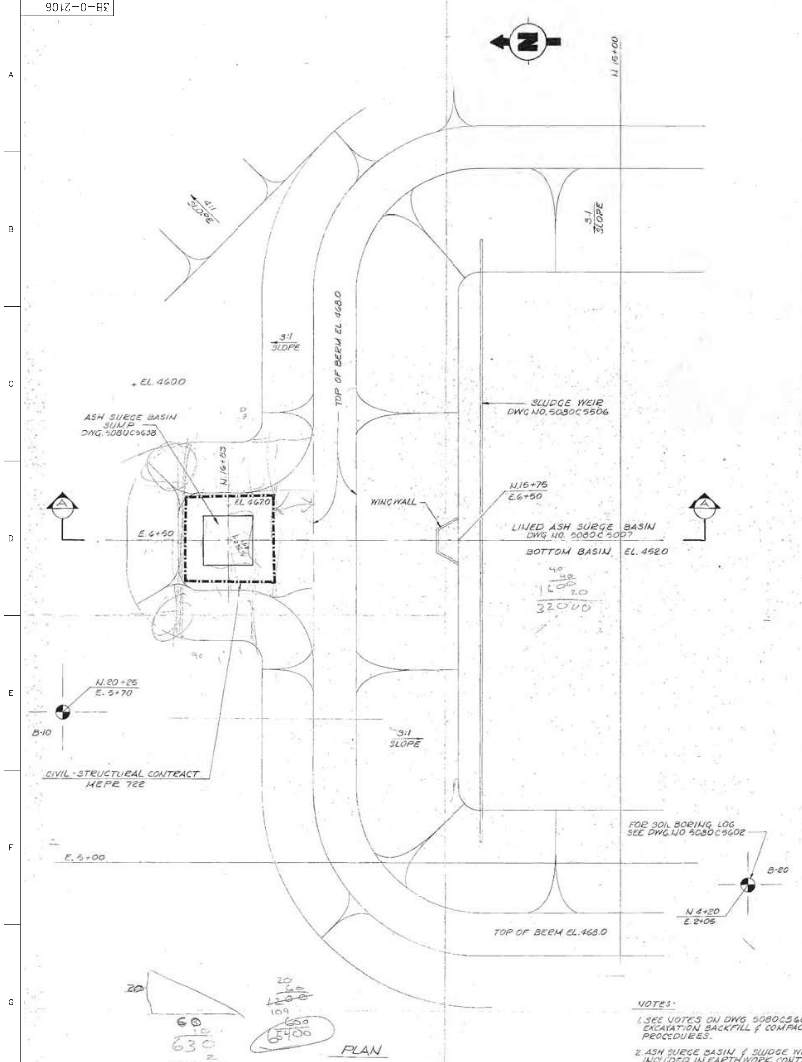
3B-0-2092

ROAD 3B-0-2092_A.TIF J. L. MEECE ENG. 03-06-03


3B-0-2093
PLAN
ASH SURGE BASIN WING WALL FOR 48"Ø PIPE
SCALE: 1/4"=1'-0" (REF. DWG. 5080 C 5007)
PLAN
METAL CLEANING BASIN WING WALL FOR 24"Ø PIPE
SCALE: 1/4"=1'-0" (REF. DWG. 5080C5008)
PLAN
LIMESTONE BASIN WING WALL FOR 30"Ø PIPE
SCALE: 1/4"=1'-0" (REF. DWG. 5080C5006)
SECTION A
SCALE: 3/8"=1'-0"
SECTION C
SCALE: 3/8"=1'-0"
SECTION E
SCALE: 3/8"=1'-0"
SECTION F
SCALE: 3/8"=1'-0"
SECTION B
SCALE: 3/8"=1'-0"
SECTION D
SCALE: 3/8"=1'-0"
TYPICAL CORNER REINFORCEMENT
SCALE: 3/4"=1'-0"
NOTES:
1. FOR GENERAL NOTES SEE DWG. C5501
DRAWING STATUS
APPROVED FOR CONSTRUCTION
4/19/78
Date
REDRAWN FROM NUS DWG. #5080 C 5510 1 OF 1, REV. 1, DTD. 4-19-78
BY: J. L. MEECE ENGINEERING | A | 03-06-03 | CREATED DRAWING FROM SCAN WO #S08868 | SDH
BY: (FIRM MAKING REVISIONS) | REV | DATE | REVISION | BY | CKD | ENG | APPD
DRAFTING SERVICES ONLY
PROVIDED BY J. L. MEECE ENGINEERING
(SEAL)
WASTE WATER TREATMENT FACILITY
WING WALL PLANS.
SECTIONS & DETAILS
STA. 3
POWERTON
MIDWEST GENERATION
An EDISON INTERNATIONAL Company
SCALE AS SHOWN
DATE 03-06-03
3B-0-2093
RCAD
3B-0-2093_A.TIF
J. L. MEECE ENG. 03-06-03


3B-0-2094
DEWATERING BIN OVERFLOW CHANNEL
SECTION
DETAIL
NOTES:
1. FOR GENERAL NOTES SEE DWG. 5500
KEY PLAN
STICK
FB 27
APPROVED FOR CONSTRUCTION
REDRAWN FROM NJS DWG. #5080 C 5511 1 OF 1, REV. 2, DTD. 7-17-78
CREATED DRAWING FROM SCAN NO #
DRAFTING SERVICES ONLY
PROVIDED BY J. L. MEECE ENGINEERING
WASTE WATER TREATMENT FACILITY
DEWATERING BIN OVERFLOW CHANNEL
SECTIONS & DETAILS
STA. 3
POWERTON
MIDWEST GENERATION
AS SHOWN
03-06-03
3B-0-2094
3B-0-2094_A.TIF
J. L. MEECE ENG. 03-06-03

3B-0-2106

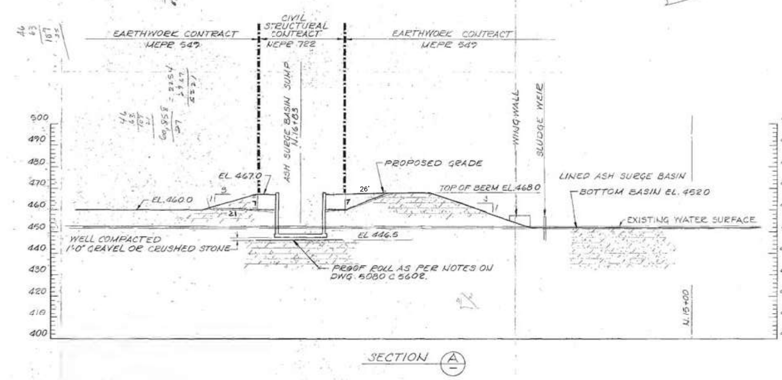


SOIL BORING

B-10

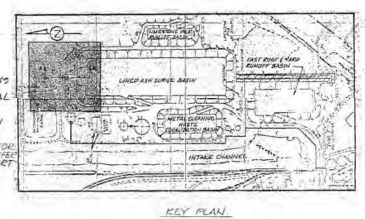
ELEV	DESCRIPTION	DEPTH	SAMPLE	N	Qu	W	REMARKS
460.6	SURFACE						
	Brown, fine to coarse, silty SAND, some cinders, FILL		1 AU		-	9	
458.6	Very stiff brown silty CLAY some fine to coarse sand and gravel, FILL		2-SS	19	2 7	13	
455.6	Black fine to coarse SAND some gravel and cinders, FILL	5	3-ST			12	γd=126 pcf
			4-SS	34		8	
451.1	Very stiff gray silty CLAY, some cinders FILL	10	5-SS	17	2 0	14	
448.6	Black cinders (fine to coarse sand size), FILL		6-SS	16		16	
		15	7-SS	7		26	
440.1	Soft gray silty CLAY to CLAY	20	8-SS	5	0 7*	37	
437.1	Stiff to very stiff gray silty CLAY to CLAY trace fine to coarse sand and gravel	25	9 SS	6	1 0*	40	
		30	10-SS	12	3 2	16	LL=35 PI=21
426.6	Medium light brown, fine to coarse silty SAND and GRAVEL	35	11-SS	18	-	11	
424.6	End of Boring	40					

* Penetrometer Value, TSF



NOTES:

1. SEE NOTES ON DWG 5080C5602 FOR EXCAVATION BACKFILL & COMPACTION PROCEDURES.
2. ASH SURGE BASIN & SLUDGE WEIR IS INCLUDED IN EARTHWORK CONTRACT MEPE 549 WORK TO BE COORDINATED BETWEEN EARTHWORK CONTRACT & CIVIL-STRUCTURAL CONTRACT.
3. SOIL BORING DATA B-10 IS FURNISHED BY A&H ENGINEERING COMPANY, DOWNERS GROVE, CHICAGO, ILL AS A PART OF THEIR SOIL INVESTIGATION WORK. THIS DATA IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. REFER SOIL INVESTIGATION REPORT FOR DETAIL REPORT.



DRAWING STATUS

Date 6/13/78

REDRAWN FROM NUS DWG. #5080 C 5586 1 OF 1, REV. 1, DTD. 6-13-78

BY: (FIRM MAKING REVISIONS)	REV	DATE	REVISION	BY	CKD	ENG/APPD
BY:						/
BY:						/
BY:						/
BY: J. L. MEECE ENGINEERING	A	03-06-03	CREATED DRAWING FROM SCAN WO #S08866	SDH	--	--/--

DRAFTING SERVICES ONLY

PROVIDED BY J. L. MEECE ENGINEERING

(SEAL)

WASTE WATER TREATMENT FACILITY
ASH SURGE BASIN
SUMP – SOIL PROFILE

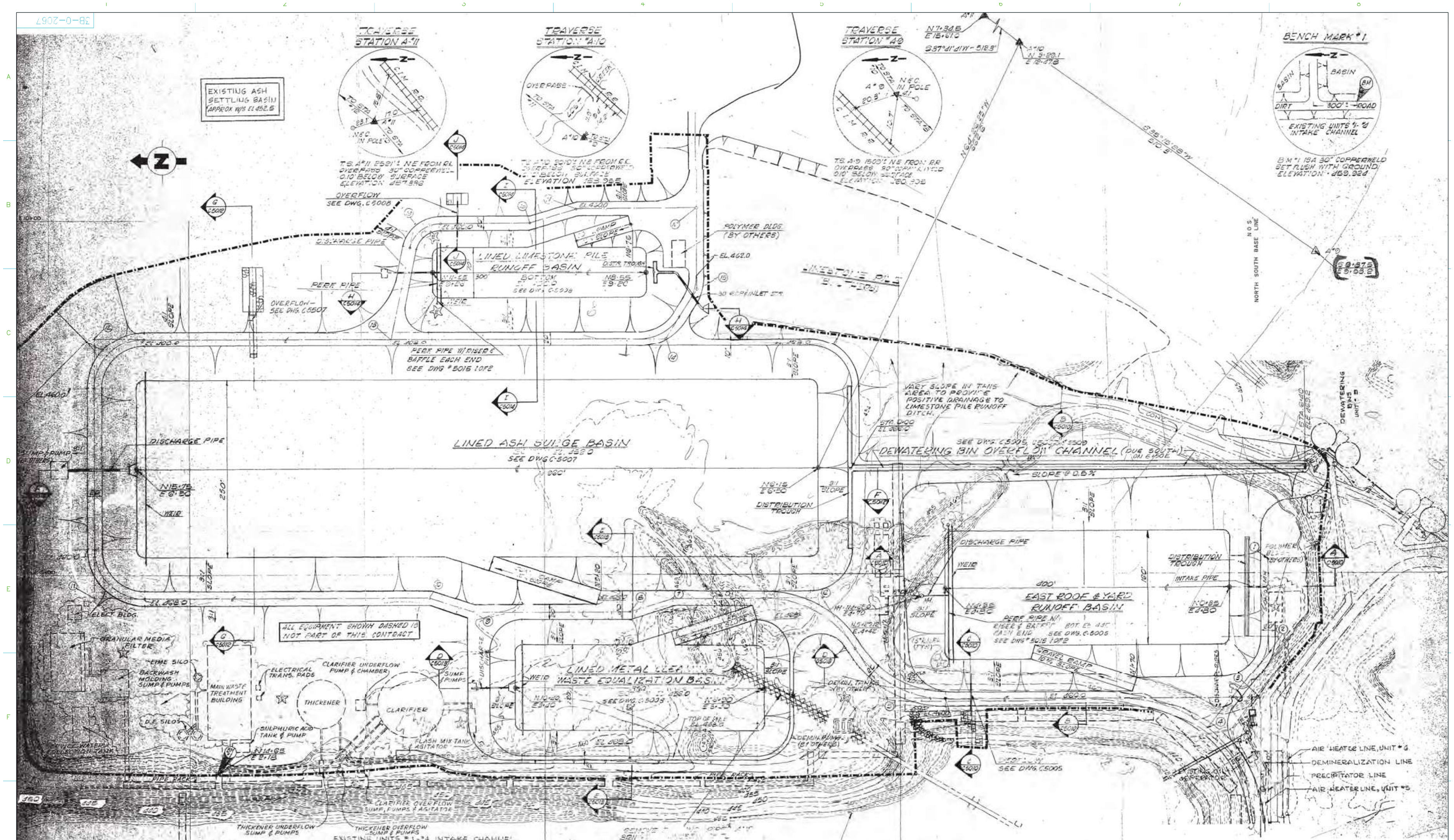
STA. 3 POWERTON

MIDWEST GENERATION
An EDISON INTERNATIONAL™ Company

SCALE 1"=20' DC –
DATE 03-06-03 SC –

3B-0-2106

RCAD 3B-0-2106_A.TIF J. L. MEECE ENG. 03-06-03



NOTES:

1. FOR GENERAL NOTES SEE DWG. C5001
2. PROVIDE 3:1 SLOPE TO MEET EXISTING GRADE, UNLESS OTHERWISE NOTED ON DWGS.
3. FOR ROAD & RAMP SECTIONS SEE DWG. C5015, SHT. 1 OF 2.

LAYOUT CONTROL FOR ROADS

NO.	N-S	E-W	RADIUS	TAN.
1	S 0+20	E5+20	—	—
2	S 0+20	E5+86	[illegible]	24'
3	S0+[illegible]	E5+25	200'	20[illegible]
4	N0+63	E2+81	—	—
5	N 5+18	E3+25	150'	62.31
6	N 6+07	E4+67	150'	[illegible]
7	N 8+28	E4+67	—	—
8	N 8+[illegible]	E6+46	—	—
9	N11+[illegible]	E4+46	100'	15'
10	N[illegible]+67	E4+67	100'	[illegible]
11	N12+33	E4+67	68'	68'
12	N12+33	E6+33	68'	68
13	N[illegible]	E8+38	—	—
14	N9+[illegible]	E[illegible]	32'	67.7'
15	N7+35	E9+[illegible]	68'	18.5'
16	N[illegible]	E[illegible]	—	—
17	N9+[illegible]	E[illegible]	100'	15'
18	[illegible]	E[illegible]	10[illegible]	[illegible]
19	N11+82	E8+85	45'	37'

APPROVED FOR CONSTRUCTION 12-19-78

REDRAWN FROM NUS DWG. #5080 C 5002 1 OF 1, REV. 2, DTD. 12-19-78

BY	REV	DATE	REVISION	BY	CKD	ENG	APPD
BY:							
BY:							
BY:							
BY: J. L. MEECE ENGINEERING	A	03-06-03	CREATED DRAWING FROM SCAN WO #S08866	SDH	--	--	--
BY: (FIRM MAKING REVISIONS)	REV	DATE	REVISION	BY	CKD	ENG	APPD

DRAFTING SERVICES ONLY

PROVIDED BY J. L. MEECE ENGINEERING

(SEAL)

WASTE WATER TREATMENT FACILITY
SITE PLAN
EAST ROOF & YARD RUNOFF BASIN

STA. 3 POWERTON

MIDWEST GENERATION
An EDISON INTERNATIONAL Company

SCALE 1"=50' DC –
DATE 03-06-03 SC –

3B-0-2067

RCAD 3B-0-2067_A.TIF J. L. MEECE ENG. 03-06-

Attachment 1-2 – ASB NRT Liner Replacement Drawings

ASH SURGE BASIN LINER REPLACEMENT
MIDWEST GENERATION
POWERTON GENERATING STATION
PEKIN, ILLINOIS

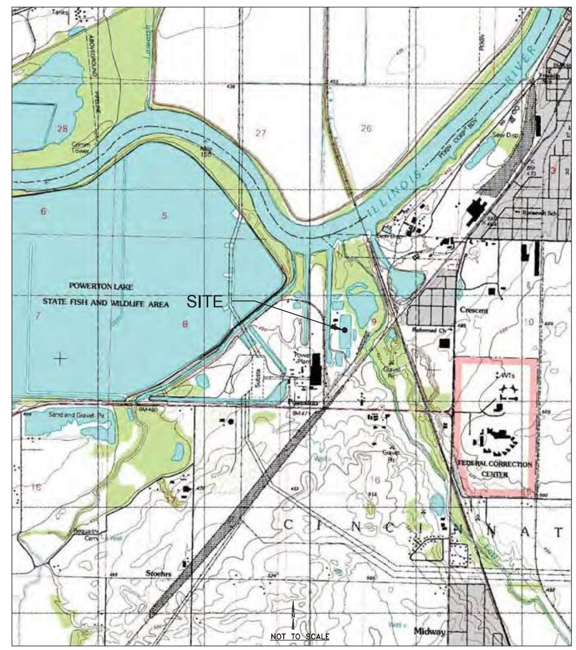
LIST OF DRAWINGS

SHEET NO.	TITLE	DRAWING NO.
TS	TITLE SHEET	D21132TS-03
C010	PRE-CONSTRUCTION SITE CONDITIONS	D21132C010-03
C020	LINER SUBGRADE PREPARATION	D21132C020-03
C021	GEOMEMBRANE PANEL LAYOUT	D21132C021-00
C030	WARNING LAYER PLAN	D21132C030-03
C031	DETAILS AND SECTIONS	D21132C031-03
C032	DETAILS AND SECTIONS	D21132C032-03

RECORD DRAWING LEGEND

~~PROPOSED~~	CROSSED OUT TEXT INDICATES CHANGES FROM THE FINAL DESIGN TO RECORD CONSTRUCTION
PRE–CONSTRUCTION	UNDERLINED TEXT INDICATES ADDED NOTES OR COMMENTS, AND DOCUMENTS CHANGES FROM THE FINAL DESIGN TO RECORD CONSTRUCTION
(cloud)	"CLOUDS" DOCUMENT ADDITIONS AND/OR CHANGES FROM THE FINAL DESIGN TO RECORD CONSTRUCTION
X	"CROSS OUTS" DOCUMENT OBJECTS REMOVED FROM THE FINAL DESIGN TO RECORD CONSTRUCTION

ILLINOIS



SITE LOCATION

PREPARED FOR:

MIDWEST GENERATION, LLC
13082 EAST MANITO RAOD
PEKIN, IL 61554

JULY 2014

REVISION:		DATE:	APP'D BY:
6.			
5.			
4.			
3.	ISSUED FOR RECORD DOCUMENTATION	07/02/14	EJT
2.	ISSUED FOR CONSTRUCTION	06/25/13	HMS
1.	ISSUED FOR BID	03/28/13	EJT
0.	ISSUED FOR PERMIT	01/15/13	HMS

NATURAL RESOURCE TECHNOLOGY

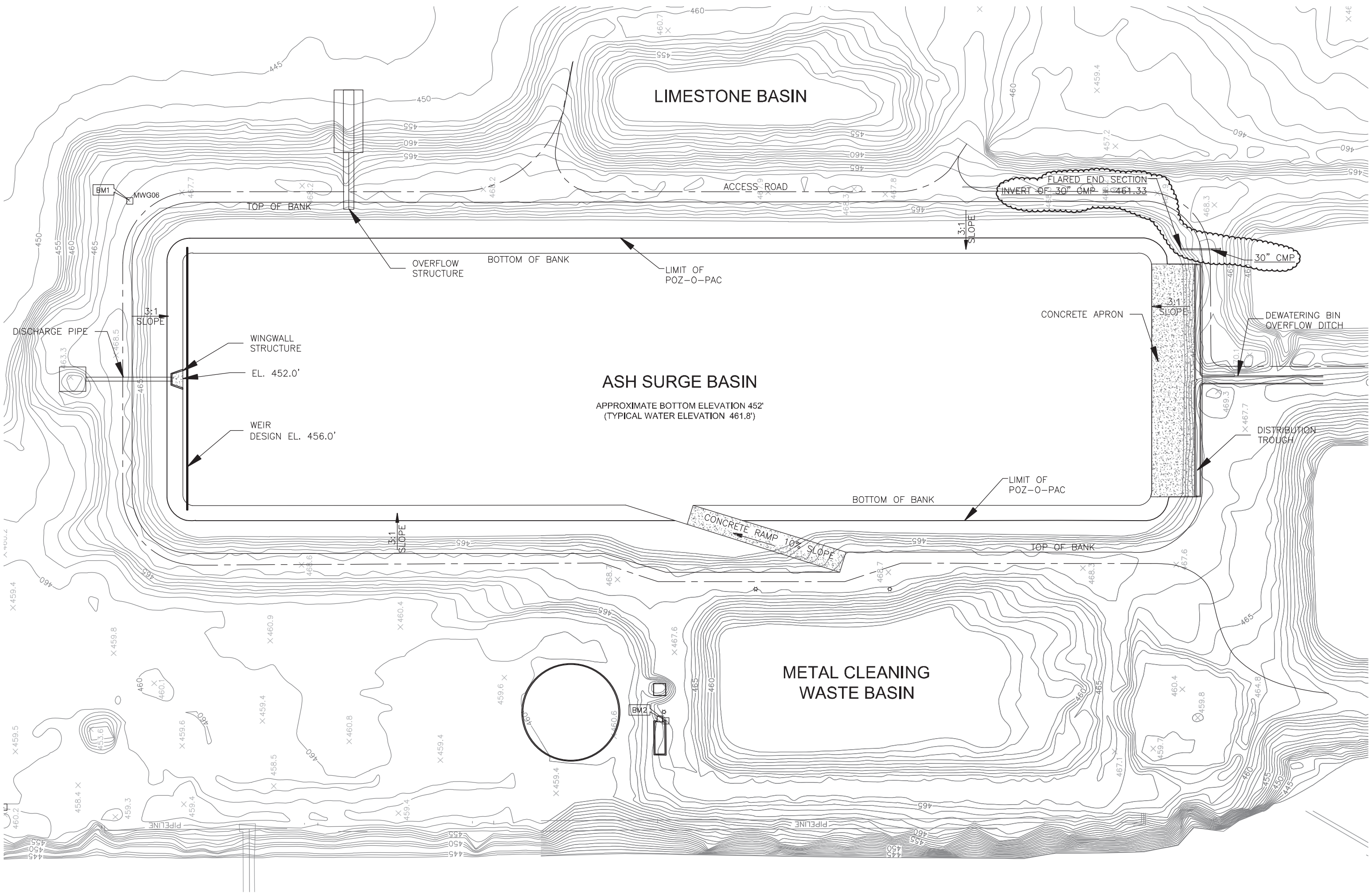
PROJECT NO. 2113.2/POWER/BID
DRAWN BY: RLH 01/14/13
CHECKED BY: HMS 01/14/13
APPROVED BY: HMS 01/15/13

TITLE SHEET

ASH SURGE BASIN LINER REPLACEMENT DOCUMENTATION
MIDWEST GENERATION
POWERTON GENERATING STATION
PEKIN, ILLINOIS

DRAWING NO: D21132TS-03
REFERENCE: .

SHEET NO. TS



460	EXISTING GROUND SURFACE CONTOURS
	LIMIT OF POZ-O-PAC
	LIGHT POLE
	ACCESS ROAD
	CONCRETE
BM2	BENCHMARK LOCATION

NOTES:

1. SITE BENCHMARK 1 (MWG06) - BRONZE DISK ON STEEL ROD W/ ACCESS COVER IS AT ELEVATION 466.79 FEET (NGVD 29).
2. BENCHMARK 2 - SE CORNER TOP CONCRETE WALL, ELEVATION 468.09 FEET (NGVD 29).

CONTRACTOR NOTES: COMPLETED DURING CONSTRUCTION

1. ACCUMULATED ASH, SLUDGE/SEDIMENT, AND DEBRIS TO BE REMOVED BY CONTRACTOR, AS DIRECTED BY OWNER.

HORIZONTAL DATUM:
ILLINOIS STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD83 FEET.

VERTICAL DATUM:
PLANT DATUM

N

0 25 50 100
SCALE IN FEET

SOURCE NOTES:
1. TOPOGRAPHIC SURVEY BY AERO-METRIC, INC. DATED 6-19-2008, PROJECT NO. 1080611, PROVIDED BY MIDWEST GENERATION.
2. ASH SURGE BASIN FEATURES TAKEN FROM MIDWEST GENERATION DRAWING TITLED WASTE WATER TREATMENT FACILITY, DETAIL PLAN, ASH SURGE BASIN, NO. 3B-0-2071, DATED 5-12-78.
3. LOCATION OF 30" CMP PIPE FROM SURVEY BY RIDGELINE CONSULTANTS, PROJECT NUMBER 2013-0340, DATED SEPTEMBER 3, 2013, PROVIDED BY TERRA CONTRACTING SERVICES.

REVISION:		DATE:	APP'D BY:
6.			
5.			
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3.	ISSUED FOR RECORD DOCUMENTATION	07/02/14	EJT
2.	ISSUED FOR CONSTRUCTION	06/18/13	HMS
1.	ISSUED FOR BID	03/28/13	EJT
0.	ISSUED FOR PERMIT	01/15/13	HMS

NATURAL RESOURCE TECHNOLOGY

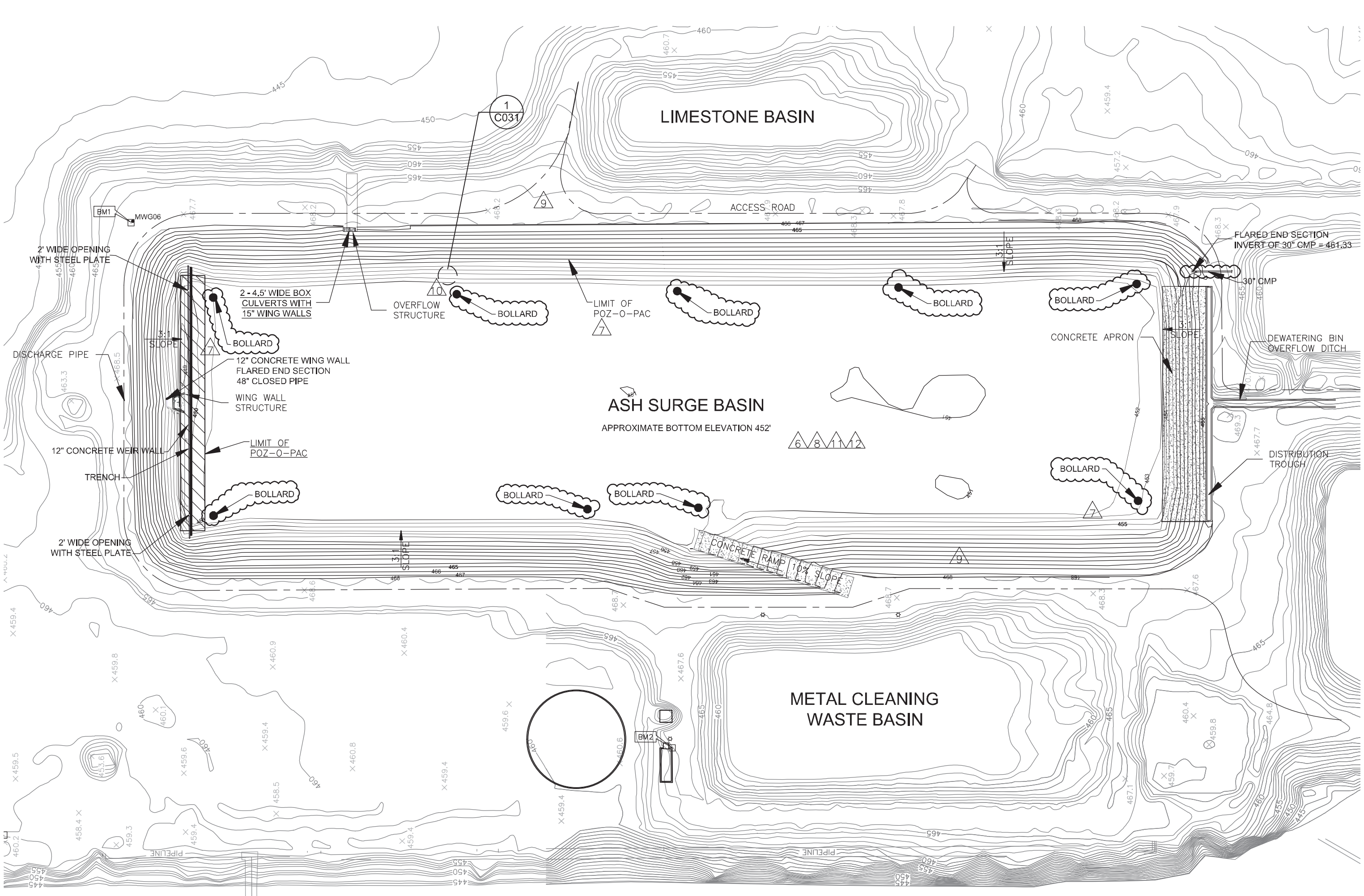
PROJECT NO. 2113.2
DRAWN BY: RLH 01/14/13
CHECKED BY: HMS 01/14/13
APPROVED BY: HMS 01/15/13

PRE-CONSTRUCTION SITE CONDITIONS

ASH SURGE BASIN LINER REPLACEMENT
POWERTON GENERATING STATION
MIDWEST GENERATION
PEKIN, ILLINOIS

DRAWING NO: D21132C010-03
REFERENCE: .
SHEET NO. C010

Jul 17, 2014 12:57pm PLOTTED BY: dduda SAVED BY: dduda
Y:\ACAData\Projects\21\2113\2113.2_Powerton\ASH SURGE BASIN\RECORD DWGS\Record 070214\D21132C010-03.dwg C010
IMAGES:
XREFS:



EXISTING PREVIOUS GROUND SURFACE CONTOURS
SUBGRADE SURFACE CONTOUR
LIMIT OF POZ-O-PAC
LIGHT POLE
ACCESS ROAD
MARKER POST LOCATION
POZ-O-PAC REMOVAL AREA
CONCRETE
BENCHMARK LOCATION

NOTES:

1. SITE BENCHMARK 1 (MWG06) - BRONZE DISK ON STEEL ROD W/ ACCESS COVER IS AT ELEVATION 466.79 FEET (NGVD 29).
2. BENCHMARK 2 - SE CORNER TOP CONCRETE WALL, ELEVATION 468.09 FEET (NGVD 29).

CONTRACTOR NOTES: △ COMPLETED DURING CONSTRUCTION

1. CONTRACTOR SHALL FIELD VERIFY LOCATION OF UNDERGROUND PIPES WITH ASSISTANCE OF OWNER'S UTILITY LOCATOR.
2. CONTRACTOR SHALL FIELD VERIFY LOCATION OF CONCRETE APRON, CONCRETE STRUCTURES, AND ABOVE GROUND PIPING.
3. CLEAR AND GRUB ALL BRUSH ALONG TOP OF SLOPE OF BASIN.
4. CONTRACTOR SHALL STORE ALL GEOSYNTHETICS AND SUBGRADE MATERIALS IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
5. CONTRACTOR SHALL STORE AND STAGE EQUIPMENT AT LOCATION APPROVED BY OWNER.
6. PROTECT ALL CONCRETE AND UTILITY STRUCTURES THROUGHOUT PROJECT DURATION.
7. ~~REMOVE EXISTING 12-INCH POZ-O-PAC LAYER ALONG SIDE SLOPES.~~ POZ-O-PAC LAYER AT BASE OF BASIN TO REMAIN IN PLACE, EXCEPT NORTH OF WEIR AND 20 FOOT SECTION SOUTH OF WEIR, AS SHOWN. CONTRACTOR SHALL REMOVE AN ADDITIONAL 6 INCHES OF SUBGRADE MATERIAL LOCATED BETWEEN THE WEIR AND THE WING WALL STRUCTURE ALONG THE NORTH TOE OF SLOPE, AS SHOWN ON SHEET C032. REMOVE AT LEAST 18 INCHES OF POZ-O-PAC LAYER AND SUBGRADE MATERIAL AT BASE OF WEIR TO THE SOUTH AND GRADE AT A ~~1%~~ 7.5% SLOPE. REFER TO SHEET C032.
8. CONTRACTOR SHALL REMOVE ALL VEGETATION, ROCKS, AND OTHER DEBRIS FROM EXISTING LINER AND DISPOSE OF IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
9. CONTRACTOR SHALL RESHAPE SIDE SLOPES AS NECESSARY TO MAINTAIN 3:1 SIDE SLOPES, AND REMOVE "SOFT" SUBGRADE MATERIAL AS DIRECTED BY OWNER AND/OR ENGINEER. BACKFILL AREAS WITH FILL IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS. EXISTING HYPALON GEOMEMBRANE MAY REMAIN IN PLACE ALONG THE SIDE SLOPES, EXCEPT IN SOFT OR LOW/HIGH (RELATIVE TO GEOMEMBRANE SUBGRADE) AREAS, AS DIRECTED BY ENGINEER AND/OR OWNER.
10. CONTRACTOR SHALL INSTALL MARKER POSTS ALONG THE TOE OF SLOPE AS SHOWN AND IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS AND DETAIL 1 ON SHEET C031.
11. SUBGRADE MUST BE APPROVED BY OWNER AND/OR ENGINEER PRIOR TO INSTALLATION OF GEOMEMBRANE.
12. CONTRACTOR SHALL PROVIDE MEANS TO PROTECT SUBGRADE LAYER FROM EROSION, STORM WATER, AND HEAVY EQUIPMENT TRAFFIC. DAMAGE TO SUBGRADE LAYER SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

HORIZONTAL DATUM:
ILLINOIS STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD83 FEET.

VERTICAL DATUM:
PLANT DATUM

N

0 25 50 100
SCALE IN FEET

SOURCE NOTES:
1. TOPOGRAPHIC SURVEY BY AERO-METRIC, INC. DATED 6-19-2008, PROJECT NO. 1080611, PROVIDED BY MIDWEST GENERATION.
2. ASH SURGE BASIN FEATURES TAKEN FROM MIDWEST GENERATION DRAWING TITLED WASTE WATER TREATMENT FACILITY, DETAIL PLAN, ASH SURGE BASIN, NO. 3B-0-2071, DATED 5-12-78.
3. SUBGRADE CONTOURS AND FEATURE LOCATIONS FROM SURVEY BY RIDGELINE CONSULTANTS, PROJECT NUMBER 2013-0340, DATED SEPTEMBER 3, 2013, PROVIDED BY TERRA CONTRACTING SERVICES.

REVISION:		DATE:	APP'D BY:
6.			
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3.	ISSUED FOR RECORD DOCUMENTATION	07/18/14	EJT
2.	ISSUED FOR CONSTRUCTION	06/18/13	HMS
1.	ISSUED FOR BID	03/28/13	EJT
0.	ISSUED FOR PERMIT	01/15/13	HMS

NATURAL RESOURCE TECHNOLOGY

PROJECT NO. 2113.2
DRAWN BY: RLH 01/14/13
CHECKED BY: HMS 01/14/13
APPROVED BY: HMS 01/15/13

LINER SUBGRADE PREPARATION

ASH SURGE BASIN LINER REPLACEMENT
POWERTON GENERATING STATION
MIDWEST GENERATION
PEKIN, ILLINOIS

DRAWING NO: D21132C020-03
REFERENCE: .
SHEET NO. C020

Jul 18, 2014 12:21pm PLOTTED BY: ddudo SAVED BY: ddudo
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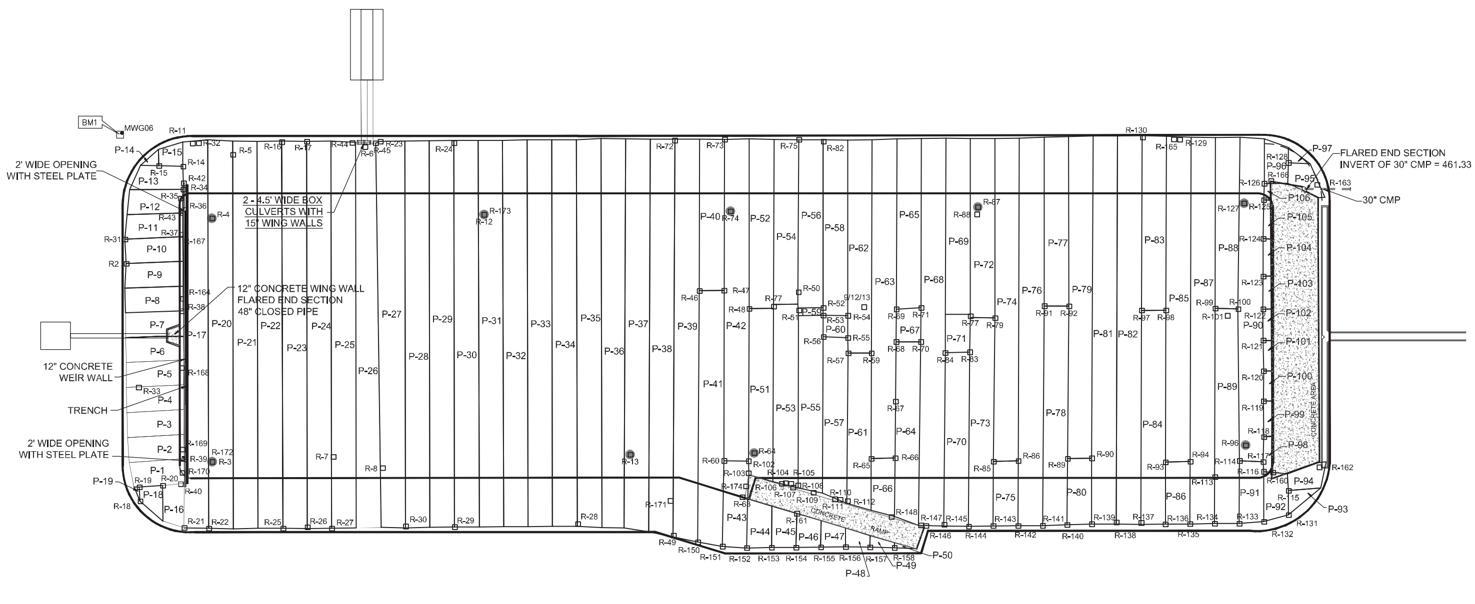
XREFS:



	GEOMEMBRANE PANEL SEAM
P23	GEOMEMBRANE PANEL AND PANEL NUMBER
R87	GEOMEMBRANE REPAIR LOCATION (NOT TO SCALE)
BM2	BENCHMARK LOCATION
●	MARKER POST LOCATION

NOTES:

1. SITE BENCHMARK 1 (MWG06) - BRONZE DISK ON STEEL ROD W/ ACCESS COVER IS AT ELEVATION 466.79 FEET (NGVD 29).
2. BENCHMARK 2 - SE CORNER TOP CONCRETE WALL, ELEVATION 468.09 FEET (NGVD 29).

N

0 25 50 100

SCALE IN FEET

HORIZONTAL DATUM:
ILLINOIS STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD83 FEET.

VERTICAL DATUM:
PLANT DATUM

SOURCE NOTES:

1. THIS DRAWING WAS DEVELOPED FROM SURVEY DATA BY RIDGELINE CONSULTANTS, PROJECT NUMBER 2013-0340, DATED SEPTEMBER 3, 2013, PROVIDED BY TERRA CONTRACTING SERVICES.

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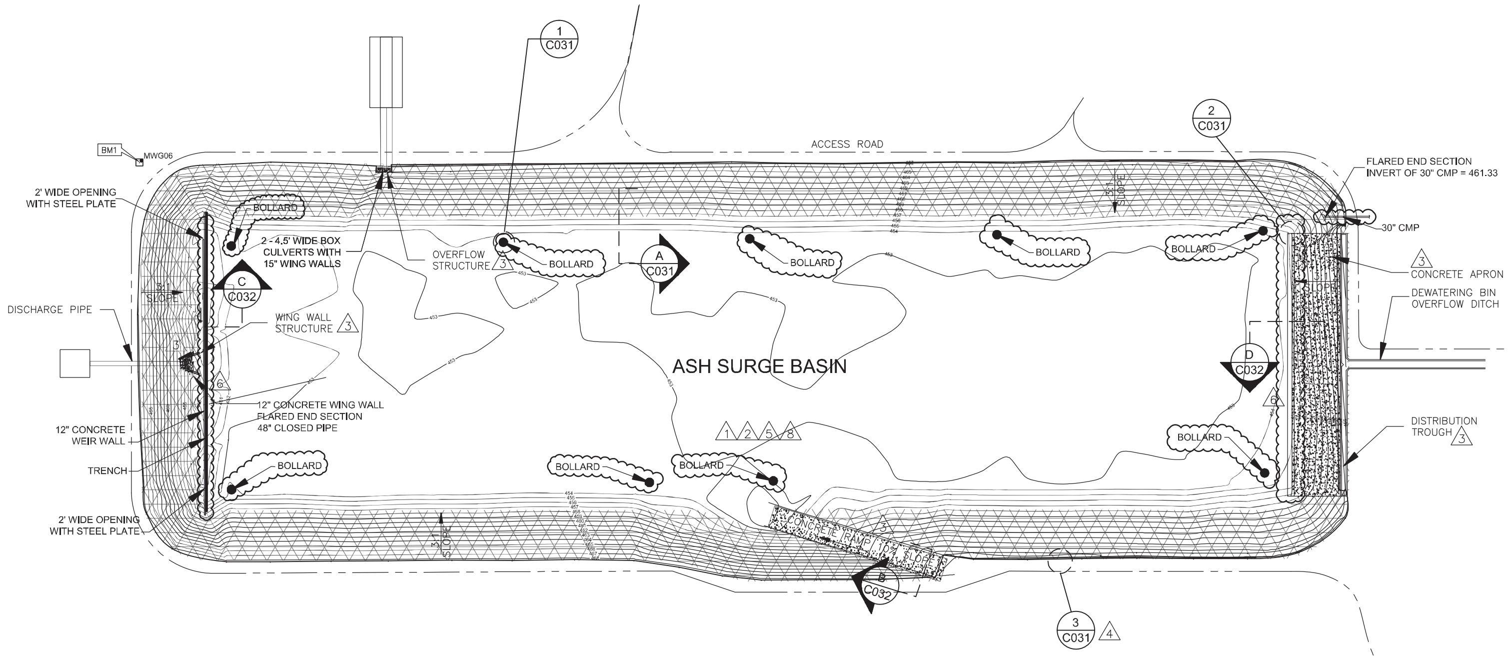
0.	ISSUED FOR RECORD DOCUMENTATION	07/17/14	EJT
REVISION:		DATE:	APP'D BY:

NATURAL RESOURCE TECHNOLOGY

PROJECT NO. 2113.2	**GEOMEMBRANE PANEL LAYOUT**
DRAWN BY: RLH 03/06/14	ASH SURGE BASIN LINER REPLACEMENT POWERTON GENERATING STATION MIDWEST GENERATION PEKIN, ILLINOIS
CHECKED BY: JRR 03/06/14	
APPROVED BY: EJT 07/17/14	DRAWING NO: D21132C021-00 REFERENCE: .
SHEET NO.	C021



FINAL SURFACE CONTOUR

LIGHT POLE

ACCESS ROAD

MARKER POST LOCATION

HDPE GEOMEMBRANE

CONCRETE

RIPRAP

BENCHMARK

CONTRACTOR NOTES: △ COMPLETED DURING CONSTRUCTION

1. CONTRACTOR SHALL PLACE 16-OZ. NON-WOVEN GEOTEXTILE OVER THE SUBGRADE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS
2. CONTRACTOR SHALL INSTALL 60 MIL HDPE, WHITE, TEXTURED GEOMEMBRANE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION PRIOR TO PLACEMENT OF THE WARNING LAYER. CONTRACTOR SHALL PROVIDE AND FOLLOW AN APPROVED GEOMEMBRANE LAYOUT PLAN.
3. CONTRACTOR SHALL ATTACH GEOMEMBRANE TO STRUCTURES, CONCRETE RAMP, AND APRON, IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION AND DETAILS ON SHEET C031 AND C032.
4. GEOMEMBRANE SHALL BE ANCHORED INTO 2.5 FEET DEEP TRENCHES ALONG TOP OF BANK, AS SHOWN IN DETAIL 3 ON SHEET C031. CONTRACTOR SHALL ADVISE OWNER AND/OR ENGINEER IF PROPOSED LOCATION FOR ANCHOR TRENCH IS NOT FEASIBLE.
5. CONTRACTOR SHALL PLACE 16-OZ. NON-WOVEN GEOTEXTILE, CUSHION MATERIAL AND WARNING LAYER MATERIAL OVER THE GEOMEMBRANE AT BASE AND 4 FEET ON SIDE SLOPES (SEE SECTION A, SHEET C031), FOLLOWING ENGINEER APPROVAL AND PASSING QUALITY CONTROL RESULTS IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS.
6. CONTRACTOR SHALL PLACE AN 18-INCH LAYER OF ~~4 TO 12 INCH DIAMETER RIPRAP~~ WARNING LAYER MATERIAL BETWEEN WEIR AND WING WALL STRUCTURE ALONG THE NORTH TOE OF SLOPE AND AT TOE OF CONCRETE APRON AS DIRECTED BY ENGINEER. REFER TO DETAILS ON SHEET C032.
7. CONTRACTOR SHALL PROVIDE SURVEY DOCUMENTATION OF THE ITEMS LISTED IN THE TECHNICAL SPECIFICATIONS.
8. CONTRACTOR SHALL PERFORM A LEAK LOCATION SURVEY IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS.
9. RESTORE AREAS DISTURBED BY EQUIPMENT AND MATERIAL LAYDOWN.

HORIZONTAL DATUM:
ILLINOIS STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD83 FEET.

VERTICAL DATUM:
PLANT DATUM

N

0 25 50 100
SCALE IN FEET

SOURCE NOTES:
1. TOPOGRAPHIC SURVEY BY AERO-METRIC, INC. DATED 6-19-2008, PROJECT NO. 1080611, PROVIDED BY MIDWEST GENERATION.
2. ASH SURGE BASIN FEATURES TAKEN FROM MIDWEST GENERATION DRAWING TITLED WASTE WATER TREATMENT FACILITY, DETAIL PLAN, ASH SURGE BASIN, NO. 3B-0-2071, DATED 5-12-78.
3. FINAL SURFACE CONTOURS AND FEATURE LOCATIONS FROM SURVEY BY RIDGELINE CONSULTANTS, PROJECT NUMBER 2013-0340, DATED OCTOBER 8, 2013, PROVIDED BY TERRA CONTRACTING SERVICES.

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3.	ISSUED FOR RECORD DOCUMENTATION	07/18/14	EJT
2.	ISSUED FOR CONSTRUCTION	06/18/13	HMS
1.	ISSUED FOR BID	03/28/13	EJT
0.	ISSUED FOR PERMIT	01/15/13	HMS
REVISION:		DATE:	APP'D BY:

NATURAL RESOURCE TECHNOLOGY

PROJECT NO. 2113.2/POWER/CON
DRAWN BY: RLH 01/15/13
CHECKED BY: HMS 01/15/13
APPROVED BY: HMS 01/16/13

WARNING LAYER PLAN

ASH SURGE BASIN LINER REPLACEMENT
POWERTON GENERATING STATION
MIDWEST GENERATION
PEKIN, ILLINOIS

DRAWING NO: D21132C030-03
REFERENCE: .
SHEET NO. C030

Jul 18, 2014 12:25pm PLOTTED BY: ddudzi SAVED BY: ddudzi
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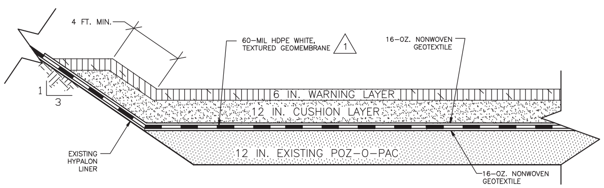
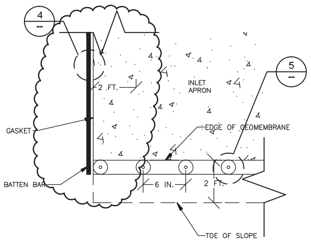
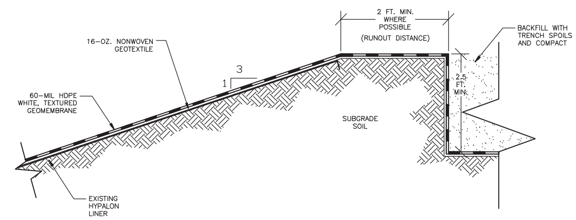


NOTE: COMPLETED DURING CONSTRUCTION
1. GEOMEMBRANE SEAMS SHALL BE PLACED 5 FT. FROM TOE OF SLOPE AT A MINIMUM.

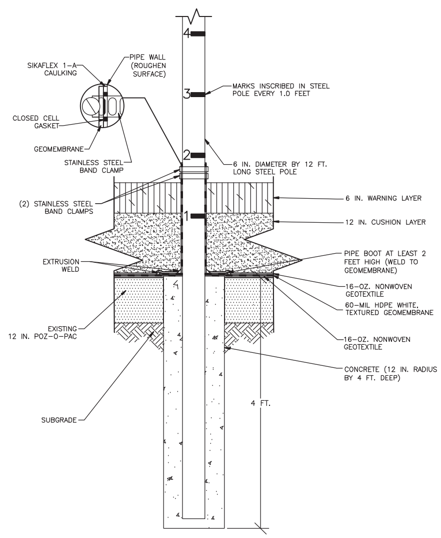
A SLOPE TRANSITION SECTION
C030 NOT TO SCALE



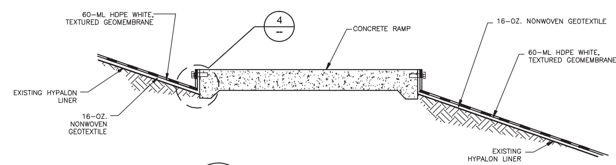
2 INLET APRON DETAIL PLAN
C030 NOT TO SCALE



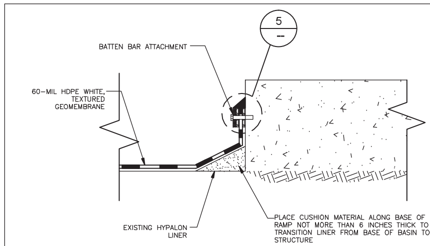
3 ANCHOR TRENCH DETAIL
C030 NOT TO SCALE



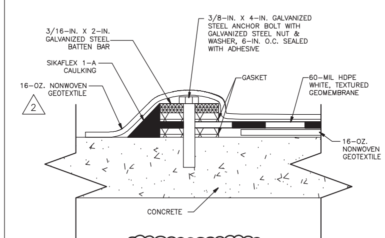
1 MARKER POST DETAIL
C020 C030 NOT TO SCALE



B CONCRETE RAMP SECTION
C030 NOT TO SCALE



4 VERTICAL CONNECTION DETAIL
-- NOT TO SCALE



NOTES: COMPLETED DURING CONSTRUCTION
1. ANCHOR BOLTS 6 IN. ON CENTER.
2. 16-OZ. NONWOVEN GEOTEXTILE TO BE USED TO PROTECT GEOMEMBRANE BELOW CUSHION LAYER OR RIPRAP LAYER.

5 BATTEN BAR ATTACHMENT
-- NOT TO SCALE

REVISION		DATE:	APP'D BY:
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3.	ISSUED FOR RECORD DOCUMENTATION	07/17/14	EJT
2.	ISSUED FOR CONSTRUCTION	06/25/13	HMS
1.	ISSUED FOR BID	03/28/13	EJT
0.	ISSUED FOR PERMIT	01/15/13	HMS

NATURAL RESOURCE TECHNOLOGY

PROJECT NO. 2113.2/POWER/CON
DRAWN BY: RLH 01/14/13
CHECKED BY: HMS 01/14/13
APPROVED BY: HMS 01/15/13

DETAILS AND SECTIONS

ASH SURGE BASIN LINER REPLACEMENT
POWERTON GENERATING STATION
MIDWEST GENERATION
PEKIN, ILLINOIS

DRAWING NO: D21132C031-03
REFERENCE: .
SHEET NO. C031

Jul 17, 2014 1:13pm PLOTTED BY: ddudo SAVED BY: ddudo
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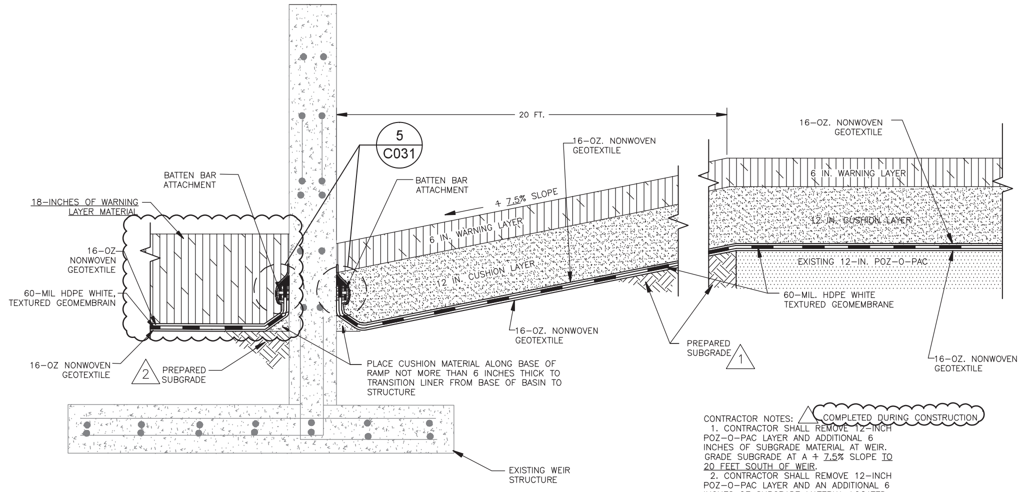
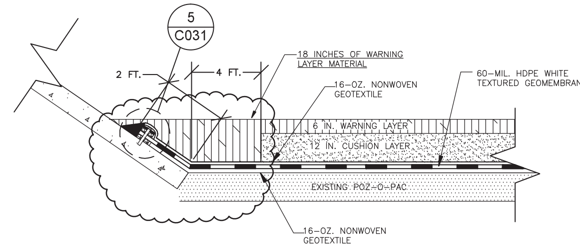


CONTRACTOR NOTES: COMPLETED DURING CONSTRUCTION

1. CONTRACTOR SHALL REMOVE 12-INCH POZ-O-PAC LAYER AND ADDITIONAL 6 INCHES OF SUBGRADE MATERIAL AT WEIR. GRADE SUBGRADE AT A ± 7.5% SLOPE TO 20 FEET SOUTH OF WEIR.

2. CONTRACTOR SHALL REMOVE 12-INCH POZ-O-PAC LAYER AND AN ADDITIONAL 6 INCHES OF SUBGRADE MATERIAL LOCATED BETWEEN THE WEIR AND THE WING WALL STRUCTURE ALONG THE NORTH TOE OF SLOPE. INSTALL GEOMEMBRANE AND BACKFILL WITH ~~RIPRAP~~ WARNING LAYER MATERIAL.

C
C030
CONCRETE WEIR SECTION
NOT TO SCALE



D
C030
INLET APRON SECTION
NOT TO SCALE

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3.	ISSUED FOR RECORD DOCUMENTATION	07/17/14	EJT
2.	ISSUED FOR CONSTRUCTION	06/25/13	HMS
1.	ISSUED FOR BID	03/28/13	EJT
0.	ISSUED FOR PERMIT	01/15/13	HMS
REVISION:		DATE:	APP'D BY:

NATURAL RESOURCE TECHNOLOGY

PROJECT NO. 2113.2/POWER/CON
DRAWN BY: RLH 01/14/13
CHECKED BY: HMS 01/14/13
APPROVED BY: HMS 01/15/13

DETAILS AND SECTIONS
ASH SURGE BASIN LINER REPLACEMENT
POWERTON GENERATING STATION
MIDWEST GENERATION
PEKIN, ILLINOIS

DRAWING NO: D21132C032-04
REFERENCE: .
SHEET NO. C032

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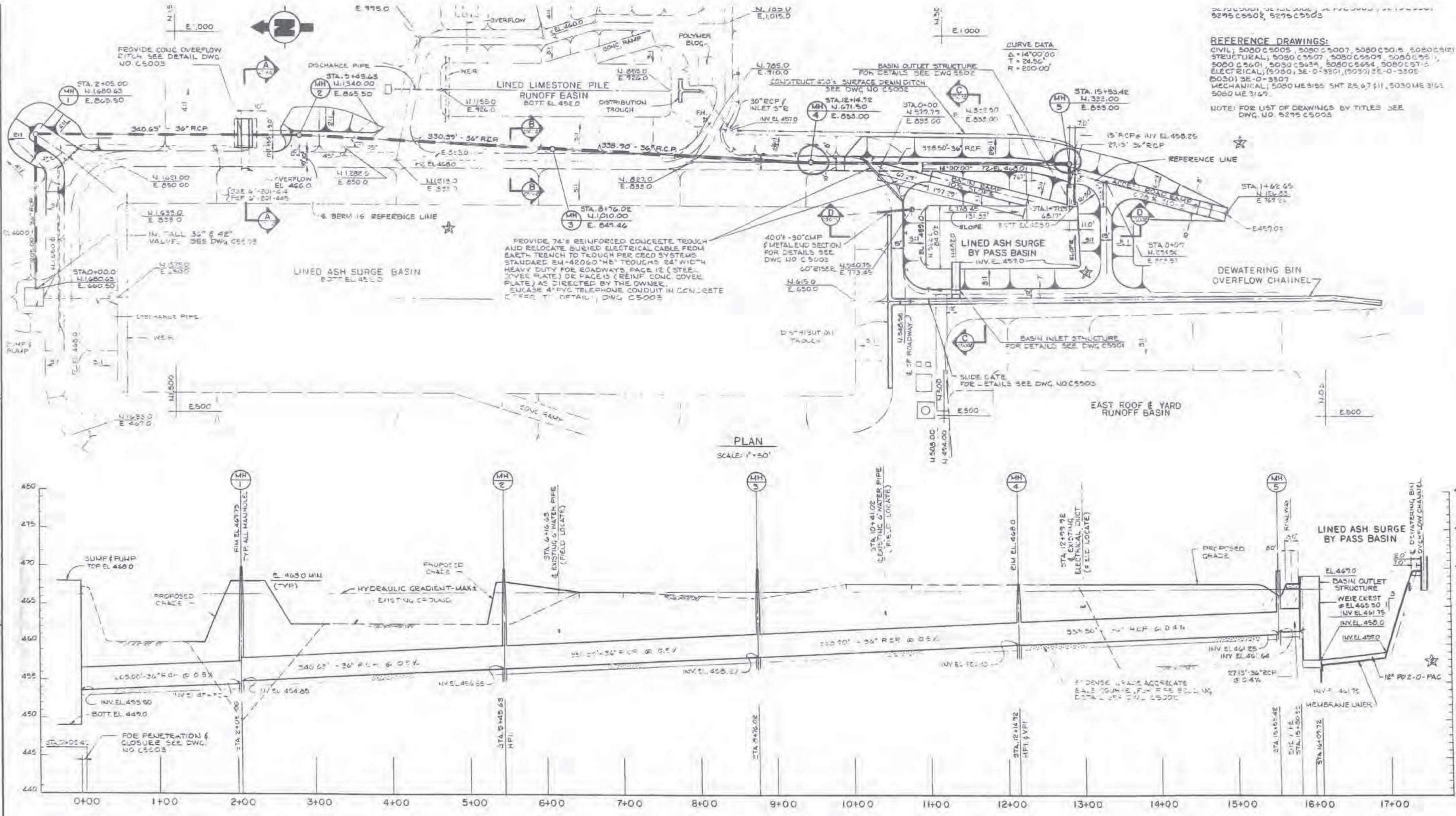
XREFS:

Attachment 1-3 – ABB NUS Construction Drawings



REFERENCE DRAWINGS:
CIVIL; 5080C5005, 5080C5007, 5080C5015, 5080C5121
STRUCTURAL; 5080C5507, 5080C5509, 5080C551[illegible], 5080C5601, 5080C5635, 5080C5654, 5080C57[illegible]
ELECTRICAL; (5080) 3E-0-3301, (5080) 3E-0-3305, (5080) 3E-0-3307
MECHANICAL; 5080ME3155 SHT 2,5,6,7 & 11, 5080ME3165, 5080ME3169

NOTE: FOR LIST OF DRAWINGS BY TITLES SEE DWG. NO. 5295C5008

2 (a) REMOVED 9" SELECT FILL AND 9" GRAVEL BLANKET (TOTAL 1'-6" FROM BOTTOM BY-PASS BASIN. REPLACED WITH 12" POZ-O-PAC
(b) ADDED ELEV., SLOPE AND REFERENCE LINE NOTATIONS TO PLAN.

DRFTSMN / CHKR / COG ENGR / DISCIP MGR / PROJ MGR

SPECIFICATION:

3. MANHOLES
MANHOLES SHALL BE THE SIZE AND AT THE LOCATIONS AND GRADES SHOWN ON THE CONTRACT DRAWINGS. MATERIAL FOR THE WALL SHALL BE EITHER CAST IN-PLACE REINFORCED CONCRETE OR PRECAST REINFORCED CONCRETE SECTIONS. PRECAST MANHOLES SHALL BE MANUFACTURED TO THE REQUIREMENTS OF ANSI/ASTM C478-78 A STANDARD SPECIFICATION FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS. JOINTS ARE TO BE SEALED WITH O-RING GASKETS. MANHOLES SHALL BE CONSTRUCTED FOR 15 FOOT HYDROSTATIC HEAD. THE COMPLETED CHANNEL THROUGH THE MANHOLE SHALL BE U-SHAPED TO A HEIGHT THREE FOURTHS THE DIAMETER. CAST FRAME (390 LBS) AND COVER (115 LBS) SHALL BE GRAY IRON ILLINOIS DOT STANDARD 1213-4 TYPE 1 (NEENAH CAT NO. R-1015, REF R-1712) OR EQUAL. CONTRACTOR TO SUBMIT VENDOR DRAWINGS FOR APPROVAL.

4. [illegible] SEE DWG NO [illegible]

MANHOLE SCHEDULE

MH NO.	BY PASS STATION	EL. TOP CONE	EL. 36" IN PIPE INV. IN	EL. 36" IN PIPE INV. OUT	MH DEPTH (MIN.)	NOTES
—	0+00	—	455.40	—	—	EXIST PUMP SUMP
1	2+05	469.0	454.85	454.55	14.45'	HPI ∠ = 90°
2	5+45.63	469.0	456.57	456.53	12.47'	HPI ∠ = 02°27'
3	8+76.02	469.0	458.22	458.18	10.82'	STRAIGHT RUN
4	12+14.92	467.25	459.92	459.88	7.37'	HPI ∠ = 2°27' USE GRADE RINGS RD
5	15+53.42	469.0	461.64	461.25	7.75'	HPI ∠ = 90°
—	15+80.55	—	—	461.75	—	OUTLET STRUCTURE

NOTE: MAX HYDRAULIC GRADIENT EL 467.85±

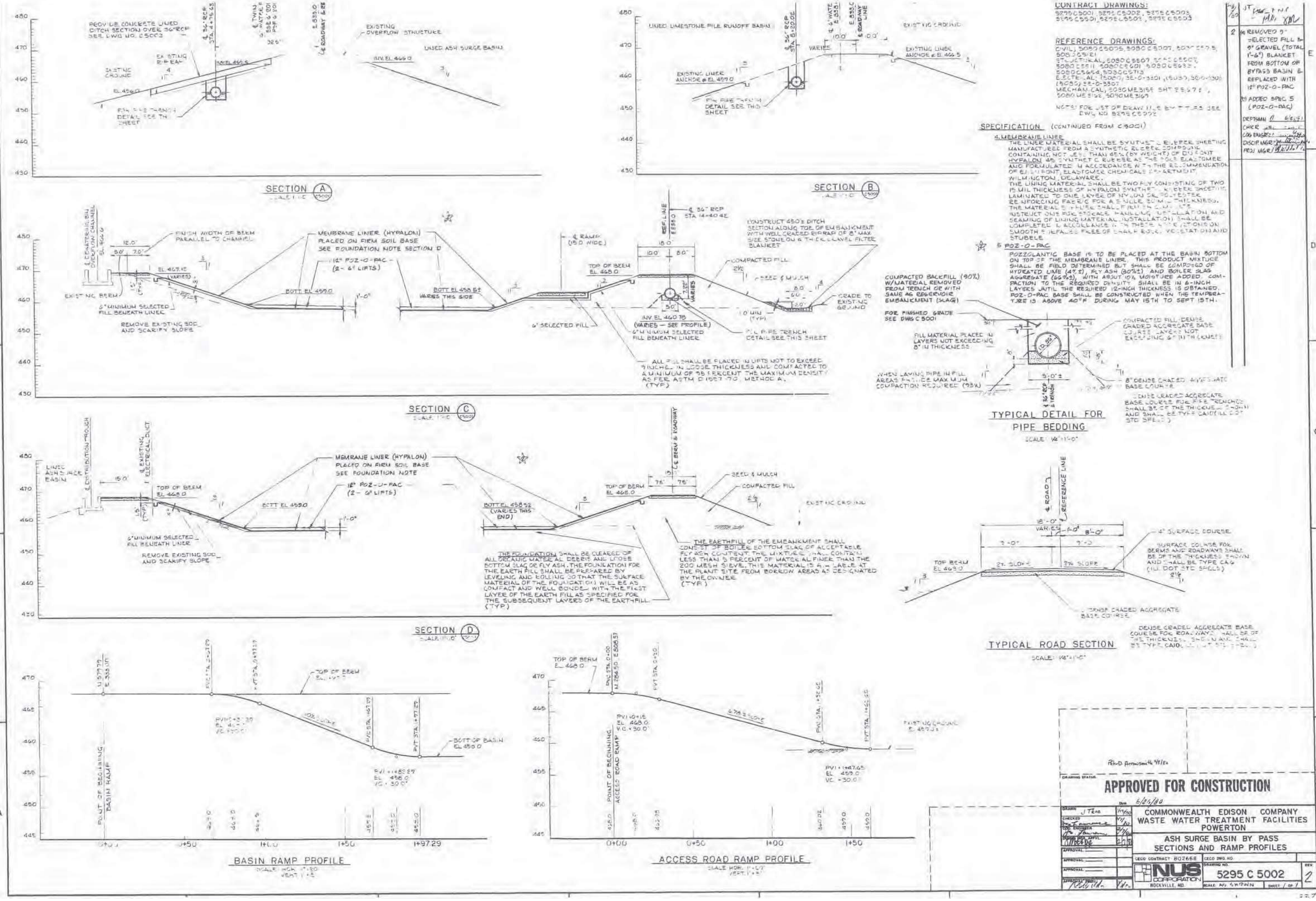
DRAWING STATUS
APPROVED FOR CONSTRUCTION
Date 6/26/80

COMMONWEALTH EDISON COMPANY
WASTE WATER TREATMENT FACILITIES
POWERTON

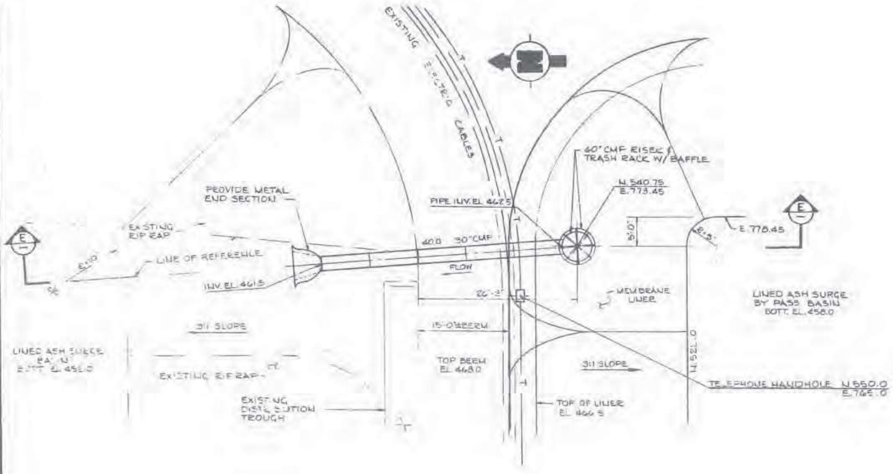
ASH SURGE BASIN BY PASS
PLAN AND PROFILE

DRAWN / CHECKED / COG. ENGINEER / APPROVAL / APPROVAL PROJ.

CECO CONTRACT: 802668
CECO DWG. NO.
NUS CORPORATION, ROCKVILLE, MD.
DRAWING NO. 5295 C 5001
REV. 2
SCALE: AS SHOWN
SHEET 1 OF 1

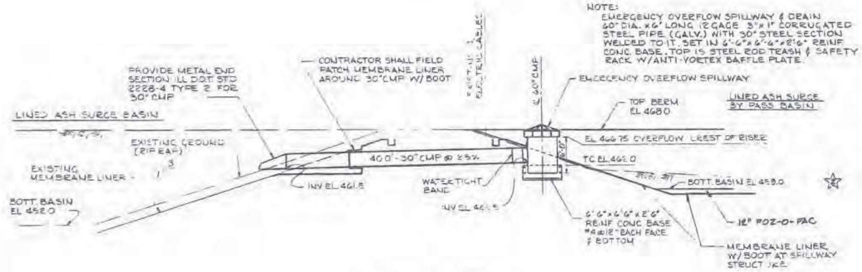


SECTION A
SECTION B
SECTION C
SECTION D
BASIN RAMP PROFILE
ACCESS ROAD RAMP PROFILE
TYPICAL DETAIL FOR PIPE BEDDING
TYPICAL ROAD SECTION
PROVIDE CONCRETE LINED DITCH SECTION OVER 36" RCP SEE DWG NO. C5003
EXISTING OVERFLOW STRUCTURE
LINED ASH SURGE BASIN
LINED LIMESTONE PILE RUNOFF BASIN
EXISTING GROUND
MEMBRANE LINER (HYPALON) PLACED ON FIRM SOIL BASE SEE FOUNDATION NOTE SECTION D
12" POZ-O-PAC (2 - 6" LIPTS)
6" MINIMUM SELECTED FILL BENEATH LINER
REMOVE EXISTING SOD AND SCARIFY SLOPE
COMPACTED FILL
SEED & MULCH
TOP OF BERM EL 468.0
BOTT EL 459.0
CONTRACT DRAWINGS:
REFERENCE DRAWINGS:
SPECIFICATION (CONTINUED FROM C5001)
4. MEMBRANE LINER
THE LINER MATERIAL SHALL BE SYNTHETIC RUBBER SHEETING MANUFACTURED FROM A SYNTHETIC RUBBER COMPOUND CONTAINING NOT LESS THAN 45% (BY WEIGHT) OF DU PONT HYPALON 45 SYNTHETIC RUBBER AS THE SOLE ELASTOMER AND FORMULATED IN ACCORDANCE WITH THE RECOMMENDATION OF DU PONT, ELASTOMER CHEMICALS DEPARTMENT, WILMINGTON, DELAWARE.
5 POZ-O-PAC
POZZOLANTIC BASE IS TO BE PLACED AT THE BASIN BOTTOM ON TOP OF THE MEMBRANE LINER. THIS PRODUCT MIXTURE SHALL BE FIELD DETERMINED BUT SHALL BE COMPOSED OF HYDRATED LIME (4%±), FLY ASH (30%±) AND BOILER SLAG AGGREGATE (66%±), WITH ABOUT 10% MOISTURE ADDED. COMPACTION TO THE REQUIRED DENSITY SHALL BE IN 6-INCH LAYERS UNTIL THE REQUIRED 12-INCH THICKNESS IS OBTAINED. POZ-O-PAC BASE SHALL BE CONSTRUCTED WHEN THE TEMPERATURE IS ABOVE 40°F DURING MAY 15TH TO SEPT 15TH.
APPROVED FOR CONSTRUCTION
6/26/80
COMMONWEALTH EDISON COMPANY
WASTE WATER TREATMENT FACILITIES
POWERTON
ASH SURGE BASIN BY PASS
SECTIONS AND RAMP PROFILES
CECO CONTRACT 802668
NUS CORPORATION
ROCKVILLE, MD.
DRAWING NO. 5295 C 5002
REV. 2
SCALE AS SHOWN
SHEET 1 OF 1



PLAN

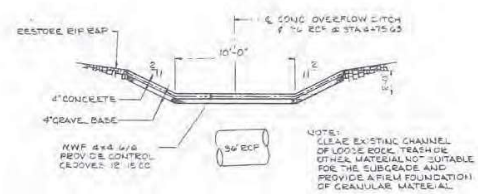
NOTE:
EMERGENCY OVERFLOW SPILLWAY & DRAIN 60" DIA. x 6' LONG 12 GAGE 3"x1" CORRUGATED STEEL PIPE (GALV.) WITH 30" STEEL SECTION WELDED TO IT, SET IN 6'-6"x6'-6"x2'-6" REINF. CONC. BASE. TOP IS STEEL ROD TRASH & SAFETY RACK W/ANTI-VORTEX BAFFLE PLATE.



SECTION (E)

EMERGENCY OVERFLOW SPILLWAY

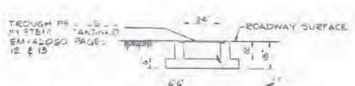
SCALE: 1/8"=1'-0"



NOTE:
CLEAR EXISTING CHANNEL OF LOOSE ROCK, TRASH OR OTHER MATERIAL NOT SUITABLE FOR THE SUBGRADE AND PROVIDE A FIRM FOUNDATION OF GRANULAR MATERIAL.

TYPICAL DETAIL
CONCRETE OVERFLOW DITCH

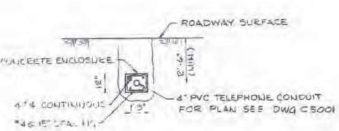
SCALE: 1/4"=1'-0"



AT ROADWAY FIELD TRANSFER BURIED CABLE FROM FAB. TRENCH TO CONCRETE TROUGH MAINTAIN DESIGNATED GROUPING OF POWER AND OPERATING CABLE.
FOR PLAN SEE DWG C5001

DETAIL
ELECTRICAL CABLE TROUGH

SCALE: 3/4"=1'-0"



DETAIL
CONCRETE ENCLOSURE FOR TELEPHONE CONDUIT

SCALE: 3/8"=1'-0"

CONTRACT DRAWINGS		
DRAWING NO.	REV.	DRAWING TITLES
5295C5001	1	PLAN & PROFILE
5295C5002	1	DETAILS & SECTIONS
5295C5003	1	MISCELLANEOUS DETAILS
5295C5501	1	INLET STRUCTURE
5295C5502	1	OUTLET STRUCTURE
5295C5503	1	MISCELLANEOUS GATES
REFERENCE DRAWINGS		
5080C5005	2	DETAIL PLAN - EAST ROOF & YARD RUNOFF BASIN
5080C5007	2	DETAIL PLAN ASH SURGE BASIN
5080C5015	2	MISCELLANEOUS SECTIONS AND DETAILS, SHTS 1 & 2
5080C5121	1	BASIN END SECTION
5080C5507	1	RAMPS & ASH SURGE BASIN OVERFLOW STRUCTURE
5080C5509	1	ASH SURGE BASIN & LIMESTONE BASIN DISTRIBUTION TROUGH SECTION & DETAILS
5080C5511	2	DEWATERING BIN OVERFLOW CHANNEL SECTIONS & DETAILS
5080C5601	2	STANDARD DETAILS
5080C5658	2	ASH SURGE BASIN SUMP - CLARIFIER OVERFLOW SUMP
5080C5654	1	PIPE SUPPORTS FRAMING PLAN & SECTIONS COL NO 7473 (3)
5080C5713	1	ASH SURGE BASIN SUMP PLAT FORM SECTIONS & DETAILS
(5050) 3E-0-3301	2	ELECTRICAL AREA LAYOUT EAST RUNOFF BASIN - NORTH
(5080) 3E-0-3305	3	ELECTRICAL AREA LAYOUT LIMESTONE PILE RUNOFF BASIN
(5080) 3E-0-3307	2	ELECTRICAL AREA LAYOUT ASH SURGE BASIN AREA
5080 ME 3155 SHT 2	4	PIPING ARRANGEMENT YARD AREA
SHT 5	3	
SHT 6	3	
SHT 7	3	
SHT 11	3	
5080ME3162 SHT 1	3	PIPING ARRANGEMENT YARD DETAIL EAST ROOF & YARD RUNOFF BASIN
5080ME3163 SHT 1	1	PIPING ARRANGEMENT YARD DETAIL LIMESTONE PILE RUNOFF BASIN AND ASH SURGE BASIN SUMPS

NOTE:
FOR ELECTRICAL CABLE TROUGH SEE CECO SYSTEMS STANDARD EM-42060 "HB" TROUGHS 24" WIDTH HEAVY DUTY FOR ROADWAYS PAGE 12 (STEEL COVER PLATE) OR PAGE 13 (REINFORCED CONCRETE COVER PLATE).

2 (a) REMOVED COMBINED SELECT AND GRAVEL BLANKET FROM BOTTOM OF BASIN AND ADDED 12" POZ-O-PAC, SEC. E
(b) CHANGED BOTTOM EL. 458.0 TO 459.0.
DRFTSMN
CHKR
COG ENGR
DSCIP MGR
PROJ MGR

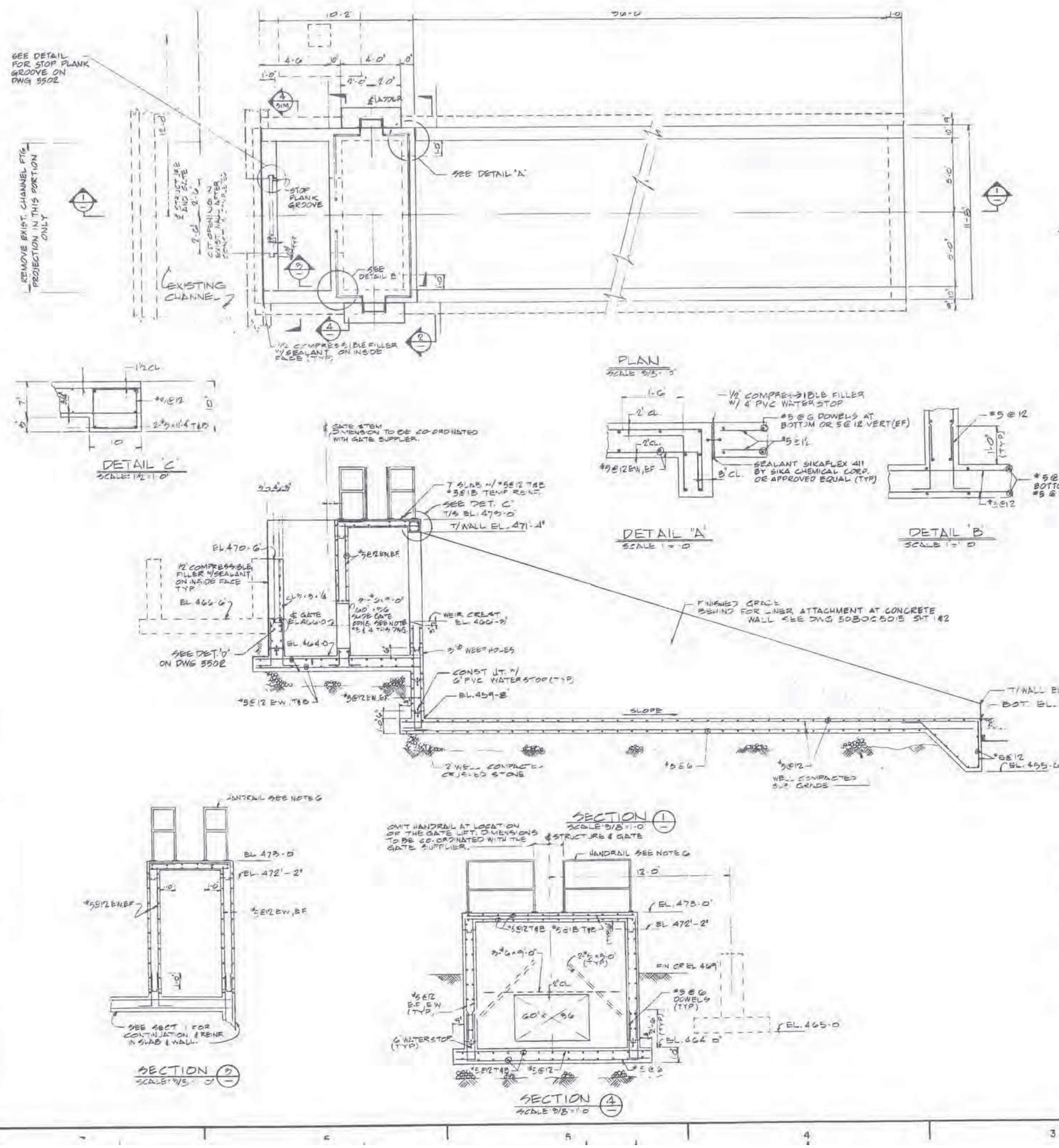
DRAWING STATUS
APPROVED FOR CONSTRUCTION
DATE 6/26/80

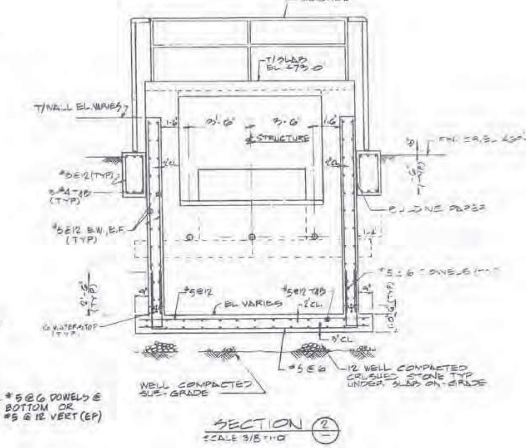
DRAWN
CHECKED
COG. ENGINEER
APPROVAL
APPROVAL
APPROVAL
APPROVAL PROJ.

COMMONWEALTH EDISON COMPANY
WASTE WATER TREATMENT FACILITIES
POWERTON

ASH SURGE BASIN BY PASS
MISCELLANEOUS DETAILS

CECO CONTRACT: 802668
CECO DWG. NO.
NUS CORPORATION
ROCKVILLE, MD.
DRAWING NO. 5295 C 5003
REV. 2
SCALE: AS SHOWN
SHEET 1 OF 1





NOTES:

1. CONCRETE: f'c = 3000 PSI AT 28 DAYS
2. REINFORCING = ASTM A 615, GRADE 60
3. CONTRACTOR SHALL FURNISH AND INSTALL FAB STEEL GATE AND ACCESSORIES AS MANUFACTURED BY ARMCO STEEL CORP. CONFORMING TO THE FOLLOWING SPEC'S OR APPROVED EQUAL.
   a. GATE MODEL 10-00
      QUANTITY REQUIRED = 1
      OPENING SIZE = 60"×56"
      FRAME TYPE = FLAT BACK, STD. BOTTOM
      MATERIAL COMBINATION = #2
      STEM DIA. = 1½" Φ
   b. ACCESSORIES
      TYPE OF LIFT = CPE 2
      LIFT SUPPORT = WALL BRACKET TO MATCH CPE 2
      STEM SUPPORT = ADJUSTABLE STEM GUIDES AT SPACING RECOMMENDED BY MANUFACTURER
4. CONTRACTOR SHALL COORDINATE WITH THE GATE SUPPLIER FOR THE NUMBER, SIZE AND LOCATION OF ANCHOR BOLTS REQUIRED TO ATTACH THE GATE, WALL BRACKET AND STEM GUIDES TO THE SUPPORTING WALL.
5. WORK THIS DWG. WITH CIVIL DWGS. 5295 C 5001 AND 5002.
6. FOR HANDRAIL & LADDER DETAILS SEE REF DWG. 5080 C 5601
7. FOR STOP PLANKS SEE DWG 5295 C 5502 NOTE 4

CONTRACT DRAWINGS:

5295 C 5001, 5002, 5003, 5501, 5502, 5503.

REFERENCE DRAWINGS:

CIVIL: 5080 C 5005, 5007, 5015, 5121

STRUCTURAL: 5080 C 5507, 5509, 5511, 5601, 5638, 5654, 5713

ELECTRICAL: (5080) 3E-0-3301, 3305, 3307

MECHANICAL: 5080 ME 3155 SHT 2,5,6,7 & 11, 3162, 3169

NOTE: FOR LIST OF DRAWINGS BY TITLES SEE DWG NO. 5295 C 5003

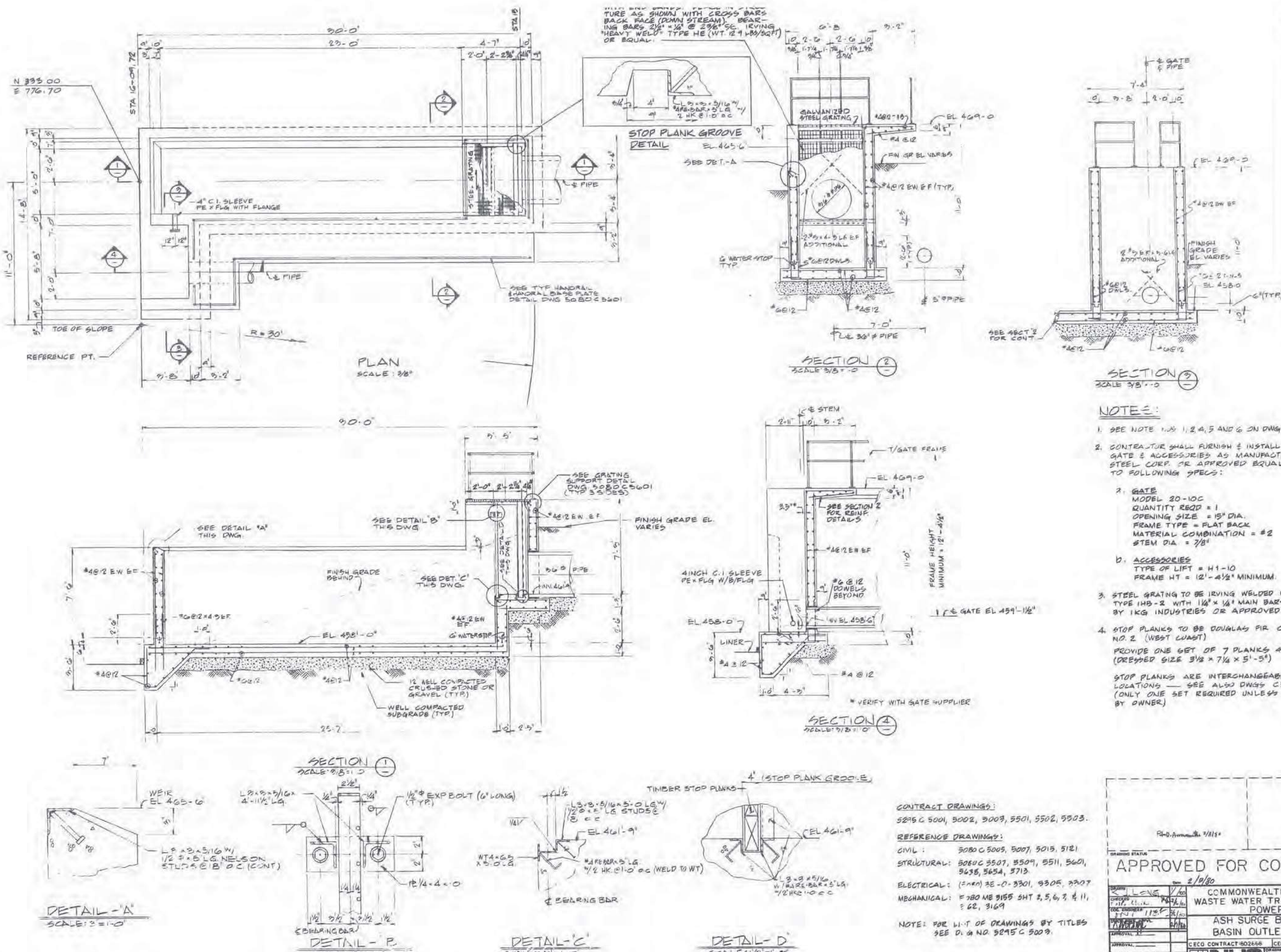
DRAWING STATUS

APPROVED FOR CONSTRUCTION

DATE 2/8/80

DRAWN: KENNETH LONG	COMMONWEALTH EDISON COMPANY WASTE WATER TREATMENT FACILITIES POWERTON
CHECKED	ASH SURGE BASIN BY PASS BASIN INLET STRUCTURE
COG. ENGINEER	802668
APPROVAL	NUS CORPORATION, ROCKVILLE, MD.
APPROVAL, PROJ.	DRAWING NO. 5295 C 5501 — REV. 1
APPROVAL, CLIENT	SCALE: AS SHOWN — SHEET 1 OF 1

33-11



NOTES:

1. SEE NOTE NOS 1, 2, 4, 5 AND 6 ON DWG 5501.
2. CONTRACTOR SHALL FURNISH & INSTALL MEDIUM DUTY SLUICE GATE & ACCESSORIES AS MANUFACTURED BY ARMCO STEEL CORP. OR APPROVED EQUAL, CONFORMING TO FOLLOWING SPECS:
   a. GATE
      MODEL 20-10C
      QUANTITY REQD = 1
      OPENING SIZE = 15" DIA.
      FRAME TYPE = FLAT BACK
      MATERIAL COMBINATION = #2
      STEM DIA = 7/8"
   b. ACCESSORIES
      TYPE OF LIFT = H1-10
      FRAME HT = 12'-4½" MINIMUM.
3. STEEL GRATING TO BE IRVING WELDED RECTANGULAR DESIGN TYPE IHB-2 WITH 1¼" × ¼" MAIN BARS, AS MANUFACTURED BY IKG INDUSTRIES OR APPROVED EQUAL (GALVANIZED)
4. STOP PLANKS TO BE DOUGLAS FIR COMMERCIAL GRADE NO. 2 (WEST COAST)

   PROVIDE ONE SET OF 7 PLANKS 4" × 8" × 5'-5" LONG (DRESSED SIZE 3½ × 7¼ × 5'-5")

   STOP PLANKS ARE INTERCHANGEABLE AT THREE LOCATIONS — SEE ALSO DWGS C5501 & C5503 (ONLY ONE SET REQUIRED UNLESS DIRECTED OTHERWISE BY OWNER)

CONTRACT DRAWINGS:

5295 C 5001, 5002, 5003, 5501, 5502, 5503.

REFERENCE DRAWINGS:

CIVIL: 5080 C 5005, 5007, 5015, 5121

STRUCTURAL: 5060C 3507, 5509, 5511, 5601, 5635, 5654, 5713

ELECTRICAL: (2080) 3E-0-3301, 3305, 3307

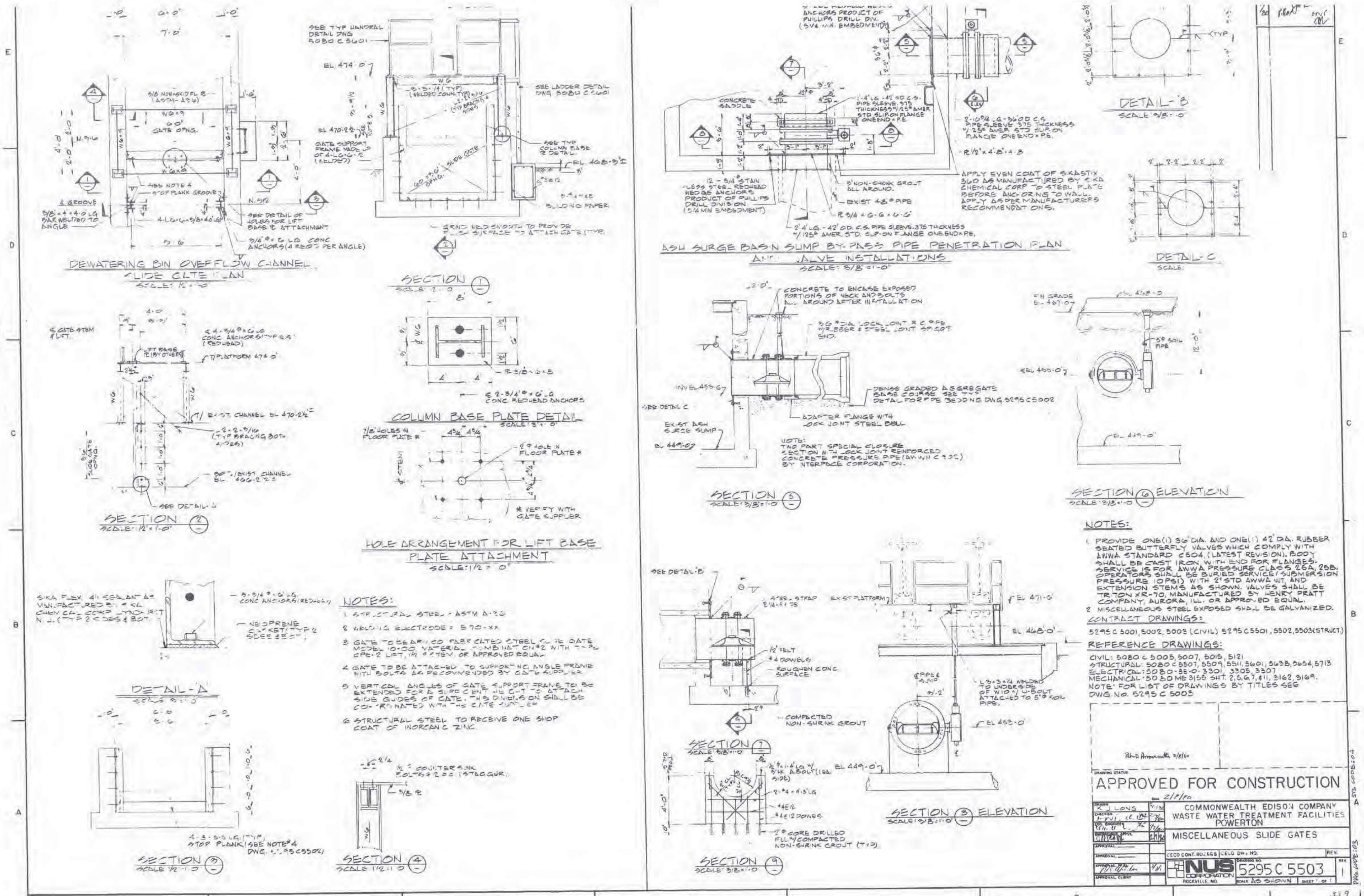
MECHANICAL: 5780 ME 3155 SHT 2, 5, 6, 7, & 11, & 62, 3169

NOTE: FOR LIST OF DRAWINGS BY TITLES SEE DWG NO. 5295 C 5003.

DRAWING STATUS
APPROVED FOR CONSTRUCTION
DATE 2/9/80

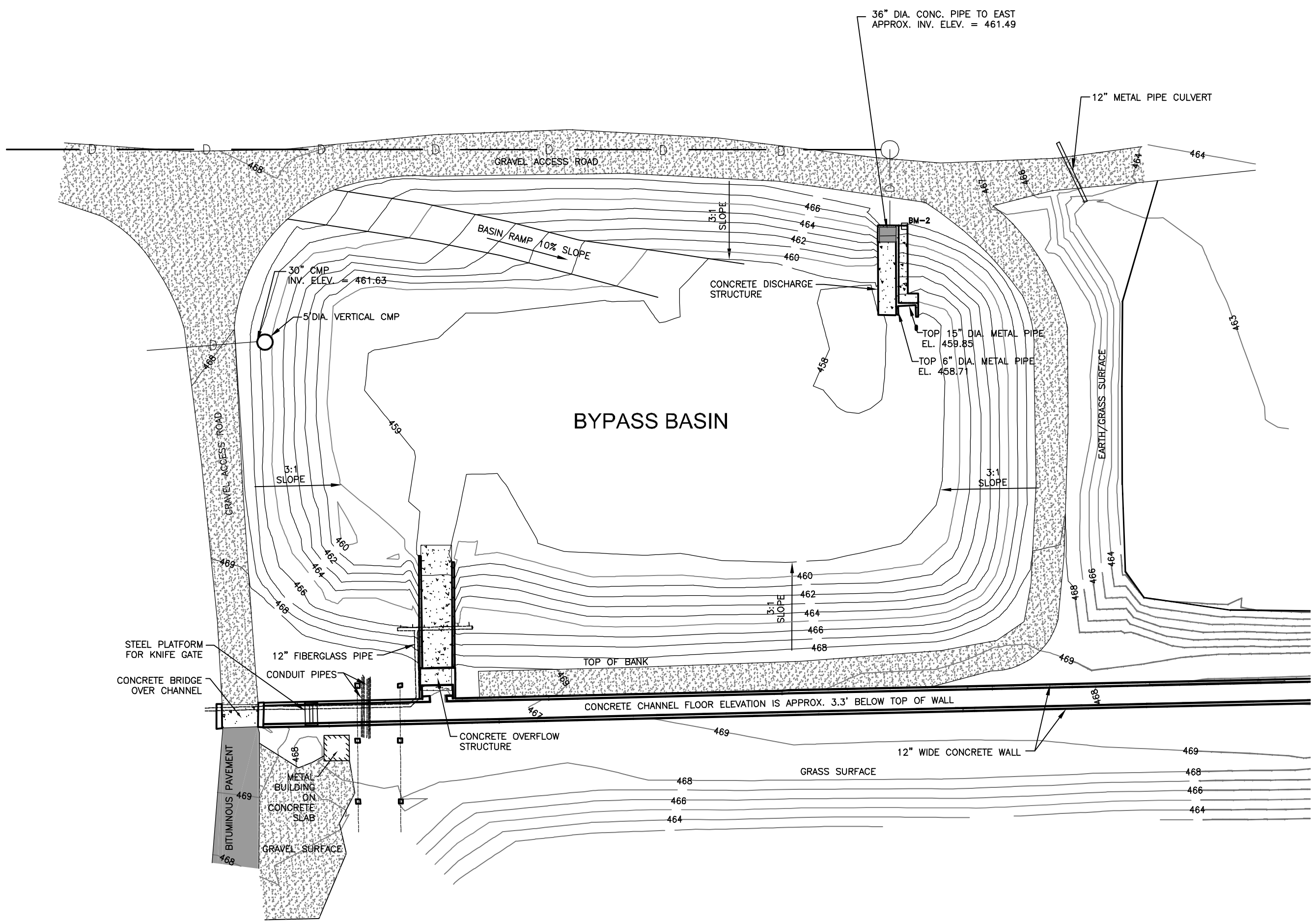
COMMONWEALTH EDISON COMPANY
WASTE WATER TREATMENT FACILITIES
POWERTON
ASH SURGE BASIN BY PASS
BASIN OUTLET STRUCTURE

CECO CONTRACT: 802668 | CECO DWG NO. | REV.
NUS CORPORATION, ROCKVILLE MD
DRAWING NO. 5295 C 5502 | REV. 1
SCALE AS SHOWN | SHEET 1 OF 1



DEWATERING BIN OVERFLOW CHANNEL SLIDE GATE PLAN
SCALE: 1/2"=1'-0"
SECTION 1
SCALE: 1/2"=1'-0"
COLUMN BASE PLATE DETAIL
SCALE: 3"=1'-0"
SECTION 2
SCALE: 1/2"=1'-0"
HOLE ARRANGEMENT FOR LIFT BASE PLATE ATTACHMENT
SCALE: 1 1/2"=1'-0"
DETAIL-A
SECTION 3
SCALE 1/2"=1'-0"
SECTION 4
SCALE 1 1/2"=1'-0"
NOTES:
1 STRUCTURAL STEEL: ASTM A-36
2 WELDING ELECTRODE = E70-XX
3 GATE TO BE ARMCO FABRICATED STEEL SLIDE GATE MODEL 10-00, MATERIAL COMBINATION #2 WITH TYPE CPE-2 LIFT, 1 1/2" STEM, OR APPROVED EQUAL.
4 GATE TO BE ATTACHED TO SUPPORTING ANGLE FRAME WITH BOLTS AS RECOMMENDED BY GATE SUPPLIER.
5 VERTICAL ANGLES OF GATE SUPPORT FRAME TO BE EXTENDED FOR A SUFFICIENT HEIGHT TO ATTACH SIDE GUIDES OF GATE. THIS DIMENSION SHALL BE COORDINATED WITH THE GATE SUPPLIER.
6 STRUCTURAL STEEL TO RECEIVE ONE SHOP COAT OF INORGANIC ZINC.
ASH SURGE BASIN SUMP BY-PASS PIPE PENETRATION PLAN AND VALVE INSTALLATIONS
SCALE: 3/8"=1'-0"
DETAIL-B
SCALE 3/8"=1'-0"
DETAIL-C
SECTION 5
SCALE 3/8"=1'-0"
SECTION 6 ELEVATION
SCALE 3/8"=1'-0"
SECTION 7
SCALE 3/8"=1'-0"
SECTION 8 ELEVATION
SCALE 3/8"=1'-0"
SECTION 9
SCALE 3/8"=1'-0"
NOTES:
1. PROVIDE ONE(1) 36" DIA. AND ONE(1) 42" DIA. RUBBER SEATED BUTTERFLY VALVES WHICH COMPLY WITH AWWA STANDARD C504 (LATEST REVISION). BODY SHALL BE CAST IRON WITH END FOR FLANGES. SERVICE IS FOR AWWA PRESSURE CLASS 25A, 25B. OPERATORS SHALL BE BURIED SERVICE/SUBMERSION PRESSURE (10 PSI) WITH 2" STD AWWA NUT AND EXTENSION STEMS AS SHOWN. VALVES SHALL BE "TRITON XR-70, MANUFACTURED BY HENRY PRATT COMPANY, AURORA, ILL. OR APPROVED EQUAL.
2 MISCELLANEOUS STEEL EXPOSED SHALL BE GALVANIZED.
CONTRACT DRAWINGS:
5295C 5001, 5002, 5003 (CIVIL) 5295C 5501, 5502, 5503 (STRUCT.)
REFERENCE DRAWINGS:
CIVIL: 5080 C 5005, 5007, 5015, 5121
STRUCTURAL: 5080 C 5507, 5509, 5511, 5601, 5638, 5654, 5713
ELECTRICAL: 5080-3E-0-3301, 3305, 3307
MECHANICAL: 5080 ME 3155 SHT. 2, 3, 6, 7, 11, 3162, 3169.
NOTE: FOR LIST OF DRAWINGS BY TITLES SEE DWG. NO. 5295 C 5003
APPROVED FOR CONSTRUCTION
COMMONWEALTH EDISON COMPANY
WASTE WATER TREATMENT FACILITIES
POWERTON
MISCELLANEOUS SLIDE GATES
NUS CORPORATION
ROCKVILLE, MD.
5295C 5503
SCALE AS SHOWN

Attachment 1-4 – ABB NRT Liner Replacement Drawings



LEGEND

D	UNDERGROUND DISCHARGE PIPE
	ABOVEGROUND INTAKE PIPE
460	GROUND SURFACE CONTOUR
BM-2	BENCHMARK 2

HORIZONTAL DATUM:
ILLINOIS STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD83.

VERTICAL DATUM:
LOCAL PLANT DATUM

BENCHMARK 2:
NORTHEAST CORNER OF CONCRETE DISCHARGE STRUCTURE. CHISELED "+" IN CONCRETE ELEVATION 468.75 FT.

SOURCE NOTES:
THIS DRAWING WAS DEVELOPED FROM A SURVEY MAURER STUTZ, INC. DATED SEPTEMBER 7, 2010, DRAWING NO. 23210023.
LOCATION OF BASIN AND ACCESS RAMP TAKEN FROM MIDWEST GENERATION DRAWING NO. 5295 C5001-2, DATED 6-26-1980.

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SCALE IN FEET

REVISION:		DATE:	APP'D BY:
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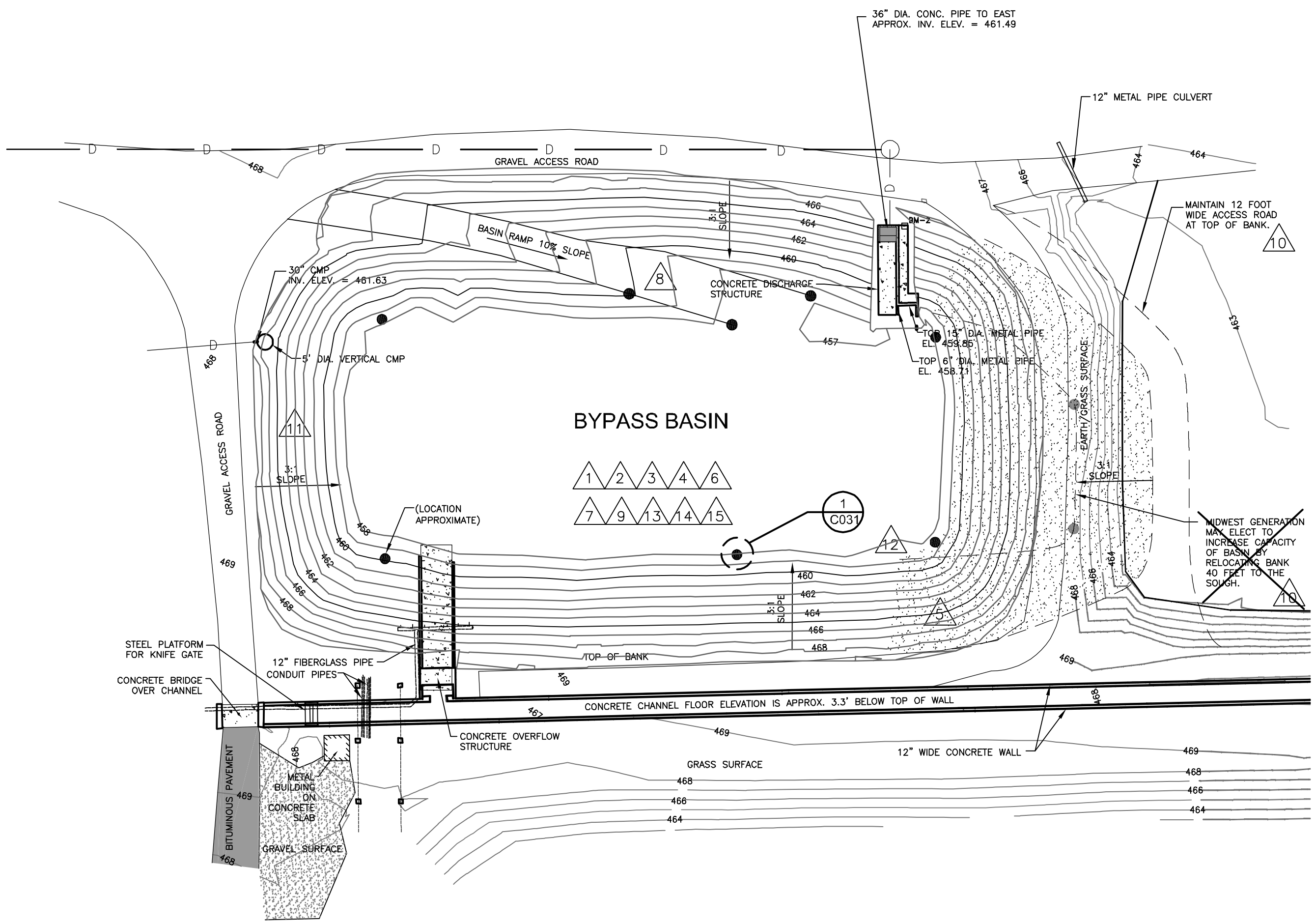
2.	RECORD DOCUMENTATION	06/08/11	HMS
1.	ISSUED FOR BID	10/06/10	HMS
0.	ISSUED FOR PERMIT	06/30/10	HMS

NATURAL RESOURCE TECHNOLOGY

PROJECT NO. 1965.5/5.4	**PRE-CONSTRUCTION CONDITIONS**
DRAWN BY: KNW 06/30/10	BYPASS BASIN LINER REPLACEMENT MIDWEST GENERATION POWERTON POWER STATION PEKIN, ILLINOIS
CHECKED BY: RJG 06/30/10	
APPROVED BY: HMS 06/130/10	DRAWING NO: D1965C010-02 / REFERENCE: - / SHEET NO. C010



LEGEND

— D —	UNDERGROUND DISCHARGE PIPE
	ABOVEGROUND INTAKE PIPE
460	PREPARED SUBGRADE SURFACE CONTOUR
	12 OZ. NON-WOVEN GEOTEXTILE
●	MARKER POST LOCATION
●	ADDITIONAL MARKER POST LOCATION IF BANK IS RELOCATED.
	~~BANK/AREA FOR POSSIBLE RELOCATION~~
BM-2	BENCHMARK 2

CONTRACTOR NOTES: △

1. CONTRACTOR SHALL FIELD VERIFY LOCATION OF UNDERGROUND PIPES WITH ASSISTANCE OF OWNER'S UTILITY LOCATOR.
2. CONTRACTOR SHALL FIELD VERIFY LOCATION OF CONCRETE STRUCTURES AND ABOVE GROUND PIPING.
3. CONTRACTOR SHALL STORE ALL GEOSYNTHETICS AND SUBGRADE MATERIALS IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
4. CONTRACTOR SHALL STORE AND STAGE EQUIPMENT AT LOCATION APPROVED BY OWNER.
5. CLEAR AND GRUB ALL BRUSH ALONG TOP OF SLOPE OF BASIN.
6. PROTECT ALL CONCRETE AND UTILITY STRUCTURES THROUGHOUT PROJECT DURATION.
7. CONTRACTOR SHALL REMOVE ALL VEGETATION, ROCKS, AND OTHER DEBRIS FROM EXISTING LINER AND DISPOSE OF IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
8. CONTRACTOR SHALL CLEAN OFF THE RAMP SURFACE TO THE EXTENT PRACTICAL TO REMOVE ROCKS THAT MAY POSE A HAZARD TO GEOMEMBRANE, AS APPROVED BY GEOMEMBRANE INSTALLER, ENGINEER AND/OR OWNER.
9. CONTRACTOR SHALL REMOVE 12-INCH LAYER OF POZ-O-PAC AND 6-INCHES OF POZ-O-PAC SUBGRADE FROM THE BASE OF BASIN.
10. ~~CONTRACTOR SHALL RELOCATE SOUTHERN BANK 40 FEET TO THE SOUTH, AS DIRECTED BY OWNER. SEGREGATE GRAVEL ACCESS ROAD MATERIAL TO BE REUSED AS BASE COURSE MATERIAL. MATERIAL REMOVED FROM THE EXISTING BANK MAY BE USED TO RECONSTRUCT NEW SOUTHERN BANK IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.~~
11. CONTRACTOR SHALL REMOVE "SOFT" SUBGRADE MATERIAL BENEATH EXISTING HYPALON LINER, AS DIRECTED BY OWNER AND/OR ENGINEER. BACK FILL AREAS WITH FILL IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS. CUT HYPALON AS NEEDED TO REPAIR THE "SOFT" SUBGRADE AREAS.
12. CONTRACTOR SHALL INSTALL MARKER POSTS ALONG THE TOE OF SLOPE AS SHOWN AND IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS AND DETAIL 1 ON SHEET C031.
13. CONTRACTOR SHALL PLACE 16 OZ. NONWOVEN GEOTEXTILE AT BASE OF BASIN AND WHERE HYPALON LINER DOES NOT EXIST OR WAS REMOVED OF THE PREPARED SUBGRADE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
14. SUBGRADE SHALL BE APPROVED BY OWNER AND/OR ENGINEER PRIOR TO INSTALLATION OF GEOMEMBRANE.
15. CONTRACTOR SHALL PROVIDE MEANS TO PROTECT SUBGRADE FROM EROSION, STORM WATER, AND HEAVY EQUIPMENT TRAFFIC. DAMAGE TO SUBGRADE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

HORIZONTAL DATUM:
ILLINOIS STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD83.

VERTICAL DATUM:
LOCAL PLANT DATUM

BENCHMARK 2:
NORTHEAST CORNER OF CONCRETE DISCHARGE STRUCTURE. CHISELED "+" IN CONCRETE ELEVATION 468.75 FT.

SOURCE NOTES:
THIS DRAWING WAS DEVELOPED FROM A SURVEY MAURER STUTZ, INC. DATED SEPTEMBER 7, 2010, DRAWING NO. 23210023.
LOCATION OF BASIN AND ACCESS RAMP TAKEN FROM MIDWEST GENERATION DRAWING NO. 5295 C5001-2, DATED 6-26-1980.
BASIN SUBGRADE AND SITE IMPROVEMENTS FROM A SURVEY PROVIDED BY MILLENNIA PROFESSIONAL SERVICES, MARCH 2011.

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SCALE IN FEET

	REVISION:	DATE:	APP'D BY:
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2.	RECORD DOCUMENTATION	06/08/11	HMS
1.	ISSUED FOR BID	10/06/10	HMS
0.	ISSUED FOR PERMIT	06/30/10	HMS

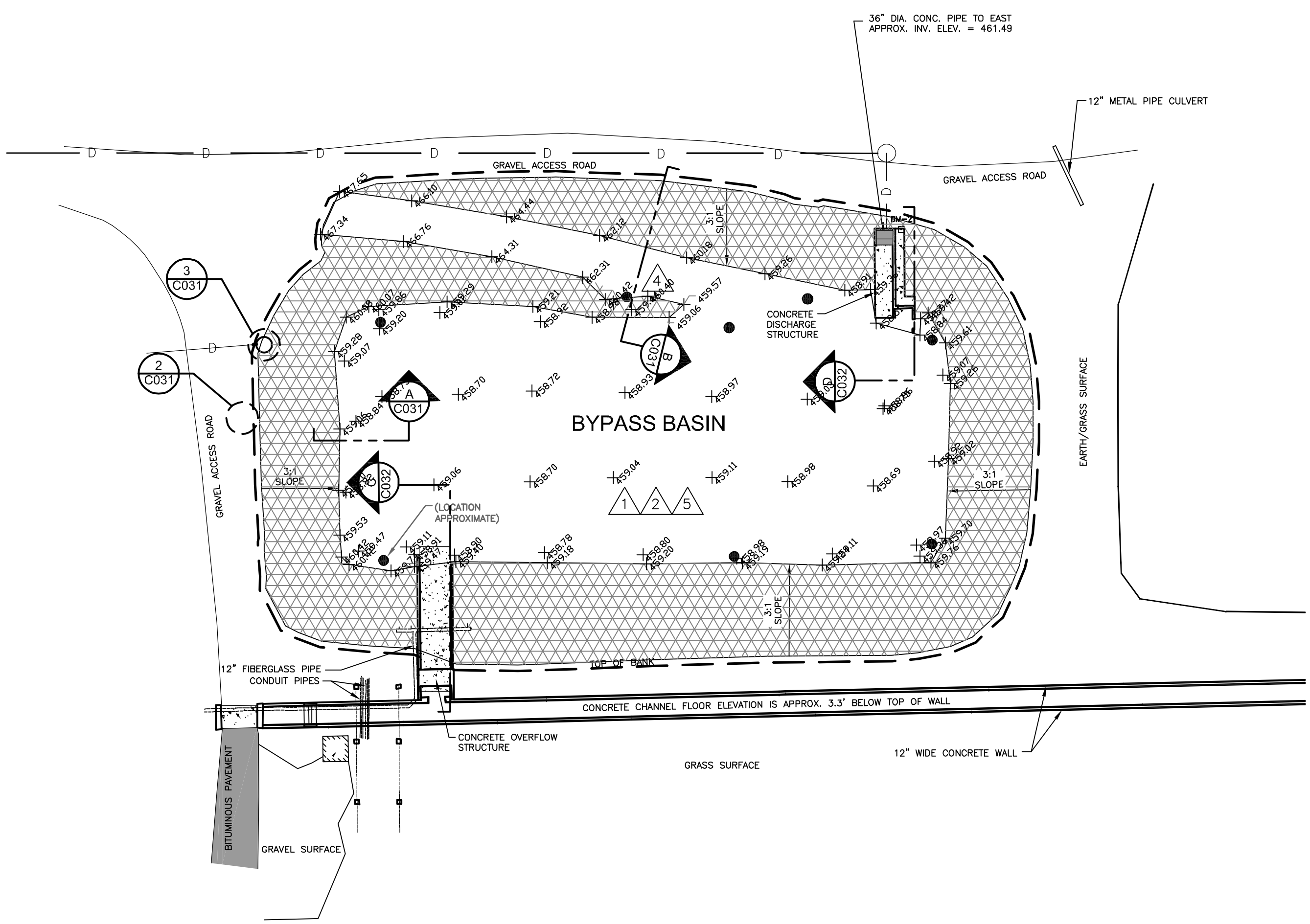
NATURAL RESOURCE TECHNOLOGY

PROJECT NO. 1965/5.4
DRAWN BY: KNW 06/30/10
CHECKED BY: RJG 06/30/10
APPROVED BY: HMS 06/30/10

LINER SUBGRADE PREPARATION

BYPASS BASIN LINER REPLACEMENT
MIDWEST GENERATION
POWERTON POWER STATION
PEKIN, ILLINOIS

DRAWING NO: D1965C020-02
REFERENCE: -
SHEET NO. C020



LEGEND

D	UNDERGROUND DISCHARGE PIPE
	ABOVEGROUND INTAKE PIPE
	ANCHOR TRENCH
× 459.11	TOP OF WARNING LAYER (ELEVATION, FT.)
●	MARKER POST LOCATION
BM-2	BENCHMARK 2
	HDPE GEOMEMBRANE

HORIZONTAL DATUM:
ILLINOIS STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD83.

VERTICAL DATUM:
LOCAL PLANT DATUM

BENCHMARK 2:
NORTHEAST CORNER OF CONCRETE DISCHARGE STRUCTURE. CHISELED "+" IN CONCRETE ELEVATION 468.75 FT.

CONTRACTOR NOTES: △

1. CONTRACTOR SHALL INSTALL 60 MIL HDPE, WHITE, TEXTURED GEOMEMBRANE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION PRIOR TO PLACEMENT OF THE WARNING LAYER. CONTRACTOR SHALL PROVIDE AND FOLLOW AN APPROVED GEOMEMBRANE LAYOUT PLAN.
2. GEOMEMBRANE SHALL BE ANCHORED INTO 2.5 FEET DEEP TRENCHES ALONG TOP OF BASIN BANK, AS SHOWN ON SHEET C031. CONTRACTOR SHALL ADVISE OWNER AND/OR ENGINEER IF PROPOSED LOCATION FOR ANCHOR TRENCH IS NOT POSSIBLE.
3. CONTRACTOR SHALL PLACE 12-OZ. NON-WOVEN GEOTEXTILE, CUSHION MATERIAL AND WARNING LAYER MATERIAL OVER THE GEOMEMBRANE AT BASE AND 4 FEET ON SIDE SLOPES FOLLOWING ENGINEER APPROVAL AND PASSING QUALITY CONTROL RESULTS IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS (SEE SHEET C031).
4. CONTRACTOR SHALL PLACE 2 LAYERS OF 12-OZ. NONWOVEN GEOTEXTILE, CUSHION AND WARNING LAYER MATERIALS OVER THE GEOMEMBRANE ON THE RAMP, AS SHOWN ON SHEET C031.
5. RESTORE AREAS DISTURBED BY EQUIPMENT AND MATERIAL LAYDOWN.
6. CONTRACTOR SHALL PROVIDE SURVEY DOCUMENTATION OF THE ITEMS LISTED IN THE TECHNICAL SPECIFICATIONS.
7. CONTRACTOR SHALL PERFORM A LEAK LOCATION SURVEY IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS.

SOURCE NOTES:
THIS DRAWING WAS DEVELOPED FROM A SURVEY MAURER STUTZ, INC. DATED SEPTEMBER 7, 2010, DRAWING NO. 23210023.
LOCATION OF BASIN AND ACCESS RAMP TAKEN FROM MIDWEST GENERATION DRAWING NO. 5295 C5001-2, DATED 6-26-1980.
BASIN SUBGRADE AND SITE IMPROVEMENTS FROM A SURVEY PROVIDED BY MILLENNIA PROFESSIONAL SERVICE, MARCH 2011.

N

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SCALE IN FEET

REVISION:		DATE:	APP'D BY:
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3.			
2.	RECORD DOCUMENTATION	06/08/11	HMS
1.	ISSUED FOR BID	10/06/10	HMS
0.	ISSUED FOR PERMIT	06/30/10	HMS

NATURAL RESOURCE TECHNOLOGY

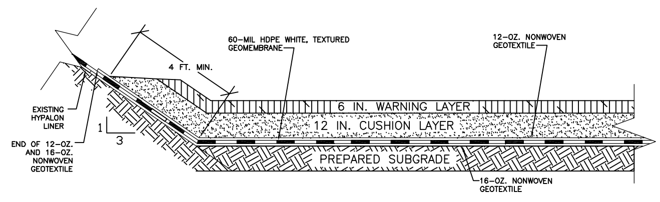
PROJECT NO.	1965.5/5.4
DRAWN BY:	KNW 06/30/10
CHECKED BY:	RJG 06/30/10
APPROVED BY:	HMS 06/30/10

WARNING LAYER PLAN

BYPASS BASIN LINER REPLACEMENT
MIDWEST GENERATION
POWERTON POWER STATION
PEKIN, ILLINOIS

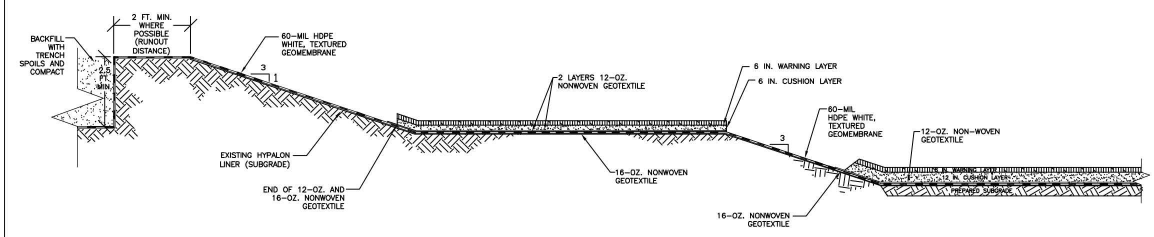
DRAWING NO: D1965C030-02
REFERENCE: -

SHEET NO. C030



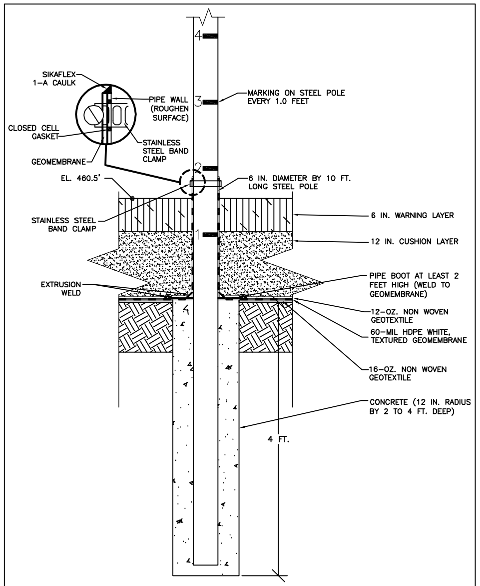
NOTE:
1. GEOMEMBRANE SEAMS SHALL BE PLACED 2 TO 5 FT. FROM TOE OF SLOPE AT A MINIMUM.

A / C030 SLOPE TRANSITION SECTION
NOT TO SCALE

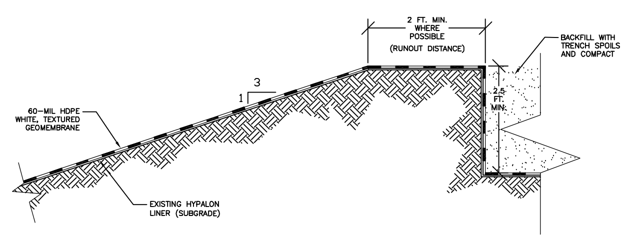


NOTE:
16-OZ. NONWOVEN GEOTEXTILE TO BE PLACED AT BASE OF BASIN AND WHERE HYPALON LINER DOES NOT EXIST OR WAS REMOVED OF PREPARED SUBGRADE

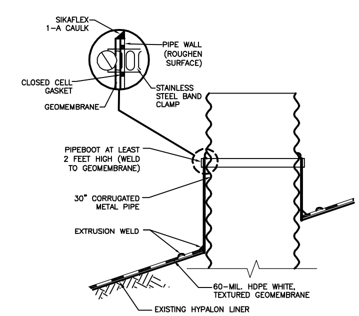
B / C030 RAMP SECTION
NOT TO SCALE



1 / C020 MARKER POST DETAIL
NOT TO SCALE



2 / C030 ANCHOR TRENCH DETAIL
NOT TO SCALE



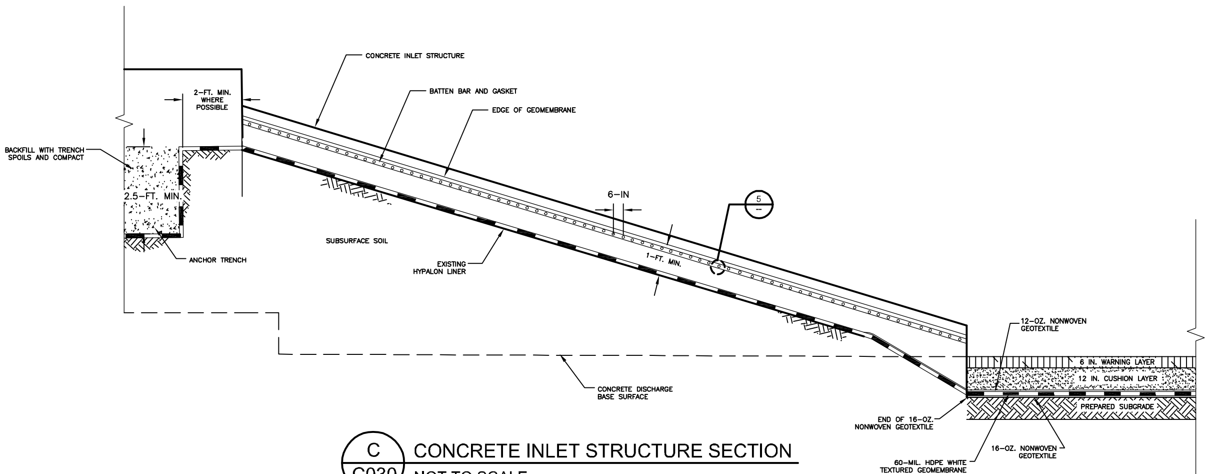
3 / C030 OVERFLOW PIPE DETAIL
NOT TO SCALE

NOT FOR CONSTRUCTION

	REVISION	DATE	APP'D BY
6.			
5.			
4.			
3.			
2.	RECORD DOCUMENTATION	06/16/11	HMS
1.	ISSUED FOR BID	10/06/10	HMS
0.	ISSUED FOR PERMIT	06/30/10	HMS

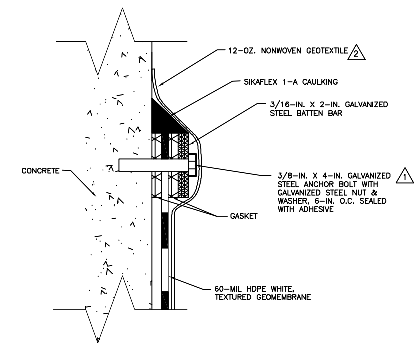
NATURAL RESOURCE TECHNOLOGY

PROJECT NO. 1965/5.4	**DETAILS AND SECTIONS**
DRAWN BY: KNW 06/30/10	BYPASS BASIN LINER REPLACEMENT MIDWEST GENERATION POWERTON POWER STATION PEKIN, ILLINOIS
CHECKED BY: RJG 06/30/10	
APPROVED BY: HMS 06/30/10	DRAWING NO: D1965C031-02 REFERENCE:
SHEET NO.	C031



C / C030 CONCRETE INLET STRUCTURE SECTION

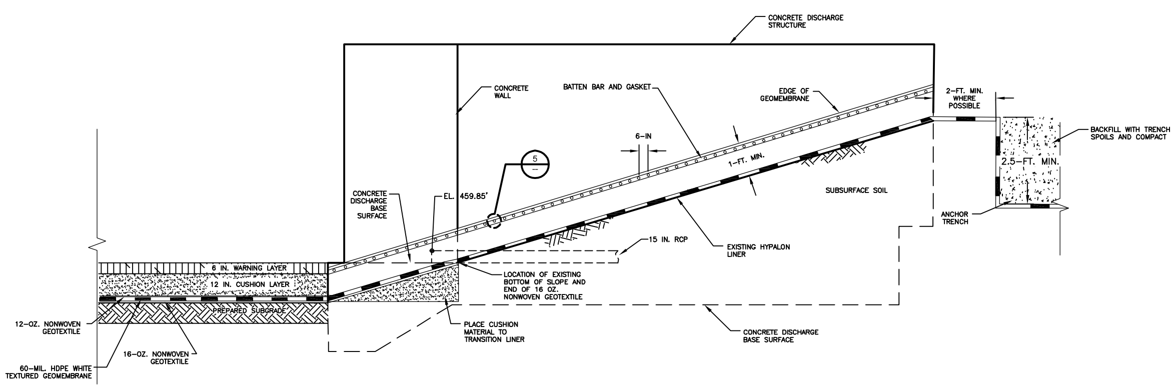
NOT TO SCALE



NOTE:
1. ANCHOR BOLTS 6 IN. ON CENTER.
2. 12-OZ. NONWOVEN GEOTEXTILE TO BE USED TO PROTECT GEOMEMBRANE BELOW CUSHION/WARNING LAYERS.

5 / -- BATTEN BAR ATTACHMENT

NOT TO SCALE



D / - CONCRETE DISCHARGE STRUCTURE SECTION

NOT TO SCALE

NOT FOR CONSTRUCTION

REVISION:		DATE:	APP'D BY:
6.			
5.			
4.			
3.			
2.	RECORD DOCUMENTATION	06/16/11	HMS
1.	ISSUED FOR BID	10/06/10	HMS
0.	ISSUED FOR PERMIT	06/30/10	HMS

NATURAL RESOURCE TECHNOLOGY

PROJECT NO. 1965/5.4
DRAWN BY: KNW 06/30/10
CHECKED BY: RJG 06/30/10
APPROVED BY: HMS 06/30/10

DETAILS AND SECTIONS

BYPASS BASIN LINER REPLACEMENT
MIDWEST GENERATION
POWERTON POWER STATION
PEKIN, ILLINOIS

DRAWING NO: D1965C032-02
REFERENCE:

SHEET NO. C032

Attachment 1-5 – FAB Cornette Construction Drawings

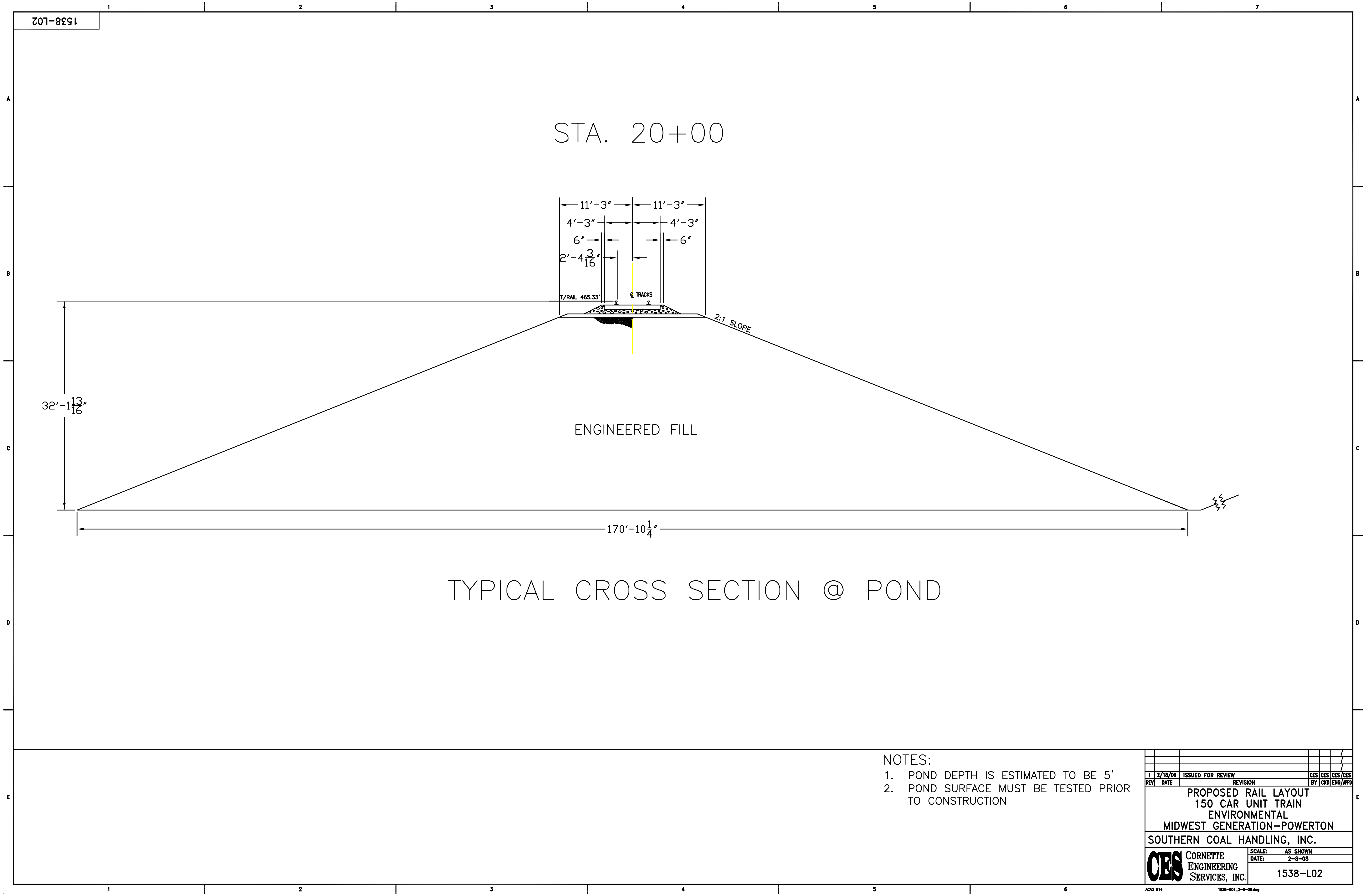


FIGURE 3 - RAIL LAYOUT CROSS SECTION

Attachment 1-6 – ASB Liner Replacement Specifications

SECTION 02600
HIGH DENSITY POLYETHYLENE (HDPE) GEOMEMBRANE

PART 1 - GENERAL

1.01 WORK INCLUDES

A. Furnish all labor, materials, tools, supervision, transportation, and installation equipment necessary for installation of 60-mil High Density Polyethylene (HDPE) geomembrane, as specified herein, and as shown on Contract Drawings.

1.02 REFERENCE STANDARDS

A. ASTM D5641 – Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber

B. ASTM D5820 – Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes

C. ASTM D6392 –Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.

D. ASTM D7007 Standard Practice for Locating Leaks in Geomembranes Covered with Water or Earthen Materials.

E. GRI Test Method, GM 13 - Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes

F. GRI Test Method, GM 14 – Selecting Variable Intervals for Taking Geomembrane Destructive Seam Samples Using the Method of Attributes.

G. GRI Test Method, GM 19 – Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes.

1.03 DEFINITIONS

A. Geomembrane Installer: hired by Contractor responsible for field handling, transporting, storing, deploying, seaming and testing of the geomembrane seams.

B. Geomembrane Manufacturer: hired by Geomembrane Installer to provide HDPE geomembrane.

C. Leak Location Contractor: hired by Contractor and responsible for locating potential holes in the installed geomembrane using electrical methods.

D. Geosynthetic Quality Assurance Laboratory (Testing Laboratory): Laboratory, independent from the Owner, Manufacturer and Installer, responsible for conducting laboratory tests on samples of geosynthetics obtained at the site or during manufacturing, usually under the direction of the Owner.

E. Lot: A quantity of resin (usually the capacity of one rail car) used in the manufacture of geomembranes. Finished roll will be identified by a roll number traceable to the resin lot used.

F. Resin Supplier: selected by Geomembrane Manufacturer to provide resin used in manufacturing geomembrane.

G. Panel: Unit area of a geomembrane that will be seamed in the field that is larger than $100ft^2$.

H. Patch: Unit area of a geomembrane that will be seamed in the field that is less than $100ft^2$.

I. Subgrade Surface: Soil Layer surface which immediately underlies the geosynthetic material(s).

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Geomembrane Manufacturer shall have a minimum of 5 years of continuous experience manufacturing HDPE geomembrane totaling 1,000,000 square feet.

2. Geomembrane Installer:

a. 5 years of continuous experience in installation of HDPE geomembrane.

b. Experience totaling a minimum of 5,000,000 square feet of installed HDPE geomembrane on some combination of at least 10 completed facilities.

c. Personnel performing seaming operations qualified by experience or by successfully passing seaming tests. Master seamer shall have experience seaming a minimum of 3,000,000 square feet of geomembrane using same type of seaming apparatus to be used on this project.

d. Geomembrane Installers that are qualified and approved by Engineer are listed below:

i. Clean Air and Water Systems
Dousman, WI
Brain McKeown
262-965-4366

3. Leak Location Contractor:

a. 3 years of continuous experience in performing leak location surveys using electrical methods.

b. Experience totaling a minimum of 2,000,000 square feet of geomembrane leak location surveys on some combination of at least 5 completed facilities.

c. Personnel performing survey qualified by experience with at least 2 years of geomembrane testing experience using the leak location survey electrical method.

d. Leak Location Contractors that are qualified and approved by Engineer are listed below:

i. Leak Location Services, Inc.
San Antonio, TX
210-408-1241

ii. Or other approved by Owner and/or Engineer.

B. Quality Assurance Program:

1. Geomembrane Manufacturer/Installer shall conform with requirements of these Technical Specifications.

2. The Owner and/or Engineer may document geomembrane installation including panel placement, seaming, pre-qualification seam testing, non-destructive seam and repair testing, repair size and locations, and weather conditions.

3. The Owner may engage and pay for the services of Engineer and QA Laboratory to monitor geomembrane installation.

1.05 SUBMITTALS

A. Prior to project start, submit the following to Owner and/or Engineer in accordance with Section 01300, Submittals:

1. Raw Materials:

a. Name of Resin Supplier, location of supplier's production plant(s), resin brand name and product number.

b. Source and nature of plasticizers, fillers, carbon black and any other additives along with their percent addition to geomembrane material.

c. Test results documenting conformance with the "index properties" of GRI Test Method, GM 13.

2. Geomembrane Manufacturer's Certification:

a. Written certification that Geomembrane Manufacturer's Quality Control Plan was fully implemented during production of geomembrane material supplied for this project. (Submittal shall be made within 5 working days of delivery to site).

3. Geomembrane Manufacturer Production Information:

   a. Corporate background information indicating compliance with qualification requirements.

   b. Quality control plan for manufacturing.

   c. Copy of quality control certificates demonstrating compliance with the quality control plan for manufacturing and the test property requirements of GRI Test method, GM 13 (i.e., mill certificates).

4. Contractor shall provide the Engineer a certificate stating the name of the geotextile manufacturer, product name, chemical composition of the filaments and other pertinent information to fully describe the geotextile.

5. Geomembrane Installer's Seaming Personnel

   a. Training completed by personnel.

   b. Seaming experience for each personnel.

6. Geomembrane Installer's Information:

   a. Corporate background information indicating compliance with qualification requirements.

   b. List of completed facilities, totaling 5,000,000 square feet minimum for which Geomembrane Installer has completed installation of a HDPE geomembrane. Include name and purpose of facility, location, date of installation, and quantity installed.

   c. Resumes of personnel performing field seaming operation, along with pertinent experience information. Include documentation regarding which seamers are qualified to use thermal fusion welding apparatus.

   d. Installation quality control plan.

7. Installation panel layout diagram identifying placement of geomembrane panels, seams, and any variance or additional details which deviate from Contract Drawings or Technical Specifications. Layout shall be drawn to scale and shall be adequate for use as a construction plan. Layout shall include dimensions and pertinent seam and anchorage details.

B. With bid, submit the following to Owner and/or Engineer in accordance with Section 01300, Submittals

   1. Leak Location Contractor's Work Plan:

a. Corporate background information indicating compliance with qualification requirements.

b. List of completed facilities, totaling 2,000,000 square feet minimum of geomembrane leak location surveys on some combination of at least 5 completed facilities. Include name and purpose of facility, location, date of survey, survey method, and quantity surveyed.

c. Resumes of personnel performing leak location survey, along with pertinent experience information.

d. Leak Location Contractor quality control plan including description of the proposed survey methods and procedures, and field calibration procedures.

e. Leak Location Contractor’s required site preparations to be completed to perform the proposed leak location survey, and estimated duration to complete the survey.

f. An example of a final report (per ASTM D 7007) provided by the Leak Location Contractor following the completion of the survey.

C. During installation, submit the following to the Owner and/or Engineer:

1. Daily records/logs prepared by Geomembrane Installer documenting work performed, personnel involved, general working conditions, and any problems encountered or anticipated on project. Submit on a weekly basis.

2. Copy of subgrade acceptance signed by Geomembrane Installer for areas to be covered with geomembrane each day.

D. Within 10 days of geomembrane installation completion, submit the following to Owner and/or Engineer:

1. Geomembrane installation certification that Work was performed under Geomembrane Installer's approved quality control plan and in substantial compliance with Technical Specifications and Contract Drawings.

2. As-built panel diagram identifying placement of geomembrane panels, seams, repairs, and destructive seam sample locations.

3. Copy of warranty for material (including factory seams) and installation covering both for a period of 2 years from the date of substantial completion.

E. The Owner and/or Engineer will review and inspect geomembrane installation upon completion of all Work specified in this Section. Deficiencies noted shall be corrected at no additional cost to the Owner.

F. The Owner and/or Engineer will provide written final acceptance of the geomembrane installation after completion of the leak location survey. Written conditional geomembrane installation acceptance can be provided to the Contractor prior to completion of the leak location survey when the following conditions are satisfied, if necessary, and requested by the Contractor:

1. The entire geomembrane installation is completed or any pre-determined subsection if the project is phased.

2. All installation quality assurance/control documentation has been completed and submitted to the Owner and/or Engineer.

3. Verification of the adequacy of all field seams, repairs and associated testing is complete.

G. Within 14 days of completion of the leak location survey, submit final written report (per ASTM D 7007) of the leak location survey provided by Leak Location Contractor.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Transportation:

1. Geomembrane rolls shall be transported, unloaded and handled at the job site in accordance with manufacturer recommendations. Damaged material may be rejected by the Owner and/or Engineer.

B. On-site Storage:

1. Geomembrane rolls which have been delivered to job site shall be unloaded and stored in original, unopened packaging in a secure location, determined by Owner and/or Engineer.

2. Store geomembrane rolls to ensure adequate protection against exposure to the following:

a. Equipment;

b. Strong oxidizing chemicals, acids, or bases;

c. Flames, including welding sparks;

d. Temperatures in excess of 160 deg. F;

e. Dust;

f. Ultraviolet radiation (i.e. sunlight); and

g. Inclement weather.

3. Whenever possible, provide a 6-inch minimum air space between rolls.

4. Containers/rolls shall not be stacked.

C. On-Site Handling:

1. Handle rolls per Geomembrane Manufacturer's recommendations and as necessary to prevent damage.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Geotextile to be used for cushioning between subgrade and geomembrane shall be polyester or polypropylene, non-woven needlepunched fabric and shall conform to the following requirements:

GEOTEXTILE PROPERTIES

Property	Units	Value	Test	Criterion
Mass Per Unit Area	oz/yd^2	16	ASTM D5261	MARV
Puncture Strength	lb	170	ASTM D4833	MARV
Trapezoid Tear	lb	145	ASTM D4533	MARV
Grab Tensile Strength	lb	370	ASTM D4632	MARV
Grab Elongation	%	50	ASTM D4632	MARV
UV Resistance @500 hours	% retained	70	ASTM D4355	Minimum

B. Geotextile to be used for separation between geomembrane and cushion material shall be polyester or polypropylene, non-woven needlepunched fabric and shall conform to the following requirements:

GEOTEXTILE PROPERTIES

Property	Units	Value	Test	Criterion
Mass Per Unit Area	oz/yd^2	12	ASTM D5261	MARV
Apparent Opening Size	US Sieve	100	ASTM D4751	MARV
Puncture Strength	lb	210	ASTM D4833	MARV
Trapezoid Tear	lb	125	ASTM D4533	MARV
Grab Tensile Strength	lb	320	ASTM D4632	MARV
Grab Elongation	%	50	ASTM D4632	MARV
UV Resistance @500 hours	% retained	70	ASTM D4355	Minimum

C. High Density Polyethylene (HDPE) White Textured Geomembrane

1. HDPE geomembrane shall be white, textured (both sides), 60-mil product approved by the Owner and/or Engineer.

2. The Contractor shall submit, with the bid, written certification from the proposed Geomembrane Manufacturer that geomembrane products proposed in the bid satisfy the following requirements:

a. The proposed HDPE compound shall be comprised entirely of virgin materials. Compliance with this specification shall be documented in accordance with Geomembrane Manufacturer's quality control program and submitted to the Owner and/or Engineer with the written conformance certification.

b. The proposed Geomembrane Manufacturer shall certify that any plasticizers, fillers and additives incorporated into the manufacturing process for the proposed HDPE geomembrane have demonstrated acceptable performance on past projects.

c. The proposed geomembrane shall meet the requirements of Geosynthetic Research Institute's test method GM 13.

d. The nominal thickness of proposed geomembrane shall be 60 mil., or as approved by the Owner and/or Engineer.

e. Geomembrane Manufacturer that are qualified and approved by Engineer are listed below:

i. GSE
Houston, TX
800 435 2008

3. Geomembrane sheets shall be visually consistent in appearance and shall contain no holes, blisters, undisbursed raw materials or other signs of contamination by foreign material. Geomembrane must have no striations, roughness or bubbles on the surface.

D. Seaming Apparatus

1. Thermal fusion welding machines used for joining geomembrane surfaces may be either extrusion or hot wedge. These machines shall include sufficient temperature and rate-of-travel monitoring devices to allow continuous monitoring of operating conditions.

2. One spare, operable thermal fusion seaming device shall be maintained on site at all times.

E. Field Test Equipment

1. Field Tensiometer: the field tensiometer shall be calibrated within three months prior to project start date over the range of field test values.

2. Air Channel Test Equipment: air channel test equipment shall consist of hoses, fittings, valves and pressure gauge(s) needed to deliver and monitor the pressure of compressed air through an approved pressure feed device.

3. Air Compressor: the air compressor utilized for field testing shall be capable of producing and maintaining an operating pressure of at least 50 psi.

4. Vacuum Box: the vacuum box shall consist of a vacuum gage, valve, and a gasket around the edge of the open bottom needed to apply vacuum to a surface.

2.02. CONFORMANCE TESTING REQUIREMENTS

A. Geomembrane shipped to site shall undergo conformance testing. Manufacturer's roll certificates may be used for conformance evaluation at the option of the Owner and/or Engineer. Nonconforming material shall either be retested at the direction of the Owner and/or Engineer or removed from site and replaced at Contractor's expense.

B. Conformance Test Methods

1. Samples will be located and collected by the Owner and/or Engineer at a rate of one sample per 100,000 square feet of geomembrane delivered to site.

2. One sample will be obtained from each geomembrane production batch delivered to the site.

3 Samples shall be cut by Geomembrane Installer and be at least 45 square feet in size.

4. Samples shall be tested in accordance with Table 1 (Smooth) or Table 2 (Textured) specified in GRI Test Method GM13.

5. Geomembrane thickness shall be measured a minimum of three times per panel during deployment to verify conformance with GRI Test Method GM13.

C. Role of Testing Laboratories

1. The Owner and/or Engineer will be responsible for acquiring samples of the geomembrane for conformance testing. The Owner or Engineer will retain an independent, third party laboratory to perform conformance testing on samples of geomembrane.

2. Retesting of geomembrane panels by the Geomembrane Installer because of failure to meet any of the conformance specifications can only be authorized by the Owner and/or Engineer.

3. The Geomembrane Manufacturer and/or Geomembrane Installer may perform independent tests in accordance with methods and procedures specified in GRI GM 13. Results shall not be substituted for quality assurance testing described herein.

D. Procedures for Determining Conformance Test Failures

1. If conformance test results fail to meet specifications, the roll and/or batch may be retested using specimens from either the original roll sample or from another sample collected by the Owner and/or Engineer. Two additional tests (retests)

shall be performed for each failed test procedure. Each retest shall consist of multiple specimen tests if multiple specimens are specified in the test procedure. If the results of both retests meet specifications, the roll and batch will be considered to have passed conformance testing.

2. Failure of any retest shall be cause for rejection of the entire roll or batch depending on the type of failing test. The Owner and/or Engineer reserves the right to collect samples from other rolls of a particular batch for further conformance testing. The Owner and/or Engineer may choose to accept only a portion of the batch on the basis of the results of conformance testing of samples collected from other rolls.

3. If retesting does not result in conformance with the specifications as defined in preceding paragraph, or if there are any other nonconformities with the material specifications, the Contractor shall remove the rolls from use in the project. The Contractor shall also be responsible for removal of rejected geomembrane from the site and replacement with acceptable geomembrane at no additional cost to the Owner.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

A. A Pre-Construction Meeting shall be held at the site to discuss and plan the details of geomembrane installation. This meeting shall be attended by the Geomembrane Installer, Owner, Engineer and the Contractor.

B. The following topics relating to geomembrane installation shall be addressed:

1. Responsibilities of each party.

2. Lines of authority and communication.

3. Methods for documenting, reporting and distributing documents and reports.

4. Procedures for packaging and storing archive samples.

5. Review of the schedule for all installation and quality assurance testing, including third-party testing turnaround times.

6. Review of panel layout, access and numbering systems for panels and seams including details for marking on the HDPE geomembrane.

7. Procedures and responsibilities for preparation and submittal of as-built drawings.

8. Temperature and weather limitations, installation procedures for adverse weather conditions and defining acceptable subgrade 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 geomembrane.

11. Procedures for covering of the geomembrane to prevent damage.

12. Plan for minimizing wrinkles in the geomembrane.

13. Measurement and payment schedules.

14. Site health and safety procedures/protocols.

3.02 SUBGRADE INSPECTION AND REPAIR

A. The Geomembrane Installer shall visually inspect the subgrade immediately prior to geomembrane deployment. Inspection shall verify that there are no potentially harmful foreign objects present, such as sharp rocks and other deleterious debris. Any foreign objects encountered shall be removed by Geomembrane Installer or Contractor. All subgrade damaged by construction equipment and deemed unsuitable for geomembrane deployment shall be repaired prior to geomembrane deployment. All repairs shall be approved by the Owner and/or Engineer and Geomembrane Installer. The responsibility for preparation, repairs, and maintenance of the subgrade shall be defined in the preconstruction meeting. The Geomembrane Installer shall provide the Owner and/or Engineer with written acceptance of subgrade surface over which 16 oz non woven geotextile and geomembrane is deployed (Part 1.05C*)* for each day of deployment.

3.03 GEOMEMBRANE LINER DEPLOYMENT

A. Geomembrane Installer shall deploy 16-oz non woven geotextile following applicable certifications/quality control certificates listed in Subsection 1.05 of this section and approved by the Owner and/or Engineer. Any 16-oz non woven geotextile placed prior to approval by the Owner and/or Engineer shall be at the sole risk of the Contractor. If geotextile installed prior to approval by the Owner and/or Engineer does not meet the requirements of this specification, it shall be removed from the site at no additional cost to the Owner.

B. 60 mil HDPE geomembrane will be deployed following installation of 16-oz non woven geotextile and applicable certifications/quality control certificates listed in Subsection 1.05 of this section according to submitted panel layout drawing as approved by the Owner and/or Engineer. The Owner and/or Engineer is to be notified of and approve any revisions or modifications to the approved panel layout drawing prior to deploying geomembrane in the area of review.

C. Adequate temporary anchoring (sand bags, tires, etc.) that will not damage the geomembrane shall be placed on a deployed panel to prevent uplift by wind.

D. Geomembrane shall not be deployed if:

1. Ambient temperatures are below 41 degrees F (5 degrees C) or above 104 degrees F (40 degrees C) measured six inches above geomembrane surface unless approved by the Owner and/or Engineer.

2. Precipitation is expected or in the presence of excessive moisture or ponded water on the subgrade surface.

3. Winds are excessive as determined by Geomembrane Installer in agreement with the Owner and/or Engineer.

4. The Owner and/or Engineer will have the authority to suspend work during such conditions.

E. The Geomembrane Installer shall be responsible for conformance with the following requirements:

1. Equipment utilized for installation/quality assurance testing does not damage geomembrane. Such equipment shall have rubber tires and a ground pressure not exceeding 8 psi . Only equipment necessary for installation and quality assurance testing is allowed on the deployed geomembrane.

2. Personnel working on geomembrane do not damage geomembrane (activities such as smoking or wearing damaging clothing shall not be allowed).

3. Method of deployment does not damage geomembrane.

4. Method of deployment minimizes wrinkles.

5. Temporary loading or anchoring does not damage geomembrane.

6. Direct contact with geomembrane is minimized.

F. Geomembrane Installer shall place 16-oz non woven geotextile on the geomembrane at the base of the basin and at least 4 feet up side slopes, as indicated on Contract Drawings. Geomembrane Installer shall cover the batten bar attachments with the 16-oz non woven geotextile.

G. No vehicles shall be allowed on deployed geomembrane under any circumstances.

3.04 FIELD SEAMS

A. Seam Layout

1. In general, seams shall be oriented parallel to the line of the maximum slope. In corners and at other odd-shaped geometric intersections, number of seams should be minimized. If at all possible, seams shall not be located at low points in the subgrade unless geometry requires seaming to be done at these locations.

2. A seam numbering system compatible with the panel numbering system shall be agreed upon at the Pre-Construction Meeting.

B. Seaming Processes/Equipment

1. Approved processes for field seaming (panel to panel) are extrusion or hot wedge fusion-type seam methods. No other processes can be used without prior written authorization from the Owner and/or Engineer. Only equipment which has been specifically approved by make and model shall be used, if applicable.

2. The Geomembrane Installer will meet the following requirements regarding use, availability, and cleaning of welding equipment at job site:

   a. Intersecting hot wedge seams shall be patched using extrusion welding process.

   b. Electric generator for equipment shall be placed on a smooth base such that no damage occurs to geomembrane. A smooth insulating plate or fabric shall be placed beneath hot equipment after usage.

3. The Geomembrane Installer shall keep records for performance and testing of all seams.

C. Seaming Requirements/Procedures

1. Weather Conditions - Range of weather conditions under which geomembrane seaming can be performed are as follows:

   a. Unless otherwise authorized in writing by Owner and/or Engineer, no seaming shall be attempted or performed at an ambient temperature below 41 degrees F (5 degrees C) or above 104 degrees F (40 degrees C).

   b. Between ambient temperatures of 32 degrees F (0 degrees C) and 41 degrees F (5 degrees C), seaming shall follow GRI GM9 cold weather seaming guidelines. Pre-qualification seams shall be produced to determine appropriate seaming parameters and for Engineer's approval.

   c. Above 41 degrees F (5 degrees C), no special conditions will be required.

   d. Geomembrane shall be dry and protected from wind.

   e. Seaming shall not be performed during any precipitation event.

   f. Seaming shall not be performed in areas where ponded water has collected below surface of geomembrane.

2. If the Geomembrane Installer chooses to use methods which may allow seaming at ambient temperatures below 41 degrees F or above 104 degrees F, the Geomembrane Installer shall demonstrate and submit certification to Owner and/or Engineer that methods and techniques used to perform seaming produce seams that are equivalent to seams produced at temperatures above 41 degrees F and below 104 degrees F. The Owner and/or Engineer may deny approval for use of the proposed technique regardless of demonstration results.

3. Overlapping - Geomembrane panels shall have finished overlap as follows:

   a. Minimum of 6 inches for thermal fusion welding.

b. Insufficient overlap will be considered a failed seam.

4. Pre-qualification tests for geomembrane fusion welding shall be conducted by a minimum of 2 pre-qualification seams conducted per day per welding machine by each seaming technician performing welding with that machine. At least one test shall be performed at the start of each work day, with tests at intervals of no greater than 5 hours and additional pre-qualification tests following work interruptions, weather changes, changes to machine settings, or as directed by the Owner and/or Engineer. Pre-qualification seams shall be made under the same conditions as the actual seams.

   a. Pre-qualification seam samples shall be 5 feet long by 1-foot wide (minimum) after seaming, with seam centered along its length. Each pre-qualification seam shall be labeled with the date, geomembrane temperature, seaming unit identifier, seam number or test location, technician performing the test seam and description of testing results.

   b. Seam overlap shall be in accordance with Subsection 3.04(C)(3).

   c. Pre-qualification seams shall be inspected for proper squeeze-out, footprint pressure, and general appearance.

   d. Four specimens, each 1-inch in length, shall be cut from opposite ends of the pre-qualification seam sample by the Geomembrane Installer. The remainder of pre-qualification seam shall be retained by the Owner and/or Engineer and may be submitted for laboratory testing.

   e. The Geomembrane Installer shall complete two shear tests and two peel tests in accordance with GRI GM 19.

   f. Pre-qualification seams failed by inspection or testing may be retested at request of the Geomembrane Installer. If the second pre-qualification seam fails, then the seaming apparatus or seaming technique shall be disqualified from use until two consecutive, satisfactory pre-qualification seams are obtained.

5. Seam Preparation

   a. Prior to seaming, seam area shall be clean and free of moisture, dust, dirt, debris of any kind, and foreign material.

   b. Seams shall be aligned so as to minimize number of wrinkles and fishmouths.

6. General Seaming Procedures

a. Fishmouths or wrinkles at seam overlaps shall be cut along ridge of the wrinkle to achieve a flat overlap. Cut fishmouths or wrinkles shall be repaired, and/or patched in accordance with Part 3.07.

b. Seaming shall extend to the outside edge of geomembrane panels including material placed in anchor trenches.

c. The intersecting thermal fusion seams shall be patched using the extrusion welding process.

3.05 NON-DESTRUCTIVE TESTING

A. Each field seam shall be non-destructively tested over its entire length by the Installer. Testing shall be conducted as field seaming progresses, not at completion of all seams, unless specifically agreed to by the Owner and/or Engineer in writing.

B. Vacuum Testing – shall be performed in accordance with ASTM D5641.

C. Air Pressure Testing – shall be performed in accordance with ASTM D5820, and GRI GM 6, Pressurized Air Channel Test for Dual Seamed Geomembranes.

D. Each seam tested non-destructively shall be marked with the date of the test, name of the testing technician, length of the seam, test method and results. The same shall also be recorded by the Owner and/or Engineer on the appropriate CQA documentation.

E. Non-Destructive Seam Test Failures

1. Seams failing non-destructive testing shall be repaired by the Geomembrane Installer according to Part 3.07. Seams shall be non-destructively retested. If the seam defect cannot be located, the entire section of seam affected shall be repaired and retested.

3.06 ELECTRONIC LEAK LOCATION SURVEY

A. Leak Location Contractor shall identify actions required by Contractor to prepare the site for the leak location survey.

B. Contractor shall ensure that the cushion and warning layers, and 12 oz non woven geotextile above and 16 oz non woven geotextile below the geomembrane contains sufficient moisture to conduct a leak location survey. Typically, a moisture content of earth materials of 1% to 2% by weight is sufficient to conduct the survey. If the moisture content of the cushion layer, warning layer and subgrade is not sufficient per the requirements of the Leak Location Contractor, Contractor shall add moisture to the layers, as required.

C. Contractor shall provide electrical isolation of the metal marker posts, batten bars, and concrete structures, as requested by Leak Location Contractor.

D. Leak Location Contractor shall inspect the site prior to commencing the survey to ensure all site preparations are completed and the site conditions are appropriate for conducting the leak location survey.

E. Any discrepancy in the required site preparation detailed in the Leak Location Contractor's Work Plan or site conditions shall be reported to the Contractor for corrective or appropriate action.

F. After the warning layer is placed, conduct a leak location survey on the warning layer material using the procedures for surveys with earth materials covering the Geomembrane as described in ASTM D 7007.

G. A leak detection sensitivity test using an artificial leak shall be conducted on the geomembrane for each set of equipment used before the equipment is used on for the leak location survey, as described in ASTM D 7007 to determine the detection distance for the survey.

H. The leak location survey shall be taken on survey lines or on a grid spaced no farther apart than twice the leak detection distance as determined in the leak detection sensitivity test.

I. The Leak Location Contractor shall inform the Owner and/or Engineer and mark the locations of all identified or indicated leaks with a flag or spray paint. The Geomembrane Installer shall repair the defect/hole as detailed in Part 3.07 of this Section.

3.07 DEFECTS AND REPAIRS

A. The geomembrane shall be examined by the Geomembrane Installer and the Owner and/or Engineer for defects, holes, blisters, undispersed raw materials, and any signs of contamination by foreign matter. The geomembrane surface shall be swept and/or washed by the Geomembrane Installer if the amount of dust or mud inhibits examination. The Contractor shall provide a water truck, an operator, clean water and hoses as reasonably necessary to assist the Geomembrane Installer in this activity.

B. Portions of geomembrane exhibiting flaws, or failing a non-destructive or destructive (if conducted) test, shall be repaired or replaced by the Geomembrane Installer. Repair procedures available include:

1. Patching - used to repair large holes, tears, undispersed raw materials, contamination by foreign matter, holes resulting from destructive sampling (if conducted), and locations where seam overlap is insufficient;

2. Capping - used to repair large lengths of failed seams; and

3. Additional Procedures - used upon recommendation of the Geomembrane Installer if agreed to by the Owner and/or Engineer.

C. Patches or caps.

1. Extend patch or cap 6 inches (minimum) beyond the edge of the defect.

2. Round corners of patch and/or cap (suggest 3-inch radius).

3. Repair procedures, equipment, materials, and techniques will be approved by the Owner and/or Engineer prior to repair.

4. Geomembrane below large caps shall be appropriately cut to avoid water or gas collection between two sheets.

D. The Geomembrane Installer shall mark on the geomembrane (using a non-puncturing writing utensil), repair date, time, and personnel involved.

E. Each repair shall be non-destructively tested in accordance with Part 3.05. Large caps may require destructive test sampling in accordance with Part 3.06 at the discretion of the Owner and/or Engineer.

F. Repairs which fail testing shall be redone and retested until a passing result is obtained. The Geomembrane Installer will perform non-destructive testing on repairs and will document retesting of repairs.

G. The Owner and/or Engineer will document repairs, repair testing, and retesting results.

H. The Geomembrane Installer shall cut and seam wrinkles which may adversely affect long-term integrity of the geomembrane, hinder subsequent construction of overlying layers, or impede drainage off of the geomembrane after it is covered by soil. Seaming shall be done in accordance with procedures described in Parts 3.04(B) and 3.04(C), and it shall be subject to test provisions of Parts 3.05 (non-destructive testing) and 3.06 (destructive testing – if conducted).

3.08 PROTRUSIONS AND CONNECTIONS TO GEOMEMBRANE

A. If required, the Geomembrane Installer shall install geomembrane around utility poles, guy wires, and other structures according to the Contract Drawings and the following requirements:

1. Use minimum 2-ft long geomembrane pipe boots and steel clamps to seal the geomembrane around pole or structure.

2. Use standard welding procedures to seam the geomembrane boot or weld strip to the geomembrane.

3. Seaming performed on and around penetrations, and other appurtenances shall be non-destructively tested using the vacuum testing method.

3.09 SURVEY DOCUMENTATION

A. Prior to covering the geomembrane, the Geomembrane Installer shall provide the Contractor , Owner and/or Engineer with 24-hour notification to conduct a survey. The Contractor shall survey the location of all seams (panel corners acceptable), and repairs. The Contractor shall provide survey data to the Owner and/or Engineer within two working day of survey completion and in accordance with Section 01050, Field Engineering and Survey.

3.10 DAILY FIELD INSTALLATION REPORTS

A. At the beginning of each day, the Geomembrane Installer shall provide the Owner and/or Engineer with a report for all work completed the previous day.

B. The Daily Field Installation Report shall include the following:

1. The total amount and location of geomembrane placed.

2. The total length and location of seams completed, technician name and welding unit numbers.

3. A drawing or sketch depicting the geomembrane installed the previous day including the panel number, seam number and locations of non-destructive and destructive testing (if conducted).

4. Results of pre-qualification test seams, if available.

5. Results of non-destructive testing.

C. Destructive test results (if conducted) shall be reported within 48 hours or prior to covering the geomembrane, whichever is practical.

END OF SECTION

Attachment 1-7 – ABB Liner Replacement Specifications

SECTION 02600
HIGH DENSITY POLYETHYLENE (HDPE) GEOMEMBRANE

PART 1 - GENERAL

1.01 WORK INCLUDES

A. Furnish all labor, materials, tools, supervision, transportation, and installation equipment necessary for installation of 60-mil High Density Polyethylene (HDPE) geomembrane, as specified herein, and as shown on Contract Drawings.

1.02 REFERENCE STANDARDS

A. ASTM D6392 –Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.

B. ASTM D7007 Standard Practice for Locating Leaks in Geomembranes Covered with Water or Earthen Materials.

C. GRI Test Method, GM 13 - Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes

D. GRI Test Method, GM 14 – Selecting Variable Intervals for Taking Geomembrane Destructive Seam Samples Using the Method of Attributes.

E. GRI Test Method, GM 19 – Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes.

1.03 DEFINITIONS

A. Geomembrane Installer: hired by Contractor or Owner responsible for field handling, transporting, storing, deploying, seaming and testing of the geomembrane seams.

B. Geomembrane Manufacturer: hired by Geomembrane Installer, Contractor, or Owner to provide HDPE geomembrane.

C. Leak Location Contractor: hired by Contractor or Owner and responsible for locating potential holes in the installed geomembrane using electrical methods.

D. Geosynthetic Quality Assurance Consultant: Consultant, independent from the Manufacturer, and Installer, responsible for field oversight of geosynthetics installation, and related testing, usually under the direction of the Owner.

D. Geosynthetic Quality Assurance Laboratory (Testing Laboratory): Laboratory, independent from the Manufacturer and Installer, responsible for conducting laboratory tests on samples of geosynthetics obtained at the site or during manufacturing, usually under the direction of the Owner.

D. Lot: A quantity of resin (usually the capacity of one rail car) used in the manufacture of geomembranes. Finished roll will be identified by a roll number traceable to the resin lot used.

E. Resin Supplier: selected by Geomembrane Manufacturer to provide resin used in manufacturing geomembrane.

F. Panel: Unit area of a geomembrane that will be seamed in the field that is larger than $100ft^2$.

G. Patch: Unit area of a geomembrane that will be seamed in the field that is less than $100ft^2$.

H. Subgrade Surface: Soil Layer surface which immediately underlies the geosynthetic material(s).

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Geomembrane Manufacturer shall have a minimum of 5 years of continuous experience manufacturing HDPE geomembrane totaling 1,000,000 square feet.

2. Geomembrane Installer:

a. 5 years of continuous experience in installation of HDPE geomembrane.

b. Experience totaling a minimum of 5,000,000 square feet of installed HDPE geomembrane on some combination of at least 10 completed facilities.

c. Personnel performing seaming operations qualified by experience or by successfully passing seaming tests. Master seamer shall have experience seaming a minimum of 3,000,000 square feet of geomembrane using same type of seaming apparatus to be used on this project.

3. Leak Location Contractor:

d. 3 years of continuous experience in performing leak location surveys using electrical methods.

e. Experience totaling a minimum of 2,000,000 square feet of geomembrane leak location surveys on some combination of at least 5 completed facilities.

f. Personnel performing survey qualified by experience with at least 2 years of geomembrane testing experience using the leak location survey electrical method.

B. Quality Assurance Program:

1. Geomembrane Manufacturer/Installer shall conform with requirements of these Technical Specifications.

2. The Owner or Contractor will engage and pay for the services of a Geosynthetic Quality Assurance Consultant and Laboratory to monitor geomembrane installation.

1.05 SUBMITTALS

A. Prior to project start, submit the following to Geosynthetic Quality Assurance Consultant in accordance with Section 01300, Submittals:

1. Raw Materials:

   a. Name of Resin Supplier, location of supplier's production plant(s), resin brand name and product number.

   b. Source and nature of plasticizers, fillers, carbon black and any other additives along with their percent addition to geomembrane material.

   c. Test results documenting conformance with the "index properties" of GRI Test Method, GM 13.

2. Geomembrane Manufacturer's Certification:

   a. Written certification that Geomembrane Manufacturer's Quality Control Plan was fully implemented during production of geomembrane material supplied for this project. (Submittal shall be made within 5 working days of delivery to site).

3. Geomembrane Installer's Seaming Personnel

   a. Training completed by personnel.

   b. Seaming experience for each personnel.

4. Geomembrane Manufacturer Production Information:

   a. Corporate background information indicating compliance with qualification requirements.

   b. Quality control plan for manufacturing.

   c. Copy of quality control certificates demonstrating compliance with the quality control plan for manufacturing and the test property requirements of GRI Test method, GM 13 (i.e. mill certificates).

5. Geomembrane Installer's Information:

a. Corporate background information indicating compliance with qualification requirements.

b. List of completed facilities, totaling 5,000,000 square feet minimum for which Geomembrane Installer has completed installation of a HDPE geomembrane. Include name and purpose of facility, location, date of installation, and quantity installed.

c. Resumes of personnel performing field seaming operation, along with pertinent experience information. Include documentation regarding which seamers are qualified to use thermal fusion welding apparatus.

d. Installation quality control plan.

6. Installation panel layout diagram identifying placement of geomembrane panels, seams, and any variance or additional details which deviate from Contract Drawings or Technical Specifications. Layout shall be drawn to scale and shall be adequate for use as a construction plan. Layout shall include dimensions and pertinent seam and anchorage details.

7. Installation Sequence and Schedule shall be included as part of Construction Progress Schedule.

8. Description of seaming apparatus to be used.

B. With bid, submit the following to Owner and/or Engineer in accordance with Section 01300, Submittals

1. Leak Location Contractor's Work Plan:

a. Corporate background information indicating compliance with qualification requirements.

b. List of completed facilities, totaling 2,000,000 square feet minimum of geomembrane leak location surveys on some combination of at least 5 completed facilities. Include name and purpose of facility, location, date of survey, survey method, and quantity surveyed.

c. Resumes of personnel performing leak location survey, along with pertinent experience information.

d. Leak Location Contractor quality control plan including description of the proposed survey methods and procedures, and field calibration procedures.

e. Leak Location Contractor's required site preparations to be completed to perform the proposed leak location survey, and estimated duration to complete the survey.

f. An example of a final report (per ASTM D 7007) provided by the Leak Location Contractor following the completion of the survey.

C. During installation, submit the following to the Geosynthetic Quality Assurance Consultant:

1. Daily records/logs prepared by Geomembrane Installer documenting work performed, personnel involved, general working conditions, and any problems encountered or anticipated on project. Submit on a weekly basis.

2. Copy of subgrade acceptance signed by Geomembrane Installer for areas to be covered with geomembrane each day.

D. Within 10 days of geomembrane installation completion, submit the following to Geosynthetic Quality Assurance Consultant:

1. Geomembrane installation certification that Work was performed under Geomembrane Installer's approved quality control plan and in substantial compliance with Technical Specifications and Contract Drawings.

2. As-built panel diagram identifying placement of geomembrane panels, seams, repairs, and destructive seam sample locations.

3. Copy of warranty for material (including factory seams) and installation covering both for a period of 2 years from the date of substantial completion.

E. The Geosynthetic Quality Assurance Consultant will review and inspect HDPE geomembrane installation upon completion of all Work specified in this Section. Deficiencies noted shall be corrected at no additional cost to the Owner.

F. The Geosynthetic Quality Assurance Consultant will provide written final acceptance of the geomembrane installation after completion of material placement above geomembrane. Written conditional geomembrane installation acceptance can be provided to the Contractor prior to completion of material placement above geomembrane when the following conditions are satisfied, if necessary, and requested by the Contractor:

1. The entire geomembrane installation is completed or any pre-determined subsection if the project is phased.

2. All installation quality assurance/control documentation has been completed and submitted to the Geosynthetic Quality Assurance Consultant or Owner.

3. Verification of the adequacy of all field seams, repairs and associated testing is complete.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Transportation:

1. Geomembrane rolls shall be transported, unloaded and handled at the job site in accordance with manufacturer recommendations. Damaged material may be rejected by the Geosynthetic Quality Assurance Consultant.

B. On-site Storage:

1. Geomembrane rolls which have been delivered to job site shall be unloaded and stored in original, unopened packaging in a secure location, determined by Owner and/or Geosynthetic Quality Assurance Consultant.

2. Store geomembrane rolls to ensure adequate protection against exposure to the following:

a. Equipment;

b. Strong oxidizing chemicals, acids, or bases;

c. Flames, including welding sparks;

d. Temperatures in excess of 160 deg. F;

e. Dust;

f. Ultraviolet radiation (i.e. sunlight); and

g. Inclement weather.

3. Whenever possible, provide a 6-inch minimum air space between rolls.

4. Containers/rolls shall not be stacked.

C. On-Site Handling:

1. Handle rolls per Geomembrane Manufacturer's recommendations and as necessary to prevent damage.

PART 2 - PRODUCTS

2.01 MATERIALS

A. High Density Polyethylene (HDPE) White Textured Geomembrane.

1. HDPE geomembrane shall be white, textured, 60-mil product approved by the Engineer and/or Geosynthetic Quality Assurance Consultant.

2. The Contractor shall submit, with the bid, written certification from the proposed Geomembrane Manufacturer that geomembrane products proposed in the bid satisfy the following requirements:

a. The proposed HDPE compound shall be comprised entirely of virgin materials. Compliance with this specification shall be documented in accordance with Geomembrane Manufacturer's quality control program and submitted to the Geosynthetic Quality Assurance Consultant with the written conformance certification.

b. The proposed Geomembrane Manufacturer shall certify that any plasticizers, fillers and additives incorporated into the manufacturing process for the proposed HDPE geomembrane have demonstrated acceptable performance on past projects.

c. The proposed geomembrane shall meet the requirements of Geosynthetic Research Institute's test method GM 13.

d. The nominal thickness of proposed geomembrane shall be 60 mil., or as approved by the Engineer and/or Geosynthetic Quality Assurance Consultant.

3. Geomembrane sheets shall be visually consistent in appearance and shall contain no holes, blisters, undisbursed raw materials or other signs of contamination by foreign material. Geomembrane must have no striations, roughness or bubbles on the surface.

B. Seaming Apparatus

1. Thermal fusion welding machines used for joining geomembrane surfaces may be either extrusion or hot wedge. These machines shall include sufficient temperature and rate-of-travel monitoring devices to allow continuous monitoring of operating conditions.

2. One spare, operable thermal fusion seaming device shall be maintained on site at all times.

C. Field Test Equipment

1. Field Tensiometer: the field tensiometer shall be calibrated within three months prior to project start date over the range of field test values.

2. Air Channel Test Equipment: air channel test equipment shall consist of hoses, fittings, valves and pressure gauge(s) needed to deliver and monitor the pressure of compressed air through an approved pressure feed device.

3. Air Compressor: the air compressor utilized for field testing shall be capable of producing and maintaining an operating pressure of at least 50 psi.

4. Vacuum Box: the vacuum box shall consist of a vacuum gage, valve, and a gasket around the edge of the open bottom needed to apply vacuum to a surface.

2.02. CONFORMANCE TESTING REQUIREMENTS

A. Geomembrane shipped to site shall undergo conformance testing. Manufacturer's roll certificates may be used for conformance evaluation at the option of the Geosynthetic Assurance Consultant. Nonconforming material shall either be retested at the direction of the Geosynthetic Quality Assurance Consultant or removed from site and replaced at Contractor's expense.

B. Conformance Test Methods

1. Samples will be located and collected by the Geosynthetic Quality Assurance Consultant at a rate of one sample per 100,000 square feet of geomembrane delivered to site.

2. One sample will be obtained from each geomembrane production batch delivered to the site.

3 Samples shall be cut by Geomembrane Installer and be at least 45 square feet in size.

4. Samples shall be tested in accordance with Table 1 (Smooth) or Table 2 (Textured) specified in GRI Test Method GM13.

5. Geomembrane thickness shall be measured a minimum of three times per panel during deployment to verify conformance with GRI Test Method GM13.

C. Role of Testing Laboratories

1. The Geosynthetic Quality Assurance Consultant will be responsible for acquiring samples of the geomembrane for conformance testing. The Owner or Geosynthetic Quality Assurance Consultant will retain an independent, third party laboratory to perform conformance testing on samples of geomembrane.

2. Retesting of geomembrane panels by the Geomembrane Installer because of failure to meet any of the conformance specifications can only be authorized by the Geosynthetic Quality Assurance Consultant. Non-conforming panels may be retested in accordance with Subsection 2.02(B) and 2.02(D) under authorization of the Geosynthetic Quality Assurance Consultant only.

3. The Geomembrane Manufacturer and/or Geomembrane Installer may perform independent tests in accordance with methods and procedures specified in Subsection 2.02(B). Results shall not be substituted for quality assurance testing described herein.

D. Procedures for Determining Conformance Test Failures

1. If conformance test results fail to meet specifications, the roll and/or batch may be retested using specimens from either the original roll sample or from another sample collected by the Geosynthetic Quality Assurance Consultant. Two additional tests (retests) shall be performed for each failed test procedure. Each retest shall consist of multiple specimen tests if multiple specimens are specified in the test procedure. If the results of both retests meet specifications, the roll and batch will be considered to have passed conformance testing.

2. Failure of any retest shall be cause for rejection of the entire roll or batch depending on the type of failing test. The Geosynthetic Quality Assurance Consultant reserves the right to collect samples from other rolls of a particular batch for further conformance testing. The Geosynthetic Quality Assurance Consultant may choose to accept only a portion of the batch on the basis of the results of conformance testing of samples collected from other rolls.

3. If retesting does not result in conformance with the specifications as defined in preceding paragraph, or if there are any other nonconformities with the material specifications, the Contractor shall remove the rolls from use in the project. The Contractor shall also be responsible for removal of rejected geomembrane from the site and replacement with acceptable geomembrane at no additional cost to the Owner.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

A. A Pre-Construction Meeting shall be held at the site to discuss and plan the details of geomembrane installation. This meeting shall be attended by the Geomembrane Installer, Owner, Engineer and the Contractor.

B. The following topics relating to geomembrane installation shall be addressed:

1. Responsibilities of each party.

2. Lines of authority and communication.

3. Methods for documenting, reporting and distributing documents and reports.

4. Procedures for packaging and storing archive samples.

5. Review of the schedule for all installation and quality assurance testing, including third-party testing turnaround times.

6. Review of panel layout, access and numbering systems for panels and seams including details for marking on the HDPE geomembrane.

7. Procedures and responsibilities for preparation and submittal of as-built drawings.

8. Temperature and weather limitations, installation procedures for adverse weather conditions and defining acceptable subgrade 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 geomembrane.

11. Procedures for covering of the geomembrane to prevent damage.

12. Plan for minimizing wrinkles in the geomembrane.

13. Measurement and payment schedules.

14. Site health and safety procedures/protocols.

3.02 SUBGRADE PREPARATION

A. Contractor shall prepare a subgrade surface in accordance with Section 02300, Earthwork.

B. The Contractor shall not excavate more than the amount of anchor trench required for one day of geosynthetics deployment, unless otherwise specified by the Geosynthetic Quality Assurance Consultant. Rounded corners shall be provided in the trenches where the geosynthetics enter the trench to allow them to be uniformly supported by the subgrade and to avoid sharp bends. The geosynthetics shall not be supported by loose soils in anchor trenches.

C. The Geomembrane Installer shall visually inspect the subgrade immediately prior to geomembrane deployment. Inspection shall verify that there are no potentially harmful foreign objects present, such as sharp rocks and other deleterious debris. Any foreign objects encountered shall be removed by Geomembrane Installer or Contractor. All subgrade damaged by construction equipment and deemed unsuitable for geomembrane deployment shall be repaired prior to geomembrane deployment. All repairs shall be approved by the Geosynthetic Quality Assurance Consultant and Geomembrane Installer. The responsibility for preparation, repairs, and maintenance of the subgrade shall be defined in the preconstruction meeting. The Geomembrane Installer shall provide the Geosynthetic Quality Assurance Consultant with written acceptance of subgrade surface over which geomembrane is deployed (Part 1 .05C) for each day of deployment.

3.03 GEOMEMBRANE DEPLOYMENT

A. Geomembrane shall not be deployed until all applicable certifications/quality control certificates listed in Subsection 1.05 of this section and conformance testing listed in Subsection 2.02 of this section are submitted and approved by the Geosynthetic Quality Assurance Consultant. Any geomembrane deployed prior to approval by the Geosynthetic Quality Assurance Consultant shall be at the sole risk of the Geomembrane Installer and/or Contractor. If material installed prior to approval by the Geosynthetic Quality Assurance Consultant does not meet the requirements of this specification, it shall be removed from the site at no additional cost to the Owner.

B. Geomembrane will be deployed according to submitted panel layout drawing as approved by the Geosynthetic Quality Assurance Consultant. The Geosynthetic Quality Assurance Consultant is to be notified of and approve any revisions or modifications to the approved panel layout drawing prior to deploying geomembrane in the area of review.

C. Adequate temporary anchoring (sand bags, tires, etc.) that will not damage the geomembrane shall be placed on a deployed panel to prevent uplift by wind.

D. Geomembrane shall not be deployed if:

1. Ambient temperatures are below 41 degrees F (5 degrees C) or above 104 degrees F (40 degrees C) measured six inches above geomembrane surface unless approved by the Geosynthetic Quality Assurance Consultant.

2. Precipitation is expected or in the presence of excessive moisture or ponded water on the subgrade surface.

3. Winds are excessive as determined by Geomembrane Installer in agreement with the Geosynthetic Quality Assurance Consultant.

4. The Geosynthetic Quality Assurance Consultant will have the authority to suspend work during such conditions.

E. The Geomembrane Installer shall be responsible for conformance with the following requirements:

1. Equipment utilized for installation/quality assurance testing does not damage geomembrane. Such equipment shall have rubber tires and a ground pressure not exceeding 5 psi or total weight exceeding 750 lbs. Only equipment necessary for installation and quality assurance testing is allowed on the deployed geomembrane.

2. Personnel working on geomembrane do not damage geomembrane (activities such as smoking or wearing damaging clothing shall not be allowed).

3. Method of deployment does not damage geomembrane.

4. Method of deployment minimizes wrinkles.

5. Temporary loading or anchoring does not damage geomembrane.

6. Direct contact with geomembrane is minimized.

F. No vehicles shall be allowed on deployed geomembrane under any circumstances.

3.04 FIELD SEAMS

A. Seam Layout

1. In general, seams shall be oriented parallel to the line of the maximum slope. In corners and at other odd-shaped geometric intersections, number of seams should be minimized. If at all possible, seams shall not be located at low points in the subgrade unless geometry requires seaming to be done at these locations.

2. A seam numbering system compatible with the panel numbering system shall be agreed upon at the Pre-Construction Meeting.

C. Field Test Methods

1. Ten 1-inch-wide samples described above under Part 3.06(B)(3) shall be field tested for peel (5 samples) and shear (5 samples) in accordance with GRI GM 19.

2. One seam sample shall be field tested for peel and shear at the end of each continuous field seam 100 feet or greater in length.

3. Testing shall be performed in accordance with ASTM D6392 using a field tensiometer or equivalent device to qualitatively and quantitatively determine mode of failure.

4. Seam shall be considered passing if failure in both peel and shear meet criteria listed in GRI GM 19.

5. The procedures specified in Subsection 3.06(D) shall be implemented when sample passes field tensiometer test.

D. Laboratory Test Methods

1. Laboratory testing of seam samples shall be conducted by the Geosynthetic Quality Assurance Laboratory under contract with the Geosynthetic Quality Assurance Consultant or Owner. Five specimens shall be tested in shear and five in peel.

2. Laboratory testing shall be conducted in accordance with GRI GM 19.

3. For both seam shear and peel tension tests, an indication will be given for each specimen tested which defines locus of failure.

4. For shear tests, the following values, along with the mean and standard deviation where appropriate, will be reported for each specimen tested:

   a. Maximum tension in pounds per square inch.

   b. Elongation at break (up to a tested maximum of 100 percent).

   c. Locus of failure using ASTM D6392 designations.

5. For peel tests, the following values, along with the mean and standard deviation where appropriate, will be reported for each specimen tested:

   a. Maximum tension in pounds per square inch.

   b. Seam separation (expressed as percent of original seam area).

c. Locus of failure.

6. Retesting of seams due to nonconformance with specifications may be performed at the discretion of the Geosynthetic Quality Assurance Consultant.

E. Destructive Seam Test Failure

1. Shear and peel test results derived from testing described in Parts 3.06(C) and 3.06(D) shall comply with GRI GM 19 for seam to be considered acceptable.

2. The Geomembrane Installer has two options in determining the repair boundary whenever a seam has failed destructive testing:

   a. The seam can be reconstructed between the two previously tested and passed destructive sample locations; or,

   b. The Geomembrane Installer can trace the welding path to an intermediate location at least ten feet from point of failed test in each direction and obtain destructive test samples collected from these locations. If destructive tests on these samples are acceptable, then the seam shall be reconstructed between the intermediate locations. If either sample fails, the process may be repeated until an acceptable seam test has been performed on both sides of the original failed sample. If a passing sample is not realized on one (or both) side of the original failed sample, then seam repair must extend to the end(s) of the seam. Retesting of seams according to this procedure shall utilize the sampling methodology described in Part 3.06(B). The Owner reserves the right to terminate this process, at the discretion of the Geosynthetic Quality Assurance Consultant, after the second retesting. An additional sample taken from the reconstructed zone must pass destructive seam testing if destructive sample failure(s) causes reconstruction.

3. The Geosynthetic Quality Assurance Consultant shall be responsible for documenting all actions taken in repairing seams. The Geomembrane Installer will be responsible for keeping the Geosynthetic Quality Assurance Consultant informed of seaming progress.

4. Additional fees for destructive seam test failures shall be assessed to the Contractor and deducted from payment. This fee shall be assessed only if the failing sample is a laboratory sample.

3.07 ELECTRONIC LEAK LOCATION SURVEY

A. The Owner shall have the option to conduct an electronic leak location survey. Leak location survey shall be performed by the Leak Location Contractor under the observation of the Geosynthetic Quality Assurance Consultant.

B. Leak Location Contractor shall identify actions required by Contractor to prepare the site for the leak location survey.

C. Contractor shall ensure that the layers above and below the geomembrane contains sufficient moisture to conduct a leak location survey. Typically, a moisture content of earth materials of 1% to 2% by weight is sufficient to conduct the survey. If the moisture content of layers above and/or below the geomembrane is not sufficient per the requirements of the Leak Location Contractor, Contractor shall add moisture to the layers, as required.

D. Contractor shall provide electrical isolation of the metal marker posts, batten bars, and concrete structures, as requested by Leak Location Contractor.

E. Leak Location Contractor shall inspect the site prior to commencing the survey to ensure all site preparations are completed and the site conditions are appropriate for conducting the leak location survey.

F. Any discrepancy in the required site preparation detailed in the Leak Location Contractor's Work Plan or site conditions shall be reported to the Contractor for corrective or appropriate action.

G. After the final layer is placed above the geomembrane, conduct a leak location survey on the final layer material using the procedures for surveys with earth materials covering the Geomembrane as described in ASTM D 7007.

H. A leak detection sensitivity test using an artificial leak shall be conducted on the geomembrane for each set of equipment used before the equipment is used on for the leak location survey, as described in ASTM D 7007 to determine the detection distance for the survey.

I. The leak location survey shall be taken on survey lines or on a grid spaced no farther apart than twice the leak detection distance as determined in the leak detection sensitivity test.

J. The Leak Location Contractor shall inform the Owner and/or Engineer and mark the locations of all identified or indicated leaks with a flag or spray paint. The Geomembrane Installer shall repair the defect/hole as detailed in Part 3.08 of this Section.

3.08 DEFECTS AND REPAIRS

A. The geomembrane shall be examined by the Geomembrane Installer and the Engineer for defects, holes, blisters, undispersed raw materials, and any signs of contamination by foreign matter. The geomembrane surface shall be swept and/or washed by the Geomembrane Installer if the amount of dust or mud inhibits examination. The

Contractor shall provide a water truck, an operator, clean water and hoses as reasonably necessary to assist the Geomembrane Installer in this activity.

B. Portions of geomembrane exhibiting flaws, or failing a non-destructive or destructive (if conducted) test, shall be repaired or replaced by the Geomembrane Installer. Repair procedures available include:

1. Patching - used to repair large holes, tears, undispersed raw materials, contamination by foreign matter, holes resulting from destructive sampling (if conducted), and locations where seam overlap is insufficient;

2. Capping - used to repair large lengths of failed seams; and

3. Additional Procedures - used upon recommendation of the Geomembrane Installer if agreed to by the Engineer.

C. Patches or caps.

1. Extend patch or cap 6 inches (minimum) beyond the edge of the defect.

2. Round corners of patch and/or cap (suggest 3-inch radius).

3. Repair procedures, equipment, materials, and techniques will be approved by the Geosynthetic Quality Assurance Consultant prior to repair.

4. Geomembrane below large caps shall be appropriately cut to avoid water or gas collection between two sheets.

D. The Geomembrane Installer shall mark on the geomembrane (using a non-puncturing writing utensil), repair date, time, and personnel involved.

E. Each repair shall be non-destructively tested in accordance with Part 3.05. Large caps may require destructive test sampling in accordance with Part 3.06 at the discretion of the Geosynthetic Quality Assurance Consultant.

F. Repairs which fail testing shall be redone and retested until a passing result is obtained. The Geomembrane Installer will perform non-destructive testing on repairs and will document retesting of repairs.

G. The Geosynthetic Quality Assurance Consultant will document repairs, repair testing, and retesting results.

H. The Geomembrane Installer shall cut and seam wrinkles which may adversely affect long-term integrity of the geomembrane, hinder subsequent construction of overlying layers, or impede drainage off of the geomembrane after it is covered by soil. Seaming shall be done in accordance with procedures described in Parts 3.04(B) and 3.04(C), and it shall be subject to test provisions of Parts 3.05 (non-destructive testing) and 3.06 (destructive testing – if conducted).

3.09 PROTRUSIONS AND CONNECTIONS TO GEOMEMBRANE

A. If required, the Geomembrane Installer shall install geomembrane around utility poles, guy wires, and other structures according to the Contract Drawings and the following requirements:

1. Use minimum 1-ft long geomembrane pipe boots and steel clamps to seal the geomembrane around pole or structure.

2. Use standard welding procedures to seam the geomembrane boot to the geomembrane.

3. Seaming performed on and around penetrations, and other appurtenances shall be non-destructively tested using the vacuum testing method.

3.10 SURVEY DOCUMENTATION

A. The Geomembrane Installer shall survey the completed geomembrane prior to covering and provide the Geosynthetic Quality Assurance Consultant with 24-hour notification of survey. The Contractor shall document the location of all seams (panel corners acceptable), destructive test samples (if conducted) and repairs. The Contractor shall provide survey data to the Geosynthetic Quality Assurance Consultant within two working day of survey completion.

3.11 DAILY FIELD INSTALLATION REPORTS

A. At the beginning of each day, the Geomembrane Installer shall provide the Geosynthetic Quality Assurance Consultant with a report for all work completed the previous day.

B. The Daily Field Installation Report shall include the following:

1. The total amount and location of geomembrane placed.

2. The total length and location of seams completed, technician name and welding unit numbers.

3. A drawing or sketch depicting the geomembrane installed the previous day including the panel number, seam number and locations of non-destructive and destructive testing (if conducted).

4. Results of pre-qualification test seams, if available.

5. Results of non-destructive testing.

C. Destructive test results (if conducted) shall be reported within 48 hours or prior to covering the geomembrane, whichever is practical.

3.12 MATERIAL ABOVE GEOMEMBRANE

A. The Geosynthetic Quality Assurance Consultant and Geomembrane Installer shall verify the area of geomembrane completion prior to placement of material over the geomembrane.

B. Soils - Apply following general criteria for covering of the geomembrane:

1. Do not place soils on the geomembrane at an ambient temperature below 32 degrees F, (0 degrees C) nor above 104 degrees F (40 degrees C), unless otherwise specified.

2. Do not drive equipment used for placing soil directly on the geomembrane.

3. A minimum thickness of 1 foot of soil is specified between a low ground pressure dozer (maximum contact pressure of 5 lb/sq. inch) and the geomembrane.

4. A minimum thickness of 2 feet of soil is required between rubber-tired vehicles and the geomembrane.

5. Do not compact soils placed directly on geomembrane.

6. Damage to the geomembrane resulting from placement of cover soils shall be repaired in accordance with Part 3.08 by the Geomembrane Installer at the Contractor's expense.

7. Do not push soil downslope. Soil shall be placed over the geomembrane starting from base of the slope, up to top of the slope.

END OF SECTION

<u>ATTACHMENT 2</u>
<u>CCR CHEMICAL CONSTITUENTS ANALYSIS</u>

eurofins

Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Tel: (708)534-5200

Laboratory Job ID: 500-201436-1
Client Project/Site: Ash

For:
Midwest Generation EME LLC
13082 E Manito Road
Pekin, Illinois 61554

Attn: Joseph Kotas

Authorized for release by:
7/12/2021 3:51:25 PM

Diana Mockler, Project Manager I
(219)252-7570
Diana.Mockler@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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1 2 3 4 5 6 7 8 9 10 11 12 13

Job ID: 500-201436-1

Laboratory: Eurofins TestAmerica, Chicago

Narrative

Job Narrative
500-201436-1

Comments
No additional comments.

Receipt
The samples were received on 6/24/2021 3:35 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.6º C.

Metals
Method 6010B: The following samples were diluted due to the abundance of non-target analytes: ASH BASIN (500-201436-2) and METALS CB (500-201436-3). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL CHI
7471A	Mercury (CVAA)	SW846	TAL CHI
9056A	Anions, Ion Chromatography	SW846	TAL CHI
Moisture	Percent Moisture	EPA	TAL CHI
SM 4500 Cl- E	Chloride, Total	SM	TAL CHI
SM 4500 F C	Fluoride	SM	TAL CHI
300_Prep	Anions, Ion Chromatography, 10% Wt/Vol	MCAWW	TAL CHI
3050B	Preparation, Metals	SW846	TAL CHI
7471A	Preparation, Mercury	SW846	TAL CHI

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CHI = Eurofins TestAmerica, Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Client: Midwest Generation EME LLC
Project/Site: Ash

Job ID: 500-201436-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
500-201436-1	FAB	Solid	06/23/21 13:30	06/24/21 15:35	
500-201436-2	ASH BASIN	Solid	06/23/21 14:23	06/24/21 15:35	
500-201436-3	METALS CB	Solid	06/23/21 15:00	06/24/21 15:35	

Client: Midwest Generation EME LLC
Project/Site: Ash

Job ID: 500-201436-1

Client Sample ID: FAB
Date Collected: 06/23/21 13:30
Date Received: 06/24/21 15:35

Lab Sample ID: 500-201436-1
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<2.0		2.0		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Arsenic	**1.8**		0.99		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Barium	**88**		0.99		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Beryllium	**1.9**		0.40		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Boron	**64**		4.9		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Cadmium	<0.20		0.20		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Calcium	**13000**		20		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Chromium	**34**		0.99		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Cobalt	**5.2**		2.5		mg/Kg		07/08/21 08:24	07/09/21 11:48	5
Lead	**4.1**		0.49		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Lithium	**10**		0.99		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Molybdenum	**2.4**		0.99		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Selenium	<0.99		0.99		mg/Kg		07/08/21 08:24	07/09/21 11:25	1
Thallium	<0.99		0.99		mg/Kg		07/08/21 08:24	07/09/21 11:25	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.032**		0.016		mg/Kg		07/06/21 14:50	07/07/21 07:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**52**		2.0		mg/Kg		07/12/21 11:07	07/12/21 12:47	1
Chloride	**27**		20		mg/Kg		07/05/21 13:55	07/05/21 16:18	1
Fluoride	**1.3**		1.0		mg/Kg		07/05/21 13:55	07/05/21 17:39	1

Client Sample ID: ASH BASIN

Date Collected: 06/23/21 14:23
Date Received: 06/24/21 15:35

Lab Sample ID: 500-201436-2
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<8.6		8.6		mg/Kg		07/08/21 08:24	07/09/21 11:51	5
Arsenic	**2.2**		0.86		mg/Kg		07/08/21 08:24	07/09/21 11:28	1
Barium	**1800**		4.3		mg/Kg		07/08/21 08:24	07/09/21 11:51	5
Beryllium	**0.90**		0.34		mg/Kg		07/08/21 08:24	07/09/21 11:28	1
Boron	**46**		4.3		mg/Kg		07/08/21 08:24	07/09/21 11:28	1
Cadmium	<0.17		0.17		mg/Kg		07/08/21 08:24	07/09/21 11:28	1
Calcium	**39000**		17		mg/Kg		07/08/21 08:24	07/09/21 11:28	1
Chromium	**16**		0.86		mg/Kg		07/08/21 08:24	07/09/21 11:28	1
Cobalt	<11		11		mg/Kg		07/08/21 08:24	07/09/21 12:04	25
Lead	**5.5**		0.43		mg/Kg		07/08/21 08:24	07/09/21 11:28	1
Lithium	**12**		0.86		mg/Kg		07/08/21 08:24	07/09/21 11:28	1
Molybdenum	**1.0**		0.86		mg/Kg		07/08/21 08:24	07/09/21 11:28	1
Selenium	<0.86		0.86		mg/Kg		07/08/21 08:24	07/09/21 11:28	1
Thallium	**1.2**		0.86		mg/Kg		07/08/21 08:24	07/09/21 11:28	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.094**		0.015		mg/Kg		07/06/21 14:50	07/07/21 07:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**230**		9.7		mg/Kg		07/12/21 11:07	07/12/21 13:42	5
Chloride	**88**		20		mg/Kg		07/05/21 13:55	07/05/21 16:18	1
Fluoride	**4.7**		1.0		mg/Kg		07/05/21 13:55	07/05/21 17:42	1

Client: Midwest Generation EME LLC
Project/Site: Ash

Job ID: 500-201436-1

Client Sample ID: METALS CB

Date Collected: 06/23/21 15:00
Date Received: 06/24/21 15:35

Lab Sample ID: 500-201436-3
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.8		1.8		mg/Kg		07/08/21 08:24	07/09/21 11:32	1
Arsenic	**7.6**		0.89		mg/Kg		07/08/21 08:24	07/09/21 11:32	1
Barium	**1900**		8.9		mg/Kg		07/08/21 08:24	07/09/21 12:00	10
Beryllium	**1.5**		0.36		mg/Kg		07/08/21 08:24	07/09/21 11:32	1
Boron	**100**		4.5		mg/Kg		07/08/21 08:24	07/09/21 11:32	1
Cadmium	**4.3**		0.18		mg/Kg		07/08/21 08:24	07/09/21 11:32	1
Calcium	**120000**		180		mg/Kg		07/08/21 08:24	07/09/21 12:00	10
Chromium	**52**		0.89		mg/Kg		07/08/21 08:24	07/09/21 11:32	1
Cobalt	<22		22		mg/Kg		07/08/21 08:24	07/09/21 12:27	50
Lead	**66**		0.45		mg/Kg		07/08/21 08:24	07/09/21 11:32	1
Lithium	**16**		0.89		mg/Kg		07/08/21 08:24	07/09/21 11:32	1
Molybdenum	**5.3**		0.89		mg/Kg		07/08/21 08:24	07/09/21 11:32	1
Selenium	**7.1**		0.89		mg/Kg		07/08/21 08:24	07/09/21 11:32	1
Thallium	**4.0**		0.89		mg/Kg		07/08/21 08:24	07/09/21 11:32	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.26**		0.015		mg/Kg		07/06/21 14:50	07/07/21 07:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**21000**		2000		mg/Kg		07/12/21 11:07	07/12/21 14:09	1000
Chloride	**110**		20		mg/Kg		07/05/21 13:55	07/05/21 16:18	1
Fluoride	**22**		0.99		mg/Kg		07/05/21 13:55	07/05/21 17:49	1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Metals

Prep Batch: 607902

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-201436-1	FAB	Total/NA	Solid	7471A	
500-201436-2	ASH BASIN	Total/NA	Solid	7471A	
500-201436-3	METALS CB	Total/NA	Solid	7471A	
MB 500-607902/12-A	Method Blank	Total/NA	Solid	7471A	
LCS 500-607902/13-A	Lab Control Sample	Total/NA	Solid	7471A	

Analysis Batch: 608143

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-201436-1	FAB	Total/NA	Solid	7471A	607902
500-201436-2	ASH BASIN	Total/NA	Solid	7471A	607902
500-201436-3	METALS CB	Total/NA	Solid	7471A	607902
MB 500-607902/12-A	Method Blank	Total/NA	Solid	7471A	607902
LCS 500-607902/13-A	Lab Control Sample	Total/NA	Solid	7471A	607902

Prep Batch: 608328

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-201436-1	FAB	Total/NA	Solid	3050B	
500-201436-2	ASH BASIN	Total/NA	Solid	3050B	
500-201436-3	METALS CB	Total/NA	Solid	3050B	
MB 500-608328/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 500-608328/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Analysis Batch: 608625

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-201436-1	FAB	Total/NA	Solid	6010B	608328
500-201436-1	FAB	Total/NA	Solid	6010B	608328
500-201436-2	ASH BASIN	Total/NA	Solid	6010B	608328
500-201436-2	ASH BASIN	Total/NA	Solid	6010B	608328
500-201436-2	ASH BASIN	Total/NA	Solid	6010B	608328
500-201436-3	METALS CB	Total/NA	Solid	6010B	608328
500-201436-3	METALS CB	Total/NA	Solid	6010B	608328
500-201436-3	METALS CB	Total/NA	Solid	6010B	608328
MB 500-608328/1-A	Method Blank	Total/NA	Solid	6010B	608328
LCS 500-608328/2-A	Lab Control Sample	Total/NA	Solid	6010B	608328

General Chemistry

Analysis Batch: 606811

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-201436-1	FAB	Total/NA	Solid	Moisture	
500-201436-2	ASH BASIN	Total/NA	Solid	Moisture	
500-201436-3	METALS CB	Total/NA	Solid	Moisture	

Prep Batch: 607760

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-201436-1	FAB	Total/NA	Solid	300_Prep	
500-201436-2	ASH BASIN	Total/NA	Solid	300_Prep	
500-201436-3	METALS CB	Total/NA	Solid	300_Prep	
MB 500-607760/1-A	Method Blank	Total/NA	Solid	300_Prep	
LCS 500-607760/2-A	Lab Control Sample	Total/NA	Solid	300_Prep	
LCSD 500-607760/3-A	Lab Control Sample Dup	Total/NA	Solid	300_Prep	

General Chemistry

Analysis Batch: 607876

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-201436-1	FAB	Total/NA	Solid	SM 4500 F C	607760
500-201436-2	ASH BASIN	Total/NA	Solid	SM 4500 F C	607760
500-201436-3	METALS CB	Total/NA	Solid	SM 4500 F C	607760
MB 500-607760/1-A	Method Blank	Total/NA	Solid	SM 4500 F C	607760
LCS 500-607760/2-A	Lab Control Sample	Total/NA	Solid	SM 4500 F C	607760
LCSD 500-607760/3-A	Lab Control Sample Dup	Total/NA	Solid	SM 4500 F C	607760

Analysis Batch: 607925

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-201436-1	FAB	Total/NA	Solid	SM 4500 Cl- E	607760
500-201436-2	ASH BASIN	Total/NA	Solid	SM 4500 Cl- E	607760
500-201436-3	METALS CB	Total/NA	Solid	SM 4500 Cl- E	607760
MB 500-607760/1-A	Method Blank	Total/NA	Solid	SM 4500 Cl- E	607760
LCS 500-607760/2-A	Lab Control Sample	Total/NA	Solid	SM 4500 Cl- E	607760
LCSD 500-607760/3-A	Lab Control Sample Dup	Total/NA	Solid	SM 4500 Cl- E	607760

Prep Batch: 608902

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-201436-1	FAB	Total/NA	Solid	300_Prep	
500-201436-2	ASH BASIN	Total/NA	Solid	300_Prep	
500-201436-3	METALS CB	Total/NA	Solid	300_Prep	
MB 500-608902/1-A	Method Blank	Total/NA	Solid	300_Prep	
LCS 500-608902/2-A	Lab Control Sample	Total/NA	Solid	300_Prep	

Analysis Batch: 608919

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-201436-1	FAB	Total/NA	Solid	9056A	608902
500-201436-2	ASH BASIN	Total/NA	Solid	9056A	608902
500-201436-3	METALS CB	Total/NA	Solid	9056A	608902
MB 500-608902/1-A	Method Blank	Total/NA	Solid	9056A	608902
LCS 500-608902/2-A	Lab Control Sample	Total/NA	Solid	9056A	608902

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 500-608328/1-A
Matrix: Solid
Analysis Batch: 608625

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 608328

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<2.0		2.0		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Arsenic	<1.0		1.0		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Barium	<1.0		1.0		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Beryllium	<0.40		0.40		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Boron	<5.0		5.0		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Cadmium	<0.20		0.20		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Calcium	<20		20		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Chromium	<1.0		1.0		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Cobalt	<0.50		0.50		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Lead	<0.50		0.50		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Lithium	<1.0		1.0		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Molybdenum	<1.0		1.0		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Selenium	<1.0		1.0		mg/Kg		07/08/21 08:24	07/09/21 10:31	1
Thallium	<1.0		1.0		mg/Kg		07/08/21 08:24	07/09/21 10:31	1

Lab Sample ID: LCS 500-608328/2-A
Matrix: Solid
Analysis Batch: 608625

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 608328

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	50.0	48.6		mg/Kg		97	80 - 120
Arsenic	10.0	9.39		mg/Kg		94	80 - 120
Barium	200	194		mg/Kg		97	80 - 120
Beryllium	5.00	4.65		mg/Kg		93	80 - 120
Boron	100	85.0		mg/Kg		85	80 - 120
Cadmium	5.00	4.62		mg/Kg		92	80 - 120
Calcium	1000	967		mg/Kg		97	80 - 120
Chromium	20.0	18.8		mg/Kg		94	80 - 120
Cobalt	50.0	47.4		mg/Kg		95	80 - 120
Lead	10.0	9.35		mg/Kg		94	80 - 120
Lithium	50.0	50.9		mg/Kg		102	80 - 120
Molybdenum	100	97.0		mg/Kg		97	80 - 120
Selenium	10.0	8.53		mg/Kg		85	80 - 120
Thallium	10.0	9.13		mg/Kg		91	80 - 120

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 500-607902/12-A
Matrix: Solid
Analysis Batch: 608143

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 607902

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.017		0.017		mg/Kg		07/06/21 14:50	07/07/21 06:11	1

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 500-607902/13-A
Matrix: Solid
Analysis Batch: 608143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 607902

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.167	0.174		mg/Kg		105	80 - 120

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 500-608902/1-A
Matrix: Solid
Analysis Batch: 608919

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 608902

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<2.0		2.0		mg/Kg		07/12/21 11:07	07/12/21 12:20	1

Lab Sample ID: LCS 500-608902/2-A
Matrix: Solid
Analysis Batch: 608919

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 608902

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	50.0	53.7		mg/Kg		107	80 - 120

Method: SM 4500 Cl- E - Chloride, Total

Lab Sample ID: MB 500-607760/1-A
Matrix: Solid
Analysis Batch: 607925

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 607760

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<20		20		mg/Kg		07/05/21 13:55	07/05/21 16:17	1

Lab Sample ID: LCS 500-607760/2-A
Matrix: Solid
Analysis Batch: 607925

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 607760

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	200	205		mg/Kg		103	85 - 115

Lab Sample ID: LCSD 500-607760/3-A
Matrix: Solid
Analysis Batch: 607925

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 607760

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	200	206		mg/Kg		103	85 - 115	0	20

Method: SM 4500 F C - Fluoride

Lab Sample ID: MB 500-607760/1-A
Matrix: Solid
Analysis Batch: 607876

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 607760

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<1.0		1.0		mg/Kg		07/05/21 13:55	07/05/21 17:23	1

Method: SM 4500 F C - Fluoride (Continued)

Lab Sample ID: LCS 500-607760/2-A
Matrix: Solid
Analysis Batch: 607876

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 607760

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	100	112		mg/Kg		112	80 - 120

Lab Sample ID: LCSD 500-607760/3-A
Matrix: Solid
Analysis Batch: 607876

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 607760

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	100	112		mg/Kg		112	80 - 120	1	20

1 2 3 4 5 6 7 8 9 10 11 12 13

Client Sample ID: FAB — Lab Sample ID: 500-201436-1

Date Collected: 06/23/21 13:30 — **Matrix: Solid**
Date Received: 06/24/21 15:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			608328	07/08/21 08:24	BDE	TAL CHI
Total/NA	Analysis	6010B		1	608625	07/09/21 11:25	JJB	TAL CHI
Total/NA	Prep	3050B			608328	07/08/21 08:24	BDE	TAL CHI
Total/NA	Analysis	6010B		5	608625	07/09/21 11:48	JJB	TAL CHI
Total/NA	Prep	7471A			607902	07/06/21 14:50	MJG	TAL CHI
Total/NA	Analysis	7471A		1	608143	07/07/21 07:00	MJG	TAL CHI
Total/NA	Prep	300_Prep			608902	07/12/21 11:07	PSP	TAL CHI
Total/NA	Analysis	9056A		1	608919	07/12/21 12:47	EAT	TAL CHI
Total/NA	Analysis	Moisture		1	606811	06/29/21 16:58	LWN	TAL CHI
Total/NA	Prep	300_Prep			607760	07/05/21 13:55	MS	TAL CHI
Total/NA	Analysis	SM 4500 Cl- E		1	607925	07/05/21 16:18	MS	TAL CHI
Total/NA	Prep	300_Prep			607760	07/05/21 13:55	MS	TAL CHI
Total/NA	Analysis	SM 4500 F C		1	607876	07/05/21 17:39	MS	TAL CHI

Client Sample ID: ASH BASIN — Lab Sample ID: 500-201436-2

Date Collected: 06/23/21 14:23 — **Matrix: Solid**
Date Received: 06/24/21 15:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			608328	07/08/21 08:24	BDE	TAL CHI
Total/NA	Analysis	6010B		1	608625	07/09/21 11:28	JJB	TAL CHI
Total/NA	Prep	3050B			608328	07/08/21 08:24	BDE	TAL CHI
Total/NA	Analysis	6010B		5	608625	07/09/21 11:51	JJB	TAL CHI
Total/NA	Prep	3050B			608328	07/08/21 08:24	BDE	TAL CHI
Total/NA	Analysis	6010B		25	608625	07/09/21 12:04	JJB	TAL CHI
Total/NA	Prep	7471A			607902	07/06/21 14:50	MJG	TAL CHI
Total/NA	Analysis	7471A		1	608143	07/07/21 07:02	MJG	TAL CHI
Total/NA	Prep	300_Prep			608902	07/12/21 11:07	PSP	TAL CHI
Total/NA	Analysis	9056A		5	608919	07/12/21 13:42	EAT	TAL CHI
Total/NA	Analysis	Moisture		1	606811	06/29/21 16:58	LWN	TAL CHI
Total/NA	Prep	300_Prep			607760	07/05/21 13:55	MS	TAL CHI
Total/NA	Analysis	SM 4500 Cl- E		1	607925	07/05/21 16:18	MS	TAL CHI
Total/NA	Prep	300_Prep			607760	07/05/21 13:55	MS	TAL CHI
Total/NA	Analysis	SM 4500 F C		1	607876	07/05/21 17:42	MS	TAL CHI

Client Sample ID: METALS CB — Lab Sample ID: 500-201436-3

Date Collected: 06/23/21 15:00 — **Matrix: Solid**
Date Received: 06/24/21 15:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			608328	07/08/21 08:24	BDE	TAL CHI
Total/NA	Analysis	6010B		1	608625	07/09/21 11:32	JJB	TAL CHI
Total/NA	Prep	3050B			608328	07/08/21 08:24	BDE	TAL CHI
Total/NA	Analysis	6010B		10	608625	07/09/21 12:00	JJB	TAL CHI

Client Sample ID: METALS CB

Lab Sample ID: 500-201436-3

Date Collected: 06/23/21 15:00

Matrix: Solid

Date Received: 06/24/21 15:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			608328	07/08/21 08:24	BDE	TAL CHI
Total/NA	Analysis	6010B		50	608625	07/09/21 12:27	JJB	TAL CHI
Total/NA	Prep	7471A			607902	07/06/21 14:50	MJG	TAL CHI
Total/NA	Analysis	7471A		1	608143	07/07/21 07:04	MJG	TAL CHI
Total/NA	Prep	300_Prep			608902	07/12/21 11:07	PSP	TAL CHI
Total/NA	Analysis	9056A		1000	608919	07/12/21 14:09	EAT	TAL CHI
Total/NA	Analysis	Moisture		1	606811	06/29/21 16:58	LWN	TAL CHI
Total/NA	Prep	300_Prep			607760	07/05/21 13:55	MS	TAL CHI
Total/NA	Analysis	SM 4500 Cl- E		1	607925	07/05/21 16:18	MS	TAL CHI
Total/NA	Prep	300_Prep			607760	07/05/21 13:55	MS	TAL CHI
Total/NA	Analysis	SM 4500 F C		1	607876	07/05/21 17:49	MS	TAL CHI

Laboratory References:

TAL CHI = Eurofins TestAmerica, Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Accreditation/Certification Summary

Client: Midwest Generation EME LLC
Job ID: 500-201436-1
Project/Site: Ash

Laboratory: Eurofins TestAmerica, Chicago

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Illinois	NELAP	IL00035	04-29-22

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park IL 60484
Phone 708-534-5200 Fax. 708-534-5211

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler:	Lab PM: Mockler Diana J	Carrier Tracking No(s):	COC No: 500-92457-41195 1
Client Contact: Joseph Kotas	Phone	E-Mail: Diana Mockler@Eurofinset.com	State of Origin	Page: Page 1 of 1
Company: Midwest Generation EME LLC	PWSID:	**Analysis Requested**		Job #: 500-201436
Address: 13082 E Manito Road	**Due Date Requested**			
City: Pekin	**TAT Requested (days)**			
State Zip: IL, 61554	**Compliance Project:** Δ Yes Δ No			
Phone: 815-372-4589(Tel)	PO #: 4502051132			
Email: joseph kotas@nrg com	WO #: 36733393			
Project Name: Powerton Station	Project #: 50000647			
Site:	SSOW#:			

500-201436 COC

Preservation Codes
A HCL, B NaOH, C Zn Acetate, D Nitric Acid, E NaHSO4, F MeOH, G Amchlor, H Ascorbic Acid, I Ice, J DI Water, K EDTA, L EDA
M Hexane, N None, O AsNaO2, P Na2O4S, Q Na2SO3, R Na2S2O3, S H2SO4, T TSP Dodecahydrate, U Acetone, V MCAA, W pH 4-5, Z other (specify)
Other

	Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, 904.0	Ra226Ra228_GFPC - Combined Rad 226/228	4500_F_C, 6010B, 7471A, 9056A, SM4500_Cl_E	Total Number of containers	Special Instructions/Note
					Preservation Code:			N	N	N		
1	FAB	6/23/21	13:30	G	Solid			X		X		
1	FAB2	6/23/21	1330	C	Solid				X			
					Solid							
2	ASH BASIN	6/23/21	14 23	C	Sl				X			
1	ASH 2	6/23/21	14:23	C	Sol			X		X		
3	Metals 2	6/23/21	15:00	C	Sol				X			
1	Metals CB	6/23/21	15.00	C	Sol			X		X		

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ________ Months

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
J N Kotas	6/23/21 4:30		Stephanie Hernandez	6/24/21 1535	ETA-CHI

Custody Seals Intact. Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks. 4.9 → 4.6

Ver: 11/01/2020 7/12/2021

ORIGIN ID PIAA (309) 477-5216
JOSEPH KOTAS
MIDWEST GENERATION
POWERTON GENERATING STATION
13082 E MANITO ROAD
PEKIN, IL 61554
UNITED STATES US

SHIP DATE 23JUN21
ACTWGT 30 00 LB
CAD 100275867/INET4340
DIMS 14x12x22 IN

BILL SENDER

TO **ATTN: SAMPLE RECEIVING**
EUROFINS TESTAMERICA, CHICAGO
2417 BOND ST

UNIVERSITY PARK IL 60484
(708) 534-5200 X 153 REF
INV
PO DEPT

500-201436 Wayb
56DJ3/B38/FE4A

FedEx Express

E

J211321033101uv

THU - 24 JUN 4:30P
STANDARD OVERNIGHT

TRK# 0201 **7740 8262 9809**

60484
IL-US **ORD**

UF JOTA

48qt.

fter printing this label
Use the 'Print' button on this page to print your label to your laser or inkjet printer
Fold the printed page along the horizontal line
Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned

/arning Use only the printed original label for shipping Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing
harges along with the cancellation of your FedEx account number
se of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex com FedEx will not be responsible
or any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher
alue, pay an additional charge, document your actual loss and file a timely claim Limitations found in the current FedEx Service Guide apply Your right to recover
om FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether
irect, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value Recovery cannot exceed actual documented
ss Maximum for items of extraordinary value is $1,000, e g jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide Written
aims must be filed within strict time limits, see current FedEx Service Guide

Login Sample Receipt Checklist

Client: Midwest Generation EME LLC

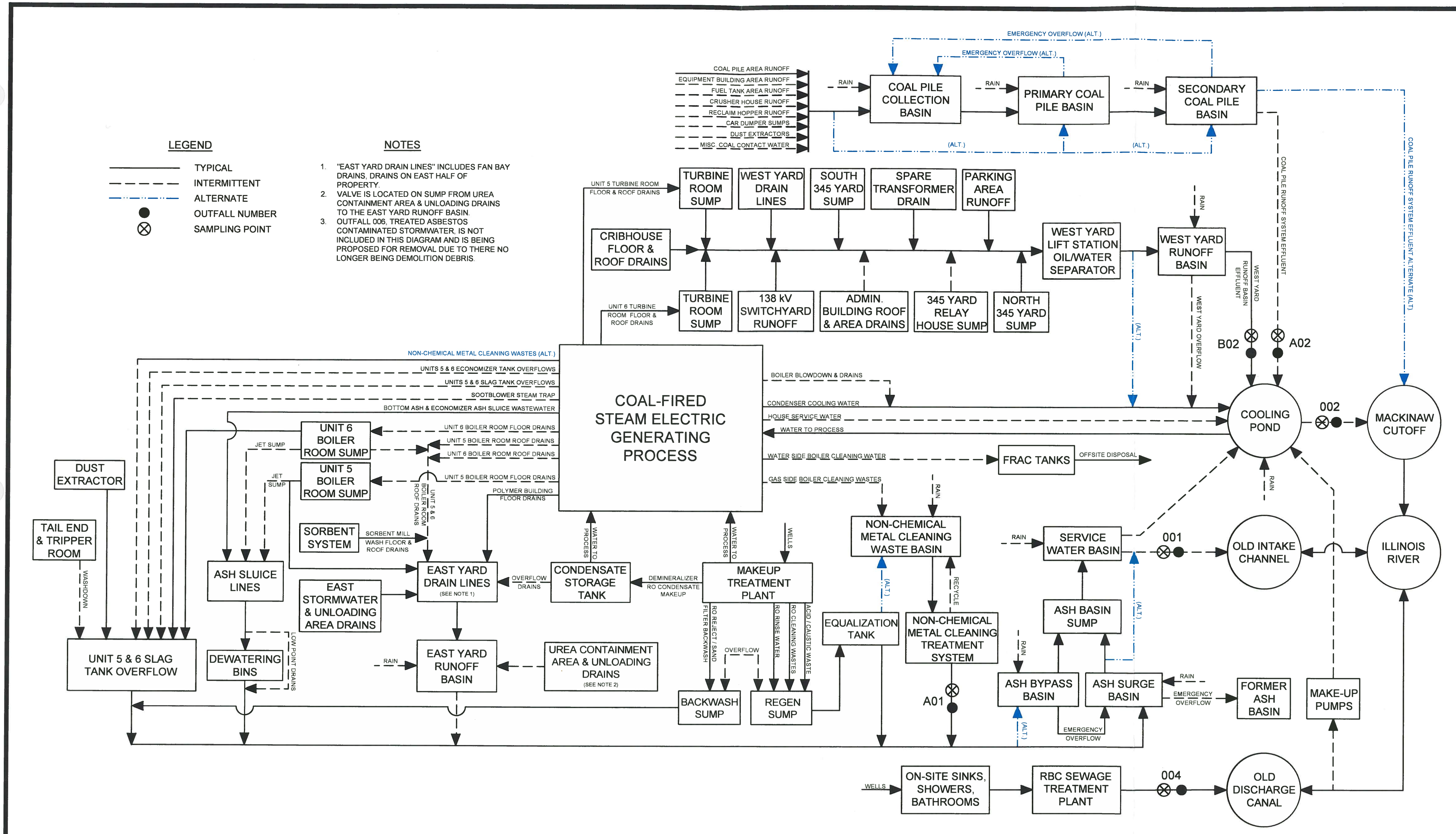
Job Number: 500-201436-1

Login Number: 201436
List Number: 1
Creator: Hernandez, Stephanie

List Source: Eurofins TestAmerica, Chicago

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.6
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ATTACHMENT 3
POWERTON FLOW DIAGRAM



REV. NO.	DATE	DESCRIPTION

APTIM

APTIM Environmental & Infrastructure, LLC

MIDWEST GENERATION, LLC
POWERTON GENERATING STATION

GENERAL FLOW DIAGRAM WITH NPDES OUTFALLS
NPDES PERMIT NO. IL0002232

DRAWN BY: ORC	APPROVED BY: SZF	PROJ. NO.: 631003864	DATE: NOVEMBER 2019

ATTACHMENT 4
LOCATION STANDARDS DEMONSTRATION

Attachment 4-1 – ASB and ABB Locations Determinations

PLACEMENT ABOVE THE UPPERMOST AQUIFER LOCATION RESTRICTIONS
ASH SURGE BASIN
POWERTON GENERATING STATION
SEPTEMBER 2021

Pursuant to 35 Ill. Adm. Code Subpart C, Section 845.300, KPRG and Associates, Inc (KPRG) prepared this report to document compliance with location restrictions related to placement above the uppermost aquifer for the existing Ash Surge Basin (ASB) at the Powerton Generating Station (Site) in Pekin, Illinois.

The work presented in this report was performed under the direction of Joshua Davenport in accordance with §845.300. Richard Gnat reviewed this report in accordance with KPRG's quality assurance/quality control procedures.

1. Placement Location Restriction Determination

The base of the ASB is approximately elevation 452 ft amsl and the upper limit groundwater elevation is 449.00 ft amsl. The ASB is not separated from the upper limit of the uppermost aquifer by a minimum of five (5) feet. The groundwater elevation data dated November 2015 to May 2021 that is associated with the ASB groundwater monitoring network and the elevation of the ASB liner were compared to determine if a hydraulic connection was present. This comparison demonstrated that an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the ASB and the uppermost aquifer due to normal fluctuations in groundwater elevations is not present.

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by KPRG personnel and information provided to KPRG by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

Joshua D. Davenport, P.E.

Illinois Professional Engineer No. 062.061945
License Expires: 11/30/2021

9/30/21

JOSHUA D. DAVENPORT
062-061945
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS

Geosyntec consultants

1420 Kensington Road, Suite 103
Oak Brook, Illinois 60523
Phone: 630.203.3340
Fax: 630.203.3341
www.geosyntec.com

PLACEMENT ABOVE THE UPPERMOST AQUIFER LOCATION RESTRICTIONS
ASH SURGE BASIN AND BYPASS BASIN
POWERTON STATION
OCTOBER 2018

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.60, Geosyntec Consultants (Geosyntec) prepared this report to document compliance with location restrictions related to placement above the uppermost aquifer for the existing Ash Surge Basin and Bypass Basin (the Basins) at the Powerton Station (Site) in Pekin, Illinois.

The work presented in this report was performed under the direction of Mr. Jesse Varsho, P.G., P.E., of Geosyntec. Ms. Jane Soule, P.E., reviewed this report in accordance with Geosyntec's senior review policy.

1. Placement Above the Uppermost Aquifer Restriction Determination

The bases of Ash Surge Basin and Bypass Basin are separated from the upper limit of the uppermost aquifer by a minimum distance of five (5) feet (1.52 meters). Therefore, the locations of the Basins are in compliance with the requirements outlined in §257.60.

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

LICENSED PROFESSIONAL ENGINEER
JESSE PAUL VARSHO
062-059069
STATE OF ILLINOIS

Jesse Varsho, P.E.
Illinois Professional Engineer No. 062.067766
License Expires: 11/30/19

Geosyntec
consultants

1420 Kensington Road, Suite 103
Oak Brook, Illinois 60523
Phone: 630.203.3340
Fax: 630.203.3341
www.geosyntec.com

WETLANDS LOCATION RESTRICTIONS
ASH SURGE AND BYPASS BASINS
POWERTON STATION
OCTOBER 2018

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.61, Geosyntec Consultants (Geosyntec) prepared this report to document compliance with location restrictions related to wetlands for the existing Ash Surge Basin and Bypass Basin (the Basins) at the Powerton Station (Site) in Pekin, Illinois.

The work presented in this report was performed under the direction of Mr. Jesse Varsho, P.G., P.E., of Geosyntec in accordance with §257.61. Ms. Jane Soule, P.E., reviewed this report in accordance with Geosyntec's senior review policy.

1. Wetlands Location Restriction Determination

The Ash Surge Basin and the Bypass Basin are not located in mapped wetlands included in the National Wetlands Inventory – Version 2 presented by the U.S. Fish and Wildlife Service (USFW) [USFW, 2018]. Therefore, the locations of the Basins are in compliance with the requirements outlined in §257.61(a).

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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3. References

USFS, 2018. "National Wetlands Inventory, Version 2," https://www.fws.gov/wetlands/data/Mapper.html, updated 1 May 2018, accessed 28 August 2018.

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FAULT AREAS LOCATION RESTRICTIONS
ASH SURGE AND BYPASS BASINS
POWERTON STATION
OCTOBER 2018

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.62, Geosyntec Consultants (Geosyntec) prepared this report to document compliance with location restrictions related to fault areas for the existing Ash Surge Basin and Bypass Basin (the Basins) at the Powerton Station (Site) in Pekin, Illinois.

The work presented in this report was performed under the direction of Mr. Jesse Varsho, P.G., P.E., of Geosyntec in accordance with §257.62. Ms. Jane Soule, P.E., reviewed this report in accordance with Geosyntec's senior review policy.

1. Fault Areas Location Restriction Determination

The Ash Surge Basin and the Bypass Basin are not located within 200 feet (60 meters) of a mapped Holocene-aged fault, as mapped by the United States Geological Survey (USGS) Quaternary Fault Database [USGS, 2018]. Therefore, the locations of the Basins are in compliance with the requirements outlined in §257.62(a).

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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3. References

USGS, 2018. "Quaternary Fault and Fold Database," https://earthquake.usgs.gov/hazards/qfaults/, accessed 28 August 2018.

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SEISMIC IMPACT ZONES LOCATION RESTRICTIONS
ASH SURGE AND BYPASS BASINS
POWERTON STATION
OCTOBER 2018

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.63, Geosyntec Consultants (Geosyntec) prepared this report to document compliance with location restrictions related to seismic impact areas for the existing Ash Surge Basin and Bypass Basin (the Basins) at the Powerton Station (Site) in Pekin, Illinois.

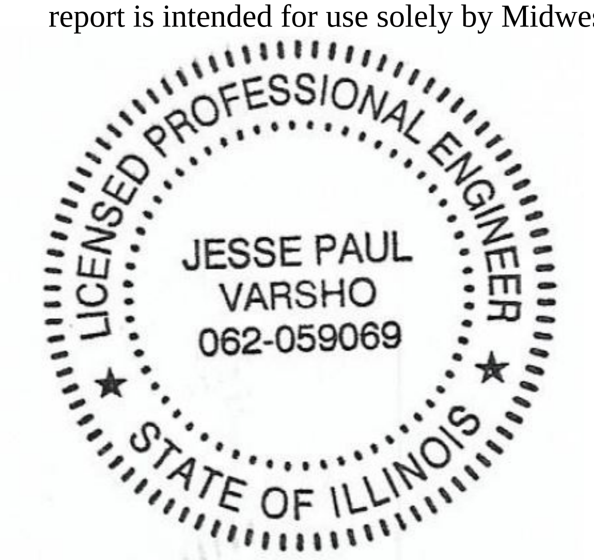
The work presented in this report was performed under the direction of Mr. Jesse Varsho, P.G., P.E., of Geosyntec in accordance with §257.63. Ms. Jane Soule, P.E., reviewed this report in accordance with Geosyntec's senior review policy.

1. Seismic Impact Zones Restriction Determination

The Ash Surge Basin and the Bypass Basin are not located within a seismic impact zone as defined in §257.53 and as mapped by the United States Geological Survey (USGS) [USGS, 2014]. Therefore, the locations of the Basins are in compliance with the requirements outlined in §257.63(a).

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.



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3. References

USGS, 2014. "2014 U.S. Geological Survey National Seismic Hazard Maps, PGA 2% in 50 Years," https://earthquake.usgs.gov/hazards/hazmaps/conterminous/index.php#2014, accessed 28 August 2018.

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UNSTABLE AREAS LOCATION RESTRICTIONS
ASH SURGE AND BYPASS BASINS
POWERTON STATION
OCTOBER 2018

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.64, Geosyntec Consultants (Geosyntec) prepared this report to document compliance with location restrictions related to unstable areas for the existing Ash Surge Basin and Bypass Basin (the Basins) at the Powerton Station (Site) in Pekin, Illinois.

The work presented in this report was performed under the direction of Mr. Jesse Varsho, P.G., P.E., of Geosyntec in accordance with §257.64. Ms. Jane Soule, P.E., reviewed this report in accordance with Geosyntec's senior review policy.

1. Unstable Areas Restriction Determination

The Ash Surge Basin and the Bypass Basin are not located in unstable areas [Geosyntec, 2016]. Therefore, the locations of the Basins are in compliance with the requirements outlined in §257.64(a).

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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3. References

Geosyntec, 2016. Structural Stability and Factor of Safety Assessment, Ash Surge Basin and Bypass Basin, Powerton Station, October.

Attachment 4-2 – FAB Locations Determinations

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PLACEMENT ABOVE THE UPPERMOST AQUIFER LOCATION RESTRICTIONS
FORMER ASH BASIN
POWERTON STATION
APRIL 2020

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.60, Geosyntec Consultants (Geosyntec) prepared this report to document compliance with location restrictions related to the uppermost aquifer at the existing Former Ash Basin at the Powerton Station (Site) in Pekin, Illinois.

The work presented in this report was performed under the direction of Mr. Jesse Varsho, P.G., P.E., of Geosyntec in accordance with §257.60. Ms. Jane Soule, P.E., reviewed this report in accordance with Geosyntec's senior review policy.

1. Placement Above the Uppermost Aquifer Location Restriction Determination

Based on previous groundwater separation evaluation performed at the Powerton Station, the base elevation of the Former Ash Basin is below the uppermost aquifer elevation. Because the Former Ash Basin does not meet the restrictions of §257.60, the Former Ash Basin will be closed to meet federal requirements.

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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WETLANDS LOCATION RESTRICTIONS
FORMER ASH BASIN
POWERTON STATION
APRIL 2020

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.61, Geosyntec Consultants (Geosyntec) prepared this report to document compliance with location restrictions related to wetlands for the existing Former Ash Basin at the Powerton Station (Site) in Pekin, Illinois.

The work presented in this report was performed under the direction of Mr. Jesse Varsho, P.G., P.E., of Geosyntec in accordance with §257.61. Ms. Jane Soule, P.E., reviewed this report in accordance with Geosyntec's senior review policy.

1. Wetlands Location Restriction Determination

A portion of the Former Ash Basin is located in a mapped wetland included in the National Wetlands Inventory – Version 2 presented by the U.S. Fish and Wildlife Service (USFW) [USFW, 2018]. Because a portion of the Former Ash Basin is located within a mapped wetland, the basin will be closed to meet federal requirements.

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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3. References

USFS, 2020. "National Wetlands Inventory, Version 2," https://www.fws.gov/wetlands/data/Mapper.html, updated 27 February 2020, accessed March 2020.

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FAULT AREAS LOCATION RESTRICTIONS
FORMER ASH BASIN
POWERTON STATION
APRIL 2020

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.62, Geosyntec Consultants (Geosyntec) prepared this report to document compliance with location restrictions related to fault areas for the existing Former Ash Basin at the Powerton Station (Site) in Pekin, Illinois.

The work presented in this report was performed under the direction of Mr. Jesse Varsho, P.G., P.E., of Geosyntec in accordance with §257.62. Ms. Jane Soule, P.E., reviewed this report in accordance with Geosyntec's senior review policy.

1. Fault Areas Location Restriction Determination

The Former Ash Basin is not located within 200 feet (60 meters) of a mapped Holocene-aged fault, as mapped by the United States Geological Survey (USGS) Quaternary Fault Database [USGS, 2020]. Therefore, the location of the Basin is in compliance with the requirements outlined in §257.62(a).

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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3. References

USGS, 2020. "Interactive Quaternary Fault Database," https://www.usgs.gov/natural-hazards/earthquake-hazards/faults?qt-science_support_page_related_con=4#qt-science_support_page_related_con, accessed March 2020.

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SEISMIC IMPACT ZONES LOCATION RESTRICTIONS
FORMER ASH BASIN
POWERTON STATION
APRIL 2020

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.63, Geosyntec Consultants (Geosyntec) prepared this report to document compliance with location restrictions related to seismic impact areas for the existing Former Ash Basin at the Powerton Station (Site) in Pekin, Illinois.

The work presented in this report was performed under the direction of Mr. Jesse Varsho, P.G., P.E., of Geosyntec in accordance with §257.63. Ms. Jane Soule, P.E., reviewed this report in accordance with Geosyntec's senior review policy.

1. Seismic Impact Zones Restriction Determination

The Former Ash Basin is not located within a seismic impact zone as defined in §257.63 and as mapped by the United States Geological Survey (USGS) [USGS, 2018]. Therefore, the location of the Basin is in compliance with the requirements outlined in §257.63(a).

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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3. References

USGS, 2018. "2018 Long-term National Seismic Hazard Map," https://www.usgs.gov/natural-hazards/earthquake-hazards/hazards, accessed March 2020.

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UNSTABLE AREAS LOCATION RESTRICTIONS
FORMER ASH BASIN
POWERTON STATION
APRIL 2020

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.64, Geosyntec Consultants (Geosyntec) prepared this report to document compliance with location restrictions related to unstable areas for the existing Former Ash Basin at the Powerton Station (Site) in Pekin, Illinois.

The work presented in this report was performed under the direction of Mr. Jesse Varsho, P.G., P.E., of Geosyntec in accordance with §257.64. Ms. Jane Soule, P.E., reviewed this report in accordance with Geosyntec's senior review policy.

1. Unstable Areas Restriction Determination

The Former Ash Basin is not located in an unstable area [Geosyntec, 2016]. Therefore, the locations of the Basin is in compliance with the requirements outlined in §257.64(a).

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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3. References

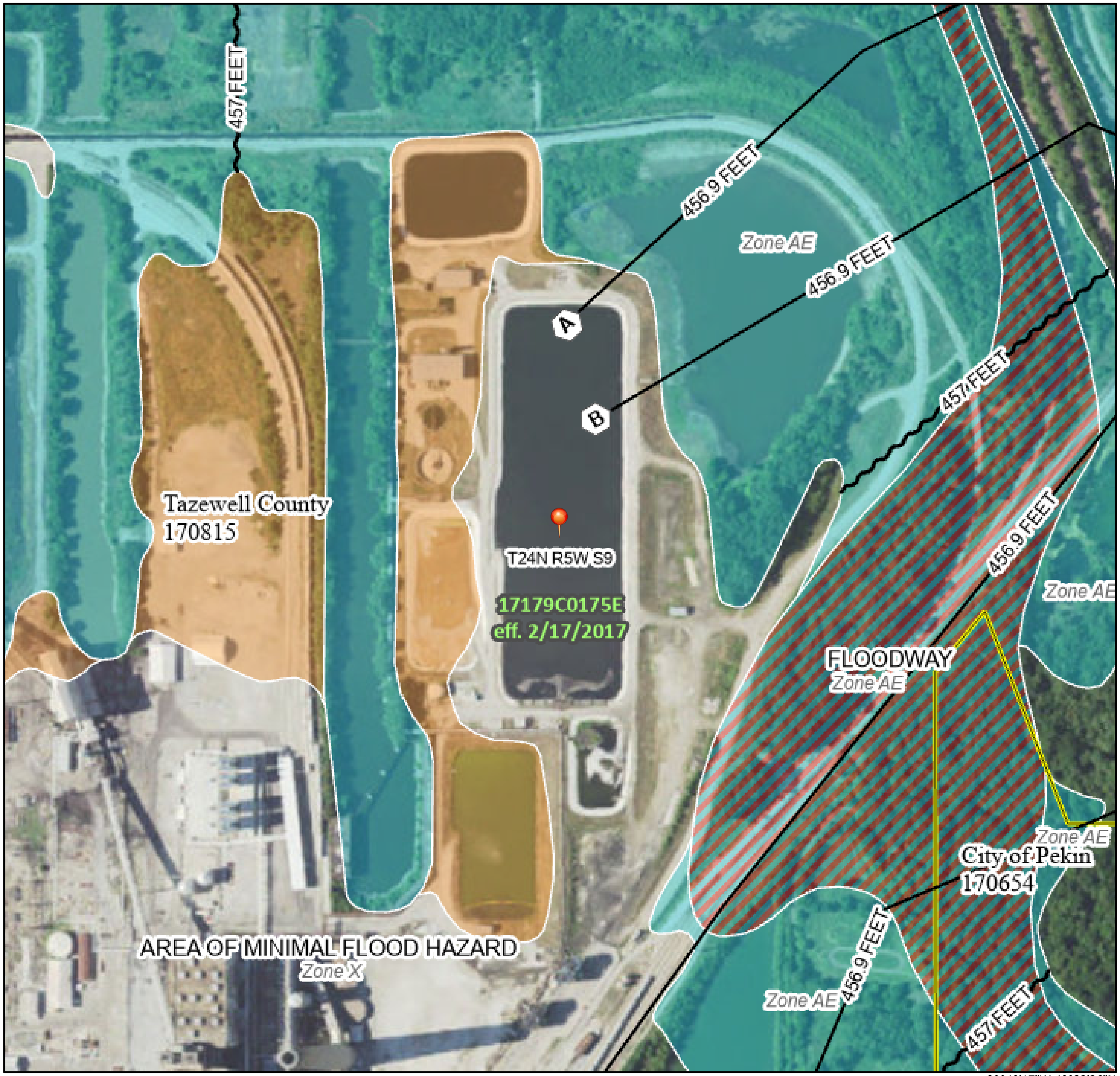
Geosyntec, 2016. Structural Stability and Factor of Safety Assessment, Ash Surge Basin and Bypass Basin, Powerton Station, October.

Attachment 4-3 – Floodplain Location Determination

National Flood Hazard Layer FIRMette

FEMA

89°40'55"W 40°32'53"N



Feet 1:6,000

0 250 500 1,000 1,500 2,000

89°40'17"W 40°32'26"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- B 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/23/2021 at 12:14 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

ATTACHMENT 5
PERMANENT MARKERS

Photo documentation –Ash Surge Basin Signage. Powerton Generating Station, Pekin, IL.

1. Ash Surge Basin Posted IEPA ID Sign

Photo documentation –Ash Bypass Basin Signage. Powerton Generating Station, Pekin, IL.

1. Ash Bypass Basin Posted IEPA ID Sign

Photo documentation –Former Ash Basin Signage. Powerton Generating Station, Pekin, IL.

1. Former Ash Basin Posted IEPA ID Sign

ATTACHMENT 6
INCISED/SLOPE PROTECTION DOCUMENTATION

Photo documentation – Ash Bypass Basin Slopes. Powerton Generating Station, Pekin, IL.

1. Ash Bypass Basin South Slope

2. Ash Bypass Basin East Slope

3. Ash Bypass Basin West Slope

Photo documentation – Ash Surge Basin Slopes. Powerton Generating Station, Pekin, IL.

1. Ash Surge Basin East Slope

2. Ash Surge Basin East Slope

3. Ash Surge Basin East Slope

4. Ash Surge Basin West Slope

Photo documentation – Ash Surge Basin Slopes. Powerton Generating Station, Pekin, IL.

5. Ash Surge Basin North Slope

6. Ash Surge Basin North Slope

Photo documentation –Former Ash Basin Slopes. Powerton Generating Station, Pekin, IL.

1. Northern Section of Former Ash Basin Wooded Slope

2. Northern Section of Former Ash Basin Wooded Slope

3. Northern Section of Former Ash Basin Wooded Slope

4. Northern Section of Former Ash Basin Wooded Slope

Photo documentation –Former Ash Basin Slopes. Powerton Generating Station, Pekin, IL.

5. Southern Section of Former Ash Basin Northern Slope

6. Southern Section of Former Ash Basin Northeast Slope

7. Southern Section of Former Ash Basin Northwest Slope

8. Southern Section of Former Ash Basin Southern Slope

ATTACHMENT 7
EMERGENCY ACTION PLAN

Attachment 7-1 – ASB and ABB Emergency Action Plan

EMERGENCY ACTION PLAN
ASH SURGE BASIN, BYPASS BASIN, and METAL CLEANING BASIN
POWERTON STATION
OCTOBER 2021

The Emergency Action Plan (EAP) was initially prepared by Civil & Environmental Consultants, Inc. (CEC) pursuant to 40 CFR 257.73(a)(3) for the Ash Surge Basin and Bypass Basin at the Midwest Generation, LLC (MWG) Powerton Station (Station) in Pekin, Illinois. This EAP has been revised to comply with 35 Ill. Adm. Code Part 845, Subpart E, §845.520 by revising the code references and including the Metal Cleaning Basin. Previous assessments performed in accordance with §257.73(a)(2) identified the Ash Surge Basin and the Ash Bypass Basin as significant hazard potential Coal Combustion Residual (CCR) surface impoundments, and as a result, this written EAP has been prepared to address a potential failure of the Ash Surge Basin and Bypass Basin along with the Metal Cleaning Basin. The Metal Cleaning Basin was not originally included in the hazard potential assessment, but the relative location of the Metal Cleaning Basin allows for the failures and the result of the failures for the Ash Surge Basin and Bypass Basin to be applied to the Metal Cleaning Basin. The EAP is presented as follows:

Section 1.0: §845.520(b)(1) Definition of the events or circumstances involving the CCR unit(s) that represent a safety emergency, along with a description of the procedures that will be followed to detect a safety emergency in a timely manner;

Section 2.0: §845.520(b)(2) Definition of the responsible persons, their respective responsibilities, and notification procedures in the event of a safety emergency involving the CCR unit(s);

Section 3.0: §845.520(b)(3) Contact information of emergency responders;

Section 4.0: §845.520(b)(4) Provide Site Maps, which delineate the downstream areas which would be affected in the event of the Basins failure and a physical description of the CCR Units;

Section 5.0: §845.520(b)(5) Include provisions for an annual face-to-face meeting or exercise between representatives of the Powerton Station and the local emergency responders; and

Section 6.0: §845.520(e) The owner or operator of the CCR unit(s) must obtain a certification from a qualified professional engineer stating that the written EAP, and any subsequent amendment of the EAP, meets the requirements of 845.520.

1.0 DEFINITION OF THE EVENTS THAT REPRESENT A SAFETY EMERGENCY

In accordance with Section 845.520(b)(1), the following tables define the events and/or circumstances involving the Basins that represent a safety emergency, along with a description of the procedures that will be followed to detect a safety emergency in a timely manner.

The information provided in the Tables 1 through 4 provide a listing of problems which may occur at the Basins, how to make a rapid evaluation of the problem, and what action should be taken in response to the problem. This section presents only generalized information to aid in first response to a given problem. Suspected problems should be reported as soon as possible, as discussed in Section 2.0, and assistance from a qualified engineer should be obtained if necessary.

The problems outlined in this Section are related to above grade, earthen type embankment dams similar in construction to the Ash Surge Basin, Ash Bypass Basin, and the Metal Cleaning Basin. The problems discussed herein include:

- Table 1: Seepage
- Table 2: Sliding
- Table 3: Cracking
- Table 4: Animal Burrows and Holes

For each problem, the indicators are discussed followed by evaluation techniques and then by action items for each problem.

2.0 RESPONSIBLE PERSONS, RESPECTIVE RESPONSIBILITIES, AND NOTIFICATION PROCEDURES

The EAP must be implemented once events or circumstances involving the CCR unit that represent a safety emergency are detected, including conditions identified during periodic structural stability assessments, annual inspections, and inspections by a qualified person. In accordance with §845.520(b)(2), the following sections define responsible persons, their respective responsibilities, and notification procedures in the event of a safety emergency involving the Ash Surge Basin, Bypass Basin, and/or the Metal Cleaning Basin. Contact information is provided in Table 5, attached.

2.1 Responsible Persons and Responsibilities

Appropriate parties will be notified based on the nature and severity of the incident as determined by the Station Environmental Specialist or Chemical Specialist. If failure is imminent or has occurred, notification and mitigation procedures are a top priority, particularly for a potentially hazardous situation. The Station Environmental Specialist or Chemical Specialist, in conjunction with the Station Director, is responsible for this determination.

2.2 Notification Sequence

The following notification procedures shall be used by employees in the event of a safety emergency with the Ash Surge Basin, Bypass Basin, and/or the Metal Cleaning Basin.

(1) Notify the Shift Supervisor and Environmental Specialist, Chemical Specialist, or alternate.

(2) If unsafe conditions exist, the employee should evacuate the area.

(3) Only the Environmental Specialist, Chemical Specialist, Corporate Environmental or designated alternate shall have any official communication with non-employees or regulatory agencies, and only the Communications Director shall have any contact with the media.

The Environmental Specialist, Chemical Specialist, or designated alternate should follow these procedures in the event of a safety emergency involving the Ash Surge Basin and/or Bypass Basin:

(1) Organize appropriately trained Station personnel and/or other employees or contractors as necessary to assist with the safety emergency.

(2) After consultation with appropriately trained Station personnel, contact the proper civil authorities (e.g., fire, police, etc.) if necessary. Notify the appropriate agencies where there has been a reportable release of material(s) into the environment. See Table 5, attached for contact information. Notify MWG Corporate via the Intelex online notification system within 24 hours in the event of a reportable release. A reportable release is a Material Release defined as a spill or leak that materialized in the waterway. A Non-Material Release is a spill or leak that did not come into contact with the waterway.

(3) Be prepared to evacuate the inundation area at any time during the safety emergency response.

(4) If the emergency is beyond the Facility's response capabilities, contact one or more emergency response contractors as necessary.

(5) Corrective actions should only be performed by properly trained individuals.

2.3 Emergency Responders Contact Information

In accordance with §845.520(b)(3), Table 5, attached, provides contact information of emergency responders. The Station Environmental Specialist, Chemical Specialist, or alternate will determine who to notify, including any affected residents and/or businesses, in the case of an imminent or actual CCR surface impoundment dam failure. The Station Environmental Specialist, Chemical Specialist, or alternate will ensure proper notifications are made.

Appropriate contractors will be utilized to assist the Station Environmental Specialist, Chemical Specialist or alternate with mitigated actions being undertaken in order to minimize the impact of an event that has occurred. Contact information for contractors and consultants are provided in Table 5.

3.0 SITE MAP AND A SITE MAP DELINEATING THE DOWNSTREAM AREA

In accordance with §845.520(b)(4), the following section provides a physical description of the Ash Surge Basin, Bypass Basin, and the Metal Cleaning Basin. A Site Vicinity Map is provided as Figure 1, a Site Plan for the Ash Surge Basin, Bypass Basin, and the Metal Cleaning Basin is provided as Figure 2. Drawings depicting the locations of, and the downstream areas affected by, a potential failure of the Ash Surge Basin and Bypass Basin were prepared by Geosyntec in October 16, 2016 and are provided in Appendix A.

3.1 Basin Locations and Descriptions

The Ash Surge Basin, Bypass Basin and Metal Cleaning Basin are located in the eastern portion of Powerton Station (see Figure 1) northeast of the Main Power Block Building situated between the Old Intake Channel and the Former Ash Basin. The Bypass Basin is immediately southeast of the Ash Surge Basin. The Metal Cleaning Basin is immediately west of the Ash Surge Basin.

From CEC's observations and review of construction and engineering documentation provided by MWG, the Basins were constructed with elevated earthen berms or embankments. Run-on is limited to precipitation contained within the earthen berm. Physical characteristics of the Ash Surge Basin, Bypass Basin, and the Metal Cleaning Basin are provided in Table 6.

3.2 Delineation of Downstream Areas

The potential impacts from failure of the Ash Surge Basin and Bypass Basin were evaluated and reported by Geosyntec in the Hazard Potential Classification Assessment (HPCA), dated October 2016. A copy of the HPCA is contained on the CCR Rule Compliance Data and Information web site (http://www.nrg.com/legal/coalcombustion-residuals/).

Results of the HPCA indicate that both the Ash Surge Basin and Bypass Basin are classified as significant hazard potential CCR surface impoundments. The evaluation reports no loss of life resulting from failure of the Basin embankments is probable because no occupied buildings are located within the anticipated inundation areas. However, potential failure during flood conditions could result in offsite economic or environmental impacts. Inundation Maps are provided in Appendix A.

Reviewing the location of the Metal Cleaning Basin, it is reasonable to conclude that no loss of life would occur resulting from a failure of the Metal Cleaning Basin embankments because no occupied buildings are located downstream.

4.0 ANNUAL FACE-TO-FACE MEETING

In accordance with §845.520(b)(5), a face-to-face meeting or an exercise between representatives of the Powerton Station and the local emergency responders shall be offered and, if accepted, held on an annual basis. The purpose of the annual meeting is to review the EAP to assure that contacts, addresses, telephone numbers, etc. are current. The annual meeting will be held whether or not an incident occurred in the previous year. In the event an incident occurs, the annual meeting date may be moved up in order to discuss the incident closer to the date of occurrence. If no incidents have occurred, the annual meeting will be held to inform local emergency responders on the contents of the EAP and changes from the previous year. Documentation of the annual face to face meeting will be recorded and placed in the operating record for the Station.

5.0 LIMITATIONS AND CERTIFICATION

This EAP was prepared to initially meet the requirements of 257.73(a)(3) and was previously prepared by CEC in April 2017 to address the Ash Surge Basin and the Bypass Basin. This EAP has been updated to include the Metal Cleaning Basin and the remainder was reviewed by KPRG for compliance with 35 Ill. Adm. Code 845.520(b). KPRG's review of the EAP is based solely on the observations of the conditions observed by KPRG personnel and information provided to KPRG by Midwest Generation. This review neither accepts nor rejects the safety emergencies identified by CEC. The safety emergencies identified along with the responses are the product of CEC. KPRG has not altered the safety emergencies or the responses associated with each emergency. As such, the Emergency Action Plan complies with 35 Ill. Adm. Code 845.520(b).

Signature:

Name: Joshua D. Davenport, P.E.

Date of Certification: 10/21/2021

Illinois Professional Engineer No. 062.061945

License Expires: 11/30/2021

JOSHUA D. DAVENPORT
062-061945
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS

FIGURES

W:\projects\midwest generation\operating permit\powerton\figures\eap map.dwg

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG

KPRG and Associates, inc.

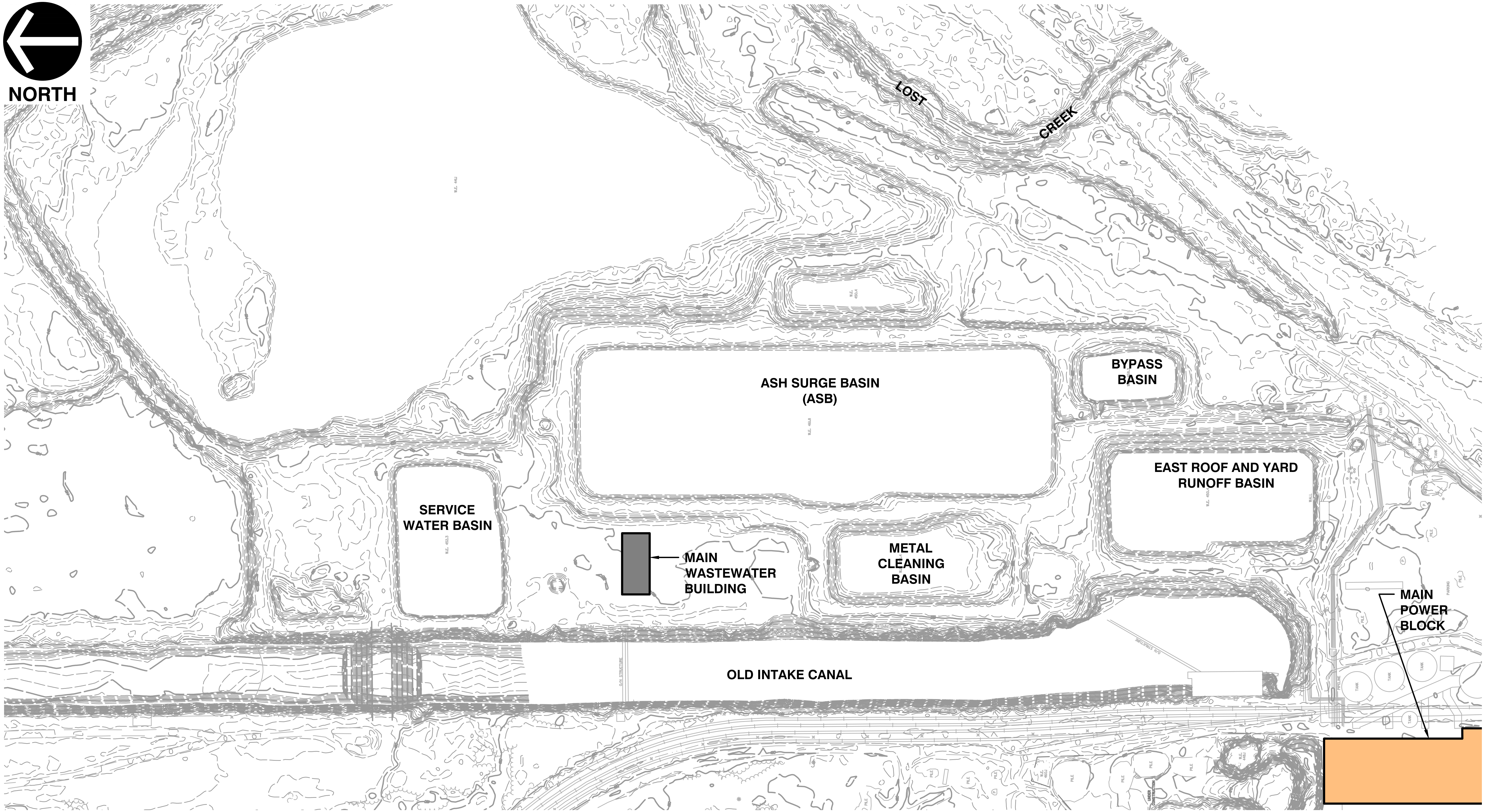
414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630-325-1300 Facsimile 630-325-1593

14665 West Lisbon Road, Suite 1A Brookfield, Wisconsin 53005 Telephone 262-781-0475 Facsimile 262-781-0478

SITE MAP

POWERTON GENERATING STATION
PEKIN, ILLINOIS

Scale: 1" = 550'	Date: October 20, 2021
KPRG Project No. 19520	FIGURE 1



P:\2016\163-469\-CADD\Dwg\CV01-Powerton Station\163469-CV01-C102-Site Plan.dwg{LAYOUT1} LS:(3/9/2017 - ccase) - LP: 4/5/2017 1:26 PM

REFERENCE

1. TOPOGRAPHIC INFORMATION SOUTH OF SECONDARY ASH SETTLING BASIN AND FAB IS BASED ON AERIAL SURVEY PERFORMED BY AEROMETRIC, INC. DATED JUNE 19, 2008. TOPOGRAPHY NORTH OF ASH SURGE BASIN IS BASED ON SURVEY BY RIDGELINE CONSULTANTS PERFORMED IN FEBRUARY AND MARCH 2016.

LEGEND

- OCCUPIED STRUCTURE
- UNOCCUPIED STRUCTURE
- TOPOGRAPHY (1-FOOT INTERVAL)

*HAND SIGNATURE ON FILE

SCALE IN FEET

0 200 400

Civil & Environmental Consultants, Inc.
555 Butterfield Road, Suite 300 - Lombard, IL 60148
630-963-6026 · 877-963-6026
www.cecinc.com

POWERTON STATION
ASH SURGE BASIN - BYPASS BASIN
PEKIN, ILLINOIS

SITE PLAN

DRAWN BY: MSK	CHECKED BY: MDJ	APPROVED BY: MDJ*	FIGURE NO.: 2
DATE: 04/05/2017	DWG SCALE: 1"=200'	PROJECT NO: 163-469.0100	

TABLES

Table 1: Ash Surge Basin, Ash Bypass Basin, and Metal Cleaning Basin
Event Definition, Evaluation and Action: Seepage

Definition	Evaluation	Action
1A: Wet area on downstream embankment slope or other area downstream of the embankment, with very little or no surface water or very minor seeps.	1B: Condition may be caused by infiltration of rain water, which is not serious; or may be the start of a serious seepage problem, which would be indicated by a quick change to one of the conditions below.	1C: No immediate action required. Note the location for future comparison.
2A: Same wet area as above, with moderate seeps of clear or relatively clear water and the rate of flow not increasing.	2B: Measure the flow periodically and note changes in clarity.	2C: No immediate action required. Note the location, flow rate, and clarity for future comparison. During reservoir flood stages, the seepage area should be watched for changes.
3A: Same wet area as above, with moderate seeps of clear or relatively clear water and rate of flow increasing.	3B: Measure the flow periodically and note changes in clarity. Inspect downstream area for new seeps.	3C: Contact a qualified engineer for immediate inspection (see Table 5). Observe the condition constantly for further changes in flow rate or clarity, unless notified otherwise by the engineer.
4A: Piping (seepage with the removal of materials from the foundation or embankment), moderate to active flows of cloudy to muddy water.	If the water is cloudy to muddy, and the rate of flow is increasing, this condition could lead to failure of the dam. If, along the piping, there is an upstream swirl (whirlpool) caused by water entering through the abutments of embankment, failure is imminent.	4C: Immediate action is necessary. Notify the appropriate agencies (see Table 5).
5A: Boils (soil particles deposited around a water exit forming a cone, varying from a few inches in diameter spaced 2 to 3 feet apart to isolated locations several feet in diameter in the floodplain downstream of the dam) may show the types of flow as noted above.	5B: Evaluation of the problem is the same as noted above for the various flow conditions, i.e., clear and constant, clear and increasing, and cloudy or muddy and increasing.	5C: Actions to be taken are essentially the same as those noted above.

Table 2: Ash Surge Basin, Ash Bypass Basin, and Metal Cleaning Basin
Event Definition, Evaluation and Action: Sliding

Definition	Evaluation	Action
1A: Movement of a portion of the embankment, either the upstream or downstream slope, toward the toe of the dam.	1B: Various degrees of severity of a slide require different responses. The first condition is that the slide does not pass through the crest and does not extend into the embankment for more than 5 ft., measured perpendicular to the slope	1C: For this condition, a qualified engineer (see Table 5) should be consulted before repairs are initiated to determine the cause of the slide and to recommend modifications to prevent future slides. The downstream side of the dam should be watched for the emergence of water, either through the slide or opposite the slide. If water is noted discharging, the area should be treated as a seepage location and monitored as noted above.
2A: Slide passes is the second condition.	2B: In this condition, the slide passes through the crest and that the reservoir elevation is more than 10 ft. below the lowered crest.	2C: Use the same actions as noted above, and notify the appropriate MWG personnel (see Table 5) of the situation so they may be prepared to act if the condition worsens.
3A: Slide passes is also the third condition.	3B: In this condition, the slide passes through the crest and that the reservoir elevation is less than 10 ft. below the lowered crest.	3C: This condition is critical, and failure of the dam should be considered imminent. Notify the appropriate agencies (see Table 5).

Table 3: Ash Surge Basin, Ash Bypass Basin, and Metal Cleaning Basin
Event Definition, Evaluation and Action: Cracking

Definition	Evaluation	Action
1A: Cracks in the embankment can occur either in the longitudinal (along the length of the dam) or transverse (across the dam from upstream to downstream directions).	1B: Some cracking of the surface soils may occur when they become dry. This cracking is to be expected, and no further action is required.	1C: No further action is required.
2A: Longitudinal cracking can indicate the beginning of a slide or be an uneven settlement of the embankment.	2B: Monitor the crack for future changes, and contact a qualified engineer for assistance in the evaluation of the crack and recommended repairs.	2C: Contact a qualified engineer for assistance and recommendations (see Table 5).
3A: Transverse cracking can indicate uneven settlement or the loss of support below the crack. Such cracks usually occur over an outlet conduit, near the abutments, or in the taller portion of the embankment.	3B: Monitor the crack for future changes, and contact a qualified engineer for assistance in the evaluation of the crack and recommended repairs.	3C: Contact a qualified engineer for assistance and recommendations (see Table 5).

Table 4: Ash Surge Basin, Ash Bypass Basin, and Metal Cleaning Basin
Event Definition, Evaluation and Action: Animal Burrows and Holes

Definition	Evaluation	Action
1A: Holes in the embankment, varying in size from about one inch in diameter to one foot in diameter caused by animals.	1B: If the holes do not penetrate through the embankment, the situation is usually not serious. Some animal holes will have soil pushed out around the hole in a circular fashion, which may look like a boil (crayfish or crawdad). Watch for the movement of water and soil particles from these holes to determine whether they are boils.	1C: Backfill as deeply as possible with impervious material. 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.

Table 5: Midwest Generation Powerton Generating Station
CCR EAP Notification List – Updated September 2021

Plant Contacts:

Name	Title	Contact Info
Joseph Kotas	Environmental Specialist	(O) 309-477-5216 (C) 815-901-6549
Dale Green	Plant Manager	(O) 309-477-5212 (C) 309-620-3908
Todd Mundorf	Operations Manager	(O) 309-477-5215 (C) 847-456-4642
Mark Vannaken	Maintenance Manager	(O) 309-477-5221 (C) 309-824-5686
Sunish Shah	Engineering Manager	(O) 309-477-5243 (C) 773-410-3225
Bill Gaynor	Class K WWT Operator	(O) 309-477-5437 (C) 309-824-2999
Station Control Room	24-Hour, 7-day	309-477-5299

Corporate Support:

Name	Title	Contact Info
Sharene Shealey	Director, Environmental	(C) 724-255-3220
Jill Buckley	Environmental Manager	(C) 724-448-9732
Tony Shea	Sr. Director, Environmental	(O) 609-524-4923 (C) 609-651-6478
Dave Schrader	Sr. Manager, Communications (public point of contact)	(O) 267-295-5768 (C) 267-294-2860

Emergency Response Agencies:

Agency	Address	Contact Info
National Response Center (NRC) – US Army Corp of Engineers	Peoria Lock and Dam 1139 Wesley Rd, Creve Coeur, IL 61610	800-424-8802 (309) 699-6111 (local)
Illinois Department of Natural Resources, Office of Water Resources	One Natural Resources Way, 2nd Floor Springfield, IL 62702-1271	8:30 a.m.-5:00 p.m. 217-782-4427
Illinois Emergency Management Agency (IEMA)	2200 Dirksen Parkway Springfield, IL 62703	800-782-7860
Illinois Environmental Protection Agency (IEPA)	Bureau of Water 1021 North Grand Avenue East Springfield, IL 62794	217-782-3637
Tazewell County Emergency Management Agency Operations Center	21304 IL State Rt. 9 Tremont, IL 61568	Phone: 309-925-2271 24-hour: 309-477-2234
Tazewell County TC3: Dispatches to Fire, Police and Emergency Medical services	101 S Capitol Street Pekin, IL 61554	Emergency: 9-1-1 Non-Emergency: 309-478-5796
Pekin Police Department	111 S Capitol St #100 Pekin, IL 61554	Emergency: 9-1-1 Non-Emergency: 309-346-3132 Front Desk: 309-478-5330
Pekin Fire Department	3232 Court Street Pekin, IL 61554	Emergency: 9-1-1 Non-Emergency: 309-477-2388

Environmental Response Contractors/Consultants:

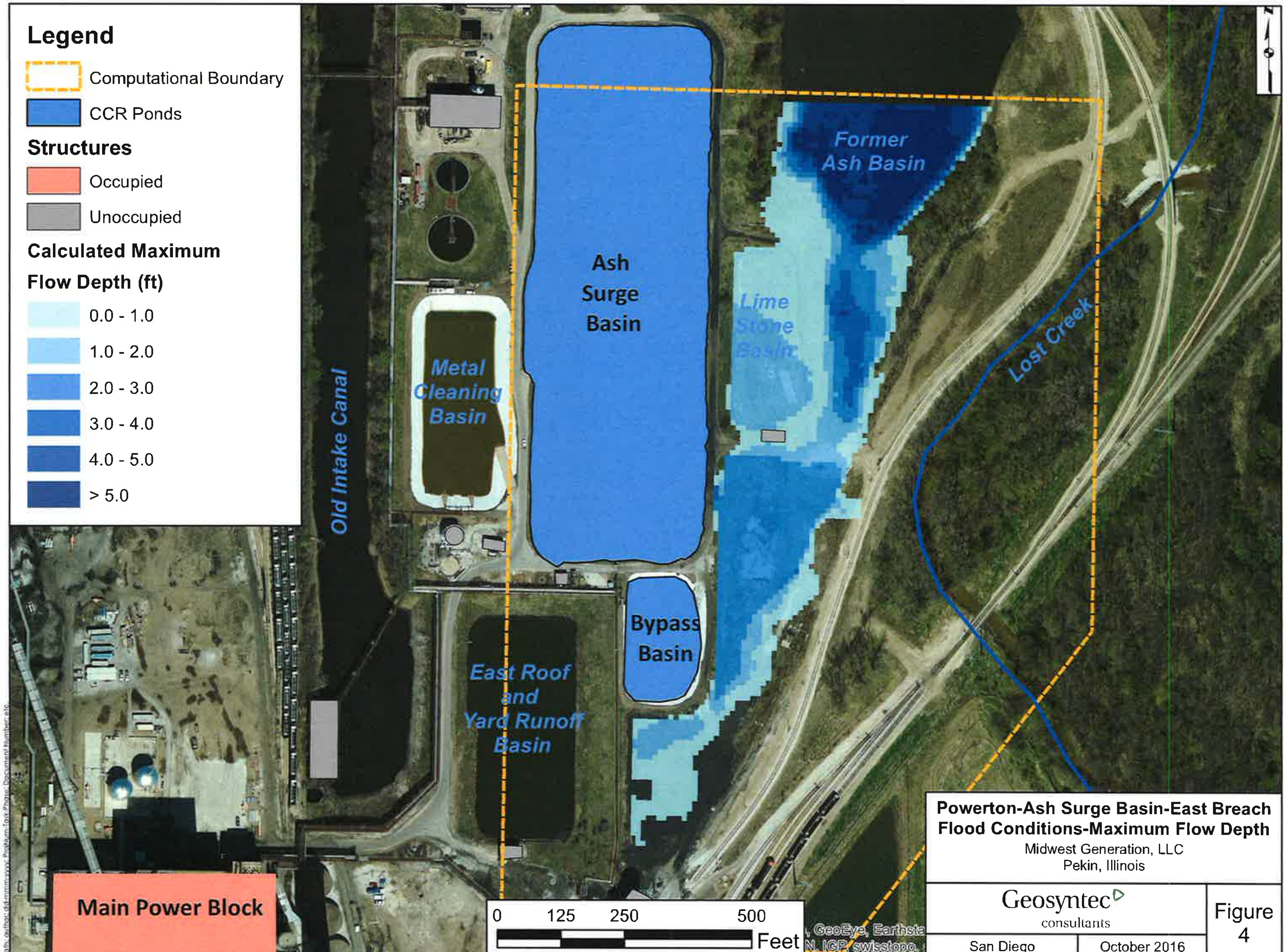
Contractor/Consultant	Address	Contact Info
Civil & Environmental Consultants, Inc.	555 Butterfield Road, Suite 300 Lombard, IL 60148	630-963-6026
Iron Hustler Excavating	1604 West Detweiller Drive Peoria, IL61615	309 691-9894
SET Environmental	450 Sumac Road Wheeling, IL 60090	847 850-1056 877-437-7455 (24-hr)
Heritage Environmental Services	15330 Canal Bank Road Lemont, IL 62095	630-739-1151

Table 6: Basin Characteristics

	Ash Surge Basin	Bypass Basin	Metal Cleaning Basin
Estimated Capacity (acre-feet)	92.1	5.1	14.0
Estimated Maximum Basin Depth (feet)	16	10	10
Elevation - Maximum Crest (ft msl.)	467.6	467.6	467.6

APPENDIX A

GEOSYNTEC HPCA INUNDATION MAPS

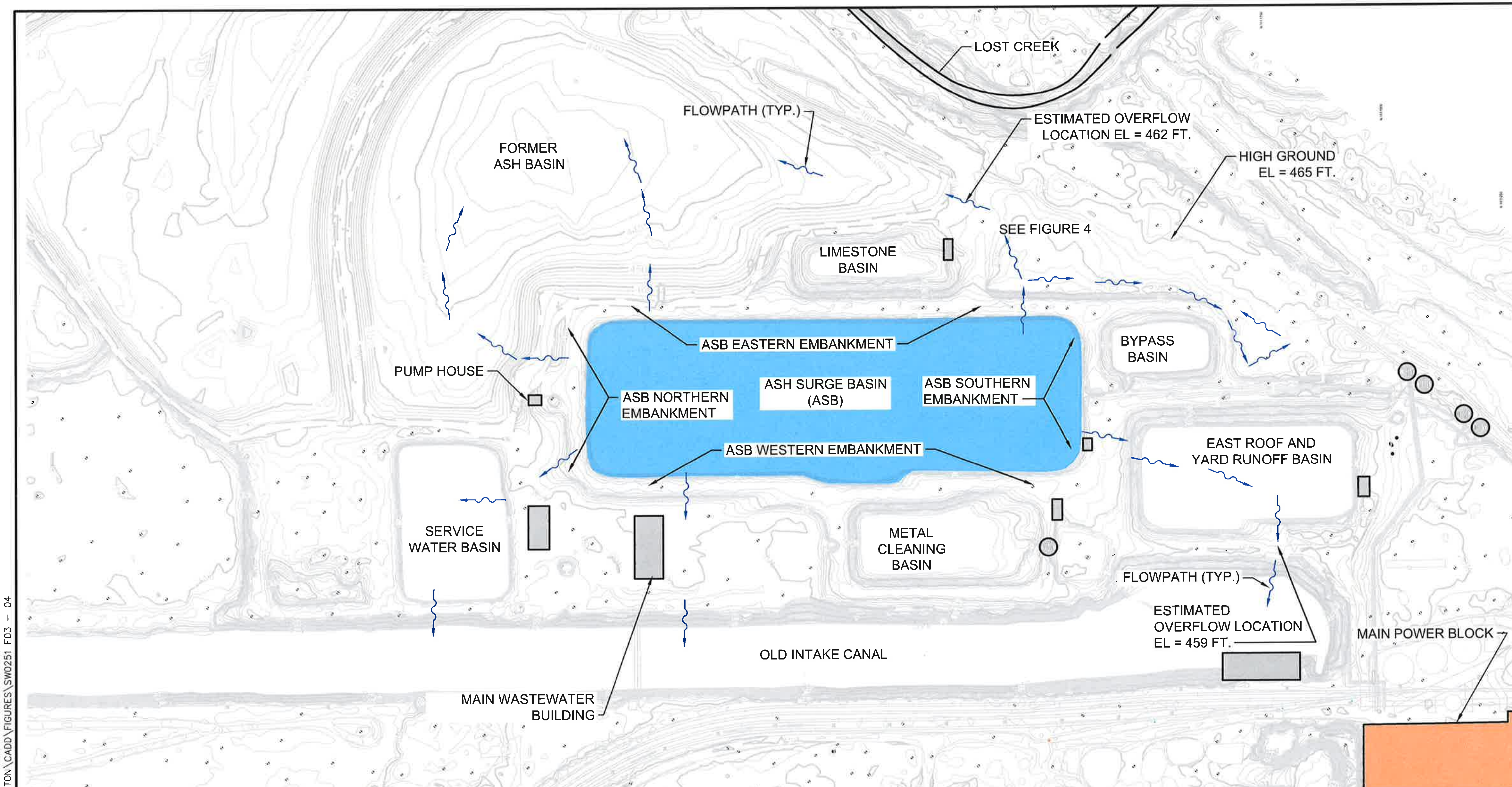


Powerton-Ash Surge Basin-East Breach Flood Conditions-Maximum Flow Depth
Midwest Generation, LLC
Pekin, Illinois

Geosyntec consultants

San Diego | October 2016

Figure 4



SOURCE OF SURVEY:

TOPOGRAPHY SOUTH OF SECONDARY ASH SETTLING BASIN AND FAB IS BASED ON AERIAL SURVEY PERFORMED BY AEROMETRIC, INC. DATED JUNE 19, 2008. TOPOGRAPHY NORTH OF ASH SURGE BASIN IS BASED ON SURVEY BY RIDGELINE CONSULTANTS PERFORMED IN FEBRUARY AND MARCH 2016.

NOTE:

1. TOPOGRAPHY SHOWN DOES NOT REFLECT MINOR REGRADING OF THE SLOPE EAST OF THE BYPASS BASIN PERFORMED IN FALL 2016.

LEGEND

STRUCTURES

OCCUPIED

UNOCCUPIED

N

0 200' 400'

SCALE IN FEET

ASH SURGE BASIN

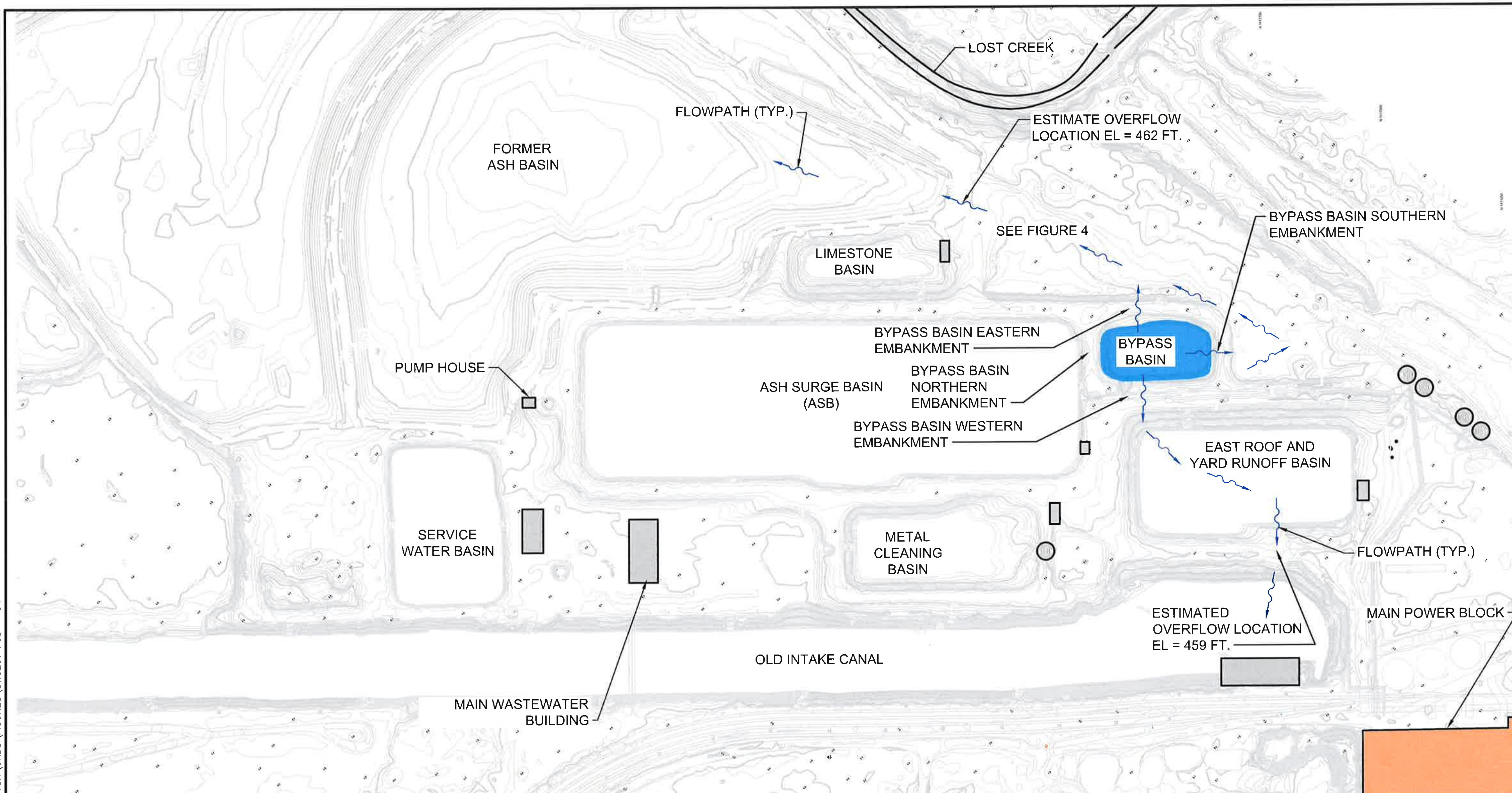
POTENTIAL BREACH FLOWPATHS

POWERTON STATION
PEKIN, ILLINOIS

Geosyntec consultants

FIGURE 3

PROJECT NO: SW0251 | OCTOBER 2016



SOURCE OF SURVEY:
TOPOGRAPHY SOUTH OF SECONDARY ASH SETTLING BASIN AND FAB IS BASED ON AERIAL SURVEY PERFORMED BY AEROMETRIC, INC. DATED JUNE 19, 2008. TOPOGRAPHY NORTH OF ASH SURGE BASIN IS BASED ON SURVEY BY RIDGELINE CONSULTANTS PERFORMED IN FEBRUARY AND MARCH 2016.

NOTE:
1. TOPOGRAPHY SHOWN DOES NOT REFLECT MINOR REGRADING OF THE SLOPE EAST OF THE BYPASS BASIN PERFORMED IN FALL 2016.

LEGEND

STRUCTURES

OCCUPIED

UNOCCUPIED

N

0 200' 400'

SCALE IN FEET

BYPASS BASIN
POTENTIAL BREACH FLOWPATHS

POWERTON STATION
PEKIN, ILLINOIS

Geosyntec consultants

FIGURE 5

PROJECT NO: SW0251

OCTOBER 2016

\\SANDIEGO-01\SW0251\07 POWERTON\CADD\FIGURES\SW0251 F03 - 04

Attachment 7-2 – FAB Emergency Action Plan

SECTION 845.520 CERTIFICATION

The Former Ash Basin Emergency Action Plan included as part of this operating permit application was initially prepared by Civil & Environmental Consultants, Inc. in August 2018 and was reviewed by KPRG for compliance with 35 Ill. Adm. Code 845.520(b). KPRG's review of the EAP is based solely on the observations of the conditions observed by KPRG personnel and information provided to KPRG by Midwest Generation. This review neither accepts nor rejects the safety emergencies identified by CEC. The safety emergencies identified along with the responses are the product of CEC. KPRG has not altered the safety emergencies or the responses associated with each emergency. As part of the review process, the contact list included as part of the original Emergency Action Plan required being updated and the updated contact list is included along with the original contact list. As such, the Former Ash Basin Emergency Action Plan complies with 35 Ill. Adm. Code 845.520(b).

Joshua D. Davenport, P.E. 10/5/21

Illinois Professional Engineer No. 062.061945

License Expires: 11/30/2021

JOSHUA D. DAVENPORT
062-061945
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS

EMERGENCY ACTION PLAN
FORMER ASH BASIN
POWERTON STATION
AUGUST 2018

This Emergency Action Plan (EAP) has been prepared pursuant to Title 40 of the Code of Federal Regulations (CFR) Part 257, Subpart D, §257.73(a)(3) for the Former Ash Basin (FAB) at the Midwest Generation, LLC (MWG) Powerton Station (Station) in Pekin, Illinois. Previous assessments performed in accordance with §257.73(a)(2) identified the FAB as a significant hazard potential coal combustion residual (CCR) surface impoundment, and as a result, this written EAP has been prepared to address potential failure of the FAB. The EAP is presented as follows:

Section 1.0: §257.73(a)(3)(i)(A) Definition of the events or circumstances involving the CCR unit(s) that represent a safety emergency, along with a description of the procedures that will be followed to detect a safety emergency in a timely manner;

Section 2.0: §257.73(a)(3)(i)(B) Definition of the responsible persons, their respective responsibilities, and notification procedures in the event of a safety emergency involving the CCR unit(s);

Section 3.0: §257.73(a)(3)(i)(C) Contact information of emergency responders;

Section 4.0: §257.73(a)(3)(i)(D) Provide Site Maps which delineate the downstream areas which would be affected in the event of an FAB failure and a physical description of the CCR units;

Section 5.0: §257.73(a)(3)(i)(E) Include provisions for an annual face-to-face meeting or exercise between representatives of the Powerton Station and the local emergency responders; and

Section 6.0: §257.73(a)(3)(iv) The owner or operator of the CCR unit(s) must obtain a certification from a qualified professional engineer stating that the written EAP, and any subsequent amendment of the EAP, meets the requirements of paragraph (a)(3) of this section.

1.0 DEFINITION OF THE EVENTS THAT REPRESENT A SAFETY EMERGENCY

In accordance with Section 257.73(a)(3)(i)(A), the following tables define the events and/or circumstances involving the FAB that represent a safety emergency, along with a description of the procedures that will be followed to detect a safety emergency in a timely manner.

The information provided in Tables 1 through 4 provides a listing of circumstances or events which may occur at the FAB, how to make a rapid evaluation of the circumstance or event, and what action should be taken in response to the circumstance or event. This section presents only generalized information to aid in first response to a given circumstance or event. Suspected circumstances or events should be reported as soon as possible, as discussed in Section 2.0, and assistance from a qualified engineer should be obtained if necessary. The circumstances and events described in Tables 1 through 4 do not represent the actual conditions at the FAB, only the potential conditions that may occur and the procedures to follow.

The circumstances and events outlined in this section are related to above grade, earthen type embankment dams similar in construction to the FAB. The circumstances discussed herein include:

- Table 1: Seepage
- Table 2: Sliding
- Table 3: Cracking
- Table 4: Animal Burrows and Holes

For each circumstance or event, the indicators are discussed followed by evaluation techniques and then by action items for each.

Table 1: Former Ash Basin, Evaluation, and Action: Seepage

Circumstance or Event Definition	Evaluation	Action
1A: Wet area on downstream embankment slope or other area downstream of the embankment, with very little or no surface water or very minor seeps.	1B: Condition may be caused by infiltration of rainwater, which is not serious; or may be the start of a serious seepage event, which would be indicated by a quick change to one of the conditions below.	1C: No immediate action required. Note the location for future comparison.
2A: Same wet area as above, with moderate seeps of clear or relatively clear water and the rate of flow not increasing.	2B: Measure the flow periodically and note changes in clarity.	2C: No immediate action required. Note the location, flow rate, and clarity for future comparison. During reservoir flood stages, the seepage area should be watched for changes.
3A: Same wet area as above, with moderate seeps of clear or relatively clear water and rate of flow increasing.	3B: Measure the flow periodically and note changes in clarity. Inspect downstream area for new seeps.	3C: Contact a qualified engineer for immediate inspection (see Table 5). Observe the condition constantly for further changes in flow rate or clarity, unless notified otherwise by the engineer.
4A: Piping (seepage with the removal of materials from the foundation or embankment), moderate to active flows of cloudy to muddy water.	4B: If the water is cloudy to muddy, and the rate of flow is increasing, this condition could lead to failure of the dam. If, along the piping, there is an upstream swirl (whirlpool) caused by water entering through the abutments of embankment, failure is imminent.	4C: Immediate action is necessary. Notify the appropriate agencies (see Table 5).
5A: Boils (soil particles deposited around a water exit forming a cone, varying from a few inches in diameter spaced 2 to 3 feet apart to isolated locations several feet in diameter in the floodplain downstream of the dam) may show the types of flow as noted above.	5B: Evaluation of the event is the same as noted above for the various flow conditions, i.e., clear and constant, clear and increasing, and cloudy or muddy and increasing.	5C: Actions to be taken are essentially the same as those noted above.

Table 2: Former Ash Basin Event Definition, Evaluation, and Action: Sliding

Circumstance or Event Indicator	Evaluation	Action
1A: Movement of a portion of the embankment, either the upstream or downstream slope, toward the toe of the dam.	1B: Various degrees of severity of a slide require different responses. The first condition is that the slide does not pass through the crest and does not extend into the embankment for more than 5 ft., measured perpendicular to the slope.	1C: For this condition, a qualified engineer (see Table 5) should be consulted before repairs are initiated to determine the cause of the slide and to recommend modifications to prevent future slides. The downstream side of the dam should be watched for the emergence of water, either through the slide or opposite the slide. If water is noted discharging, the area should be treated as a seepage location and monitored as noted above.
2A: Slide passes is the second condition.	2B: In this condition, the slide passes through the crest and that the reservoir elevation is more than 10 ft. below the lowered crest.	2C: Use the same actions as noted above, and notify the appropriate MWG personnel (see Table 5) of the situation so they may be prepared to act if the condition worsens.
3A: Slide passes is also the third condition.	3B: In this condition, the slide passes through the crest and that the reservoir elevation is less than 10 ft. below the lowered crest.	3C: This condition is critical, and failure of the dam should be considered imminent. Notify the appropriate agencies (see Table 5).

Table 3: Former Ash Basin Event Definition, Evaluation, and Action: Cracking

Circumstance or Event Indicator	Evaluation	Action
1A: Cracks in the embankment can occur either in the longitudinal (along the length of the dam) or transverse (across the dam from upstream to downstream directions).	1B: Some cracking of the surface soils may occur when they become dry. This cracking is to be expected, and no further action is required.	1C: No further action is required.
2A: Longitudinal cracking can indicate the beginning of a slide or be an uneven settlement of the embankment.	2B: Monitor the crack for future changes, and contact a qualified engineer for assistance in the evaluation of the crack and recommended repairs.	2C: Contact a qualified engineer for assistance and recommendations (see Table 5).
3A: Transverse cracking can indicate uneven settlement or the loss of support below the crack. Such cracks usually occur over an outlet conduit, near the abutments, or in the taller portion of the embankment.	3B: Monitor the crack for future changes, and contact a qualified engineer for assistance in the evaluation of the crack and recommended repairs.	3C: Contact a qualified engineer for assistance and recommendations (see Table 5).

Table 4: Former Ash Basin Event Definition, Evaluation, and Action: Animal Burrows and Holes

Circumstance or Event Indicator	Evaluation	Action
1A: Holes in the embankment, varying in size from about one inch in diameter to one foot in diameter caused by animals.	1B: If the holes do not penetrate through the embankment, the situation is usually not serious. Some animal holes will have soil pushed out around the hole in a circular fashion, which may look like a boil (crayfish or crawdad). Watch for the movement of water and soil particles from these holes to determine whether they are boils.	1C: Backfill as deeply as possible with impervious material. 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.

2.0 RESPONSIBLE PERSONS, RESPECTIVE RESPONSIBILITIES, AND NOTIFICATION PROCEDURES

The EAP must be implemented once events or circumstances involving the CCR unit that represent a safety emergency are detected, including conditions identified during periodic structural stability assessments, annual inspections, and inspections by a qualified person. In accordance with §257.73(a)(3)(i)(B), the following sections define responsible persons, their respective responsibilities, and notification procedures in the event of a safety emergency involving the FAB. Contact information is provided in Table 5, attached.

2.1 RESPONSIBLE PERSONS AND RESPONSIBILITIES

Appropriate parties will be notified based on the nature and severity of the incident as determined by the Station Environmental Specialist or Chemical Specialist. If failure is imminent or has occurred, notification and mitigation procedures are a top priority, particularly for a potentially hazardous situation. The Station Environmental Specialist or Chemical Specialist, in conjunction with the Station Director, is responsible for this determination.

2.2 NOTIFICATION SEQUENCE

The following notification procedures shall be used by employees in the event of a safety emergency with the FAB.

(1) Notify the Shift Supervisor and Environmental Specialist, Chemical Specialist, or alternate.
(2) If unsafe conditions exist, the employee should evacuate the area.
(3) Only the Environmental Specialist, Chemical Specialist, Corporate Environmental Manager, or designated alternate shall have any official communication with non-employees or regulatory agencies, and only the Communications Director shall have any contact with the media.

The Environmental Specialist, Chemical Specialist, or designated alternate should follow these procedures in the event of a safety emergency involving the FAB:

(1) Organize appropriately trained Station personnel and/or other employees or contractors as necessary to assist with the safety emergency.

(2) After consultation with appropriately trained Station personnel, contact the proper civil authorities (e.g., fire, police, etc.) if necessary. Notify the appropriate agencies where there has been a reportable release of material(s) into the environment. See Table 5, attached for contact information. Notify MWG Corporate via the Intelex online notification system within twenty-four hours in the event of a reportable release. A reportable release is a Material Release defined as a spill or leak that materialized in the waterway. A Non-Material Release is a spill or leak that did not come into contact with the waterway.

(3) Be prepared to evacuate the inundation area at any time during the safety emergency response.

(4) If the emergency is beyond the facility's response capabilities, contact one or more emergency response contractors as necessary.

(5) Corrective actions should only be performed by properly trained individuals.

2.3 EMERGENCY RESPONDERS CONTACT INFORMATION

In accordance with §257.73(a)(3)(i)(C), Table 5, attached, provides contact information of emergency responders. The Station Environmental Specialist, Chemical Specialist, or alternate will determine who to notify, including any affected residents and/or businesses, in the case of an imminent or actual CCR surface impoundment dam failure. The Station Environmental Specialist, Chemical Specialist, or alternate will ensure proper notifications are made.

Appropriate contractors will be utilized to assist the Station Environmental Specialist, Chemical Specialist or alternate with mitigated actions being undertaken in order to minimize the impact of an event that has occurred. Contact information for contractors and consultants are provided in Table 5, attached.

3.0 SITE MAP AND A SITE MAP DELINEATING THE DOWNSTREAM AREA

In accordance with §257.73(a)(3)(i)(D), the following section provides a physical description of the FAB. A Site Vicinity Map is provided as Figure 1, and a Site Plan is provided as Figure 2, attached. The locations of, and the downstream areas affected by, a potential failure of the FAB were prepared by CEC in the Initial Hazard Potential Classification Assessment April 2018.

3.1 BASIN LOCATIONS AND DESCRIPTIONS

The FAB is an inactive surface impoundment that is scheduled to begin closure. Approximately 30 acres in size, the FAB is located in the eastern portion of Powerton Station (see Figure 1) northeast of the Main Power Block Building and the Ash Surge Basin. In 2010, the FAB was sectioned into a North Pond and South Pond to accommodate a new railroad embankment and the geometry has remained unchanged since. The site plan also shows the topography of the FAB and surrounding area.

CEC has visually inspected both the North Pond and South Pond; both ponds appear to be primarily incised with the surrounding ground at or higher in elevation. Other than an emergency over flow from the adjacent Ash Surge Basin into the South Pond, operations have no in-flow to either the North or South Pond. Physical characteristics of the FAB are provided in Table 6, below.

Table 6: FAB Characteristics

	Ash Surge Basin
Estimated Capacity (acre-feet)	310
Estimated Maximum Basin Depth (feet)	10
Elevation - Maximum Crest (ft msl.)	468

3.2 DELINEATION OF DOWNSTREAM AREAS

The potential impacts from failure of the FAB were evaluated and reported by CEC in the Initial Hazard Potential Classification Assessment (HPCA), dated April 2018. A copy of the HPCA is contained on the CCR Rule Compliance Data and Information web site (http://www.nrg.com/legal/coal-combustion-residuals/).

Results of the HPCA indicate that the FAB is classified as a significant hazard potential CCR surface impoundment. The evaluation reports no loss of life resulting from failure of the FAB embankments is probable because no occupied buildings are located within the anticipated inundation areas. However, potential failure during flood conditions could result in offsite economic or environmental impacts.

4.0 ANNUAL FACE-TO-FACE MEETING

In accordance with §257.73(a)(3)(i)(E), a face-to-face meeting or an exercise between representatives of the Powerton Station and the local emergency responders shall be offered and, if accepted, held on an annual basis. The purpose of the annual meeting is to review the EAP to assure that contacts, addresses, telephone numbers, etc. are current. The annual meeting will be held whether or not an incident occurred in the previous year. In the event an incident occurs, the annual meeting date may be moved up in order to discuss the incident closer to the date of occurrence. If no incidents have occurred, the annual meeting will be held to inform local emergency responders on the contents of the EAP and changes from the previous year.

Pursuant to §257.73(a)(3)(ii)(B), the EAP requires modification whenever there is a change in conditions that would substantially affect the EAP in effect. Changes to the plan shall be made as appropriate, and a copy of the changes will be kept at the Station, with the revised EAP placed in the facility's operating record as required by §257.105(f)(6). The written EAP must be evaluated, at a minimum, every five years to ensure the information required in §257.73(a)(3) is accurate.

5.0 LIMITATIONS AND CERTIFICATION

This emergency action plan was prepared to meet the requirements of §257.73(a)(3) and was prepared under the direction of Mr. M. Dean Jones, P.E.

By affixing my seal to this, I do hereby certify to the best of my knowledge, information, and belief that the information contained in this report is true and correct. I further certify I am licensed to practice in the State of Illinois and that it is within my professional expertise to verify the correctness of the information. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Seal:

Signature: ______________________

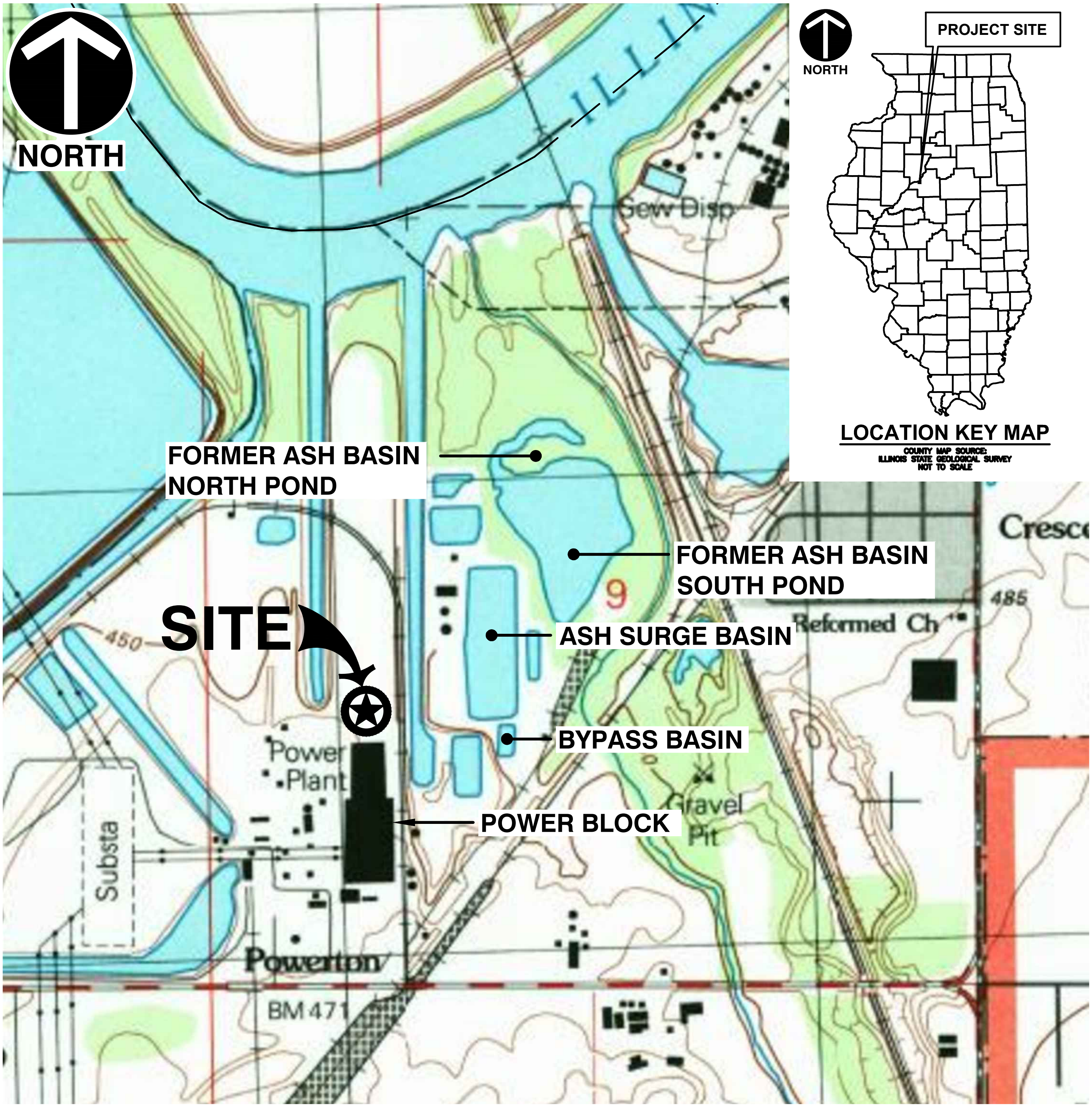
Name: M. Dean Jones, P.E.

Date of Certification: August 24, 2018

Illinois Professional Engineer No.: 062-051317

Expiration Date: November 30, 2019

FIGURES



REFERENCE

1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, PEKIN QUADRANGLE, ILLINOIS DATED: 1996.

SCALE IN FEET

0 1000 2000

Civil & Environmental Consultants, Inc.

555 Butterfield Road, Suite 300 - Lombard, IL 60148

630-963-6026 · 877-963-6026

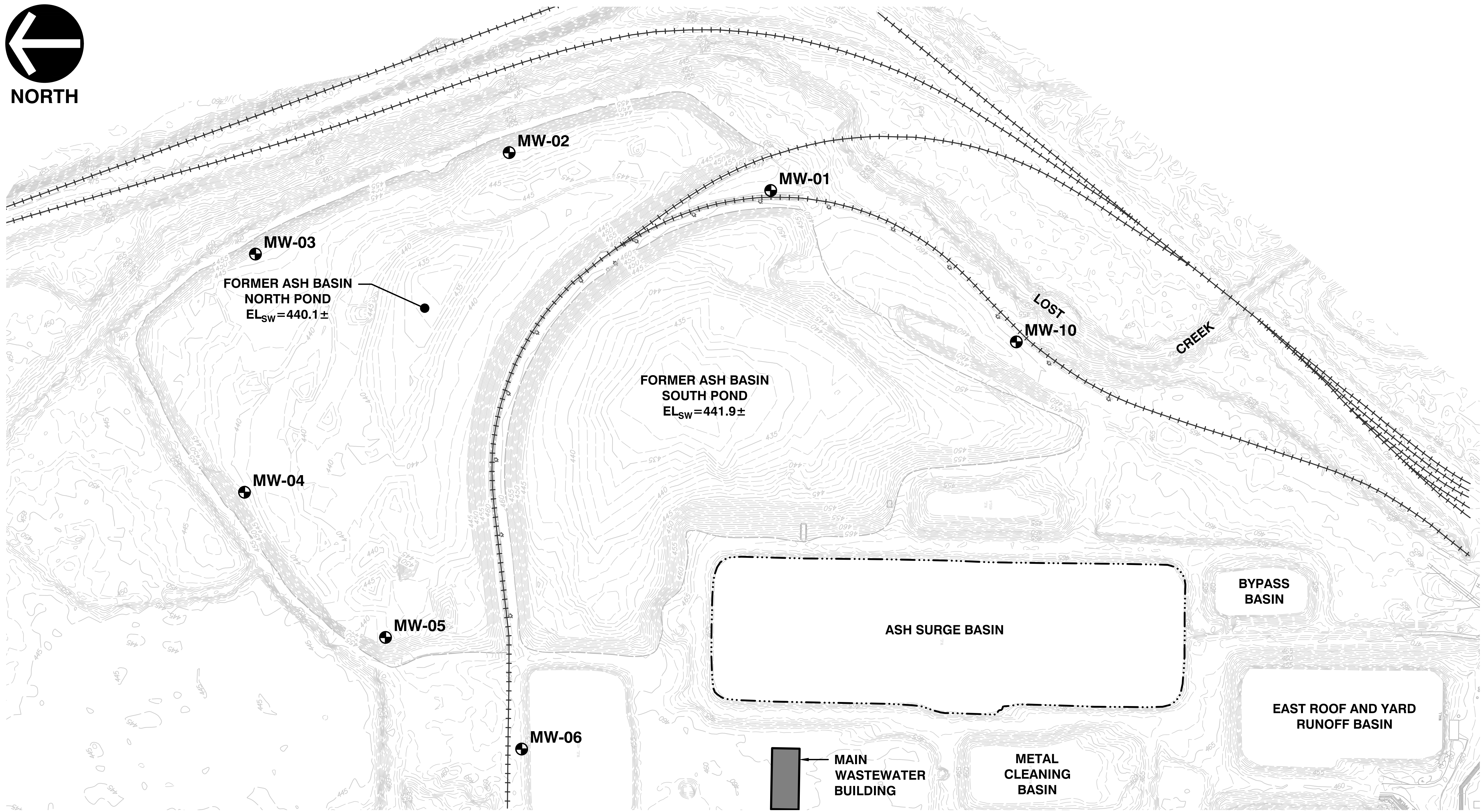
www.cecinc.com

POWERTON STATION
ASH SURGE BASIN - BYPASS BASIN
PEKIN, ILLINOIS

SITE VICINITY MAP

DRAWN BY:	MSK	CHECKED BY:	MDJ	APPROVED BY:	MDJ	FIGURE NO.:	1
DATE:	08/27/2018	DWG SCALE:	1"=1000'	PROJECT NO:	183-551.0100		

P:\2018\183-551\-CADD\Dwg\CV01-Hazard Assessment\183551-CV01-C101-Site Vicinity Map.dwg{LAYOUT1} LS:(8/27/2018 - mkarpf) - LP: 8/27/2018 9:04 AM



REFERENCE

1. TOPOGRAPHIC INFORMATION BASED ON SURVEY BY RIDGELINE CONSULTANTS PERFORMED IN FEBRUARY AND MARCH 2016 AND APPENDED TO AERIAL SURVEY PERFORMED BR AEROMETRIC, INC. DATED JUNE 19, 2008.
2. SURFACE WATER ELEVATION, EL_{SW}, DATED JUNE 23, 2017.

LEGEND

- TOPOGRAPHY (1–FOOT INTERVAL)
- WATER LINE
- MW-01 MONITORING WELL (LOCATION APPROXIMATE)

SCALE IN FEET

0 200 400

CEC

Civil & Environmental Consultants, Inc.

555 Butterfield Road, Suite 300 - Lombard, IL 60148
630-963-6026 · 877-963-6026
www.cecinc.com

POWERTON STATION
ASH SURGE BASIN - BYPASS BASIN
PEKIN, ILLINOIS

SITE PLAN

DRAWN BY: MSK	CHECKED BY: MDJ	APPROVED BY: MDJ	FIGURE NO.:
DATE: 08/27/2018	DWG SCALE: 1"=200'	PROJECT NO: 183-551.0100	2

P:\2018\183-551\-CADD\Dwg\CIV01-Hazard Assessment\183551-CV01-C102-Site Plan.dwg{LAYOUT1} LS:(7/26/2018 - mkarpf) - LP: 8/27/2018 9:04 AM

TABLE 5

EAP NOTIFICATION LIST

Table 5: Midwest Generation Powerton Generating Station
CCR EAP Notification List – Updated September 2021

Plant Contacts:

Name	Title	Contact Info
Joseph Kotas	Environmental Specialist	(O) 309-477-5216 (C) 815-901-6549
Dale Green	Plant Manager	(O) 309-477-5212 (C) 309-620-3908
Todd Mundorf	Operations Manager	(O) 309-477-5215 (C) 847-456-4642
Mark Vannaken	Maintenance Manager	(O) 309-477-5221 (C) 309-824-5686
Sunish Shah	Engineering Manager	(O) 309-477-5243 (C) 773-410-3225
Bill Gaynor	Class K WWT Operator	(O) 309-477-5437 (C) 309-824-2999
Station Control Room	24-Hour, 7-day	309-477-5299

Corporate Support:

Name	Title	Contact Info
Sharene Shealey	Director, Environmental	(C) 724-255-3220
Jill Buckley	Environmental Manager	(C) 724-448-9732
Tony Shea	Sr. Director, Environmental	(O) 609-524-4923 (C) 609-651-6478
Dave Schrader	Sr. Manager, Communications (public point of contact)	(O) 267-295-5768 (C) 267-294-2860

Emergency Response Agencies:

Agency	Address	Contact Info
National Response Center (NRC) – US Army Corp of Engineers	Peoria Lock and Dam 1139 Wesley Rd, Creve Coeur, IL 61610	800-424-8802 (309) 699-6111 (local)
Illinois Department of Natural Resources, Office of Water Resources	One Natural Resources Way, 2nd Floor Springfield, IL 62702-1271	8:30 a.m.-5:00 p.m. 217-782-4427
Illinois Emergency Management Agency (IEMA)	2200 Dirksen Parkway Springfield, IL 62703	800-782-7860
Illinois Environmental Protection Agency (IEPA)	Bureau of Water 1021 North Grand Avenue East Springfield, IL 62794	217-782-3637
Tazewell County Emergency Management Agency Operations Center	21304 IL State Rt. 9 Tremont, IL 61568	Phone: 309-925-2271 24-hour: 309-477-2234
Tazewell County TC3: Dispatches to Fire, Police and Emergency Medical services	101 S Capitol Street Pekin, IL 61554	Emergency: 9-1-1 Non-Emergency: 309-478-5796
Pekin Police Department	111 S Capitol St #100 Pekin, IL 61554	Emergency: 9-1-1 Non-Emergency: 309-346-3132 Front Desk: 309-478-5330
Pekin Fire Department	3232 Court Street Pekin, IL 61554	Emergency: 9-1-1 Non-Emergency: 309-477-2388

Environmental Response Contractors/Consultants:

Contractor/Consultant	Address	Contact Info
Civil & Environmental Consultants, Inc.	555 Butterfield Road, Suite 300 Lombard, IL 60148	630-963-6026
Iron Hustler Excavating	1604 West Detweiller Drive Peoria, IL61615	309 691-9894
SET Environmental	450 Sumac Road Wheeling, IL 60090	847 850-1056 877-437-7455 (24-hr)
Heritage Environmental Services	15330 Canal Bank Road Lemont, IL 62095	630-739-1151

Table 5: Midwest Generation Powerton Station CCR Surface Impoundment EAP Notification List

Plant Contacts:

Name	Title	Contact Info
Joe Kotas	Environmental Specialist	Office: 309-346-2165 x 5216 Cell: 815-901-6549
Mark Kelly	Chemical Specialist	Office: 309-346-2165 x 5240 Cell: 309-2417419
Dale Green	Station Director	Office: 309-346-2165 x 5212 Cell: 309-824-5620
Todd Mundorf	Operations Manager	Office: 309-346-2165 x 5215 Cell: 847-456-4642
Mark Vannaken	Maintenance Manager	Office: 309-346-2165 x 5221 Cell: 309-824-5686
Sunish Shah	Engineering Manager	Office: 309-346-2165 x 5243 Cell: 773-410-3225
Mark Kelly Bill Gaynor	Class K WWT Operator	Office: 309-346-2165 x 5240 Cell: 309-241-7419 Office: 309-346-2165 x 5437 Cell: 309-824-2999

Corporate Support:

Name	Title	Contact Info (Cell Phone #)
Sharene Shealey	Environmental Manager - Midwest Region	724-255-3220
Nate Rozic	Manager - East Region	
Tony Shea	Director - Environmental Compliance	609-651-6478
Dave Gaier	Stations Communications Director (point of public contact)	609-524-4529

Emergency Response Agencies:

Agency	Address	Contact Info
National Response Center (NRC)	NA	800-424-8802
Illinois Department of Natural Resources, Office of Water Resources	One Natural Resources Way, 2nd Floor Springfield, IL 62702-1271	8:30 a.m. – 5:00 p.m. 217-785-3334
Illinois Emergency Management Agency (IEMA)	110 East Adams Springfield, IL 62701	800-782-7860
Illinois Environmental Protection Agency (IEPA)	Bureau of Water 1021 North Grand Avenue East Springfield, IL 62794	217-782-3637
Tazewell County Emergency Management Agency Operations Center	21304 IL State Rt. 9 Tremont, IL 61568	Phone: 309-925-2271 24-Hr: 309-477-2234
Tazewell County ETSB: Dispatches to Fire, Police and Emergency Medical services	101 South Capitol Street Pekin, IL 61554	Emergency: 9-1-1 Non-Emergency: 309-478-5796
Pekin Police Department	111 South Capitol Street, #100 Pekin, IL 61554	Emergency: 9-1-1 Non-Emergency: 309-346-3132 Front Desk: 309-478-5330
Pekin Fire Department	3232 Court Street Pekin, IL 61554	Emergency: 9-1-1 Non-Emergency: 309-477-2388

Environmental Response Contractors/Consultants:

Contractor/Consultant	Address	Contact Info
Civil & Environmental Consultants, Inc. Dean Jones	555 Butterfield Road, Suite 300 Lombard, IL 60148	630-963-6026
SET Environmental - Project Manager JR Bonnot	450 Sumac Road Wheeling, IL 60090	847-850-1056
SET Enviromental 24-hr Emergency Response		877-437-7455

ATTACHMENT 8
FUGITIVE DUST CONTROL PLAN

CCR COMPLIANCE
FUGITIVE DUST CONTROL PLAN

Midwest Generation, LLC
Powerton Generating Station
13082 East Manito Road
Pekin, Illinois

PREPARED BY: KPRG and Associates, Inc.
14665 W. Lisbon Road, Suite 1A
Brookfield, WI 53005

October 19, 2021

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1.0 INTRODUCTION

On April 15, 2021, the Illinois Environmental Protection Agency adopted a new Part 845 of its waste disposal regulations creating statewide standards for the disposal of coal combustion residuals (CCR) in surface impoundments, created by the generation of electricity by coal-fired power plants. Part 845 specifically requires that "the owner or operator of a CCR surface impoundment, or any lateral expansion of a CCR surface impoundment, must adopt measures that will effectively minimize CCR from becoming airborne at the facility, including CCR fugitive dust originating from CCR surface impoundments, roads, and other CCR management and material handling activities". As a result, each regulated facility must develop a CCR fugitive dust control plan that complies with 35 Ill. Adm. Code 845.500(b).

This site specific Fugitive Dust Control Plan (Plan) has been developed to comply with the requirements specified in Section 845.500. In general, the Plan identifies the potential CCR fugitive dust sources and describes the control measures that will be implemented to minimize CCR fugitive dust emissions. The Plan also includes a procedure for the periodic assessment of the Plan's effectiveness, documentation of any Plan amendments deemed necessary to assure continued compliance, a record of any citizen complaints received pertaining to CCR fugitive dust emissions, and an outline of the required reporting and recordkeeping requirements in 35 Ill. Adm. Code 845.500.

2.0 SITE INFORMATION

2.1 Owner/Operator and Address:

Midwest Generation, LLC
Powerton Generating Station
13082 East Manito Road
Pekin, Illinois

2.2 Owner Representative/Responsible Person Contact Information:

Mr. Dale Green
Plant Manager
309-346-2165

2.3 Location and Description of Facility Operations

The Midwest Generation Powerton Generating Station is located at 13082 East Manito Road, Pekin, Tazewell County, Illinois. The facility is a coal-fired electric power generating station occupying approximately 1,710 acres. Units 5 and 6 began operating in 1972 and 1975, respectively. Electrical power is transmitted from the site to the area grid through overhead transmission power lines. In conjunction with the station is a man-made perched cooling pond which occupies approximately 1,440 acres and provides cooling water to the facility.

The general vicinity is a primarily mixed industrial and agricultural area with limited commercial and residential developments.

3.0 POTENTIAL FUGITIVE DUST SOURCES

Potential fugitive dust sources associated with the bottom ash and slag and fly ash systems have been identified at the facility; however, some of these are regulated by the facility's operating permit and are adequately addressed within the required fugitive dust operating program. The potential CCR fugitive dust sources generally include exterior ash distribution systems, temporary ash storage locations, ash bulk loading/unloading operations and ash truck transportation routes. Fugitive dust could potentially be generated from these sources as a result of equipment malfunctions, wind erosion, housekeeping issues and/or the nature of the operation. Specifically, these identified sources were further evaluated to determine the probability of CCR fugitive dust being generated and to determine the level of emission controls that are warranted to mitigate fugitive dust emissions. The findings of the evaluation are individually discussed in the following sections.

3.1 Bottom Ash and Slag Distribution System

Collected bottom ash and slag in the boilers is transported as a liquid mixture through an enclosed piping system to the dewatering bins. Some of this piping is located inside a building; however, a portion is situated above ground and in the outside environment. Although not an anticipated occurrence, a breach in the exterior piping could result in the accidental release of bottom ash and slag and potential fugitive dust emissions if the material were to accumulate and dry out.

3.2 Dewatering Bins

The dewatering bins are designed to remove water from the bottom ash and slag. Bottom ash and slag that is relatively wet is drop loaded through the bins into open top trucks for removal off-site for beneficial reuse purposes. The water removed from the dewatering bins is pumped to the Ash Surge Basin and the Ash Bypass Basin where settling occurs prior to discharge of the water from the facility. As of right now, the Metals Cleaning Basin has no water. The loading operation has the potential for fugitive dust emissions if bottom ash and slag is not properly loaded and is allowed to accumulate and dry out on the ground surface beneath the dewatering bins.

3.3 Ash Surge Basin, Bypass Basin, and Metal Cleaning Basin

Extracted water from the dewatering bins is pumped through enclosed pipes to the Ash Surge Basin or the Ash Bypass Basin. Occasionally, CCR material is placed in the Metal Cleaning Basin. After settling occurs, water from the Ash Surge Basin, Ash Bypass Basin, and the Metal Cleaning Basin is ultimately discharged through a final settling basin and then through a regulated NPDES outfall. These basins are normally filled with water; however, dredging occasionally may be required to remove the settled material from each basin. When this requirement occurs, the basins are dewatered and the dredged material is allowed to dry within each basin. When the material is suitable for transport, it is loaded into open top trucks, covered if necessary, and sent off site to a mine reclamation site. Potential fugitive dust emissions could occur if dry bottom ash and slag residual is exposed or loaded during excessive windy and dry weather conditions.

3.4 Former Ash Basin

This basin was formerly used for the routine disposal of bottom ash and slag; however, this procedure ceased in the 1970s. The bottom ash and slag is completely submerged within the basin. Water level fluctuations in the basin are attributable to precipitation and other weather-related conditions. In rare emergency operational situations, overflow from the Ash Surge Basin to the Former Ash Basin could occur by gravity through the spillway. This discharge is not expected to contain significant quantities of CCR and is allowed through the existing NPDES permit. It is noted that a new railroad spur was constructed through the middle of the Former Ash Basin.

3.5 Concrete Storage Pad

This partially below-grade concrete structure is used for the temporary storage of residual bottom ash and slag generated at the dewatering bins and as a result of other routine ash-related maintenance activities. The staged bottom ash and slag is allowed to partially dry within the structure until it is suitable for off-site removal. The material is placed in temporary storage, loaded into open top trucks, covered and sent off site to a mine reclamation site. Dry material that is exposed during excessively windy and dry weather conditions has the potential for becoming fugitive dust emissions.

3.6 Fly Ash Equipment

Collected fly ash in the precipitator hoppers is initially transported in a closed vacuum piping system to a cyclone and bag filter where it is mechanically separated from the air stream within an enclosed building. Fly ash is then sent within an enclosed building to the fly ash silos. At the silos, the fly ash is drop loaded into trucks through a telescopic pipe contained within a drop chute. The loading of fly ash occurs within a partially enclosed structure. After the trucks containing fly ash have been loaded and the truck's rear gate is water sprayed to remove dust, they proceed to a nearby platform to allow the truck driver to secure the truck and to broom sweep or water spray any residual fly ash remaining on the truck. This entire process is covered by the fugitive dust operating program for the facility.

3.7 Ash Transport Roadways

Both gravel covered and asphalt paved roads within the facility are used by trucks hauling bottom ash, slag, and fly ash to the mine reclamation site as well as by other vehicles entering and exiting the facility. Fugitive CCR dust emissions could occur during transit if CCR material is not properly cleaned from the trucks or if there is a release of CCR material from the vehicle due to a malfunction or accident.

These potential fugitive dust sources are identified on the Site Diagram included in Appendix A.

4.0 DESCRIPTION OF CONTROL MEASURES

4.1 Purpose

The purpose of developing appropriate control measures is to minimize and reduce the emissions of CCR fugitive dust from the identified potential emission sources. The control measures and work practices implemented at the facility are described in the following sections.

4.2 Bottom Ash and Slag Distribution System

Bottom ash and slag is in a liquid mixture within a closed system until the point of discharge at the dewatering bins. A significant portion of the piping system is contained within a building, which eliminates dust emissions to the outside environment. An assessment of the exterior distribution system will be performed on a quarterly basis to verify the integrity of the system or when a breach in the system is detected. If a leak is noted, resulting in the release of bottom ash and slag, the affected area will be restored to original conditions and repair of the pipe will be performed as soon as feasible. The CCR will be sent off site to a mine reclamation site.

4.3 Dewatering Bins

The bottom ash and slag is drop loaded from the dewatering bins in a wet state and into trucks positioned beneath the bins. The bottom ash and slag has sufficient moisture to preclude this material from becoming airborne during loading. An assessment of the dewatering bin loading operation will be performed on a quarterly basis to verify if there has been an equipment malfunction resulting in an accumulation of released material. Should there be a malfunction in the dewatering equipment that results in a spill of the material, repair of any malfunctioning equipment and clean up and transfer of the material to the concrete storage pit will be performed as soon as feasible.

4.4 Ash Surge Basin, Ash Bypass Basin, and Metal Cleaning Basin

During normal operations, the Ash Surge Basin and Ash Bypass Basin are filled with water thereby suppressing any potential fugitive dust emissions. The Metal Cleaning Basin has recently been emptied and cleaned thereby suppressing any potential fugitive dust emissions. Infrequently, the basins will need to be dewatered and the sediment removed for proper off-site disposition. While the bottom ash and slag residue is drying, there is the potential for this material to become airborne especially during excessively dry and windy conditions. Loading of this material under these adverse conditions also has the potential for generating fugitive dust. Dewatered basins will be assessed on a quarterly basis or more frequently during excessively dry and windy conditions. To minimize fugitive dust emissions from exposed dry bottom ash and slag, the height of the staged material will be minimized and the material piles will be either sprayed with water or covered. Loading activities also will be limited during such occasions.

4.5 Former Ash Basin

The Former Ash Basin was used for the disposal of bottom ash and slag in the past; however, this procedure is no longer occurring. The previously deposited material is completely submerged within the basin with the typical water level at approximately 10-15 feet below grade, thereby, making the bottom ash and slag not readily susceptible to wind erosion and generation of potential fugitive dust emissions.

4.6 Concrete Storage Pad

The concrete pad only periodically contains bottom ash and slag and other CCR-related materials generated from routine plant maintenance activities. Typically these materials are in a wet state but are allowed to partially dry to facilitate removal. When sufficiently dry, the material is promptly removed off site. The concrete pad will be assessed on a quarterly basis or more frequently during excessively dry and windy conditions. To minimize fugitive dust emissions from exposed dry bottom ash and slag and other CCR-related materials, the height of the staged material will be minimized and the material piles will be either sprayed with water or covered.

4.7 Fly Ash Equipment

Fly ash from the mechanical separators is sent to the silos within an enclosed structure. The fly ash is drop loaded into an opening within the tarp covering the truck trailer through a telescopic pipe contained within a drop chute. This loading mechanism minimizes the potential for fly ash to become airborne during the loading process. The loading of trucks also occurs within a partial enclosure. At the completion of loading but prior to leaving the enclosure, the rear of each truck trailer is sprayed with water. The truck is then broom swept or water sprayed at the truck stand to remove any accumulated fly ash. Accumulated CCR is promptly transferred to the concrete storage pad.

This process is covered by the facility's fugitive dust operating program. Under the program, the facility must maintain control measures, including enclosures, covers and dust collection devices. Additionally, the facility is required to conduct weekly inspections of the process to confirm compliance. A record of the inspections is maintained at the facility.

4.8 Ash Transport Roadways

Truck drivers are instructed on the proper procedure for cleaning trucks and a vehicle speed limit is enforced at the facility. Ash material that may not have been adequately removed from the trucks has the potential to become airborne and ultimately be deposited on haul roads. To minimize fugitive dust emissions, these roads will be assessed on a quarterly basis and any observed accumulated ash material will be promptly cleaned up and collected for off-site removal.

5.0 PLAN ASSESSMENTS/AMENDMENTS

To assure that the work practices being implemented adequately control the dust from the identified potential fugitive dust emission sources at the facility, routine assessments and record keeping are performed. These procedures include the following:

5.1 Fugitive CCR Dust Assessments

Pursuant to 845.500(b)(3), assessments of the potential fugitive dust emission sources identified within this Plan will be conducted to assess the effectiveness of this Plan. The assessment will include observation of ash removal from basins, temporary storage and transport activities at the facility to confirm the adequacy of the control measures. The assessments will be conducted on a quarterly basis by an individual designated by the contact identified in Section 2.2 of this Plan. Observations made during each assessment are recorded on a form similar to the one included in Appendix B, however, the station may create their own form.

If the results of the assessment determine that ash-related equipment has malfunctioned or the integrity of the equipment has been compromised, the necessary repairs or replacement will be performed as soon as feasible. If the assessment finds that this Plan does not effectively minimize the CCR from becoming airborne, this Plan will be amended to include additional control measures.

5.2 Plan Amendments

This Fugitive Dust Plan will be reviewed whenever there is a change in conditions that would substantially affect the written Plan currently in place. A record of the reviews and any modifications or amendments made to the Plan currently in place will be kept on a form similar to the one included in Appendix C, however, the station may create their own form. The amended Plan will be reviewed by a Registered Professional Engineer and, if deemed acceptable, will be recertified.

5.3 Citizen Complaints

Any written or verbal complaints received from a citizen involving alleged CCR fugitive dust emission events at the facility will be recorded by an individual designated by the contact identified in Section 2.2 of this Plan. The complaints will be recorded on a form similar to the one included in Appendix D, however, the station may create their own form. Upon receipt of the complaint, an investigation of the alleged source of the fugitive dust emissions will be performed and the results of that investigation recorded on the form. If the fugitive dust emission event is confirmed, any necessary repairs or changes in operation required to mitigate the fugitive dust emissions will be implemented as soon as practicable. Quarterly reports will be submitted to the IEPA no later than 14 days from the end of the quarter of all complaints received during that quarter, including the information required by 845.500(b)(2)(A).

6.0 CCR FUGITIVE DUST PLAN REPORTING/RECORDKEEPING REQUIREMENTS

This section outlines the Plan reports that must be prepared, submitted, and records that must be maintained to meet the requirements specified in 35 Ill. Adm. Code Section 845.500. These requirements include the following:

- Place the Plan in the facility's operating record and publicly accessible internet site. If the Plan is amended, replace the initial Plan with the amended Plan. Only the most recent amended Plan will be maintained in the facility's operating record and internet site.

- Prepare an annual CCR Fugitive Dust Control Report and submit to the IEPA as part of the annual consolidated report required by 845.550. The annual report will include:
  - A description of the actions taken to control CCR fugitive dust,
  - A record of all citizen complaints, and
  - A summary of any corrective measures taken.
  - Placement of this report in the operating record and publicly accessible internet site.

- Provide notification to the IEPA and, if applicable, the Tribal authority when the Plan and reports are placed in the facility's operating record and publicly accessible internet site.

- Submit quarterly reports to IEPA within 14 days from the end of the quarter of all complaints received in that quarter. The quarterly reports will include:
  - The date of the complaint,
  - The date of the incident,
  - The name and contact information of the complainant, and
  - All actions taken to assess and resolve the complaint.

7.0 PROFESSIONAL ENGINEER CERTIFICATION

The undersigned Registered Professional Engineer is familiar with the requirements of 845.500 and has visited and examined the facility or has supervised examination of the facility by appropriately qualified personnel. The undersigned Registered Professional Engineer attests that this CCR Fugitive Dust Control Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and meets the requirements of 845.500, and that this Plan is adequate for the facility. This certification was prepared as required by 845.500(b)(7).

Engineer: Joshua D. Davenport

Signature: ______________________

Date: 10/19/21

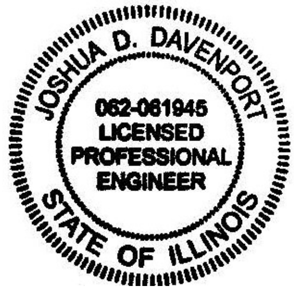
Company: KPRG and Associates, Inc.

Registration State: Wisconsin

Registration Number: 062.061945

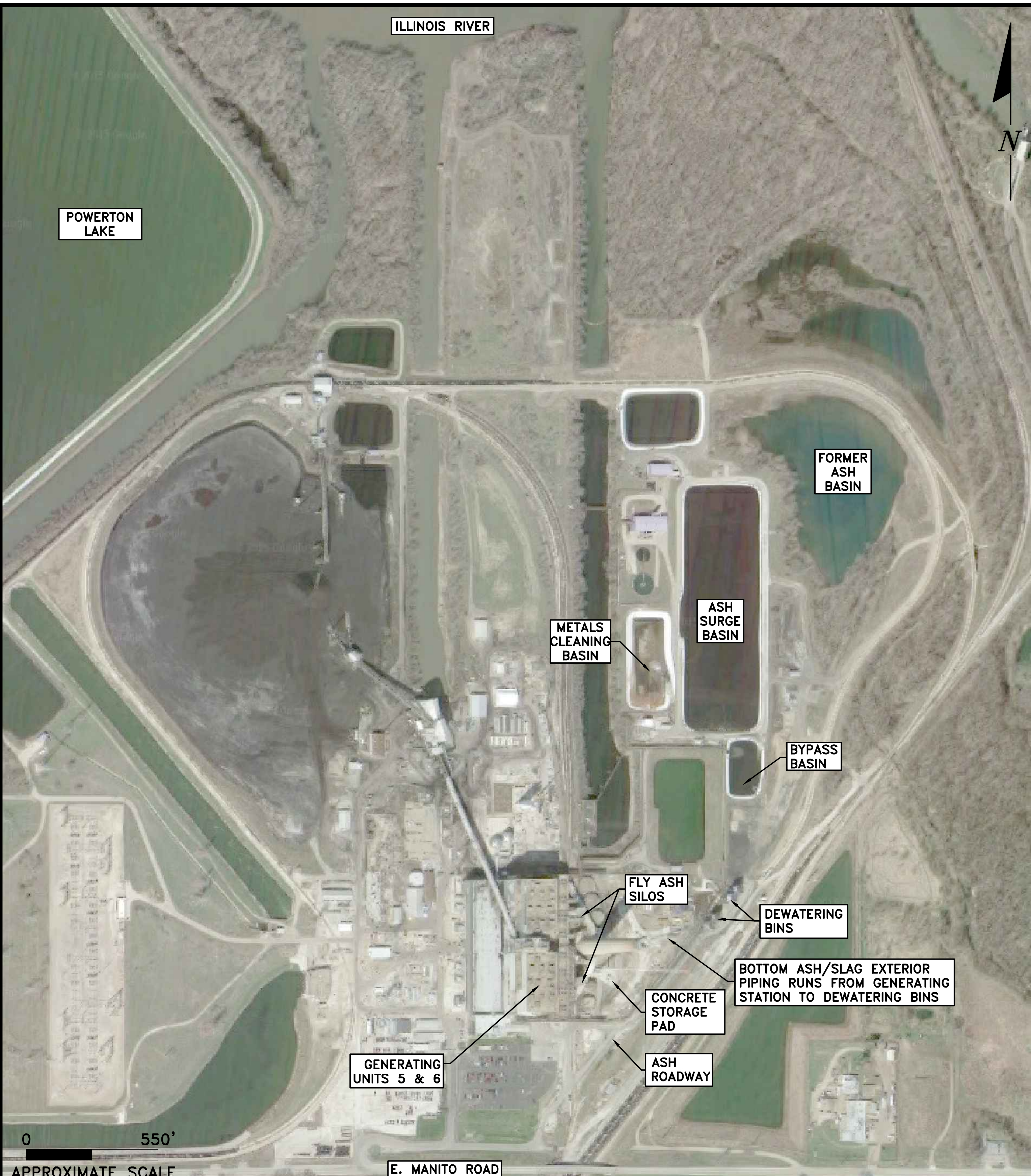
License Expiration Date: November 30, 2021

Professional Engineer Stamp:



APPENDIX A

SITE DIAGRAM
POTENTIAL FUGITIVE DUST SOURCES



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG

KPRG and Associates, inc.

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SITE DIAGRAM/FUGITIVE DUST SOURCES

POWERTON GENERATING STATION
PEKIN, ILLINOIS

Scale: 1" = 550' | Date: October 15, 2021

KPRG Project No. 15315 | APPENDIX A

W:\projects\midwest generation\attorney-client privilege\fugitive dust plans\powerton map.dwg

APPENDIX B

EXAMPLE ASSESSMENT RECORD

APPENDIX B

POWERTON STATION

EXAMPLE ASSESSMENT RECORD

Date	Inspector	Unit Inspected (See Key Below)	Maintenance/Cleanup Required (yes/no)	Response Action Performed (completion date)	Inspector Signature

Unit Key:

1 - Exterior Bottom Ash/Slag Piping
2 - Dewatering Bins
3 - Concrete Storage Pad
4 - Ash Roadways
5 - Ash Surge Basin
6 - Bypass Basin

APPENDIX C

EXAMPLE PLAN REVIEW AND AMENDMENT RECORD

APPENDIX C

POWERTON STATION

EXAMPLE CCR PLAN REVIEW/AMENDMENT RECORD

Date of Review	Reason for Review	Section Amended	P.E. Certification (Name/Date)

APPENDIX D

EXAMPLE CITIZEN COMPLAINT LOG

APPENDIX D

POWERTON STATION

EXAMPLE CITIZEN COMPLAINT LOG

Date	Time	Citizen Information (Name, Address, Phone No., Email)	Summary of Complaint	Action Taken	Recorded By

ATTACHMENT 9
GROUNDWATER MONITORING INFORMATION

Attachment 9-1 – Local Well Stratigraphy Information

Attachment 9-1

Local Well Statrigraphy Information. Midwest Generation, LLC, Powerton Generating Station, Pekin, IL.

ID	Well_Count	Well_ID	From	To	Original Logged Description	Grouped As_ToUseToDefine_K_interval	Base of Model	Notes	Ignored
11	3	121790013000	70	70	shale at	shale	x		
30	5	121790012800	76	76	shale at	shale	x		
51	9	121790013200	59	61	shale	shale	x		
58	10	121790052800	49	49	blue shale at	shale	x		
68	12	121790048800	120	121	gray shale	shale	x		
97	14	121790012700	76	76	shale at	shale	x		
101	15	121790012600	36	36	shale at	shale	x		
103	16	121790012500	85	85	shale at	shale	x		
114	18	121792462600	99	103	dk gray shale & hd dk color limestone	shale	x		
128	22	121792453000	44	45	shale bedrock	shale	x		
133	23	121792323500	93	93	shale at	shale	x		
139	24	121792489200	63	63	shale below	shale	x		
178	31	121792478800	99	104	gray shale	shale	x		
194	35	121792481600	102	103	dark gray shale	shale	x		
214	39	121792534000	70	70	boulders or bedrock at	shale	x		
238	45	121792501800	73	73	shale at	shale	x		
258	49	121792492400	60	85	blue-green shale below 60'	shale	x		
334	65	121792379400	61	65.5	light gray, hard, shale	shale	x		
352	70	121792361700	39	40	shale gray	shale	x		
358	72	121792552000	141	141	shale below	shale	x		
421	87	121792438000	45.5	50.25	clayey shale, gray & rust brown-extremely dense	shale	x		
442	90	121792440300	60	70	clayey shale;medium dark gray	shale	x		
451	91	121792440000	35	48.1	clayey shale-gray weathered-very dense	shale	x		
500	99	121792515900	72	72	gray shale at	shale	x		
508	100	121792515800	93	100	soft and hard shale	shale	x		
525	104	121792519900	56	58	shale	shale	x		
536	106	121792312100	103	103	shale at	shale	x		
540	107	121792200900	47	47	shale at	shale	x		
558	111	121792311900	106	106	shale at	shale	x		
572	114	121792180200	104	104	rocks	shale	x	(Assumed to be bedrock)	
581	115	121792179800	78	79	shale	shale	x		
584	116	121792179700	48	67	rock	shale	x	(Assumed to be bedrock)	
599	121	121792180500	88	88	shale	shale	x		
616	123	121792090700	105	107	shale	shale	x		
629	125	121792088600	54	54	cap rock & gray shale at	shale	x		
641	130	121792238000	105	105	rocks at	shale	x	(Assumed to be bedrock)	
650	131	121792237900	95	100	firm gray shale	shale	x		
661	133	121792237700	81	85	firm gray shale	shale	x		
667	135	121792157500	42	42	shale	shale	x		
669	136	121792156800	105	108	black shale	shale	x		
681	138	121792219300	136	136	shale at	shale	x		
693	141	121792138000	80	108	rocks	shale	x	(Assumed to be bedrock)	x
701	142	121792237600	118	120	gray shale	shale	x		
715	146	121792285300	133	133	shale at	shale	x		
730	148	121792204800	96	100	dark gray shale	shale	x		
750	152	121790067100	100	100	hardpan at	shale	x	(Assumed to be bedrock)	

Attachment 9-2 – Boring Logs

PATRICK ENGINEERING INC.	BORING NUMBER **B-MW-1-Po** SHEET **1** OF **2**
	CLIENT **Midwest Generation**
	PROJECT & NO. **21053.070**
	LOCATION **Powerton**

LOGGED BY **MPG**

GROUND ELEVATION **461.7**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □ Water Content ○ LL △ (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
461.7	0.0		Brown coarse to fine sand, dry FILL				
				SS-1 1.0-2.5 14"R	3 4 4		qu=NT
				SS-2 3.5-5.0 12"R	3 3 5		Bentonite seal 3.0'-18.0'. Stickup protective cover installed. qu=NT
				SS-3 6.0-7.5 12"R	2 6 8		qu=NT
				SS-4 8.5-10.0 10"R	2 5 8		qu=NT
			Trace coarse gravel	SS-5 11.0-12.5 8"R	5 9 10		qu=NT
				SS-6 13.5-15.0 12"R	3 6 6		qu=NT
				SS-7 16.0-17.5 16"R	4 6 7		qu=NT
443.2	18.5		Brown coarse to medium sand, trace fine gravel, medium dense, saturated SW	SS-8 18.5-20.0 14"R	4 5 6		Sand pack 18.0'-30.0' qu=NT

DRILLING CONTRACTOR **Groff Testing**	REMARKS	WATER LEVEL (ft.)
DRILLING METHOD **4.25" I.D. HSA**	**Installed 2" diameter PVC monitoring well.**	⊻ **22.0**
DRILLING EQUIPMENT **CME 550 ATV**		⊻
DRILLING STARTED **10/4/10** ENDED **10/4/10**		⊻

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-1-Po** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **461.7**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □---○---△ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✻ (1 2 3 4 5)	NOTES & TEST RESULTS
441.7	20.0						Set screen (slot 0.010") 20.5'-30.5'
439.7	22.0		▽	SS-9 21.0-22.5 15"R	4 5 5		qu=NT
				SS-10 23.5-25.0 18"R	4 4 4		qu=NT
				SS-11 26.0-27.5 18"R	4 4 6		qu=NT
433.7	28.0		Coarse to fine gravel, some coarse sand, medium dense, saturated GP	SS-12 28.5-30.0 18"R	4 5 6		qu=NT
				SS-13 31.0-32.5 18"R	4 6 7		qu=NT
429.2	32.5		End of Boring at 32.5'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/4/10** ENDED **10/4/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **22.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER B-MW-2-Po SHEET 1 OF 2
CLIENT Midwest Generation
PROJECT & NO. 21053.070
LOCATION Powerton

LOGGED BY MPG
GROUND ELEVATION 459.2

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □ - - - ○ - - - △ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
459.2	0.0		Dark brown topsoil, silty clay, dry FILL				
457.7	1.5			SS-1 1.0-2.5 10"R	4 4 4		qu=NT
			Light brown coarse to fine sand, loose, dry FILL				
				SS-2 3.5-5.0 10"R	2 3 2		Bentonite seal 3.0'-20.0'. Stickup protective cover installed. qu=NT
				SS-3 6.0-7.5 12"R	3 3 4		qu=NT
			Dry	SS-4 8.5-10.0 14"R	4 5 4		qu=NT
				SS-5 11.0-12.5 15"R	2 2 3		qu=NT
			Some fine gravel	SS-6 13.5-15.0 15"R	3 6 5		qu=NT
				SS-7 16.0-17.5 18"R	2 5 6		qu=NT
			Dry	SS-8 18.5-20.0 18"R	3 3 4		qu=NT
439.2	20.0						

DRILLING CONTRACTOR Groff Testing
DRILLING METHOD 4.25" I.D. HSA
DRILLING EQUIPMENT CME 550 ATV
DRILLING STARTED 10/5/10 ENDED 10/5/10

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ 24.0
▼
▼

PATRICK ENGINEERING INC.	BORING NUMBER **B-MW-2-Po**	SHEET **2** OF **2**
	CLIENT **Midwest Generation**	
	PROJECT & NO. **21053.070**	
	LOCATION **Powerton**	

LOGGED BY **MPG**

GROUND ELEVATION **459.2**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □ 10 20 ○ 30 40 △ LL 50 / Unconfined Compressive Strength (TSF) ✳ 1 2 3 4 5	NOTES & TEST RESULTS
439.2	20.0		Light brown fine to medium sand, well graded, medium dense, dry FILL				Sand pack 20.0'-33.5'
				SS-9 21.0-22.5 18"R	4 10 11		qu=NT
435.7	23.5						
435.2	24.0		▽ Gray coarse to fine gravel, coarse sand, trace fine sand and silt, poorly graded, medium dense GP	SS-10 23.5-25.0 18"R	5 13 13		qu=NT Set screen (slot 0.010") 23.5'-33.5'
				SS-11 26.0-27.5 18"R	4 6 8		qu=NT
				SS-12 28.5-30.0 18"R	7 10 10		qu=NT
				SS-13 31.0-32.5 18"R	7 8 7		qu=NT
				SS-14 33.5-35.0 18"R	6 9 10		qu=NT
424.2	35.0		End of Boring at 35.0'				

DRILLING CONTRACTOR **Groff Testing**	REMARKS	WATER LEVEL (ft.)
DRILLING METHOD **4.25" I.D. HSA**	**Installed 2" diameter PVC monitoring well.**	▽ **24.0**
DRILLING EQUIPMENT **CME 550 ATV**		▼
DRILLING STARTED **10/5/10** ENDED **10/5/10**		▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-3-Po** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **459.1**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL 10 20 30 40 50 LL / Unconfined Compressive Strength (TSF) 1 2 3 4 5	NOTES & TEST RESULTS
459.1 458.6	0.0 0.5		Dark brown silty clay topsoil				
			Light brown coarse to medium sand, trace fine gravel, trace fine sand, very loose to loose, dry FILL	SS-1 1.0-2.5 16"R	2 1 2		qu=NT
				SS-2 3.5-5.0 14"R	1 1 2		Bentonite seal 3.0'-20.0'. Stickup protective cover installed. qu=NT
				SS-3 6.0-7.5 16"R	2 2 3		qu=NT
			Some fine sand	SS-4 8.5-10.0 18"R	2 3 2		qu=NT
			Light brown medium to fine sand, loose, dry	SS-5 11.0-12.5 17"R	1 2 2		qu=NT
				SS-6 13.5-15.0 18"R	4 5 6		qu=NT
				SS-7 16.0-17.5 16"R	2 2 3		qu=NT
440.1	19.0		Brown coarse sand, trace fine gravel, well graded, very loose, wet	SS-8 18.5-20.0 16"R	3 4 3		qu=NT

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/5/10** ENDED **10/5/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **23.0**

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-3-Po** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **459.1**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □ - - ○ - - △ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
439.1	20.0		SW				Sand pack 20.0'-34.0'
				SS-9 21.0-22.5 18"R	1 1 1		qu=NT
436.1	23.0		▽ Saturated				
				SS-10 23.5-25.0 0"R	1 2 2		qu=NT Set screen (slot 0.010") 24.0'-34.0'
				SS-11 26.0-27.5 18"R	1 2 2		qu=NT
				SS-12 28.5-30.0 18"R	2 1 2		qu=NT
				SS-13 31.0-32.5 18"R	1 2 2		qu=NT
425.1	34.0		End of Boring at 34.0'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/5/10** ENDED **10/5/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **23.0**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-4-Po** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **457.3**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □ 10 20 ○ 30 40 △ LL 50 / Unconfined Compressive Strength (TSF) ✳ 1 2 3 4 5	NOTES & TEST RESULTS
457.3	0.0		Brown silty clay, roots, topsoil FILL				
456.5	0.8		Light brown sand, medium to fine brown silty clay, fine gravel, dry FILL	SS-1 1.0-2.5 10"R	6 3 4		
				SS-2 3.5-5.0 8"R	3 4 4		Bentonite seal 3.0'-20.0'. Stickup protective cover installed.
				SS-3 6.0-7.5 18"R	4 6 9		qu=4.0**tsf
			Brown clayey silt	SS-4 8.5-10.0 18"R	4 5 5		qu=4.0**tsf
				SS-5 11.0-12.5 17"R	3 3 4		qu=3.5**tsf
				SS-6 13.5-15.0 17"R	2 2 3		qu=3.5**tsf
			Black clayey silt to silty clay				
441.3	16.0		Light brown coarse to fine sand, fine gravel, loose, dry SP	SS-7 16.0-17.5 18"R	2 2 3		
				SS-8 18.5-20.0 18"R	2 3 5		
437.3	20.0						

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/16/10** ENDED **10/16/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **24.0**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-4-Po** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **457.3**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □ — ○ — △ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
437.3	20.0		Brown coarse to fine gravel, trace coarse to medium sand, loose to medium dense, poorly graded GP				Sand pack 20.0'-34.0'
				SS-9 21.0-22.5 12"R	4 8 6		qu=NT
433.3	24.0		∇ Saturated	SS-10 23.5-25.0 18"R	6 5 7		qu=NT Set screen (slot 0.010") 24.0'-34.0'
				SS-11 26.0-27.5 14"R	2 3 3		qu=NT
				SS-12 28.5-30.0 18"R	5 6 10		qu=NT
				SS-13 31.0-32.5 10"R	4 4 8		qu=NT
			Coarse to fine gravel, trace silt				
423.3	34.0						
			End of Boring at 34.0'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/16/10** ENDED **10/16/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ **24.0**

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-5-Po** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **455.8**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □ - - ○ - - △ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
455.8	0.0		Dark brown silty clay, black coal cinders, topsoil FILL				
				SS-1 1.0-2.5 12"R	2 2 3		qu=NT
			Dry				Bentonite seal 2.0'-19.0'. Stickup protective cover installed.
				SS-2 3.5-5.0 14"R	6 8 10		qu=NT
			Coarse gravel, red coal cinders				
			Gray silty clay with coarse sand and fine gravel, medium stiff, dry	SS-3 6.0-7.5 16"R	2 3 3		qu=1.25**tsf
				SS-4 8.5-10.0 18"R	1 2 2		qu=1.0**tsf
				SS-5 11.0-12.5 18"R	2 2 3		qu=0.5**tsf
			Trace black coal cinders Trace coarse sand, moist				
			Gray clayey silt	SS-6 13.5-15.0 18"R	WOH 2 2		
				SS-7 16.0-17.5 18"R	WOH 6 6		
438.8	17.0		Gray coarse to fine gravel, coarse to fine sand, poorly graded, medium dense, dry GP				
				SS-8 18.5-20.0 18"R	4 8 7		Sand pack 19.0'-31.0'
435.8	20.0						

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/5/10** ENDED **10/6/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **20.5**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER B-MW-5-Po SHEET 2 OF 2
CLIENT Midwest Generation
PROJECT & NO. 21053.070
LOCATION Powerton

LOGGED BY MPG
GROUND ELEVATION 455.8

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □---O---△ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
435.8 435.3	20.0 20.5		⊻ Coarse to fine gravel, trace coarse to fine sand, poorly graded, medium dense, saturated GP				
				SS-9 21.0-22.5 0"R	4 6 6		qu=NT Set screen (slot 0.010") 21.0'-31.0'
				SS-10 23.5-25.0 10"R	4 6 6		qu=NT
			Loose	SS-11 26.0-27.5 10"R	3 4 4		qu=NT
				SS-12 28.5-30.0 10"R	4 5 6		qu=NT
424.8	31.0		End of Boring at 31.0'				

DRILLING CONTRACTOR Groff Testing
DRILLING METHOD 4.25" I.D. HSA
DRILLING EQUIPMENT CME 550 ATV
DRILLING STARTED 10/5/10 ENDED 10/6/10

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
⊻ 20.5
⊻
⊻

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-6-Po** SHEET 1 OF 2
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **461.2**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □ — ○ — △ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
461.2	0.0		Gravel, clay, coal cinders FILL				
				SS-1 1.0-2.5			
				SS-2 3.5-5.0			Bentonite seal 3.0'-18.0'. Stickup protective cover installed.
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
451.2	10.0		Dark gray clayey silt, organics, very soft, moist FILL				
				SS-5 11.0-12.5 17"R	WOH 1 1		qu=0.25**tsf
				SS-6 13.5-15.0 16"R	WOH 3 3		qu=0.25**tsf
447.2	14.0		Black coal cinders, loose, wet FILL				
				SS-7 16.0-17.5 14"R	2 3 3		
444.2	17.0		▽				
443.2	18.0		Olive gray and gray organic silt, trace clay, trace peat, low plasticity, wet OL	SS-8 18.5-20.0	2 2 1		Sand pack 18.0'-28.0' qu=NT Set screen (slot 0.010") 19.0'-29.0'

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/6/10** ENDED **10/6/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **17.0**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-6-Po** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **461.2**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content: PL □ 10 20 30 40 50 LL; Unconfined Compressive Strength (TSF) ✳ 1 2 3 4 5	NOTES & TEST RESULTS
441.2	20.0						
				SS-9 21.0-22.5 16"R	WOH 1 2		qu=0.25**tsf
			Trace fine sand, dark gray mottled black organic silt, trace fine sand, wet	SS-10 23.5-25.0 18"R	1 2 3		qu=0.50**tsf
				SS-11 26.0-27.5 18"R	3 3 3		qu=0.75**tsf
433.7	27.5		Dark gray organic clay, trace fine sand, medium stiff, moist OL				
				SS-12 28.5-30.0 18"R	2 2 3		qu=1.25**tsf
431.2	30.0		End of Boring at 30.0'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/6/10** ENDED **10/6/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **17.0**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-7-Po** SHEET **1** OF **3**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **459.6**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □ Water Content ○ LL △ (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
459.6	0.0		Sand, gravel, black cinders, dry FILL				
				SS-1 1.0-2.5			
				SS-2 3.5-5.0			Bentonite seal 3.0'-32.0'. Stickup protective cover installed.
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
449.6	10.0		Sand, gravel, clay, black coal cinders FILL				
				SS-5 11.0-12.5 6"R	5 3 3		
446.1	13.5		Dark gray organic clay, soft, moist OH	SS-6 13.5-15.0 10"R	2 2 2		qu=0.5**tsf
			Moist	SS-7 16.0-17.5 18"R	2 1 2		qu=0.5**tsf
			Trace fine sand, organic silt, moist	SS-8 18.5-20.0 18"R	WOH 2 2		qu=0.75**tsf
439.6	20.0						

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/4/10** ENDED **10/5/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **36.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-7-Po** SHEET **2** OF **3**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **459.6**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content (PL □ 10 20 30 40 50 LL △) / Unconfined Compressive Strength (TSF) ✱ 1 2 3 4 5	NOTES & TEST RESULTS
439.6	20.0		Dark gray organic clay, mottled black, medium stiff, dry OH				
				SS-9 21.0-22.5 18"R	3 2 4		qu=1.0**tsf
				SS-10 23.5-25.0 18"R	2 3 4		qu=1.25**tsf
433.6	26.0		Gray organic silt, trace shells, fibers, very soft, moist OL	SS-11 26.0-27.5 18"R	2 2 2		qu=0.25**tsf
			Dry	SS-12 28.5-30.0 18"R	2 3 3		qu=1.75**tsf
428.6	31.0		Dark gray organic clay, trace fine gravel, moist OH	SS-13 31.0-32.5 18"R	2 4 3		qu=1.25**tsf Sand pack 32.0'-45.0'
426.1	33.5		Gray clayey gravel, coarse sand, clay, silt, moist GC	SS-14 33.5-35.0 18"R	WOH 2 2		qu=NT Set screen (slot 0.010") 35.0'-45.0'
423.6	36.0		⊽ Medium dense, saturated	SS-15 36.0-37.5 18"R	2 7 6		qu=NT
				SS-16 38.5-40.0 10"R	2 4 7		
419.6	40.0						

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/4/10** ENDED **10/5/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
⊽ **36.0**
⊽
⊽

PATRICK ENGINEERING INC.	
BORING NUMBER	B-MW-8-Po
SHEET	1 OF 2
CLIENT	Midwest Generation
PROJECT & NO.	21053.070
LOCATION	Powerton

LOGGED BY MPG

GROUND ELEVATION 468.7

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □---○---△ LL (10, 20, 30, 40, 50) / Unconfined Compressive Strength (TSF) ✳ (1, 2, 3, 4, 5)	NOTES & TEST RESULTS
468.7	0.0		Fine gravel, sand, silt, clay, black cinders, dry FILL				
				SS-1 1.0-2.5			
				SS-2 3.5-5.0			Bentonite seal 3.0'-18.0'. Stickup protective cover installed.
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
458.7	10.0		Black cinders FILL				
				SS-5 11.0-12.5 14"R	15 28 15/3"		
				SS-6 13.5-15.0 18"R	11 15 12		
			Silty clay seam 15.5'-16.5'				
				SS-7 16.0-17.5 17"R	15 15 14		
							Sand pack 18.0'-30.0'
449.2	19.5		▼	SS-8 18.5-20.0 18"R	7 11 11		

DRILLING CONTRACTOR Groff Testing

DRILLING METHOD 4.25" I.D. HSA

DRILLING EQUIPMENT CME 550 ATV

DRILLING STARTED 9/30/10 ENDED 9/30/10

REMARKS

Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)

▽ 21.0

▼ 19.5

▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-8-Po** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **468.7**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □ Water Content ○ LL △ (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
448.7	20.0		Black cinders FILL				Set screen (slot 0.010") 20.0'-30.0'
447.7	21.0		∇ Saturated	SS-9 21.0-22.5 18"R	5 5 3		
				SS-10 23.5-25.0 18"R	1 1 2		
444.2	24.5		Dark gray organic clay, soft, moist OH				qu=0.75**tsf
				SS-11 26.0-27.5 18"R	1 2 2		qu=1.0**tsf
441.2	27.5		Dark gray organic silt, medium stiff to soft, low plasticity, moist OL	SS-12 28.5-30.0 18"R	2 4 4		qu=1.25**tsf
438.7	30.0		End of Boring at 30.0'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **9/30/10** ENDED **9/30/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ **21.0**
▼ **19.5**
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-9-Po** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **466.2**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL 10 20 30 40 50 LL / Unconfined Compressive Strength (TSF) 1 2 3 4 5	NOTES & TEST RESULTS
466.2	0.0		Black cinders, fine gravel, crushed rock, dry FILL				
				SS-1 1.0-2.5			
				SS-2 3.5-5.0			Bentonite seal 3.0'-20.0'. Stickup protective cover installed.
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
456.2	10.0		Black cinders, coarse to fine sand, brick, fine gravel, dry FILL				
				SS-5 11.0-12.5 14"R	6 12 15		qu=NT
				SS-6 13.5-15.0 18"R	5 6 7		qu=NT
			Moist	SS-7 16.0-17.5 18"R	6 9 10		qu=NT
449.2	17.0		Brown clayey silt, trace fine sand, moist CL				
447.2	19.0			SS-8 18.5-20.0 18"R	3 6 11		qu=NT
			Light brown fine to medium sand, loose, well graded				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **9/28/10** ENDED **9/28/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **23.5**
▼ **21.6**
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-9-Po** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **466.2**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □- - -○- - -△ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
446.2	20.0		SW				Sand pack 20.0'-32.0'
444.6	21.6		▼	SS-9 21.0-22.5 18"R	3 3 4		Set screen (slot 0.010") 22.0'-32.0'
442.7	23.5		∇ Saturated	SS-10 23.5-25.0 18"R	1 3 6		
				SS-11 26.0-27.5 18"R	0 2 2		
			Medium dense	SS-12 28.5-30.0 18"R	2 6 13		
			Trace fine gravel	SS-13 31.0-32.5 18"R	2 5 10		
433.7	32.5		End of Boring at 32.5'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **9/28/10** ENDED **9/28/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ **23.5**
▼ **21.6**
▼

PATRICK ENGINEERING INC.

BORING NUMBER	**B-MW-10-Po**	SHEET	1 OF 2
CLIENT	**Midwest Generation**		
PROJECT & NO.	**21053.070**		
LOCATION	**Powerton**		

LOGGED BY **MPG**

GROUND ELEVATION **454.1**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □ - - - ○ - - - △ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✱ (1 2 3 4 5)	NOTES & TEST RESULTS
454.1	0.0		Black and brown silty clay topsoil CL				
				SS-1 1.0-2.5			
				SS-2 3.5-5.0			Bentonite seal 3.0'-17.0'. Stickup protective cover installed.
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
444.1	10.0		Brown organic silt, some clay, trace peat, soft, moist OL				
				SS-5 11.0-12.5 16"R	1 2 2		qu=0.5**tsf
440.6	13.5		Black organic clay, medium plasticity, medium stiff, dry OL	SS-6 13.5-15.0 18"R	2 3 4		qu=1.5**tsf
438.1	16.0		Brown and gray silty clay, trace to little coarse to fine sand, medium stiff, dry CL	SS-7 16.0-17.5 18"R	4 4 4		qu=2.0**tsf Sand pack 17.0'-29.0'
				SS-8 18.5-20.0			Set screen (slot 0.010") 19.0'-29.0'

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/4/10** ENDED **10/4/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **21.0'**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-10-Po** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **454.1**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □- - -○- - -△ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
434.1	20.0						
433.1	21.0		Gray coarse to fine sand, trace fine gravel, silt, poorly graded, loose, saturated SP	SS-9 21.0-22.5 18"R	2 2 1		qu=NT
				SS-10 23.5-25.0 10"R	2 4 3		qu=NT
429.6	24.5		Brown and gray coarse to fine gravel, poorly graded, loose, saturated GP				
				SS-11 26.0-27.5 10"R	2 4 7		qu=NT
				SS-12 28.5-30.0 14"R	5 7 8		qu=NT
424.1	30.0		End of Boring at 30.0'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **10/4/10** ENDED **10/4/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ 21.0'
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER B-MW-11-Po SHEET 1 OF 2
CLIENT Midwest Generation
PROJECT & NO. 21053.070
LOCATION Powerton

LOGGED BY MPG
GROUND ELEVATION 468.1

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □ Water Content ○ LL △ (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✱ (1 2 3 4 5)	NOTES & TEST RESULTS
468.1	0.0		Cinders, gravel, sand, silt FILL				
				SS-1 1.0-2.5			
				SS-2 3.5-5.0			Bentonite seal 3.0'-28.0'. Stickup protective cover installed.
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
458.1	10.0		Black and brown clay, fine gravel, cinders, bricks, silt, coarse sand, dry FILL				
				SS-5 11.0-12.5 16"R	8 10 10		qu=NT
				SS-6 13.5-15.0 17"R	2 2 3		qu=2.5**tsf
452.1	16.0		Brown and gray silty clay, trace fine gravel, trace fine sand, stiff, dry CL	SS-7 16.0-17.5 18"R	1 3 4		qu=1.5**tsf
449.6	18.5		Gray clayey silt, organics, very soft, moist ML	SS-8 18.5-20.0 18"R	WOH 2 2		qu=0.5**tsf

DRILLING CONTRACTOR Groff Testing
DRILLING METHOD 4.25" I.D. HSA
DRILLING EQUIPMENT CME 550 ATV
DRILLING STARTED 9/28/10 ENDED 9/29/10

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
- 32.5 while drilling
- 26.5 after 12 hours
- 26.5 after 48 hours

PATRICK ENGINEERING INC.

BORING NUMBER	B-MW-11-Po
SHEET	2 OF 2
CLIENT	Midwest Generation
PROJECT & NO.	21053.070
LOCATION	Powerton

LOGGED BY MPG

GROUND ELEVATION 468.1

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □---O---△ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✱ (1 2 3 4 5)	NOTES & TEST RESULTS
448.1	20.0						
				SS-9 21.0-22.5 0"R	1 2 3		qu=NT
				SS-10 23.5-25.0 18"R	WOH WOH 1		qu=0.5**tsf
442.1	26.0						
441.6	26.5		▼ Dark gray silty clay, some organics, medium stiff, dry CL	SS-11 26.0-27.5 18"R	1 3 4		qu=1.5**tsf
				SS-12 28.5-30.0 18"R	3 4 6		Sand pack 28.0'-40.0' qu=2.5**tsf
				SS-13 31.0-32.5 18"R	3 4 6		Set screen (slot 0.010") 30.0'-40.0' qu=2.5**tsf
435.6	32.5		▽ Brown and gray coarse to fine gravel, coarse to fine sand, loose, saturated GP	SS-14 33.5-35.0 18"R	1 2 1		qu=NT
431.6	36.5		Light brown fine sand, well graded, very loose, saturated SW	SS-15 36.0-37.5 18"R	1 0 0		qu=NT
				SS-16 38.5-40.0 18"R	2 3 4		qu=NT
428.1	40.0		End of Boring at 40.0'				

DRILLING CONTRACTOR Groff Testing

DRILLING METHOD 4.25" I.D. HSA

DRILLING EQUIPMENT CME 550 ATV

DRILLING STARTED 9/28/10 ENDED 9/29/10

REMARKS

Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)

▽ 32.5 while drilling

▼ 26.5 after 12 hours

▼ 26.5 after 48 hours

PATRICK ENGINEERING INC.

BORING NUMBER	B-MW-12-Po
SHEET	1 OF 2
CLIENT	Midwest Generation
PROJECT & NO.	21053.070
LOCATION	Powerton
LOGGED BY	MPG
GROUND ELEVATION	470.0

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □- - -O- - -△ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✱ (1 2 3 4 5)	NOTES & TEST RESULTS
470.0	0.0		Black cinders, fine gravel, silty clay, dry FILL				
				SS-1 1.0-2.5			
				SS-2 3.5-5.0			Bentonite seal 3.0'-18.0'. Stickup protective cover installed.
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
460.0	10.0		Black cinders FILL				
				SS-5 11.0-12.5 18"R	17 18 11		qu=NT
				SS-6 13.5-15.0 18"R	12 20 17		qu=NT
			Seam of l ight brown coarse sand	SS-7 16.0-17.5 18"R	6 7 6		qu=NT
451.5	18.5		Gray silt, little to some coarse to fine sand, trace clay, very soft, ⊻ saturated	SS-8 18.5-20.0 18"R	1 5 2		Sand pack 18.0'-35.0' qu=NT Set screen (slot 0.010") 19.0'-29.0'
450.5	19.5						

DRILLING CONTRACTOR	Groff Testing
DRILLING METHOD	4.25" I.D. HSA
DRILLING EQUIPMENT	CME 550 ATV
DRILLING STARTED	9/29/10
ENDED	9/29/10

REMARKS

Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)

⊻ 20.5

⊻ 19.5

⊻

PATRICK ENGINEERING INC.	BORING NUMBER	B-MW-12-Po	SHEET 2 OF 2
	CLIENT	Midwest Generation	
	PROJECT & NO.	21053.070	
	LOCATION	Powerton	

LOGGED BY MPG
GROUND ELEVATION 470.0

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □ Water Content ○ LL △ (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✱ (1 2 3 4 5)	NOTES & TEST RESULTS
450.0 / 449.5	20.0 / 20.5		∇ ML				
				SS-9 21.0-22.5 18"R	1 2 1		qu=0.25**tsf
			Trace peat	SS-10 23.5-25.0 18"R	WOH 2 1		qu=0.5**tsf
444.0	26.0		Gray mottled black clayey silt, with some organics, trace peat, very soft, medium stiff, moist OH	SS-11 26.0-27.5 18"R	WOH WOH 2		qu=0.5**tsf
				SS-12 28.5-30.0 18"R	1 3 4		qu=1.75**tsf
				SS-13 31.0-32.5 18"R	2 3 3		qu=2.0**tsf
437.5	32.5		Dark brown and gray silty clay, trace coarse sand, trace organics, stiff to very stiff, dry CL	SS-14 33.5-35.0 18"R	4 6 6		qu=2.5**tsf
435.0	35.0		End of Boring at 35.0'				

DRILLING CONTRACTOR Groff Testing
DRILLING METHOD 4.25" I.D. HSA
DRILLING EQUIPMENT CME 550 ATV
DRILLING STARTED 9/29/10 ENDED 9/29/10

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ 20.5
▼ 19.5
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-13-Po** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **467.7**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □---○---△ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✱ (1 2 3 4 5)	NOTES & TEST RESULTS
467.7	0.0		Black cinders, sand, rock, dry FILL				
				SS-1 1.0-2.5			
				SS-2 2.5-4.0			Bentonite seal 3.0'-28.0'. Stickup protective cover installed.
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
457.7	10.0		Black cinders, medium sand FILL				
				SS-5 11.0-12.5 14"R	5 9 7		qu=NT
				SS-6 13.5-15.0 15"R	3 3 2		qu=NT
			Some organic silt, moist	SS-7 16.0-17.5 18"R	WOH 1 1		qu=NT
450.2	17.5		Gray/olive gray organic silt, very soft OL				
				SS-8 18.5-20.0 18"R	1 0 0		qu=0.0**tsf
447.7	20.0						

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **9/29/10** ENDED **9/29/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **31.5**
▼ **29.5**
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-13-Po** SHEET **2** OF **2**

CLIENT **Midwest Generation**

PROJECT & NO. **21053.070**

LOCATION **Powerton**

LOGGED BY **MPG**

GROUND ELEVATION **467.7**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content PL □ - - - ○ - - - △ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✱ (1 2 3 4 5)	NOTES & TEST RESULTS
447.7	20.0		Dark gray and black organic clay, very soft, moist OH	SS-9 21.0-22.5 18"R	WOH WOH 2		qu=0.25**tsf
445.2	22.5		Dark gray and black organic silt, very soft, moist OL	SS-10 23.5-25.0 18"R	WOH 1 1		qu=0.25**tsf
441.7	26.0		Dark gray and black organic clay, soft, dry OH	SS-11 26.0-27.5 18"R	WOH 1 2		qu=1.0**tsf
			Medium stiff	SS-12 28.5-30.0 18"R	0 2 3		Sand pack 28.0'-40.0' qu=1.5**tsf
438.2	29.5	▼					
437.2	30.5		Gray silty clay, some coarse to fine sand, trace fine gravel, wet CL				Set screen (slot 0.010") 30.0'-40.0'
436.2	31.5	▽		SS-13 31.0-32.5 18"R	2 4 5		qu=2.0**tsf
433.7	34.0		Stiff	SS-14 33.5-35.0 6"R	2 3 2		qu=2.0**tsf
			Brown coarse to fine gravel, trace coarse to medium sand, silt, medium dense, saturated GP	SS-15 36.0-37.5 8"R	4 6 6		qu=NT
				SS-16 38.5-40.0 8"R	5 8 8		qu=NT
427.7	40.0		End of Boring at 40.0'				

DRILLING CONTRACTOR **Groff Testing**

DRILLING METHOD **4.25" I.D. HSA**

DRILLING EQUIPMENT **CME 550 ATV**

DRILLING STARTED **9/29/10** ENDED **9/29/10**

REMARKS

Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)

▽ **31.5**

▼ **29.5**

▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-14-Po** SHEET **1** OF **2**

CLIENT **Midwest Generation**

PROJECT & NO. **21053.070**

LOCATION **Powerton**

LOGGED BY **MPG**

GROUND ELEVATION **467.7**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content: PL □ – – ○ – – △ LL (10, 20, 30, 40, 50); Unconfined Compressive Strength (TSF) ✱ (1, 2, 3, 4, 5)	NOTES & TEST RESULTS
467.7	0.0		Cinders, gravel, sand, silt, dry FILL				
				SS-1 1.0-2.5			
				SS-2 3.5-5.0			Bentonite seal 3.0'-18.0'. Stickup protective cover installed.
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
457.7	10.0		Brown fine gravel, some silty clay and coarse sand, dry FILL				
				SS-5 11.0-12.5 18"R	4 4 4		
				SS-6 13.5-15.0 16"R	4 3 4		
			Black cinders	SS-7 16.0-17.5 16"R	2 3 3		
				SS-8 18.5-20.0 18"R	3 3 1		Sand pack 18.0'-30.0'
448.2	19.5	▽	Gray organic silt, some fine sand,				

DRILLING CONTRACTOR **Groff Testing**

DRILLING METHOD **4.25" I.D. HSA**

DRILLING EQUIPMENT **CME 550 ATV**

DRILLING STARTED **9/30/10** ENDED **9/30/10**

REMARKS

Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)

▽ **19.5**

▼ **20.5**

▼

PATRICK ENGINEERING INC.	
BORING NUMBER	B-MW-14-Po
SHEET	2 OF 2
CLIENT	Midwest Generation
PROJECT & NO.	21053.070
LOCATION	Powerton

LOGGED BY MPG

GROUND ELEVATION 467.7

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □ Water Content ○ LL △ (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✱ (1 2 3 4 5)	NOTES & TEST RESULTS
447.7 447.2	20.0 20.5		⊻ very loose, low plasticity, saturated OL				Set screen (slot 0.010") 20.0'-30.0'
				SS-9 21.0-22.5 18"R	1 0 0		qu=NT
				SS-10 23.5-25.0 18"R	1 1 2		qu=0.25**tsf
442.7	25.0		Gray and mottled black organic silt, trace fine sand, soft, low plasticity, moist OL				
				SS-11 26.0-27.5 18"R	0 0 1		qu=0.25**tsf
438.7	29.0		Gray and black organic clay, medium stiff, moist OH	SS-12 28.5-30.0 18"R	2 3 4		qu=1.25**tsf
437.7	30.0		End of Boring at 30.0'				

DRILLING CONTRACTOR	Groff Testing
DRILLING METHOD	4.25" I.D. HSA
DRILLING EQUIPMENT	CME 550 ATV
DRILLING STARTED	9/30/10
ENDED	9/30/10

REMARKS

Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)

⊻ 19.5

⊻ 20.5

⊻

PATRICK ENGINEERING INC.

BORING NUMBER B-MW-15-Po SHEET 2 OF 2
CLIENT Midwest Generation
PROJECT & NO. 21053.070
LOCATION Powerton

LOGGED BY MPG
GROUND ELEVATION 468.3

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □ Water Content ○ LL △ (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✳ (1 2 3 4 5)	NOTES & TEST RESULTS
448.3	20.0		Gray fine sand, trace medium sand, loose, saturated SM				Set screen (slot 0.010") 20.0'-30.0'
				SS-9 21.0-22.5 18"R	1 1 1		qu=NT
444.8	23.5		Gray silt, mottled black, some organics, soft, moist to wet OL	SS-10 23.5-25.0 18"R	1 2 2		qu=0.75**tsf
				SS-11 26.0-27.5 18"R	1 2 2		qu=1.0**tsf
440.3	28.0		Gray silty clay, some organics, soft, medium stiff, dry CL	SS-12 28.5-30.0 18"R	1 3 2		qu=1.0**tsf
438.3	30.0		End of Boring at 30.0'				

DRILLING CONTRACTOR Groff Testing
DRILLING METHOD 4.25" I.D. HSA
DRILLING EQUIPMENT CME 550 ATV
DRILLING STARTED 9/30/10 ENDED 9/30/10

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ 20.0'
▼ 19.5
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-15-Po** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Powerton**

LOGGED BY **MPG**
GROUND ELEVATION **468.3**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □ Water Content ○ △ LL (10 20 30 40 50) / Unconfined Compressive Strength (TSF) ✱ (1 2 3 4 5)	NOTES & TEST RESULTS
468.3	0.0		Black cinders, fine gravel, sand, silt, dry FILL				
				SS-1 1.0-2.5			
				SS-2 3.5-5.0			Bentonite seal 3.0'-17.0'. Stickup protective cover installed.
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
458.3	10.0		Black cinders, fine gravel, coarse sand, silt, dry FILL				
				SS-5 11.0-12.5 14"R	6 13 12		
				SS-6 13.5-15.0 0"R	50/1"		
				SS-7 16.0-17.5 14"R	7 7 5		Sand pack 17.0'-30.0'
				SS-8 18.5-20.0 18"R	2 1 1		
448.8	19.5	▽					
448.3	20.0						

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 550 ATV**
DRILLING STARTED **9/30/10** ENDED **9/30/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **20.0'**
▼ **19.5**
▼

KPRG
ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Powerton Station
Pekin, Illinois

KPRG Project No. 18311.21

GEOLOGIC LOG OF MW-16

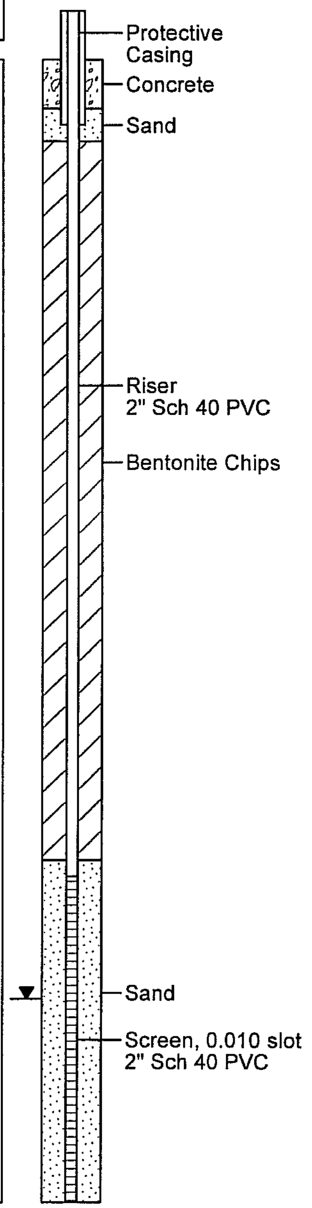
(Page 1 of 1)

Date Started	: 11/27/2012
Date Well Set	: 11/27/2012
Rock Coring Tools	: Not cored
Drilling Tools	: 4.25 ID HSA
Drill Rig	: Geoprobe
Driller Name/Co	: S. Keehma/Cabeno

Total Boring Depth	: 35 feet
Well Bottom Depth	: 35 feet
Surface Elev.	: 468.957 feet above MSL
TOC Elev.	: 471.564 feet above MSL
Groundwater Elev.	: 439.81
Riser Material	: 2" Sch 40 PVC
Screen Material	: 2" Sch 40 PVC, 0.010 slot
Coordinate N	: 40 32' 22.9" N
Coordinate E	: 89 40' 41.1" W
Logged By	: M. Wilson

Depth in Feet	Surf. Elev. 468.957	DESCRIPTION	PID	% Recovery
0	469			
		FILL: Black to brown silty clay with sand and gravel (Hydrovac from 0-10')		
2	467			
4	465			
6	463			
8	461	Approximate extent of fill		
10	459	Tan medium to fine grained SAND with some gravel		
			0	60
12	457			
14	455		0	
16	453		0	70
18	451			
			0	
20	449	- Gravel layer approximately 2" thick		
			0	100
22	447			
24	445		0	
		- Thin layer of fine grained sand		
26	443		0	100
28	441			
			0	
30	439	- Wet		
			0	60
32	437			
34	435		0	
36	433	End of boring at 35'		
38	431			
40				

Well Diagram: MW-16



12-13-2012 N:\Projects\18311 - Midwest Generation Ash Storage Issues\18311.2 - Powerton\Well Install\MW 16.bor

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KPRG and Associates, Inc.

Midwest Generation, LLC
Powerton Station
Pekin, Illinois

Project No. 15315.7

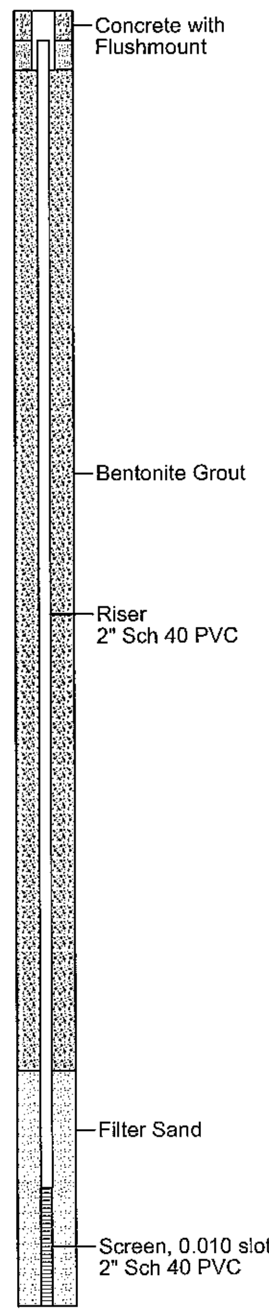
GEOLOGIC LOG OF MW-17

Date Started	: 09/21/15
Date Well Set	: 09/21/15
Drilling Tools	: 8 1/4 HSA
Reaming Tools	: None
Drill Rig	: Geoprobe
Driller Name/Co	: Nick / Cabeno Env. Serv.

Total Boring Depth	: 30.0 feet
Well Bottom Depth	: 30.0 feet
Surface Elev.	: xxx feet above MSL
TOC Elev.	: xxx feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 2" Sch 40 PVC
Screen Material	: 2" Sch 40 PVC, 0.010 slot
Coordinate N	:
Coordinate E	:
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 575	DESCRIPTION	% RQD	% Recovery
0	575	Asphalt Roadway over sand, silt, gravel mix, brown, dry.		
1	574			
2	573	SILTY SAND, fine to coarse, black, slightly moist, occ silty layers.		
3	572			
4	571			
5	570			
6	569			
7	568			
8	567			
9	566			
10	565			
11	564			
12	563	- begin black with orange brown		
13	562			
14	561			
15	560			
16	559	- some gray silt laminates		
17	558			
18	557			
19	556	SILT, gray, laminated with SILTY SAND, moist		
20	555	- increase to very moist then wet		
21	554			
22		SILT, gray, laminated with light brown silt, trace organics, wet.		

Well Diagram:



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

GEOLOGIC LOG OF MW-17

Midwest Generation, LLC
Powerton Station
Pekin, Illinois

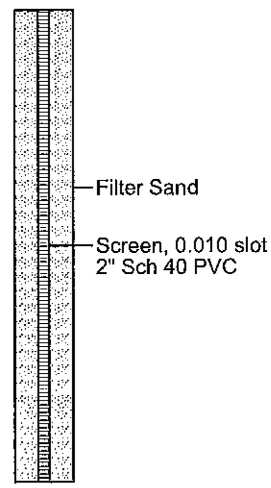
Project No. 15315.7

Date Started	: 09/21/15
Date Well Set	: 09/21/15
Drilling Tools	: 8 1/4 HSA
Reaming Tools	: None
Drill Rig	: Geoprobe
Driller Name/Co	: Nick / Cabeno Env. Serv.

Total Boring Depth	: 30.0 feet
Well Bottom Depth	: 30.0 feet
Surface Elev.	: xxx feet above MSL
TOC Elev.	: xxx feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 2" Sch 40 PVC
Screen Material	: 2" Sch 40 PVC, 0.010 slot
Coordinate N	:
Coordinate E	:
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 575	DESCRIPTION	% RQD	% Recovery
22	553			
23	552			
24	551			
25	550	SILTY SAND, black and dark gray, fine to meduim, wet.		
26	549			
27	548	SILT and SAND, gray and black, wet.		
28	547			
29	546			
30	545	End of Boring at 30 feet.		
31	544			
32	543			
33	542			
34	541			
35	540			
36	539			
37	538			
38	537			
39	536			
40	535			
41	534			
42	533			
43	532			
44				

Well Diagram:



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

Midwest Generation, LLC
Powerton Station
Pekin, Illinois

Project No. 15315.7

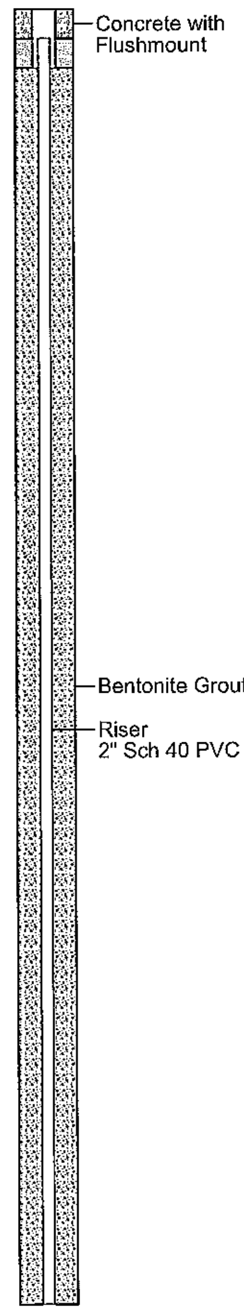
GEOLOGIC LOG OF MW-18

Date Started	: 09/21/15
Date Well Set	: 09/21/15
Drilling Tools	: 8 1/4 HSA
Reaming Tools	: None
Drill Rig	: Geoprobe
Driller Name/Co	: Nick / Cabeno Env. Serv.

Total Boring Depth	: 30.0 feet
Well Bottom Depth	: 30.0 feet
Surface Elev.	: xxx feet above MSL
TOC Elev.	: xxx feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 2" Sch 40 PVC
Screen Material	: 2" Sch 40 PVC, 0.010 slot
Coordinate N	:
Coordinate E	:
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 575	DESCRIPTION	% RQD	% Recovery
0	575	SILTY CLAY, brown, trace gravel, slightly moist.		
1	574			
2	573			
3	572	SILTY SAND, fine to coarse, black, brown and dark gray, dry to slightly moist.		
4	571			
5	570			
6	569			
7	568	- clayey from 7-8, followed by occasional clayey layers		
8	567			
9	566			
10	565			
11	564			
12	563			
13	562			
14	561			
15	560			
16	559	- begin all black		
17	558			
18	557			
19	556	- very moist		
20	555			
21	554			
22				

Well Diagram:



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Midwest Generation, LLC
Powerton Station
Pekin, Illinois

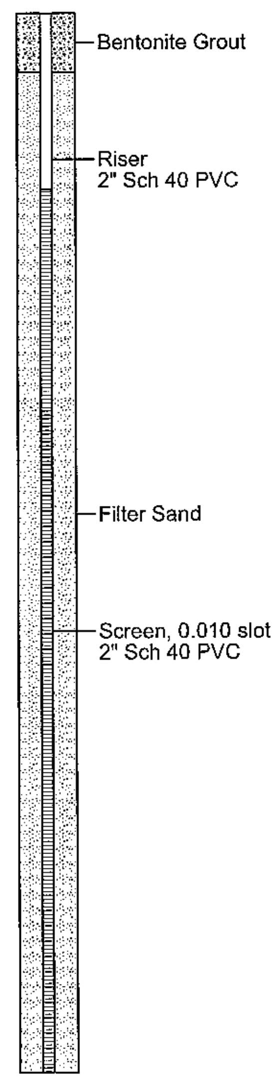
Project No. 15315.7

GEOLOGIC LOG OF MW-18

Date Started	: 09/21/15	Total Boring Depth	: 30.0 feet
Date Well Set	: 09/21/15	Well Bottom Depth	: 30.0 feet
Drilling Tools	: 8 1/4 HSA	Surface Elev.	: xxx feet above MSL
Reaming Tools	: None	TOC Elev.	: xxx feet above MSL
Drill Rig	: Geoprobe	Groundwater Elev.	: xxx feet above MSL
Driller Name/Co	: Nick / Cabeno Env. Serv.	Riser Material	: 2" Sch 40 PVC
		Screen Material	: 2" Sch 40 PVC, 0.010 slot
		Coordinate N	:
		Coordinate E	:
		Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 575	DESCRIPTION	% RQD	% Recovery
22	553			
23	552			
24	551			
25	550			
26	549			
27	548			
28	547			
29	546	CLAY, gray, some black, moist.		
30	545			
31	544			
32	543	CLAY, dark gray, trace organics, moist.		
33	542			
34	541			
35	540			
36	539	CLAY, greenish gray, trace organics, moist.		
37	538			
38	537			
39	536	SILTY SAND, tan, some gravel, very moist.		
40	535	End of Boring at 40 feet.		
41	534			
42	533			
43	532			
44				

Well Diagram:



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

Midwest Generation, LLC
Powerton Station
Pekin, Illinois

GEOLOGIC LOG OF MW-19

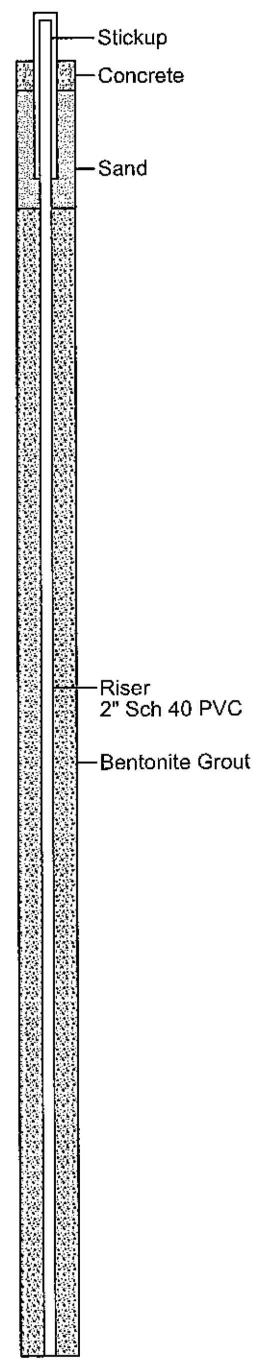
(Page 1 of 2)

Date Started	: 10/05/16
Date Well Set	: 10/05/16
Drilling Tools	: 8 1/4 HSA
Reaming Tools	: None
Drill Rig	: Geoprobe
Driller Name/Co	: Nick / Cabeno Env. Serv.

Total Boring Depth	: 41.0 feet
Well Bottom Depth	: 41.0 feet
Surface Elev.	: xxx feet above MSL
TOC Elev.	: xxx feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 2" Sch 40 PVC
Screen Material	: 2" Sch 40 PVC, 0.010 slot
Coordinate N	:
Coordinate E	:
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 575	DESCRIPTION	% RQD	% Recovery
0	575			
1	574	SILTY SAND, black, fine to coarse, occasional clayey layers slightly moist.		
2	573			
3	572			
4	571			
5	570	- very moist to wet		
6	569			
7	568	- slightly moist		
8	567			
9	566			
10	565			
11	564			
12	563			
13	562			
14	561	- 6" white and brown gravel		
15	560			
16	559			
17	558			
18	557	- moist		
19	556			
20	555			
21	554			
22				

Well Diagram:



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Midwest Generation, LLC
Powerton Station
Pekin, Illinois

GEOLOGIC LOG OF MW-19

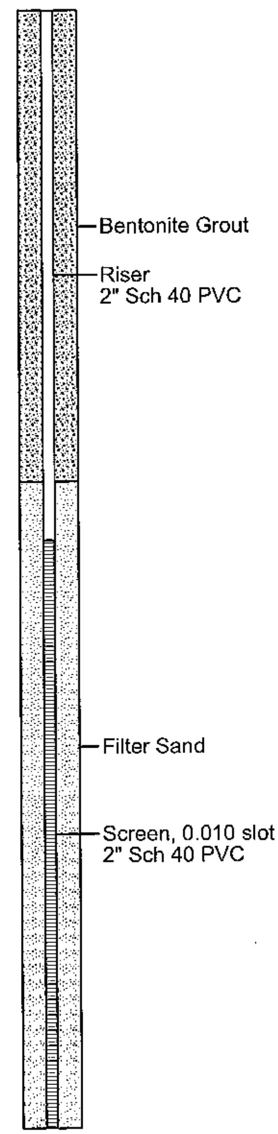
(Page 2 of 2)

Date Started	: 10/05/16
Date Well Set	: 10/05/16
Drilling Tools	: 8 1/4 HSA
Reaming Tools	: None
Drill Rig	: Geoprobe
Driller Name/Co	: Nick / Cabeno Env. Serv.

Total Boring Depth	: 41.0 feet
Well Bottom Depth	: 41.0 feet
Surface Elev.	: xxx feet above MSL
TOC Elev.	: xxx feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 2" Sch 40 PVC
Screen Material	: 2" Sch 40 PVC, 0.010 slot
Coordinate N	:
Coordinate E	:
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 575	DESCRIPTION	% RQD	% Recovery
22	553			
23	552			
24	551			
25	550			
26	549			
27	548			
28	547			
29	546	SAND, fine to medium, gray, trace gravel, moist.		
30	545	SAND, fine to medium, brown, very moist.		
31	544			
32	543			
33	542			
34	541			
35	540			
36	539			
37	538			
38	537			
39	536			
40	535			
41	534	End of Boring at 41 feet.		
42	533			
43	532			
44				

Well Diagram:



Attachment 9-3 – Historical CCA Groundwater Data

Sample: MW-01

Parameter	Standards	12/15/2010 DL	Result	3/25/2011 DL	Result	6/16/2011 DL	Result	9/19/2011 DL	Result	12/12/2011 DL	Result	3/19/2012 DL	Result	6/25/2012 DL	Result	9/18/2012 DL	Result
Antimony	0.006	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.001	0.001	ND
Barium	2.0	NP	0.044	0.001	0.026	0.001	0.034	0.001	0.056	0.001	0.044	0.001	0.038	0.001	0.06	0.001	0.074
Beryllium	0.004	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	NP	0.45	0.01	0.26	0.01	0.33	0.01	1.0	0.01	0.48	0.01	0.29	0.01	0.46	0.01	1.8
Cadmium	0.005	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Chloride	200.0	NP	46	10	37	10	40	10	41	10	26	10	53	10	42	10	43
Chromium	0.1	NP	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Cobalt	1.0	NP	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Copper	0.65	NP	ND	0.003	ND	0.003	ND	0.003	0.0057	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Cyanide	0.2	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	0.0077	0.0050	ND	0.0050	ND
Fluoride	4.0	NP	0.28	0.25	0.32	0.25	0.38	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND
Iron	5.0	NP	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Lead	0.0075	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Manganese	0.15	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.0027
Mercury	0.002	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	NP	0.01	0.005	0.008	0.005	ND	0.005	0.0069	0.005	0.0095	0.005	ND	0.005	0.0066	0.005	0.01
Nitrogen/Nitrate	10.0	NP	7.2	0.20	4.3	0.20	5.7	0.20	11	0.20	4.1	0.20	7.3	0.20	6.5	0.20	5.4
Nitrogen/Nitrate, Nitr	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	NP	0.0016	0.001	0.0022	0.001	0.0016	0.001	0.0036	0.001	0.0027	0.001	0.0025	0.001	0.0042	0.001	0.005
Silver	0.05	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Sulfate	400.0	NP	50	10	30	10	39	10	83	10	31	10	61	10	68	25	72
Thallium	0.002	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Total Dissolved Soli	1,200	NP	490	17	340	17	410	17	510	17	440	17	470	17	580	17	710
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	NP	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	7.46	NA	7.43	NA	7.58	NA	7.37	NA	6.39	NA	7.59	NA	7.45	NA	7.06
Temperature	NA	NA	10.47	NA	3.77	NA	9.71	NA	18.42	NA	10.85	NA	7.33	NA	17.97	NA	15.74
Conductivity	NA	NA	0.92	NA	0.64	NA	0.69	NA	0.74	NA	0.56	NA	0.53	NA	0.79	NA	0.92
Dissolved Oxygen	NA	NA	NM	NA	7.76	NA	4.61	NA	4.57	NA	5.21	NA	8.46	NA	0.66	NA	3.34
ORP	NA	NA	NM	NA	140.1	NA	209.8	NA	-98	NA	13	NA	242	NA	43	NA	165

Parameter	12/12/2012 DL	Result	2/27/2013 DL	Result	5/29/2013 DL	Result	7/29/2013 DL	Result	10/21/2013 DL	Result	3/6/2014 DL	Result	5/27/2014 DL	Result	8/28/2014 DL	Result
Antimony	0.0050	ND	0.003	ND	0.0030	0.0048	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0050	ND	0.001	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.20	ND	0.001	0.08	0.0025	0.078	0.0025	0.081	0.0025	0.070	0.0025	0.064	0.0025	0.041	0.0025	0.046
Beryllium	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	2.0	ND	0.01	1.7	0.050	0.47	0.050	0.48	0.050	0.62	0.050	0.53	0.050	0.26	0.050	0.16
Cadmium	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	41	10	38	10	160	10	140	2.0	46	2.0	48	2.0	73	2.0	58
Chromium	0.0030	0.014	0.004	0.0076	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND ^	0.0050	ND	0.0050	ND
Cobalt	0.0030	ND	0.002	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.010	ND	0.003	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND	0.0020	ND ^
Cyanide	0.0050	ND	0.005	ND	0.010	ND	0.010	0.011	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.25	ND	0.25	ND	0.10	0.12	0.10	0.16	0.10	0.11	0.10	0.10	0.10	0.13	0.10	0.15
Iron	0.010	0.17	0.01	ND	0.10	0.43	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0050	ND	0.001	ND	0.00050	0.00080	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0020	0.018	0.001	ND	0.0025	0.027	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.010	ND	0.005	0.0062	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.20	7.2	0.2	7.4	0.10	0.23	0.10	0.42	0.10	4.5	0.10	4.7	0.10	2.2	0.10	1.5
Nitrogen/Nitrate, Nitr	NR	NR	NR	NR	0.10	0.23	0.10	0.42	0.50	4.5	0.50	4.7	0.50	2.2	0.10	1.5
Nitrogen/Nitrite	NR	NR	NR	NR	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0050	ND	0.001	0.0045	0.0025	ND	0.0025	ND	0.0025	0.0042	0.0025	0.0040	0.0025	ND	0.0025	ND
Silver	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	10	91	10	77	100	330	50	270	20	85	20	99	20	51	10	36
Thallium	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	26	640	26	640	10	840	10	870	10	660	10	590	10	440	10	350
Vanadium	0.005	ND	0.005	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	6.98	NA	9.53	NA	7.00	NA	6.75	NA	7.12	NA	7.65	NA	7.15	NA	7.25
Temperature	NA	13.58	NA	11.00	NA	10.71	NA	15.64	NA	15.06	NA	9.08	NA	18.25 *	NA	21.57
Conductivity	NA	0.85	NA	0.88	NA	0.94	NA	1.06	NA	0.88	NA	0.55	NA	0.73	NA	0.71
Dissolved Oxygen	NA	3.04	NA	3.03	NA	3.10	NA	2.03	NA	1.33	NA	3.25	NA	5.05	NA	0.94
ORP	NA	130	NA	94	NA	30.4	NA	58.8	NA	-127	NA	-37.2	NA	-14.1	NA	21.5

Parameter	10/29/2014 DL	Result	2/23/2015 DL	Result	5/11/2015 DL	Result	8/18/2015 DL	Result	11/16/2015 DL	Result	2/25/2016 DL	Result	5/20/2016 DL	Result	8/17/2016 DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.0025	0.049	0.0025	0.037	0.0025	0.038	0.0025	0.065	0.0025	0.054	0.0025	0.049	0.0025	0.052	0.0025	0.046
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.050	0.075	0.050	0.059	0.050	0.087	0.050	0.30	0.050	0.94	0.050	0.26	0.050	0.31	0.050	0.27
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	2.0	42	2.0	37	2.0	67	2.0	58	2.0	44	2.0	42	2.0	44	2.0	40
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.18	0.10	0.17	0.10	0.23	0.10	0.16	0.10	0.18	0.10	0.16	0.10	0.17	0.10	0.24
Iron	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	ND	0.0025	0.0043	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0028	0.0025	ND	0.0025	ND
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.10	4.4	0.10	4.1	0.10	2.6	0.10	0.27	0.10	4.3	0.10	3.6	0.10	4.9	0.10	5.7
Nitrogen/Nitrate, Nitr	0.50	4.4	0.50	4.1	0.20	2.6	0.10	0.27	0.50	4.3	0.20	3.6	0.50	4.9	0.50	5.7
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0037	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	20	54	10	43	10	50	20	55	20	66	10	57	10	59	10	51
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	10	410	10	470	10	450	10	650	10	510	10	460	10	500	10	620
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0016	0.00050	ND	0.00050	ND	0.00050	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0053	0.0025	ND	0.0025	0.0038	0.0025	ND
pH	NA	7.25	NA	6.93	NA	7.39	NA	6.89	NA	7.07	NA	7.23	NA	6.95	NA	7.16
Temperature	NA	17.15	NA	1.92	NA	14.01	NA	22.91	NA	13.85	NA	7.82	NA	14.70	NA	24.92
Conductivity	NA	0.92	NA	0.44	NA	0.65	NA	1.01	NA	0.68	NA	0.57	NA	0.62	NA	0.74
Dissolved Oxygen	NA	1.63	NA	9.99	NA	4.82	NA	2.51	NA	1.62	NA	3.74	NA	5.69	NA	1.53
ORP	NA	-3.6	NA	150.7	NA	53.6	NA	-15.3	NA	118.2	NA	47.3	NA	38.8	NA	10.1

Parameter	11/16/2016 DL	Result	2/14/2017 DL	Result	5/3/2017 DL	Result	8/25/2017 DL	Result	11/8/2017 DL	Result	3/6/2018 DL	Result	5/17/2018 DL	Result	8/8/2018 DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.003	0.0036	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	0.0042	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.044	0.0025	0.036	0.0025	0.032	0.0025	0.048	0.0025	0.075	0.0025	0.047	0.0025	0.045	0.0025	0.053
Beryllium	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.050	0.17	0.050	0.14	0.050	0.17	0.05	0.55	0.05	0.44	0.05	0.37	0.05	0.13	0.05	0.13
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2.0	39	2.0	55	2.0	58	2	41	2	39	2	63	2	50	2	46
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.10	0.23	0.10	0.42	0.10	0.16	0.1	0.18	0.1	0.12	0.1	0.1	0.1	0.11	0.1	0.13
Iron	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	ND	0.0025	0.0054	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.00020	ND	0.00020	ND F2	0.00020	ND	0.0002	ND	0.0002	0.00081	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.10	5.2	0.10	6.4	0.10	4.6	0.1	6.6	0.1	4.4	0.1	5	0.1	3.8	0.1	5.2
Nitrogen/Nitrate, Nitr	0.50	5.2	0.50	6.4	0.50	4.6	0.5	6.6	0.5	4.4	0.5	5	0.5	3.8	0.5	5.2
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND ^	0.004	ND
Selenium	0.0025	ND ^	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	10	55	10	58	10	40	20	69	20	57	20	42	20	58	20	33
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	480	10	500	10	470	10	440	10	660	10	500	10	530	10	370
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.00079
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0011	0.0025	0.0014	0.0025	ND	0.0025	0.01089
pH	NA	7.22	NA	7.30	NA	7.41	NA	7.41	NA	6.69	NA	7.09	NA	6.70	NA	6.80
Temperature	NA	18.68	NA	10.70	NA	9.68	NA	18.50	NA	13.54	NA	7.93	NA	15.57	NA	22.04
Conductivity	NA	0.62	NA	0.59	NA	0.54	NA	0.67	NA	0.81	NA	0.48	NA	0.56	NA	0.62
Dissolved Oxygen	NA	3.11	NA	6.64	NA	7.36	NA	0.86	NA	5.83	NA	9.54	NA	10.50	NA	5.17
ORP	NA	10.7	NA	21.7	NA	-46.6	NA	102.4	NA	83.2	NA	-4.8	NA	11.8	NA	64.2

Parameter	10/30/2018 DL	Result	2/25/2019 DL	Result	4/30/2019 DL	Result	8/27/2019 DL	Result	11/13/2019 DL	Result	2/24/2020 DL	Result	5/19/2020 DL	Result	8/10/2020 DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	0.0086	0.003	ND
Arsenic	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.066	0.0025	0.045	0.0025	0.036	0.0025	0.056	0.0025	0.05	0.0025	0.042	0.0025	0.059	0.0025	0.057
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND
Boron	0.05	0.17	0.05	0.057	0.05	0.061	0.05	0.53	0.05	0.53	0.05	0.24	0.5	2	0.25	0.82
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND ^	0.0005	ND
Chloride	2	42	2	67	2	55	2	38	2	46	2	54	10	36	2	39
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND
Fluoride	0.1	0.12	0.1	0.15	0.1	0.16	0.1	0.13	0.1	0.2	0.1	0.24	0.1	0.17	0.1	0.17
Iron	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.35	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	0.0059	0.0025	ND	0.0025	ND	0.0025	0.013	0.0025	0.0029	0.0025	ND	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	3.4	0.1	4.6	0.1	3.8	0.1	5.1	0.1	5.7	0.1	4.5	0.1	2.4	0.1	1.3
Nitrogen/Nitrate, Nitr	0.2	3.4	0.5	4.6	0.5	3.8	0.5	5.1	0.5	5.7 ^	0.5	4.5	0.5	2.4	0.1	1.3
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0054	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	10	39	25	33	5	28	5	89	5	46	5	32	25	98 H	25	64
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	530	10	470	10	410	10	580	10	380	10	410	10	500	30	440
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND ^	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.59	NA	7.32	NA	7.20	NA	7.15	NA	7.51	NA	7.19	NA	7.10	NA	6.86
Temperature	NA	17.91	NA	5.80	NA	6.10	NA	12.10	NA	16.07	NA	9.90	NA	10.00	NA	13.90
Conductivity	NA	0.68	NA	0.85	NA	0.47	NA	0.14	NA	0.69	NA	0.28	NA	0.76	NA	0.82
Dissolved Oxygen	NA	6.29	NA	9.35	NA	7.43	NA	3.51	NA	2.88	NA	4.50	NA	3.28	NA	5.33
ORP	NA	15.5	NA	66.1	NA	119.1	NA	110.7	NA	-48	NA	52.7	NA	73.9	NA	139.9

Parameter	12/7/2020 DL	Result	2/23/2021 DL	Result	5/11/2021 DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.058	0.0025	0.046	0.0025	0.045
Beryllium	0.001	ND ^1+	0.001	ND ^+	0.001	ND ^+
Boron	0.05	0.53	0.05	0.34	0.05	0.17
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2	53	4	61	2	49
Chromium	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.005	0.0064 *	0.005	ND	0.005	ND
Fluoride	0.1	0.26	0.1	0.18	0.1	0.18 H
Iron	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	0.008	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	8.4	0.1	5.5	0.1	3.3
Nitrogen/Nitrate, Nitr	0.5	8.4	0.5	5.5	0.5	3.3 F1
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	15	57 F1	10	41	10	38
Thallium	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	420	10	430	10	380
Vanadium	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.22	NA	7.52	NA	7.52
Temperature	NA	11.90	NA	5.70	NA	8.00
Conductivity	NA	0.86	NA	0.55	NA	0.77
Dissolved Oxygen	NA	4.36	NA	8.66	NA	3.41
ORP	NA	-4.8	NA	37.3	NA	116

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NM - Not Measured

NR - Not Required
NS - Not Sampled
H - Prepped/analyzed past hold time
V - Serial Dilution Exceeds Control Limits

F1- MS and/or MSD Recovery outside of limits.
F2- MS/MSD RPD exceeds control limits.
^1+ - Initial Calibration Verification is outside acceptance limits, high biased
^+ - Continuing Calibration Verification is outside acceptance limits, high biased

^ - Denotes instrument related QC exceeds the control limits
* - Median Value (for temp)
* - LCS or LCSD is outside acceptance limits

Temperature °C degrees Celcius
Conductivity ms/cm milliSiemens/centimeters
Dissolved Oxygen mg/L milligrams/liter
Oxygen Reduction Potential (ORP) mV millivolts

Sample: MW-02

Parameter	Standards	12/15/2010 DL	Result	3/25/2011 DL	Result	6/16/2011 DL	Result	9/19/2011 DL	Result	12/12/2011 DL	Result	3/19/2012 DL	Result	6/25/2012 DL	Result	9/18/2012 DL	Result
Antimony	0.006	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	NP	0.0018	0.001	0.0015	0.001	0.0017	0.001	ND	0.001	ND	0.001	ND	0.001	0.0011	0.001	0.0012
Barium	2.0	NP	0.042	0.001	0.025	0.001	0.053	0.001	0.059	0.001	0.066	0.001	0.049	0.001	0.064	0.001	0.06
Beryllium	0.004	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	NP	0.38	0.01	0.23	0.01	0.35	0.01	0.83	0.01	0.69	0.01	0.27	0.01	0.74	0.01	0.65
Cadmium	0.005	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Chloride	200.0	NP	45	10	43	10	44	10	46	10	40	10	53	10	51	10	45
Chromium	0.1	NP	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Cobalt	1.0	NP	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Copper	0.65	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Cyanide	0.2	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Fluoride	4.0	NP	ND	0.25	0.30	0.25	0.35	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND
Iron	5.0	NP	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Lead	0.0075	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Manganese	0.15	NP	ND	0.001	0.0012	0.001	0.0022	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.0019
Mercury	0.002	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	NP	0.0086	0.005	0.0096	0.005	0.0053	0.005	0.01	0.005	0.0073	0.005	ND	0.005	0.0065	0.005	0.0066
Nitrogen/Nitrate	10.0	NP	7.5	0.20	4.5	0.20	4.7	0.20	4.3	0.20	6.9	0.20	5.1	0.20	4.4	0.20	2.9
Nitrogen/Nitrate, Nitr	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	NP	0.0017	0.001	0.0032	0.001	0.0014	0.001	0.0032	0.001	0.0037	0.001	ND	0.001	0.0039	0.001	0.0016
Silver	0.05	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Sulfate	400.0	NP	52	10	42	10	53	10	70	10	69	10	55	10	73	10	69
Thallium	0.002	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Total Dissolved Soli	1,200	NP	480	17	420	17	470	17	460	17	490	17	440	17	500	17	510
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	NP	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	0.013	0.006	ND	0.006	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	7.91	NA	7.78	NA	7.20	NA	7.52	NA	6.41	NA	7.92	NA	7.35	NA	7.32
Temperature	NA	NA	14.01	NA	3.26	NA	13.14	NA	14.75	NA	9.58	NA	9.56	NA	14.90	NA	17.12
Conductivity	NA	NA	0.96	NA	0.74	NA	0.75	NA	0.64	NA	0.59	NA	0.56	NA	0.66	NA	0.68
Dissolved Oxygen	NA	NA	NM	NA	7.73	NA	0.58	NA	0.28	NA	3.34	NA	3.91	NA	0.78	NA	0.53
ORP	NA	NA	NM	NA	124.5	NA	226.3	NA	-196	NA	63	NA	272	NA	168	NA	157

Parameter	12/12/2012 DL	Result	2/27/2013 DL	Result	5/29/2013 DL	Result	7/29/2013 DL	Result	10/21/2013 DL	Result	3/5/2014 DL	Result	5/27/2014 DL	Result	8/25/2014 DL	Result
Antimony	0.0050	ND	0.003	ND	0.0030	0.015	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0050	ND	0.001	0.0011	0.0010	0.0010	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.040	0.075	0.001	0.035	0.0025	0.053	0.0025	0.078	0.0025	0.088	0.0025	0.046	0.0025	0.069	0.0025	0.071
Beryllium	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.40	0.8	0.01	0.29	0.050	0.21	0.050	1.4	0.050	2.7	0.050	0.28	0.050	0.38	0.050	1.1
Cadmium	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	48	10	52	2.0	53	2.0	48	10	90	10	88	10	91	2.0	58 ^
Chromium	0.0030	0.0096	0.004	0.0042	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND ^	0.0050	ND	0.0050	ND
Cobalt	0.0030	ND	0.002	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.010	ND	0.003	ND	0.0020	0.0021	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND	0.0020	ND
Cyanide	0.0050	ND	0.005	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	0.024
Fluoride	0.25	0.28	0.25	ND	0.10	0.32	0.10	0.19	0.10	0.17	0.10	0.19	0.10	0.18	0.10	0.19
Iron	0.010	0.046	0.01	0.026	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0020	0.0063	0.001	ND	0.0025	ND	0.0025	0.0060	0.0025	0.0060	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.010	ND	0.005	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.20	2.4	0.2	5.7	0.10	0.44	0.10	0.59	0.10	1.1	0.10	2.4	0.10	4.0	0.10	0.28
Nitrogen/Nitrate, Nitr	NR	NR	NR	NR	0.10	0.48	0.10	0.59	0.10	1.1	0.50	2.4	0.50	4.0	0.10	0.28
Nitrogen/Nitrite	NR	NR	NR	NR	0.020	0.041	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0050	ND	0.001	0.0032	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	10	95	10	53	20	96	25	140	50	190	10	53	20	63	20	76
Thallium	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	26	520	26	440	10	340	10	560	10	770	10	430	10	440	10	460
Vanadium	0.0080	ND	0.005	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.38	NA	7.53	NA	7.39	NA	7.03	NA	7.20	NA	8.21	NA	7.19	NA	7.01
Temperature	NA	12.33	NA	13.30	NA	20.87	NA	17.02	NA	12.34	NA	6.67	NA	15.72 *	NA	20.87
Conductivity	NA	0.68	NA	0.54	NA	0.56	NA	0.74	NA	0.80	NA	0.40	NA	0.69	NA	0.76
Dissolved Oxygen	NA	2.03	NA	10.89	NA	0.65	NA	0.47	NA	0.32	NA	7.92	NA	0.55	NA	0.46
ORP	NA	200	NA	185.2	NA	-34.5	NA	33.9	NA	-180.3	NA	-53	NA	72.5	NA	35.9

Parameter	10/27/2014 DL	Result	2/25/2015 DL	Result	5/13/2015 DL	Result	8/17/2015 DL	Result	11/17/2015 DL	Result	2/23/2016 DL	Result	5/17/2016 DL	Result	8/16/2016 DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	ND	0.0010	0.0015	0.0010	0.0016	0.0010	0.0017	0.0010	ND	0.0010	0.0013	0.0010	0.0010	0.0010	ND
Barium	0.0025	0.067	0.0025	0.051	0.0025	0.055	0.0025	0.072	0.0025	0.066	0.0025	0.058	0.0025	0.061	0.0025	0.050
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.050	0.078	0.050	0.082	0.050	0.11	0.050	0.41	0.050	0.50	0.050	0.24	0.050	0.30	0.050	0.32
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	2.0	44	2.0	54	10	92	2.0	51	2.0	45	2.0	45	2.0	47	2.0	39
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.22	0.10	0.17	0.10	0.22	0.10	0.22	0.10	0.18	0.10	0.16	0.10	0.23	0.10	0.24
Iron	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.00050	0.0013	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.015	0.0025	0.0027	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND F2	0.00020	ND	0.00020	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.10	4.3	0.10	5.9	0.10	1.2	0.10	ND	0.10	3.2	0.10	2.9	0.10	4.1	0.10	2.7
Nitrogen/Nitrate, Nitr	0.50	4.3	0.50	5.9	0.10	1.2	0.10	ND ^	0.20	3.2	0.20	2.9	0.50	4.1	0.50	2.7
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	20	49	10	57	10	41	10	53	20	77	20	73	10	54	10	39
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	10	440	10	510	10	490	10	540	10	480	10	440	10	470	10	370
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.001	0.00050	ND	0.00050	ND	0.00050	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.00055	0.0025	0.0042	0.0025	ND	0.0025	0.00077	0.0025	0.00068
pH	NA	7.37	NA	8.13	NA	7.86	NA	7.28	NA	7.12	NA	7.28	NA	7.33	NA	7.29
Temperature	NA	17.43	NA	2.61	NA	12.12	NA	24.86	NA	13.93	NA	5.47	NA	11.12	NA	10.65
Conductivity	NA	0.78	NA	0.49	NA	0.66	NA	0.86	NA	0.64	NA	0.47	NA	0.55	NA	0.56
Dissolved Oxygen	NA	2.96	NA	11.55	NA	1.99	NA	1.52	NA	8.66	NA	4.93	NA	2.58	NA	1.89
ORP	NA	60.1	NA	113.1	NA	87.3	NA	-37.7	NA	112.9	NA	36.9	NA	27.6	NA	-32.8

Parameter	11/15/2016 DL	Result	2/14/2017 DL	Result	5/1/2017 DL	Result	8/23/2017 DL	Result	11/7/2017 DL	Result	3/6/2018 DL	Result	5/15/2018 DL	Result	8/7/2018 DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.0010	0.0015	0.0010	0.0013	0.0010	0.0012	0.001	0.0038	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.057	0.0025	0.046	0.0025	0.050	0.0025	0.062	0.0025	0.088	0.0025	0.058	0.0025	0.065	0.0025	0.066
Beryllium	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.050	0.15	0.050	0.16	0.050	0.21	0.25	1.3	0.05	2.8	0.25	0.39	0.05	0.18	0.25	1.5
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2.0	39	2.0	50	2.0	56	2	48	2	47	2	62	2	47	2	55
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.10	0.19	0.10	0.22	0.10	0.15	0.1	0.18	0.1	0.16	0.1	0.15	0.1	0.23	0.1	0.14
Iron	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.10	4.5	0.10	4.1	0.10	0.78	0.1	1.6	0.1	1.8	0.1	4.1	0.1	3.6	0.1	1.7
Nitrogen/Nitrate, Nitr	0.50	4.5	0.50	4.1	0.10	0.78	0.1	1.6	0.1	1.8	0.5	4.1	0.2	3.6	0.1	1.7
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND ^	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND F1	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	10	53	10	50	25	60	20	57	25	83	20	45	20	57	20	66
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	470	10	510	10	500	10	420	10	530	10	490	10	500	10	560
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.00066	0.0025	0.0015	0.0025	0.0007	0.0025	0.00062
pH	NA	7.50	NA	6.18	NA	7.99	NA	7.40	NA	7.10	NA	7.10	NA	7.71	NA	7.09
Temperature	NA	11.20	NA	5.17	NA	10.37	NA	15.30	NA	12.19	NA	5.33	NA	14.74	NA	19.91
Conductivity	NA	0.53	NA	0.50	NA	0.56	NA	0.64	NA	0.57	NA	0.45	NA	0.51	NA	0.63
Dissolved Oxygen	NA	6.05	NA	5.00	NA	3.26	NA	0.79	NA	6.57	NA	10.49	NA	5.03	NA	5.17
ORP	NA	13.2	NA	235.1	NA	-51.6	NA	45.5	NA	2.6	NA	19.4	NA	-6.7	NA	39.7

Parameter	10/30/2018 DL	Result	2/26/2019 DL	Result	4/30/2019 DL	Result	8/27/2019 DL	Result	11/12/2019 DL	Result	2/24/2020 DL	Result	5/19/2020 DL	Result	8/10/2020 DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	0.0036	0.003	ND
Arsenic	0.001	ND	0.001	0.0012	0.001	0.0017	0.001	ND	0.001	0.0011	0.001	ND	0.001	0.0012	0.001	ND
Barium	0.0025	0.068	0.0025	0.038	0.0025	0.046	0.0025	0.066	0.0025	0.066	0.0025	0.061	0.0025	0.057	0.0025	0.078
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND
Boron	0.05	0.092	0.05	0.064	0.05	0.13	0.05	0.49	0.05	0.43	0.05	0.3	0.05	0.33	0.25	1.1
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND ^	0.0005	ND
Chloride	2	42	2	51	2	51	2	49	2	46	2	55	10	47	2	42
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND
Fluoride	0.1	0.17	0.1	0.16	0.1	0.18	0.1	0.17	0.1	0.19	0.1	0.23	0.1	0.2	0.1	0.22
Iron	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND F1	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	3.4	0.1	3.7	0.1	1.2	0.1	0.71	0.1	2.4	0.1	2.1	0.1	4.1	0.1	6.3
Nitrogen/Nitrate, Nitr	0.2	3.4	0.5	3.7	0.1	1.2	0.1	0.71	0.5	2.4	0.5	2.1	0.5	4.1	1	6.3
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND F2	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	10	33	1	24	5	30	5	38	5	43	5	39	5	37 H	25	68
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND F1	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	480	10	400	10	440	10	420	10	420	10	380	10	390	30	450
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND ^	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.83	NA	7.82	NA	7.60	NA	7.13	NA	7.66	NA	7.43	NA	7.33	NA	6.96
Temperature	NA	12.91	NA	1.60	NA	4.90	NA	15.20	NA	13.75	NA	6.80	NA	10.10	NA	17.90
Conductivity	NA	0.57	NA	0.70	NA	0.48	NA	0.13	NA	0.71	NA	0.33	NA	0.64	NA	0.84
Dissolved Oxygen	NA	8.30	NA	8.28	NA	4.19	NA	0.45	NA	0.61	NA	1.11	NA	0.55	NA	1.03
ORP	NA	16.6	NA	91.4	NA	116.0	NA	108.7	NA	-65.1	NA	44.5	NA	60.2	NA	135.3

Parameter	12/9/2020 DL	Result	2/22/2021 DL	Result	5/11/2021 DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	ND	0.001	ND	0.001	0.001
Barium	0.0025	0.071	0.0025	0.054	0.0025	0.057
Beryllium	0.001	ND ^1+	0.001	ND ^+	0.001	ND ^+
Boron	0.05	0.56	0.05	0.25	0.05	0.19
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2	43	4	44	2	50
Chromium	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.005	ND	0.005	ND	0.005	ND
Fluoride	0.1	0.15	0.1	0.15	0.1	0.18 H
Iron	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	9.5	0.1	7.9	0.1	3.4
Nitrogen/Nitrate, Nitr	0.5	9.5	0.5	7.9	0.5	3.4
Nitrogen/Nitrite	0.02	ND	0.02	ND ^1+	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	15	65	15	51	10	39
Thallium	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	340	10	540	10	300
Vanadium	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.78	NA	7.65	NA	7.70
Temperature	NA	9.50	NA	2.40	NA	12.30
Conductivity	NA	0.84	NA	0.50	NA	0.76
Dissolved Oxygen	NA	5.30	NA	11.49	NA	0.68
ORP	NA	168.3	NA	140.7	NA	132.7

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.
DL - Detection limit
NA - Not Applicable
ND - Not Detected
NM - Not Measured
NR - Not Required
NS - Not Sampled
H - Prepped/analyzed past hold time
V - Serial Dilution Exceeds Control Limits
F1- MS and/or MSD Recovery outside of limits.
F2- MS/MSD RPD exceeds control limits.
^1+ - Initial Calibration Verification is outside acceptance limits, high biased
^+ - Continuing Calibration Verification is outside acceptance limits, high biased
^ - Denotes instrument related QC exceeds the control limits
* - Median Value (for temp)
* - LCS or LCSD is outside acceptance limits
Temperature °C degrees Celcius
Conductivity ms/cm milliSiemens/centimeters
Dissolved Oxygen mg/L milligrams/liter
Oxygen Reduction Potential (ORP) mV millivolts

Sample: MW-03

Parameter	Standards	12/15/2010 DL	Result	3/25/2011 DL	Result	6/16/2011 DL	Result	9/19/2011 DL	Result	12/12/2011 DL	Result	3/19/2012 DL	Result	6/25/2012 DL	Result	9/18/2012 DL	Result
Antimony	0.006	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	NP	0.0017	0.001	ND	0.001	0.0011	0.001	0.0012	0.001	0.0012	0.001	0.0012	0.001	ND	0.001	0.0015
Barium	2.0	NP	0.038	0.001	0.03	0.001	0.063	0.001	0.081	0.001	0.076	0.001	0.052	0.001	0.059	0.001	0.1
Beryllium	0.004	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	NP	0.75	0.01	0.18	0.01	0.24	0.01	0.64	0.01	0.7	0.01	0.56	0.01	0.63	0.01	0.64
Cadmium	0.005	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Chloride	200.0	NP	39	10	52	10	59	10	62	10	39	10	54	10	57	10	54
Chromium	0.1	NP	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Cobalt	1.0	NP	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Copper	0.65	NP	ND	0.003	ND	0.003	ND	0.003	0.012	0.003	0.0042	0.003	ND	0.003	ND	0.003	ND
Cyanide	0.2	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Fluoride	4.0	NP	0.3	0.25	0.35	0.25	0.41	0.25	0.35	0.25	ND	0.25	ND	0.25	ND	0.25	0.29
Iron	5.0	NP	ND	0.010	ND	0.010	ND	0.010	0.042	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Lead	0.0075	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Manganese	0.15	NP	0.0047	0.001	0.0023	0.001	ND	0.001	0.0037	0.001	0.0014	0.001	ND	0.001	0.0033	0.001	0.002
Mercury	0.002	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	NP	0.011	0.005	0.0095	0.005	ND	0.005	0.008	0.005	0.0078	0.005	ND	0.005	0.005	0.005	0.0067
Nitrogen/Nitrate	10.0	NP	9.4	0.20	5.2	0.20	5.4	0.02	0.20	0.02	0.20	0.20	2.1	0.02	0.37	0.02	0.08
Nitrogen/Nitrate, Nitr	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	NP	ND	0.001	0.0036	0.001	0.0015	0.001	0.0036	0.001	0.0021	0.001	0.0067	0.001	0.0018	0.001	0.0033
Silver	0.05	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Sulfate	400.0	NP	64	10	42	10	47	10	66	10	45	10	72	10	84	10	74
Thallium	0.002	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Total Dissolved Soli	1,200	NP	480	17	430	17	440	17	460	17	480	17	450	17	520	17	520
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	NP	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	0.012	0.006	ND	0.006	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	7.43	NA	7.55	NA	7.33	NA	7.30	NA	6.58	NA	7.38	NA	7.36	NA	7.46
Temperature	NA	NA	17.07	NA	5.24	NA	15.72	NA	21.59	NA	18.58	NA	15.50	NA	15.26	NA	15.10
Conductivity	NA	NA	0.90	NA	0.74	NA	0.73	NA	0.76	NA	0.72	NA	0.65	NA	0.67	NA	0.68
Dissolved Oxygen	NA	NA	NM	NA	7.20	NA	0.40	NA	0.32	NA	0.99	NA	4.95	NA	3.02	NA	5.22
ORP	NA	NA	NM	NA	135.1	NA	220.5	NA	-218	NA	29	NA	157	NA	125	NA	180

Parameter	12/12/2012 DL	Result	2/27/2013 DL	Result	5/29/2013 DL	Result	7/31/2013 DL	Result	10/21/2013 DL	Result	3/5/2014 DL	Result	5/27/2014 DL	Result	8/25/2014 DL	Result
Antimony	0.0050	ND	0.003	ND	0.0030	0.0057	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0050	ND	0.001	0.0013	0.0010	0.0012	0.0010	0.0013	0.0010	0.0011	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.040	0.11	0.001	0.056	0.0025	0.061	0.0025	0.064	0.0025	0.099	0.0025	0.056	0.0025	0.052	0.0025	0.070
Beryllium	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.40	0.63	0.01	0.65	0.050	0.21	0.050	0.47	0.050	0.46	0.050	0.14	0.050	0.15	0.050	0.37
Cadmium	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	58	10	53	2.0	55	2.0	60	2.0	57	10	120	10	100	10	79
Chromium	0.0030	0.0086	0.004	0.005	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND ^	0.0050	ND	0.0050	ND
Cobalt	0.0030	ND	0.002	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.010	ND	0.003	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	0.0057	0.0020	ND
Cyanide	0.0050	ND	0.005	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	0.011
Fluoride	0.25	0.35	0.25	ND	0.10	0.31	0.10	0.28	0.10	0.26	0.10	0.24	0.10	0.23	0.10	0.25
Iron	0.010	0.036	0.01	0.019	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00097	0.00050	ND
Manganese	0.0020	0.034	0.001	0.011	0.0025	ND	0.0025	ND	0.0025	0.0039	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.010	ND	0.005	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0036	0.0020	ND
Nitrogen/Nitrate	0.02	0.13	0.2	2.00	0.10	0.15	0.10	ND	0.10	ND	0.10	2.6	0.10	5.3	0.10	ND
Nitrogen/Nitrate, Nitr	NR	NR	NR	NR	0.10	0.15	0.10	ND	0.10	ND	0.50	2.6	0.50	5.3	0.10	ND
Nitrogen/Nitrite	NR	NR	NR	NR	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0050	ND	0.001	0.0048	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	10	74	10	64	20	82	20	99	20	96	20	65	20	65	25	100
Thallium	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	26	460	26	500	10	310	10	460	10	430	10	490	10	440	10	490
Vanadium	0.0080	ND	0.005	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	0.14	0.020	ND
Benzene	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.41	NA	7.46	NA	7.31	NA	7.22	NA	7.25	NA	8.34	NA	7.27	NA	6.97
Temperature	NA	14.28	NA	13.60	NA	21.93	NA	24.89	NA	20.22	NA	7.08	NA	16.70	NA	19.57
Conductivity	NA	0.66	NA	0.73	NA	0.56	NA	0.76	NA	0.70	NA	0.43	NA	0.66	NA	0.83
Dissolved Oxygen	NA	2.50	NA	6.10	NA	0.40	NA	0.24	NA	0.35	NA	5.08	NA	4.83	NA	0.48
ORP	NA	90	NA	140.31	NA	-101.8	NA	-44.7	NA	-160.1	NA	-60.3	NA	117.3	NA	45

Parameter	10/27/2014 DL	Result	2/25/2015 DL	Result	5/13/2015 DL	Result	8/17/2015 DL	Result	11/17/2015 DL	Result	2/23/2016 DL	Result	5/17/2016 DL	Result	8/16/2016 DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	ND	0.0010	ND	0.0010	0.0010	0.0010	0.0017	0.0010	ND	0.0010	0.0014	0.0010	ND	0.0010	ND
Barium	0.0025	0.063	0.0025	0.048	0.0025	0.045	0.0025	0.054	0.0025	0.061	0.0025	0.042	0.0025	0.051	0.0025	0.058
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.050	0.14	0.050	0.32	0.050	0.086	0.050	0.34	0.050	0.30	0.050	0.42	0.050	0.28	0.050	0.30
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	2.0	47	2.0	47	2.0	48	2.0	45	2.0	43	2.0	46	2.0	46	2.0	44
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.25	0.10	0.23	0.10	0.22	0.10	0.30	0.10	0.29	0.10	0.23	0.10	0.20	0.10	0.22
Iron	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.016	0.0025	0.0031	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.10	2.4	0.10	2.0	0.10	2.7	0.10	ND	0.10	0.19	0.10	0.95	0.10	0.70	0.10	0.98
Nitrogen/Nitrate, Nitr	0.50	2.4	0.10	2.0	0.20	2.7	0.10	ND ^	0.10	0.19	0.10	0.95	0.10	0.70	0.10	0.98
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	0.0046	0.0025	ND	0.0025	ND	0.0025	0.0025	0.0025	ND	0.0025	0.0044
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	10	40	10	46	10	39	10	48	20	50	20	77	20	78	20	74
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	10	440	10	400	10	380	10	420	10	380	10	400	10	450	10	530
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.002	0.00050	ND	0.00050	ND	0.00050	ND
BETX	0.0025	0.0012	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0054	0.0025	ND	0.0025	0.00074	0.0025	ND
pH	NA	7.43	NA	7.75	NA	7.63	NA	7.63	NA	7.12	NA	7.41	NA	6.99	NA	7.23
Temperature	NA	19.36	NA	8.51	NA	10.39	NA	25.85	NA	19.09	NA	6.10	NA	8.82	NA	15.65
Conductivity	NA	0.79	NA	0.49	NA	0.53	NA	0.74	NA	0.60	NA	0.44	NA	0.49	NA	0.59
Dissolved Oxygen	NA	2.33	NA	3.65	NA	6.34	NA	3.10	NA	1.01	NA	9.60	NA	3.67	NA	2.52
ORP	NA	52	NA	102.3	NA	107.9	NA	-35.7	NA	92.5	NA	36.1	NA	70.1	NA	2.8

Parameter	11/15/2016 DL	Result	2/14/2017 DL	Result	5/1/2017 DL	Result	8/23/2017 DL	Result	11/7/2017 DL	Result	3/6/2018 DL	Result	5/15/2018 DL	Result	8/7/2018 DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.003	0.003	0.003	ND	0.003	ND	0.0030	ND	0.003	ND
Arsenic	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	0.0039	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.054	0.0025	0.059	0.0025	0.057	0.0025	0.059	0.0025	0.067	0.0025	0.052	0.0025	0.056	0.0025	0.072
Beryllium	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.050	0.31	0.050	0.19	0.050	0.24	0.05	0.38	0.05	0.3	0.05	0.085	0.05	0.33	0.05	0.34
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2.0	39	2.0	47	2.0	55	2	52	2	63	2	55	2	68	2	67
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.10	0.24	0.10	0.24	0.10	0.21	0.1	0.29	0.1	0.26	0.1	0.24	0.1	0.23	0.1	0.23
Iron	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.10	3.7	0.10	4.6	0.10	1.2	0.1	ND	0.1	2.3	0.1	4	0.1	0.41	0.1	0.22
Nitrogen/Nitrate, Nitr	0.20	3.7	0.50	4.6	0.10	1.2	0.1	ND	0.2	2.3	0.5	4	0.1	0.41	0.1	0.22
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND ^	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	0.0036	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	10	46	10	50	20	54	20	42	20	56	10	64	25	55	20	53
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	450	10	460	10	510	10	410	10	460	10	400	10	510	10	530
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.0011
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0019	0.0025	ND	0.0025	0.01403
pH	NA	7.33	NA	7.49	NA	7.54	NA	7.44	NA	7.04	NA	7.05	NA	7.53	NA	6.60
Temperature	NA	14.93	NA	11.71	NA	11.66	NA	19.50	NA	13.80	NA	5.20	NA	12.94	NA	18.21
Conductivity	NA	0.53	NA	0.55	NA	0.55	NA	0.65	NA	0.54	NA	0.40	NA	0.49	NA	0.64
Dissolved Oxygen	NA	3.56	NA	2.04	NA	5.97	NA	0.37	NA	4.39	NA	7.28	NA	5.43	NA	5.89
ORP	NA	22.1	NA	118.3	NA	-1.0	NA	180.9	NA	-15.5	NA	15.7	NA	21.1	NA	60.7

Parameter	10/30/2018 DL	Result	2/26/2019 DL	Result	4/30/2019 DL	Result	8/26/2019 DL	Result	11/12/2019 DL	Result	2/24/2020 DL	Result	5/19/2020 DL	Result	8/10/2020 DL	Result
Antimony	0.003	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.001	ND	0.001	ND	0.001	0.0011	0.001	ND	0.001	0.0012	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.054	0.0025	0.049	0.0025	0.058	0.0025	0.071	0.0025	0.075	0.0025	0.063	0.0025	0.053	0.0025	0.056
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND
Boron	0.05	0.18	0.05	ND	0.05	0.27	0.05	0.28	0.05	0.3	0.05	0.3	0.05	0.15	0.05	0.49
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND ^	0.0005	ND
Chloride	2	44	2	56	2	48	2	51	2	50	2	53	10	49	2	47
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND
Fluoride	0.1	0.26	0.1	0.25	0.1	0.23	0.1	0.25	0.1	0.27	0.1	0.25	0.1	0.3	0.1	0.26
Iron	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.014	0.0025	0.0036	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	1	0.1	3.7	0.1	0.22	0.1	ND	0.1	0.46	0.1	ND	0.1	4.6	0.1	0.39
Nitrogen/Nitrate, Nitr	0.1	1	0.5	3.7	0.1	0.22	0.1	ND	0.1	0.46	0.1	ND	0.5	4.6	0.1	0.39
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	5	29	25	27	5	39	5	15	5	32	5	71	5	34	5	43
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	410	10	400	10	420	10	420	10	390	10	410	10	340	30	350
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND ^	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.84	NA	7.49	NA	7.17	NA	7.17	NA	7.55	NA	7.10	NA	7.09	NA	7.00
Temperature	NA	14.63	NA	2.80	NA	10.50	NA	25.0	NA	19.0	NA	10.0	NA	12.0	NA	21.5
Conductivity	NA	0.51	NA	0.72	NA	0.44	NA	0.73	NA	0.72	NA	0.71	NA	0.19	NA	0.42
Dissolved Oxygen	NA	4.20	NA	8.66	NA	4.53	NA	0.24	NA	0.43	NA	0.30	NA	3.61	NA	0.28
ORP	NA	9.6	NA	116.4	NA	117.8	NA	30.3	NA	-50.3	NA	147.8	NA	53.2	NA	77.8

Parameter	12/9/2020 DL	Result	2/22/2021 DL	Result	5/11/2021 DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.081	0.0025	0.088	0.0025	0.076
Beryllium	0.001	ND ^1+	0.001	ND ^+	0.001	ND ^+
Boron	0.05	0.76	0.05	0.6	0.05	0.18
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2	44	4	53	4	49
Chromium	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.005	ND	0.005	ND	0.005	ND
Fluoride	0.1	0.29	0.1	0.24	0.1	0.19 H
Iron	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	4.3	0.1	6.1	0.1	4.1
Nitrogen/Nitrate, Nitr	0.5	4.3	0.5	6.1	0.5	4.1
Nitrogen/Nitrite	0.02	ND	0.02	ND ^1+	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	0.0032	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	25	59	25	54	5	40
Thallium	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	410	10	520	10	370
Vanadium	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.46	NA	7.34	NA	7.33
Temperature	NA	17.8	NA	13.9	NA	7.2
Conductivity	NA	0.25	NA	0.68	NA	0.73
Dissolved Oxygen	NA	1.15	NA	1.12	NA	5.90
ORP	NA	148.9	NA	148.2	NA	143.3

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.
DL - Detection limit
NA - Not Applicable
ND - Not Detected
NM - Not Measured
NR - Not Required
NS - Not Sampled
H - Prepped/analyzed past hold time
V - Serial Dilution Exceeds Control Limits
F1- MS and/or MSD Recovery outside of limits.
F2- MS/MSD RPD exceeds control limits.
^1+ - Initial Calibration Verification is outside acceptance limits, high biased
^+ - Continuing Calibration Verification is outside acceptance limits, high biased
^ - Denotes instrument related QC exceeds the control limits
* - Median Value (for temp)
* - LCS or LCSD is outside acceptance limits
Temperature °C degrees Celcius
Conductivity ms/cm milliSiemens/centimeters
Dissolved Oxygen mg/L milligrams/liter
Oxygen Reduction Potential (ORP) mV millivolts

Attachment 9-3 Historical CCA Groundwater Data - Midwest Generation LLC, Powerton Station, Pekin, IL

Sample: MW-04

Parameter	Standards	12/15/2010 DL	12/15/2010 Result	3/25/2011 DL	3/25/2011 Result	6/16/2011 DL	6/16/2011 Result	9/19/2011 DL	9/19/2011 Result	12/12/2011 DL	12/12/2011 Result	3/19/2012 DL	3/19/2012 Result	6/25/2012 DL	6/25/2012 Result
Antimony	0.006	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	2.0	NP	0.055	0.001	0.052	0.001	0.058	0.001	0.041	0.001	0.048	0.001	0.043	0.001	0.04
Beryllium	0.004	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	NP	0.77	0.01	0.83	0.01	0.33	0.01	0.84	0.01	0.79	0.01	0.78	0.01	0.83
Cadmium	0.005	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Chloride	200.0	NP	150	10	77	10	43	25	86	1.0	8.1	10	58	10	75
Chromium	0.1	NP	0.0045	0.004	ND	0.004	ND	0.004	0.0044	0.004	ND	0.004	ND	0.004	ND
Cobalt	1.0	NP	ND	0.002	0.0026	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Copper	0.65	NP	ND	0.003	ND	0.003	ND	0.003	0.0033	0.003	0.01	0.003	ND	0.003	ND
Cyanide	0.2	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Fluoride	4.0	NP	0.3	0.25	0.39	0.25	0.43	0.25	0.31	0.25	ND	0.25	ND	0.25	ND
Iron	5.0	NP	ND	0.010	0.017	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Lead	0.0075	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Manganese	0.15	NP	0.77	0.001	0.68	0.001	0.41	0.001	0.69	0.001	0.35	0.001	0.089	0.001	0.26
Mercury	0.002	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	NP	0.012	0.005	0.012	0.005	0.0067	0.005	0.011	0.005	0.01	0.005	0.0055	0.005	0.0074
Nitrogen/Nitrate	10.0	NP	0.34	0.02	0.73	0.20	2.7	0.02	0.06	0.02	0.07	0.02	0.65	0.02	1.1
Nitrogen/Nitrate, Nit	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	NP	0.0022	0.001	0.0037	0.001	0.0022	0.001	0.0039	0.001	0.002	0.001	0.0085	0.001	0.0035
Silver	0.05	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Sulfate	400.0	NP	110	25	140	10	48	25	61	1.0	6.7	50	160	10	94
Thallium	0.002	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Total Dissolved Solids	1,200	NP	680	17	620	17	470	17	580	17	520	17	660	17	600
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	NP	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BTEX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	7.27	NA	7.48	NA	7.26	NA	7.22	NA	6.37	NA	7.24	NA	7.04
Temperature	NA	NA	16.30	NA	13.33	NA	17.54	NA	19.07	NA	16.35	NA	12.99	NA	18.12
Conductivity	NA	NA	1.29	NA	1.06	NA	0.75	NA	0.91	NA	0.76	NA	0.76	NA	0.83
Dissolved Oxygen	NA	NA	NM	NA	3.93	NA	0.26	NA	0.18	NA	0.20	NA	1.43	NA	0.33
ORP	NA	NA	NM	NA	116.5	NA	202.6	NA	-228	NA	51	NA	212	NA	124

Parameter	9/18/2012 DL	9/18/2012 Result	12/12/2012 DL	12/12/2012 Result	2/27/2013 DL	2/27/2013 Result	5/29/2013 DL	5/29/2013 Result	7/31/2013 DL	7/31/2013 Result	10/21/2013 DL	10/21/2013 Result	3/5/2014 DL	3/5/2014 Result
Antimony	0.003	ND	0.0050	ND	0.003	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.001	0.0012	0.0050	ND	0.001	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.001	0.07	0.040	0.09	0.001	0.054	0.0025	0.030	0.0025	0.048	0.0025	0.062	0.0025	0.039
Beryllium	0.001	ND	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.01	0.76	0.40	0.74	0.01	0.97	0.050	0.23	0.050	0.67	0.050	0.81	0.050	0.81
Cadmium	0.001	ND	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	25	110	25	130	10	90	2.0	54	2.0	70	10	150	10	130
Chromium	0.004	0.0045	0.0030	0.01	0.004	0.0052	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND^
Cobalt	0.002	ND	0.0030	ND	0.002	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.003	ND	0.010	ND	0.003	ND	0.0020	ND	0.0020	0.0024	0.0020	0.0025	0.0020	ND^
Cyanide	0.0050	ND	0.0050	ND	0.005	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.25	0.26	0.25	0.29	0.25	ND	0.10	0.39	0.10	0.31	0.10	0.21	0.10	0.29
Iron	0.010	ND	0.010	0.14	0.01	0.059	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.001	ND	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.001	0.50	0.0020	0.027	0.001	0.007	0.0025	ND	0.0025	0.13	0.0025	0.27	0.0025	0.026
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.005	0.0095	0.010	ND	0.005	ND	0.0020	ND	0.0020	0.0023	0.0020	0.0039	0.0020	ND
Nitrogen/Nitrate	0.02	0.46	0.02	1.0	0.02	1.8	0.10	ND	0.10	ND	0.10	0.50	0.10	ND
Nitrogen/Nitrate, Nit	NR	NR	NR	NR	NR	NR	0.10	ND	0.10	ND	0.10	0.50	0.10	ND
Nitrogen/Nitrite	NR	NR	NR	NR	NR	NR	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	NR	NR	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.001	0.0032	0.0050	ND	0.001	0.013	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.005	ND	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	25	170	25	150	50	130	20	92	50	190	100	260	50	200
Thallium	0.001	ND	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	17	800	26	720	26	640	10	350	10	670	10	980	10	780
Vanadium	NR	NR	0.0080	ND	0.005	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.006	ND	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	NR	NR	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BTEX	NR	NR	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.13	NA	7.14	NA	7.37	NA	7.30	NA	7.02	NA	7.00	NA	8.00
Temperature	NA	16.51	NA	14.11	NA	13.20	NA	21.84	NA	26.31	NA	16.83	NA	11.96
Conductivity	NA	1.05	NA	0.98	NA	0.92	NA	0.58	NA	1.08	NA	1.15	NA	0.81
Dissolved Oxygen	NA	0.46	NA	4.01	NA	5.93	NA	0.47	NA	0.24	NA	0.53	NA	1.63
ORP	NA	119	NA	130	NA	170.3	NA	-90.1	NA	4.1	NA	-169.7	NA	-57

Parameter	5/27/2014 DL	5/27/2014 Result	8/25/2014 DL	8/25/2014 Result	10/27/2014 DL	10/27/2014 Result	2/25/2015 DL	2/25/2015 Result	5/13/2015 DL	5/13/2015 Result	8/17/2015 DL	8/17/2015 Result	11/17/2015 DL	11/17/2015 Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.0025	0.054	0.0025	0.055	0.0025	0.070	0.0025	0.025	0.0025	0.025	0.0025	0.027	0.0025	0.030
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.050	0.94	0.050	1.0	0.050	0.77	0.050	0.94	0.050	0.80	0.050	0.44	0.050	0.51
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	92	10	95	10	96	10	74	2.0	65	2.0	47	2.0	74
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.0020	ND	0.0020	0.0021	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0021
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.23	0.10	0.25	0.10	0.21	0.10	0.32	0.10	0.26	0.10	0.30	0.10	0.26
Iron	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	0.029	0.0025	0.24	0.0025	0.075	0.0025	0.018	0.0025	ND	0.0025	0.015	0.0025	0.14
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	ND	0.0020	0.0024	0.0020	0.0020	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.10	ND	0.10	ND	0.10	0.14	0.10	0.30	0.10	ND	0.10	ND	0.10	0.85
Nitrogen/Nitrate, Nit	0.10	ND	0.10	ND	0.10	0.14	0.10	0.30	0.10	ND	0.10	ND ^	0.10	0.85
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	100	320	50	260	100	390	25	100	20	120	10	47	25	75
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	10	980	10	880	10	1100	10	580	10	540	10	470	10	550
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0017
BTEX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0056
pH	NA	7.04	NA	7.06	NA	7.20	NA	7.63	NA	7.30	NA	7.37	NA	6.72
Temperature	NA	17.48 *	NA	24.18	NA	20.48	NA	8.95	NA	13.52	NA	24.79	NA	16.54
Conductivity	NA	1.20	NA	1.36	NA	1.62	NA	0.72	NA	0.73	NA	0.79	NA	0.77
Dissolved Oxygen	NA	2.01	NA	1.23	NA	0.83	NA	1.97	NA	3.05	NA	1.31	NA	6.90
ORP	NA	13.7	NA	53.5	NA	22.9	NA	22.5	NA	72.4	NA	-32.1	NA	88.4

Parameter	2/23/2016 DL	2/23/2016 Result	5/17/2016 DL	5/17/2016 Result	8/16/2016 DL	8/16/2016 Result	11/15/2016 DL	11/15/2016 Result	2/14/2017 DL	2/14/2017 Result	5/1/2017 DL	5/1/2017 Result	8/28/2017 DL	8/28/2017 Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.003	ND
Arsenic	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND
Barium	0.0025	0.028	0.0025	0.037	0.0025	0.035	0.0025	0.026	0.0025	0.022	0.0025	0.029	0.0025	0.026
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND
Boron	0.050	0.43	0.050	0.60	0.050	0.90	0.10	0.79	0.050	0.48	0.050	0.55	0.05	0.69
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
Chloride	2.0	47	2.0	60	2.0	59	2.0	53	2.0	56	2.0	58	10	77
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND
Copper	0.0020	ND	0.0020	ND	0.0020	0.0020	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.01	ND H
Fluoride	0.10	0.22	0.10	0.25	0.10	0.28	0.10	0.27	0.10	0.25	0.10	0.19	0.1	0.29
Iron	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.1	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	0.0041	0.0025	0.025	0.0025	0.22	0.0025	0.19	0.0025	ND	0.0025	0.46
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	0.0002
Nickel	0.0020	0.0021	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	0.0029
Nitrogen/Nitrate	0.10	0.45	0.10	ND	0.10	1.3	0.10	ND	0.10	0.64	0.10	0.38	0.1	ND
Nitrogen/Nitrate, Nit	0.10	0.45	0.10	ND	0.10	1.3	0.10	ND	0.10	0.64	0.10	0.38	0.1	ND
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND
Selenium	0.0025	0.0033	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	0.0049	0.0025	0.0026	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
Sulfate	20	74	20	65	20	61	10	30	20	68	25	67	25	80
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND
Total Dissolved Solids	10	420	10	480	10	590	10	510	10	510	10	540	10	640
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND ^
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND
BTEX	0.0025	0.00069	0.0025	0.0013	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.28	NA	7.09	NA	7.07	NA	7.12	NA	7.21	NA	7.34	NA	7.13
Temperature	NA	6.06	NA	14.14	NA	21.42	NA	17.30	NA	12.11	NA	12.10	NA	20.80
Conductivity	NA	0.48	NA	0.67	NA	0.77	NA	0.68	NA	0.64	NA	0.61	NA	0.80
Dissolved Oxygen	NA	9.71	NA	0.94	NA	2.20	NA	2.26	NA	2.91	NA	5.49	NA	0.42
ORP	NA	43.8	NA	43.3	NA	-95.2	NA	-43.9	NA	57.7	NA	-4.5	NA	196.4

Parameter	11/7/2017 DL	11/7/2017 Result	3/6/2018 DL	3/6/2018 Result	5/15/2018 DL	5/15/2018 Result	8/7/2018 DL	8/7/2018 Result	10/30/2018 DL	10/30/2018 Result	2/26/2019 DL	2/26/2019 Result	4/30/2019 DL	4/30/2019 Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.046	0.0025	0.057	0.0025	0.033	0.0025	0.03	0.0025	0.048	0.0025	0.025	0.0025	0.024
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.05	0.51	0.05	0.099	0.05	0.63	0.05	0.74	0.05	0.53	0.05	0.35	0.05	0.37
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	93	10	81	2	68	2	69	10	86	2	55	2	47
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	0.0023	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.1	0.21	0.1	0.26	0.1	0.27	0.1	0.33	0.1	0.24	0.1	0.26	0.1	0.25
Iron	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.025	0.0025	ND	0.0025	ND	0.0025	0.054	0.0025	0.013	0.0025	0.033	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	1.5	0.1	4.2	0.1	ND	0.1	ND	0.1	0.44	0.1	0.18	0.1	ND
Nitrogen/Nitrate, Nit	0.1	1.5	0.5	4.2	0.1	ND	0.1	ND	0.1	0.44	0.1	0.18	0.1	ND
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND ^	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	0.0071	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	50	120	10	50	25	100	20	50	50	100	50	59	5	36
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	10	700	10	410	10	650	10	460	10	710	10	450	10	380
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND ^
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BTEX	0.0025	0.00722	0.0025	0.0015	0.0025	0.00097	0.0025	0.004	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	6.80	NA	7.19	NA	7.63	NA	6.72	NA	7.55	NA	7.18	NA	7.08
Temperature	NA	13.71	NA	7.31	NA	15.20	NA	21.89	NA	17.42	NA	8.90	NA	11.70
Conductivity	NA	0.71	NA	0.43	NA	0.56	NA	0.75	NA	0.85	NA	0.83	NA	0.44
Dissolved Oxygen	NA	5.10	NA	2.30	NA	8.73	NA	2.47	NA	1.28	NA	1.00	NA	2.32
ORP	NA	-5.5	NA	-10.1	NA	5.0	NA	51.2	NA	-7.4	NA	107.7	NA	117.8

Parameter	8/26/2019 DL	8/26/2019 Result	11/12/2019 DL	11/12/2019 Result	2/24/2020 DL	2/24/2020 Result	4/28/2020 DL	4/28/2020 Result	8/10/2020 DL	8/10/2020 Result	12/9/2020 DL	12/9/2020 Result	2/22/2021 DL	2/22/2021 Result	5/11/2021 DL	5/11/2021 Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.034	0.0025	0.028	0.0025	0.024	0.0025	0.024	0.0025	0.03	0.0025	0.033	0.0025	0.032	0.0025	0.024
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND ^+
Boron	0.05	0.58	0.05	0.25	0.05	0.32	0.05	0.52	0.05	0.69	0.05	0.5	0.05	0.47	0.05	0.56
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2	58	2	53	2	51	2	50	2	56	10	88	6	62	4	44
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	0.1	0.24	0.1	0.27	0.1	0.22	0.1	0.25	0.1	0.25	0.1	0.32	0.1	0.31	0.1	0.30 H
Iron	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.086	0.0025	0.1	0.0025	0.041	0.0025	0.0098	0.0025	0.024	0.0025	0.22	0.0025	0.059	0.0025	0.0036
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0022	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	ND	0.1	ND	0.1	0.1	0.1	ND	0.1	ND	0.1	0.23	0.1	0.36	0.1	ND
Nitrogen/Nitrate, Nit	0.1	ND	0.1	ND	0.1	0.1	0.1	ND	0.1	ND	0.1	0.23	0.1	0.36	0.1	ND
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND ^1+	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	5	15	5	66	5	71	5	54 ^	5	23	15	97	15	86	15	80
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	10	520	10	440	10	390	10	380	30	420	10	530	10	560	10	430
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	0.035	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BTEX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.08	NA	7.78	NA	7.05	NA	7.03	NA	6.92	NA	7.10	NA	7.23	NA	7.22
Temperature	NA	25.10	NA	18.93	NA	6.70	NA	12.50	NA	23.60	NA	16.60	NA	13.20	NA	13.50
Conductivity	NA	0.91	NA	0.72	NA	0.65	NA	0.23	NA	0.77	NA	0.19	NA	0.73	NA	0.72
Dissolved Oxygen	NA	3.98	NA	6.90	NA	2.92	NA	2.51	NA	5.96	NA	1.92	NA	4.10	NA	3.07
ORP	NA	15.9	NA	-56.0	NA	138.9	NA	62.1	NA	111.5	NA	60.5	NA	143.4	NA	136.2

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.
DL - Detection limit; NA - Not Applicable; ND - Not Detected; NM - Not Measured
NR - Not Required; NS - Not Sampled; H - Prepped/analyzed past hold time; V - Serial Dilution Exceeds Control Limits
F1 - MS and/or MSD Recovery outside of limits.; F2 - MS/MSD RPD exceeds control limits; ^1+ - Initial Calibration Verification is outside acceptance limits, high biased; ^+ - Continuing Calibration Verification is outside acceptance limits, high biased
^ - Denotes instrument related QC exceeds the control limits; * - Median Value (for temp); * - LCS or LCSD is outside acceptance limits
Temperature °C degrees Celcius; Conductivity ms/cm^c millisiemens/centimeters; Dissolved Oxygen mg/L milligrams/liter; Oxygen Reduction Potential (ORP) mV millivolts

Sample: MW-05

Parameter	Standards	12/15/2010 DL	12/15/2010 Result	3/25/2011 DL	3/25/2011 Result	6/16/2011 DL	6/16/2011 Result	9/19/2011 DL	9/19/2011 Result	12/12/2011 DL	12/12/2011 Result	3/19/2012 DL	3/19/2012 Result	6/25/2012 DL	6/25/2012 Result
Antimony	0.006	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	NP	0.0011	0.001	ND	0.001	ND	0.001	ND	0.001	0.001	0.001	ND	0.001	ND
Barium	2.0	NP	0.053	0.001	0.048	0.001	0.046	0.001	0.071	0.001	0.065	0.001	0.054	0.001	0.058
Beryllium	0.004	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	NP	0.95	0.01	0.93	0.01	0.79	0.01	0.79	0.01	0.77	0.01	0.82	0.01	0.74
Cadmium	0.005	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Chloride	200.0	NP	150	25	120	10	89	25	160	25	140	10	82	50	100
Chromium	0.1	NP	0.0044	0.004	0.0042	0.004	ND	0.004	0.0066	0.004	ND	0.004	ND	0.004	ND
Cobalt	1.0	NP	0.0025	0.002	0.0023	0.002	ND	0.002	0.0027	0.002	0.0022	0.002	ND	0.002	ND
Copper	0.65	NP	ND	0.003	ND	0.003	ND	0.003	0.0036	0.003	0.0061	0.003	ND	0.003	0.0031
Cyanide	0.2	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Fluoride	4.0	NP	0.27	0.25	0.36	0.25	0.43	0.25	0.25	0.25	ND	0.25	ND	0.25	ND
Iron	5.0	NP	0.13	0.010	0.050	0.010	0.046	0.010	0.082	0.010	0.036	0.010	ND	0.010	ND
Lead	0.0075	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Manganese	0.15	NP	0.51	0.001	0.49	0.001	0.48	0.001	0.64	0.001	0.50	0.001	0.26	0.001	0.41
Mercury	0.002	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	NP	0.014	0.005	0.013	0.005	0.0077	0.005	0.014	0.005	0.014	0.005	0.008	0.005	0.0095
Nitrogen/Nitrate	10.0	NP	ND	0.02	ND	0.02	0.08	0.02	ND	0.02	ND	0.02	1.6	0.02	0.04
Nitrogen/Nitrate, Nit	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	NP	0.0019	0.001	0.003	0.001	ND	0.001	0.0045	0.001	0.0023	0.001	0.0028	0.001	0.0033
Silver	0.05	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Sulfate	400.0	NP	160	25	170	25	110	25	250	25	170	25	120	50	130
Thallium	0.002	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Total Dissolved Solids	1,200	NP	740	17	680	17	640	17	890	17	820	17	590	17	700
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	NP	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BTEX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	7.24	NA	7.36	NA	7.29	NA	7.05	NA	6.34	NA	7.14	NA	7.00
Temperature	NA	NA	14.80	NA	14.35	NA	15.83	NA	15.80	NA	15.64	NA	17.03	NA	16.99
Conductivity	NA	NA	1.33	NA	1.16	NA	1.00	NA	1.21	NA	1.10	NA	0.85	NA	0.94
Dissolved Oxygen	NA	NA	NM	NA	3.95	NA	0.07	NA	0.06	NA	0.06	NA	0.05	NA	0.07
ORP	NA	NA	NM	NA	110.1	NA	70.5	NA	-274	NA	-26	NA	237	NA	128

Parameter	9/18/2012 DL	9/18/2012 Result	12/12/2012 DL	12/12/2012 Result	2/27/2013 DL	2/27/2013 Result	5/29/2013 DL	5/29/2013 Result	7/31/2013 DL	7/31/2013 Result	10/21/2013 DL	10/21/2013 Result	3/5/2014 DL	3/5/2014 Result
Antimony	0.003	ND	0.0050	ND	0.003	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.001	ND	0.0050	ND	0.001	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.001	0.066	0.040	0.077	0.001	0.061	0.0025	0.089	0.0025	0.092	0.0025	0.088	0.0025	0.059
Beryllium	0.001	ND	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.01	0.65	0.40	0.66	0.01	0.66	0.050	0.70	0.050	0.64	0.050	0.83	0.050	0.70
Cadmium	0.001	ND	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	50	150	25	170	50	110	10	92	10	150	10	170	10	120
Chromium	0.004	0.0058	0.0030	0.0049	0.004	0.0053	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND^
Cobalt	0.002	0.002	0.0030	ND	0.002	ND	0.0010	0.0022	0.0010	0.0015	0.0010	0.0015	0.0010	ND
Copper	0.003	ND	0.010	ND	0.003	ND	0.0020	ND	0.0020	ND	0.0020	0.0027	0.0020	ND^
Cyanide	0.0050	ND	0.0050	ND	0.005	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.25	0.32	0.25	0.32	0.25	ND	0.10	0.23	0.10	0.24	0.10	0.24	0.10	0.35
Iron	0.010	ND	0.010	0.43	0.01	0.052	0.10	0.20	0.10	ND	0.10	ND	0.10	ND
Lead	0.001	ND	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.001	1.00	0.040	0.59	0.001	0.21	0.0025	0.67	0.0025	0.29	0.0025	0.62	0.0025	0.077
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.005	0.013	0.010	ND	0.005	0.009	0.0020	0.0055	0.0020	0.0059	0.0020	0.0068	0.0020	0.0038
Nitrogen/Nitrate	0.02	0.04	0.02	0.04	0.02	0.19	0.10	ND	0.10	ND	0.10	0.34	0.10	0.74
Nitrogen/Nitrate, Nit	NR	NR	NR	NR	NR	NR	0.10	ND	0.10	ND	0.10	0.34	0.10	0.77
Nitrogen/Nitrite	NR	NR	NR	NR	NR	NR	0.020	ND	0.020	ND	0.020	ND	0.020	0.033
Perchlorate	NR	NR	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.001	0.0031	0.0050	ND	0.001	0.0029	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.005	ND	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	50	200	25	200	50	180	100	310	100	290	100	260	50	180
Thallium	0.001	ND	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	17	890	26	840	26	790	10	990	10	1000	10	1100	10	840
Vanadium	NR	NR	0.0080	ND	0.005	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.006	ND	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	NR	NR	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BTEX	NR	NR	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	6.94	NA	6.94	NA	8.01	NA	6.87	NA	6.82	NA	6.89	NA	7.69
Temperature	NA	16.03	NA	14.38	NA	14.50	NA	16.36	NA	17.75	NA	14.79	NA	12.62
Conductivity	NA	1.19	NA	1.17	NA	1.17	NA	1.14	NA	1.25	NA	1.33	NA	0.28
Dissolved Oxygen	NA	0.01	NA	0.46	NA	0.40	NA	0.28	NA	0.36	NA	0.32	NA	1.17
ORP	NA	152	NA	30	NA	99.2	NA	-50.9	NA	55.5	NA	-197	NA	-51

Parameter	5/27/2014 DL	5/27/2014 Result	8/25/2014 DL	8/25/2014 Result	10/27/2014 DL	10/27/2014 Result	2/25/2015 DL	2/25/2015 Result	5/13/2015 DL	5/13/2015 Result	8/17/2015 DL	8/17/2015 Result	11/17/2015 DL	11/17/2015 Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.0025	0.052	0.0025	0.069	0.0025	ND	0.0025	0.041	0.0025	0.055	0.0025	0.073	0.0025	0.060
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.050	0.76	0.050	0.71	0.050	ND	0.050	1.1	0.050	0.72	0.050	1.3	0.050	0.74
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00050	0.00050	ND
Chloride	10	80	10	140	10	120	10	79	10	120	2.0	60	10	110
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.0020	ND	0.0020	0.0023	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.29	0.10	0.32	0.10	0.28	0.10	0.38	0.10	0.37	0.10	0.26	0.10	0.27
Iron	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	0.043	0.0025	0.016	0.0025	ND	0.0025	0.058	0.0025	0.0078	0.0025	0.13	0.0025	0.084
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	0.0036	0.0020	0.0041	0.0020	ND	0.0020	0.0025	0.0020	0.0023	0.0020	0.0051	0.0020	0.0027
Nitrogen/Nitrate	0.10	2.2	0.10	0.11	0.10	0.20	0.10	0.74	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrate, Nit	0.50	2.2	0.10	0.11	0.10	0.20	0.10	0.74	0.10	ND	0.10	ND ^	0.10	ND
Nitrogen/Nitrite	0.020	0.026	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	0.0028	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	50	150	50	200	50	310	20	110	50	150	50	250	50	180
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	10	640	10	870	10	910	10	570	10	730	10	860	10	810
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00068
BTEX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.00278
pH	NA	7.01	NA	6.86	NA	7.30	NA	7.52	NA	7.26	NA	7.35	NA	6.65
Temperature	NA	20.54	NA	21.14	NA	21.18	NA	5.51	NA	17.46	NA	25.42	NA	15.07
Conductivity	NA	1.01	NA	1.28	NA	1.38	NA	0.69	NA	1.06	NA	1.32	NA	1.06
Dissolved Oxygen	NA	0.53	NA	1.01	NA	2.20	NA	2.50	NA	1.54	NA	2.24	NA	1.32
ORP	NA	-59.6	NA	64.8	NA	6.8	NA	9.8	NA	23.5	NA	-27.7	NA	-4.8

Parameter	2/23/2016 DL	2/23/2016 Result	5/17/2016 DL	5/17/2016 Result	8/16/2016 DL	8/16/2016 Result	11/15/2016 DL	11/15/2016 Result	2/14/2017 DL	2/14/2017 Result	5/1/2017 DL	5/1/2017 Result	8/28/2017 DL	8/28/2017 Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.003	ND
Arsenic	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND
Barium	0.0025	0.043	0.0025	0.051	0.0025	0.055	0.0025	0.051	0.0025	0.052	0.0025	0.055	0.0025	0.063
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND
Boron	0.050	0.59	0.050	0.63	0.050	0.66	0.10	0.83	0.050	0.59	0.050	0.68	0.05	0.57
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
Chloride	2.0	54	10	88	10	100	2.0	66	10	98	10	92	10	120
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.01	ND H
Fluoride	0.10	0.27	0.10	0.35	0.10	0.30	0.10	0.25	0.10	0.27	0.10	0.27	0.1	0.33
Iron	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.1	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
Manganese	0.0025	0.044	0.0025	0.039	0.0025	0.015	0.0025	0.0040	0.0025	0.0068	0.0025	0.024	0.0025	0.032
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	0.00021
Nickel	0.0020	0.0032	0.0020	0.0027	0.0020	0.0020	0.0020	ND	0.0020	ND	0.0020	0.0022	0.002	0.0027
Nitrogen/Nitrate	0.10	0.27	0.10	ND	0.10	ND	0.10	0.12	0.10	ND	0.10	ND	0.1	ND
Nitrogen/Nitrate, Nit	0.10	0.27	0.10	ND	0.10	ND	0.10	0.12	0.10	ND	0.10	ND	0.1	ND
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	ND ^	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
Sulfate	25	130	25	140	50	160	25	94	50	130	50	180	50	230
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND
Total Dissolved Solids	10	550	10	690	10	800	10	630	10	720	10	720	10	880
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND ^
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND ^	0.020	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND
BTEX	0.0025	ND	0.0025	0.0011	0.0025	0.0006	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.18	NA	7.08	NA	6.85	NA	6.96	NA	7.25	NA	7.60	NA	7.05
Temperature	NA	11.30	NA	13.85	NA	19.41	NA	15.32	NA	13.93	NA	12.43	NA	16.90
Conductivity	NA	0.75	NA	0.83	NA	1.02	NA	0.77	NA	0.87	NA	0.82	NA	1.06
Dissolved Oxygen	NA	1.99	NA	2.58	NA	2.88	NA	1.33	NA	1.93	NA	3.43	NA	0.49
ORP	NA	-103.8	NA	-65.0	NA	-99.8	NA	-34.7	NA	-18.4	NA	-142.5	NA	232.2

Parameter	11/7/2017 DL	11/7/2017 Result	3/6/2018 DL	3/6/2018 Result	5/15/2018 DL	5/15/2018 Result	8/7/2018 DL	8/7/2018 Result	10/30/2018 DL	10/30/2018 Result	2/26/2019 DL	2/26/2019 Result	4/30/2019 DL	4/30/2019 Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.057	0.0025	0.072	0.0025	0.057	0.0025	0.051	0.0025	0.07	0.0025	0.054	0.0025	0.041
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.05	0.45	0.05	0.34	0.05	0.56	0.05	0.45	0.05	0.5	0.05	0.56	0.05	0.6
Cadmium	0.0005	ND	0.0005	0.00053	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	110	10	110	10	90	10	120	10	120	10	87	2	74
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	0.0022	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.1	0.32	0.1	0.21	0.1	0.29	0.1	0.33	0.1	0.29	0.1	0.34	0.1	0.37
Iron	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	0.77	0.0025	0.015	0.0025	0.12	0.0025	ND	0.0025	0.0076	0.0025	0.039
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	0.0039	0.002	ND	0.002	0.003	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	0.22	0.1	3.7	0.1	ND	0.1	0.13	0.1	0.28	0.1	0.48	0.1	0.24
Nitrogen/Nitrate, Nit	0.1	0.22	0.2	3.7	0.1	ND	0.1	0.13	0.1	0.28	0.1	0.48	0.1	0.24
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND ^	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	0.0031	0.0025	ND	0.0025	ND	0.0025	0.0032	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	50	140	20	64	50	230	50	160	50	130	130	140	5	130
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	10	690	10	570	10	1000	10	790	10	890	10	660	10	590
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND ^
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.00056	0.0005	ND	0.0005	ND	0.0005	ND
BTEX	0.0025	0.0021	0.0025	0.00092	0.0025	0.00073	0.0025	0.00896	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	6.87	NA	7.10	NA	7.70	NA	6.56	NA	7.57	NA	6.99	NA	6.96
Temperature	NA	13.03	NA	10.12	NA	16.71	NA	17.48	NA	15.77	NA	14.50	NA	14.40
Conductivity	NA	0.82	NA	0.63	NA	0.83	NA	1.04	NA	1.01	NA	1.13	NA	0.62
Dissolved Oxygen	NA	4.09	NA	1.68	NA	4.33	NA	2.17	NA	8.36	NA	0.10	NA	0.21
ORP	NA	-9.6	NA	-43.3	NA	-9.7	NA	41.1	NA	17.8	NA	109.7	NA	116.4

Parameter	8/26/2019 DL	8/26/2019 Result	11/12/2019 DL	11/12/2019 Result	2/24/2020 DL	2/24/2020 Result	4/28/2020 DL	4/28/2020 Result	8/10/2020 DL	8/10/2020 Result	12/9/2020 DL	12/9/2020 Result	2/22/2021 DL	2/22/2021 Result	5/11/2021 DL	5/11/2021 Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.053	0.0025	0.049	0.0025	0.055	0.0025	0.05	0.0025	0.059	0.0025	0.048	0.0025	0.045	0.0025	0.039
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND ^+
Boron	0.05	0.47	0.05	0.56	0.05	0.52	0.05	0.48	0.05	0.68	0.05	0.46	0.05	0.53	0.05	0.48
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	78	2	72	2	80	2	56	2	70	10	80	6	70	4	53
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	0.0039	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.005	ND	0.005	0.0069	0.005	ND
Fluoride	0.1	0.29	0.1	0.35	0.1	0.39	0.1	0.37	0.1	0.26	0.1	0.31	0.1	0.33	0.1	0.34 H
Iron	0.1	ND	0.1	ND	0.1	ND ^	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.037	0.0025	0.053	0.0025	0.028	0.0025	0.03	0.0025	0.042	0.0025	0.04	0.0025	0.0084	0.0025	0.018
Mercury	0.0002	ND	0.0002	0.00047	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	0.0025	0.002	0.0022	0.002	0.0026	0.002	0.0022	0.002	0.0023	0.002	0.0022	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.33	0.1	0.92
Nitrogen/Nitrate, Nit	0.1	ND	0.1	ND	0.1	0.1	0.1	ND	0.1	ND	0.1	ND	0.1	0.33	0.1	0.92
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND ^1+	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	5	140	5	120	5	140	5	130 ^	25	92	15	110	25	110	15	100
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	10	660	10	590	10	660	10	600	30	650	10	580	10	650	10	540
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BTEX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.01	NA	7.85	NA	6.90	NA	6.87	NA	6.79	NA	6.91	NA	7.14	NA	7.20
Temperature	NA	17.70	NA	15.40	NA	14.20	NA	13.50	NA	16.70	NA	15.00	NA	15.60	NA	14.60
Conductivity	NA	0.15	NA	0.96	NA	0.34	NA	0.26	NA	1.12	NA	0.19	NA	0.86	NA	0.89
Dissolved Oxygen	NA	0.35	NA	0.51	NA	0.21	NA	0.23	NA	0.20	NA	0.21	NA	1.12	NA	0.21
ORP	NA	139.4	NA	-58.1	NA	40.3	NA	17.0	NA	-0.9	NA	56.3	NA	146.2	NA	116.7

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.
DL - Detection limit; NA - Not Applicable; ND - Not Detected; NM - Not Measured
NR - Not Required; NS - Not Sampled; H - Prepped/analyzed past hold time; V - Serial Dilution Exceeds Control Limits
F1 - MS and/or MSD Recovery outside of limits.; F2 - MS/MSD RPD exceeds control limits; ^1+ - Initial Calibration Verification is outside acceptance limits, high biased; ^+ - Continuing Calibration Verification is outside acceptance limits, high biased
^ - Denotes instrument related QC exceeds the control limits; * - Median Value (for temp); * - LCS or LCSD is outside acceptance limits
Temperature °C degrees Celcius; Conductivity ms/cm^c millisiemens/centimeters; Dissolved Oxygen mg/L milligrams/liter; Oxygen Reduction Potential (ORP) mV millivolts

Sample: MW-06

Parameter	Standards	12/15/2010 DL	12/15/2010 Result	3/25/2011 DL	3/25/2011 Result	6/16/2011 DL	6/16/2011 Result	9/19/2011 DL	9/19/2011 Result	12/12/2011 DL	12/12/2011 Result	3/19/2012 DL	3/19/2012 Result	6/25/2012 DL	6/25/2012 Result
Antimony	0.006	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	NP	0.0042	0.001	0.0024	0.001	0.0029	0.001	0.0031	0.001	0.0036	0.001	0.002	0.001	0.0021
Barium	2.0	NP	0.11	0.001	0.092	0.001	0.1	0.001	0.1	0.001	0.12	0.001	0.097	0.001	0.12
Beryllium	0.004	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	NP	0.5	0.01	0.35	0.01	0.43	0.01	0.61	0.01	0.63	0.01	0.39	0.01	0.46
Cadmium	0.005	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Chloride	200.0	NP	180	50	200	50	160	50	210	50	150	50	150	50	200
Chromium	0.1	NP	0.006	0.004	0.0083	0.004	0.0045	0.004	0.0085	0.004	0.0056	0.004	ND	0.004	0.0054
Cobalt	1.0	NP	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Copper	0.65	NP	ND	0.003	ND	0.003	0.0032	0.003	0.0042	0.003	ND	0.003	0.16	0.003	ND
Cyanide	0.2	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Fluoride	4.0	NP	0.65	0.25	0.61	0.25	0.63	0.25	0.64	0.25	0.50	0.25	0.47	0.25	0.37
Iron	5.0	NP	1.6	0.010	1.6	0.010	1.7	0.010	1.8	0.010	1.9	0.010	1.7	0.010	1.9
Lead	0.0075	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Manganese	0.15	NP	0.68	0.001	0.68	0.001	0.63	0.001	0.66	0.001	0.63	0.001	0.61	0.001	0.71
Mercury	0.002	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	NP	0.0091	0.005	0.014	0.005	0.0078	0.005	0.0099	0.005	0.0089	0.005	ND	0.005	0.0095
Nitrogen/Nitrate	10.0	NP	0.037	0.02	ND	0.02	ND	0.02	0.04	0.02	0.06	0.02	ND	0.02	ND
Nitrogen/Nitrate, Nit	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	NP	0.0034	0.001	ND	0.001	ND	0.001	0.0025	0.001	0.0033	0.001	ND	0.001	0.0013
Silver	0.05	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Sulfate	400.0	NP	210	50	250	50	280	50	260	50	170	50	250	50	450
Thallium	0.002	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Total Dissolved Solids	1,200	NP	950	17	990	17	1100	17	970	17	1000	17	1100	17	1300
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	NP	0.0064	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	0.049	0.006	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BTEX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	7.67	NA	7.97	NA	7.62	NA	7.61	NA	7.35	NA	7.68	NA	7.59
Temperature	NA	NA	24.53	NA	16.38	NA	18.99	NA	22.40	NA	22.76	NA	20.99	NA	19.83
Conductivity	NA	NA	1.65	NA	1.63	NA	1.68	NA	1.56	NA	1.61	NA	1.54	NA	1.65
Dissolved Oxygen	NA	NA	NM	NA	0.24	NA	0.08	NA	0.10	NA	0.08	NA	0.03	NA	0.23
ORP	NA	NA	NM	NA	-137.5	NA	-161.9	NA	-236	NA	-196	NA	-176	NA	-169

Parameter	9/18/2012 DL	9/18/2012 Result	12/12/2012 DL	12/12/2012 Result	2/27/2013 DL	2/27/2013 Result	5/29/2013 DL	5/29/2013 Result	7/31/2013 DL	7/31/2013 Result	10/23/2013 DL	10/23/2013 Result	3/6/2014 DL	3/6/2014 Result
Antimony	0.003	ND	0.0050	ND	0.003	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.001	0.0022	0.0050	ND	0.001	0.0017	0.0010	0.0027	0.0010	0.0037	0.0010	0.0039	0.0010	0.0010
Barium	0.001	0.11	0.040	0.12	0.001	0.088	0.0025	0.12	0.0025	0.12	0.0025	0.11	0.0025	0.10
Beryllium	0.001	ND	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.01	0.57	0.40	0.45	0.01	0.39	0.050	1.0	0.050	0.62	0.050	0.51	0.050	0.34
Cadmium	0.001	ND	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	50	190	50	240	50	200	10	99	10	200	10	210	10	230
Chromium	0.004	0.0072	0.0030	0.0077	0.004	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND^
Cobalt	0.002	ND	0.0030	ND	0.002	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.003	ND	0.010	ND	0.003	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND^
Cyanide	0.0050	ND	0.0050	ND	0.005	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.25	0.48	0.25	0.42	0.25	ND	0.10	0.36	0.10	0.56	0.10	0.64	0.10	0.42
Iron	0.010	1.9	0.010	1.6	0.01	1.1	0.10	1.8	0.10	2.2	0.10	1.8	0.10	1.5
Lead	0.001	ND	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.001	0.64	0.040	0.61	0.001	0.50	0.0025	1.3	0.0025	0.70	0.0025	0.58	0.0025	0.68
Mercury	0.0002	ND	0.00020	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.005	0.011	0.010	ND	0.005	0.0062	0.0020	ND	0.0020	ND	0.0020	0.0020	0.0020	ND
Nitrogen/Nitrate	0.02	0.04	0.02	0.06	0.02	0.02	0.10	ND	0.10	ND	0.10	0.16	0.10	ND
Nitrogen/Nitrate, Nit	NR	NR	NR	NR	NR	NR	0.10	ND	0.10	ND	0.10	0.16	0.10	ND
Nitrogen/Nitrite	NR	NR	NR	NR	NR	NR	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	NR	NR	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.001	0.0023	0.0050	ND	0.001	0.001	0.0025	0.0030	0.0025	ND	0.0025	0.0065	0.0025	ND
Silver	0.005	ND	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	50	340	50	440	50	320	130	560	100	440	100	310	100	410
Thallium	0.001	ND	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	17	1200	26	1200	26	1100	10	1400	10	1200	10	1100	10	1100
Vanadium	NR	NR	0.0080	ND	0.005	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.006	ND	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	NR	NR	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BTEX	NR	NR	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.73	NA	7.68	NA	9.30	NA	7.23	NA	7.37	NA	7.55	NA	8.21
Temperature	NA	20.30	NA	20.07	NA	14.40	NA	16.14	NA	24.20	NA	23.30	NA	10.06
Conductivity	NA	1.69	NA	1.75	NA	1.49	NA	1.47	NA	1.71	NA	1.74	NA	1.01
Dissolved Oxygen	NA	0.02	NA	0.41	NA	0.18	NA	0.45	NA	0.14	NA	0.26	NA	1.24
ORP	NA	-183	NA	-160	NA	-85.8	NA	-97.1	NA	-180.4	NA	-233.2	NA	-168.8

Parameter	5/29/2014 DL	5/29/2014 Result	8/27/2014 DL	8/27/2014 Result	10/29/2014 DL	10/29/2014 Result	2/23/2015 DL	2/23/2015 Result	5/11/2015 DL	5/11/2015 Result	8/18/2015 DL	8/18/2015 Result	11/17/2015 DL	11/17/2015 Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	0.20	0.0010	0.0024	0.0010	0.0016	0.0010	0.0011	0.0010	ND	0.0010	0.0025	0.0010	0.0016
Barium	0.0025	0.54	0.0025	0.11	0.0025	0.10	0.0025	0.099	0.0025	0.094	0.0025	0.12	0.0025	0.11
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.050	0.35	0.050	0.52	0.050	0.34	0.050	0.34	0.050	0.35	0.050	0.75	0.050	0.51
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	230	10	230 ^	10	240	10	110	10	230	10	170	10	210
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	0.0068	0.0010	ND	0.0010	ND	0.0010	0.0013	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.0020	ND	0.0020	ND ^	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.53	0.10	0.74	0.10	0.79	0.10	0.48	0.10	0.52	0.10	0.56	0.10	0.64
Iron	0.10	22	0.10	1.0	0.10	0.81	0.10	1.0	0.10	0.29	0.10	1.8	0.10	1.4
Lead	0.00050	ND	0.00050	ND	0.00050	0.00082	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.013	8.0	0.0025	0.71	0.0025	0.57	0.0025	0.86	0.0025	0.90	0.0025	1.2	0.0025	0.98
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	0.0061	0.0020	ND	0.0020	ND	0.0020	0.0024	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.10	ND	0.10	ND	0.10	0.11	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrate, Nit	0.10	ND	0.10	ND	0.10	0.11	0.10	ND	0.10	ND	0.10	ND ^	0.10	ND
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	100	530	100	300	100	380	100	360	100	350	100	400	100	490
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	10	1400	10	1300	10	1100	10	1100	10	1300	10	1400	10	1100
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BTEX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0013
pH	NA	7.45	NA	7.73	NA	7.60	NA	8.05	NA	7.76	NA	7.94	NA	7.46
Temperature	NA	19.41 *	NA	26.15	NA	19.31	NA	7.20	NA	17.91	NA	21.94	NA	18.66
Conductivity	NA	1.84	NA	1.91	NA	2.36	NA	1.17	NA	1.67	NA	1.99	NA	1.58
Dissolved Oxygen	NA	0.80	NA	0.39	NA	0.32	NA	0.96	NA	1.57	NA	1.60	NA	1.20
ORP	NA	-25.3	NA	-143.4	NA	-126.7	NA	-147.7	NA	-73.6	NA	-142.7	NA	-90.4

Parameter	2/23/2016 DL	2/23/2016 Result	5/17/2016 DL	5/17/2016 Result	8/16/2016 DL	8/16/2016 Result	11/16/2016 DL	11/16/2016 Result	2/16/2017 DL	2/16/2017 Result	5/2/2017 DL	5/2/2017 Result	8/24/2017 DL	8/24/2017 Result
Antimony	0.0030	ND F1	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.003	0.0033
Arsenic	0.0010	0.0019 F1	0.0010	ND	0.0010	ND	0.0010	0.0022	0.0010	ND	0.0010	ND	0.001	0.0016
Barium	0.0025	0.082 F1	0.0025	0.098	0.0025	0.090	0.0025	0.090	0.0025	0.079	0.0025	0.077	0.0025	0.097
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND
Boron	0.050	0.40 F1	0.050	0.34	0.050	0.41	0.050	0.36	0.050	0.29	0.050	0.36	0.05	0.36
Cadmium	0.00050	ND F1	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
Chloride	10	200	10	200 F1	10	210	10	180 F1	10	190	10	180	10	180
Chromium	0.0050	ND F1	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND
Cobalt	0.0010	ND F1	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND
Copper	0.0020	ND F1	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND F1 F2	0.01	ND
Fluoride	0.10	0.58	0.10	0.48	0.10	0.60	0.10	0.50	0.10	0.26	0.10	0.31	0.1	0.62
Iron	0.10	1.6 F1	0.10	0.15	0.10	ND	0.10	1.1	0.10	1.4	0.10	ND	0.1	1.2
Lead	0.00050	ND F1	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
Manganese	0.0025	0.87 F1	0.0025	0.85	0.0025	0.57	0.0025	0.79	0.0025	1.0	0.0025	0.086	0.0025	0.73
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	ND
Nickel	0.0020	0.0020	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND
Nitrogen/Nitrate	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.19	0.1	ND
Nitrogen/Nitrate, Nit	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.19	0.1	ND
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND
Selenium	0.0025	ND F1	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	ND ^	0.0025	ND	0.0025	ND
Silver	0.00050	ND F1	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
Sulfate	100	390	250	500	100	380	100	470	100	390	100	420	100	340
Thallium	0.0020	ND F1	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND
Total Dissolved Solids	10	1100	10	1400	10	1200	10	1100	10	1000	10	1200	10	1100
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND
Zinc	0.020	ND F1	0.020	ND	0.020	ND	0.020	ND	0.020	ND ^	0.020	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND
BTEX	0.0025	0.00061	0.0025	0.00053	0.0025	0.00099	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.68	NA	7.47	NA	7.31	NA	7.66	NA	7.66	NA	7.58	NA	7.38
Temperature	NA	13.60	NA	15.26	NA	28.74	NA	19.81	NA	12.94	NA	14.71	NA	22.90
Conductivity	NA	1.31	NA	1.56	NA	1.94	NA	1.43	NA	1.24	NA	1.26	NA	1.53
Dissolved Oxygen	NA	0.64	NA	0.83	NA	1.32	NA	1.42	NA	1.06	NA	2.84	NA	0.21
ORP	NA	-96.8	NA	-58.8	NA	-166.3	NA	-154.6	NA	-102.5	NA	-79.2	NA	-102.3

Parameter	11/8/2017 DL	11/8/2017 Result	3/6/2018 DL	3/6/2018 Result	5/18/2018 DL	5/18/2018 Result	8/10/2018 DL	8/10/2018 Result	10/29/2018 DL	10/29/2018 Result	2/25/2019 DL	2/25/2019 Result	5/1/2019 DL	5/1/2019 Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	0.0015	0.001	ND	0.001	ND	0.001	0.0014	0.001	ND	0.001	ND	0.001	0.0017
Barium	0.0025	0.098	0.0025	0.071	0.0025	0.072	0.0025	0.1	0.0025	0.083	0.0025	0.071	0.0025	0.073
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.05	0.3	0.05	0.3	0.05	0.39	0.05	0.36	0.05	0.31	0.05	0.24	0.05	0.33
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	180	10	180	10	170	10	190	10	170	10	170	10	180
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.1	0.6	0.1	0.36	0.1	0.37	0.1	0.55	0.1	0.6	0.1	0.43	0.1	0.42
Iron	0.1	1.5	0.1	0.94	0.1	ND	0.1	1	0.1	0.47	0.1	1.2	0.1	1.8
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.95	0.0025	1.1	0.0025	0.48	0.0025	1	0.0025	0.75	0.0025	0.78	0.0025	1.1
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	ND	0.1	0.11	0.1	0.22	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrate, Nit	0.1	ND	0.1	0.11	0.1	0.22	0.1	ND	0.1	ND	0.1	ND	0.1	ND ^
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	0.037	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND ^	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0036	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	100	410	100	350	100	460	100	320	100	410	20	350	20	390
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	10	1100	10	1000	10	1300	10	1100	10	1100	10	1000	10	1100
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BTEX	0.0025	0.00067	0.0025	0.0014	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.24	NA	7.42	NA	6.97	NA	6.96	NA	7.75	NA	7.55	NA	7.36
Temperature	NA	18.78	NA	8.80	NA	15.39	NA	24.22	NA	21.39	NA	12.10	NA	12.40
Conductivity	NA	1.43	NA	0.99	NA	1.18	NA	1.49	NA	1.37	NA	1.60	NA	1.02
Dissolved Oxygen	NA	1.56	NA	2.82	NA	8.16	NA	7.57	NA	7.50	NA	0.75	NA	0.19
ORP	NA	-141.4	NA	-83.1	NA	-33.8	NA	-42.8	NA	-63.3	NA	-125.9	NA	-49.2

Parameter	8/27/2019 DL	8/27/2019 Result	11/12/2019 DL	11/12/2019 Result	2/25/2020 DL	2/25/2020 Result	4/27/2020 DL	4/27/2020 Result	8/11/2020 DL	8/11/2020 Result	12/9/2020 DL	12/9/2020 Result	2/23/2021 DL	2/23/2021 Result	5/10/2021 DL	5/10/2021 Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	0.0023	0.001	0.0022	0.001	ND	0.001	ND ^	0.001	0.0016	0.001	0.0017	0.001	0.0011	0.001	ND
Barium	0.0025	0.081	0.0025	0.07	0.0025	0.055	0.0025	0.063	0.0025	0.062	0.0025	0.052	0.0025	0.049	0.0025	0.047
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND ^+
Boron	0.05	0.35	0.05	0.26	0.05	0.22	0.05	0.31	0.05	0.49	0.05	0.23	0.05	0.25	0.05	0.32
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	160	10	150	10	150	10	140	10	140	10	140	10	130	10	130
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	0.1	0.49	0.1	0.51	0.1	0.46	0.1	0.42	0.1	0.47	0.1	0.57	0.1	0.41	0.1	0.44 H F1
Iron	0.1	1.1	0.1	0.87	0.1	1.4	0.1	1.1	0.1	0.65	0.1	1.2	0.1	1	0.1	0.45
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.77	0.0025	0.73	0.0025	0.7	0.0025	0.7	0.0025	0.57	0.0025	0.57	0.0025	0.66	0.0025	0.47
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.13 H
Nitrogen/Nitrate, Nit	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.13
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	0.0063	0.0025	ND	0.0025	0.012	0.0025	0.0025	0.0025	ND	0.0025	0.0069	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	20	360 F1	20	280	20	280	50	400	100	280	50	220	50	240	50	400
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	10	970	10	920	10	830	10	1200	30	790	10	640	10	790	10	680
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BTEX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.52	NA	8.03	NA	7.76	NA	7.52	NA	7.50	NA	7.65	NA	7.90	NA	7.74
Temperature	NA	22.80	NA	18.25	NA	10.50	NA	11.90	NA	18.90	NA	16.00	NA	10.70	NA	12.40
Conductivity	NA	1.50	NA	1.35	NA	1.21	NA	0.34	NA	0.66	NA	1.21	NA	0.94	NA	1.49
Dissolved Oxygen	NA	0.23	NA	0.22	NA	0.22	NA	0.24	NA	0.36	NA	0.11	NA	0.34	NA	0.20
ORP	NA	-159.0	NA	-132.2	NA	-193.2	NA	-173.0	NA	-102.4	NA	-217.5	NA	-171.7	NA	37.5

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.
DL - Detection limit; NA - Not Applicable; ND - Not Detected; NM - Not Measured
NR - Not Required; NS - Not Sampled; H - Prepped/analyzed past hold time; V - Serial Dilution Exceeds Control Limits
F1 - MS and/or MSD Recovery outside of limits.; F2 - MS/MSD RPD exceeds control limits; ^1+ - Initial Calibration Verification is outside acceptance limits, high biased; ^+ - Continuing Calibration Verification is outside acceptance limits, high biased
^ - Denotes instrument related QC exceeds the control limits; * - Median Value (for temp); * - LCS or LCSD is outside acceptance limits
Temperature °C degrees Celcius; Conductivity ms/cm^c millisiemens/centimeters; Dissolved Oxygen mg/L milligrams/liter; Oxygen Reduction Potential (ORP) mV millivolts

Sample: MW-07	Date	12/6/2010		3/25/2011		6/16/2011		9/19/2011		12/12/2011		3/19/2012		6/25/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	NP	0.026	0.001	0.085	0.001	0.12	0.001	0.18	0.001	0.23	0.001	0.23	0.001	0.15
Barium	2.0	NP	0.55	0.001	0.52	0.001	0.57	0.001	0.57	0.001	0.59	0.001	0.57	0.001	0.44
Beryllium	0.004	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	NP	0.61	0.01	0.44	0.012	0.43	0.01	0.38	0.01	0.34	0.01	0.35	0.01	0.41
Cadmium	0.005	NP	0.0026	0.001	ND	0.001	0.0015	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Chloride	200.0	NP	170	50	200	25	140	25	130	10	81	25	99	25	130
Chromium	0.1	NP	0.0088	0.004	0.0075	0.004	0.0061	0.004	0.011	0.004	ND	0.004	ND	0.004	0.0043
Cobalt	1.0	NP	0.017	0.002	0.0056	0.002	0.007	0.002	0.0055	0.002	0.006	0.002	0.0067	0.002	0.011
Copper	0.65	NP	0.14	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Cyanide	0.2	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	0.0055
Fluoride	4.0	NP	0.47	0.25	0.42	0.25	0.58	0.25	0.94	0.25	0.47	0.25	0.54	0.25	0.38
Iron	5.0	NP	8.0	0.010	7.5	0.010	10	0.010	22	0.010	26	0.010	31	0.010	10
Lead	0.0075	NP	0.039	0.001	ND	0.001	0.0014	0.001	ND	0.001	ND	0.001	ND	0.001	0.0013
Manganese	0.15	NP	3.5	0.001	5.9	0.001	6.4	0.001	12	0.001	12	0.001	11	0.001	9.3
Mercury	0.002	NP	ND	0.0002	ND	0.0002	0.00025	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	NP	0.045	0.005	0.021	0.005	0.022	0.005	0.026	0.005	0.022	0.005	0.018	0.005	0.026
Nitrogen/Nitrate	10.0	NP	0.043	0.02	0.08	0.02	ND	0.20	0.31	0.02	0.03	0.02	ND	0.02	0.02
Nitrogen/Nitrate, Nitr	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	NP	0.0043	0.001	0.0026	0.001	0.0025	0.001	0.0073	0.001	0.0054	0.001	0.0013	0.001	0.006
Silver	0.05	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Sulfate	400.0	NP	120	10	49	10	25	1.0	9.1	1.0	3.3	1.0	3.0	10	18
Thallium	0.002	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Total Dissolved Soli	1,200	NP	860	17	1100	17	1300	17	1300	17	1300	17	1400	17	1300
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	NP	0.076	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	0.011
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	NM	NA	7.04	NA	6.78	NA	6.83	NA	6.45	NA	6.79	NA	6.91
Temperature	NA	NA	NM	NA	16.49	NA	18.51	NA	19.33	NA	16.43	NA	21.06	NA	19.19
Conductivity	NA	NA	NM	NA	1.98	NA	2.02	NA	2.02	NA	1.90	NA	2.04	NA	1.84
Dissolved Oxygen	NA	NA	NM	NA	0.61	NA	0.12	NA	0.34	NA	0.17	NA	0.13	NA	-0.02
ORP	NA	NA	NM	NA	-81.6	NA	-95.7	NA	-171	NA	-148	NA	-141	NA	-119

Sample: MW-07	9/18/2012		12/12/2012		2/27/2013		5/31/2013		7/31/2013		10/23/2013		3/5/2014	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	ND	0.0050	ND	0.003	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.001	0.18	0.0050	0.26	0.001	0.17	0.0010	0.12	0.0010	0.22	0.0010	0.20	0.0010	0.15
Barium	0.001	0.46	0.040	0.47	0.001	0.44	0.0025	0.42	0.0025	0.46	0.0025	0.49	0.0025	0.56
Beryllium	0.001	ND	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.01	0.36	0.40	0.41	0.01	0.47	0.050	0.52	0.050	0.41	0.050	0.46	0.050	0.37
Cadmium	0.001	ND	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	25	130	25	150	50	160	10	180	10	150	10	160	10	170
Chromium	0.004	0.0051	0.0030	0.028	0.004	0.017	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND^
Cobalt	0.002	0.009	0.0030	0.0056	0.002	0.0075	0.0010	0.0059	0.0010	0.0045	0.0010	0.0071	0.0010	0.0085
Copper	0.003	ND	0.010	ND	0.003	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND^
Cyanide	0.0050	ND	0.0050	ND	0.005	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.25	0.35	0.25	0.35	0.25	ND	0.10	0.47	0.10	0.46	0.10	0.43	0.10	0.41
Iron	0.010	21	0.010	18	0.01	27	0.10	15	0.10	30	0.10	20	0.10	17
Lead	0.001	ND	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0011
Manganese	0.001	8	0.040	6.7	0.001	9.5	0.025	5.7	0.0025	11	0.0025	5.9	0.0025	5.8 E
Mercury	0.0002	ND	0.00020	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.005	0.028	0.010	ND	0.005	0.014	0.0020	0.0063	0.0020	0.0055	0.0020	0.0081	0.0020	0.0099
Nitrogen/Nitrate	0.02	ND	0.02	0.03	0.02	0.06	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrate, Nitr	NR	NR	NR	NR	NR	NR	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrite	NR	NR	NR	NR	NR	NR	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	NR	NR	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.001	0.0047	0.0050	ND	0.001	0.0031	0.0025	0.0028	0.0025	ND	0.0025	0.0056	0.0025	ND
Silver	0.005	ND	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	10	25	10	43	10	36	25	120	10	42	20	80	20	95
Thallium	0.001	ND	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	17	1300	26	1100	26	1200	10	1000	10	1300	10	1200	10	1200
Vanadium	NR	NR	0.0080	0.012	0.005	0.0051	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.006	ND	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	NR	NR	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	NR	NR	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	6.93	NA	6.97	NA	6.87	NA	6.69	NA	6.68	NA	6.82	NA	7.20
Temperature	NA	17.25	NA	16.64	NA	16.30	NA	17.12	NA	17.95	NA	16.36	NA	14.02
Conductivity	NA	1.78	NA	1.63	NA	1.87	NA	1.42	NA	1.77	NA	1.66	NA	1.36
Dissolved Oxygen	NA	5.53	NA	2.86	NA	2.31	NA	0.50	NA	0.29	NA	0.44	NA	1.01
ORP	NA	-100	NA	-100	NA	-116.9	NA	-145.5	NA	-140.7	NA	-134.7	NA	-116.9

Sample: MW-07	5/29/2014		8/27/2014		10/29/2014		2/23/2015		5/11/2015		8/18/2015		11/16/2015	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	ND	0.0010	0.19	0.0010	0.31	0.0010	0.18	0.0010	0.18	0.0010	0.23	0.0010	0.13
Barium	0.0025	0.13	0.0025	0.52	0.0025	0.55	0.0025	0.61	0.0025	0.50	0.0025	0.49	0.0025	0.43
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.25	1.0	0.050	0.33	0.050	0.27	0.050	0.39	0.050	0.34	0.050	0.38	0.050	0.36
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	150	10	160 ^	10	150	10	130	10	170	10	140	10	160
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	0.0010	0.0070	0.0010	0.0046	0.0010	0.012	0.0010	0.0070	0.0010	0.0026	0.0010	0.0062
Copper	0.0020	ND	0.0020	ND ^	0.0020	ND	0.0020	0.0091	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.41	0.10	0.43	0.10	0.46	0.10	0.42	0.10	0.42	0.10	0.44	0.10	0.43
Iron	0.10	0.15	0.10	14	0.10	35	0.10	23	0.10	9.5	0.10	38	0.10	12
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0066	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	0.33	0.013	6.6	0.013	13	0.013	7.0	0.050	5.9	0.13	15	0.025	6.2
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	ND	0.0020	0.0072	0.0020	0.0045	0.0020	0.020	0.0020	0.0077	0.0020	0.0024	0.0020	0.0064
Nitrogen/Nitrate	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrate, Nitr	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND ^	0.10	ND
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	10	52	20	71	5.0	16	10	50	10	55	10	59	20	68
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	10	1200	10	1300	10	1300	10	1100	10	1100	10	1300	10	1100
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	0.0084	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	0.027	0.020	ND	0.020	ND	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00078
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.00238
pH	NA	6.67	NA	7.00	NA	6.94	NA	6.90	NA	6.88	NA	7.03	NA	6.60
Temperature	NA	17.66 *	NA	22.30	NA	14.31	NA	8.40	NA	17.66	NA	22.21	NA	13.34
Conductivity	NA	1.78	NA	1.87	NA	2.62	NA	1.37	NA	1.67	NA	2.18	NA	1.47
Dissolved Oxygen	NA	0.65	NA	0.47	NA	1.50	NA	2.66	NA	1.19	NA	0.75	NA	1.47
ORP	NA	-94.6	NA	-118.1	NA	-109.2	NA	-93.7	NA	-109.8	NA	-149.0	NA	-40.8

Sample: MW-07	2/24/2016		5/18/2016		8/19/2016		11/16/2016		2/16/2017		5/2/2017		8/24/2017		11/8/2017		3/6/2018		5/18/2018		8/10/2018	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.003	0.0032	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.0010	0.21	0.0010	0.13	0.0010	0.14	0.0010	0.18	0.0010	0.19	0.0010	0.12	0.001	0.15	0.001	0.17	0.001	0.073	0.001	0.16 V	0.001	0.17 V
Barium	0.0025	0.50	0.0025	0.46	0.0025	0.44	0.0025	0.51	0.0025	0.50	0.0025	0.41	0.0025	0.44	0.0025	0.49	0.0025	0.33	0.0025	0.5	0.0025	0.48
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.050	0.39	0.050	0.36	0.050	0.36	0.050	0.35	0.050	0.30	0.050	0.50	0.05	0.35	0.05	0.29	0.05	0.56	0.1	0.37	0.05	0.33
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	150	10	180	10	160	10	150	10	170	10	170	10	160	10	160	10	170	10	150	10	170
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.0010	0.0038	0.0010	0.0062	0.0010	0.0064	0.0010	0.0058	0.0010	0.0054	0.0010	0.0044	0.001	0.0052	0.001	0.0056	0.001	0.0038	0.001	0.0061	0.001	0.006
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.10	0.47	0.10	0.41	0.10	0.43	0.10	0.39	0.10	0.37	0.10	0.38	0.1	0.43	0.1	0.41	0.1	0.46	0.1	0.41	0.1	0.39
Iron	0.10	33	0.10	9.2	0.10	14	0.10	22	0.10	20	0.10	13	0.1	15	0.1	16	0.1	5.5	0.1	15	0.1	15
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.025	13	0.025	3.0	0.013	7.1	0.025	7.8	0.050	8.6	0.013	5.5	0.013	6.9	0.013	8.5	0.0025	3.9	0.005	6.6	0.013	7.7
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.0020	0.0052	0.0020	0.0069	0.0020	0.0066	0.0020	0.0055	0.0020	0.0054	0.0020	0.0050	0.002	0.0055	0.002	0.0058	0.002	0.0047	0.002	0.006	0.002	0.0059
Nitrogen/Nitrate	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrate, Nitr	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND ^	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0026	0.0025	0.0029	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	10	41	20	69	10	54	10	27	10	49	25	95	20	58	5	32	50	120	20	62	10	26
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	1300	10	1000	10	1400	10	1200	10	1200	10	1100	10	1100	10	1200	10	1100	10	1300	10	1200
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND ^	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0015	0.0025	0.002	0.0025	0.00077	0.0025	0.0011
pH	NA	6.80	NA	6.77	NA	6.62	NA	6.64	NA	6.83	NA	7.08	NA	6.75	NA	6.63	NA	7.01	NA	6.74	NA	6.83
Temperature	NA	10.72	NA	16.18	NA	21.90	NA	18.24	NA	16.29	NA	15.35	NA	17.40	NA	15.76	NA	9.19	NA	17.83	NA	21.77
Conductivity	NA	1.55	NA	1.47	NA	1.75	NA	1.61	NA	1.66	NA	1.43	NA	1.72	NA	1.59	NA	1.13	NA	1.52	NA	1.70
Dissolved Oxygen	NA	1.61	NA	2.26	NA	2.66	NA	2.07	NA	1.26	NA	3.06	NA	0.58	NA	4.41	NA	5.01	NA	7.09	NA	7.47
ORP	NA	-87.7	NA	-78.3	NA	-68.0	NA	-78.6	NA	-72.3	NA	-92.4	NA	-88.1	NA	-69.3	NA	-33.4	NA	-61.4	NA	-45.4

Sample: MW-07	10/29/2018		2/25/2019		5/1/2019		8/27/2019		11/12/2019		2/25/2020		4/27/2020		8/11/2020		12/9/2020		2/23/2021		5/10/2021	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	0.2	0.001	0.14	0.001	0.21	0.001	0.17	0.001	0.16	0.001	0.11	0.001	0.2	0.001	0.15	0.001	0.13	0.001	0.12	0.001	0.14
Barium	0.0025	0.5	0.0025	0.51	0.0025	0.45	0.0025	0.48	0.0025	0.44	0.0025	0.47	0.0025	0.49	0.0025	0.52	0.0025	0.49	0.0025	0.46	0.0025	0.47
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND ^+
Boron	0.05	0.31	0.05	0.33	0.1	0.58	0.05	0.38	0.05	0.58	0.05	0.53	0.05	0.44	0.05	0.59	0.05	0.46	0.05	0.47	0.05	0.34
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	160	10	170	10	170	10	170	10	150	10	170	10	170	10	170	10	170	10	150	10	130
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	0.0056	0.001	0.0058	0.001	0.0044	0.001	0.005	0.001	0.0043	0.001	0.0052	0.001	0.0052	0.001	0.0044	0.001	0.0056	0.001	0.0051	0.001	0.0054
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.005	ND	0.005	ND F1	0.005	0.0053
Fluoride	0.1	0.42	0.1	0.41	0.1	0.45	0.1	0.37	0.1	0.44	0.1	0.44	0.1	0.44	0.1	0.31	0.1	0.5	0.1	0.48	0.1	0.46 H
Iron	0.1	19	0.1	11	0.1	13	0.1	19	0.1	10	0.1	14	0.1	11	0.1	20	0.1	15	0.1	12	0.1	11
Lead	0.0005	ND	0.0005	0.0012	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.00054	0.0005	ND
Manganese	0.013	8.6	0.0025	4.9	0.005	5.9	0.013	7.5	0.013	5.3	0.013	11	0.013	5.1	0.013	7.3	0.013	5.2	0.0025	4.9	0.013	5.5
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	0.0053	0.002	0.0073	0.002	0.0055	0.002	0.0053	0.002	0.0054	0.002	0.0068	0.002	0.0064	0.002	0.005	0.002	0.0064	0.002	0.0061	0.002	0.0055
Nitrogen/Nitrate	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND H
Nitrogen/Nitrate, Nitr	0.1	ND	0.1	ND	0.1	ND ^	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	0.0041	0.0025	0.0077	0.0025	ND	0.0025	0.0094	0.0025	ND	0.0025	0.011	0.0025	0.0063	0.0025	ND	0.0025	0.0035	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	10	34	2	49	5	48	5	18	5	87	5	64	5	30	25	57	15	52	10	82	10	59
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	1300	10	1100	10	1100	10	1100	10	1100	10	1100	10	1100	60	1100	10	1000	10	1000	10	970
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.13	NA	6.61	NA	6.58	NA	6.68	NA	7.32	NA	6.64	NA	6.58	NA	6.55	NA	6.51	NA	6.76	NA	6.76
Temperature	NA	17.67	NA	16.20	NA	16.50	NA	18.80	NA	15.85	NA	15.50	NA	15.90	NA	16.20	NA	15.20	NA	14.80	NA	15.50
Conductivity	NA	1.67	NA	1.96	NA	1.26	NA	2.05	NA	1.77	NA	0.42	NA	1.69	NA	0.82	NA	0.23	NA	1.64	NA	1.91
Dissolved Oxygen	NA	3.48	NA	0.00	NA	0.25	NA	0.67	NA	0.55	NA	0.20	NA	0.31	NA	5.14	NA	0.29	NA	0.41	NA	0.23
ORP	NA	-41.0	NA	-103.7	NA	-127.6	NA	-102.7	NA	-113.0	NA	-162.0	NA	-153.6	NA	127.3	NA	-119.8	NA	-126.9	NA	-97.5

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NM - Not Measured

NR - Not Required
NS - Not Sampled
H - Prepped/analyzed past hold time
V - Serial Dilution Exceeds Control Limits

F1- MS and/or MSD Recovery outside of limits.
F2- MS/MSD RPD exceeds control limits.
^1+ - Initial Calibration Verification is outside acceptance limits, high biased
^+ - Continuing Calibration Verification is outside acceptance limits, high biased

^ - Denotes instrument related QC exceeds the control limits
* - Median Value (for temp)
* - LCS or LCSD is outside acceptance limits

Temperature °C degrees Celcius
Conductivity ms/cm millisiemens/centimeters
Dissolved Oxygen mg/L milligrams/liter
Oxygen Reduction Potential (ORP) mV millivolts

Sample: MW-08	Date	12/15/2010		3/25/2011		6/16/2011		9/19/2011		12/12/2011		3/19/2012		6/25/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	NP	0.0052	0.001	0.0039	0.001	0.0044	0.001	0.0036	0.001	0.0052	0.001	0.0038	0.001	0.004
Barium	2.0	NP	0.11	0.001	0.12	0.001	0.11	0.001	0.11	0.001	0.13	0.001	0.14	0.001	0.14
Beryllium	0.004	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	NP	0.93	0.01	0.72	0.012	0.64	0.01	0.82	0.01	0.82	0.01	0.57	0.01	0.57
Cadmium	0.005	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Chloride	200.0	NP	180	50	210	50	140	50	210	50	190	50	170	50	200
Chromium	0.1	NP	0.0059	0.004	0.0081	0.004	0.0059	0.004	0.0084	0.004	0.0053	0.004	ND	0.004	0.0056
Cobalt	1.0	NP	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Copper	0.65	NP	ND	0.003	ND	0.003	0.0036	0.003	0.0037	0.003	0.01	0.003	ND	0.003	ND
Cyanide	0.2	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Fluoride	4.0	NP	0.77	0.25	0.76	0.25	0.81	0.25	0.84	0.25	0.75	0.25	0.70	0.25	0.63
Iron	5.0	NP	0.56	0.010	2.1	0.010	1.7	0.010	0.97	0.010	0.94	0.010	2.3	0.010	1.2
Lead	0.0075	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Manganese	0.15	NP	0.15	0.001	0.27	0.001	0.29	0.001	0.18	0.001	0.2	0.001	0.27	0.001	0.2
Mercury	0.002	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	NP	0.011	0.005	0.013	0.005	0.0076	0.005	0.007	0.005	0.009	0.005	0.0054	0.005	0.0075
Nitrogen/Nitrate	10.0	NP	ND	0.02	ND	0.02	0.10	1.0	1.6	0.02	ND	0.02	ND	0.02	ND
Nitrogen/Nitrate, Nitr	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	NP	0.0036	0.001	0.0013	0.001	ND	0.001	0.0031	0.001	0.0036	0.001	0.0018	0.001	0.0018
Silver	0.05	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Sulfate	400.0	NP	160	50	240	50	140	50	200	50	200	50	300	50	440
Thallium	0.002	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Total Dissolved Soli	1,200	NP	890	17	990	17	970	17	940	17	990	17	1200	17	1200
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	NP	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	8.24	NA	8.17	NA	7.66	NA	8.24	NA	7.87	NA	7.97	NA	8.20
Temperature	NA	NA	19.95	NA	18.15	NA	18.82	NA	17.95	NA	19.20	NA	19.73	NA	18.28
Conductivity	NA	NA	1.62	NA	1.67	NA	1.61	NA	1.40	NA	1.47	NA	1.57	NA	1.65
Dissolved Oxygen	NA	NA	NM	NA	0.25	NA	0.08	NA	0.05	NA	0.03	NA	0.03	NA	0.06
ORP	NA	NA	NM	NA	-190.8	NA	-181.5	NA	-271	NA	-238	NA	-222	NA	-228

Sample: MW-08	9/18/2012		12/12/2012		2/27/2013		5/30/2013		7/31/2013		10/23/2013		3/3/2014	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	ND	0.0050	ND	0.003	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.001	0.0041	0.0050	0.0062	0.001	0.005	0.0010	0.0036	0.0010	0.0041	0.0010	0.0037	0.0010	0.0030
Barium	0.001	0.14	0.040	0.16	0.001	0.14	0.0025	0.14	0.0025	0.13	0.0025	0.13	0.0025	0.11
Beryllium	0.001	ND	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.01	1	0.40	0.93	0.01	1.1	0.050	0.91	0.050	1.2	0.050	0.93	0.050	0.83
Cadmium	0.001	ND	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	50	210	50	220	50	200	10	230	10	220	10	260	10	230
Chromium	0.004	0.0066	0.0030	0.012	0.004	0.0046	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.002	ND	0.0030	ND	0.002	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.003	0.0032	0.010	ND	0.003	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.0050	ND	0.0050	ND	0.005	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.25	0.53	0.25	0.63	0.25	0.28	0.10	0.74	0.10	0.68	0.10	0.74	0.10	0.67
Iron	0.010	1.3	0.010	2.1	0.01	6.5	0.10	2.3	0.10	6.6	0.10	1.3	0.10	0.89
Lead	0.001	ND	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.001	0.2	0.0020	0.23	0.001	0.43	0.0025	0.25	0.0025	0.48	0.0025	0.16	0.0025	0.20
Mercury	0.0002	ND	0.00020	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.005	0.009	0.010	ND	0.005	0.0057	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.02	ND	0.02	ND	0.02	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrate, Nitr	NR	NR	NR	NR	NR	NR	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrite	NR	NR	NR	NR	NR	NR	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	NR	NR	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.001	ND	0.0050	ND	0.001	0.002	0.0025	0.0029	0.0025	ND	0.0025	0.0048	0.0025	ND
Silver	0.005	ND	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	50	330	50	360	50	330	100	460	100	380	100	350	100	320
Thallium	0.001	ND	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	17	1200	26	1200	26	1100	10	1300	10	1300	10	1300	10	1200
Vanadium	NR	NR	0.0080	ND	0.005	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.006	ND	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	NR	NR	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	NR	NR	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	8.23	NA	8.09	NA	7.72	NA	7.81	NA	7.39	NA	8.16	NA	8.46
Temperature	NA	19.15	NA	18.34	NA	17.10	NA	18.11	NA	17.58	NA	15.62	NA	11.74
Conductivity	NA	1.79	NA	1.82	NA	1.78	NA	1.55	NA	1.60	NA	1.62	NA	1.29
Dissolved Oxygen	NA	0.09	NA	0.64	NA	0.33	NA	0.32	NA	0.16	NA	0.25	NA	1.19
ORP	NA	-231	NA	-210	NA	-183.8	NA	-225.9	NA	-182	NA	-225	NA	140.2

Sample: MW-08	5/28/2014		8/27/2014		10/28/2014		2/26/2015		5/11/2015		8/18/2015		11/18/2015	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	ND	0.0010	0.0025	0.0010	0.0022	0.0010	0.0026	0.0010	0.0024	0.0010	0.0024	0.0010	0.0021
Barium	0.0025	0.11	0.0025	0.13	0.0025	0.13	0.0025	0.12	0.0025	0.10	0.0025	0.092	0.0025	0.14
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.050	0.44	0.050	0.80	0.050	0.72	0.050	0.81	0.050	0.74	0.050	1.5	0.050	1.4
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	340	50	380 ^	10	340	10	260	10	270	10	250	10	160
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.0020	ND	0.0020	ND ^	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.65	0.10	0.73	0.10	0.71	0.10	0.63	0.10	0.66	0.10	0.34	0.10	0.44
Iron	0.10	0.24	0.10	0.62	0.10	0.53	0.10	0.17	0.10	0.12	0.10	0.85	0.10	0.89
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	0.70	0.0025	0.17	0.0025	0.13	0.0025	0.11	0.0025	0.11	0.0025	0.78	0.0025	0.21
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0040	0.0020	ND
Nitrogen/Nitrate	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrate, Nitr	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	100	300	50	240	50	290	50	160	50	160	50	310	100	530
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	10	1400	10	1400	10	1200	10	1100	10	1100	10	1200	10	1200
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00081
BETX	0.0025	ND	0.0025	ND	0.0025	0.0040	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.00281
pH	NA	7.72	NA	8.12	NA	7.89	NA	8.62	NA	7.90	NA	7.36	NA	7.61
Temperature	NA	19.53	NA	19.84	NA	16.22	NA	6.86	NA	15.81	NA	19.60	NA	14.72
Conductivity	NA	1.94	NA	1.95	NA	1.99	NA	1.19	NA	1.55	NA	1.86	NA	1.56
Dissolved Oxygen	NA	0.59	NA	0.51	NA	0.66	NA	1.22	NA	2.97	NA	1.03	NA	0.72
ORP	NA	-65.2	NA	-148.4	NA	-62.6	NA	-154.2	NA	-97.9	NA	-81.8	NA	-30.2

Sample: MW-08	2/25/2016		5/18/2016		8/17/2016		11/15/2016		2/16/2017		5/2/2017		8/29/2017		11/8/2017		3/7/2018		5/17/2018		8/8/2018	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.0010	0.0015	0.0010	0.0028	0.0010	0.0016	0.0010	ND	0.0010	ND ^	0.0010	0.0025	0.001	ND	0.001	0.0016	0.001	0.0038	0.001	ND	0.001	ND
Barium	0.0025	0.093	0.0025	0.17	0.0025	0.12	0.0025	0.068	0.0025	0.071	0.0025	0.12	0.0025	0.062	0.0025	0.11	0.0025	0.088	0.0025	0.055	0.0025	0.062
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.25	1.8	0.050	1.4	0.050	0.86	0.25	1.2	0.050	0.87	0.050	0.68	0.25	1.4	0.05	0.52	0.1	0.63	0.05	0.84	0.05	0.89
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	190	10	130	10	260	10	300	10	360	10	300	50	380	10	280	10	250	10	180	10	250
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.10	0.33	0.10	0.33	0.10	0.33	0.10	0.36	0.10	0.32	0.10	0.34	0.1	0.48	0.1	0.43	0.1	0.46	0.1	0.39	0.1	0.32
Iron	0.10	0.23	0.10	1.7	0.10	1.5	0.10	ND	0.10	0.26	0.10	2.4	0.1	ND	0.1	0.7	0.1	0.71	0.1	0.2	0.1	0.33
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.23	0.0025	0.23	0.0025	0.28	0.0025	0.38	0.0025	0.43	0.0025	0.58	0.0025	0.3	0.0025	0.33	0.0025	0.35	0.0025	0.16	0.0025	0.3
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	0.00025	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.0020	0.0038	0.0020	ND	0.0020	ND	0.0020	0.0024	0.0020	0.0026	0.0020	ND	0.002	0.0032	0.002	ND	0.002	ND	0.002	ND	0.002	0.0022
Nitrogen/Nitrate	0.10	0.19	0.10	ND	0.10	ND	0.10	0.44	0.10	ND	0.10	ND	0.1	1.3	0.1	ND	0.1	0.14	0.1	0.17	0.1	ND
Nitrogen/Nitrate, Nitr	0.10	0.19	0.10	ND	0.10	ND	0.10	0.44	0.10	ND	0.10	ND	0.1	1.3	0.1	ND	0.1	0.14	0.1	0.17	0.1	ND
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	0.034	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND ^	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	50	250	100	290	100	360	50	290	50	300	100	350	50	310	50	240	50	250	50	230	50	140
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	1100	10	1200	10	1400	10	1300	10	1400	10	1300	10	1500	10	1100	10	1100	10	1100	10	1100
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND ^	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	0.00068	0.0025	0.0015	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0013	0.0025	0.0017	0.0025	0.0013	0.0025	0.016
pH	NA	7.00	NA	7.67	NA	7.33	NA	6.90	NA	7.00	NA	7.30	NA	7.29	NA	7.27	NA	7.17	NA	6.79	NA	6.93
Temperature	NA	10.91	NA	19.30	NA	22.16	NA	16.05	NA	14.27	NA	14.28	NA	15.50	NA	14.04	NA	8.99	NA	18.33	NA	18.22
Conductivity	NA	1.32	NA	1.55	NA	1.80	NA	2.01	NA	1.89	NA	1.63	NA	1.81	NA	1.47	NA	1.22	NA	1.36	NA	1.59
Dissolved Oxygen	NA	1.09	NA	0.41	NA	2.22	NA	1.36	NA	2.26	NA	1.71	NA	1.89	NA	1.83	NA	1.28	NA	3.53	NA	4.71
ORP	NA	-46.8	NA	-139.2	NA	-96.6	NA	-24.8	NA	-41.8	NA	-110.0	NA	37.2	NA	-81.1	NA	-92.1	NA	-36.6	NA	-103.2

Sample: MW-08	10/31/2018		2/25/2019		5/1/2019		8/27/2019		11/13/2019		2/25/2020		5/19/2020		8/11/2020		12/9/2020		2/23/2021		5/11/2021	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	ND	0.001	0.0014	0.001	0.0023	0.001	ND	0.001	0.0017	0.001	0.0011	0.001	0.0027	0.001	ND	0.001	0.0016	0.001	0.0015	0.001	0.0014
Barium	0.0025	0.06	0.0025	0.064	0.0025	0.066	0.0025	0.11	0.0025	0.072	0.0025	0.08	0.0025	0.096	0.0025	0.1	0.0025	0.12	0.0025	0.1	0.0025	0.09
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND ^+
Boron	0.05	0.69	0.05	0.67	0.05	0.6	0.25	1.2	0.5	0.99	0.5	0.82	0.05	0.62	0.25	0.96	0.05	0.72	0.05	0.58	0.05	0.5
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND ^	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	220	10	100	2	73	10	100	10	80	10	78	10	130	10	220	10	200	10	130	10	100
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	0.1	0.36	0.1	0.36	0.1	0.35	0.1	0.22	0.1	0.34	0.1	0.35	0.1	0.37	0.1	0.26	0.1	0.38	0.1	0.36	0.1	0.36 H
Iron	0.1	0.2	0.1	0.44	0.1	1.4	0.1	0.61	0.1	1.6	0.1	2.5	0.1	3.5 ^	0.1	2.5	0.1	4	0.1	4.6	0.1	3.3
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.43	0.0025	0.32	0.0025	0.35	0.0025	0.5	0.0025	0.73	0.0025	0.77	0.0025	0.65	0.0025	0.65	0.0025	0.68	0.0025	0.74	0.0025	0.52
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	0.0026	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.12	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrate, Nitr	0.1	ND	0.1	ND	0.1	ND ^	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.12	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0053	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	50	130	130	130	5	88	20	280	5	110	5	59	25	86 H	25	110	15	88	25	69	15	110
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	1000	10	780	10	640	10	950	10	700	10	610	10	680	60	880	10	740	10	630	10	660
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.38	NA	7.13	NA	7.60	NA	6.92	NA	7.66	NA	7.43	NA	7.40	NA	7.09	NA	7.40	NA	7.70	NA	7.64
Temperature	NA	12.40	NA	13.30	NA	14.30	NA	15.00	NA	13.04	NA	14.10	NA	13.80	NA	14.40	NA	14.60	NA	14.30	NA	14.10
Conductivity	NA	1.22	NA	1.42	NA	0.70	NA	1.57	NA	1.14	NA	0.34	NA	0.23	NA	0.72	NA	1.37	NA	0.98	NA	1.15
Dissolved Oxygen	NA	2.59	NA	0.06	NA	0.13	NA	0.31	NA	0.45	NA	0.16	NA	0.24	NA	2.16	NA	0.12	NA	0.56	NA	0.12
ORP	NA	-35.5	NA	-38.6	NA	-176.8	NA	-19.3	NA	-90.5	NA	-191.8	NA	-231.6	NA	-57.9	NA	-194.7	NA	-178.0	NA	-174.6

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NM - Not Measured

NR - Not Required
NS - Not Sampled
H - Prepped/analyzed past hold time
V - Serial Dilution Exceeds Control Limits

F1- MS and/or MSD Recovery outside of limits.
F2- MS/MSD RPD exceeds control limits.
^1+ - Initial Calibration Verification is outside acceptance limits, high biased
^+ - Continuing Calibration Verification is outside acceptance limits, high biased

^ - Denotes instrument related QC exceeds the control limits
* - Median Value (for temp)
* - LCS or LCSD is outside acceptance limits

Temperature °C degrees Celcius
Conductivity ms/cm millisiemens/centimeters
Dissolved Oxygen mg/L milligrams/liter
Oxygen Reduction Potential (ORP) mV millivolts

Sample: MW-09	Date	12/16/2010		3/25/2011		6/16/2011		9/19/2011		12/12/2011		3/19/2012		6/25/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	NP	ND	0.001	0.0018	0.001	0.0017	0.001	ND	0.001	0.0012	0.001	ND	0.001	0.0017
Barium	2.0	NP	0.038	0.001	0.042	0.001	0.038	0.001	0.03	0.001	0.038	0.001	0.035	0.001	0.038
Beryllium	0.004	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	NP	2.1	0.01	1.9	0.012	1.9	0.01	2.5	0.01	2.7	0.01	2.6	0.01	2.6
Cadmium	0.005	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Chloride	200.0	NP	25	10	28	10	28	10	30	25	30	10	30	10	27
Chromium	0.1	NP	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Cobalt	1.0	NP	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Copper	0.65	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Cyanide	0.2	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Fluoride	4.0	NP	ND	0.25	0.31	0.25	0.34	0.25	0.25	0.25	ND	0.25	ND	0.25	ND
Iron	5.0	NP	ND	0.010	0.066	0.010	ND	0.010	ND	0.010	ND	0.010	0.014	0.010	ND
Lead	0.0075	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Manganese	0.15	NP	0.23	0.001	0.45	0.001	0.48	0.001	0.14	0.001	0.28	0.001	0.22	0.001	0.34
Mercury	0.002	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	NP	0.01	0.005	0.0093	0.005	0.0063	0.005	0.0065	0.005	0.0088	0.005	ND	0.005	ND
Nitrogen/Nitrate	10.0	NP	2.9	0.20	5.6	0.20	5.6	0.20	3.7	0.50	2.6	0.20	5.0	0.20	2.8
Nitrogen/Nitrate, Nitr	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	NP	0.0024	0.001	0.0072	0.001	0.0017	0.001	0.0043	0.001	0.0041	0.001	0.0072	0.001	0.0047
Silver	0.05	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Sulfate	400.0	NP	110	25	110	25	110	25	130	25	110	25	120	50	130
Thallium	0.002	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Total Dissolved Soli	1,200	NP	500	17	510	17	540	17	500	17	520	17	530	17	520
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	NP	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	7.22	NA	7.34	NA	7.10	NA	7.32	NA	6.31	NA	7.28	NA	7.30
Temperature	NA	NA	14.61	NA	13.19	NA	14.51	NA	14.08	NA	14.56	NA	18.11	NA	15.72
Conductivity	NA	NA	0.91	NA	0.85	NA	0.84	NA	0.66	NA	0.66	NA	0.73	NA	0.67
Dissolved Oxygen	NA	NA	NM	NA	0.27	NA	0.49	NA	0.16	NA	0.08	NA	0.07	NA	0.11
ORP	NA	NA	NM	NA	21.2	NA	148.2	NA	-268	NA	20	NA	68	NA	47

Sample: MW-09	9/18/2012		12/12/2012		2/27/2013		5/30/2013		7/30/2013		10/22/2013		3/3/2014	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	ND	0.0050	ND	0.003	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.001	ND	0.0050	ND	0.001	0.0013	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	0.0021
Barium	0.001	0.038	0.040	0.062	0.001	0.049	0.0025	0.042	0.0025	0.050	0.0025	0.048	0.0025	0.064
Beryllium	0.001	ND	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.01	2.9	1.0	3.2	0.01	4.3	0.050	3.2	0.050	2.5	0.050	1.6	0.050	1.7
Cadmium	0.001	ND	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	28	10	31	10	27	2.0	29	2.0	33	2.0	42	2.0	25
Chromium	0.004	ND	0.0030	0.01	0.004	0.0046	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND^
Cobalt	0.002	ND	0.0030	ND	0.002	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	0.0032
Copper	0.003	ND	0.010	ND	0.003	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND^
Cyanide	0.0050	ND	0.0050	ND	0.005	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.25	ND	0.25	0.3	0.25	ND	0.10	0.21	0.10	0.18	0.10	0.17	0.10	0.16
Iron	0.010	ND	0.010	ND	0.01	0.024	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.001	ND	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00051
Manganese	0.001	0.11	0.0020	0.1	0.001	0.19	0.0025	0.053	0.0025	0.038	0.0025	0.019	0.0025	0.84
Mercury	0.0002	ND	0.00020	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.005	0.0067	0.010	ND	0.005	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0045
Nitrogen/Nitrate	0.20	6.3	0.20	10	0.2	12	0.10	11	0.10	7.9	0.10	4.6	0.10	3.2
Nitrogen/Nitrate, Nitr	NR	NR	NR	NR	NR	NR	1.0	11	0.50	7.9	0.50	4.6	0.50	3.2
Nitrogen/Nitrite	NR	NR	NR	NR	NR	NR	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	NR	NR	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.001	0.0044	0.0050	0.009	0.001	0.015	0.0025	0.016	0.0025	0.014	0.0025	0.0047	0.0025	0.0030
Silver	0.005	ND	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	25	120	25	130	50	140	50	140	25	130	25	90	25	110
Thallium	0.001	ND	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	17	580	26	560	26	520	10	600	10	610	10	430	10	560
Vanadium	NR	NR	0.0080	ND	0.005	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND^
Zinc	0.006	ND	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	NR	NR	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	NR	NR	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.18	NA	7.10	NA	8.00	NA	7.21	NA	6.63	NA	7.19	NA	7.53
Temperature	NA	16.55	NA	13.91	NA	16.40	NA	17.38	NA	14.49	NA	14.68	NA	11.20
Conductivity	NA	0.72	NA	0.77	NA	0.82	NA	0.72	NA	0.76	NA	0.66	NA	0.66
Dissolved Oxygen	NA	0.56	NA	1.10	NA	0.87	NA	0.64	NA	0.29	NA	1.01	NA	1.27
ORP	NA	168	NA	210	NA	77.2	NA	-68.3	NA	117.2	NA	-159.8	NA	316.1

Sample: MW-09	5/29/2014		8/26/2014		10/30/2014		2/24/2015		5/12/2015		8/19/2015		11/18/2015	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.0025	0.044	0.0025	0.039	0.0025	0.047	0.0025	0.043	0.0025	0.026	0.0025	0.034	0.0025	0.023
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	ND
Boron	0.25	2.5	0.050	2.4	0.050	1.6	0.050	3.0	0.050	3.2	0.25	3.3	0.050	2.2
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	2.0	34	2.0	33	2.0	32	2.0	34	2.0	37	2.0	36	2.0	30
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.0020	ND	0.0020	ND ^	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.20	0.10	0.19	0.10	0.15	0.10	0.18	0.10	0.16	0.10	0.14	0.10	0.19
Iron	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	0.36	0.0025	0.031	0.0025	0.022	0.0025	0.024	0.0025	0.086	0.0025	0.020	0.0025	0.076
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.10	11	0.10	1.6	0.10	5.9	0.10	13	0.10	9.3	0.10	11	0.10	0.74
Nitrogen/Nitrate, Nitr	2.5	11	0.10	1.6	0.50	5.9	1.0	13	1.0	9.3	2.0	11	0.10	0.74
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	0.0074	0.0025	0.0061	0.0025	0.0084	0.0025	0.0091	0.0025	0.014	0.0025	0.010	0.0025	0.0028
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	25	110	25	100	50	160	25	130	50	140	50	160	25	130
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	10	540	10	490	10	630	10	570	10	620	10	670	10	410
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00089
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.00379
pH	NA	6.99	NA	7.09	NA	7.29	NA	7.53	NA	7.44	NA	7.35	NA	7.15
Temperature	NA	19.42	NA	20.80	NA	12.73	NA	11.65	NA	14.26	NA	18.58	NA	16.51
Conductivity	NA	0.78	NA	0.79	NA	1.05	NA	0.67	NA	0.79	NA	0.88	NA	0.67
Dissolved Oxygen	NA	2.11	NA	0.80	NA	1.52	NA	1.37	NA	2.20	NA	0.68	NA	1.42
ORP	NA	41.5	NA	22.3	NA	16.3	NA	25.0	NA	35.5	NA	-22.6	NA	72.9

Sample: MW-09	2/25/2016		5/19/2016		8/17/2016		11/17/2016		2/15/2017		5/3/2017		8/25/2017		11/8/2017		3/7/2018		5/16/2018		8/8/2018	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.003	0.0037	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	0.0043	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.034	0.0025	0.030	0.0025	0.036	0.0025	0.037	0.0025	0.038	0.0025	0.035	0.0025	0.046	0.0025	0.047	0.0025	0.055	0.0025	0.04	0.0025	0.038
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.25	2.3	0.050	1.5	0.050	2.7	0.50	3.8	0.050	3.0	0.050	3.4	0.5	3.8	0.05	3.4	1	4.1	1	4.1	1	4.4
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2.0	35	2.0	36	2.0	41	2.0	38	2.0	38	2.0	37	2	37	2	38	2	37	2	37	2	36
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.10	0.20	0.10	0.16	0.10	0.15	0.10	0.15	0.10	0.14	0.10	0.13	0.1	0.14	0.1	0.13	0.1	0.16	0.1	0.15	0.1	0.14
Iron	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.084	0.0025	0.079	0.0025	0.11	0.0025	0.10	0.0025	0.088	0.0025	0.12	0.0025	0.21	0.0025	0.16	0.0025	0.084	0.0025	0.085	0.0025	0.075
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.10	1.0	0.10	5.9	0.10	5.7	0.10	4.4	0.10	5.2	0.10	9.9	0.1	5.7	0.1	2.1	0.1	6.6	0.1	10	0.1	10
Nitrogen/Nitrate, Nitr	0.10	1.0	0.50	5.9	0.50	5.7	0.50	4.4	0.50	5.2	1.0	9.9	0.5	5.7	0.2	2.1	0.5	6.6	1	10	1	10
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	0.0047	0.0025	0.0034	0.0025	0.0035	0.0025	0.0063	0.0025	0.011	0.0025	0.0053	0.0025	ND	0.0025	0.0035	0.0025	0.0069	0.0025	0.0086
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	25	140	25	100	50	130	50	140	50	120	50	180	50	160	50	170	50	200	50	210	50	150
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	480	10	490	10	760	10	600	10	590	10	690	10	600	10	620	10	690	10	780	10	640
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND ^	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.00069
BETX	0.0025	0.00063	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0012	0.0025	ND	0.0025	0.01689
pH	NA	7.34	NA	7.30	NA	7.32	NA	7.37	NA	6.94	NA	7.48	NA	7.30	NA	6.92	NA	6.95	NA	7.83	NA	7.31
Temperature	NA	10.02	NA	20.82	NA	22.91	NA	17.20	NA	9.91	NA	13.52	NA	14.20	NA	14.50	NA	10.71	NA	16.88	NA	19.90
Conductivity	NA	0.55	NA	0.76	NA	0.85	NA	0.70	NA	0.65	NA	0.70	NA	0.76	NA	0.77	NA	0.65	NA	0.74	NA	0.83
Dissolved Oxygen	NA	1.47	NA	4.29	NA	2.87	NA	4.07	NA	2.52	NA	3.10	NA	0.17	NA	2.43	NA	1.91	NA	2.48	NA	5.67
ORP	NA	-37.1	NA	-54.3	NA	-76.3	NA	-40.5	NA	69.1	NA	-74.4	NA	127.0	NA	-51.7	NA	-43.0	NA	-20.5	NA	-73.1

Sample: MW-09	11/1/2018		2/27/2019		5/1/2019		8/28/2019		11/14/2019		2/25/2020		4/29/2020		8/12/2020		12/8/2020		2/24/2021		5/13/2021	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.042	0.0025	0.051	0.0025	0.039	0.0025	0.04	0.0025	0.044	0.0025	0.03	0.0025	0.033	0.0025	0.034	0.0025	0.037	0.0025	0.032	0.0025	0.03
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND
Boron	0.5	5.2	0.05	4.5	1	4.8	0.5	3.8	0.5	2.4	0.5	2.4	0.05	2.1	0.5	1.8	0.25	2.2	0.25	2.2	0.25	1.9
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2	39	2	37	2	39	2	36	2	32	2	38	2	35	2	34	2	33	2	32	2	32
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.005	ND *	0.005	ND	0.005	ND
Fluoride	0.1	0.16	0.1	0.16	0.1	0.17	0.1	0.14	0.1	0.18	0.1	0.2	0.1	0.19	0.1	0.17	0.1	0.23	0.1	0.2	0.1	0.18
Iron	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND ^	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.077	0.0025	0.19	0.0025	0.077	0.0025	0.077	0.0025	0.1	0.0025	0.1	0.0025	0.11	0.0025	0.08	0.0025	0.069	0.0025	0.096	0.0025	0.083
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	2.9	0.1	2.4	0.1	6.2	0.1	4.2	0.1	2.1	0.1	ND	0.1	1.7	0.1	5.9	0.1	0.83	0.1	1	0.1	2.1
Nitrogen/Nitrate, Nitr	0.2	2.9	0.5	2.4	0.5	6.2	0.5	4.2	0.5	2.1	0.5	ND	0.1	1.7	1	5.9	0.5	0.83	0.1	1	0.2	2.1
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	0.0026	0.0025	0.0028	0.0025	0.005	0.0025	0.0027	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	50	130	10	180	10	190	5	150	5	88	5	87	5	130 ^	25	120	15	64	25	80	25	120
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	700	10	630	10	630	10	610	10	500	10	400	10	520	30	480	10	220	10	360	10	370
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	0.00329	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.09	NA	7.13	NA	7.11	NA	7.34	NA	7.49	NA	7.23	NA	7.19	NA	7.22	NA	7.29	NA	7.35	NA	7.33
Temperature	NA	13.00	NA	14.80	NA	14.80	NA	13.70	NA	14.87	NA	15.10	NA	13.20	NA	12.50	NA	15.60	NA	14.50	NA	13.20
Conductivity	NA	0.75	NA	1.03	NA	0.64	NA	0.96	NA	0.79	NA	0.67	NA	0.72	NA	0.47	NA	0.24	NA	0.62	NA	0.79
Dissolved Oxygen	NA	2.21	NA	0.05	NA	0.23	NA	0.34	NA	5.80	NA	0.35	NA	0.24	NA	3.26	NA	0.53	NA	0.42	NA	0.10
ORP	NA	16.0	NA	22.5	NA	10.6	NA	38.5	NA	-36.5	NA	0.2	NA	-12.6	NA	112.4	NA	88.3	NA	4.7	NA	61.9

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NM - Not Measured

NR - Not Required
NS - Not Sampled
H - Prepped/analyzed past hold time
V - Serial Dilution Exceeds Control Limits

F1- MS and/or MSD Recovery outside of limits.
F2- MS/MSD RPD exceeds control limits.
^1+ - Initial Calibration Verification is outside acceptance limits, high biased
^+ - Continuing Calibration Verification is outside acceptance limits, high biased

^ - Denotes instrument related QC exceeds the control limits
* - Median Value (for temp)
* - LCS or LCSD is outside acceptance limits

Temperature °C degrees Celcius
Conductivity ms/cm millisiemens/centimeters
Dissolved Oxygen mg/L milligrams/liter
Oxygen Reduction Potential (ORP) mV millivolts

Attachment 9-3 Historical CCA Groundwater Data - Midwest Generation LLC, Powerton Station, Pekin, IL

Sample: MW-10	Date	12/15/2010		3/25/2011		6/16/2011		9/19/2011		12/12/2011		3/19/2012		6/25/2012		9/18/2012		12/12/2012		2/27/2013	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.0050	ND	0.003	ND
Arsenic	0.010	NP	ND	0.001	ND	0.001	0.0015	0.001	ND	0.001	ND	0.001	ND	0.001	0.0015	0.001	0.0014	0.0050	ND	0.001	0.001
Barium	2.0	NP	0.24	0.001	0.28	0.001	0.36	0.001	0.25	0.001	0.26	0.001	0.26	0.001	0.27	0.001	0.23	0.040	0.24	0.001	0.22
Beryllium	0.004	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0010	ND	0.001	ND
Boron	2.0	NP	0.48	0.01	0.48	0.012	0.52	0.01	0.42	0.01	0.57	0.01	0.54	0.01	0.54	0.01	0.42	0.40	0.46	0.01	0.64
Cadmium	0.005	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0010	ND	0.001	ND
Chloride	200.0	NP	40	10	43	10	43	10	49	10	42	10	45	10	46	10	45	10	45	10	37
Chromium	0.1	NP	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.0030	0.0048	0.004	0.0064
Cobalt	1.0	NP	0.0026	0.002	0.0027	0.002	0.0039	0.002	0.0025	0.002	0.0026	0.002	0.0024	0.002	0.0029	0.002	0.0029	0.0030	ND	0.002	0.0021
Copper	0.65	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	0.0041	0.003	ND	0.003	ND	0.003	ND	0.010	ND	0.003	ND
Cyanide	0.2	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND
Fluoride	4.0	NP	ND	0.25	0.30	0.25	0.36	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	0.28	0.25	ND
Iron	5.0	NP	ND	0.010	ND	0.010	0.044	0.010	ND	0.010	ND	0.010	ND	0.010	0.015	0.010	0.012	0.010	0.016	0.01	ND
Lead	0.0075	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0050	ND	0.001	ND
Manganese	0.15	NP	2.1	0.001	2.8	0.001	3.8	0.001	2.3	0.001	2.3	0.001	2.3	0.001	2.6	0.001	2.5	0.040	2.2	0.001	1.9
Mercury	0.002	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.00020	ND	0.0002	ND
Nickel	0.1	NP	0.015	0.005	0.016	0.005	0.015	0.005	0.01	0.005	0.013	0.005	0.0091	0.005	0.0093	0.005	0.014	0.010	ND	0.005	0.0079
Nitrogen/Nitrate	10.0	NP	3.0	0.20	4.0	0.20	2.1	0.20	4.5	0.20	4.9	0.20	6.0	0.20	2.9	0.20	5.2	0.20	4.8	0.2	3.3
Nitrogen/Nitrate, Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	NP	0.0042	0.001	0.0064	0.001	0.0043	0.001	0.0057	0.001	0.0065	0.001	0.0056	0.001	0.0056	0.001	0.0058	0.0050	0.0074	0.001	0.0083
Silver	0.05	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.010	ND	0.005	ND
Sulfate	400.0	NP	62	10	64	10	67	10	64	10	72	10	76	10	63	10	58	10	59	10	69
Thallium	0.002	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0010	ND	0.001	ND
Total Dissolved Solids	1,200	NP	530	17	520	17	650	17	470	17	540	17	530	17	550	17	580	26	420	26	440
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0080	ND	0.005	ND
Zinc	5.0	NP	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.020	ND	0.006	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.005	ND	0.005	ND
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.03	ND	0.03	ND
pH	6.5 - 9.0	NA	7.04	NA	7.01	NA	6.88	NA	7.04	NA	6.03	NA	7.03	NA	6.95	NA	6.96	NA	7.03	NA	8.39
Temperature	NA	NA	11.72	NA	11.98	NA	14.25	NA	11.76	NA	11.05	NA	14.51	NA	13.49	NA	12.84	NA	11.87	NA	11.60
Conductivity	NA	NA	0.99	NA	0.92	NA	1.04	NA	0.62	NA	0.65	NA	0.71	NA	0.67	NA	0.67	NA	0.60	NA	0.70
Dissolved Oxygen	NA	NA	NM	NA	0.29	NA	0.08	NA	0.02	NA	0.04	NA	0.02	NA	0.04	NA	0.10	NA	2.07	NA	0.49
ORP	NA	NA	NM	NA	106.4	NA	132.3	NA	-297	NA	23	NA	118	NA	67	NA	107	NA	60	NA	33.2

Sample: MW-10	5/29/2013		7/31/2013		10/23/2013		3/6/2014		5/30/2014		8/28/2014		10/30/2014		2/23/2015		5/14/2015		8/18/2015		11/18/2015		2/24/2016		5/18/2016		8/19/2016		11/16/2016		2/15/2017		5/2/2017	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	0.0012	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	0.0011	0.0010	ND	0.0010	ND	0.0010	0.0012	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND
Barium	0.0025	0.30	0.0025	0.18	0.0025	0.23	0.0025	0.31	0.0025	0.25	0.0025	0.28	0.0025	0.13	0.0025	0.17	0.0025	0.23	0.0025	0.14	0.0025	0.17	0.0025	0.18	0.0025	0.25	0.0025	0.17	0.0025	0.17	0.0025	0.19	0.0025	0.28
Beryllium	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND
Boron	0.050	0.98	0.050	1.9	0.050	0.61	0.050	2.1	0.25	3.2	0.050	1.9	0.050	0.84	0.050	0.83	0.050	0.64	0.050	0.42	0.050	0.30	0.050	0.40	0.050	0.38	0.050	0.35	0.050	0.37	0.050	0.48	0.050	0.49
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	2.0	41	2.0	40	2.0	54	2.0	40	2.0	37	2.0	57	2.0	62	2.0	22	2.0	52	2.0	55	2.0	53	2.0	48	2.0	44	2.0	44	2.0	44	2.0	44	2.0	44
Chromium	0.0050	0.0061	0.0050	ND	0.0050	ND	0.0050	ND^	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	0.012	0.0010	0.0019	0.0010	0.0025	0.0010	0.0037	0.0010	0.0012	0.0010	0.0034	0.0010	0.0015	0.0010	0.0019	0.0010	0.0019	0.0010	0.0013	0.0010	0.0017	0.0010	0.0020	0.0010	0.0020	0.0010	0.0018	0.0010	0.0016	0.0010	0.0018	0.0010	0.0029
Copper	0.0020	0.028	0.0020	ND	0.0020	ND	0.0020	0.0020^	0.0020	ND	0.0020	ND ^	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0021	0.0020	0.0022
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	0.024	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.18	0.10	0.18	0.10	0.17	0.10	0.20	0.10	0.18	0.10	0.20	0.10	0.18	0.10	0.17	0.10	0.21	0.10	0.17	0.10	0.17	0.10	0.17	0.10	0.18	0.10	0.18	0.10	0.17	0.10	0.16	0.10	0.18
Iron	0.10	2.7	0.10	ND	0.10	0.18	0.10	0.19	0.10	0.11	0.10	0.34	0.10	ND	0.10	0.22	0.10	0.34	0.10	ND	0.10	0.13	0.10	0.20	0.10	ND	0.10	0.15	0.10	ND	0.10	0.22	0.10	ND
Lead	0.00050	0.012	0.00050	ND	0.00050	ND	0.00050	0.00080	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00058	0.00050	ND
Manganese	0.0025	3.2	0.0025	1.5	0.0025	2.0	0.0025	3.1	0.0025	1.6	0.0025	2.1	0.0025	1.1	0.0025	1.3	0.0025	1.7	0.0025	0.94	0.0025	1.4	0.0025	1.6	0.0025	2.3	0.0025	1.4	0.0025	1.3	0.0025	1.1	0.0025	3.3
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	0.023	0.0020	0.0037	0.0020	0.0051	0.0020	0.0073	0.0020	0.0038	0.0020	0.0046	0.0020	0.0028	0.0020	0.0045	0.0020	0.0049	0.0020	0.0024	0.0020	0.0030	0.0020	0.0046	0.0020	0.0045	0.0020	0.0034	0.0020	0.0027	0.0020	0.0043	0.0020	0.0065
Nitrogen/Nitrate	0.10	1.9	0.10	1.5	0.10	1.2	0.10	2.0	0.10	2.1	0.10	0.41	0.10	0.67	0.10	0.90	0.10	1.2	0.10	2.8	0.10	1.3	0.10	3.1	0.10	2.2	0.10	1.7	0.10	0.54	0.10	0.20	0.10	0.22
Nitrogen/Nitrate, Nitrite	0.20	1.9	0.10	1.6	0.10	1.2	0.50	2.0	0.50	2.1	0.10	0.43	0.10	0.71	0.10	0.94	0.10	1.2	0.20	2.9	0.10	1.3	0.20	3.2	0.50	2.2	0.20	1.8	0.10	0.58	0.10	0.20	0.10	0.22
Nitrogen/Nitrite	0.020	ND	0.020	0.056	0.020	0.034	0.020	ND	0.020	0.028	0.020	0.022	0.020	0.039	0.020	0.038	0.020	0.032	0.020	0.077	0.020	ND	0.020	0.056	0.020	0.025	0.020	0.051	0.020	0.043	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	0.0043	0.0025	0.0087	0.0025	0.0080	0.0025	ND	0.0025	0.0073	0.0025	0.0057	0.0025	0.0048	0.0025	0.0028	0.0025	0.0050	0.0025	0.0054	0.0025	0.0033	0.0025	0.0043	0.0025	0.0048	0.0025	0.0041	0.0025	0.0032	0.0025	ND ^	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	25	92	25	150	25	90	50	160	50	140	25	110	25	95	10	46	10	50	20	64	20	110	20	88	20	67	20	59	10	62	10	43	20	44
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	10	580	10	550	10	620	10	670	10	630	10	590	10	550	10	530	10	530	10	550	10	500	10	540	10	580	10	600	10	480	10	470	10	640
Vanadium	0.0050	0.012	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND ^	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.00055	0.0025	0.00066	0.0025	0.0011	0.0025	ND	0.0025	0.0027	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	6.87	NA	6.85	NA	7.02	NA	7.90	NA	7.09	NA	6.74	NA	7.16	NA	7.36	NA	7.13	NA	7.46	NA	6.74	NA	6.71	NA	6.72	NA	6.69	NA	7.02	NA	6.88	NA	6.93
Temperature	NA	14.99	NA	13.28	NA	11.61	NA	10.63	NA	18.61 *	NA	15.79	NA	11.11	NA	5.22	NA	13.91	NA	23.06	NA	13.70	NA	7.22	NA	13.24	NA	17.04	NA	18.18	NA	9.67	NA	12.94
Conductivity	NA	0.69	NA	0.71	NA	0.70	NA	0.63	NA	0.93	NA	0.83	NA	1.04	NA	0.56	NA	0.70	NA	0.86	NA	0.67	NA	0.59	NA	0.70	NA	0.68	NA	0.64	NA	0.57	NA	0.72
Dissolved Oxygen	NA	0.39	NA	0.19	NA	0.50	NA	1.00	NA	3.29	NA	0.77	NA	0.64	NA	3.45	NA	0.88	NA	2.21	NA	2.01	NA	0.99	NA	1.62	NA	2.38	NA	2.51	NA	3.56	NA	2.40
ORP	NA	63.9	NA	20.8	NA	-138.7	NA	-65.7	NA	-39.0	NA	-0.5	NA	-86.1	NA	20.3	NA	-4.0	NA	-56.8	NA	70.3	NA	4.2	NA	30.6	NA	-76.5	NA	-20.3	NA	-34.4	NA	-73.9

Sample: MW-10	8/24/2017		11/9/2017		3/7/2018		5/16/2018		8/8/2018		10/30/2018		2/26/2019		5/1/2019		8/27/2019		11/12/2019		2/25/2020		4/28/2020		8/11/2020		12/8/2020		2/23/2021		5/11/2021	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	0.0035	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	0.0041	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.0013	0.001	ND	0.001	ND	0.001	0.0011	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.19	0.0025	0.2	0.0025	0.2	0.0025	0.17	0.0025	0.19	0.0025	0.2	0.0025	0.25	0.0025	0.19	0.0025	0.16	0.0025	0.24	0.0025	0.21	0.0025	0.21	0.0025	0.2	0.0025	0.22	0.0025	0.18	0.0025	0.2
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND ^+
Boron	0.05	0.33	0.05	0.34	0.05	0.45	0.05	0.41	0.05	0.37	0.05	0.32	0.05	0.35	0.05	0.41	0.05	0.26	0.05	0.31	0.05	1.3	0.05	0.94	0.25	1	0.5	2.3	0.05	0.97	0.05	0.59
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2	50	2	49	2	42	2	45	2	57	2	54	2	49	2	48	2	50	2	44	2	47	2	40	2	42	2	45	4	42	10	56
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	0.0019	0.001	0.0021	0.001	0.0015	0.001	0.0015	0.001	0.0024	0.001	0.0058	0.001	0.0028	0.001	0.0017	0.001	0.0015	0.001	0.0027	0.001	0.0023	0.001	0.0018	0.001	0.0021	0.001	0.002	0.001	0.0016	0.001	0.0019
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0061	0.002	0.0027	0.002	ND	0.002	ND	0.002	0.0026	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.005	ND *	0.005	ND	0.005	ND
Fluoride	0.1	0.18	0.1	0.17	0.1	0.21	0.1	0.19	0.1	0.19	0.1	0.2	0.1	0.22	0.1	0.22	0.1	0.19	0.1	0.24	0.1	0.21	0.1	0.23	0.1	0.19	0.1	0.26	0.1	0.25	0.1	0.21 H
Iron	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.88	0.1	1.5	0.1	0.1	0.1	ND	0.1	0.13	0.1	0.26	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.11
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.0027	0.0005	0.0015	0.0005	ND	0.0005	ND	0.0005	0.00068	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	1.5	0.0025	1.7	0.0025	2	0.0025	1.4	0.0025	1.7	0.0025	1.9	0.0025	2.6	0.0025	1.9	0.0025	1.3	0.0025	2.7	0.0025	1.9	0.0025	2	0.0025	1.9	0.0025	1.9	0.0025	1.3	0.0025	1.7
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	0.0035	0.002	0.004	0.002	0.0044	0.002	0.0031	0.002	0.0037	0.002	0.0065	0.002	0.0079	0.002	0.0042	0.002	0.0031	0.002	0.0055	0.002	0.0048	0.002	0.0041	0.002	0.0033	0.002	0.0039	0.002	0.0032	0.002	0.0031
Nitrogen/Nitrate	0.1	1.9	0.1	2.9	0.1	2.3	0.1	1.1	0.1	2	0.1	0.64	0.1	ND	0.1	1.2	0.1	2.2	0.1	1.6	0.1	4	0.1	3.6	0.1	1.5	0.1	2.6	0.1	4.2	0.1	4.7
Nitrogen/Nitrate, Nitrite	0.1	1.9	0.2	2.9	0.2	2.3	0.1	1.2	0.2	2.1	0.1	0.68	0.1	ND	0.1	1.2	0.5	2.3	0.1	1.6	0.1	4.1	0.5	3.6	0.1	1.5	0.5	2.6	0.5	4.3	0.5	4.7
Nitrogen/Nitrite	0.02	0.047	0.02	0.034	0.02	ND	0.02	0.052	0.02	0.055	0.02	0.04	0.02	ND	0.02	0.036	0.02	0.053	0.02	0.02	0.02	0.061	0.02	0.046	0.02	ND	0.02	0.044	0.02	0.055	0.02	0.048
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND ^	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	0.0049	0.0025	0.0034	0.0025	0.0041	0.0025	0.0051	0.0025	0.0072	0.0025	0.0031	0.0025	ND	0.0025	0.0062	0.0025	0.0056	0.0025	0.006	0.0025	0.0045	0.0025	0.0077	0.0025	0.0048	0.0025	0.0032	0.0025	0.0035	0.0025	0.005
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	10	50	20	50	25	55	25	67	20	44	20	48	2	37	5	32	5	32	5	49	5	63	5	67 ^	25	57	15	71	10	64	25	58
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	10	500	10	470	10	520	10	490	10	460	10	550	10	500	10	470	10	420	10	530	10	520	10	460	30	480	10	450	10	430	10	530
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	0.008	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND ^	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.00053	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	0.0017	0.0025	0.00098	0.0025	ND	0.0025	0.00273	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.14	NA	6.78	NA	6.71	NA	7.64	NA	7.10	NA	7.65	NA	6.77	NA	6.81	NA	7.09	NA	7.72	NA	6.82	NA	6.80	NA	6.85	NA	7.11	NA	7.08	NA	7.01
Temperature	NA	15.50	NA	11.00	NA	8.66	NA	17.00	NA	18.02	NA	16.86	NA	11.80	NA	12.60	NA	14.10	NA	12.61	NA	11.80	NA	12.30	NA	12.90	NA	12.30	NA	12.80	NA	13.00
Conductivity	NA	0.63	NA	0.58	NA	0.51	NA	0.57	NA	0.65	NA	0.64	NA	0.96	NA	0.49	NA	0.19	NA	0.84	NA	0.79	NA	0.24	NA	0.90	NA	0.19	NA	0.71	NA	0.89
Dissolved Oxygen	NA	0.19	NA	3.69	NA	2.33	NA	3.34	NA	8.49	NA	8.63	NA	0.01	NA	0.24	NA	0.48	NA	1.30	NA	0.26	NA	0.22	NA	2.35	NA	0.16	NA	0.57	NA	0.15
ORP	NA	136.7	NA	-95.1	NA	-36.1	NA	-62.9	NA	-116.4	NA	-62.8	NA	118.0	NA	7.2	NA	10.1	NA	-37.0	NA	-14.5	NA	8.6	NA	26.1	NA	33.9	NA	22.4	NA	137.2

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NM - Not Measured
NR - Not Required
NS - Not Sampled
H - Prepped/analyzed past hold time
V - Serial Dilution Exceeds Control Limits
F1 - MS and/or MSD Recovery outside of limits.
F2 - MS/MSD RPD exceeds control limits.
^1+ - Initial Calibration Verification is outside acceptance limits, high biased
^+ - Continuing Calibration Verification is outside acceptance limits, high biased
^ - Denotes instrument related QC exceeds the control limits
* - Median Value (for temp)
* - LCS or LCSD is outside acceptance limits

Temperature — °C — degrees Celcius
Conductivity — ms/cm[c] — millisiemens/centimeters
Dissolved Oxygen — mg/L — milligrams/liter
Oxygen Reduction Potential (ORP) — mV — millivolts

Sample: MW-11	Date	12/16/2010		2/15/2011		6/16/2011		9/19/2011		12/12/2011		3/19/2012		6/25/2012		9/18/2012		12/12/2012		2/27/2013		5/30/2013		7/30/2013	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	NP	ND	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.0050	ND	0.003	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	NP	0.0021	NP	0.0025	0.001	0.0019	0.001	0.0016	0.001	0.0019	0.001	0.0021	0.001	0.0032	0.001	0.0038	0.0050	0.03	0.001	0.045	0.0010	0.028	0.0010	0.038
Barium	2.0	NP	0.17	NP	0.11	0.001	0.18	0.001	0.11	0.001	0.11	0.001	0.13	0.001	0.17	0.001	0.22	0.20	ND	0.001	0.2	0.0025	0.15	0.0025	0.19
Beryllium	0.004	NP	ND	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND
Boron	2.0	NP	1.6	NP	1.8	0.012	1.6	0.01	1.5	0.01	1.8	0.01	2.3	0.01	1.9	0.01	2.6	2.0	ND	0.01	1.4	0.050	1.3	0.050	1.5
Cadmium	0.005	NP	ND	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND
Chloride	200.0	NP	70	NP	66	50	120	25	53	50	87	10	54	25	150	10	52	50	83	10	84	10	79	10	110
Chromium	0.1	NP	ND	NP	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	0.0051	0.004	ND	0.0030	0.015	0.004	0.0099	0.0050	ND	0.0050	ND
Cobalt	1.0	NP	0.0028	NP	0.0041	0.002	0.0024	0.002	ND	0.002	ND	0.002	0.0024	0.002	0.0039	0.002	0.0049	0.0030	0.0041	0.002	0.0028	0.0010	0.0020	0.0010	0.0023
Copper	0.65	NP	0.0032	NP	0.0032	0.003	0.0043	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	0.0049	0.010	ND	0.003	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	NP	ND	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.010	ND	0.010	ND
Fluoride	4.0	NP	0.53	NP	0.56	0.25	0.67	0.25	0.58	0.25	0.44	0.25	0.42	0.25	0.32	0.25	0.56	0.25	0.64	0.25	0.43	0.10	0.79	0.10	0.80
Iron	5.0	NP	0.44	NP	0.01	0.010	0.029	0.010	0.018	0.010	ND	0.010	ND	0.010	0.056	0.010	2.0	0.010	0.7	0.01	2.4	0.10	3.1	0.10	3.9
Lead	0.0075	NP	ND	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.0023	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND
Manganese	0.15	NP	3.2	NP	3.6	0.001	2.9	0.001	2.2	0.001	2.5	0.001	2.9	0.001	3.7	0.001	4.7	0.20	12	0.001	11	0.025	7.5	0.0025	8.0
Mercury	0.002	NP	ND	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.00020	ND	0.0002	ND	0.00020	ND	0.00020	ND
Nickel	0.1	NP	0.019	NP	0.016	0.005	0.013	0.005	0.011	0.005	0.013	0.005	0.011	0.005	0.013	0.005	0.017	0.010	ND	0.005	0.0088	0.0020	0.0026	0.0020	0.0033
Nitrogen/Nitrate	10.0	NP	0.41	NP	0.17	0.02	0.04	0.02	0.74	0.02	1.5	0.02	0.39	0.02	ND	0.20	4.6	0.02	0.39	0.02	0.33	0.10	1.1	0.10	ND
Nitrogen/Nitrate, Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.10	1.1	0.10	ND
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.020	ND	0.020	ND
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0040	ND	0.0040	ND
Selenium	0.05	NP	0.0026	NP	0.0015	0.001	0.0018	0.001	0.004	0.001	0.0031	0.001	0.0039	0.001	0.0039	0.001	0.004	0.0050	ND	0.001	0.0014	0.0025	ND	0.0025	ND
Silver	0.05	NP	ND	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	NP	170	NP	160	50	210	25	140	50	160	50	130	100	320	25	170	50	200	50	150	50	240	50	280
Thallium	0.002	NP	ND	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	1,200	NP	740	NP	710	17	930	17	620	17	730	17	740	17	1000	17	760	26	970	26	840	10	850	10	980
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0080	ND	0.005	ND	0.0050	ND	0.0050	ND
Zinc	5.0	NP	0.012	NP	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	0.0073	0.020	ND	0.006	ND	0.020	ND	0.020	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.88	NA	7.13	NA	7.02	NA	7.31	NA	6.48	NA	7.32	NA	7.15	NA	7.30	NA	7.28	NA	8.27	NA	6.99	NA	7.08
Temperature	NA	NA	12.61	NA	13.66	NA	17.58	NA	14.67	NA	13.85	NA	16.31	NA	15.74	NA	17.90	NA	13.95	NA	14.20	NA	17.00	NA	16.66
Conductivity	NA	NA	1.27	NA	1.14	NA	1.44	NA	0.85	NA	0.89	NA	0.98	NA	1.26	NA	0.96	NA	1.22	NA	1.30	NA	1.19	NA	1.22
Dissolved Oxygen	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	3.73	NA	5.16	NA	2.54	NA	3.55	NA	0.28	NA	0.20
ORP	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	0.47	NA	43	NA	-60	NA	-113.2	NA	-147.5	NA	-144.2

Sample: MW-11	10/22/2013		3/4/2014		5/29/2014		8/26/2014		10/28/2014		2/24/2015		5/12/2015		8/19/2015		11/19/2015		2/26/2016		5/20/2016		8/17/2016		11/17/2016		2/16/2017		5/3/2017	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	0.038	0.0010	0.057	0.0010	0.036	0.0010	0.068	0.0010	0.045	0.0010	0.022	0.0010	0.052	0.0010	0.027	0.0010	0.015	0.0010	0.0097	0.0010	0.011	0.0010	0.015	0.0010	0.0071	0.0010	0.0077	0.0010	0.0065
Barium	0.0025	0.18	0.0025	0.22	0.0025	0.16	0.0025	0.21	0.0025	0.19	0.0025	0.16	0.0025	0.16	0.0025	0.15	0.0025	0.15	0.0025	0.17	0.0025	0.21	0.0025	0.14	0.0025	0.19	0.0025	0.17	0.0025	0.21
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND
Boron	0.050	1.2	0.050	1.1	0.25	1.4	0.050	0.97	0.050	0.89	0.050	1.7	0.050	1.3	0.050	2.0	0.050	1.5	0.25	1.8	0.050	1.2	0.050	1.1	0.25	1.0	0.050	1.3	0.050	1.1
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	79	2.0	67	2.0	70	10	120	10	91	2.0	66	2.0	65	2.0	60	2.0	60	10	120	10	130	10	83	10	130	10	120	10	160
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	0.0025	0.0010	ND	0.0010	0.0017	0.0010	0.0017	0.0010	0.0017	0.0010	0.0023	0.0010	0.0017	0.0010	0.0021	0.0010	0.0021	0.0010	0.0020	0.0010	0.0020	0.0010	0.0018	0.0010	0.0024	0.0010	0.0021	0.0010	0.0024
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.75	0.10	0.64	0.10	0.64	0.10	0.71	0.10	0.71	0.10	0.66	0.10	0.79	0.10	0.61	0.10	0.56	0.10	0.53	0.10	0.50	0.10	0.55	0.10	0.45	0.10	0.44	0.10	0.42
Iron	0.10	3.3	0.10	5.8	0.10	3.8	0.10	5.5	0.10	5.0	0.10	2.0	0.10	4.2	0.10	2.2	0.10	1.5	0.10	1.2	0.10	1.1	0.10	1.8	0.10	0.80	0.10	0.80	0.10	0.88
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	7.3	0.013	7.9	0.013	8.0	0.013	8.4	0.013	6.6	0.025	5.5	0.050	7.8	0.025	5.9	0.0025	4.1	0.0025	3.6	0.0025	3.9	0.0025	4.2	0.0025	4.0	0.0025	3.7	0.0025	4.1
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	0.0036	0.0020	0.0024	0.0020	ND	0.0020	ND	0.0020	0.0023	0.0020	0.0042	0.0020	ND	0.0020	0.0028	0.0020	0.0031	0.0020	0.0045	0.0020	0.0038	0.0020	0.0028	0.0020	0.0040	0.0020	0.0036	0.0020	0.0046
Nitrogen/Nitrate	0.10	0.18	0.10	0.34	0.10	0.27	0.10	ND	0.10	ND	0.10	ND	0.10	0.52	0.10	0.20	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrate, Nitrite	0.10	0.18	0.10	0.34	0.10	0.27	0.10	ND	0.10	ND^	0.10	ND	0.10	0.52	0.10	0.20	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	ND ^	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	50	180	50	210	50	170	50	200	50	200	25	120	20	130	50	150	50	210	50	260	50	280	50	210	100	390	100	270	100	410
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	10	770	10	760	10	660	10	860	10	790	10	700	10	710	10	750	10	630	10	890	10	950	10	920	10	1100	10	980	10	1300
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND ^	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0013	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.00086	0.0025	0.0041	0.0025	0.00058	0.0025	0.0019	0.0025	ND	0.0025	0.00053	0.0025	ND	0.0025	ND
pH	NA	7.23	NA	8.00	NA	7.10	NA	7.12	NA	7.37	NA	7.55	NA	7.33	NA	7.25	NA	7.06	NA	7.25	NA	7.10	NA	7.08	NA	7.21	NA	6.62	NA	7.36
Temperature	NA	13.33	NA	9.77	NA	19.35	NA	22.73	NA	16.12	NA	10.59	NA	16.31	NA	20.65	NA	13.73	NA	11.18	NA	15.78	NA	24.68	NA	21.29	NA	10.32	NA	14.30
Conductivity	NA	1.10	NA	0.92	NA	1.19	NA	1.38	NA	1.34	NA	0.91	NA	1.17	NA	1.21	NA	0.95	NA	0.96	NA	1.13	NA	1.41	NA	1.32	NA	1.03	NA	1.30
Dissolved Oxygen	NA	0.76	NA	2.38	NA	0.32	NA	0.98	NA	0.71	NA	2.74	NA	1.62	NA	0.57	NA	0.85	NA	1.10	NA	2.65	NA	1.84	NA	2.86	NA	2.00	NA	5.21
ORP	NA	-141.3	NA	-108.3	NA	-126.2	NA	-138.8	NA	-126.3	NA	-110.5	NA	-146.8	NA	-115.3	NA	-40.7	NA	-100.5	NA	-123.5	NA	-115.7	NA	-93.7	NA	-24.3	NA	-98.5

Sample: MW-11	8/29/2017		11/9/2017		3/8/2018		5/16/2018		8/9/2018		11/1/2018		2/27/2019		5/1/2019		8/28/2019		11/14/2019		2/26/2020		4/29/2020		8/12/2020		12/8/2020		2/25/2021		5/13/2021	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	0.0016	0.001	0.0056	0.001	0.0036	0.001	0.0045	0.001	0.011	0.001	0.064	0.001	0.015	0.001	0.0068	0.001	0.0041	0.001	0.013	0.001	0.0087	0.001	0.0081	0.001	0.0075	0.001	0.0085	0.001	0.0073	0.001	0.011
Barium	0.0025	0.043	0.0025	0.14	0.0025	0.11	0.0025	0.17	0.0025	0.19	0.0025	0.28	0.0025	0.19	0.0025	0.11	0.0025	0.11	0.0025	0.14	0.0025	0.16	0.0025	0.14	0.0025	0.13	0.0025	0.15	0.0025	0.15	0.0025	0.15
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND
Boron	0.25	2.1	0.05	1.9	1	3.4	0.5	2.4	0.25	1.6	0.05	1.3	0.05	1.5	0.25	3.2	0.25	2.5	0.25	1.7	0.25	1.4	0.05	1.3	0.25	1.5	0.25	1.3	0.25	1.3	0.25	1.1
Cadmium	0.0005	0.00059	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	86	2	70	2	41	10	86	10	120	10	92	10	100	2	62	2	50	2	75	2	100	10	110	10	84	10	91	10	120	6	120
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	0.0021	0.001	0.0011	0.001	0.0026	0.001	0.0022	0.001	0.0029	0.001	0.0022	0.001	0.0011	0.001	0.0016	0.001	0.0015	0.001	0.0018	0.001	0.0015	0.001	0.0015	0.001	0.0016	0.001	0.0017	0.001	0.0016
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0048	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	0.0056	0.005	ND *	0.005	ND	0.005	0.0053
Fluoride	0.1	0.56	0.1	0.56	0.1	0.45	0.1	0.56	0.1	0.58	0.1	0.61	0.1	0.54	0.1	0.62	0.1	0.53	0.1	0.54	0.1	0.55	0.1	0.6	0.1	0.52	0.1	0.67	0.1	0.64	0.1	0.66
Iron	0.1	0.8	0.1	0.44	0.1	ND	0.1	0.12	0.1	1.4	0.1	10	0.1	1.7	0.1	0.23	0.1	ND	0.1	1.1	0.1	1.1	0.1	0.64	0.1	1.1	0.1	1.3	0.1	0.95	0.1	1.3
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.65	0.0025	3.7	0.0025	1.9	0.0025	4.9	0.0025	4.4	0.0025	4.6	0.0025	4	0.0025	2.1	0.0025	3	0.0025	3.2	0.0025	3.3	0.0025	2.7	0.0025	3.5	0.0025	3.4	0.0025	3.3	0.0025	3.4
Mercury	0.0002	0.00024	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	0.0028	0.002	0.003	0.002	ND	0.002	0.0038	0.002	0.0038	0.002	0.0045	0.002	0.0037	0.002	0.0024	0.002	0.0028	0.002	0.0028	0.002	0.004	0.002	0.0033	0.002	0.0023	0.002	0.0034	0.002	0.0033	0.002	0.0025
Nitrogen/Nitrate	0.1	0.73	0.1	2.6	0.1	5.1	0.1	1.1	0.1	0.42	0.1	ND	0.1	ND	0.1	3.6	0.1	1.9	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrate, Nitrite	0.1	0.73 F1 F2	0.2	2.6	0.5	5.2	0.1	1.1	0.1	0.42	0.1	ND	0.1	ND	0.5	3.6	0.1	1.9	0.1	ND	0.1	ND ^	0.1	ND	0.1	ND	0.1	ND ^+	0.1	ND	0.1	ND
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	0.13	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND ^	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	100	310	50	250	50	170	100	280	100	310	50	170	20	320	10	210	5	160	20	230	20	350	50	300	25	210	50	210	25	240	25	240
Thallium	0.002	0.0038	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	10	1000	10	820	10	650	10	1100	10	1100	10	970	10	1100	10	740	10	710	10	880	10	1000	10	1100	30	750	10	780	10	890	10	830
Vanadium	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND ^	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	0.0007	0.0025	0.00065	0.0025	0.0058	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.23	NA	6.96	NA	7.11	NA	7.89	NA	7.24	NA	7.49	NA	7.05	NA	7.08	NA	7.19	NA	7.43	NA	7.18	NA	7.08	NA	6.95	NA	7.26	NA	7.26	NA	7.26
Temperature	NA	17.20	NA	12.16	NA	9.18	NA	19.41	NA	21.43	NA	14.03	NA	12.90	NA	15.90	NA	17.00	NA	14.82	NA	15.20	NA	15.50	NA	16.50	NA	14.70	NA	15.50	NA	16.90
Conductivity	NA	1.18	NA	1.10	NA	0.66	NA	1.02	NA	1.26	NA	1.15	NA	1.53	NA	0.85	NA	1.25	NA	1.39	NA	1.39	NA	0.30	NA	0.60	NA	0.22	NA	1.21	NA	1.42
Dissolved Oxygen	NA	0.14	NA	3.21	NA	1.42	NA	1.86	NA	3.28	NA	7.23	NA	0.15	NA	0.26	NA	0.30	NA	0.58	NA	0.16	NA	0.20	NA	3.83	NA	0.16	NA	0.35	NA	0.11
ORP	NA	-49.5	NA	-76.5	NA	-83.8	NA	-52.7	NA	-62.5	NA	-26.9	NA	-83.6	NA	-50.1	NA	-23.5	NA	-105.0	NA	-131.1	NA	-126.3	NA	-98.6	NA	-154.4	NA	-109.5	NA	-101.1

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NM - Not Measured
NR - Not Required
NS - Not Sampled
H - Prepped/analyzed past hold time
V - Serial Dilution Exceeds Control Limits
F1 - MS and/or MSD Recovery outside of limits.
F2 - MS/MSD RPD exceeds control limits.
^1+ - Initial Calibration Verification is outside acceptance limits, high biased
^+ - Continuing Calibration Verification is outside acceptance limits, high biased
^ - Denotes instrument related QC exceeds the control limits
* - Median Value (for temp)
* - LCS or LCSD is outside acceptance limits

Temperature — °C — degrees Celcius
Conductivity — ms/cm[c] — millisiemens/centimeters
Dissolved Oxygen — mg/L — milligrams/liter
Oxygen Reduction Potential (ORP) — mV — millivolts

Sample: MW-12	Date	12/15/2010		2/15/2011		6/16/2011		9/19/2011		12/12/2011		3/19/2012		6/25/2012		9/18/2012		12/12/2012		2/27/2013		5/30/2013		7/29/2013	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0030	ND	0.0030	ND
Arsenic	0.010	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0010	0.0031	0.0010	0.016
Barium	2.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0025	0.091	0.0025	0.092
Beryllium	0.004	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0010	ND ^	0.0010	ND
Boron	2.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.050	3.7	0.050	1.1
Cadmium	0.005	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00050	ND	0.00050	ND
Chloride	200.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10	200	10	190
Chromium	0.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0050	ND	0.0050	ND
Cobalt	1.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0010	ND	0.0010	ND
Copper	0.65	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0020	ND	0.0020	ND
Cyanide	0.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.010	ND	0.010	ND
Fluoride	4.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.10	0.62	0.10	0.56
Iron	5.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.10	8.9	0.10	4.5
Lead	0.0075	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00050	ND	0.00050	ND
Manganese	0.15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0025	0.24	0.0025	1.3
Mercury	0.002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00020	ND	0.00020	ND
Nickel	0.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0020	ND	0.0020	0.0029
Nitrogen/Nitrate	10.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.10	ND	0.10	ND
Nitrogen/Nitrate, Nitrite	NA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.10	ND	0.10	ND
Nitrogen/Nitrite	NA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.020	ND	0.020	ND
Perchlorate	0.0049	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0040	ND	0.0040	ND
Selenium	0.05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0025	ND	0.0025	ND
Silver	0.05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00050	ND	0.00050	ND
Sulfate	400.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100	410	100	420
Thallium	0.002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0020	ND	0.0020	ND
Total Dissolved Solids	1,200	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10	1200	10	1200
Vanadium	0.049	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0050	ND	0.0050	ND
Zinc	5.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.020	ND	0.020	ND
Benzene	0.005	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00050	ND	0.00050	ND
BETX	11.705	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NA	7.17	NA	7.29
Temperature	NA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NA	21.42	NA	17.93
Conductivity	NA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NA	1.63	NA	1.47
Dissolved Oxygen	NA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NA	1.04	NA	0.25
ORP	NA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NA	-146.5	NA	-85.9

Sample: MW-12	10/22/2013		3/4/2014		5/29/2014		8/26/2014		10/28/2014		2/24/2015		5/12/2015		8/19/2015		11/19/2015		2/26/2016		5/20/2016		8/18/2016		11/18/2016		2/16/2017		5/3/2017	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	0.018	0.0010	0.0025	0.0010	0.0017	0.0010	0.0021	0.0010	0.0019	0.0010	ND	0.0010	0.0034	0.0010	0.0025	0.0010	0.0033	0.0010	0.0020	0.0010	0.0045 F1	0.0010	0.0038	0.0010	0.013	0.0010	0.0022	0.0010	0.0020
Barium	0.0025	0.087	0.0025	0.086	0.0025	0.073	0.0025	0.066	0.0025	0.063	0.0025	0.070	0.0025	0.071	0.0025	0.083	0.0025	0.091	0.0025	0.060	0.0025	0.094	0.0025	0.092	0.0025	0.096	0.0025	0.059	0.0025	0.074
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^	0.0010	ND
Boron	0.050	1.1	0.050	0.41	0.050	0.69	0.050	0.73	0.050	0.59	0.050	0.58	0.050	0.59	0.050	1.5	0.050	0.94	0.050	0.57	0.050	0.50	0.050	0.75	0.10	0.81	0.050	0.40	0.050	0.50
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	180	10	220	10	220	10	210	10	200	10	210	10	230	10	220	10	220	10	210	10	200 F1	10	210	10	180	10	190	10	190
Chromium	0.0050	ND	0.0050	ND^	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.0020	ND	0.0020	ND^	0.0020	ND	0.0020	ND ^	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.51	0.10	0.56	0.10	0.42	0.10	0.54	0.10	0.54	0.10	0.58	0.10	0.52	0.10	0.59	0.10	0.58	0.10	0.41	0.10	0.48	0.10	0.53	0.10	0.53	0.10	0.42	0.10	0.37
Iron	0.10	0.23	0.10	2.4	0.10	0.39	0.10	0.17	0.10	0.33	0.10	1.7	0.10	0.48	0.10	2.2	0.10	0.61	0.10	0.88	0.10	1.2	0.10	1.5	0.10	2.2	0.10	0.76	0.10	2.1
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	1.5	0.0025	0.23	0.0025	0.65	0.0025	1.2	0.0025	1.2	0.0025	0.17	0.0025	0.63	0.0025	0.16	0.0025	1.2	0.0025	0.065	0.0025	0.51	0.0025	1.0	0.0025	0.96	0.0025	0.079	0.0025	0.081
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	0.0028	0.0020	0.0020	0.0020	0.0026	0.0020	0.0033	0.0020	0.0031	0.0020	0.0031	0.0020	0.0022	0.0020	0.0020	0.0020	0.0023	0.0020	0.0020	0.0020	ND	0.0020	0.0037	0.0020	ND	0.0020	0.0022	0.0020	ND
Nitrogen/Nitrate	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrate, Nitrite	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND^	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.31	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	0.048	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	0.024	0.020	ND	0.020	ND	0.040	0.22	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND F1	0.0025	ND	0.0025	ND ^	0.0025	ND ^	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	100	270	100	530	100	560	100	310	100	420	100	450	100	530	100	390	100	750	100	580	100	570	100	600	100	300	100	550	100	450
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	10	1000	10	1400	10	1300 H	10	1100	10	1000	10	1300	10	1400	10	1300	10	1400	10	1300	10	1300	10	1700	10	1300	10	1200	10	1200
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND ^	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0013	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0061	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.73	NA	7.99	NA	7.14	NA	7.37	NA	7.33	NA	7.61	NA	7.49	NA	7.43	NA	7.12	NA	7.96	NA	7.28	NA	7.06	NA	7.34	NA	7.54	NA	7.47
Temperature	NA	14.78	NA	11.22	NA	19.48	NA	22.71	NA	16.37	NA	6.11	NA	18.19	NA	19.48	NA	14.85	NA	9.04	NA	15.14	NA	24.40	NA	17.01	NA	11.48	NA	14.00
Conductivity	NA	1.20	NA	1.30	NA	1.73	NA	1.69	NA	1.55	NA	1.24	NA	1.76	NA	1.74	NA	1.59	NA	1.29	NA	1.55	NA	1.91	NA	1.39	NA	1.34	NA	1.29
Dissolved Oxygen	NA	0.20	NA	1.43	NA	1.59	NA	0.36	NA	0.36	NA	1.29	NA	1.87	NA	1.13	NA	1.49	NA	1.31	NA	2.73	NA	2.81	NA	1.51	NA	1.68	NA	3.77
ORP	NA	-205.6	NA	-91.9	NA	-23.6	NA	-49.2	NA	6.0	NA	-80.6	NA	-55.7	NA	-109.9	NA	36.6	NA	-134	NA	-91.4	NA	8.9	NA	-110.1	NA	1.9	NA	-74.9

Sample: MW-12	8/29/2017		11/10/2017		3/8/2018		5/16/2018		8/9/2018		11/1/2018		2/27/2019		5/1/2019		8/28/2019		11/14/2019		2/26/2020		4/29/2020		8/12/2020		12/8/2020		2/25/2021		5/13/2021	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	0.0082	0.001	0.015	0.001	0.0026	0.001	0.0015	0.001	0.0057	0.001	0.0063	0.001	0.0015	0.001	0.002	0.001	0.0045	0.001	0.01	0.001	ND	0.001	ND ^	0.001	0.0059	0.001	0.0079	0.001	ND	0.001	ND
Barium	0.0025	0.12	0.0025	0.096	0.0025	0.065	0.0025	0.067	0.0025	0.061	0.0025	0.058	0.0025	0.044	0.0025	0.052	0.0025	0.057	0.0025	0.058	0.0025	0.028	0.0025	0.035	0.0025	0.051	0.0025	0.053	0.0025	0.031	0.0025	0.053
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND
Boron	0.25	1.5	0.05	0.77	0.05	0.39	0.05	0.45	0.05	0.67	0.05	0.64	0.05	0.4	0.05	0.44	0.05	0.57	0.05	0.67	0.05	0.24	0.05	0.37	0.05	0.5	0.05	0.56	0.05	0.31	0.05	0.34
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	180	10	170	10	180	10	180	10	180	10	150	10	160	10	170	10	180	10	150	10	140	10	150 F1	10	150	10	160	10	130	10	140
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	0.0013	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.005	ND *	0.005	ND	0.005	ND
Fluoride	0.1	0.53	0.1	0.51	0.1	0.5	0.1	0.48	0.1	0.45	0.1	0.48	0.1	0.44	0.1	0.38	0.1	0.41	0.1	0.47	0.1	0.31	0.1	0.34	0.1	0.48	0.1	0.57	0.1	0.27	0.1	0.19
Iron	0.1	1.1	0.1	2.2	0.1	1.1	0.1	1.1	0.1	1.1	0.1	0.23	0.1	0.88	0.1	0.94	0.1	1	0.1	0.92	0.1	0.28	0.1	0.64	0.1	1.7	0.1	0.77	0.1	0.61	0.1	0.69
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	2.7	0.0025	1.2	0.0025	0.098	0.0025	0.066	0.0025	0.77	0.0025	0.84	0.0025	0.11	0.0025	0.042	0.0025	0.42	0.0025	0.69	0.0025	0.029	0.0025	0.043	0.0025	0.52	0.0025	0.55	0.0025	0.046	0.0025	0.079
Mercury	0.0002	0.00026	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	0.0026	0.002	ND	0.002	ND	0.002	ND	0.002	0.0024	0.002	0.002	0.002	0.0029	0.002	ND	0.002	0.0043	0.002	0.0028	0.002	ND	0.002	ND	0.002	ND	0.002	0.002	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	0.11	0.1	ND	0.1	ND	0.1	ND	0.1	1	0.1	0.27	0.1	ND	0.1	ND	0.1	0.13	0.1	ND	0.1	ND	0.1	ND	0.1	0.98	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrate, Nitrite	0.1	0.14	0.1	ND	0.1	ND	0.1	ND	0.1	1	0.1	0.72	0.1	ND	0.1	ND	0.1	0.13	0.1	ND	0.1	ND ^	0.1	ND	0.1	0.98	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrite	0.02	0.027	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.1	0.45	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND ^	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0025	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND ^	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	100	520	100	370	100	610	250	660	100	360	100	260	20	390	20	360	20	390	20	360 F1	20	250	50	350	100	370	50	320	100	270	50	340
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	10	1400	10	1100	10	1300	10	1600	10	1200	10	1100	10	1000	10	1000	10	1200	10	1100	10	800	10	1000	60	1000	10	920	10	850	10	920
Vanadium	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	0.00056	0.0025	0.0011	0.0025	0.00067	0.0025	ND	0.0025	0.00259	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.34	NA	7.38	NA	7.20	NA	8.12	NA	7.42	NA	7.70	NA	7.43	NA	7.68	NA	7.37	NA	7.61	NA	8.00	NA	7.96	NA	7.18	NA	7.36	NA	7.91	NA	7.39
Temperature	NA	17.30	NA	14.47	NA	9.07	NA	23.82	NA	20.87	NA	13.39	NA	12.20	NA	14.00	NA	15.10	NA	14.41	NA	8.80	NA	10.00	NA	13.20	NA	14.00	NA	9.90	NA	11.10
Conductivity	NA	1.48	NA	1.27	NA	1.13	NA	1.59	NA	1.57	NA	1.19	NA	1.60	NA	0.99	NA	1.70	NA	1.52	NA	1.16	NA	1.33	NA	0.63	NA	0.29	NA	0.95	NA	1.45
Dissolved Oxygen	NA	0.87	NA	1.33	NA	1.54	NA	4.53	NA	5.89	NA	6.50	NA	0.05	NA	0.25	NA	0.57	NA	1.10	NA	0.18	NA	0.24	NA	3.94	NA	0.16	NA	0.45	NA	0.18
ORP	NA	-59.0	NA	-96.9	NA	-23.0	NA	-38.9	NA	-32.6	NA	-11.6	NA	-110.4	NA	-179.2	NA	-0.3	NA	-60.7	NA	-193.5	NA	-220.4	NA	-79.4	NA	-78.8	NA	-160.7	NA	-70.4

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NM - Not Measured
NR - Not Required
NS - Not Sampled
H - Prepped/analyzed past hold time
V - Serial Dilution Exceeds Control Limits
F1 - MS and/or MSD Recovery outside of limits.
F2 - MS/MSD RPD exceeds control limits.
^1+ - Initial Calibration Verification is outside acceptance limits, high biased
^+ - Continuing Calibration Verification is outside acceptance limits, high biased
^ - Denotes instrument related QC exceeds the control limits
* - Median Value (for temp)
* - LCS or LCSD is outside acceptance limits

Temperature — °C — degrees Celcius
Conductivity — ms/cm[c] — millisiemens/centimeters
Dissolved Oxygen — mg/L — milligrams/liter
Oxygen Reduction Potential (ORP) — mV — millivolts

Attachment 9-3 Historical CCA Groundwater Data - Midwest Generation LLC, Powerton Station, Pekin, IL

Sample: MW-13	Date	12/15/2010	2/15/2011	4/25/2011	6/16/2011	8/9/2011	10/13/2011	12/12/2011	4/10/2012	12/14/2012	2/28/2013	5/30/2013	7/30/2013	10/22/2013	3/4/2014	5/28/2014	8/27/2014	10/29/2014	2/26/2015	5/13/2015	8/19/2015	11/19/2015	2/24/2016	5/19/2016	8/18/2016	11/17/2016	2/17/2017	5/4/2017	8/24/2017	11/9/2017	3/7/2018	5/16/2018	8/9/2018	10/31/2018	2/28/2019	5/2/2019	8/28/2019	11/14/2019	2/26/2020	4/30/2020	8/11/2020	12/10/2020	2/24/2021	5/13/2021
[illegible]																																												

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater. All values are in mg/L (ppm) unless otherwise noted.
DL - Detection limit; NA - Not Applicable; ND - Not Detected; NM - Not Measured; NR - Not Required; NS - Not Sampled; H - Prepped/analyzed past hold time; V - Serial Dilution Exceeds Control Limits; F1- MS and/or MSD Recovery outside of limits; F2- MS/MSD RPD exceeds control limits; ^1+ - Initial Calibration Verification is outside acceptance limits, high biased; ^+ - Continuing Calibration Verification is outside acceptance limits, high biased; ^ - Denotes instrument related QC exceeds the control limits; * - Median Value (for temp); * - LCS or LCSD is outside acceptance limits
Temperature °C degrees Celcius; Conductivity ms/cm^c millisiemens/centimeters; Dissolved Oxygen mg/L milligrams/liter; Oxygen Reduction Potential (ORP) mV millivolts

Sample: MW-14	Date	12/15/2010		2/15/2011		4/25/2011		6/16/2011		8/9/2011		10/13/2011		12/12/2011		4/10/2012		12/14/2012		2/27/2013		5/30/2013		7/30/2013		10/23/2013		3/4/2014	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
[illegible]																													
pH	6.5 - 9.0	NA	7.55	NA	7.75	NA	7.27	NA	7.15	NA	7.08	NA	7.40	NA	6.05	NA	8.35	NA	7.13	NA	8.21	NA	7.03	NA	6.93	NA	7.11	NA	7.72
Temperature	NA	NA	17.28	NA	14.52	NA	16.04	NA	17.94	NA	18.65	NA	16.54	NA	14.74	NA	15.10	NA	15.06	NA	14.50	NA	17.22	NA	16.52	NA	13.59	NA	12.83
Conductivity	NA	NA	2.61	NA	2.42	NA	2.44	NA	2.60	NA	2.74	NA	2.07	NA	2.00	NA	2.92	NA	2.06	NA	1.72	NA	1.98	NA	2.17	NA	2.10	NA	1.74
Dissolved Oxygen	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	2.00	NA	3.88	NA	0.72	NA	0.31	NA	0.51	NA	1.55
ORP	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	80	NA	127	NA	5.9	NA	2.8	NA	-146.8	NA	-77.3

Sample: MW-14	5/28/2014		8/28/2014		10/29/2014		2/26/2015		5/13/2015		8/19/2015		11/18/2015		2/24/2016		5/19/2016		8/18/2016		11/17/2016		2/17/2017		5/4/2017		8/29/2017		11/9/2017		3/7/2018	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
[illegible]																																
pH	NA	6.99	NA	7.17	NA	7.31	NA	7.28	NA	7.04	NA	7.30	NA	7.03	NA	7.05	NA	7.03	NA	6.78	NA	6.80	NA	7.17	NA	7.23	NA	7.02	NA	6.81	NA	6.83
Temperature	NA	17.53	NA	20.10	NA	14.66	NA	6.67	NA	16.35	NA	21.01	NA	17.89	NA	10.84	NA	16.54	NA	22.91	NA	17.82	NA	15.94	NA	12.98	NA	17.10	NA	13.13	NA	8.07
Conductivity	NA	2.00	NA	2.83	NA	3.49	NA	1.89	NA	2.98	NA	2.90	NA	2.62	NA	1.81	NA	2.02	NA	2.53	NA	2.86	NA	3.22	NA	2.85	NA	2.72	NA	2.57	NA	2.23
Dissolved Oxygen	NA	0.42	NA	0.37	NA	0.66	NA	4.11	NA	1.03	NA	1.15	NA	0.59	NA	2.50	NA	2.16	NA	3.44	NA	1.49	NA	3.18	NA	4.79	NA	1.00	NA	3.81	NA	3.32
ORP	NA	-26.4	NA	-41.2	NA	-105.4	NA	52.4	NA	9.8	NA	-30.6	NA	67.6	NA	-8.6	NA	-13.5	NA	-128.8	NA	5.1	NA	-4.9	NA	-64.1	NA	37.4	NA	-32.9	NA	-7.1

Sample: MW-14	5/17/2018		8/9/2018		10/31/2018		2/28/2019		5/2/2019		8/2/2019		11/14/2019		2/26/2020		4/30/2020		8/11/2020		12/10/2020		2/24/2021		5/12/2021	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
[illegible]																										
pH	NA	6.78	NA	7.18	NA	7.48	NA	6.88	NA	6.86	NA	6.92	NA	7.33	NA	6.97	NA	6.82	NA	6.80	NA	6.73	NA	7.20	NA	7.13
Temperature	NA	16.95	NA	20.77	NA	13.09	NA	13.60	NA	14.40	NA	15.70	NA	14.88	NA	14.80	NA	14.60	NA	16.00	NA	15.70	NA	15.20	NA	15.20
Conductivity	NA	1.85	NA	2.15	NA	1.79	NA	3.58	NA	2.53	NA	0.26	NA	3.01	NA	2.54	NA	2.36	NA	0.78	NA	2.53	NA	2.07	NA	2.35
Dissolved Oxygen	NA	4.00	NA	4.66	NA	4.70	NA	0.37	NA	0.39	NA	0.29	NA	0.48	NA	0.24	NA	0.27	NA	8.57	NA	1.73	NA	1.05	NA	0.15
ORP	NA	86.0	NA	-25.6	NA	-3.7	NA	-18.4	NA	-72.3	NA	18.1	NA	-66.0	NA	-93.1	NA	-58.6	NA	60.6	NA	63.0	NA	-12.9	NA	70.3

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Temperature °C degrees Celcius; Conductivity ms/cm^c millisiemens/centimeters; Dissolved Oxygen mg/L milligrams/liter; Oxygen Reduction Potential (ORP) mV millivolts

Sample: MW-15	Date	12/15/2010		2/15/2011		4/25/2011		6/16/2011		8/9/2011		10/13/2011		12/12/2011		4/10/2012		12/14/2012		2/28/2013		5/30/2013		7/30/2013		10/23/2013		3/6/2014	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	NP	ND	NP	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.0050	ND	0.003	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	NP	0.0099	NP	0.0092	0.001	0.0064	0.001	0.0052	0.001	0.0053	0.001	0.011	0.001	0.0097	0.001	0.0061	0.0050	0.011	0.001	0.0078	0.0010	0.0037	0.0010	0.0046	0.0010	0.0066	0.0010	0.0072
Barium	2.0	NP	0.058	NP	0.052	0.001	0.061	0.001	0.11	0.001	0.057	0.001	0.06	0.001	0.063	0.001	0.075	0.0020	0.11	0.001	0.096	0.0025	0.11	0.0025	0.080	0.0025	0.12	0.0025	0.098
Beryllium	0.004	NP	ND	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND
Boron	2.0	NP	1.6	NP	1.4	0.01	1.5	0.01	1.6	0.01	1.3	0.02	1.2	0.01	1.2	0.01	1.4	2.0	ND	0.01	1.7	0.050	1.5	0.050	1.6	0.050	1.2	0.050	1.1
Cadmium	0.005	NP	ND	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	NP	180	NP	190	25	190	50	170	25	210	100	180	100	200	50	200	50	220	50	200	10	210	10	220	10	210	10	240
Chromium	0.1	NP	0.0042	NP	0.0061	0.004	0.0092	0.004	0.0054	0.004	0.0091	0.004	0.0062	0.004	0.0062	0.004	0.0071	0.0030	0.012	0.004	0.0062	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND^
Cobalt	1.0	NP	ND	NP	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.0030	ND	0.002	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	NP	ND	NP	ND	0.003	0.0039	0.003	0.005	0.003	0.0041	0.003	0.0037	0.003	0.0031	0.003	0.0039	0.010	ND	0.003	0.0036	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND^
Cyanide	0.2	NP	ND	NP	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	4.0	NP	0.69	NP	0.75	0.25	0.60	0.25	0.73	0.25	0.76	0.25	0.77	0.25	0.75	0.25	0.79	0.25	0.95	0.25	0.29	0.10	0.65	0.10	0.78	0.10	0.71	0.10	0.78
Iron	5.0	NP	3.3	NP	2.4	0.010	2.1	0.010	0.70	0.010	2.1	0.010	2.6	0.010	2.1	0.010	1.1	0.010	1.9	0.01	1.5	0.10	0.83	0.10	1.3	0.10	1.1	0.10	2.0
Lead	0.0075	NP	ND	NP	ND	0.001	0.0012	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.15	NP	0.56	NP	0.42	0.001	0.36	0.001	0.6	0.001	0.37	0.001	0.48	0.001	0.39	0.001	0.25	0.0020	0.51	0.001	0.35	0.0025	0.27	0.0025	0.30	0.0025	0.43	0.0025	0.59
Mercury	0.002	NP	ND	NP	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.00020	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.1	NP	0.013	NP	0.011	0.005	0.012	0.005	0.015	0.005	0.01	0.005	0.011	0.005	0.011	0.005	0.01	0.010	ND	0.005	0.0079	0.0020	0.0072	0.0020	0.0063	0.0020	0.0052	0.0020	0.0034
Nitrogen/Nitrate	10.0	NP	0.03	NP	0.086	0.02	0.04	0.02	0.07	0.02	0.05	0.02	ND	0.02	0.07	0.02	0.12	0.02	0.12	0.02	0.02	0.10	ND	0.10	ND	0.10	0.22	0.10	ND
Nitrogen/Nitrate, Nitr	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.10	ND	0.10	ND	0.10	0.22	0.10	ND
Nitrogen/Nitrite	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.05	NP	0.0042	NP	0.0079	0.001	0.017	0.001	0.004	0.001	0.002	0.001	0.004	0.001	0.0047	0.001	0.025	0.0050	ND	0.001	0.0024	0.0025	0.0065	0.0025	ND	0.0025	0.013	0.0025	ND
Silver	0.05	NP	ND	NP	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	NP	300	NP	220	100	270	100	650	50	250	100	180	100	140	50	200	50	320	50	280	250	570	100	460	100	420	100	260
Thallium	0.002	NP	ND	NP	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solid	1,200	NP	1000	NP	1000	17	1100	17	1600	17	1000	17	890	17	840	17	1000	26	1100	26	1100	10	1700	10	1400	10	1400	10	1300
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0080	ND	0.005	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	5.0	NP	ND	NP	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.006	ND	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.43	NA	7.23	NA	7.06	NA	6.79	NA	6.89	NA	7.37	NA	6.84	NA	8.23	NA	7.30	NA	8.09	NA	6.71	NA	6.93	NA	7.18	NA	7.75
Temperature	NA	NA	15.96	NA	15.59	NA	16.50	NA	17.95	NA	18.41	NA	13.38	NA	16.50	NA	15.20	NA	16.25	NA	13.30	NA	18.64	NA	16.91	NA	15.59	NA	14.71
Conductivity	NA	NA	1.78	NA	1.66	NA	1.70	NA	2.23	NA	1.66	NA	1.25	NA	1.20	NA	1.51	NA	1.58	NA	1.00	NA	1.97	NA	1.62	NA	1.58	NA	1.29
Dissolved Oxygen	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	0.09	NA	0.37	NA	0.40	NA	0.16	NA	0.28	NA	1.15
ORP	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	NM	NA	-90	NA	-87	NA	-9.3	NA	-48.3	NA	-180.6	NA	-141.6

Sample: MW-15	5/28/2014		8/27/2014		10/28/2014		2/26/2015		5/14/2015		8/19/2015		11/18/2015		2/25/2016		5/19/2016		8/18/2016		11/17/2016		2/17/2017		5/4/2017		8/29/2017		11/10/2017		3/7/2018	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0060	ND	0.0030	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.0010	0.0019	0.0010	0.0029	0.0010	0.0059	0.0010	0.0017	0.0010	0.0024	0.0010	0.0020	0.0010	0.0032	0.0010	0.0019	0.0010	0.0019	0.0010	0.0018	0.0010	0.0011	0.0050	ND	0.0010	0.0031	0.001	0.0012	0.001	0.0032	0.001	ND
Barium	0.0025	0.068	0.0025	0.14	0.0025	0.14	0.0025	0.10	0.0025	0.12	0.0025	0.070	0.0025	0.083	0.0025	0.059	0.0025	0.078	0.0025	0.045	0.0025	0.053	0.013	0.048	0.0025	0.042	0.0025	0.043	0.0025	0.043	0.0025	0.049
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0020	ND ^	0.0010	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.25	1.2	0.050	0.95	0.050	0.74	0.25	1.1	0.25	1.4	0.050	1.9	0.050	1.5	0.25	2.4	0.050	1.9	0.050	1.8	0.25	2.0	0.10	1.6	0.25	1.4	0.05	1.6	0.05	1.2 V	0.5	1.8
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0010	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	220	10	240	10	230	10	240	10	230	10	110	10	200	10	110	10	230	10	170	10	180	10	190 F1	10	170	10	190	10	180	10	180
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0020	ND	0.0010	ND	0.001	ND	0.001	ND ^	0.001	ND
Copper	0.0020	ND	0.0020	ND ^	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0040	ND ^	0.0020	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.10	0.65	0.10	0.67	0.10	0.71	0.10	0.64	0.10	0.47	0.10	0.57	0.10	0.52	0.10	0.63	0.10	0.52	0.10	0.56	0.10	0.53	0.10	0.49	0.10	0.55	0.1	0.52	0.1	0.62	0.1	0.52
Iron	0.10	0.37	0.10	0.78	0.10	2.1	0.10	0.28	0.10	0.44	0.10	0.17	0.10	1.8	0.10	0.11	0.10	0.64	0.10	0.81	0.10	0.22	0.10	0.66	0.10	1.4	0.1	ND	0.1	1.1	0.1	0.11
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0010	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.30	0.0025	0.95	0.0025	0.87	0.0025	0.40	0.0025	0.42	0.0025	0.18	0.0025	1.3	0.0025	0.095	0.0025	0.59	0.0025	0.52	0.0025	0.19	0.0025	0.43	0.0025	0.67	0.0025	0.03	0.0025	0.71	0.0025	0.51
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	0.00022	0.0002	ND	0.0002	ND
Nickel	0.0020	0.0047	0.0020	0.0038	0.0020	0.0037	0.0020	0.0090	0.0020	0.010	0.0020	0.0057	0.0020	0.0082	0.0020	0.0076	0.0020	0.0089	0.0020	0.0055	0.0020	0.0063	0.0040	0.0050	0.0020	0.0051	0.002	0.0061	0.002	0.0039	0.002	0.0038
Nitrogen/Nitrate	0.10	0.40	0.10	ND	0.10	ND	0.10	0.18	0.10	0.10	0.10	0.34	0.10	ND	0.10	2.0	0.10	ND	0.10	ND	0.10	0.17	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	0.66
Nitrogen/Nitrate, Nitr	0.10	0.40	0.10	ND	0.10	ND^	0.10	0.18	0.10	0.10	0.10	0.34	0.10	ND	0.10	2.0	0.10	ND	0.10	ND	0.10	0.17	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	0.66
Nitrogen/Nitrite	0.020	ND	0.020	0.046	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND F1	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	0.033	0.0025	ND	0.0025	0.0030	0.0025	0.068	0.0025	0.051	0.0025	0.013	0.0025	0.0080	0.0025	0.042	0.0025	0.015	0.0025	ND	0.0025	0.017	0.013	ND	0.0025	ND F1	0.0025	0.013	0.0025	0.0093	0.0025	0.049
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0010	ND	0.00050	ND	0.0005	ND	0.0005	ND ^	0.0005	ND
Sulfate	100	390	130	620	100	660	100	460	250	930	250	640	250	1500	250	670	500	1100	100	620	130	570	130	610	100	480	100	680	100	450	100	460
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0040	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solid	10	1300	10	1800	10	1600	10	1400	10	2500	10	1900	10	2400	10	1600	10	2800	10	1900	10	1900	10	1700	10	1500	10	1900	10	1500	10	1500
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND ^	0.005	ND	0.005	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.040	ND ^	0.020	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.00073	0.0025	ND	0.0025	0.00054	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.00068	0.0025	0.0012
pH	NA	6.89	NA	7.45	NA	7.36	NA	7.53	NA	7.05	NA	7.07	NA	6.55	NA	6.84	NA	6.83	NA	6.96	NA	6.91	NA	7.24	NA	7.35	NA	6.87	NA	7.09	NA	6.89
Temperature	NA	20.04	NA	26.66	NA	17.05	NA	7.93	NA	15.57	NA	19.19	NA	15.04	NA	11.00	NA	18.10	NA	23.69	NA	18.29	NA	17.81	NA	14.56	NA	16.90	NA	11.37	NA	8.36
Conductivity	NA	1.80	NA	2.32	NA	2.26	NA	1.41	NA	2.67	NA	2.45	NA	2.55	NA	1.73	NA	2.89	NA	2.52	NA	2.05	NA	2.09	NA	1.74	NA	1.96	NA	1.57	NA	1.38
Dissolved Oxygen	NA	0.65	NA	0.57	NA	0.45	NA	1.36	NA	0.83	NA	1.51	NA	0.70	NA	1.36	NA	2.53	NA	1.76	NA	3.28	NA	2.30	NA	3.87	NA	0.69	NA	2.34	NA	1.90
ORP	NA	-8.6	NA	-30.9	NA	-84.6	NA	-34.4	NA	-25.7	NA	-29.2	NA	31.9	NA	22.8	NA	-0.2	NA	-60.6	NA	-27.3	NA	20.3	NA	-74.4	NA	123.3	NA	-87.8	NA	-51.4

Sample: MW-15	5/17/2018		8/9/2018		10/31/2018		2/28/2019		5/2/2019		8/28/2019		11/14/2019		2/26/2020		4/29/2020		8/11/2020		12/8/2020		2/24/2021		5/12/2021	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	0.0016	0.001	ND	0.001	ND	0.001	0.0018	0.001	0.0025	0.001	ND	0.001	0.0017	0.001	0.0012	0.001	0.0026	0.001	ND	0.001	0.0025	0.001	0.001	0.001	0.0013
Barium	0.0025	0.05	0.0025	0.044	0.0025	0.045	0.0025	0.058	0.0025	0.052	0.0025	0.055	0.0025	0.05	0.0025	0.057	0.0025	0.064	0.0025	0.084	0.0025	0.074	0.0025	0.057	0.0025	0.066
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND
Boron	0.5	2.4	0.5	2.3	0.05	1.8	0.05	1.4	0.25	1.8	0.25	1.8	0.25	1.7	0.25	1.4	0.05	1.2	0.5	2.6	0.25	1.3	0.25	1.2	0.25	1.3
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	10	160	10	200	10	170	10	190	10	210	10	170	10	160	10	160	10	190	10	210	10	200	10	160	10	180
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.005	0.0052 *	0.005	ND	0.005	ND
Fluoride	0.1	0.52	0.1	0.5	0.1	0.54	0.1	0.55	0.1	0.53	0.1	0.5	0.1	0.51	0.1	0.5	0.1	0.55	0.1	0.41	0.1	0.56	0.1	0.52	0.1	0.49
Iron	0.1	0.36	0.1	ND	0.1	ND	0.1	0.83	0.1	0.49	0.1	0.11	0.1	0.39	0.1	0.5	0.1	0.65	0.1	ND	0.1	2.7	0.1	0.43	0.1	0.65
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.084	0.0025	0.11	0.0025	0.16	0.0025	0.69	0.0025	0.43	0.0025	0.17	0.0025	0.32	0.0025	0.63	0.0025	0.65	0.0025	0.063	0.0025	1.1	0.0025	0.45	0.0025	0.5
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	0.0068	0.002	0.0062	0.002	0.0048	0.002	0.0035	0.002	0.0048	0.002	0.0057	0.002	0.0043	0.002	0.0046	0.002	0.0044	0.002	0.0084	0.002	0.0049	0.002	0.0026	0.002	0.004
Nitrogen/Nitrate	0.1	2.9	0.1	2.7	0.1	0.36	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	1.6	0.1	0.12	0.1	0.13	0.1	ND
Nitrogen/Nitrate, Nitr	0.5	2.9	0.2	2.7	0.1	0.36	0.1	ND	0.1	ND ^	0.1	ND	0.1	ND	0.1	ND ^	0.1	ND	0.1	1.6	0.1	0.12	0.1	0.13	0.1	ND
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND ^	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	0.096	0.0025	0.07	0.0025	0.014	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0046	0.0025	0.0031	0.0025	ND ^	0.0025	0.046	0.0025	0.0077	0.0025	0.025	0.0025	0.0058
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	250	540	100	490	100	200	20	330	20	450	40	420	20	340	20	360	50	360	100	700	100	550	50	440	50	470
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solid	10	1900	10	1600	10	1300	10	1300	10	1500	10	1400	10	1200	10	1200	10	1300	150	1800	10	1500	10	1300	10	1500
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	0.0066	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	6.75	NA	7.06	NA	7.54	NA	7.03	NA	6.89	NA	6.95	NA	7.24	NA	6.73	NA	6.90	NA	6.53	NA	7.04	NA	7.00	NA	6.97
Temperature	NA	19.90	NA	20.75	NA	14.49	NA	14.20	NA	15.50	NA	16.30	NA	14.53	NA	15.00	NA	15.30	NA	16.00	NA	15.10	NA	15.60	NA	16.70
Conductivity	NA	1.91	NA	1.98	NA	1.50	NA	1.98	NA	1.33	NA	0.23	NA	1.76	NA	1.67	NA	1.72	NA	2.62	NA	0.31	NA	1.67	NA	2.06
Dissolved Oxygen	NA	3.49	NA	7.90	NA	8.52	NA	0.16	NA	0.29	NA	0.53	NA	1.06	NA	0.42	NA	0.22	NA	1.12	NA	0.64	NA	1.12	NA	1.41
ORP	NA	9.5	NA	-49.3	NA	4.5	NA	-58.7	NA	-65.7	NA	1.6	NA	-39.1	NA	-48.8	NA	-81.5	NA	111.7	NA	-84.7	NA	-27.4	NA	-9.5

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater. All values are in mg/L (ppm) unless otherwise noted.
DL - Detection limit; NA - Not Applicable; ND - Not Detected; NM - Not Measured; NR - Not Required; NS - Not Sampled; H - Prepped/analyzed past hold time; V - Serial Dilution Exceeds Control Limits; F1- MS and/or MSD Recovery outside of limits; F2- MS/MSD RPD exceeds control limits; ^1+ - Initial Calibration Verification is outside acceptance limits, high biased; ^+ - Continuing Calibration Verification is outside acceptance limits, high biased; ^ - Denotes instrument related QC exceeds the control limits; * - Median Value (for temp); * - LCS or LCSD is outside acceptance limits
Temperature °C degrees Celcius; Conductivity ms/cm^c millisiemens/centimeters; Dissolved Oxygen mg/L milligrams/liter; Oxygen Reduction Potential (ORP) mV millivolts

Sample: MW-16	Date	12/15/2010		2/15/2011		4/25/2011		6/16/2011		8/9/2011		10/13/2011		12/12/2011		4/10/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Arsenic	0.010	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Barium	2.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Beryllium	0.004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Boron	2.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cadmium	0.005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chloride	200.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	0.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cobalt	1.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Copper	0.65	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cyanide	0.2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluoride	4.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Iron	5.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Lead	0.0075	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Manganese	0.15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Mercury	0.002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nickel	0.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrate	10.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrate, Nitr	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrite	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Perchlorate	0.0049	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Silver	0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Sulfate	400.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Thallium	0.002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Total Dissolved Soli	1,200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Vanadium	0.049	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	5.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzene	0.005	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
BETX	11.705	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
pH	6.5 - 9.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Temperature	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conductivity	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Dissolved Oxygen	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
ORP	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Sample: MW-16	12/12/2012		2/27/2013		5/29/2013		7/29/2013		10/22/2013		3/3/2014		5/30/2014		8/26/2014	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0050	ND	0.003	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0050	ND	0.001	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.020	0.039	0.001	0.042	0.0025	0.038	0.0025	0.035	0.0025	0.037	0.0025	0.060	0.0025	0.036	0.0025	0.035
Beryllium	0.0010	ND	0.001	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.20	ND	0.01	0.13	0.050	0.20	0.050	0.26	0.050	0.35	0.050	0.17	0.050	0.17	0.050	0.15
Cadmium	0.0010	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	10	26	10	18	2.0	19	2.0	21	2.0	35	10	230	2.0	20	2.0	25
Chromium	0.0030	0.0047	0.004	0.0052	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND^	0.0050	ND	0.0050	ND
Cobalt	0.0030	ND	0.002	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.010	ND	0.003	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND^	0.0020	ND	0.0020	ND ^
Cyanide	0.0050	ND	0.005	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.25	ND	0.25	ND	0.10	ND	0.10	0.11	0.10	0.11	0.10	ND	0.10	0.11	0.10	0.11
Iron	0.010	0.012	0.01	0.019	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0050	ND	0.001	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0020	0.022	0.001	0.0053	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0035	0.0025	ND	0.0025	ND
Mercury	0.00020	ND	0.0002	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.010	ND	0.005	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.50	18	0.5	23	0.10	20	0.10	13	0.10	19	0.10	16	0.10	21	0.10	22
Nitrogen/Nitrate, Nitr	NR	NR	NR	NR	2.5	20	2.5	13	1.0	19	2.0	16	2.5	21	2.0	22
Nitrogen/Nitrite	NR	NR	NR	NR	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	NR	NR	NR	NR	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0050	ND	0.001	0.0015	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.010	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	10	37	10	31	20	50	20	55	20	55	10	34	10	40	10	35
Thallium	0.0010	ND	0.001	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	26	520	26	420	10	460	10	440	10	540	10	800	10	390	10	440
Vanadium	0.0080	ND	0.005	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND^	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.006	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.005	ND	0.005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	0.03	ND	0.03	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.38	NA	8.31	NA	7.10	NA	7.18	NA	7.27	NA	7.85	NA	7.20	NA	7.41
Temperature	NA	12.84	NA	13.10	NA	15.29	NA	16.61	NA	12.74	NA	9.98	NA	17.83 *	NA	22.10
Conductivity	NA	0.61	NA	1.17	NA	0.60	NA	0.59	NA	0.63	NA	0.89	NA	0.88	NA	0.75
Dissolved Oxygen	NA	9.54	NA	8.53	NA	6.78	NA	4.91	NA	6.24	NA	6.50	NA	6.99	NA	6.84
ORP	NA	110	NA	-38	NA	70.2	NA	24.7	NA	-83.4	NA	315.3	NA	74.8	NA	36.7

Sample: MW-16	10/30/2014		2/24/2015		5/12/2015		8/18/2015		11/16/2015		2/24/2016		5/16/2016		8/19/2016	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	0.0025	0.034	0.0025	0.038	0.0025	0.037	0.0025	0.039	0.0025	0.038	0.0025	0.043	0.0025	0.043	0.0025	0.039
Beryllium	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	0.050	0.14	0.050	0.17	0.050	0.15	0.050	0.25	0.050	1.0	0.050	0.63	0.050	0.23	0.050	0.19
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	2.0	24	2.0	24	2.0	29	2.0	29	2.0	33	2.0	45	2.0	33	2.0	33
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	0.10	0.10	0.10	0.10	0.10	0.11	0.10	0.10	0.10	0.11	0.10	0.11	0.10	0.10	0.10	0.10
Iron	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.0025	ND	0.0025	0.0025	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	0.10	28	0.10	28	0.10	24	0.10	19	0.10	17	0.10	16	0.10	22	0.10	25
Nitrogen/Nitrate, Nitr	2.5	28	2.0	28	2.0	24	2.0	19	1.0	17	1.0	16	2.0	22	2.0	25
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	10	54	10	27	10	33	20	64	25	57	10	50	10	40	10	43
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Soli	10	510	10	490	10	530	10	540	10	460	10	510	10	530	10	620
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0011	0.0025	ND	0.0025	0.0018	0.0025	ND
pH	NA	7.30	NA	7.56	NA	7.35	NA	7.19	NA	6.78	NA	7.23	NA	7.13	NA	7.09
Temperature	NA	13.09	NA	8.21	NA	12.56	NA	19.75	NA	13.05	NA	9.13	NA	14.63	NA	22.11
Conductivity	NA	0.94	NA	0.57	NA	0.67	NA	0.80	NA	0.62	NA	0.59	NA	0.68	NA	0.80
Dissolved Oxygen	NA	2.05	NA	8.44	NA	7.97	NA	7.43	NA	7.61	NA	7.95	NA	8.26	NA	7.50
ORP	NA	-2.7	NA	95.6	NA	105.0	NA	-9.1	NA	188.1	NA	43.3	NA	57.0	NA	67.0

Sample: MW-16	11/16/2016		2/15/2017		5/2/2017		8/23/2017		11/9/2017		3/8/2018		5/17/2018		8/8/2018		10/31/2018	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	0.0030	ND	0.0030	ND	0.003	0.0031	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	0.004	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.041	0.0025	0.040	0.0025	0.039	0.0025	0.039	0.0025	0.045	0.0025	0.041	0.0025	0.041	0.0025	0.038	0.0025	0.041
Beryllium	0.0010	ND	0.0010	ND ^	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	0.050	0.18	0.050	0.17	0.050	0.14	0.05	0.14	0.05	0.19	0.05	0.13	0.05	0.14	0.05	0.15	0.05	0.18
Cadmium	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2.0	26	2.0	29	2.0	33	2	22	2	29	2	28	2	23	2	23	2	24
Chromium	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.010	ND	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Iron	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.0059	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.028	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.10	27	0.10	23	0.10	27	0.1	22	0.1	24	0.1	26	0.1	25	0.1	24	0.1	22
Nitrogen/Nitrate, Nitr	2.0	27	2.5	23	2.5	27	2	22	2	24	2	26	2	25	2	24	2	22
Nitrogen/Nitrite	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND ^	0.004	ND	0.004	ND
Selenium	0.0025	ND ^	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	10	38	10	33	10	43	10	34	20	38	20	41	20	30	10	29	10	25
Thallium	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	540	10	520	10	560	10	460	10	530	10	530	10	540	10	470	10	590
Vanadium	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.020	ND	0.020	ND ^	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.00056	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0014	0.0025	0.0009	0.0025	0.00866	0.0025	0.0021
pH	NA	6.93	NA	6.72	NA	7.14	NA	7.44	NA	6.95	NA	6.93	NA	6.76	NA	7.19	NA	7.85
Temperature	NA	16.10	NA	9.78	NA	13.99	NA	16.10	NA	13.06	NA	6.81	NA	17.97	NA	18.67	NA	14.83
Conductivity	NA	0.67	NA	0.61	NA	0.65	NA	0.67	NA	0.66	NA	0.53	NA	0.67	NA	0.67	NA	0.63
Dissolved Oxygen	NA	6.51	NA	8.00	NA	8.04	NA	7.63	NA	8.10	NA	7.53	NA	8.80	NA	8.26	NA	8.59
ORP	NA	17.0	NA	214.2	NA	39.1	NA	170.0	NA	-34.3	NA	-16.9	NA	12.8	NA	5.4	NA	2.4

Sample: MW-16	2/27/2019		5/2/2019		8/27/2019		11/14/2019		2/25/2020		4/27/2020		8/11/2020		12/10/2020		2/23/2021		5/10/2021	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.001	ND	0.001	ND	0.001	ND	0.001	ND F1	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.045	0.0025	0.039	0.0025	0.039	0.0025	0.046	0.0025	0.042	0.0025	0.04	0.0025	0.04	0.0025	0.041	0.0025	0.038	0.0025	0.041
Beryllium	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND ^1+	0.001	ND ^+	0.001	ND ^+
Boron	0.05	0.17	0.05	0.2	0.05	0.16	0.05	0.22	0.05	0.16	0.05	0.15	0.05	0.14	0.05	0.12	0.05	0.12	0.05	0.091
Cadmium	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	2	25	2	22	2	31	2	26	2	26	2	18	2	21	2	23	2	24	2	25
Chromium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND F1 F2	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Fluoride	0.1	ND	0.1	ND	0.1	ND	0.1	0.11	0.1	0.1	0.1	0.12	0.1	ND	0.1	0.11	0.1	0.1	0.1	0.10 H
Iron	0.1	0.23	0.1	ND	0.1	ND	0.1	0.13	0.1	ND ^	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	0.014	0.0025	ND	0.0025	0.027	0.0025	0.019	0.0025	0.0051	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0058	0.0025	ND
Mercury	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	0.1	23	0.1	20	0.1	12	0.1	19	0.1	22	0.1	23	0.1	18	0.1	29	0.1	22	0.1	22 H
Nitrogen/Nitrate, Nitr	2.5	23	2.5	20	2.5	12	2.5	19 ^	2.5	22	2	23	1	18	5	29	2	22	2.5	22
Nitrogen/Nitrite	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND F1	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND F1	0.0025	ND	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	25	36	5	33	5	35	5	32	5	29	5	29	5	25	5	27	5	25	5	30
Thallium	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Soli	10	520	10	550	10	470	10	480	10	440	10	500	30	400	10	390	10	500	10	210
Vanadium	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND ^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	NA	7.00	NA	6.94	NA	7.03	NA	7.29	NA	7.02	NA	6.94	NA	6.94	NA	7.44	NA	7.21	NA	7.20
Temperature	NA	12.30	NA	12.40	NA	14.20	NA	12.45	NA	12.30	NA	12.70	NA	13.60	NA	13.30	NA	12.70	NA	12.70
Conductivity	NA	0.89	NA	0.53	NA	0.79	NA	0.82	NA	0.29	NA	0.72	NA	0.81	NA	0.84	NA	0.64	NA	0.80
Dissolved Oxygen	NA	8.16	NA	6.89	NA	8.33	NA	8.72	NA	7.14	NA	7.20	NA	7.04	NA	5.21	NA	8.19	NA	8.64
ORP	NA	81.3	NA	75.8	NA	106.6	NA	-18.7	NA	28.9	NA	13.6	NA	135.3	NA	97.9	NA	58.8	NA	172.1

Notes: Standards obtained from IAC, Title 35, Chapter I, Part 620, Subpart D, Section 620.410 - Groundwater Quality Standards for Class I: Potable Resource Groundwater
All values are in mg/L (ppm) unless otherwise noted.

DL - Detection limit
NA - Not Applicable
ND - Not Detected
NM - Not Measured

NR - Not Required
NS - Not Sampled
H - Prepped/analyzed past hold time
V - Serial Dilution Exceeds Control Limits

F1- MS and/or MSD Recovery outside of limits.
F2- MS/MSD RPD exceeds control limits.
^1+ - Initial Calibration Verification is outside acceptance limits, high biased
^+ - Continuing Calibration Verification is outside acceptance limits, high biased

^ - Denotes instrument related QC exceeds the control limits
* - Median Value (for temp)
* - LCS or LCSD is outside acceptance limits

Temperature	°C	degrees Celcius
Conductivity	ms/cm^c	millisiemens/centimeters
Dissolved Oxygen	mg/L	milligrams/liter
Oxygen Reduction Potential (ORP)	mV	millivolts

Attachment 9-4 – IL PE Stamp

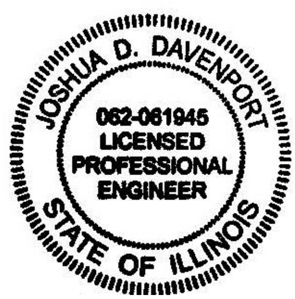
CERTIFICATION
35 Ill. Adm. Code 845.630

In accordance with Section 35 Ill. Adm. Code 845.630(g), I hereby certify based on review of the information contained within the Initial Operating Permit Application for Powerton Station dated October 29, 2021, the groundwater monitoring system has been designed and constructed to satisfy the requirements of 35 Ill. Adm. Code 845.630. For this site the minimum number of wells required is deemed sufficient based on the following: 1) The number of wells, placement and screened intervals are based on a hydrogeologic assessment performed for the site; 2) hydrogeologic considerations included aquifer characteristics affecting flow velocity and physical transport processes; 3) available historical groundwater flow data indicate consistent flow conditions over time; and 4) Illinois Environmental Protection Agency (IEPA) approved the overall hydrogeologic assessment as part of a larger study.

Certified by: ______________________________

Date: 10/29/21

Joshua Davenport, P.E.
Professional Engineer Registration No.: 062-061945
KPRG and Associates, Inc.



Attachment 9-5 – CCR Compliance Statistical Approach

ILLINOIS STATE CCR RULE COMPLIANCE STATISTICAL APPROACH FOR GROUNDWATER DATA EVALUATION

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August 23, 2021

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1.0 INTRODUCTION

On April 21, 2021, the Illinois Pollution Control Board (IPCB) and Illinois Environmental Protection Agency (Illinois EPA) enacted a final rule regulating coal combustion residuals (CCR) as part of Ill. Adm. Code Title 35, Part 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (State CCR Rule). The State CCR Rule specifically requires that the owner or operator of a CCR unit must develop an Operating Permit that will specify a sampling and analysis program that includes procedures and techniques for sample collection, sample preservation and shipment, analytical procedures, chain of custody (COC) control, and quality assurance and quality control. As a result, each regulated facility must develop a program that meets the State CCR Rule. At the Powerton facility, the Ash Bypass Basin/Ash Surge Basin (ABB/ASB) the Former Ash Basin (FAB) and the Metals Cleaning Basin (MCB) require monitoring under the State CCR Rule. The monitoring well networks around these basins consist of the following wells:

- Combined ABB/ASB monitoring network - upgradient wells MW-01, MW-09 and MW-19 and downgradient wells MW-08, MW-11, MW-12, MW-15, MW-17 and MW-18.

- FAB monitoring network - upgradient wells MW-01 and MW-10 and downgradient wells MW-02 thru MW-05.

- MCB monitoring network – upgradient wells MW-15 and MW-17 and downgradient wells MW-14, MW-20 and MW-21.

The well locations are shown on Figure 1.

Section 845.640(f) of the State CCR Rule requires the development of the statistical approach that will be used for assessing the data and determining whether a statistically significant increase over background concentrations in groundwater has occurred at identified downgradient monitoring points. Potential statistical methods that can be applied to the data are listed in Section 845.640(f) and performance standards are provided in 845.640(g).

This narrative of the statistical approach that will be used for the Powerton facility's groundwater monitoring data is intended to fulfill certification requirements under Section 845.640(f)(2). The professional engineer's certification of this statistical approach is provided in Section 4.0 of this document.

2.0 STATISTICAL METHOD SELECTION and BACKGROUND DATA EVALUATION

Section 845.640(f)(1) identifies five statistical data evaluation methods that can be used for assessing site groundwater data. Relative to the subject site, the prediction interval procedure identified in 845.640(f)(1)(C) will be used. This approach is robust and conforms to varying data distributions and facilitates various non-detect frequencies. U.S. EPA identifies this method as preferred over establishment of tolerance intervals (Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance, March 2009 [Unified Guidance]).

Total recoverable metals groundwater data has been collected for this site at many of the monitoring well locations since 2015 as part of Federal CCR Rule requirements. Under the Federal CCR Rule, the initial eight rounds of quarterly data generated were used to develop a representative background concentration with which to develop applicable prediction limits for subsequent statistical downgradient monitoring well data comparisons. Since additional data has been generated since the initial eight rounds of groundwater monitoring under the Federal CCR Rule, the full, currently available data set through the second quarter 2021 will be evaluated for potential use in developing a representative background dataset. If appending this additional data to the original eight rounds of background sampling is determined to be not statistically appropriate, then the background calculations will be reverted to using the initial eight rounds of background data for subsequent calculations. The established, representative background concentration for the upgradient well locations will be used to develop prediction limits for the regulated unit for each constituent listed in Section 845.600(a) and (b) as provided in Table 1.

Statistical evaluations will be performed with the assistance of the Sanitas™ software package.

2.1 Outlier Testing

The background dataset will be first checked for potential outliers for each constituent. Potential causes of outliers can be, but are not limited to:

- Changes in sampling technique;
- Changes in analytical methods;
- Data transcription errors;
- Unnatural localized event such as a spill; or
- Natural but extreme variations in constituent concentration.

The Unified Guidance does not recommend removing an outlier from the data set unless it can be shown that the outlier is not caused by extreme natural variation. If the outlier can be traced to other than natural causes, the data set will be adjusted appropriately.

2.2 Spatial Variability

If more than one background well is being used for the monitored unit, an evaluation of spatial variability will be performed to determine whether the mean concentration of a constituent varies statistically between the background points. This is generally accomplished by performing an Analysis of Variance (ANOVA). If statistically significant spatial variation is determined to be present, the background points will not be combined between the wells. If the spatial variability is determined to be natural, an intrawell data evaluation approach may be considered for both upgradient and downgradient wells.

2.3 Temporal Variability

Temporal variability in groundwater data from a specific monitoring point occurs when a consistent fluctuation of constituent concentrations occurs over time. The most common example is seasonal variation. If such a variation is noted in the data, the dataset should be corrected to account for the trend; however, any such corrections must be applied judiciously and would be completed in accordance with the Unified Guidance recommended procedures.

2.4 Trend Testing

As discussed above, it is intended to expand the initial background dataset collected under the Federal CCR Rule which consisted of eight rounds of quarterly sampling, with any additional data collected for a specific well since that time to facilitate a larger background data set upon which to develop subsequent interwell, and if necessary intrawell, prediction limits. The expanded background dataset for each upgradient well, for each constituent listed in Table 1, will undergo trend analysis to determine if there may be a potential statistically significant trend in the data. Linear regression will be the primary trend analysis tool, however, other methods such Sen's Slope Estimator may also be used. If a statistically significant trend is identified in the larger combined background dataset, the new data cannot be added to the initial background dataset, and only the original eight rounds of data can be used for that well in background development and associated subsequent calculations.

2.5 Test of Normality

The main underlying assumption in parametric data evaluations, such as establishing prediction limits, is that the underlying data distribution is normal. A quick approximation can be made by calculating the Coefficient of Variance (CV) which is the quotient of the standard deviation divided by the sample mean. In general, if this quotient is greater than 1, the underlying data distribution is probably not normal. The new Unified Guidance is more conservative and suggests that if this quotient is greater than 0.5, the dataset may not be normal and a more robust distribution evaluation should be performed. Therefore, for any CV value greater than 0.5 for a specific dataset, normality will be evaluated using the Shapiro-Wilk Test with an alpha (α) value of 0.05 (or 95%).

If the dataset does not pass this initial test, the data will undergo a log transformation and the test will be repeated for the natural log values of the dataset. If it is determined that this dataset is log-normal, statistical evaluations will be completed on those values and the result converted back to the standard value. If the underlying distribution is also determined not to be log-normal, the Unified Guidance provides for a number of other data transformations that can be performed to evaluate whether those underlying distributions may be normal at which point the entire dataset would be transformed for subsequent calculations.

If a normal underlying distribution can not be determined, non-parametric statistical evaluations will need to be considered which do not rely on a specific underlying distribution.

2.6 Non-Detects

It is not uncommon in environmental datasets to have parameters being detected at low concentrations during one sampling event and being not detected in other sampling events. Having a consistent approach to the handling of non-detect values is an important part of the statistical evaluation process. The handling of non-detect values will be accomplished as follows:

- 100 Percent Non-Detects – Assumed that the constituent is not present and no statistical evaluations will be performed. The upper prediction limit will be set at the Reporting Limit (RL) established by the analytical laboratory.

- 50 Percent or Greater Non-Detects – A non-parametric evaluation will be performed where the confidence interval will be constructed using the highest detected concentration as the upper prediction limit.

- 15 to 50 Percent Non-Detects – Aitchison's Adjustment will be used with subsequent parametric or non-parametric evaluations, as appropriate, based on underlying distributions.

- 0 to 15 Percent Non-Detects - The non-detect values will be replaced with RL/2 and the dataset will be evaluated for distribution normality with subsequent parametric or non-parametric evaluations, as appropriate, based on underlying distributions.

2.7 Prediction Limit Calculation for Normally Distributed Data

For datasets where the distribution or underlying transformed distribution is normal, a parametric statistical approach will be used for establishing the prediction limit at the required 95% statistical confidence. In accordance with Unified Guidance, the following equation will be used:

$$95\%\ Prediction\ Limit = \bar{x} + t_{1-0.05/m,n-1} s \sqrt{1 + \frac{1}{n}}$$

Where:

$\bar{x}$ = the sample mean of the detected or adjusted results
S = sample standard deviation of the detected or adjusted results
$t_{1-0.05/m,n-1}$ = the students t-coefficient for degrees of freedom (n-1) and confidence level (1-0.05/m)
n = the number of samples
m = the number of future samples

The number of future sampling events (*m*) will be set at 2 which will account for one sampling event and a confirmation resampling. This will assist in limiting the potential number of false positives. An acceptable site-wide false positive (SWFP) rate of 10% or less is acceptable under the Unified Guidance.

2.8 Prediction Limit Calculation for Non-Normally Distributed Data

If the dataset distribution or underlying distribution is determined not to be normal, a non-parametric approach will need to be used for the establishment of the prediction limit. The non-parametric evaluation will use the highest detected concentration as the upper prediction limit for the specific constituent.

3.0 GROUNDWATER MONITORING

The State CCR Rule does not distinguish between detection monitoring or assessment monitoring as was defined under the Federal CCR Rule. To meet the requirements set forth in Section 845.650(b), a minimum of eight rounds of groundwater data need to be collected for establishing background. As noted above, if more than eight rounds of data are available, then the larger dataset will be evaluated to determine whether the background dataset can be expanded to provide a more robust statistical assessment. At that point, statistical evaluation of the background dataset will be performed to establish the upper prediction limits for each Section 845.600(a) and (b) constituent. It is noted that in the case of pH, a lower prediction limit will also be established since this parameter has an established upper and lower value range for compliance.

Site specific Groundwater Protection Standards (GWPSs) will be developed in accordance with Section 845.600(a)(2) as follows:

- If the constituent has an established State standard listed in Section 845.600(a)(1) and the standard is greater than the calculated background upper prediction limit, then the standard will serve as the GWPS. If the background upper prediction limit is greater than the standard, the upper prediction limit will serve as the GWPS.

- If the constituent does not have an established standard (i.e., calcium and turbidity) then the calculated upper prediction limit will serve as the GWPS.

Once the proposed GWPSs are determined and approved by Illinois EPA, subsequent downgradient well concentrations will be compared against the upper prediction limit (and lower prediction limit in the case of pH), and the GWPSs. If an exceedance of the GWPS is identified during a quarterly sampling event, an immediate resampling of the specific well(s) will be completed for those specific parameters. If the exceedance is confirmed by the resampling, the Illinois EPA will be notified of the exceedance(s) and the notification will be placed in the facilities operating record in accordance with 845.800(d)(16). It is noted that there are some constituents that historically may have had no detections (i.e., 100% non-detects). In this case, in accordance with the Unified Guidance, if there is a detection of such a constituent, then the Double Quantification Rule will be applied. Under this rule, a confirmed exceedance is registered if any well-constituent pair in the 100% non-detect group exhibits quantified measurements (i.e., at or above the Reporting Limit in two consecutive sample and resample events.

If an exceedance of the GWPS is recorded and reported to Illinois EPA, an Alternate Source Demonstration (ASD) may be completed within 60-days of the confirmed exceedance in accordance with Section 845.650(e) and submitted to the Illinois EPA as well as placing the ASD on the facility's publically accessible CCR website. Illinois EPA will review and approve or disapprove the ASD.

If it is decided not to complete an ASD or if Illinois EPA does not concur with and approve the ASD, a characterization of the nature and extent of the potential release must be completed in accordance with Section 845.650(d)(1) as well as meeting the requirements of Sections 845.660, 845.670 and 845.680.

4.0 CERTIFICATION

In accordance with Section 845.640(f)(2) of the State CCR Rule, I hereby certify based on a review of the information contained within this Illinois State CCR Rule Compliance Statistical Approach for Groundwater Data Evaluation dated August 23, 2021, the statistical procedures developed and selected for evaluation of groundwater data associated with the Midwest Generation Powerton Station CCR Units are adequate and appropriate for evaluating the groundwater data.

Certified by: ______________________________

Date: 823/21

Joshua Davenport, P.E.

Professional Engineer Registration No. 062-061945

KPRG and Associates, Inc.

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FIGURE

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CCR MONITORING WELL SITE MAP

POWERTON STATION
PEKIN, ILLINOIS

Scale: 1" = 350'	Date: June 10, 2021
KPRG Project No. 12313.1	FIGURE 1

W:\projects\midwest generation\12313 groundwater\figures\powerton\ccr\powerton ccr 4q2018 gw map.dwg

TABLE

Table 1. Section 845.600 Groundwater Monitoring Parameter List

Parameter	Section 845.600 Standards
Antimony	0.006
Arsenic	0.01
Barium	2
Beryllium	0.004
Boron	2.0
Cadmium	0.005
Chloride	200
Chromium	0.1
Cobalt	0.006
Combined Radium 226 + 228 (pCi/L)	5.0
Fluoride	4.0
Lead	0.0075
Lithium	0.04
Mercury	0.002
Molybdenum	0.10
pH (standard units)	6.5-9.0
Selenium	0.05
Sulfate	400
Thallium	0.002
Total Dissolved Solids	1200
Calcium	NE
Turbidity	NE

All vaues in mg/l unless otherwise specified.
NE- Not Established

Attachment 9-6 – Statistical Evaluation Summary

ATTACHMENT 9-6

BACKGROUND STATISTICAL EVALUATION SUMMARY
STATE RULE CCR GROUNDWATER MONITORING
POWERTON GENERATING STATION

The newly enacted Ill. Adm. Code Title 35, Part 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (State CCR Rule) requires development of proposed Groundwater Protection Standards (GWPSs) for inclusion within the Operating Permit for the regulated surface impoundments at the facility. Upon Illinois Environmental Protection Agency (EPA) review, concurrence and approval of these site-specific proposed GWPSs, subsequent quarterly downgradient groundwater monitoring data will be compared against these standards to determine whether standard quarterly monitoring is to continue or whether additional evaluations need to occur to in accordance with Section 845.650(d), 845.650(e), 845.660 and 845.670. The overall statistical approach to be used for the development of the proposed GWPSs is provided in Attachment 9-5 of the Operating Permit.

Powerton Generating Station has four separate regulated units. Two of the units will be referred to as the combined Ash Bypass Basin and Ash Surge Basin (ABB/ASB), the third unit is the Former Ash Basin (FAB) and the fourth unit is the Metals Cleaning Basin (MCB). The ABB/ASB and the FAB are the subjects of this Operating Permit submittal. The MCB Operating Permit will be submitted under separate cover. The ABB/ASB and the FAB are treated as having distinct monitoring networks and therefore, for the development of GWPSs, will be discussed separately. The proposed site-specific GWPSs for the Powerton Generating Station are summarized in Section 9 of this Operating Permit. Table 9-10 summarizes GWPSs for the ABB/ASB and Table 9-11 summarizes GWPSs for the FAB. The background Prediction Limit values presented in those tables were developed, where possible, by combining or "pooling" as many background data points as possible from the various upgradient monitoring wells. This includes evaluating whether the initial eight rounds of data generated as part of Federal CCR Rule compliance can be combined with subsequent available data from ongoing groundwater monitoring since that time at a specific upgradient monitoring well location, and whether datasets from individual upgradient monitoring points can also be combined or "pooled". The initial eight rounds were completed for the ABB/ASB between 2015 and 2017, while the initial eight rounds for the FAB were completed between 2017 and 2019. The initial eight rounds of turbidity were completed this calendar year (2021) since this was a new state requirement that was not part of the Federal CCR Rule. The following general decision process was followed to determine whether background data from within a well and/or between upgradient wells can be pooled for background calculations:

- If the combined dataset (original eight rounds of data plus any subsequent data generated since the initial background sampling) at a specific well location (intrawell evaluation) for a specific parameter does not show a statistically trend, the data for that specific parameter at that well location can be pooled. If a statistically significant trend in the data is noted to exist, only the original eight rounds of background sampling can be used for subsequent calculations. If there is more than one background monitoring well, and one of the combined datasets for a specific parameter shows a statistically significant trend but the other does not, then the specific parameter data for the well that did not indicate a trend can potentially be used for subsequent evaluations.

- If there is more than one upgradient monitoring well, then datasets for individual parameters between the wells (interwell evaluation) must pass an analysis of variance to determine whether there may be a statistically significant variation between the two datasets. If no statistically significant variance is noted between the two (or more) upgradient monitoring points, and the individual parameter data passes the intrawell trend evaluation noted above, then the datasets for that parameter can be pooled between the wells to establish a larger background dataset. If there is a statistically significant variation noted between the two (or more) upgradient monitoring points, then the specific parameter datasets from those wells cannot be combined.

- If it is determined that datasets from upgradient monitoring points cannot be combined, then a decision needs to be made as to which monitoring point will be used for a specific parameter for background calculations. At this point some professional judgement needs to be used by considering the number of data points within each dataset, any potential statistical outliers, any statistical seasonality, the distribution and/or underlying distribution of that data, number of detects versus non-detects, etc.

With the above decision process in mind, the various statistical evaluations performed are summarized below. The evaluations were performed with the assistance of the Sanitas® statistical software package.

Outlier Testing

Outlier tests were performed for all monitoring wells (upgradient and downgradient) in the proposed State CCR monitoring well network for all data available since the start of Federal CCR monitoring.

Ash Bypass Basin and Ash Surge Basin

Wells MW-01, MW-09 and MW-19 are designated background wells. The following statistically significant outliers (dates in parentheses) were noted:

- Arsenic – MW-18 (5/5/17 and 12/7/20)
- Cadmium – MW-15 (5/19/16 and 8/18/2016)
- Chloride – MW-15 (2/25/17), MW-17 (11/13/2019), and MW-19 (11/13/2019)
- Combined Radium 226/228 – MW-08 (12/14/20) and MW-18 (2/22/2016)
- Lead – MW-19 (5/5/17)
- Lithium – MW-18 (2/22/16)
- Molybdenum – MW-01 (5/11/21) and MW-18 (12/7/20)
- pH – MW-11 (2/16/17 and 5/16/18), MW-17 (5/14/2018) and MW-18 (2/22/2016)
- Total Dissolved Solids – MW-15 (5/19/16)

- Turbidity – MW-01 (2/23/21)

Since the outliers cannot be attributed to either lab error, transcription error or field sampling error, the outlier values were not removed from the datasets at this time but may be considered during subsequent data evaluations. A statistical run summary which includes the specific statistical method used for each parameter for each well is provided at the end of this discussion.

Former Ash Basin

Wells MW-01 and MW-10 are designated background wells. The following statistically significant outliers were noted.

- Arsenic – MW-02 (2/26/19) and MW-10 (10/30/18 and 2/26/19)
- Barium – MW-01 (11/8/17) and MW-10 (10/30/18 and 2/26/19)
- Boron – MW-03 (12/9/20)
- Calcium – MW-10 (2/26/19)
- Chromium – MW-10 (10/30/18 and 2/26/19)
- Combined Radium 226/228 – MW-03 (8/23/17)
- Molybdenum – MW-01 (5/11/21)
- Turbidity – MW-01 (2/23/21)

Since the outliers cannot be attributed to either lab error, transcription error or field sampling error, the outlier values were not removed from the datasets at this time but may be considered during subsequent data evaluations. A statistical run summary which includes the specific statistical method used for each parameter for each well is provided at the end of this discussion.

Seasonality/Temporal Variability Testing

Seasonality/temporal variability tests were performed for all monitoring wells (upgradient and downgradient) in the proposed State CCR monitoring well network for all data available since the start of Federal CCR monitoring. Statistically significant seasonal/temporal variations were noted in both ABB/ASB and FAB monitoring wells.

Ash Bypass Basin and Ash Surge Basin

Wells MW-01, MW-09 and MW-19 are designated background wells. The following statistically significant seasonal/temporal variations were noted:

- Arsenic – MW-09
- Barium – MW-01
- Boron – MW-12 and MW-18

Former Ash Basin

Wells MW-01 and MW-10 are upgradient wells. The following statistically significant seasonal/temporal variations were noted.

- pH – MW-05

A statistical run summary which includes the specific statistical method used for each parameter for each well is provided at the end of this discussion. The turbidity database to date is insufficient to evaluate potential seasonal/temporal variability at this time.

Trend Analysis

To determine whether data generated since the initial eight rounds of background groundwater sampling since the enactment of the Federal Rule can potentially be pooled at a specific upgradient monitoring well location, trend analysis for each constituent at each designated background well location was performed. The results are summarized as flows:

Ash Bypass Basin and Ash Surge Basin

- MW-01 – No statistically significant trends were noted any parameter.
- MW-09 – Statistically significant trend was noted for molybdenum.
- MW-19 – Statistically significant trends were noted for fluoride, selenium, sulfate and TDS.

A statistical run summary which includes the specific statistical method used for each parameter for each well is provided at the end of this discussion.

Former Ash Basin

- MW-01 – Statistically significant trend was noted for arsenic.
- MW-10 – Statistically significant trends were noted for boron and fluoride.

A statistical run summary which includes the specific statistical method used for each parameter for each well is provided at the end of this discussion.

Spatial Variability Testing

To determine whether the background data sets from background wells can be pooled to establish a representative statistical background, spatial variability testing was performed on the datasets using a parametric analysis of variance (ANOVA). This analysis was done for each of the monitoring parameters. The following observations are made:

Ash Bypass Basin and Ash Surge Basin

- Background wells MW-01, MW-09 and MW-19 all parameter values pooled – No statistically significant variance between the full datasets for chromium, cobalt, lithium, mercury, pH and turbidity.

- Background wells MW-01 and MW-09 all parameter values pooled – No statistically significant variance between full datasets for arsenic, cadmium, chromium, fluoride, lithium, mercury and pH.
- Background wells MW-01 and MW-19 all parameter values pooled – No statistically significant variance between full datasets for cadmium, calcium, chromium, combined radium 226/228, lithium and pH.
- Background MW-09 and MW-19 all parameter values pooled - No statistically significant variance between full datasets for boron, chloride, cobalt, combined radium 226/228, fluoride, lead, mercury, pH, selenium, sulfate and TDS

It is noted that antimony, beryllium and thallium had no detections at any of the designated background well locations during any sampling event, therefore, although an analysis of variance cannot be formally completed, these data sets can be pooled since there is no variation in the reporting limits.

Statistical run summaries which include the specific statistical method used for each parameter for each of the dataset comparisons are provided at the end of this discussion.

Former Ash Basin

- Background wells MW-01 and MW-10 all parameter values pooled – No statistically significant variance between the full datasets for beryllium, cadmium, calcium, chloride chromium, cobalt, lithium, molybdenum, pH, sulfate and TDS.
- Background wells MW-01 and MW-10 original eight background values pooled – No statistically significant variance between full datasets for arsenic, beryllium, boron, calcium, chloride, chromium, combined radium 226/228, fluoride, lead, molybdenum, pH, sulfate and TDS.

It is noted that antimony, mercury and thallium had no detections at any of the upgradient well locations during any sampling event, therefore, although an analysis of variance cannot be formally completed, these data sets can be pooled since there is no variation in the reporting limits.

Statistical run summaries which include the specific statistical method used for each parameter for each of the dataset comparisons are provided at the end of this discussion.

Test of Normality

The Shapiro-Wilk Normality Test with an alpha (α) value of 0.05 (or 95%) was used to evaluate the distribution of the background datasets for each constituent at each background well location and the distribution of pooled datasets for both background wells. A Test of Ladders was also run to evaluate other potential underlying transformational distributions in the case that the non-transformed dataset was found not to be normally distributed. The statistical runs are provided for the various combinations of upgradient wells by parameter at the end of this discussion.

Prediction Limits

Based on the various statistical evaluations discussed above, the following background data sets were used for background prediction limit calculations:

Ash Bypass Basin and Ash Surge Basin

- Background wells MW-01, MW-09 and MW-19 all parameter values pooled for antimony, beryllium, cadmium, chromium, cobalt, lithium, mercury, pH, thallium and turbidity. As noted above there were no detections of antimony, beryllium or thallium at any of the three upgradient well locations and the reporting limits were the same. Relative to the other parameters, there were no statistically significant trends within wells for the combined data observations and there was no statistically significant variance noted between the datasets.
- Background wells MW-01 and MW-09 all parameter values were pooled for fluoride. For this combined parameter dataset, there was no individual trend within each well and there was no statistically significant variance noted between the datasets.
- Background wells MW-01 and MW-19 all parameter values were pooled for calcium and combined radium 226/228. For these combined parameter datasets, there were no individual trends within each well and there was no statistically significant variance noted between the datasets.
- Background wells MW-09 and MW-19 all parameter values were pooled for boron, chloride and lead. For this combined parameter dataset, there were no individual trends within each well and there was no statistically significant variance noted between the datasets.
- Background well MW-01 all parameter values were used for arsenic, selenium, sulfate, and TDS. None of these parameters indicated statistically significant trends within this well and none of these parameters were noted as statistical outliers at this well location. Sulfate and TDS had normal or underlying normal distributions, while distributions for arsenic and selenium for all upgradient wells were found not to be normal.
- Background well MW-19 all parameter values were used for barium and molybdenum. None of these parameters indicated statistically significant trends within this well and none of these parameters were noted as statistical outliers at this well location. Both had normal or underlying normal distributions.

Former Ash Basin

- Background wells MW-01 and MW-10 all parameter values pooled for antimony, beryllium, cadmium, calcium, chloride, chromium, lithium, mercury, molybdenum, pH, sulfate, thallium and TDS. As noted above there were no detections of antimony, mercury or thallium at any of the two upgradient well locations and the reporting limits were the same. Relative to the other parameters, there were no statistically significant trends within wells for the combined data observations and there was no statistically significant variance noted between the datasets.
- Background well MW-01 all parameter values were used for barium, boron, combined radium 226/228 and fluoride. None of these parameters indicated statistically

significant trends within this well and all had normal or underlying normal distributions. Barium was noted to have an outlier value at well MW-01 (0.083 mg/l) and two outliers were also noted at well MW-10 (0.41 mg/l and 0.59 mg/l). Since the noted barium outlier concentration at MW-01 was still substantially below the Section 845.600 standard of 2.0 mg/l, and as stated above there is no known laboratory or field sampling error basis on which to remove this data point, it was decided to include the full available barium dataset for MW-01 in the statistical background calculation.

- Upgradient well MW-10 all parameter values were used for arsenic, cobalt, lead, selenium and turbidity. None of these parameters indicated statistically significant trends within this well. Cobalt, lead, selenium and turbidity had normal or underlying normal distributions, while distributions for arsenic for both background wells were found not to be normal. Arsenic was noted to have two outlier values at well MW-10 (0.011 mg/l and 0.022 mg/l), however there was a statistically significant data trend noted in the other background well (MW-01) for arsenic precluding that expanded dataset to be pooled. While the noted arsenic outlier concentrations are above the 845.600 standard of 0.01 mg/l, there is no site wide data trend for arsenic in other compliance wells during the two sampling periods with the outlier values and there is no known laboratory or field sampling error basis on which to remove these data points. The dataset for arsenic at MW-10 contains only 13 background data points. The Unified Guidance Section 5.2.3 states: *"Even when conditions have not changed, an apparently extreme measurement may represent nothing more than a portion of the background distribution that has yet to be observed. This is particularly true if the background data set contains fewer than 20 samples"*. Based on this guidance and some of the other above stated reasons, it was decided to include these outliers in the statistical background calculation for arsenic at well MW-10. This background calculation may be re-evaluated at a later date after at least 20 background data points have been collected.

The calculated prediction limits under the various background dataset selection scenarios for the ABB/ASB and FAB are summarized in Tables 9-10 and 9-11, respectively, in Section 9 of this permit application. A prediction limit statistical run summary which includes the specific statistical method used for each parameter for each well scenario noted above are provided at the end of this discussion.

Poweron ABB ASB Outlier Analysis

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 8/12/2021, 10:35 AM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	15	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-08	n/a	n/a	n/a	NP (nrm)	NaN	15	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-09 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	15	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-11	n/a	n/a	n/a	NP (nrm)	NaN	15	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-12	n/a	n/a	n/a	NP (nrm)	NaN	15	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-15	n/a	n/a	n/a	NP (nrm)	NaN	15	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-17	n/a	n/a	n/a	NP (nrm)	NaN	15	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-18	n/a	n/a	n/a	NP (nrm)	NaN	15	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-19 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	11	0.003	0	unknown	ShapiroWilk
Arsenic (mg/L)	MW-01 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.003653	0.006819	unknown	ShapiroWilk
Arsenic (mg/L)	MW-08	No	n/a	n/a	EPA 1989	0.05	17	0.002706	0.001081	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-09 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.001806	0.001442	unknown	ShapiroWilk
Arsenic (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	17	0.1044	0.1631	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-12	No	n/a	n/a	EPA 1989	0.05	17	0.12	0.1385	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-15	No	n/a	n/a	EPA 1989	0.05	17	0.01944	0.03049	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-17	No	n/a	n/a	NP (nrm)	NaN	17	0.1784	0.1477	unknown	ShapiroWilk
Arsenic (mg/L)	**MW-18**	**Yes**	**0.0032,0....**	**5/5/2017,...**	**NP (nrm)**	**NaN**	**17**	**0.001312**	**0.000721**	**unknown**	**ShapiroWilk**
Arsenic (mg/L)	MW-19 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	13	0.001031	0.0001109	unknown	ShapiroWilk
Barium (mg/L)	MW-01 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.05453	0.01389	unknown	ShapiroWilk
Barium (mg/L)	MW-08	No	n/a	n/a	EPA 1989	0.05	17	0.1035	0.03184	normal	ShapiroWilk
Barium (mg/L)	MW-09 (bg)	No	n/a	n/a	EPA 1989	0.05	17	0.038	0.007374	normal	ShapiroWilk
Barium (mg/L)	MW-11	No	n/a	n/a	NP (nrm)	NaN	17	0.57	0.6928	unknown	ShapiroWilk
Barium (mg/L)	MW-12	No	n/a	n/a	EPA 1989	0.05	17	0.2187	0.2331	ln(x)	ShapiroWilk
Barium (mg/L)	MW-15	No	n/a	n/a	EPA 1989	0.05	17	0.06435	0.02348	ln(x)	ShapiroWilk
Barium (mg/L)	MW-17	No	n/a	n/a	EPA 1989	0.05	17	0.1255	0.1072	ln(x)	ShapiroWilk
Barium (mg/L)	MW-18	No	n/a	n/a	NP (nrm)	NaN	17	0.1271	0.01105	unknown	ShapiroWilk
Barium (mg/L)	MW-19 (bg)	No	n/a	n/a	EPA 1989	0.05	13	0.07792	0.01082	normal	ShapiroWilk
Beryllium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	15	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-08	n/a	n/a	n/a	NP (nrm)	NaN	15	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-09 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	15	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-11	n/a	n/a	n/a	NP (nrm)	NaN	15	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-12	n/a	n/a	n/a	NP (nrm)	NaN	15	0.00102	0.0000...	unknown	ShapiroWilk
Beryllium (mg/L)	MW-15	n/a	n/a	n/a	NP (nrm)	NaN	15	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-17	n/a	n/a	n/a	NP (nrm)	NaN	15	0.00102	0.0000...	unknown	ShapiroWilk
Beryllium (mg/L)	MW-18	n/a	n/a	n/a	NP (nrm)	NaN	15	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-19 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	11	0.001	0	unknown	ShapiroWilk
Boron (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	17	0.3353	0.2393	ln(x)	ShapiroWilk
Boron (mg/L)	MW-08	No	n/a	n/a	EPA 1989	0.05	17	1.06	0.3921	normal	ShapiroWilk
Boron (mg/L)	MW-09 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	3.194	0.9763	unknown	ShapiroWilk
Boron (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	17	1.484	0.4286	normal	ShapiroWilk
Boron (mg/L)	MW-12	No	n/a	n/a	EPA 1989	0.05	17	0.6047	0.1908	normal	ShapiroWilk
Boron (mg/L)	MW-15	No	n/a	n/a	EPA 1989	0.05	17	1.747	0.423	ln(x)	ShapiroWilk
Boron (mg/L)	MW-17	No	n/a	n/a	EPA 1989	0.05	17	1.384	0.2918	normal	ShapiroWilk
Boron (mg/L)	MW-18	No	n/a	n/a	EPA 1989	0.05	17	0.6618	0.1215	normal	ShapiroWilk
Boron (mg/L)	MW-19 (bg)	No	n/a	n/a	EPA 1989	0.05	13	3.392	0.8301	normal	ShapiroWilk
Cadmium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.000...	0.0000...	unknown	ShapiroWilk
Cadmium (mg/L)	MW-08	n/a	n/a	n/a	NP (nrm)	NaN	17	0.000...	0.0000...	unknown	ShapiroWilk
Cadmium (mg/L)	MW-09 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	MW-11	n/a	n/a	n/a	NP (nrm)	NaN	17	0.000...	0.0000...	unknown	ShapiroWilk
Cadmium (mg/L)	MW-12	No	n/a	n/a	NP (nrm)	NaN	17	0.001597	0.001927	unknown	ShapiroWilk

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Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Cadmium (mg/L)	**MW-15**	**Yes**	**0.00098,0...**	**5/19/2016...**	**NP (nrm)**	**NaN**	**17**	**0.000...**	**0.0008708**	**unknown**	**ShapiroWilk**
Cadmium (mg/L)	MW-17	No	n/a	n/a	NP (nrm)	NaN	17	0.001012	0.0006228	unknown	ShapiroWilk
Cadmium (mg/L)	MW-18	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	MW-19 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	13	0.0005	0	unknown	ShapiroWilk
Calcium (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	17	95.94	14.66	normal	ShapiroWilk
Calcium (mg/L)	MW-08	No	n/a	n/a	NP (nrm)	NaN	17	135.4	22.1	unknown	ShapiroWilk
Calcium (mg/L)	MW-09 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	79.18	8.033	unknown	ShapiroWilk
Calcium (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	17	128.5	21.15	normal	ShapiroWilk
Calcium (mg/L)	MW-12	No	n/a	n/a	EPA 1989	0.05	17	123.6	26.48	normal	ShapiroWilk
Calcium (mg/L)	MW-15	No	n/a	n/a	NP (nrm)	NaN	17	195.9	45.42	unknown	ShapiroWilk
Calcium (mg/L)	MW-17	No	n/a	n/a	EPA 1989	0.05	17	185.3	39.39	normal	ShapiroWilk
Calcium (mg/L)	MW-18	No	n/a	n/a	NP (nrm)	NaN	17	127.1	9.852	unknown	ShapiroWilk
Calcium (mg/L)	MW-19 (bg)	No	n/a	n/a	EPA 1989	0.05	13	94.31	15.57	normal	ShapiroWilk
Chloride (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	17	48.12	7.737	normal	ShapiroWilk
Chloride (mg/L)	MW-08	No	n/a	n/a	EPA 1989	0.05	17	230.9	121.5	normal	ShapiroWilk
Chloride (mg/L)	MW-09 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	36.35	2.234	unknown	ShapiroWilk
Chloride (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	17	104.4	26.68	normal	ShapiroWilk
Chloride (mg/L)	MW-12	No	n/a	n/a	EPA 1989	0.05	17	180.6	20.45	normal	ShapiroWilk
Chloride (mg/L)	**MW-15**	**Yes**	**110**	**2/25/2016**	**Dixon`s**	**0.05**	**17**	**187.1**	**27.1**	**normal**	**ShapiroWilk**
Chloride (mg/L)	**MW-17**	**Yes**	**600**	**11/13/2019**	**NP (nrm)**	**NaN**	**17**	**237.6**	**98.27**	**unknown**	**ShapiroWilk**
Chloride (mg/L)	MW-18	No	n/a	n/a	EPA 1989	0.05	17	191.8	25.55	normal	ShapiroWilk
Chloride (mg/L)	**MW-19 (bg)**	**Yes**	**53**	**11/13/2019**	**Dixon`s**	**0.05**	**13**	**37.92**	**5.204**	**normal**	**ShapiroWilk**
Chromium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.006294	0.004845	unknown	ShapiroWilk
Chromium (mg/L)	MW-08	n/a	n/a	n/a	NP (nrm)	NaN	15	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	MW-09 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	15	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	MW-11	n/a	n/a	n/a	NP (nrm)	NaN	15	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	MW-12	n/a	n/a	n/a	NP (nrm)	NaN	15	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	MW-15	n/a	n/a	n/a	NP (nrm)	NaN	15	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	MW-17	n/a	n/a	n/a	NP (nrm)	NaN	15	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	MW-18	n/a	n/a	n/a	NP (nrm)	NaN	15	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	MW-19 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	11	0.005	0	unknown	ShapiroWilk
Cobalt (mg/L)	MW-01 (bg)	No	n/a	n/a	NP (nrm)	NaN	18	0.002667	0.00363	unknown	ShapiroWilk
Cobalt (mg/L)	MW-08	n/a	n/a	n/a	NP (nrm)	NaN	17	0.001	0	unknown	ShapiroWilk
Cobalt (mg/L)	MW-09 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.001135	0.0005326	unknown	ShapiroWilk
Cobalt (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	17	0.002988	0.0009493	normal	ShapiroWilk
Cobalt (mg/L)	MW-12	n/a	n/a	n/a	NP (nrm)	NaN	17	0.001018	0.0000...	unknown	ShapiroWilk
Cobalt (mg/L)	MW-15	n/a	n/a	n/a	NP (nrm)	NaN	17	0.001012	0.0000...	unknown	ShapiroWilk
Cobalt (mg/L)	MW-17	No	n/a	n/a	NP (nrm)	NaN	17	0.001388	0.000511	unknown	ShapiroWilk
Cobalt (mg/L)	MW-18	n/a	n/a	n/a	NP (nrm)	NaN	17	0.001	0	unknown	ShapiroWilk
Cobalt (mg/L)	MW-19 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	13	0.001023	0.0000...	unknown	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	17	0.6338	0.172	normal	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	**MW-08**	**Yes**	**1.31**	**12/14/2020**	**Dixon`s**	**0.05**	**17**	**0.6072**	**0.2317**	**normal**	**ShapiroWilk**
Combined Radium 226 + 228 (pCi/L)	MW-09 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.4845	0.1213	unknown	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	17	0.9534	0.6105	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-12	No	n/a	n/a	NP (nrm)	NaN	17	0.9695	0.8136	unknown	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-15	No	n/a	n/a	EPA 1989	0.05	17	0.5055	0.1451	normal	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-17	No	n/a	n/a	EPA 1989	0.05	17	1.853	1.944	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	**MW-18**	**Yes**	**1.88**	**2/22/2016**	**Dixon`s**	**0.05**	**17**	**0.6792**	**0.3539**	**ln(x)**	**ShapiroWilk**
Combined Radium 226 + 228 (pCi/L)	MW-19 (bg)	No	n/a	n/a	EPA 1989	0.05	13	0.5295	0.1765	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	17	0.1771	0.03704	normal	ShapiroWilk

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Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Fluoride (mg/L)	MW-08	No	n/a	n/a	EPA 1989	0.05	17	0.3594	0.05414	normal	ShapiroWilk
Fluoride (mg/L)	MW-09 (bg)	No	n/a	n/a	EPA 1989	0.05	17	0.1647	0.02853	normal	ShapiroWilk
Fluoride (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	17	0.5729	0.08971	normal	ShapiroWilk
Fluoride (mg/L)	MW-12	No	n/a	n/a	Dixon`s	0.05	17	0.4412	0.08528	normal	ShapiroWilk
Fluoride (mg/L)	MW-15	No	n/a	n/a	EPA 1989	0.05	17	0.5335	0.04987	normal	ShapiroWilk
Fluoride (mg/L)	MW-17	No	n/a	n/a	EPA 1989	0.05	17	0.6294	0.09653	normal	ShapiroWilk
Fluoride (mg/L)	MW-18	No	n/a	n/a	EPA 1989	0.05	17	0.6047	0.07001	normal	ShapiroWilk
Fluoride (mg/L)	MW-19 (bg)	No	n/a	n/a	EPA 1989	0.05	13	0.15	0.0216	normal	ShapiroWilk
Lead (mg/L)	MW-01 (bg)	No	n/a	n/a	NP (nrm)	NaN	18	0.004516	0.008072	unknown	ShapiroWilk
Lead (mg/L)	MW-08	No	n/a	n/a	NP (nrm)	NaN	17	0.000...	0.0001655	unknown	ShapiroWilk
Lead (mg/L)	MW-09 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.000...	0.0000...	unknown	ShapiroWilk
Lead (mg/L)	MW-11	No	n/a	n/a	NP (nrm)	NaN	17	0.000...	0.0004384	unknown	ShapiroWilk
Lead (mg/L)	MW-12	No	n/a	n/a	NP (nrm)	NaN	17	0.001191	0.001114	unknown	ShapiroWilk
Lead (mg/L)	MW-15	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0005	0	unknown	ShapiroWilk
Lead (mg/L)	MW-17	No	n/a	n/a	NP (nrm)	NaN	17	0.000...	0.000415	unknown	ShapiroWilk
Lead (mg/L)	MW-18	n/a	n/a	n/a	NP (nrm)	NaN	17	0.000...	0.0000...	unknown	ShapiroWilk
Lead (mg/L)	**MW-19 (bg)**	**Yes**	**0.0012**	**5/5/2017**	**NP (nrm)**	**NaN**	**13**	**0.000...**	**0.0001944**	**unknown**	**ShapiroWilk**
Lithium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.01012	0.0004851	unknown	ShapiroWilk
Lithium (mg/L)	MW-08	No	n/a	n/a	EPA 1989	0.05	17	0.01982	0.007577	normal	ShapiroWilk
Lithium (mg/L)	MW-09 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.01	0	unknown	ShapiroWilk
Lithium (mg/L)	MW-11	n/a	n/a	n/a	NP (nrm)	NaN	17	0.01012	0.0004851	unknown	ShapiroWilk
Lithium (mg/L)	MW-12	No	n/a	n/a	EPA 1989	0.05	17	0.01388	0.003407	ln(x)	ShapiroWilk
Lithium (mg/L)	MW-15	No	n/a	n/a	EPA 1989	0.05	17	0.029	0.007408	ln(x)	ShapiroWilk
Lithium (mg/L)	MW-17	No	n/a	n/a	EPA 1989	0.05	17	0.02035	0.005862	ln(x)	ShapiroWilk
Lithium (mg/L)	**MW-18**	**Yes**	**0.022**	**2/22/2016**	**Dixon`s**	**0.05**	**17**	**0.01382**	**0.002675**	**normal**	**ShapiroWilk**
Lithium (mg/L)	MW-19 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	13	0.01	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-08	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-09 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.000...	0.0000...	unknown	ShapiroWilk
Mercury (mg/L)	MW-11	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-12	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-15	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-17	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-18	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-19 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	13	0.0002	0	unknown	ShapiroWilk
Molybdenum (mg/L)	**MW-01 (bg)**	**Yes**	**0.01**	**5/11/2021**	**NP (nrm)**	**NaN**	**17**	**0.005724**	**0.001328**	**unknown**	**ShapiroWilk**
Molybdenum (mg/L)	MW-08	No	n/a	n/a	EPA 1989	0.05	17	0.01624	0.008238	ln(x)	ShapiroWilk
Molybdenum (mg/L)	MW-09 (bg)	No	n/a	n/a	EPA 1989	0.05	17	0.03318	0.007452	ln(x)	ShapiroWilk
Molybdenum (mg/L)	MW-11	No	n/a	n/a	NP (nrm)	NaN	17	0.01634	0.006475	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-12	No	n/a	n/a	NP (nrm)	NaN	17	0.02012	0.006679	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-15	No	n/a	n/a	EPA 1989	0.05	17	0.02612	0.006809	normal	ShapiroWilk
Molybdenum (mg/L)	MW-17	No	n/a	n/a	EPA 1989	0.05	17	0.07559	0.03481	normal	ShapiroWilk
Molybdenum (mg/L)	**MW-18**	**Yes**	**0.061**	**12/7/2020**	**NP (nrm)**	**NaN**	**17**	**0.008529**	**0.01352**	**unknown**	**ShapiroWilk**
Molybdenum (mg/L)	MW-19 (bg)	No	n/a	n/a	EPA 1989	0.05	13	0.039	0.007778	normal	ShapiroWilk
pH (n/a)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	17	7.186	0.2747	normal	ShapiroWilk
pH (n/a)	MW-08	No	n/a	n/a	NP (nrm)	NaN	17	7.308	0.2953	unknown	ShapiroWilk
pH (n/a)	MW-09 (bg)	No	n/a	n/a	EPA 1989	0.05	17	7.312	0.2248	normal	ShapiroWilk
pH (n/a)	**MW-11**	**Yes**	**7.89,6.62**	**5/16/2018...**	**Dixon`s**	**0.05**	**17**	**7.195**	**0.2541**	**normal**	**ShapiroWilk**
pH (n/a)	MW-12	No	n/a	n/a	EPA 1989	0.05	17	7.498	0.2921	normal	ShapiroWilk
pH (n/a)	MW-15	No	n/a	n/a	EPA 1989	0.05	17	6.995	0.2247	normal	ShapiroWilk

Poweron ABB ASB Outlier Analysis

Powerton Generating Station Client: NRG Data: Powerton Printed 8/12/2021, 10:35 AM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
pH (n/a)	**MW-17**	**Yes**	**7.79**	**5/14/2018**	**Dixon`s**	**0.05**	**17**	**7.233**	**0.2064**	**normal**	**ShapiroWilk**
pH (n/a)	**MW-18**	**Yes**	**7.06**	**2/22/2016**	**Dixon`s**	**0.05**	**17**	**7.821**	**0.2939**	**normal**	**ShapiroWilk**
pH (n/a)	MW-19 (bg)	No	n/a	n/a	EPA 1989	0.05	13	7.346	0.2818	normal	ShapiroWilk
Selenium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.002524	0.0000...	unknown	ShapiroWilk
Selenium (mg/L)	MW-08	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0025	0	unknown	ShapiroWilk
Selenium (mg/L)	MW-09 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.004224	0.002535	unknown	ShapiroWilk
Selenium (mg/L)	MW-11	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0025	0	unknown	ShapiroWilk
Selenium (mg/L)	MW-12	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0025	0	unknown	ShapiroWilk
Selenium (mg/L)	MW-15	No	n/a	n/a	EPA 1989	0.05	17	0.01685	0.02215	ln(x)	ShapiroWilk
Selenium (mg/L)	MW-17	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0025	0	unknown	ShapiroWilk
Selenium (mg/L)	MW-18	n/a	n/a	n/a	NP (nrm)	NaN	17	0.0025	0	unknown	ShapiroWilk
Selenium (mg/L)	MW-19 (bg)	No	n/a	n/a	NP (nrm)	NaN	13	0.003792	0.001512	unknown	ShapiroWilk
Sulfate (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	17	50.76	15.29	normal	ShapiroWilk
Sulfate (mg/L)	MW-08	No	n/a	n/a	EPA 1989	0.05	17	230.9	115.8	normal	ShapiroWilk
Sulfate (mg/L)	MW-09 (bg)	No	n/a	n/a	EPA 1989	0.05	17	137.9	38.26	normal	ShapiroWilk
Sulfate (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	17	241.2	69	ln(x)	ShapiroWilk
Sulfate (mg/L)	MW-12	No	n/a	n/a	EPA 1989	0.05	17	478.2	136.7	normal	ShapiroWilk
Sulfate (mg/L)	MW-15	No	n/a	n/a	NP (nrm)	NaN	17	630	278.2	unknown	ShapiroWilk
Sulfate (mg/L)	MW-17	No	n/a	n/a	EPA 1989	0.05	17	689.4	147.7	normal	ShapiroWilk
Sulfate (mg/L)	MW-18	No	n/a	n/a	EPA 1989	0.05	17	290.6	80.89	normal	ShapiroWilk
Sulfate (mg/L)	MW-19 (bg)	No	n/a	n/a	Dixon`s	0.05	13	148.2	34.32	normal	ShapiroWilk
Thallium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-08	n/a	n/a	n/a	NP (nrm)	NaN	17	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-09 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-11	n/a	n/a	n/a	NP (nrm)	NaN	17	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-12	n/a	n/a	n/a	NP (nrm)	NaN	17	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-15	n/a	n/a	n/a	NP (nrm)	NaN	17	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-17	No	n/a	n/a	NP (nrm)	NaN	17	0.003129	0.001857	unknown	ShapiroWilk
Thallium (mg/L)	MW-18	n/a	n/a	n/a	NP (nrm)	NaN	17	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-19 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	13	0.002	0	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	17	500	69.73	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-08	No	n/a	n/a	EPA 1989	0.05	17	1106	361.1	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-09 (bg)	No	n/a	n/a	EPA 1989	0.05	17	581.2	112.2	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-11	No	n/a	n/a	EPA 1989	0.05	17	927.6	161.7	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-12	No	n/a	n/a	EPA 1989	0.05	17	1251	190.9	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	**MW-15**	**Yes**	**2800**	**5/19/2016**	**Dixon`s**	**0.05**	**17**	**1735**	**380.7**	**normal**	**ShapiroWilk**
Total Dissolved Solids (mg/L)	MW-17	No	n/a	n/a	EPA 1989	0.05	17	1700	327.9	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-18	No	n/a	n/a	NP (nrm)	NaN	17	1135	123.5	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-19 (bg)	No	n/a	n/a	NP (nrm)	NaN	13	643.1	115.9	unknown	ShapiroWilk

Outlier Analysis FAB

Powerton Generating Station Client: NRG Data: Powerton FAB Printed 8/13/2021, 12:17 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	16	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	11	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	11	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	11	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	14	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	11	0.003	0	unknown	ShapiroWilk
Arsenic (mg/L)	MW-01 (bg)	No	n/a	n/a	NP (nrm)	NaN	18	0.00195	0.001931	unknown	ShapiroWilk
Arsenic (mg/L)	**MW-02**	**Yes**	**0.0026**	**2/26/2019**	**Dixon`s**	**0.05**	**13**	**0.0014**	**0.0004183**	**normal**	**ShapiroWilk**
Arsenic (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	13	0.001192	0.0001935	unknown	ShapiroWilk
Arsenic (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	13	0.001031	0.0000...	unknown	ShapiroWilk
Arsenic (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	16	0.001	1.2e-11	unknown	ShapiroWilk
Arsenic (mg/L)	**MW-10 (bg)**	**Yes**	**0.011,0.022**	**10/30/201...**	**Dixon`s**	**0.05**	**13**	**0.004046**	**0.006002**	**normal**	**ShapiroWilk**
Barium (mg/L)	**MW-01 (bg)**	**Yes**	**0.083**	**11/8/2017**	**Dixon`s**	**0.05**	**18**	**0.05183**	**0.01011**	**normal**	**ShapiroWilk**
Barium (mg/L)	MW-02	No	n/a	n/a	EPA 1989	0.05	13	0.06423	0.0125	normal	ShapiroWilk
Barium (mg/L)	MW-03	No	n/a	n/a	NP (nrm)	NaN	13	0.06562	0.007943	unknown	ShapiroWilk
Barium (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	13	0.03285	0.008591	ln(x)	ShapiroWilk
Barium (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	16	0.05369	0.007153	normal	ShapiroWilk
Barium (mg/L)	**MW-10 (bg)**	**Yes**	**0.41,0.59**	**10/30/201...**	**Dixon`s**	**0.05**	**13**	**0.2815**	**0.1071**	**normal**	**ShapiroWilk**
Beryllium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	16	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	11	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	11	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	11	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	14	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	11	0.001364	0.001206	unknown	ShapiroWilk
Boron (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	18	0.3339	0.2358	ln(x)	ShapiroWilk
Boron (mg/L)	MW-02	No	n/a	n/a	EPA 1989	0.05	13	0.7333	0.9931	ln(x)	ShapiroWilk
Boron (mg/L)	**MW-03**	**Yes**	**0.86**	**12/9/2020**	**Dixon`s**	**0.05**	**13**	**0.3328**	**0.1844**	**normal**	**ShapiroWilk**
Boron (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	13	0.5585	0.1403	normal	ShapiroWilk
Boron (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	16	0.6169	0.1222	ln(x)	ShapiroWilk
Boron (mg/L)	MW-10 (bg)	No	n/a	n/a	NP (nrm)	NaN	13	0.6746	0.61	unknown	ShapiroWilk
Cadmium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	11	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	11	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	11	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	14	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	11	0.000...	0.0003086	unknown	ShapiroWilk
Calcium (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	18	95.78	14.37	ln(x)	ShapiroWilk
Calcium (mg/L)	MW-02	No	n/a	n/a	EPA 1989	0.05	13	86.23	8.228	normal	ShapiroWilk
Calcium (mg/L)	MW-03	No	n/a	n/a	NP (nrm)	NaN	13	79.23	5.847	unknown	ShapiroWilk
Calcium (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	13	86	10.54	normal	ShapiroWilk
Calcium (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	16	102.3	11.89	normal	ShapiroWilk
Calcium (mg/L)	**MW-10 (bg)**	**Yes**	**150**	**2/26/2019**	**Dixon`s**	**0.05**	**13**	**104.5**	**16.72**	**normal**	**ShapiroWilk**
Chloride (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	18	47.83	7.846	normal	ShapiroWilk
Chloride (mg/L)	MW-02	No	n/a	n/a	EPA 1989	0.05	13	48.77	4.166	normal	ShapiroWilk
Chloride (mg/L)	MW-03	No	n/a	n/a	EPA 1989	0.05	13	53.23	7.452	normal	ShapiroWilk
Chloride (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	13	65.46	17.28	normal	ShapiroWilk
Chloride (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	16	84.13	21.28	normal	ShapiroWilk
Chloride (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	13	48.15	4.279	normal	ShapiroWilk
Chromium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.005111	0.0004714	unknown	ShapiroWilk
Chromium (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	13	0.005	0	unknown	ShapiroWilk

Outlier Analysis FAB

Powerton Generating Station   Client: NRG   Data: Powerton FAB   Printed 8/13/2021, 12:17 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Chromium (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	13	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	13	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	16	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	**MW-10 (bg)**	**Yes**	**0.024,0.063**	**10/30/201...**	**NP (nrm)**	**NaN**	**13**	**0.0112**	**0.01643**	**unknown**	**ShapiroWilk**
Cobalt (mg/L)	MW-01 (bg)	No	n/a	n/a	NP (nrm)	NaN	18	0.001772	0.001476	unknown	ShapiroWilk
Cobalt (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	13	0.001	0	unknown	ShapiroWilk
Cobalt (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	13	0.001	0	unknown	ShapiroWilk
Cobalt (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	13	0.001015	0.0000...	unknown	ShapiroWilk
Cobalt (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	16	0.001	0	unknown	ShapiroWilk
Cobalt (mg/L)	MW-10 (bg)	No	n/a	n/a	NP (nrm)	NaN	13	0.01793	0.02202	unknown	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	18	0.6154	0.1656	normal	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-02	No	n/a	n/a	EPA 1989	0.05	13	0.5498	0.2315	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	**MW-03**	**Yes**	**1.2**	**8/23/2017**	**Dixon`s**	**0.05**	**13**	**0.5121**	**0.2291**	**normal**	**ShapiroWilk**
Combined Radium 226 + 228 (pCi/L)	MW-04	No	n/a	n/a	Dixon`s	0.05	13	0.5114	0.2117	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	16	0.4712	0.1076	normal	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	13	1.46	1.056	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	18	0.1767	0.03896	normal	ShapiroWilk
Fluoride (mg/L)	MW-02	No	n/a	n/a	EPA 1989	0.05	13	0.1815	0.02444	normal	ShapiroWilk
Fluoride (mg/L)	MW-03	No	n/a	n/a	EPA 1989	0.05	13	0.2446	0.02727	normal	ShapiroWilk
Fluoride (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	13	0.2731	0.04171	normal	ShapiroWilk
Fluoride (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	16	0.3131	0.04332	normal	ShapiroWilk
Fluoride (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	13	0.2108	0.02629	normal	ShapiroWilk
Lead (mg/L)	MW-01 (bg)	No	n/a	n/a	NP (nrm)	NaN	18	0.002458	0.003375	unknown	ShapiroWilk
Lead (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	13	0.000...	0.0002219	unknown	ShapiroWilk
Lead (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	13	0.000...	0.0000...	unknown	ShapiroWilk
Lead (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	13	0.000...	0.0001941	unknown	ShapiroWilk
Lead (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	16	0.000...	0.0001025	unknown	ShapiroWilk
Lead (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	13	0.006195	0.01074	ln(x)	ShapiroWilk
Lithium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.01	0	unknown	ShapiroWilk
Lithium (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	12	0.01	0	unknown	ShapiroWilk
Lithium (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	12	0.01	0	unknown	ShapiroWilk
Lithium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	12	0.01	0	unknown	ShapiroWilk
Lithium (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	15	0.01	0	unknown	ShapiroWilk
Lithium (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.01242	0.006487	unknown	ShapiroWilk
Mercury (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	12	0.000...	0.0000...	unknown	ShapiroWilk
Mercury (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	15	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0002	0	unknown	ShapiroWilk
Molybdenum (mg/L)	**MW-01 (bg)**	**Yes**	**0.01**	**5/11/2021**	**NP (nrm)**	**NaN**	**18**	**0.005522**	**0.001183**	**unknown**	**ShapiroWilk**
Molybdenum (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	13	0.005415	0.001252	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	13	0.005	0	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-04	No	n/a	n/a	NP (nrm)	NaN	13	0.006123	0.002316	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-05	No	n/a	n/a	NP (nrm)	NaN	16	0.006112	0.00107	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	13	0.005123	0.0004438	unknown	ShapiroWilk
pH (n/a)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	18	7.166	0.2539	normal	ShapiroWilk
pH (n/a)	MW-02	No	n/a	n/a	EPA 1989	0.05	13	7.455	0.3042	normal	ShapiroWilk
pH (n/a)	MW-03	No	n/a	n/a	EPA 1989	0.05	13	7.266	0.3052	normal	ShapiroWilk
pH (n/a)	MW-04	No	n/a	n/a	EPA 1989	0.05	13	7.155	0.263	normal	ShapiroWilk

Outlier Analysis FAB

Powerton Generating Station Client: NRG Data: Powerton FAB Printed 8/13/2021, 12:17 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
pH (n/a)	MW-05	No	n/a	n/a	EPA 1989	0.05	16	7.068	0.2899	normal	ShapiroWilk
pH (n/a)	MW-10 (bg)	No	n/a	n/a	NP (nrm)	NaN	13	7.041	0.3036	unknown	ShapiroWilk
Selenium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.002522	0.0000...	unknown	ShapiroWilk
Selenium (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	13	0.002515	0.0000...	unknown	ShapiroWilk
Selenium (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	13	0.002585	0.0003051	unknown	ShapiroWilk
Selenium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	13	0.003015	0.001858	unknown	ShapiroWilk
Selenium (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	16	0.0025	0	unknown	ShapiroWilk
Selenium (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	13	0.0046	0.0009129	normal	ShapiroWilk
Sulfate (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	18	51.44	16	normal	ShapiroWilk
Sulfate (mg/L)	MW-02	No	n/a	n/a	EPA 1989	0.05	13	46.08	17.59	normal	ShapiroWilk
Sulfate (mg/L)	MW-03	No	n/a	n/a	EPA 1989	0.05	13	48.69	19.97	normal	ShapiroWilk
Sulfate (mg/L)	MW-04	No	n/a	n/a	Dixon`s	0.05	13	70.62	33.04	normal	ShapiroWilk
Sulfate (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	16	138.4	41.77	normal	ShapiroWilk
Sulfate (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	13	54.85	15.14	normal	ShapiroWilk
Thallium (mg/L)	MW-01 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-02	n/a	n/a	n/a	NP (nrm)	NaN	11	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	11	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	11	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	14	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	11	0.002	0	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-01 (bg)	No	n/a	n/a	EPA 1989	0.05	18	503.9	66.87	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-02	No	n/a	n/a	EPA 1989	0.05	13	452.3	54.95	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-03	No	n/a	n/a	EPA 1989	0.05	13	433.1	47.33	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	13	523.8	111.1	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	16	722.5	138.1	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-10 (bg)	No	n/a	n/a	NP (nrm)	NaN	13	513.8	41.94	unknown	ShapiroWilk

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Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Antimony (mg/L)	MW-01 (bg)	No	0	0	0	15	0.05
Antimony (mg/L)	MW-08	No	0	0	0	15	0.05
Antimony (mg/L)	MW-09 (bg)	No	0	0	0	15	0.05
Antimony (mg/L)	MW-11	No	0	0	0	15	0.05
Antimony (mg/L)	MW-12	No	0	0	0	15	0.05
Antimony (mg/L)	MW-15	No	0	0	0	15	0.05
Antimony (mg/L)	MW-17	No	0	0	0	15	0.05
Antimony (mg/L)	MW-18	No	0	0	0	15	0.05
Arsenic (mg/L)	MW-01 (bg)	No	1.208	7.815	3	17	0.05
Arsenic (mg/L)	MW-08	No	1.554	7.815	3	17	0.05
Arsenic (mg/L)	**MW-09 (bg)**	**Yes**	**10.11**	**7.815**	**3**	**17**	**0.05**
Arsenic (mg/L)	MW-11	No	2.369	7.815	3	17	0.05
Arsenic (mg/L)	MW-12	No	1.787	7.815	3	17	0.05
Arsenic (mg/L)	MW-15	No	0.267	7.815	3	17	0.05
Arsenic (mg/L)	MW-17	No	3.792	7.815	3	17	0.05
Arsenic (mg/L)	MW-18	No	3.6	7.815	3	17	0.05
Arsenic (mg/L)	MW-19 (bg)	No	3.6	7.815	3	13	0.05
Barium (mg/L)	**MW-01 (bg)**	**Yes**	**8.186**	**7.815**	**3**	**17**	**0.05**
Barium (mg/L)	MW-08	No	0.971	7.815	3	17	0.05
Barium (mg/L)	MW-09 (bg)	No	2.492	7.815	3	17	0.05
Barium (mg/L)	MW-11	No	2.728	7.815	3	17	0.05
Barium (mg/L)	MW-12	No	1.138	7.815	3	17	0.05
Barium (mg/L)	MW-15	No	0.9203	7.815	3	17	0.05
Barium (mg/L)	MW-17	No	2.487	7.815	3	17	0.05
Barium (mg/L)	MW-18	No	0.8944	7.815	3	17	0.05
Barium (mg/L)	MW-19 (bg)	No	0.8944	7.815	3	13	0.05
Beryllium (mg/L)	MW-01 (bg)	No	0	0	3	15	0.05
Beryllium (mg/L)	MW-08	No	0	0	3	15	0.05
Beryllium (mg/L)	MW-09 (bg)	No	0	0	3	15	0.05
Beryllium (mg/L)	MW-11	No	0	0	3	15	0.05
Beryllium (mg/L)	MW-12	No	0	0	3	15	0.05
Beryllium (mg/L)	MW-15	No	0	0	3	15	0.05
Beryllium (mg/L)	MW-17	No	2	7.815	3	15	0.05
Beryllium (mg/L)	MW-18	No	0	0	3	15	0.05
Boron (mg/L)	MW-01 (bg)	No	5.32	7.815	3	17	0.05
Boron (mg/L)	MW-08	No	1.843	7.815	3	17	0.05
Boron (mg/L)	MW-09 (bg)	No	1.146	7.815	3	17	0.05
Boron (mg/L)	MW-11	No	0.1714	7.815	3	17	0.05
Boron (mg/L)	**MW-12**	**Yes**	**11.55**	**7.815**	**3**	**17**	**0.05**
Boron (mg/L)	MW-15	No	1.834	7.815	3	17	0.05
Boron (mg/L)	MW-17	No	4.522	7.815	3	17	0.05
Boron (mg/L)	**MW-18**	**Yes**	**8.235**	**7.815**	**3**	**17**	**0.05**
Boron (mg/L)	MW-19 (bg)	No	8.235	7.815	3	13	0.05
Cadmium (mg/L)	MW-01 (bg)	No	2.4	7.815	3	17	0.05
Cadmium (mg/L)	MW-08	No	4.667	7.815	3	17	0.05
Cadmium (mg/L)	MW-09 (bg)	No	0	0	3	17	0.05
Cadmium (mg/L)	MW-11	No	4.667	7.815	3	17	0.05
Cadmium (mg/L)	MW-12	No	1.16	7.815	3	17	0.05
Cadmium (mg/L)	MW-15	No	1.687	7.815	3	17	0.05
Cadmium (mg/L)	MW-17	No	3.274	7.815	3	17	0.05

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Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Cadmium (mg/L)	MW-18	No	0	0	3	17	0.05
Cadmium (mg/L)	MW-19 (bg)	No	0	0	3	13	0.05
Calcium (mg/L)	MW-01 (bg)	No	6.203	7.815	3	17	0.05
Calcium (mg/L)	MW-08	No	1.076	7.815	3	17	0.05
Calcium (mg/L)	MW-09 (bg)	No	1.145	7.815	3	17	0.05
Calcium (mg/L)	MW-11	No	1.224	7.815	3	17	0.05
Calcium (mg/L)	MW-12	No	2.379	7.815	3	17	0.05
Calcium (mg/L)	MW-15	No	3.219	7.815	3	17	0.05
Calcium (mg/L)	MW-17	No	2.514	7.815	3	17	0.05
Calcium (mg/L)	MW-18	No	0.9169	7.815	3	17	0.05
Calcium (mg/L)	MW-19 (bg)	No	0.9169	7.815	3	13	0.05
Chloride (mg/L)	MW-01 (bg)	No	5.385	7.815	3	17	0.05
Chloride (mg/L)	MW-08	No	1.77	7.815	3	17	0.05
Chloride (mg/L)	MW-09 (bg)	No	3.489	7.815	3	17	0.05
Chloride (mg/L)	MW-11	No	2.13	7.815	3	17	0.05
Chloride (mg/L)	MW-12	No	1.251	7.815	3	17	0.05
Chloride (mg/L)	MW-15	No	0.5227	7.815	3	17	0.05
Chloride (mg/L)	MW-17	No	0.9027	7.815	3	17	0.05
Chloride (mg/L)	MW-18	No	3.277	7.815	3	17	0.05
Chloride (mg/L)	MW-19 (bg)	No	3.277	7.815	3	13	0.05
Chromium (mg/L)	MW-01 (bg)	No	1.5	7.815	3	17	0.05
Chromium (mg/L)	MW-08	No	1.5	7.815	3	15	0.05
Chromium (mg/L)	MW-09 (bg)	No	1.5	7.815	3	15	0.05
Chromium (mg/L)	MW-11	No	1.5	7.815	3	15	0.05
Chromium (mg/L)	MW-12	No	1.5	7.815	3	15	0.05
Chromium (mg/L)	MW-15	No	1.5	7.815	3	15	0.05
Chromium (mg/L)	MW-17	No	0	0	3	15	0.05
Chromium (mg/L)	MW-18	No	0	0	3	15	0.05
Cobalt (mg/L)	MW-01 (bg)	No	2.105	7.815	3	18	0.05
Cobalt (mg/L)	MW-08	No	0	0	3	17	0.05
Cobalt (mg/L)	MW-09 (bg)	No	2.567	7.815	3	17	0.05
Cobalt (mg/L)	MW-11	No	2.874	7.815	3	17	0.05
Cobalt (mg/L)	MW-12	No	4.667	7.815	3	17	0.05
Cobalt (mg/L)	MW-15	No	2.4	7.815	3	17	0.05
Cobalt (mg/L)	MW-17	No	2.92	7.815	3	17	0.05
Cobalt (mg/L)	MW-18	No	0	0	3	17	0.05
Cobalt (mg/L)	MW-19 (bg)	No	0	0	3	13	0.05
Combined Radium 226 + 228 (pCi/L)	MW-01 (bg)	No	2.439	7.815	3	17	0.05
Combined Radium 226 + 228 (pCi/L)	MW-08	No	3.765	7.815	3	17	0.05
Combined Radium 226 + 228 (pCi/L)	MW-09 (bg)	No	0.7268	7.815	3	17	0.05
Combined Radium 226 + 228 (pCi/L)	MW-11	No	3.758	7.815	3	17	0.05
Combined Radium 226 + 228 (pCi/L)	MW-12	No	3.178	7.815	3	17	0.05
Combined Radium 226 + 228 (pCi/L)	MW-15	No	1.02	7.815	3	17	0.05
Combined Radium 226 + 228 (pCi/L)	MW-17	No	1.035	7.815	3	17	0.05
Combined Radium 226 + 228 (pCi/L)	MW-18	No	2.092	7.815	3	17	0.05
Combined Radium 226 + 228 (pCi/L)	MW-19 (bg)	No	2.092	7.815	3	13	0.05
Fluoride (mg/L)	MW-01 (bg)	No	0.963	7.815	3	17	0.05
Fluoride (mg/L)	MW-08	No	2.688	7.815	3	17	0.05
Fluoride (mg/L)	MW-09 (bg)	No	1.539	7.815	3	17	0.05
Fluoride (mg/L)	MW-11	No	1.814	7.815	3	17	0.05

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Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Fluoride (mg/L)	MW-12	No	6.835	7.815	3	17	0.05
Fluoride (mg/L)	MW-15	No	0.7717	7.815	3	17	0.05
Fluoride (mg/L)	MW-17	No	1.867	7.815	3	17	0.05
Fluoride (mg/L)	MW-18	No	0.6421	7.815	3	17	0.05
Fluoride (mg/L)	MW-19 (bg)	No	0.6421	7.815	3	13	0.05
Lead (mg/L)	MW-01 (bg)	No	1.446	7.815	3	18	0.05
Lead (mg/L)	MW-08	No	5.607	7.815	3	17	0.05
Lead (mg/L)	MW-09 (bg)	No	2.4	7.815	3	17	0.05
Lead (mg/L)	MW-11	No	1.14	7.815	3	17	0.05
Lead (mg/L)	MW-12	No	3.988	7.815	3	17	0.05
Lead (mg/L)	MW-15	No	0	0	3	17	0.05
Lead (mg/L)	MW-17	No	2.171	7.815	3	17	0.05
Lead (mg/L)	MW-18	No	2.4	7.815	3	17	0.05
Lead (mg/L)	MW-19 (bg)	No	2.4	7.815	3	13	0.05
Lithium (mg/L)	MW-01 (bg)	No	2.4	7.815	3	17	0.05
Lithium (mg/L)	MW-08	No	2.667	7.815	3	17	0.05
Lithium (mg/L)	MW-09 (bg)	No	0	0	3	17	0.05
Lithium (mg/L)	MW-11	No	1.833	7.815	3	17	0.05
Lithium (mg/L)	MW-12	No	4.438	7.815	3	17	0.05
Lithium (mg/L)	MW-15	No	0.7891	7.815	3	17	0.05
Lithium (mg/L)	MW-17	No	0.2949	7.815	3	17	0.05
Lithium (mg/L)	MW-18	No	5.078	7.815	3	17	0.05
Lithium (mg/L)	MW-19 (bg)	No	5.078	7.815	3	13	0.05
Mercury (mg/L)	MW-01 (bg)	No	0	0	3	17	0.05
Mercury (mg/L)	MW-08	No	0	0	3	17	0.05
Mercury (mg/L)	MW-09 (bg)	No	1.833	7.815	3	17	0.05
Mercury (mg/L)	MW-11	No	0	0	3	17	0.05
Mercury (mg/L)	MW-12	No	0	0	3	17	0.05
Mercury (mg/L)	MW-15	No	0	0	3	17	0.05
Mercury (mg/L)	MW-17	No	0	0	3	17	0.05
Mercury (mg/L)	MW-18	No	0	0	3	17	0.05
Mercury (mg/L)	MW-19 (bg)	No	0	0	3	13	0.05
Molybdenum (mg/L)	MW-01 (bg)	No	1.562	7.815	3	17	0.05
Molybdenum (mg/L)	MW-08	No	3.185	7.815	3	17	0.05
Molybdenum (mg/L)	MW-09 (bg)	No	1.154	7.815	3	17	0.05
Molybdenum (mg/L)	MW-11	No	1.561	7.815	3	17	0.05
Molybdenum (mg/L)	MW-12	No	2.713	7.815	3	17	0.05
Molybdenum (mg/L)	MW-15	No	5.93	7.815	3	17	0.05
Molybdenum (mg/L)	MW-17	No	7.677	7.815	3	17	0.05
Molybdenum (mg/L)	MW-18	No	1.674	7.815	3	17	0.05
Molybdenum (mg/L)	MW-19 (bg)	No	1.674	7.815	3	13	0.05
pH (n/a)	MW-01 (bg)	No	0.9435	7.815	3	17	0.05
pH (n/a)	MW-08	No	1.471	7.815	3	17	0.05
pH (n/a)	MW-09 (bg)	No	2.499	7.815	3	17	0.05
pH (n/a)	MW-11	No	2.06	7.815	3	17	0.05
pH (n/a)	MW-12	No	6.169	7.815	3	17	0.05
pH (n/a)	MW-15	No	0.09162	7.815	3	17	0.05
pH (n/a)	MW-17	No	4.866	7.815	3	17	0.05
pH (n/a)	MW-18	No	3.609	7.815	3	17	0.05
pH (n/a)	MW-19 (bg)	No	3.609	7.815	3	13	0.05

Seasonality ABBASB

Powerton Generating Station Client: NRG Data: Powerton Printed 8/12/2021, 11:30 AM

Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Selenium (mg/L)	MW-01 (bg)	No	3.25	7.815	3	17	0.05
Selenium (mg/L)	MW-08	No	0	0	3	17	0.05
Selenium (mg/L)	MW-09 (bg)	No	6.582	7.815	3	17	0.05
Selenium (mg/L)	MW-11	No	0	0	3	17	0.05
Selenium (mg/L)	MW-12	No	0	0	3	17	0.05
Selenium (mg/L)	MW-15	No	0.9603	7.815	3	17	0.05
Selenium (mg/L)	MW-17	No	0	0	3	17	0.05
Selenium (mg/L)	MW-18	No	0	0	3	17	0.05
Selenium (mg/L)	MW-19 (bg)	No	0	0	3	13	0.05
Sulfate (mg/L)	MW-01 (bg)	No	0.8146	7.815	3	17	0.05
Sulfate (mg/L)	MW-08	No	1.534	7.815	3	17	0.05
Sulfate (mg/L)	MW-09 (bg)	No	3.164	7.815	3	17	0.05
Sulfate (mg/L)	MW-11	No	3.964	7.815	3	17	0.05
Sulfate (mg/L)	MW-12	No	2.582	7.815	3	17	0.05
Sulfate (mg/L)	MW-15	No	0.2204	7.815	3	17	0.05
Sulfate (mg/L)	MW-17	No	0.4915	7.815	3	17	0.05
Sulfate (mg/L)	MW-18	No	3.727	7.815	3	17	0.05
Sulfate (mg/L)	MW-19 (bg)	No	3.727	7.815	3	13	0.05
Thallium (mg/L)	MW-01 (bg)	No	0	0	3	17	0.05
Thallium (mg/L)	MW-08	No	0	0	3	17	0.05
Thallium (mg/L)	MW-09 (bg)	No	0	0	3	17	0.05
Thallium (mg/L)	MW-11	No	0	0	3	17	0.05
Thallium (mg/L)	MW-12	No	0	0	3	17	0.05
Thallium (mg/L)	MW-15	No	0	0	3	17	0.05
Thallium (mg/L)	MW-17	No	3.634	7.815	3	17	0.05
Thallium (mg/L)	MW-18	No	0	0	3	17	0.05
Thallium (mg/L)	MW-19 (bg)	No	0	0	3	13	0.05
Total Dissolved Solids (mg/L)	MW-01 (bg)	No	1.281	7.815	3	17	0.05
Total Dissolved Solids (mg/L)	MW-08	No	2.318	7.815	3	17	0.05
Total Dissolved Solids (mg/L)	MW-09 (bg)	No	5.057	7.815	3	17	0.05
Total Dissolved Solids (mg/L)	MW-11	No	2.211	7.815	3	17	0.05
Total Dissolved Solids (mg/L)	MW-12	No	3.959	7.815	3	17	0.05
Total Dissolved Solids (mg/L)	MW-15	No	1.996	7.815	3	17	0.05
Total Dissolved Solids (mg/L)	MW-17	No	3.007	7.815	3	17	0.05
Total Dissolved Solids (mg/L)	MW-18	No	1.28	7.815	3	17	0.05
Total Dissolved Solids (mg/L)	MW-19 (bg)	No	1.28	7.815	3	13	0.05

Seasonality FAB

Powerton Generating Station   Client: NRG   Data: Powerton FAB   Printed 8/12/2021, 11:37 AM

Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Antimony (mg/L)	MW-01 (bg)	No	0	0	3	16	0.05
Antimony (mg/L)	MW-05	No	0	0	3	14	0.05
Arsenic (mg/L)	MW-01 (bg)	No	1.38	7.815	3	18	0.05
Arsenic (mg/L)	MW-02	No	1.38	7.815	3	13	0.05
Arsenic (mg/L)	MW-03	No	1.38	7.815	3	13	0.05
Arsenic (mg/L)	MW-04	No	1.38	7.815	3	13	0.05
Arsenic (mg/L)	MW-05	No	3	7.815	3	16	0.05
Arsenic (mg/L)	MW-10 (bg)	No	3	7.815	3	13	0.05
Barium (mg/L)	MW-01 (bg)	No	7.255	7.815	3	18	0.05
Barium (mg/L)	MW-02	No	7.255	7.815	3	13	0.05
Barium (mg/L)	MW-03	No	7.255	7.815	3	13	0.05
Barium (mg/L)	MW-04	No	7.255	7.815	3	13	0.05
Barium (mg/L)	MW-05	No	1.252	7.815	3	16	0.05
Barium (mg/L)	MW-10 (bg)	No	1.252	7.815	3	13	0.05
Beryllium (mg/L)	MW-01 (bg)	No	0	0	3	16	0.05
Beryllium (mg/L)	MW-05	No	0	0	3	14	0.05
Boron (mg/L)	MW-01 (bg)	No	4.364	7.815	3	18	0.05
Boron (mg/L)	MW-02	No	4.364	7.815	3	13	0.05
Boron (mg/L)	MW-03	No	4.364	7.815	3	13	0.05
Boron (mg/L)	MW-04	No	4.364	7.815	3	13	0.05
Boron (mg/L)	MW-05	No	0.7946	7.815	3	16	0.05
Boron (mg/L)	MW-10 (bg)	No	0.7946	7.815	3	13	0.05
Cadmium (mg/L)	MW-01 (bg)	No	0	0	3	18	0.05
Cadmium (mg/L)	MW-05	No	0	0	3	14	0.05
Calcium (mg/L)	MW-01 (bg)	No	4.731	7.815	3	18	0.05
Calcium (mg/L)	MW-02	No	4.731	7.815	3	13	0.05
Calcium (mg/L)	MW-03	No	4.731	7.815	3	13	0.05
Calcium (mg/L)	MW-04	No	4.731	7.815	3	13	0.05
Calcium (mg/L)	MW-05	No	5.122	7.815	3	16	0.05
Calcium (mg/L)	MW-10 (bg)	No	5.122	7.815	3	13	0.05
Chloride (mg/L)	MW-01 (bg)	No	6.964	7.815	3	18	0.05
Chloride (mg/L)	MW-02	No	6.964	7.815	3	13	0.05
Chloride (mg/L)	MW-03	No	6.964	7.815	3	13	0.05
Chloride (mg/L)	MW-04	No	6.964	7.815	3	13	0.05
Chloride (mg/L)	MW-05	No	4.177	7.815	3	16	0.05
Chloride (mg/L)	MW-10 (bg)	No	4.177	7.815	3	13	0.05
Chromium (mg/L)	MW-01 (bg)	No	2.6	7.815	3	18	0.05
Chromium (mg/L)	MW-02	No	2.6	7.815	3	13	0.05
Chromium (mg/L)	MW-03	No	2.6	7.815	3	13	0.05
Chromium (mg/L)	MW-04	No	2.6	7.815	3	13	0.05
Chromium (mg/L)	MW-05	No	0	0	3	16	0.05
Chromium (mg/L)	MW-10 (bg)	No	0	0	3	13	0.05
Cobalt (mg/L)	MW-01 (bg)	No	2.121	7.815	3	18	0.05
Cobalt (mg/L)	MW-02	No	2.121	7.815	3	13	0.05
Cobalt (mg/L)	MW-03	No	2.121	7.815	3	13	0.05
Cobalt (mg/L)	MW-04	No	2.121	7.815	3	13	0.05
Cobalt (mg/L)	MW-05	No	0	0	3	16	0.05
Cobalt (mg/L)	MW-10 (bg)	No	0	0	3	13	0.05
Combined Radium 226 + 228 (pCi/L)	MW-01 (bg)	No	2.153	7.815	3	18	0.05
Combined Radium 226 + 228 (pCi/L)	MW-02	No	2.153	7.815	3	13	0.05

Seasonality FAB

Powerton Generating Station Client: NRG Data: Powerton FAB Printed 8/12/2021, 11:37 AM

Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Combined Radium 226 + 228 (pCi/L)	MW-03	No	2.153	7.815	3	13	0.05
Combined Radium 226 + 228 (pCi/L)	MW-04	No	2.153	7.815	3	13	0.05
Combined Radium 226 + 228 (pCi/L)	MW-05	No	1.704	7.815	3	16	0.05
Combined Radium 226 + 228 (pCi/L)	MW-10 (bg)	No	1.704	7.815	3	13	0.05
Fluoride (mg/L)	MW-01 (bg)	No	0.4979	7.815	3	18	0.05
Fluoride (mg/L)	MW-02	No	0.4979	7.815	3	13	0.05
Fluoride (mg/L)	MW-03	No	0.4979	7.815	3	13	0.05
Fluoride (mg/L)	MW-04	No	0.4979	7.815	3	13	0.05
Fluoride (mg/L)	MW-05	No	1.98	7.815	3	16	0.05
Fluoride (mg/L)	MW-10 (bg)	No	1.98	7.815	3	13	0.05
Lead (mg/L)	MW-01 (bg)	No	2.793	7.815	3	18	0.05
Lead (mg/L)	MW-02	No	2.793	7.815	3	13	0.05
Lead (mg/L)	MW-03	No	2.793	7.815	3	13	0.05
Lead (mg/L)	MW-04	No	2.793	7.815	3	13	0.05
Lead (mg/L)	MW-05	No	3	7.815	3	16	0.05
Lead (mg/L)	MW-10 (bg)	No	3	7.815	3	13	0.05
Lithium (mg/L)	MW-01 (bg)	No	0	0	3	18	0.05
Lithium (mg/L)	MW-02	No	0	0	3	12	0.05
Lithium (mg/L)	MW-03	No	0	0	3	12	0.05
Lithium (mg/L)	MW-04	No	0	0	3	12	0.05
Lithium (mg/L)	MW-05	No	0	0	3	15	0.05
Lithium (mg/L)	MW-10 (bg)	No	0	0	3	12	0.05
Mercury (mg/L)	MW-01 (bg)	No	0	0	3	18	0.05
Mercury (mg/L)	MW-02	No	0	0	3	12	0.05
Mercury (mg/L)	MW-03	No	0	0	3	12	0.05
Mercury (mg/L)	MW-04	No	0	0	3	12	0.05
Mercury (mg/L)	MW-05	No	0	0	3	15	0.05
Mercury (mg/L)	MW-10 (bg)	No	0	0	3	12	0.05
Molybdenum (mg/L)	MW-01 (bg)	No	1.442	7.815	3	18	0.05
Molybdenum (mg/L)	MW-02	No	1.442	7.815	3	13	0.05
Molybdenum (mg/L)	MW-03	No	1.442	7.815	3	13	0.05
Molybdenum (mg/L)	MW-04	No	1.442	7.815	3	13	0.05
Molybdenum (mg/L)	MW-05	No	2.004	7.815	3	16	0.05
Molybdenum (mg/L)	MW-10 (bg)	No	2.004	7.815	3	13	0.05
pH (n/a)	MW-01 (bg)	No	1.95	7.815	3	18	0.05
pH (n/a)	MW-02	No	1.95	7.815	3	13	0.05
pH (n/a)	MW-03	No	1.95	7.815	3	13	0.05
pH (n/a)	MW-04	No	1.95	7.815	3	13	0.05
pH (n/a)	**MW-05**	**Yes**	**8.69**	**7.815**	**3**	**16**	**0.05**
pH (n/a)	MW-10 (bg)	No	8.69	7.815	3	13	0.05
Selenium (mg/L)	MW-01 (bg)	No	2.6	7.815	3	18	0.05
Selenium (mg/L)	MW-02	No	2.6	7.815	3	13	0.05
Selenium (mg/L)	MW-03	No	2.6	7.815	3	13	0.05
Selenium (mg/L)	MW-04	No	2.6	7.815	3	13	0.05
Selenium (mg/L)	MW-05	No	0	0	3	16	0.05
Selenium (mg/L)	MW-10 (bg)	No	0	0	3	13	0.05
Sulfate (mg/L)	MW-01 (bg)	No	3	7.815	3	18	0.05
Sulfate (mg/L)	MW-02	No	3	7.815	3	13	0.05
Sulfate (mg/L)	MW-03	No	3	7.815	3	13	0.05
Sulfate (mg/L)	MW-04	No	3	7.815	3	13	0.05

Seasonality FAB

Powerton Generating Station   Client: NRG   Data: Powerton FAB   Printed 8/12/2021, 11:37 AM

Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Sulfate (mg/L)	MW-05	No	2.399	7.815	3	16	0.05
Sulfate (mg/L)	MW-10 (bg)	No	2.399	7.815	3	13	0.05
Thallium (mg/L)	MW-01 (bg)	No	0	0	3	18	0.05
Thallium (mg/L)	MW-05	No	0	0	3	14	0.05
Total Dissolved Solids (mg/L)	MW-01 (bg)	No	4.39	7.815	3	18	0.05
Total Dissolved Solids (mg/L)	MW-02	No	4.39	7.815	3	13	0.05
Total Dissolved Solids (mg/L)	MW-03	No	4.39	7.815	3	13	0.05
Total Dissolved Solids (mg/L)	MW-04	No	4.39	7.815	3	13	0.05
Total Dissolved Solids (mg/L)	MW-05	No	2.629	7.815	3	16	0.05
Total Dissolved Solids (mg/L)	MW-10 (bg)	No	2.629	7.815	3	13	0.05

Powerton ABB ASB Trend Test

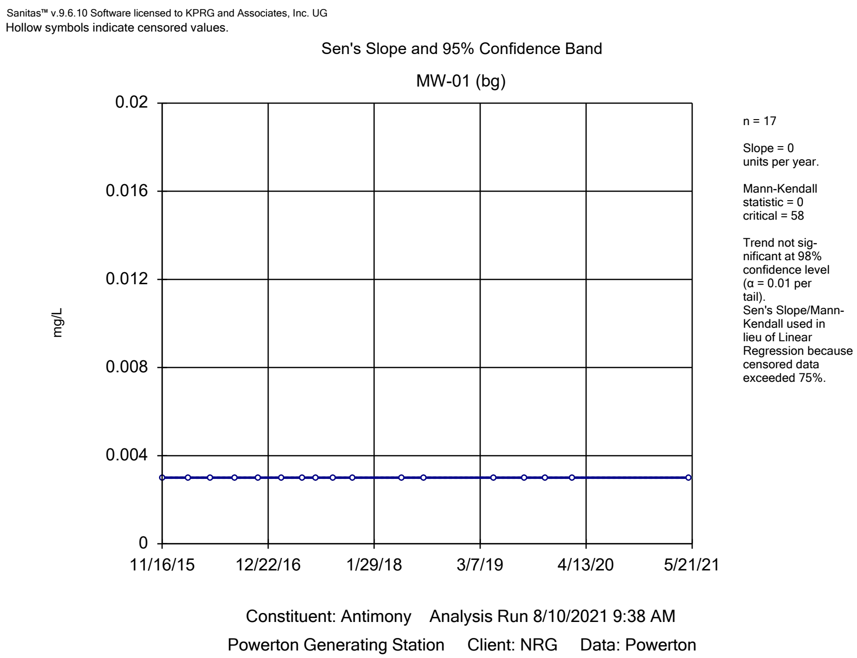
Powerton Generating Station Client: NRG Data: Powerton Printed 8/10/2021, 9:42 AM

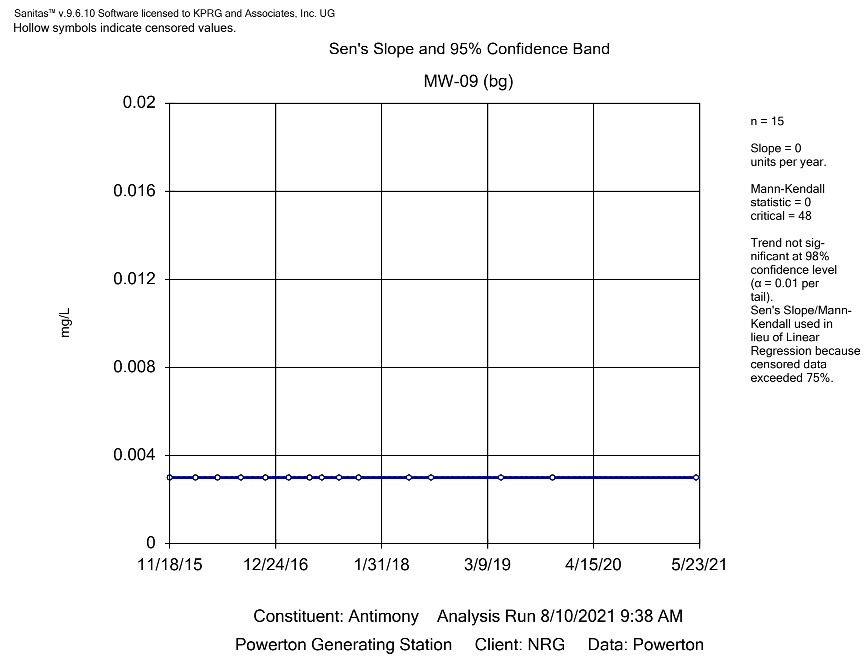
Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Antimony (mg/L)	MW-01 (bg)	0	0	58	No	17	100	n/a	n/a	0.02	NP (NDs)
Antimony (mg/L)	MW-09 (bg)	0	0	48	No	15	100	n/a	n/a	0.02	NP (NDs)
Antimony (mg/L)	MW-19 (bg)	0	0	31	No	11	100	n/a	n/a	0.02	NP (NDs)
Arsenic (mg/L)	MW-01 (bg)	0	-51	-68	No	19	57.89	n/a	n/a	0.02	NP (Nor...
Arsenic (mg/L)	MW-09 (bg)	0	-3	-58	No	17	52.94	n/a	n/a	0.02	NP (Nor...
Arsenic (mg/L)	MW-19 (bg)	0	6	39	No	13	92.31	n/a	n/a	0.02	NP (NDs)
Barium (mg/L)	MW-01 (bg)	-0.00...	-27	-68	No	19	0	n/a	n/a	0.02	NP (Nor...
Barium (mg/L)	MW-09 (bg)	0.001422	1.341	2.249	No	17	0	Yes	no	0.02	Param.
Barium (mg/L)	MW-19 (bg)	-0.00...	-27	-39	No	13	0	n/a	n/a	0.02	NP (Nor...
Beryllium (mg/L)	MW-01 (bg)	0	0	58	No	17	100	n/a	n/a	0.02	NP (NDs)
Beryllium (mg/L)	MW-09 (bg)	0	0	48	No	15	100	n/a	n/a	0.02	NP (NDs)
Beryllium (mg/L)	MW-19 (bg)	0	0	31	No	11	100	n/a	n/a	0.02	NP (NDs)
Boron (mg/L)	MW-01 (bg)	-0.00...	-0.00...	2.224	No	19	0	Yes	square...	0.02	Param.
Boron (mg/L)	MW-09 (bg)	-0.06533	-0.4427	2.249	No	17	0	Yes	no	0.02	Param.
Boron (mg/L)	MW-19 (bg)	-0.305	-2.218	2.328	No	13	0	Yes	no	0.02	Param.
Cadmium (mg/L)	MW-01 (bg)	0	10	68	No	19	94.74	n/a	n/a	0.02	NP (NDs)
Cadmium (mg/L)	MW-09 (bg)	0	0	58	No	17	100	n/a	n/a	0.02	NP (NDs)
Cadmium (mg/L)	MW-19 (bg)	0	0	39	No	13	100	n/a	n/a	0.02	NP (NDs)
Calcium (mg/L)	MW-01 (bg)	-1.248	-0.6301	2.224	No	19	0	Yes	no	0.02	Param.
Calcium (mg/L)	MW-09 (bg)	-0.5163	-0.425	2.249	No	17	0	Yes	no	0.02	Param.
Calcium (mg/L)	MW-19 (bg)	-1.775	-0.5807	2.328	No	13	0	Yes	no	0.02	Param.
Chloride (mg/L)	MW-01 (bg)	1.199	1.131	2.224	No	19	0	Yes	no	0.02	Param.
Chloride (mg/L)	MW-09 (bg)	-4272480	-1.71	2.249	No	17	0	Yes	x^5	0.02	Param.
Chloride (mg/L)	MW-19 (bg)	-0.3565	-9	-39	No	13	0	n/a	n/a	0.02	NP (Nor...
Chromium (mg/L)	MW-01 (bg)	0	-3	-68	No	19	89.47	n/a	n/a	0.02	NP (NDs)
Chromium (mg/L)	MW-09 (bg)	0	0	48	No	15	100	n/a	n/a	0.02	NP (NDs)
Chromium (mg/L)	MW-19 (bg)	0	0	31	No	11	100	n/a	n/a	0.02	NP (NDs)
Cobalt (mg/L)	MW-01 (bg)	0	-38	-73	No	20	65	n/a	n/a	0.02	NP (Nor...
Cobalt (mg/L)	MW-09 (bg)	0	-3	-58	No	17	88.24	n/a	n/a	0.02	NP (NDs)
Cobalt (mg/L)	MW-19 (bg)	0	-8	-39	No	13	84.62	n/a	n/a	0.02	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-01 (bg)	-0.01553	-0.643	2.224	No	19	52.63	Yes	no	0.02	Param.
Combined Radium 226 + 228 (pCi/L)	MW-09 (bg)	0.01962	30	58	No	17	82.35	n/a	n/a	0.02	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-19 (bg)	0.00533	0.2342	2.328	No	13	53.85	Yes	square...	0.02	Param.
Fluoride (mg/L)	MW-01 (bg)	0.004035	0.7664	2.224	No	19	0	Yes	no	0.02	Param.
Fluoride (mg/L)	MW-09 (bg)	0.008285	2.194	2.249	No	17	0	Yes	no	0.02	Param.
Fluoride (mg/L)	**MW-19 (bg)**	**0.009155**	**2.773**	**2.328**	**Yes**	**13**	**0**	**Yes**	**no**	**0.02**	**Param.**
Lead (mg/L)	MW-01 (bg)	-0.00...	-46	-73	No	20	45	n/a	n/a	0.02	NP (Nor...
Lead (mg/L)	MW-09 (bg)	0	10	58	No	17	94.12	n/a	n/a	0.02	NP (NDs)
Lead (mg/L)	MW-19 (bg)	0	-26	-39	No	13	69.23	n/a	n/a	0.02	NP (Nor...
Lithium (mg/L)	MW-01 (bg)	0	10	68	No	19	94.74	n/a	n/a	0.02	NP (NDs)
Lithium (mg/L)	MW-09 (bg)	0	0	58	No	17	100	n/a	n/a	0.02	NP (NDs)
Lithium (mg/L)	MW-19 (bg)	0	0	39	No	13	100	n/a	n/a	0.02	NP (NDs)
Mercury (mg/L)	MW-01 (bg)	0	0	68	No	19	100	n/a	n/a	0.02	NP (NDs)
Mercury (mg/L)	MW-09 (bg)	0	4	58	No	17	94.12	n/a	n/a	0.02	NP (NDs)
Mercury (mg/L)	MW-19 (bg)	0	0	39	No	13	100	n/a	n/a	0.02	NP (NDs)
Molybdenum (mg/L)	MW-01 (bg)	0	17	68	No	19	57.89	n/a	n/a	0.02	NP (Nor...
Molybdenum (mg/L)	**MW-09 (bg)**	**-0.00...**	**-5.318**	**-2.249**	**Yes**	**17**	**0**	**Yes**	**square...**	**0.02**	**Param.**
Molybdenum (mg/L)	MW-19 (bg)	0.002316	1.674	2.328	No	13	0	Yes	no	0.02	Param.
pH (n/a)	MW-01 (bg)	0.02745	0.7533	2.224	No	19	0	Yes	no	0.02	Param.
pH (n/a)	MW-09 (bg)	0.009659	0.2965	2.249	No	17	0	Yes	no	0.02	Param.

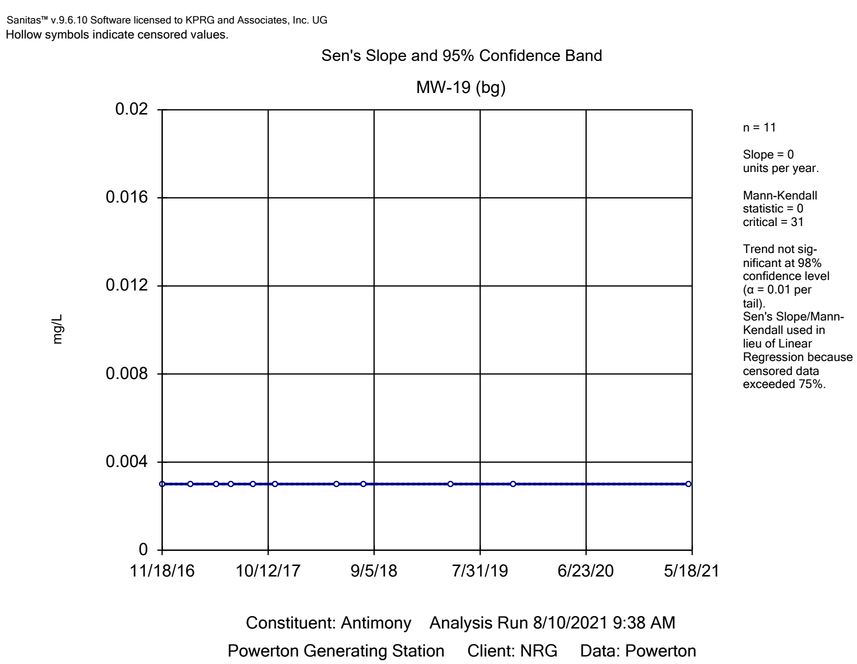
Powerton ABB ASB Trend Test

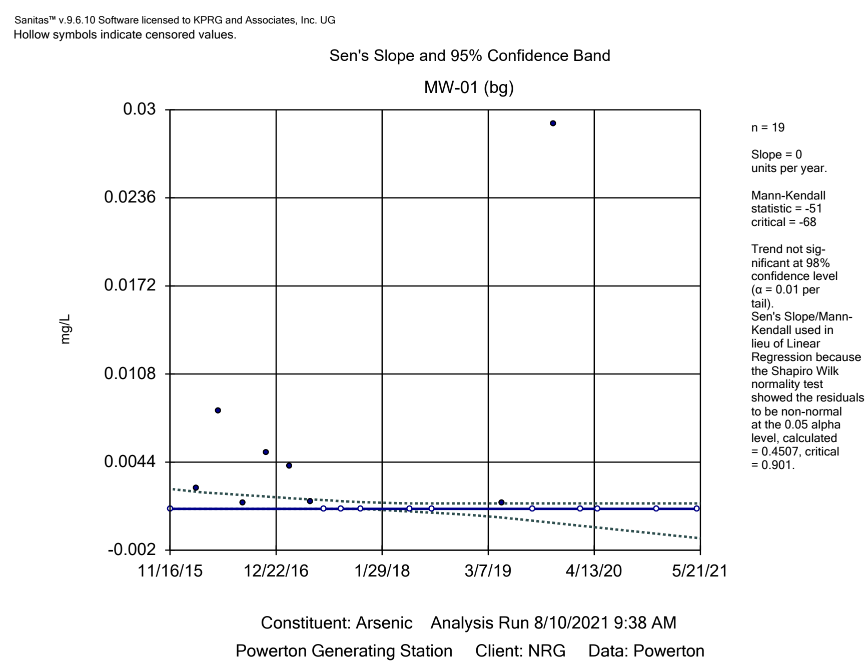
Powerton Generating Station Client: NRG Data: Powerton Printed 8/10/2021, 9:42 AM

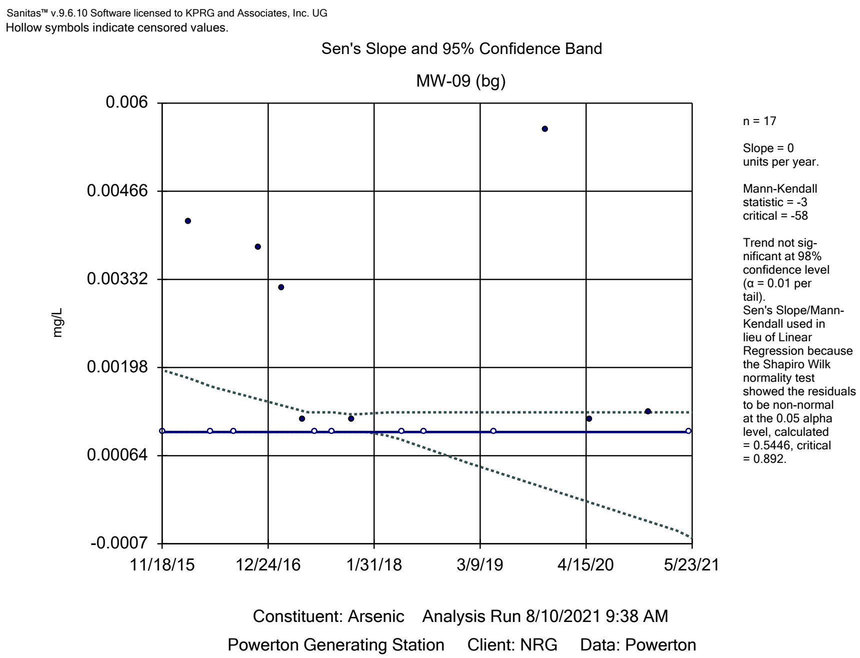
Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
pH (n/a)	MW-19 (bg)	-0.04872	-0.899	2.328	No	13	0	Yes	no	0.02	Param.
Selenium (mg/L)	MW-01 (bg)	0	-16	-68	No	19	94.74	n/a	n/a	0.02	NP (NDs)
Selenium (mg/L)	MW-09 (bg)	0	-6	-58	No	17	47.06	n/a	n/a	0.02	NP (Nor...
Selenium (mg/L)	**MW-19 (bg)**	**-0.00...**	**-2.557**	**-2.328**	**Yes**	**13**	**38.46**	**Yes**	**no**	**0.02**	**Param.**
Sulfate (mg/L)	MW-01 (bg)	-4.185	-2.092	2.224	No	19	0	Yes	no	0.02	Param.
Sulfate (mg/L)	MW-09 (bg)	-3.501	-0.6088	2.249	No	17	0	Yes	no	0.02	Param.
Sulfate (mg/L)	**MW-19 (bg)**	**-15.6**	**-3.145**	**-2.328**	**Yes**	**13**	**0**	**Yes**	**no**	**0.02**	**Param.**
Thallium (mg/L)	MW-01 (bg)	0	0	68	No	19	100	n/a	n/a	0.02	NP (NDs)
Thallium (mg/L)	MW-09 (bg)	0	0	58	No	17	100	n/a	n/a	0.02	NP (NDs)
Thallium (mg/L)	MW-19 (bg)	0	0	39	No	13	100	n/a	n/a	0.02	NP (NDs)
Total Dissolved Solids (mg/L)	MW-01 (bg)	-3.804	-0.3814	2.224	No	19	0	Yes	no	0.02	Param.
Total Dissolved Solids (mg/L)	MW-09 (bg)	-27.14	-1.743	2.249	No	17	0	Yes	no	0.02	Param.
Total Dissolved Solids (mg/L)	**MW-19 (bg)**	**-46.02**	**-2.495**	**-2.328**	**Yes**	**13**	**0**	**Yes**	**no**	**0.02**	**Param.**


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-01 (bg)
mg/L
0.02
0.016
0.012
0.008
0.004
0
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 17
Slope = 0 units per year.
Mann-Kendall statistic = 0 critical = 58
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Antimony Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

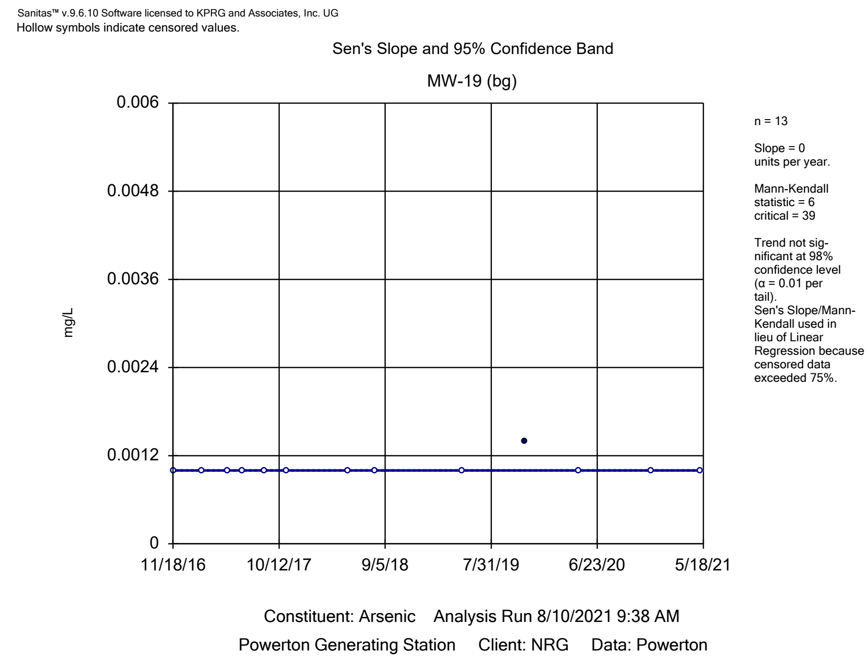

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-09 (bg)
mg/L
0.02
0.016
0.012
0.008
0.004
0
11/18/15
12/24/16
1/31/18
3/9/19
4/15/20
5/23/21
n = 15
Slope = 0 units per year.
Mann-Kendall statistic = 0 critical = 48
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Antimony Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-19 (bg)
mg/L
0.02
0.016
0.012
0.008
0.004
0
11/18/16
10/12/17
9/5/18
7/31/19
6/23/20
5/18/21
n = 11
Slope = 0 units per year.
Mann-Kendall statistic = 0 critical = 31
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Antimony Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

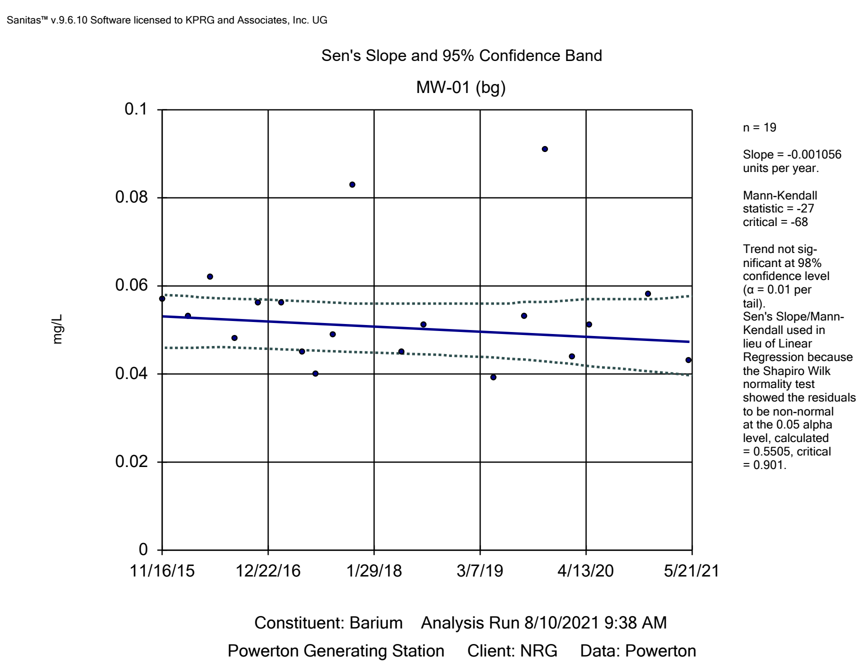

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-01 (bg)
mg/L
0.03
0.0236
0.0172
0.0108
0.0044
-0.002
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 19
Slope = 0 units per year.
Mann-Kendall statistic = -51 critical = -68
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.05 alpha level, calculated = 0.4507, critical = 0.901.
Constituent: Arsenic Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton



Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-09 (bg)
mg/L
0.006
0.00466
0.00332
0.00198
0.00064
-0.0007
11/18/15
12/24/16
1/31/18
3/9/19
4/15/20
5/23/21
n = 17
Slope = 0 units per year.
Mann-Kendall statistic = -3 critical = -58
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.05 alpha level, calculated = 0.5446, critical = 0.892.
Constituent: Arsenic Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

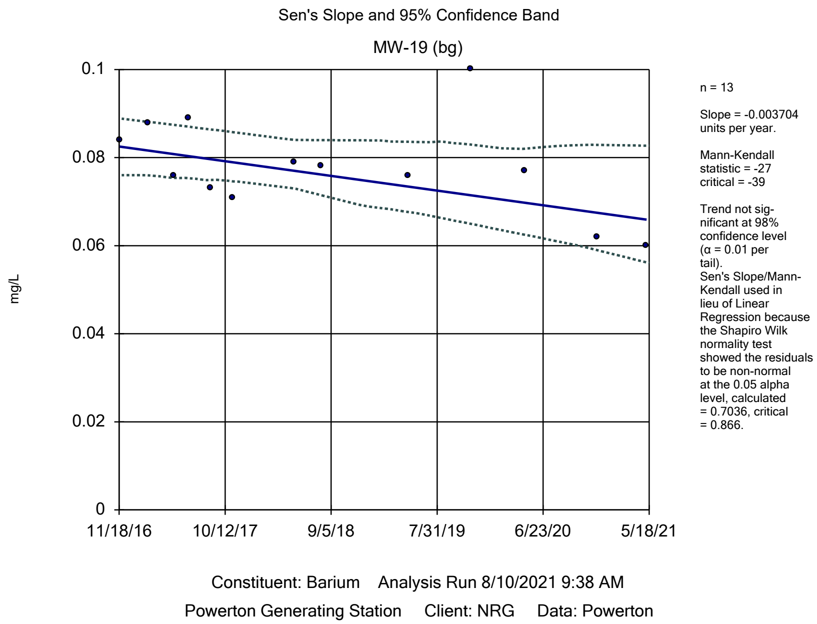


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-19 (bg)
mg/L
0.006
0.0048
0.0036
0.0024
0.0012
0
11/18/16
10/12/17
9/5/18
7/31/19
6/23/20
5/18/21
n = 13
Slope = 0 units per year.
Mann-Kendall statistic = 6 critical = 39
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Arsenic Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

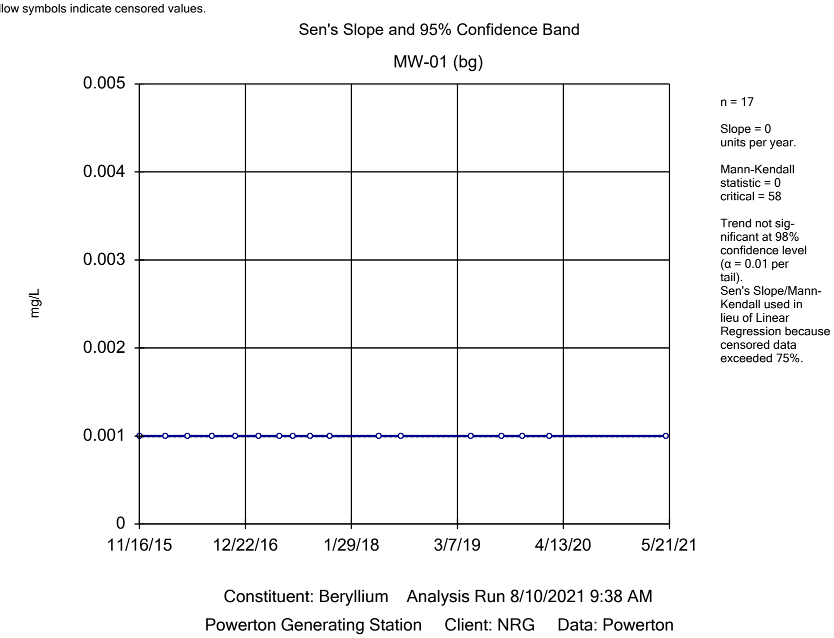


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Sen's Slope and 95% Confidence Band
MW-01 (bg)
mg/L
0.1
0.08
0.06
0.04
0.02
0
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 19
Slope = -0.001056 units per year.
Mann-Kendall statistic = -27 critical = -68
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.05 alpha level, calculated = 0.5505, critical = 0.901.
Constituent: Barium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

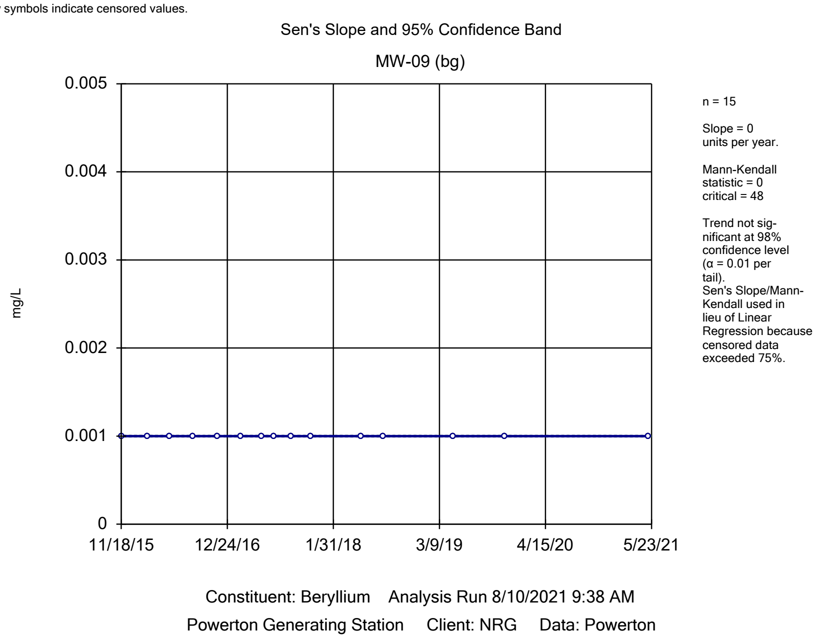
Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Linear Regression and 95% Confidence Band
MW-09 (bg)
mg/L
0.06
0.048
0.036
0.024
0.012
0
11/18/15
12/27/16
2/6/18
3/18/19
4/27/20
6/7/21
n = 17
Slope = 0.001422 units/year.
alpha = 0.02
t = 1.341
critical = 2.249
No significant trend.
Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.949, critical = 0.892.
Constituent: Barium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton



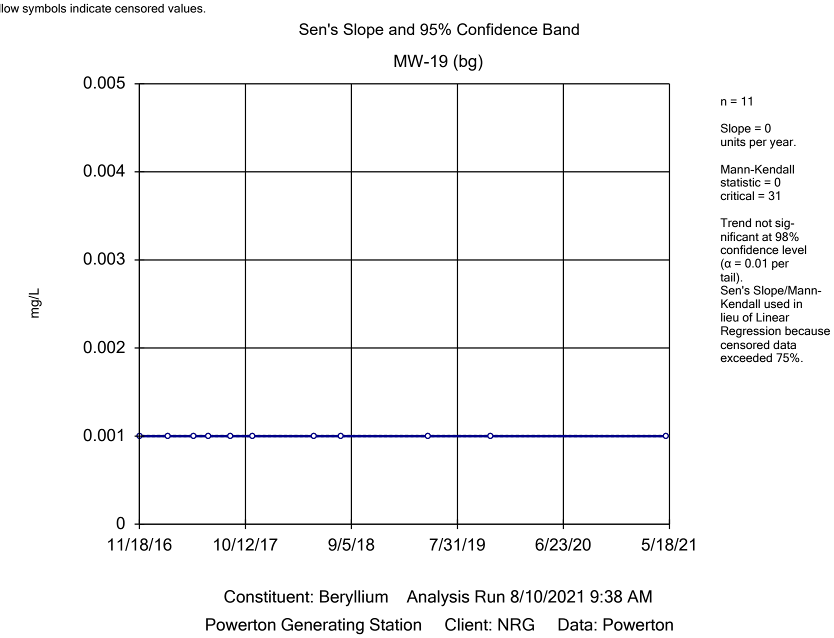
Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



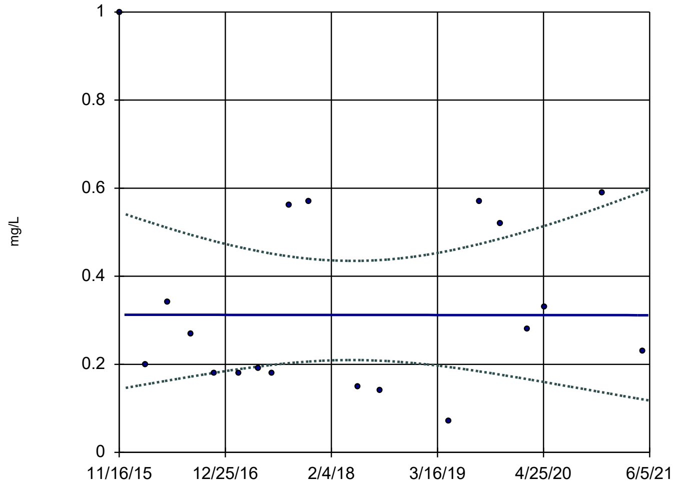
Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-01 (bg)



n = 19

Slope = -0.0001529
square root units/year.

alpha = 0.02
t = -0.005766
critical = 2.224

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.9258 after square
root transformation,
critical = 0.901.

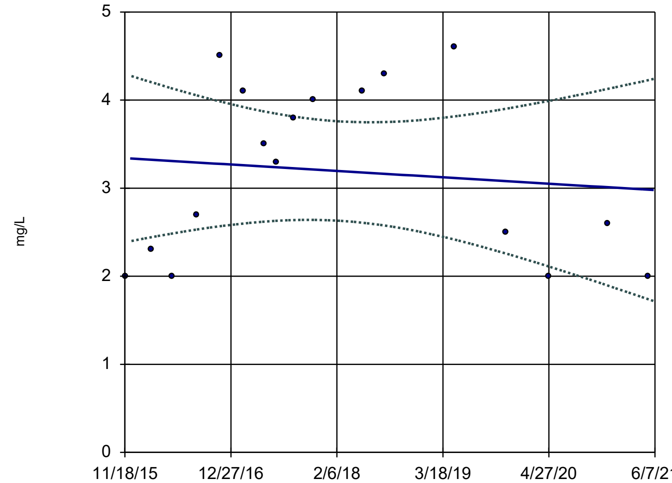
Constituent: Boron   Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station   Client: NRG   Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-09 (bg)



n = 17

Slope = -0.06533
units/year.

alpha = 0.02
t = -0.4427
critical = 2.249

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.916, critical =
0.892.

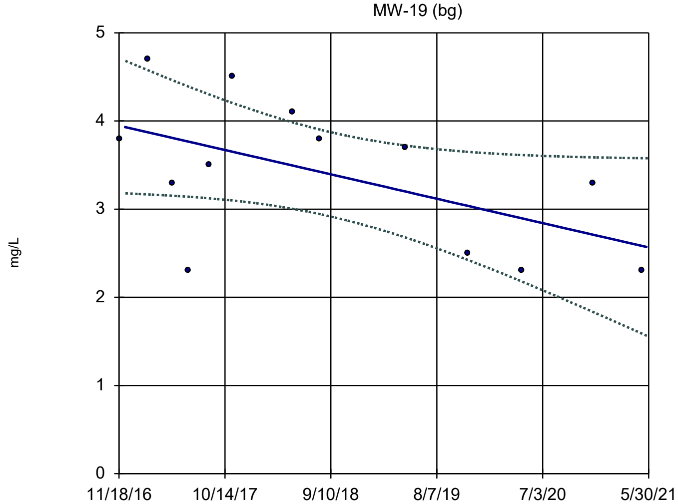
Constituent: Boron   Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station   Client: NRG   Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-19 (bg)



n = 13

Slope = -0.305
units/year.

alpha = 0.02
t = -2.218
critical = 2.328

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.9223, critical
= 0.866.

Constituent: Boron   Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station   Client: NRG   Data: Powerton

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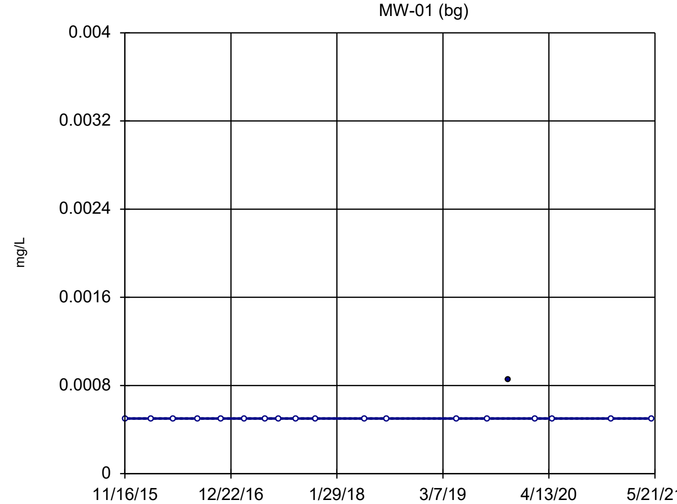
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-01 (bg)



n = 19

Slope = 0
units per year.

Mann-Kendall
statistic = 10
critical = 68

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).
Sen's Slope/Mann-
Kendall used in
lieu of Linear
Regression because
censored data
exceeded 75%.

Constituent: Cadmium   Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station   Client: NRG   Data: Powerton

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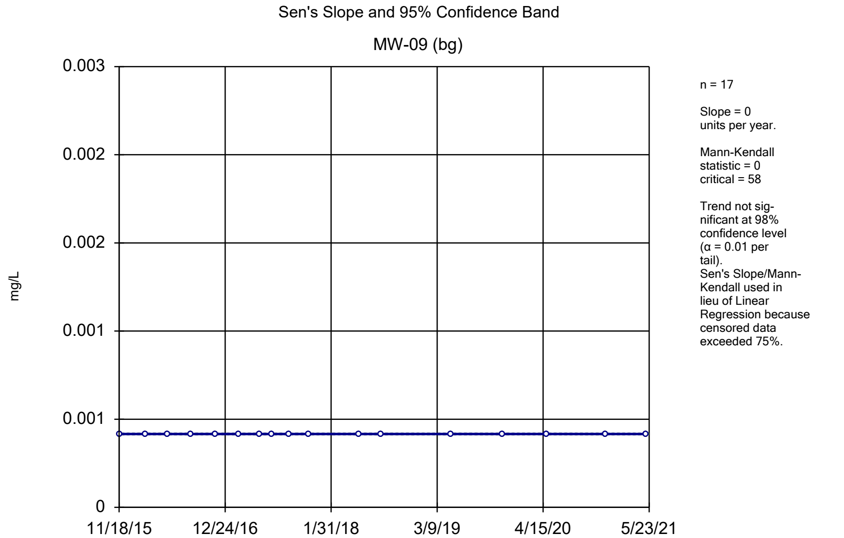
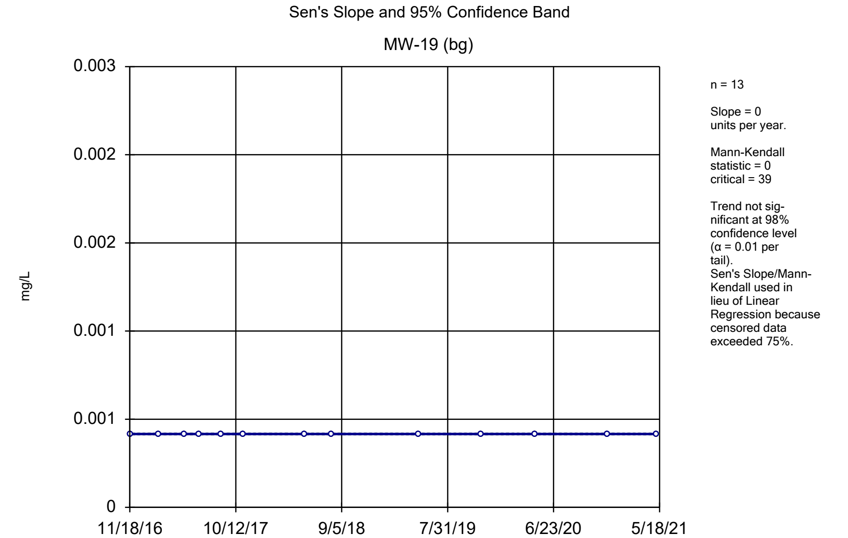
Hollow symbols indicate censored values.



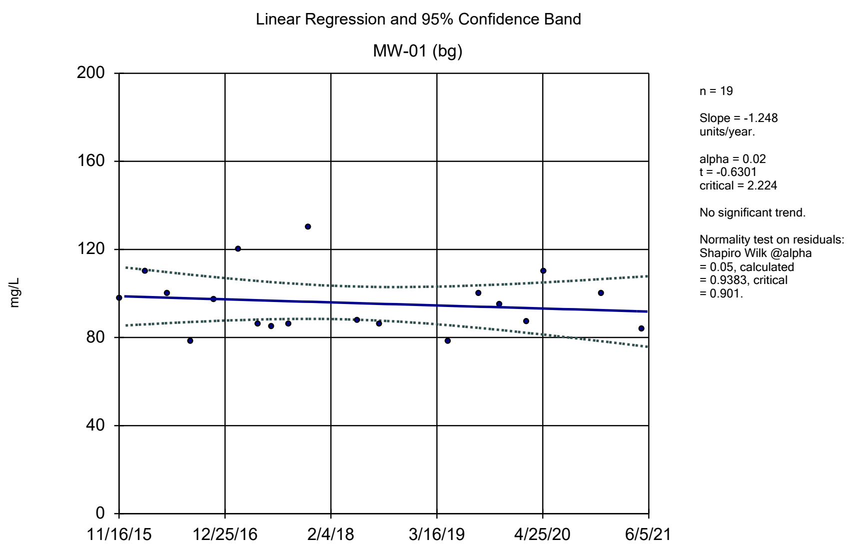
Constituent: Cadmium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



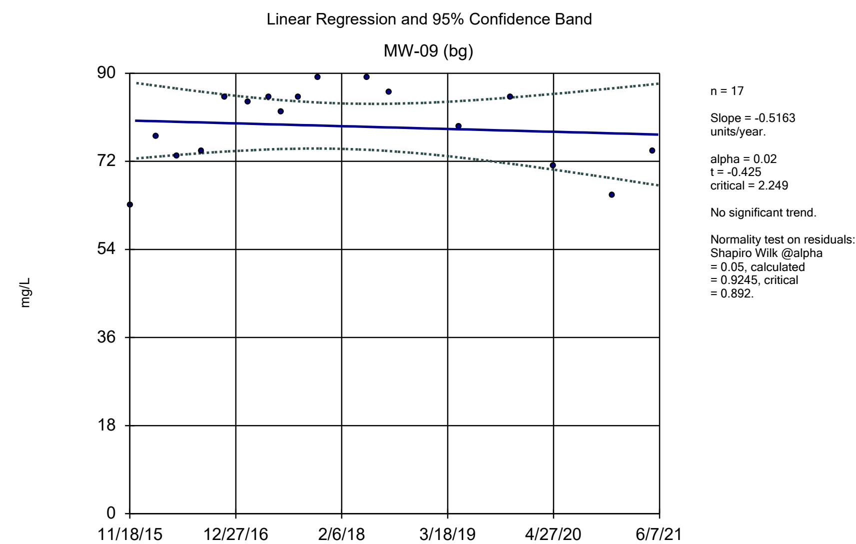
Constituent: Cadmium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG



Constituent: Calcium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

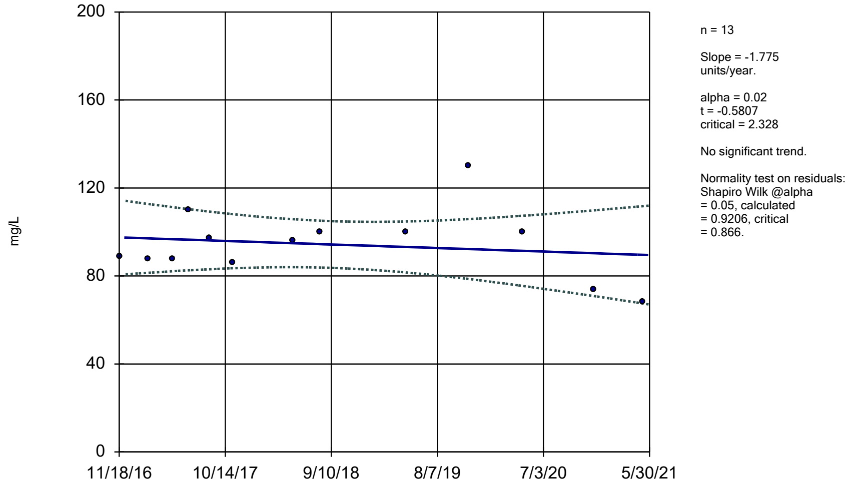


Constituent: Calcium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-19 (bg)



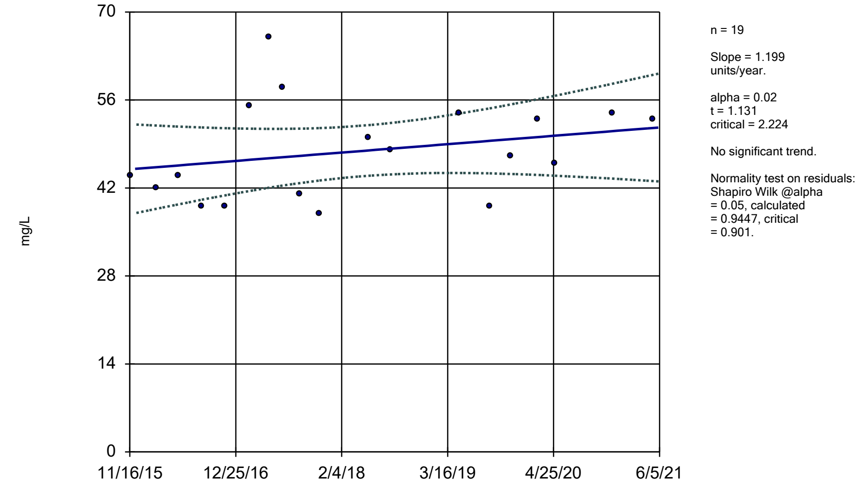
Constituent: Calcium Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-01 (bg)



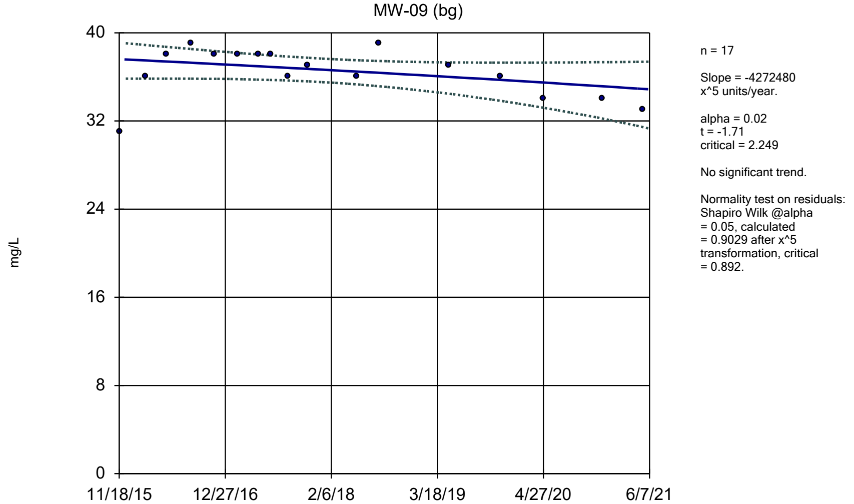
Constituent: Chloride Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-09 (bg)



Constituent: Chloride Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

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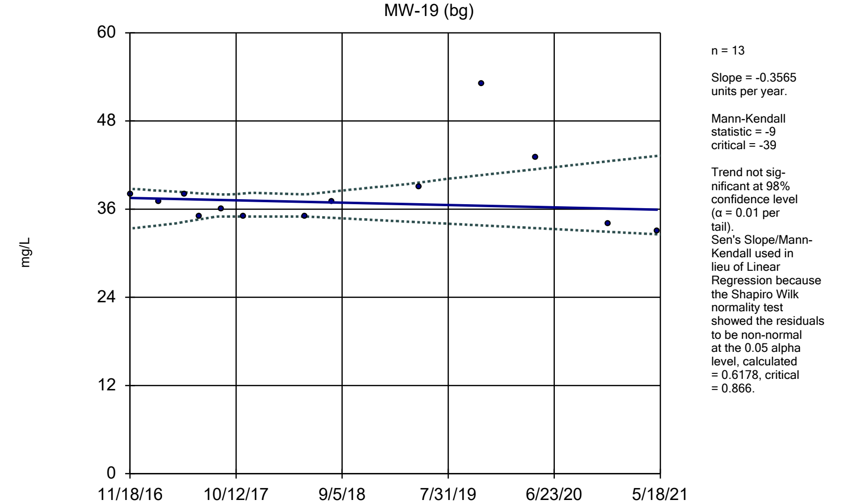
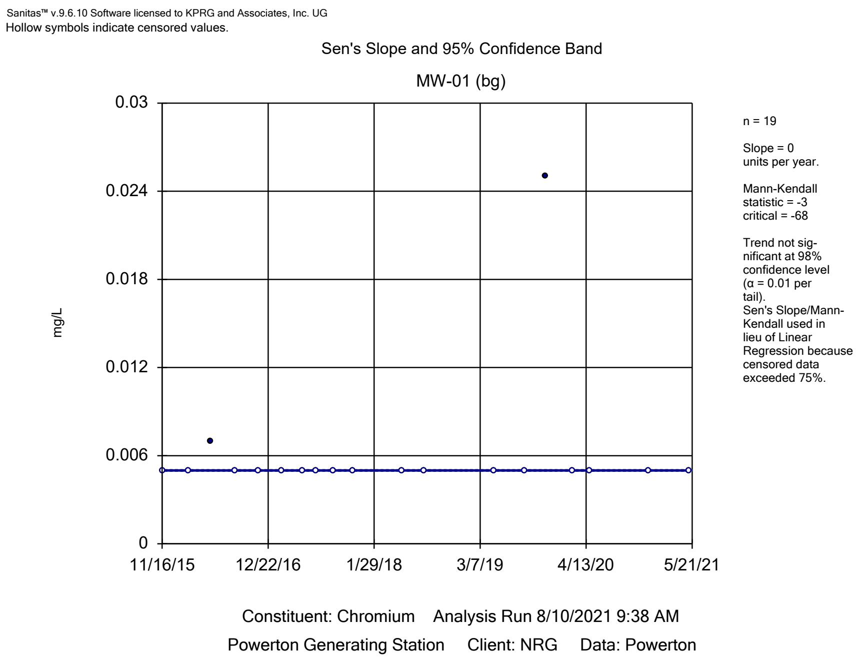
Sen's Slope and 95% Confidence Band

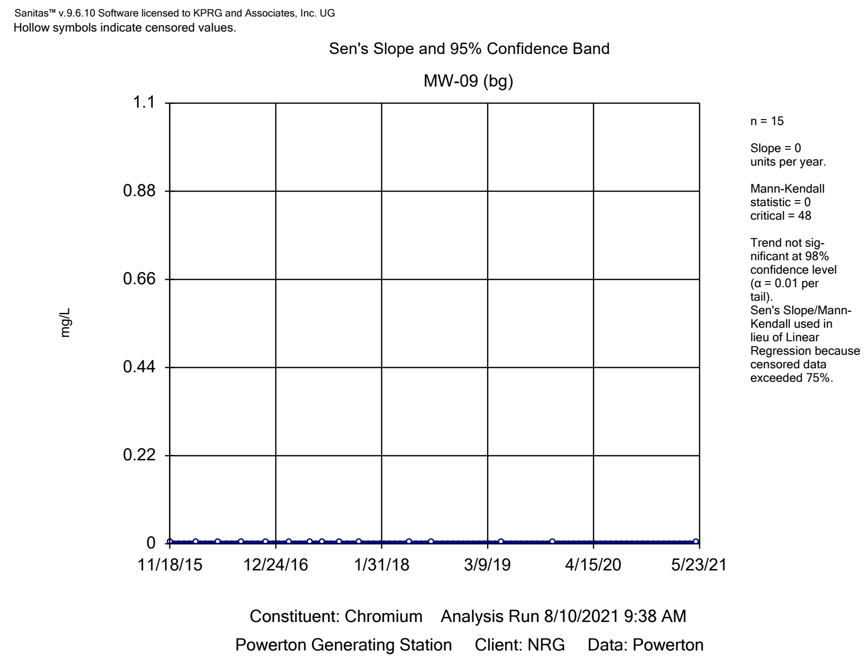
MW-19 (bg)

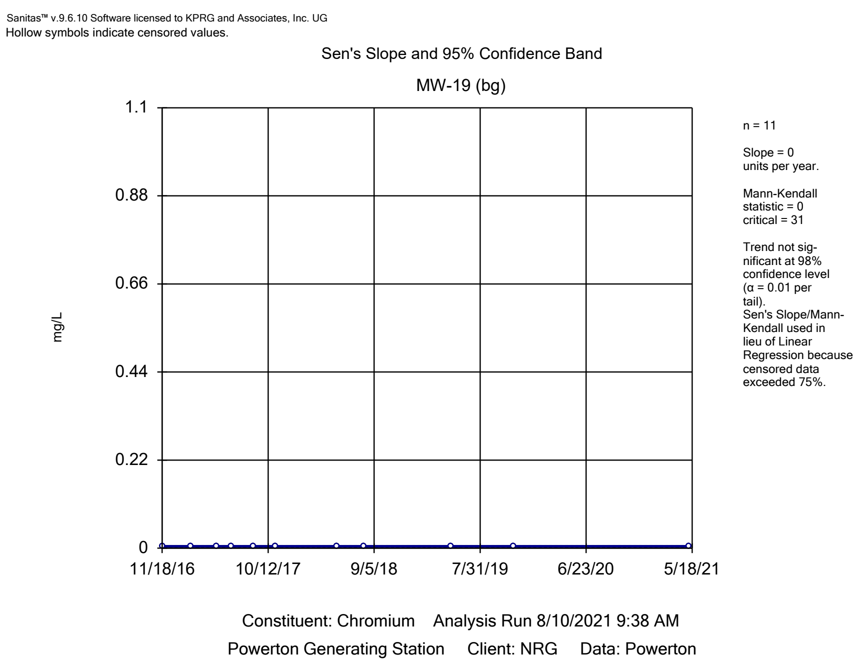


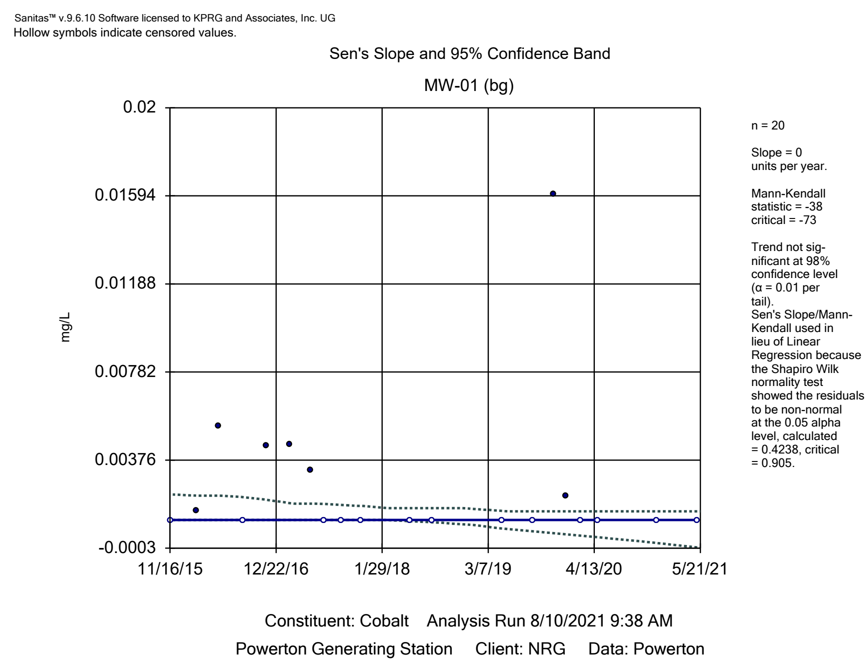
Constituent: Chloride Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

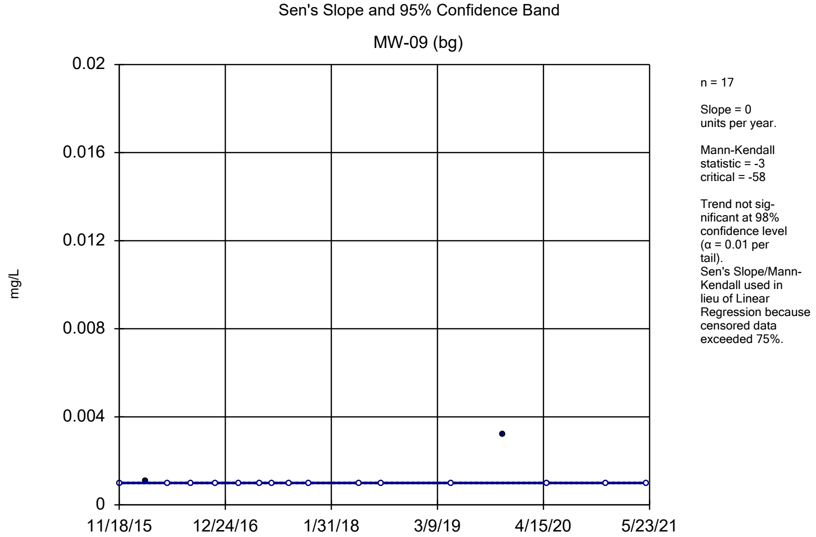

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-01 (bg)
0.03
0.024
0.018
0.012
0.006
0
mg/L
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 19
Slope = 0 units per year.
Mann-Kendall statistic = -3 critical = -68
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Chromium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-09 (bg)
1.1
0.88
0.66
0.44
0.22
0
mg/L
11/18/15
12/24/16
1/31/18
3/9/19
4/15/20
5/23/21
n = 15
Slope = 0 units per year.
Mann-Kendall statistic = 0 critical = 48
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Chromium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-19 (bg)
1.1
0.88
0.66
0.44
0.22
0
mg/L
11/18/16
10/12/17
9/5/18
7/31/19
6/23/20
5/18/21
n = 11
Slope = 0 units per year.
Mann-Kendall statistic = 0 critical = 31
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Chromium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

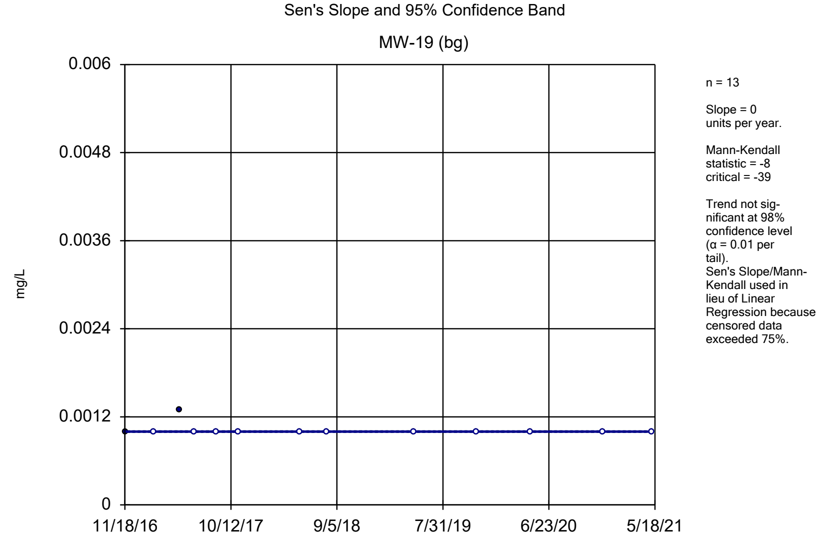

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-01 (bg)
0.02
0.01594
0.01188
0.00782
0.00376
-0.0003
mg/L
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 20
Slope = 0 units per year.
Mann-Kendall statistic = -38 critical = -73
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.05 alpha level, calculated = 0.4238, critical = 0.905.
Constituent: Cobalt Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



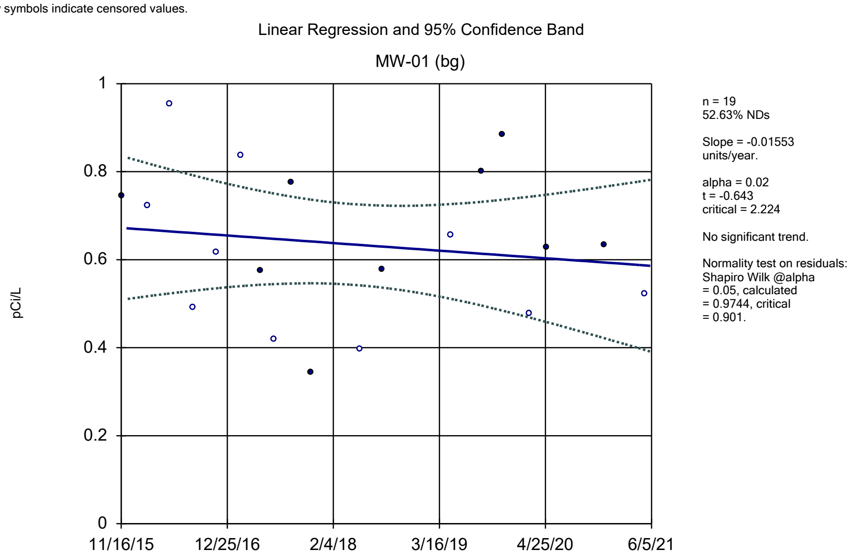
Constituent: Cobalt Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



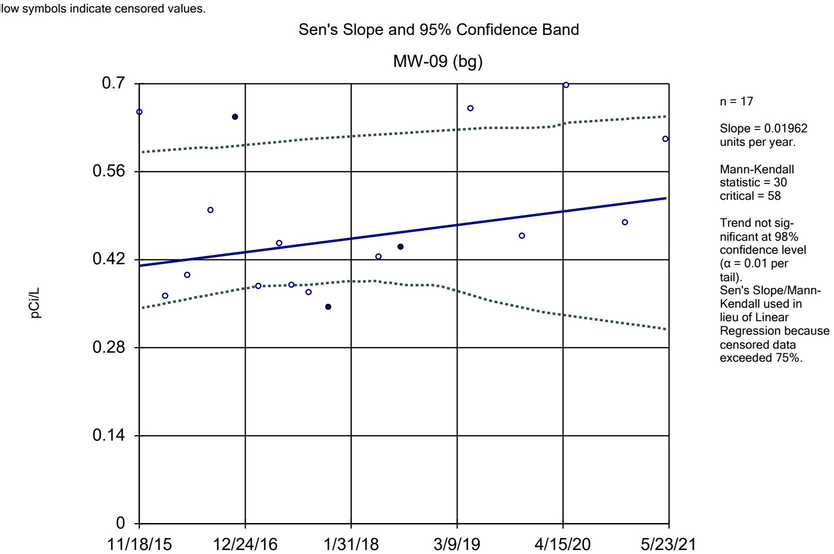
Constituent: Cobalt Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



Constituent: Combined Radium 226 + 228 Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

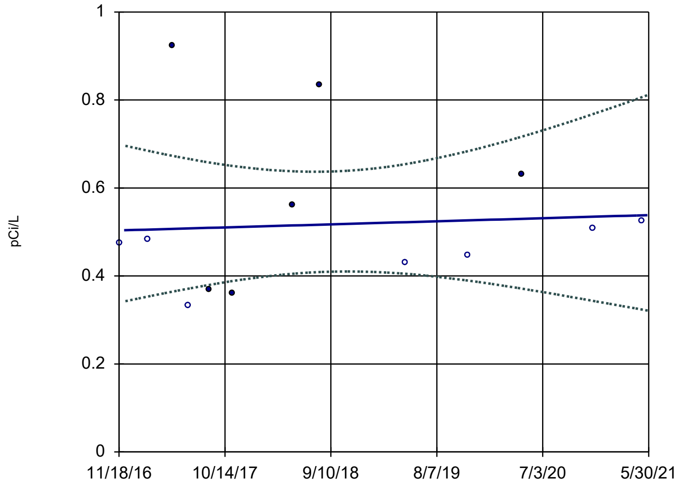


Constituent: Combined Radium 226 + 228 Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Linear Regression and 95% Confidence Band

MW-19 (bg)



n = 13
53.85% NDs

Slope = 0.00533
square root units/year.

alpha = 0.02
t = 0.2342
critical = 2.328

No significant trend.

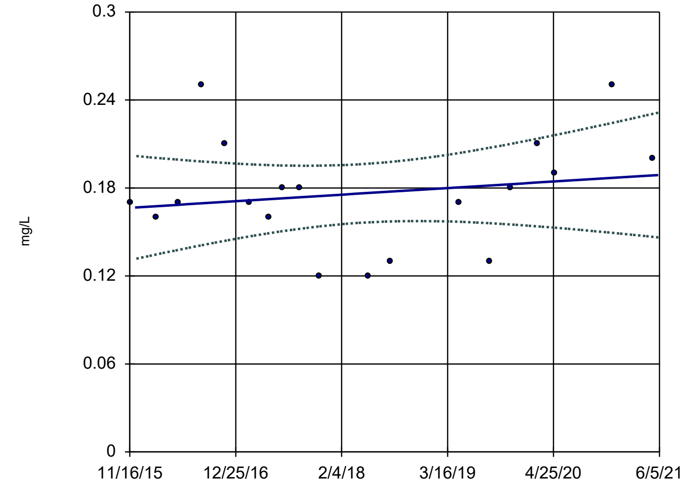
Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.8847 after square
root transformation,
critical = 0.866.

Constituent: Combined Radium 226 + 228 Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-01 (bg)



n = 19

Slope = 0.004035
units/year.

alpha = 0.02
t = 0.7664
critical = 2.224

No significant trend.

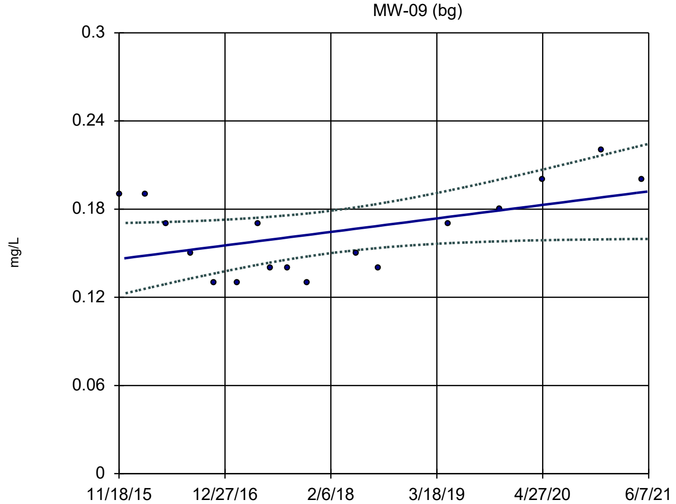
Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.9285, critical
= 0.901.

Constituent: Fluoride Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-09 (bg)



n = 17

Slope = 0.008285
units/year.

alpha = 0.02
t = 2.194
critical = 2.249

No significant trend.

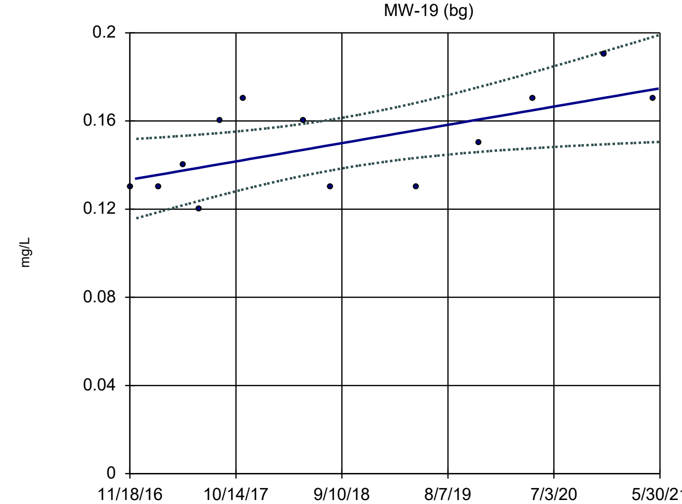
Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.931, critical =
0.892.

Constituent: Fluoride Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-19 (bg)



n = 13

Slope = 0.009155
units/year.

alpha = 0.02
t = 2.773
critical = 2.328

Significant increasing trend.

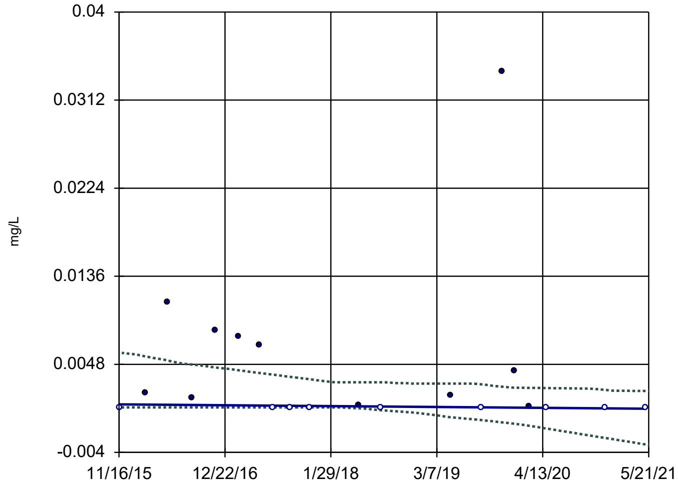
Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.965, critical =
0.866.

Constituent: Fluoride Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-01 (bg)



n = 20

Slope = -0.00007965
units per year.

Mann-Kendall
statistic = -46
critical = -73

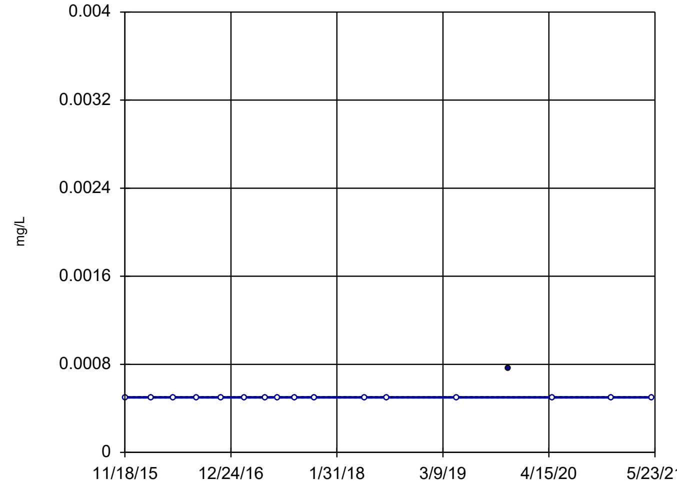
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.05 alpha level, calculated = 0.4238, critical = 0.905.

Constituent: Lead   Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station   Client: NRG   Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-09 (bg)



n = 17

Slope = 0
units per year.

Mann-Kendall
statistic = 10
critical = 58

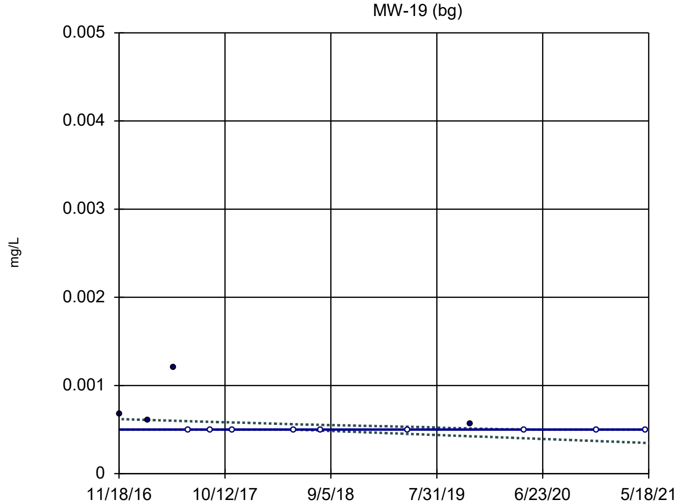
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

Constituent: Lead   Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station   Client: NRG   Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-19 (bg)



n = 13

Slope = 0
units per year.

Mann-Kendall
statistic = -26
critical = -39

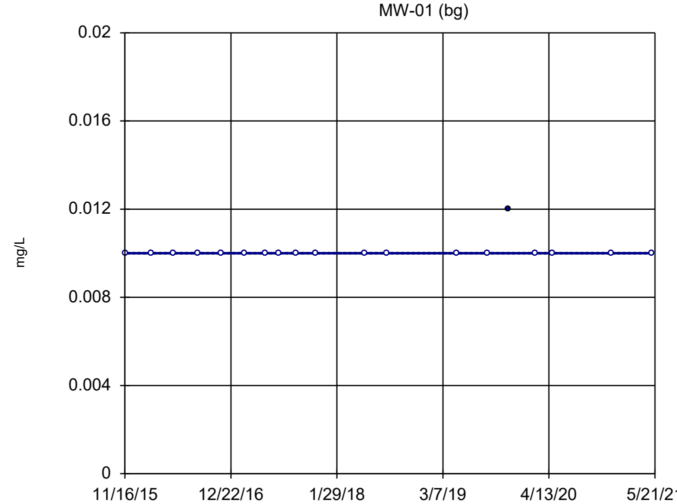
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.05 alpha level, calculated = 0.5553, critical = 0.866.

Constituent: Lead   Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station   Client: NRG   Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-01 (bg)



n = 19

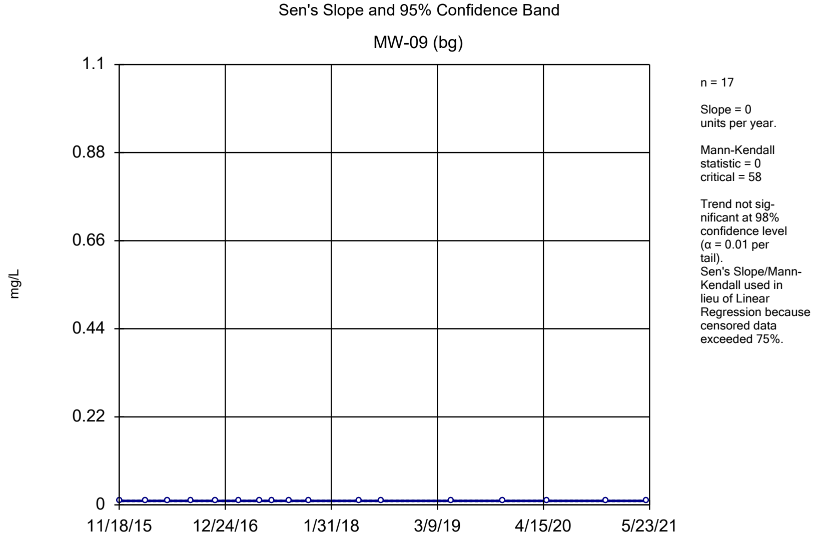
Slope = 0
units per year.

Mann-Kendall
statistic = 10
critical = 68

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

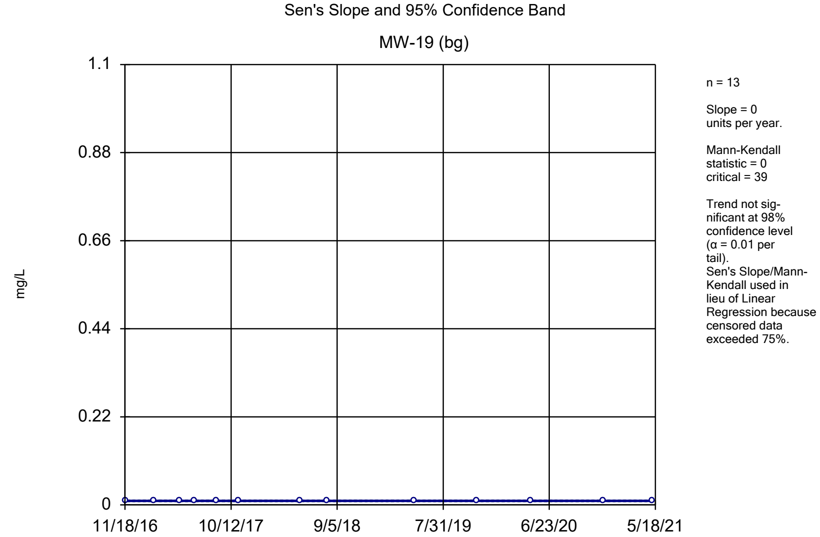
Constituent: Lithium   Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station   Client: NRG   Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



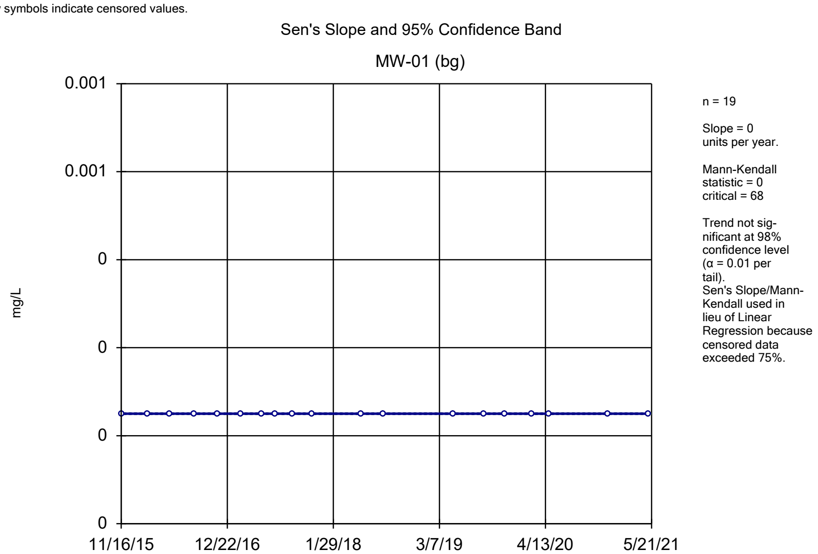
Constituent: Lithium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



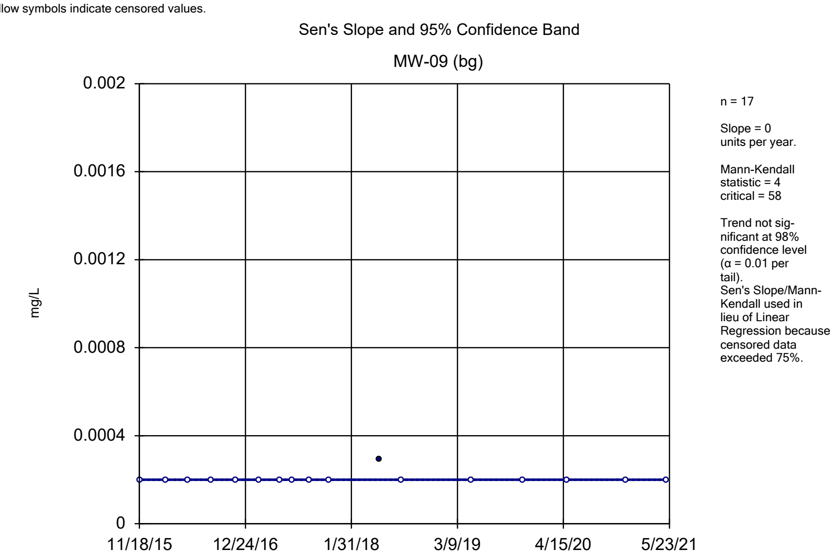
Constituent: Lithium Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



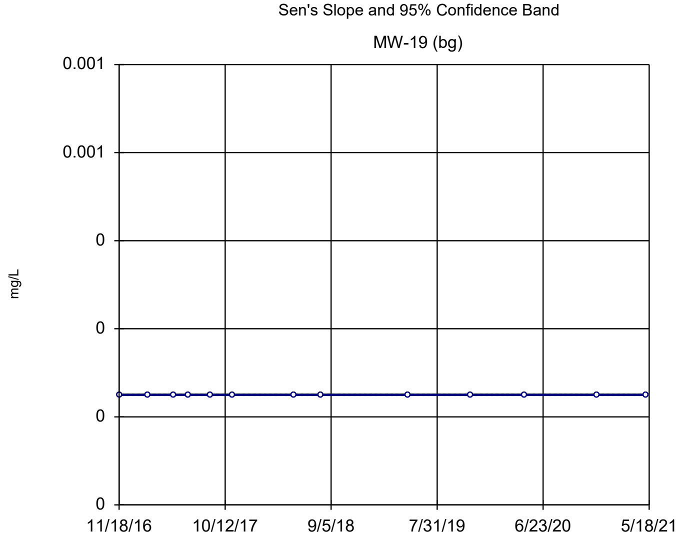
Constituent: Mercury Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



Constituent: Mercury Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



n = 13

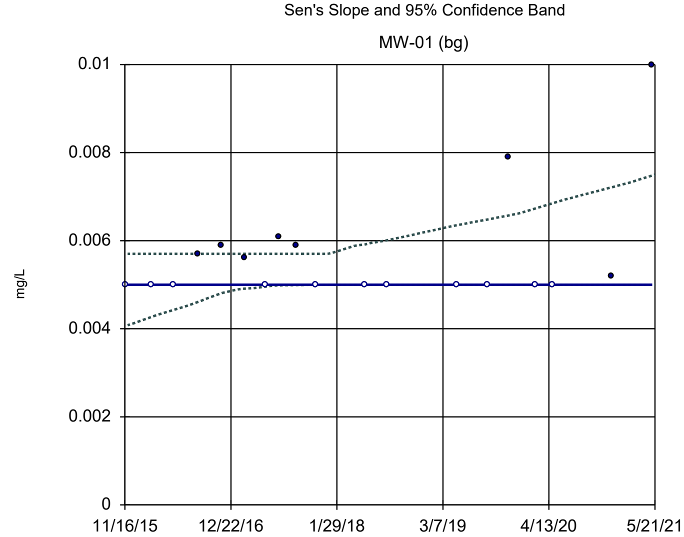
Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 39

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

Constituent: Mercury Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



n = 19

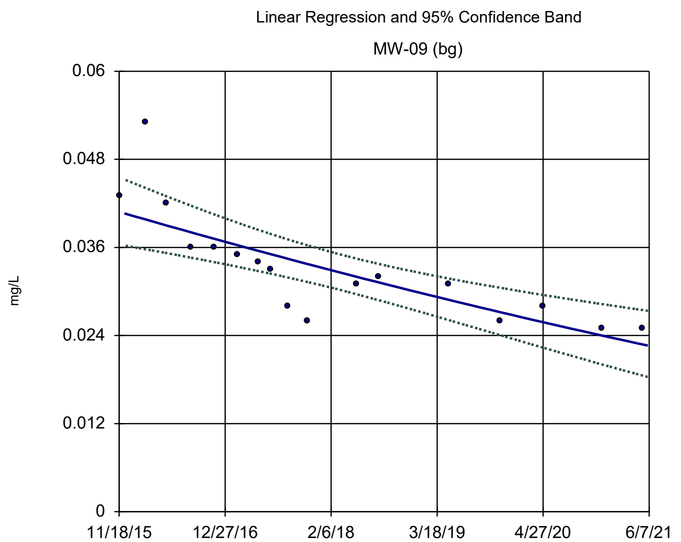
Slope = 0
units per year.

Mann-Kendall
statistic = 17
critical = 68

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.05 alpha level, calculated = 0.711, critical = 0.901.

Constituent: Molybdenum Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG



n = 17

Slope = -0.009331
square root units/year.

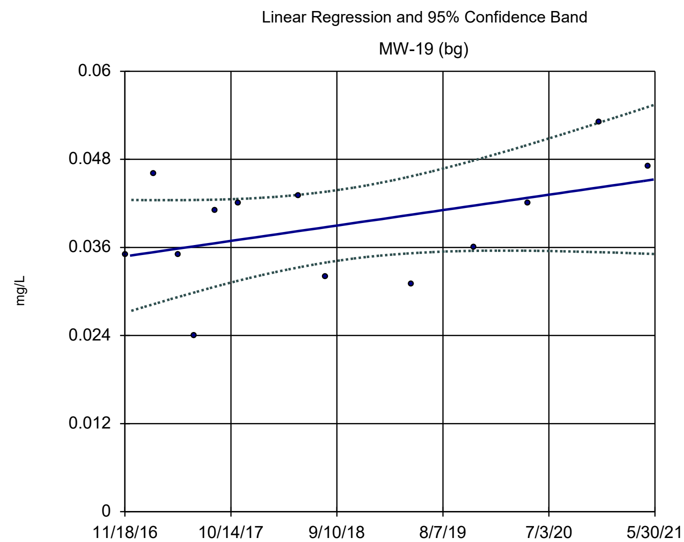
alpha = 0.02
t = -5.318
critical = -2.249

Significant decreasing trend.

Normality test on residuals:
Shapiro Wilk @alpha = 0.05, calculated = 0.8962 after square root transformation, critical = 0.892.

Constituent: Molybdenum Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG



n = 13

Slope = 0.002316
units/year.

alpha = 0.02
t = 1.674
critical = 2.328

No significant trend.

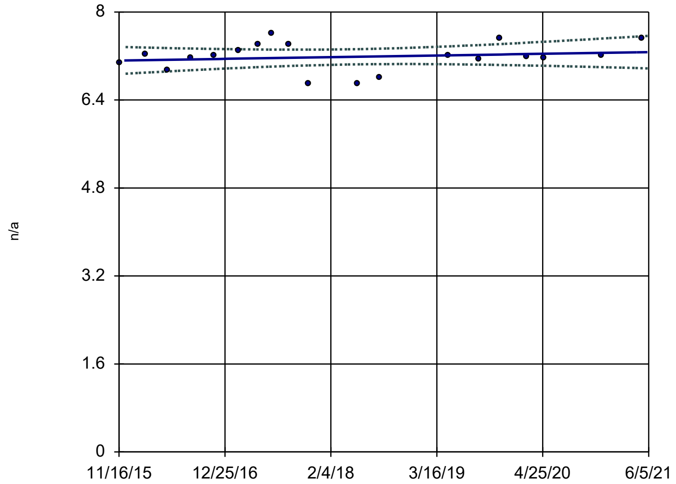
Normality test on residuals:
Shapiro Wilk @alpha = 0.05, calculated = 0.9658, critical = 0.866.

Constituent: Molybdenum Analysis Run 8/10/2021 9:38 AM
Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-01 (bg)



n = 19

Slope = 0.02745 units/year.

alpha = 0.02
t = 0.7533
critical = 2.224

No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.9409, critical = 0.901.

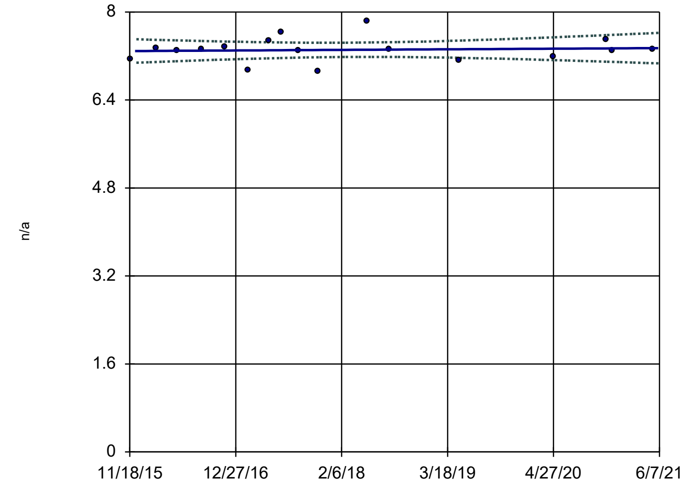
Constituent: pH Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-09 (bg)



n = 17

Slope = 0.009659 units/year.

alpha = 0.02
t = 0.2965
critical = 2.249

No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.958, critical = 0.892.

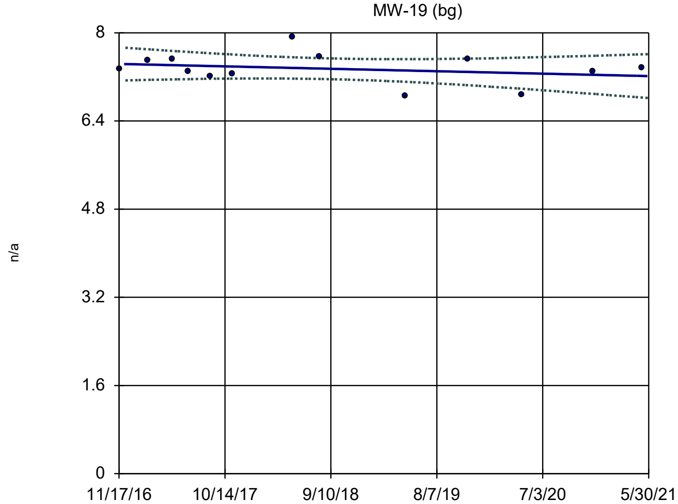
Constituent: pH Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-19 (bg)



n = 13

Slope = -0.04872 units/year.

alpha = 0.02
t = -0.899
critical = 2.328

No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.9667, critical = 0.866.

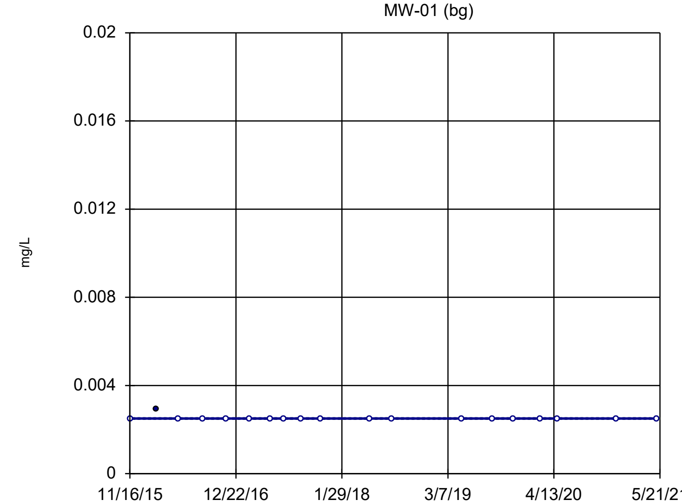
Constituent: pH Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-01 (bg)



n = 19

Slope = 0 units per year.

Mann-Kendall statistic = -16
critical = -68

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

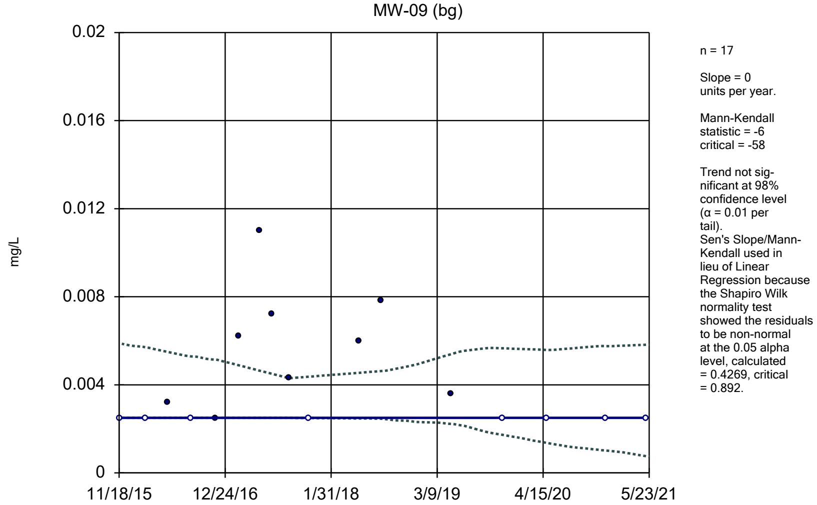
Constituent: Selenium Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-09 (bg)



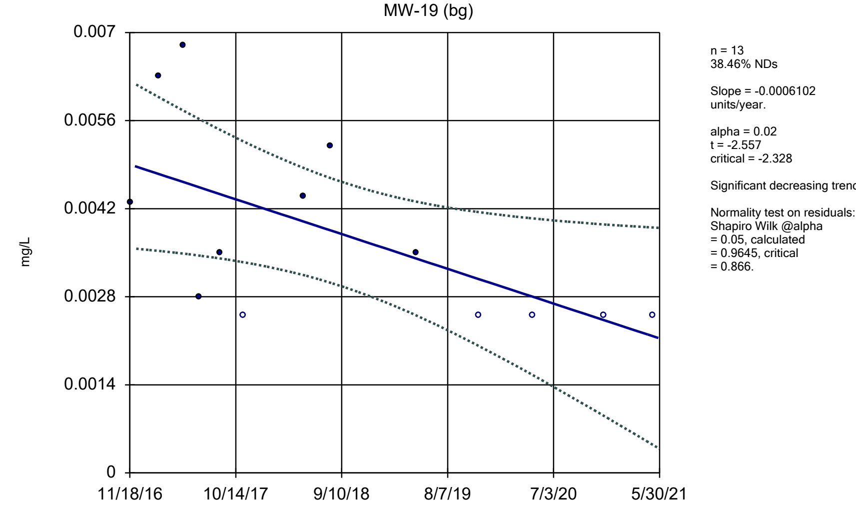
Constituent: Selenium Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Linear Regression and 95% Confidence Band

MW-19 (bg)



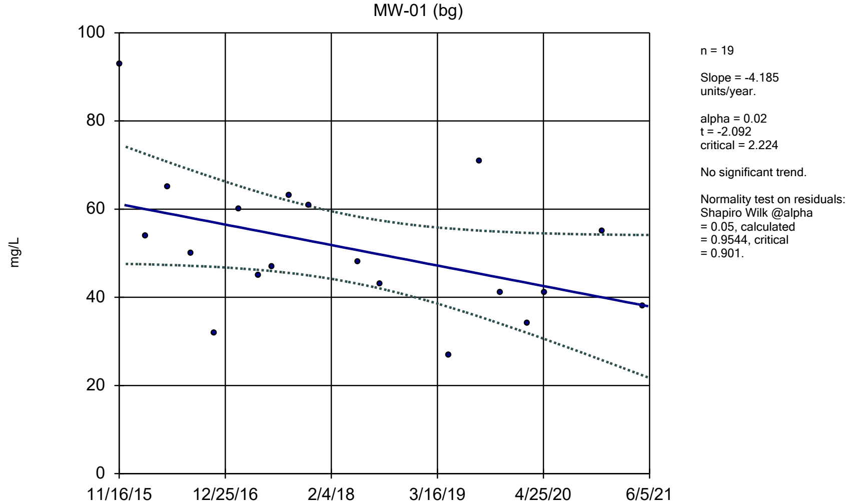
Constituent: Selenium Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-01 (bg)



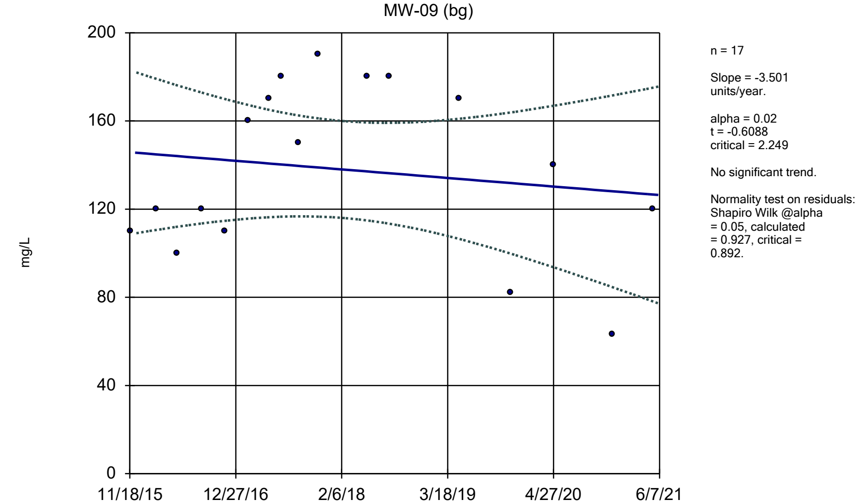
Constituent: Sulfate Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-09 (bg)



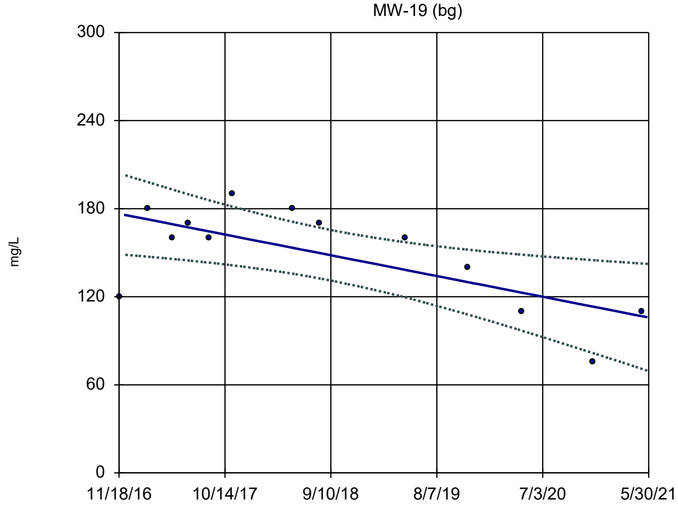
Constituent: Sulfate Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-19 (bg)



n = 13

Slope = -15.6
units/year.

alpha = 0.02
t = -3.145
critical = -2.328

Significant decreasing trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.9061, critical
= 0.866.

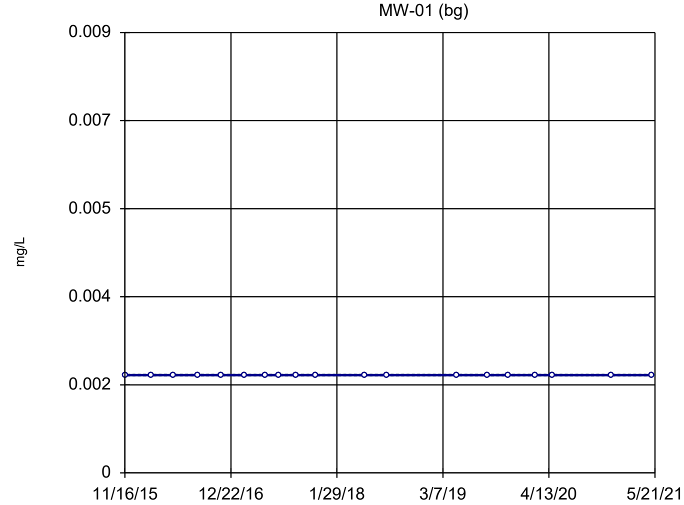
Constituent: Sulfate Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-01 (bg)



n = 19

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 68

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

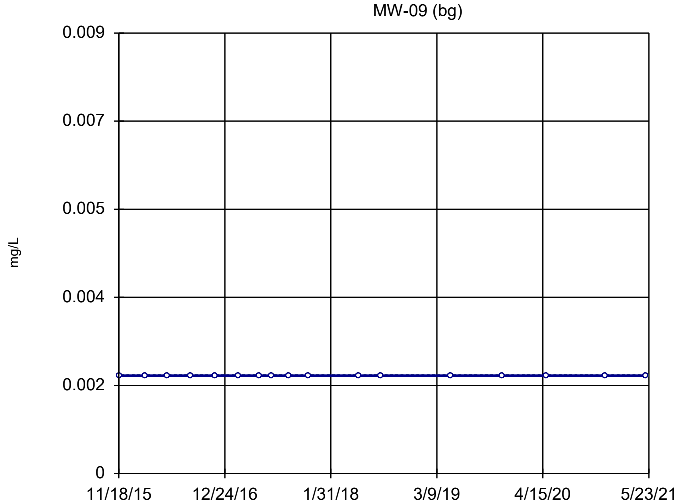
Constituent: Thallium Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-09 (bg)



n = 17

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 58

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

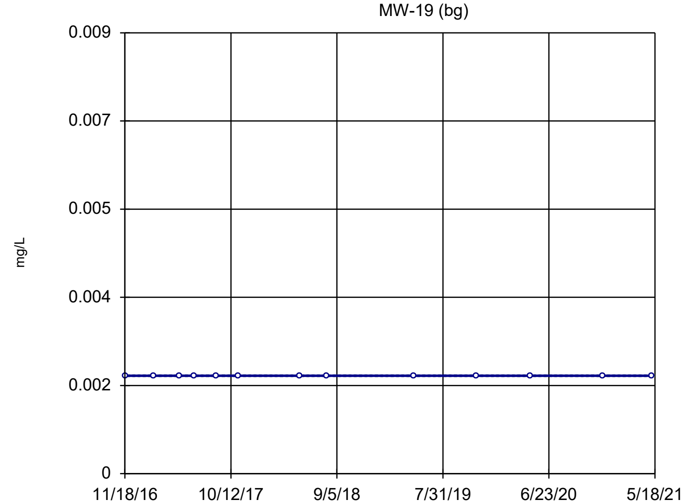
Constituent: Thallium Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-19 (bg)



n = 13

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 39

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

Constituent: Thallium Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

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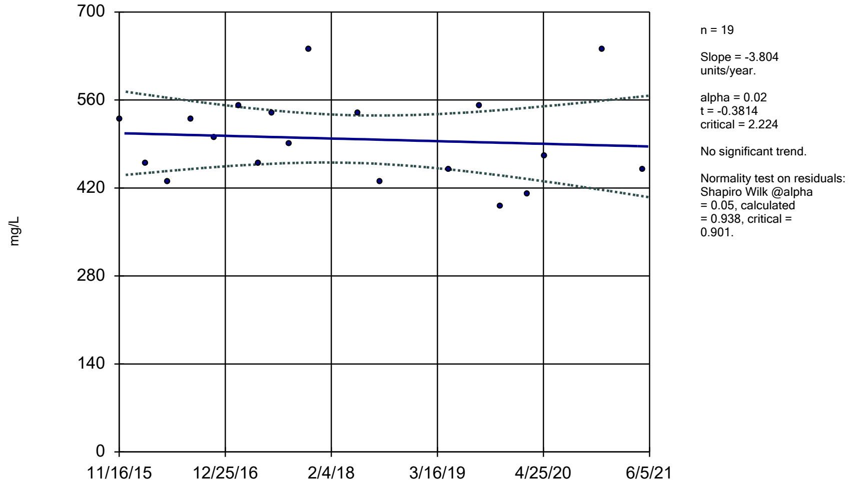
Linear Regression and 95% Confidence Band

MW-01 (bg)



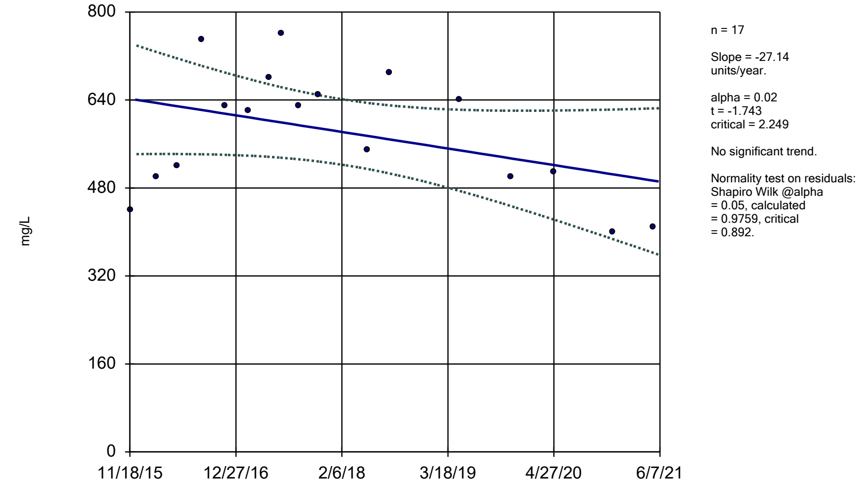
Constituent: Total Dissolved Solids Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-09 (bg)



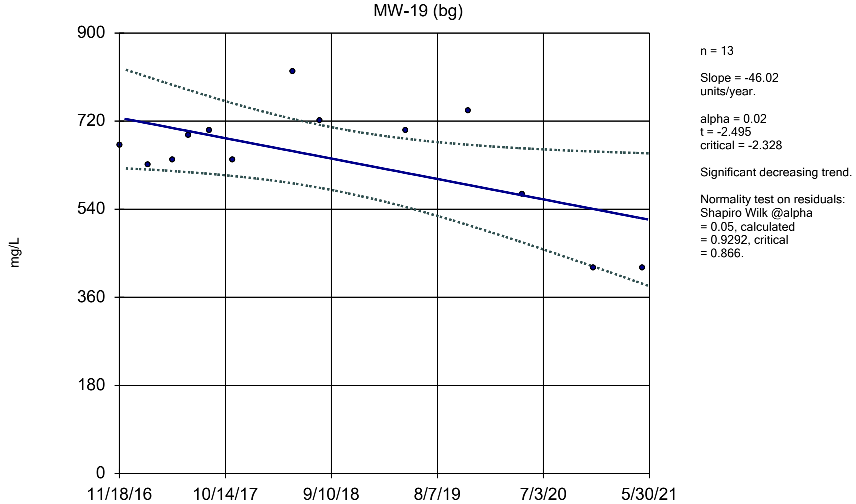
Constituent: Total Dissolved Solids Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-19 (bg)



Constituent: Total Dissolved Solids Analysis Run 8/10/2021 9:38 AM

Powerton Generating Station Client: NRG Data: Powerton

Powerton FAB Trend Test

Powerton Generating Station Client: NRG Data: Powerton FAB Printed 8/12/2021, 11:52 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Antimony (mg/L)	MW-01 (bg)	0	0	53	No	16	100	n/a	n/a	0.02	NP (NDs)
Antimony (mg/L)	MW-10 (bg)	0	0	31	No	11	100	n/a	n/a	0.02	NP (NDs)
Arsenic (mg/L)	**MW-01 (bg)**	**-0.00...**	**-2.343**	**-2.235**	**Yes**	**18**	**61.11**	**Yes**	**cube root**	**0.02**	**Param.**
Arsenic (mg/L)	MW-10 (bg)	-0.00...	-2	-39	No	13	7.692	n/a	n/a	0.02	NP (Nor...
Barium (mg/L)	MW-01 (bg)	-0.00...	-1.098	2.235	No	18	0	Yes	square...	0.02	Param.
Barium (mg/L)	MW-10 (bg)	0.01021	16	39	No	13	0	n/a	n/a	0.02	NP (Nor...
Beryllium (mg/L)	MW-01 (bg)	0	0	53	No	16	100	n/a	n/a	0.02	NP (NDs)
Beryllium (mg/L)	MW-10 (bg)	0	2	31	No	11	100	n/a	n/a	0.02	NP (NDs)
Boron (mg/L)	MW-01 (bg)	-0.00692	-0.2524	2.235	No	18	0	Yes	square...	0.02	Param.
Boron (mg/L)	**MW-10 (bg)**	**0.3052**	**2.62**	**2.328**	**Yes**	**13**	**0**	**Yes**	**no**	**0.02**	**Param.**
Cadmium (mg/L)	MW-01 (bg)	0	0	63	No	18	100	n/a	n/a	0.02	NP (NDs)
Cadmium (mg/L)	MW-10 (bg)	0	3	31	No	11	81.82	n/a	n/a	0.02	NP (NDs)
Calcium (mg/L)	MW-01 (bg)	-1.226	-0.5871	2.235	No	18	0	Yes	no	0.02	Param.
Calcium (mg/L)	MW-10 (bg)	0.04912	0.8838	2.328	No	13	0	Yes	cube root	0.02	Param.
Chloride (mg/L)	MW-01 (bg)	1.164	1.044	2.235	No	18	0	Yes	no	0.02	Param.
Chloride (mg/L)	MW-10 (bg)	-0.8939	-0.8886	2.328	No	13	0	Yes	no	0.02	Param.
Chromium (mg/L)	MW-01 (bg)	0	-13	-63	No	18	94.44	n/a	n/a	0.02	NP (NDs)
Chromium (mg/L)	MW-10 (bg)	0	3	39	No	13	76.92	n/a	n/a	0.02	NP (NDs)
Cobalt (mg/L)	MW-01 (bg)	-0.00...	-2.017	2.235	No	18	72.22	Yes	no	0.02	Param.
Cobalt (mg/L)	MW-10 (bg)	-0.0169	-0.08084	2.328	No	13	0	Yes	natura...	0.02	Param.
Combined Radium 226 + 228 (pCi/L)	MW-01 (bg)	-0.02977	-1.285	2.235	No	18	55.56	Yes	no	0.02	Param.
Combined Radium 226 + 228 (pCi/L)	MW-10 (bg)	0.08318	0.8868	2.328	No	13	7.692	Yes	square...	0.02	Param.
Fluoride (mg/L)	MW-01 (bg)	0.004756	0.8497	2.235	No	18	0	Yes	no	0.02	Param.
Fluoride (mg/L)	**MW-10 (bg)**	**0.01859**	**6.036**	**2.328**	**Yes**	**13**	**0**	**Yes**	**no**	**0.02**	**Param.**
Lead (mg/L)	MW-01 (bg)	-0.00...	-2.129	2.235	No	18	50	Yes	no	0.02	Param.
Lead (mg/L)	MW-10 (bg)	-0.00...	-0.01643	2.328	No	13	7.692	Yes	natura...	0.02	Param.
Lithium (mg/L)	MW-01 (bg)	0	0	63	No	18	100	n/a	n/a	0.02	NP (NDs)
Lithium (mg/L)	MW-10 (bg)	0	1	35	No	12	83.33	n/a	n/a	0.02	NP (NDs)
Mercury (mg/L)	MW-01 (bg)	0	0	63	No	18	100	n/a	n/a	0.02	NP (NDs)
Mercury (mg/L)	MW-10 (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Molybdenum (mg/L)	MW-01 (bg)	0	5	63	No	18	61.11	n/a	n/a	0.02	NP (Nor...
Molybdenum (mg/L)	MW-10 (bg)	0	0	39	No	13	92.31	n/a	n/a	0.02	NP (NDs)
pH (n/a)	MW-01 (bg)	0.01803	0.487	2.235	No	18	0	Yes	no	0.02	Param.
pH (n/a)	MW-10 (bg)	-0.00...	-3	-39	No	13	0	n/a	n/a	0.02	NP (Nor...
Selenium (mg/L)	MW-01 (bg)	0	-15	-63	No	18	94.44	n/a	n/a	0.02	NP (NDs)
Selenium (mg/L)	MW-10 (bg)	0.000...	0.3664	2.328	No	13	0	Yes	no	0.02	Param.
Sulfate (mg/L)	MW-01 (bg)	-4.134	-1.958	2.235	No	18	0	Yes	no	0.02	Param.
Sulfate (mg/L)	MW-10 (bg)	0.09615	0.02609	2.328	No	13	0	Yes	no	0.02	Param.
Thallium (mg/L)	MW-01 (bg)	0	0	63	No	18	100	n/a	n/a	0.02	NP (NDs)
Thallium (mg/L)	MW-10 (bg)	0	0	31	No	11	100	n/a	n/a	0.02	NP (NDs)
Total Dissolved Solids (mg/L)	MW-01 (bg)	-0.4106	-0.0418	2.235	No	18	0	Yes	no	0.02	Param.
Total Dissolved Solids (mg/L)	MW-10 (bg)	3.701	0.3647	2.328	No	13	0	Yes	no	0.02	Param.

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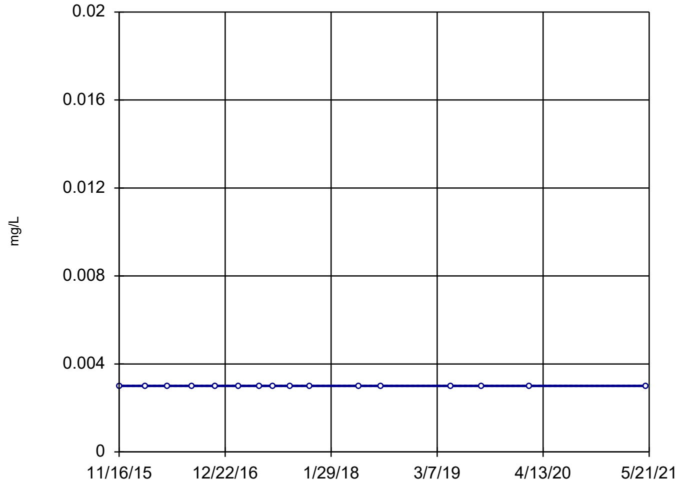
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-01 (bg)



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 53

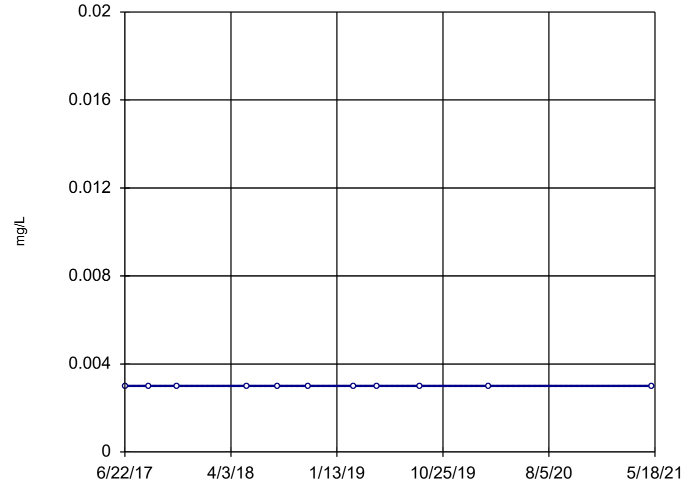
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

Constituent: Antimony   Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-10 (bg)



n = 11

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 31

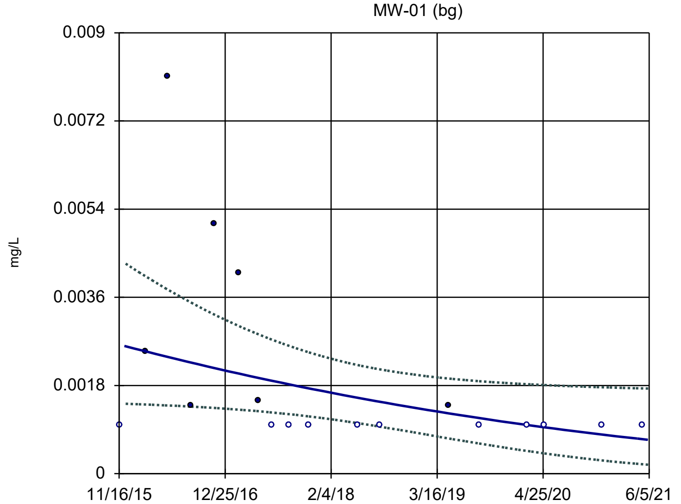
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

Constituent: Antimony   Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Linear Regression and 95% Confidence Band

MW-01 (bg)



n = 18
61.11% NDs

Slope = -0.008968
cube root units/year.

alpha = 0.02
t = -2.343
critical = -2.235

Significant decreasing trend.

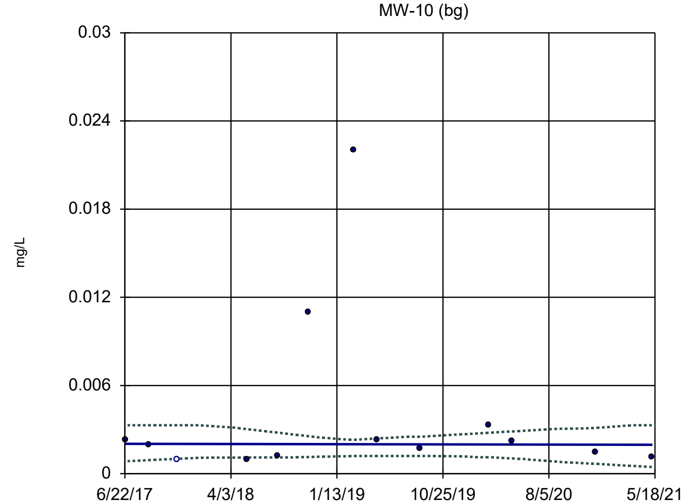
Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.9068 after cube root transformation, critical = 0.897.

Constituent: Arsenic   Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-10 (bg)



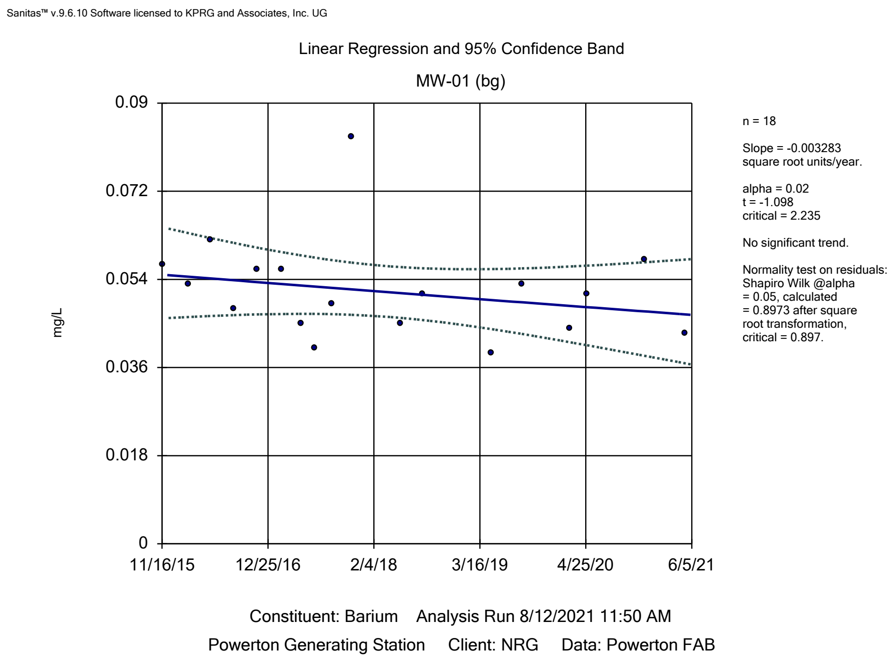
n = 13

Slope = -0.00001753
units per year.

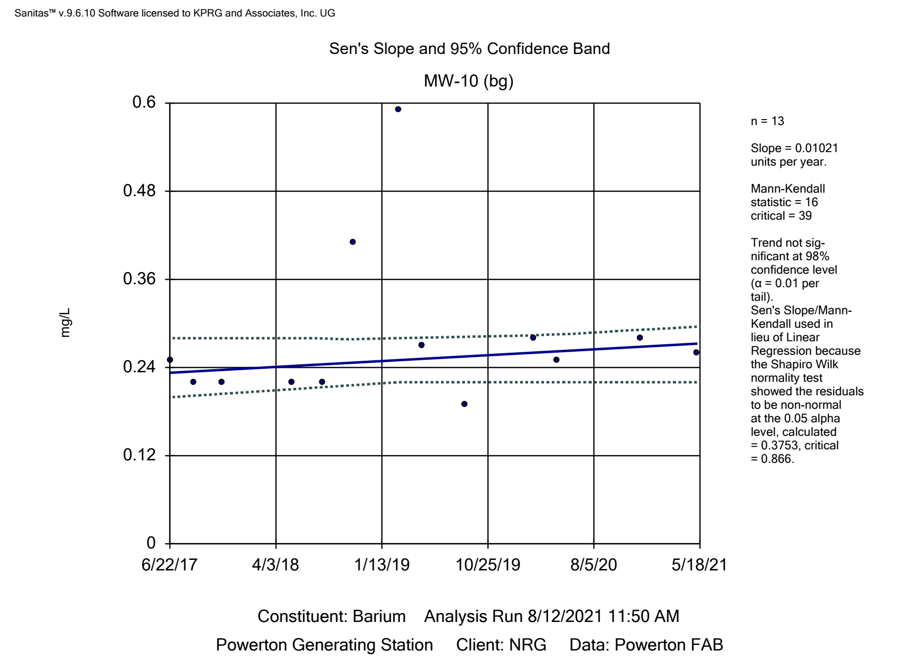
Mann-Kendall
statistic = -2
critical = -39

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.05 alpha level, calculated = 0.3284, critical = 0.866.

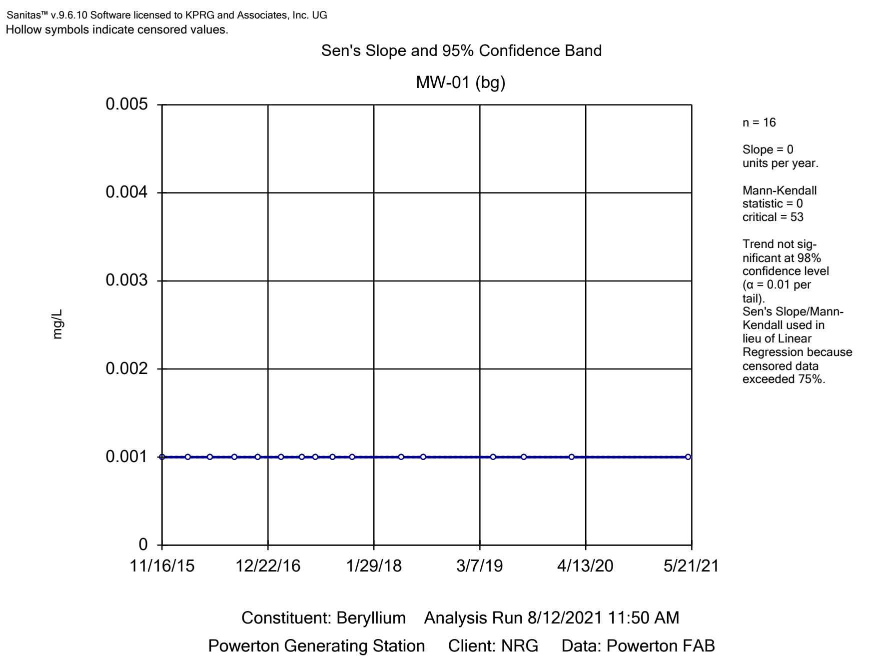
Constituent: Arsenic   Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station   Client: NRG   Data: Powerton FAB



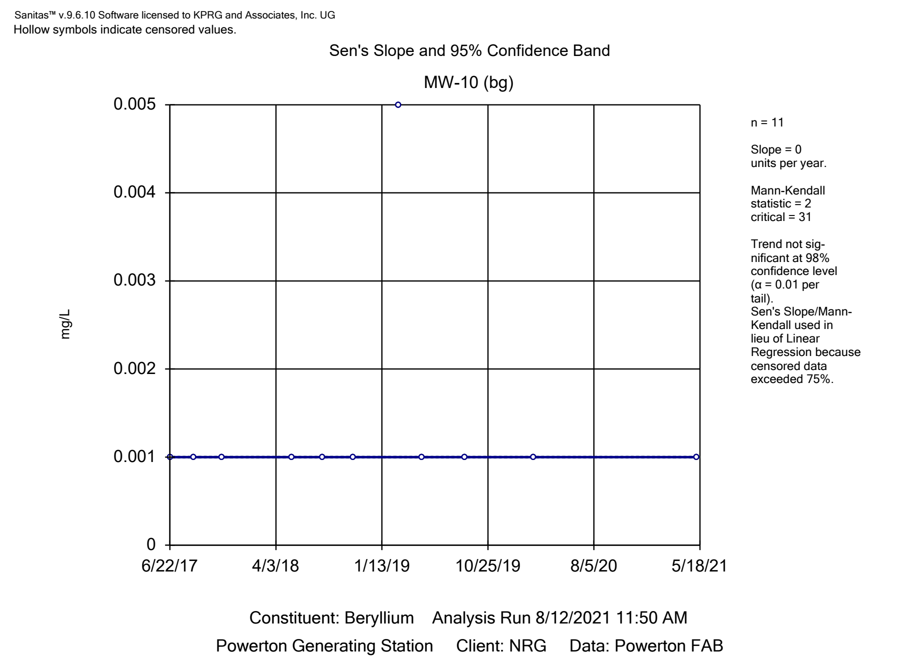
Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Linear Regression and 95% Confidence Band
MW-01 (bg)
mg/L
0.09
0.072
0.054
0.036
0.018
0
11/16/15
12/25/16
2/4/18
3/16/19
4/25/20
6/5/21
n = 18
Slope = -0.003283 square root units/year.
alpha = 0.02
t = -1.098
critical = 2.235
No significant trend.
Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.8973 after square root transformation, critical = 0.897.
Constituent: Barium Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB



Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Sen's Slope and 95% Confidence Band
MW-10 (bg)
mg/L
0.6
0.48
0.36
0.24
0.12
0
6/22/17
4/3/18
1/13/19
10/25/19
8/5/20
5/18/21
n = 13
Slope = 0.01021 units per year.
Mann-Kendall statistic = 16
critical = 39
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.05 alpha level, calculated = 0.3753, critical = 0.866.
Constituent: Barium Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB



Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-01 (bg)
mg/L
0.005
0.004
0.003
0.002
0.001
0
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 16
Slope = 0 units per year.
Mann-Kendall statistic = 0
critical = 53
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Beryllium Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

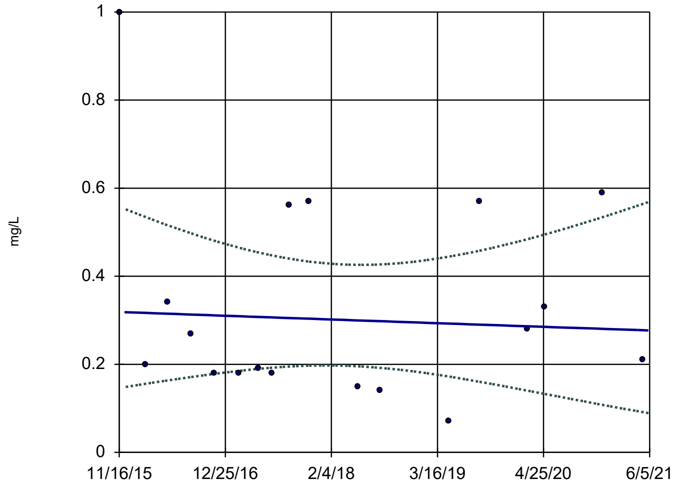


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-10 (bg)
mg/L
0.005
0.004
0.003
0.002
0.001
0
6/22/17
4/3/18
1/13/19
10/25/19
8/5/20
5/18/21
n = 11
Slope = 0 units per year.
Mann-Kendall statistic = 2
critical = 31
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Beryllium Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-01 (bg)



n = 18

Slope = -0.00692
square root units/year.

alpha = 0.02
t = -0.2524
critical = 2.235

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.9135 after square
root transformation,
critical = 0.897.

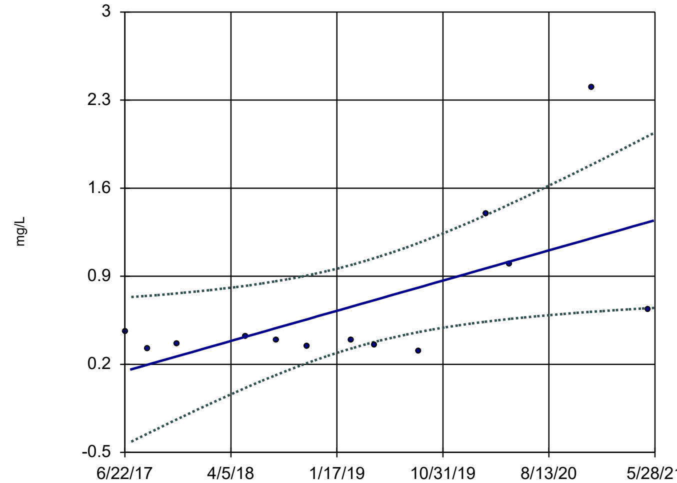
Constituent: Boron   Analysis Run 8/12/2021 11:50 AM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-10 (bg)



n = 13

Slope = 0.3052
units/year.

alpha = 0.02
t = 2.62
critical = 2.328

Significant increasing trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.9283, critical
= 0.866.

Constituent: Boron   Analysis Run 8/12/2021 11:50 AM

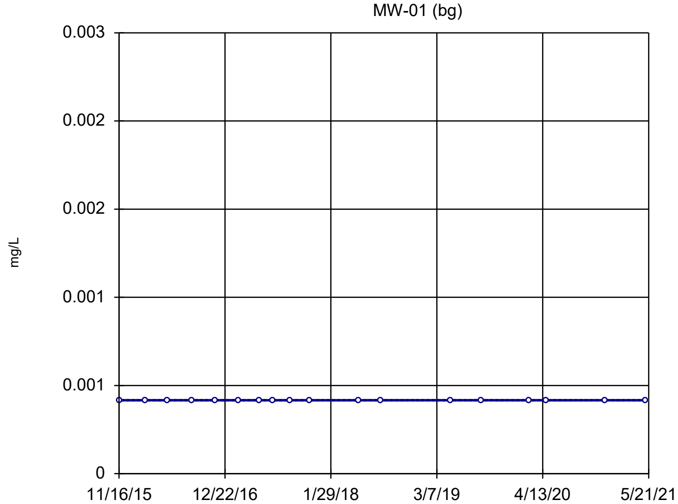
Powerton Generating Station   Client: NRG   Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-01 (bg)



n = 18

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 63

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

Constituent: Cadmium   Analysis Run 8/12/2021 11:50 AM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

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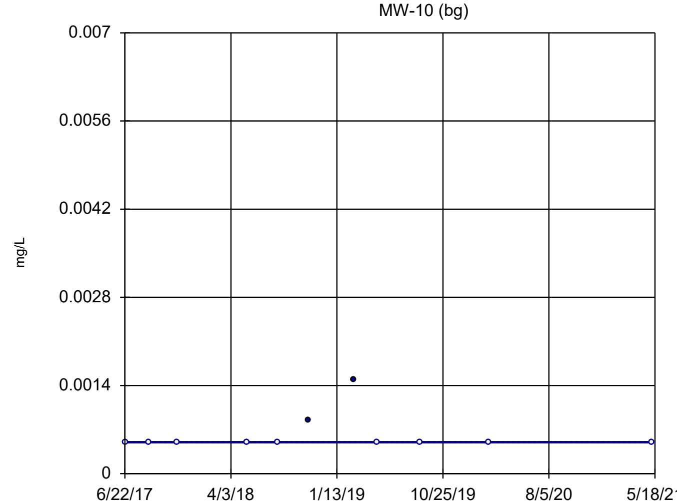
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-10 (bg)



n = 11

Slope = 0
units per year.

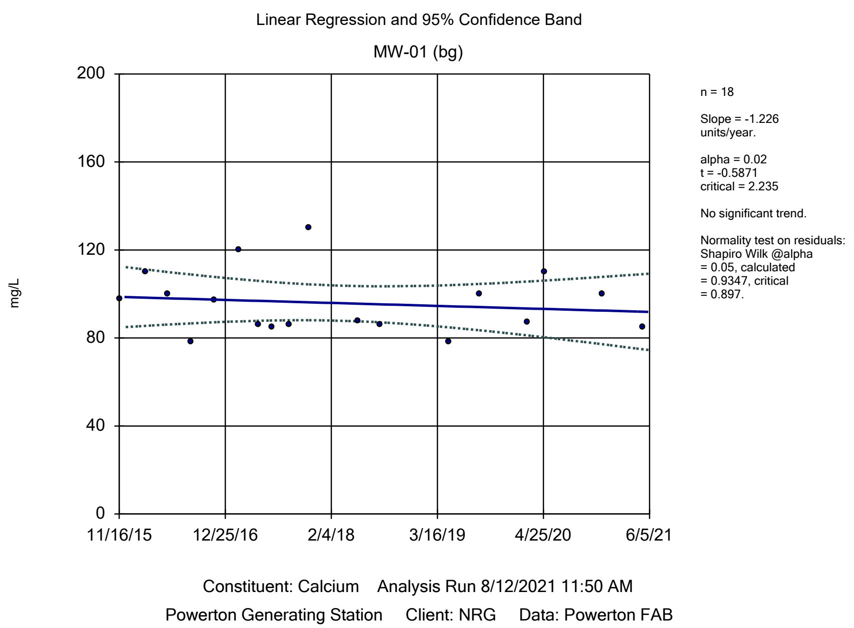
Mann-Kendall
statistic = 3
critical = 31

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

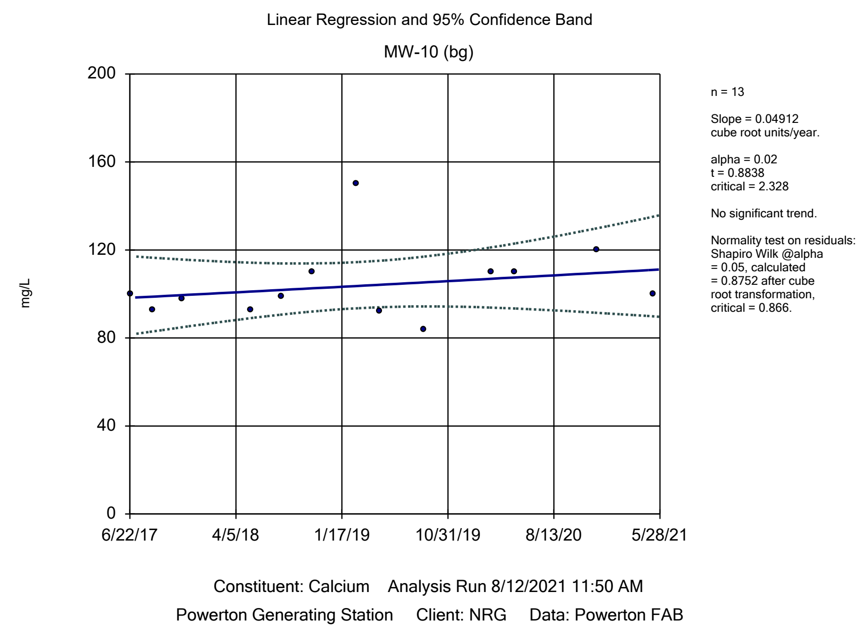
Constituent: Cadmium   Analysis Run 8/12/2021 11:50 AM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

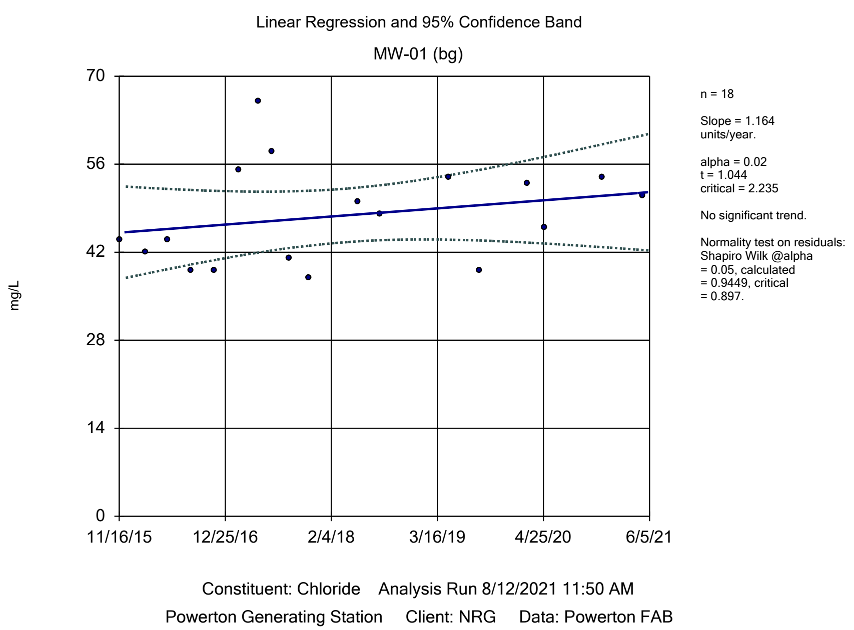
Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG



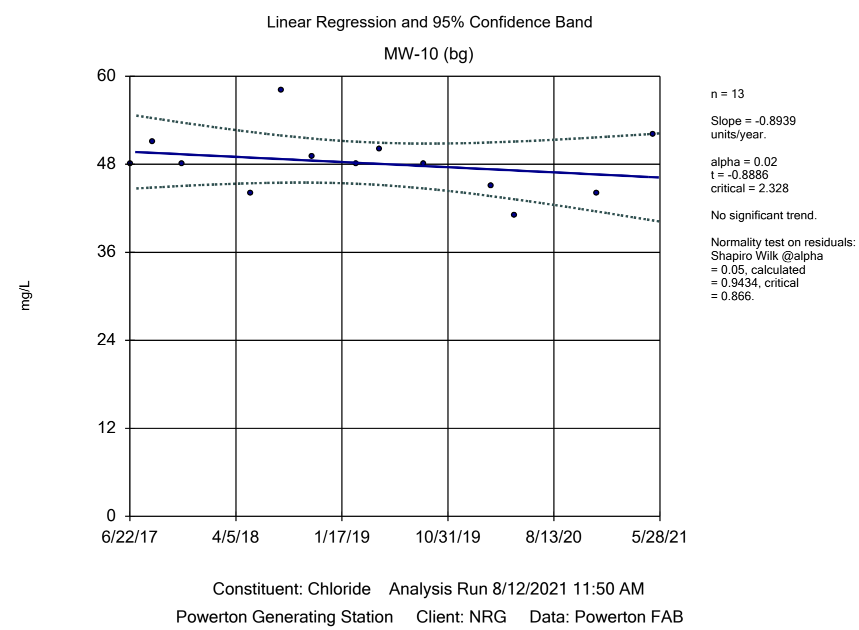
Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

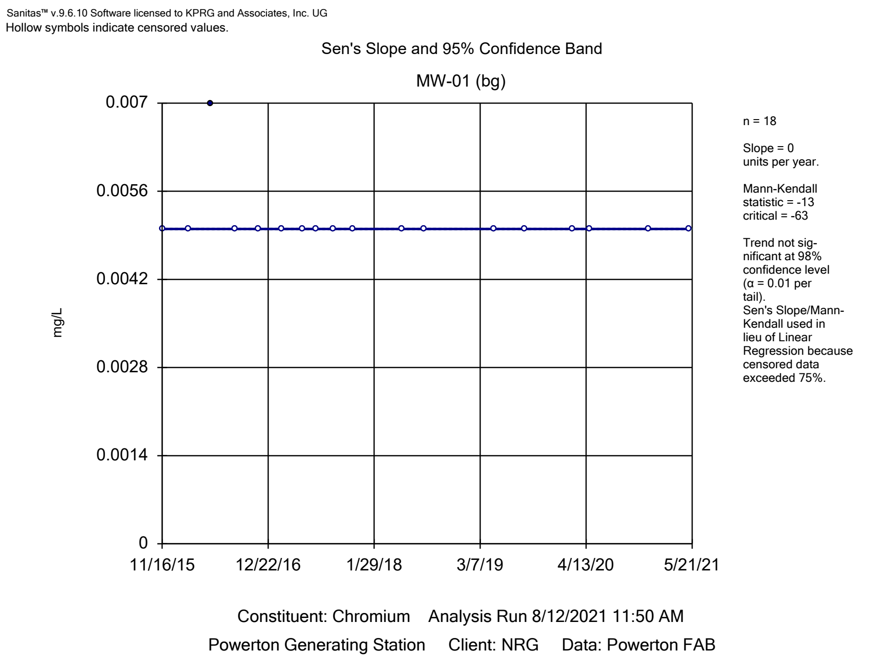


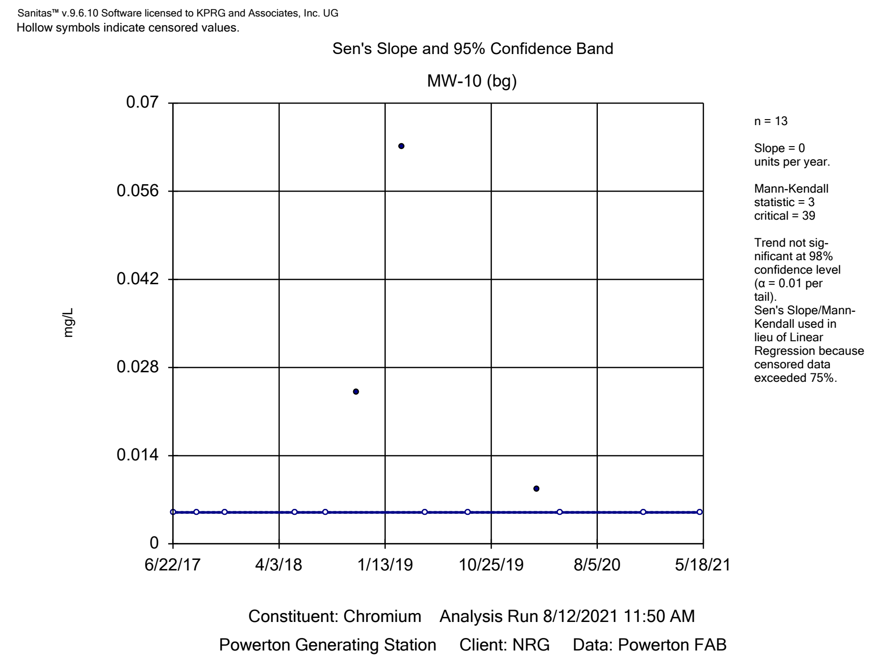
Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

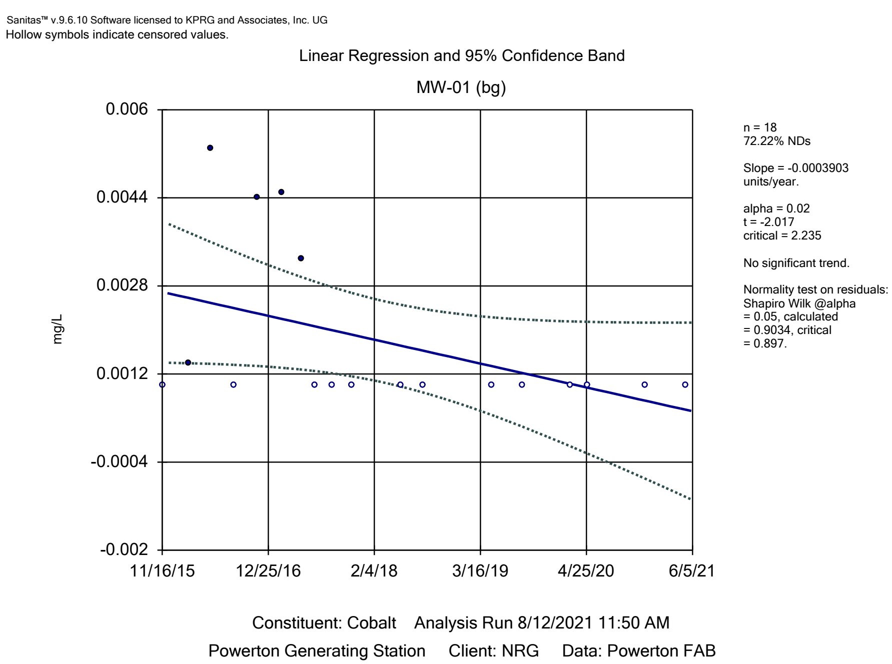


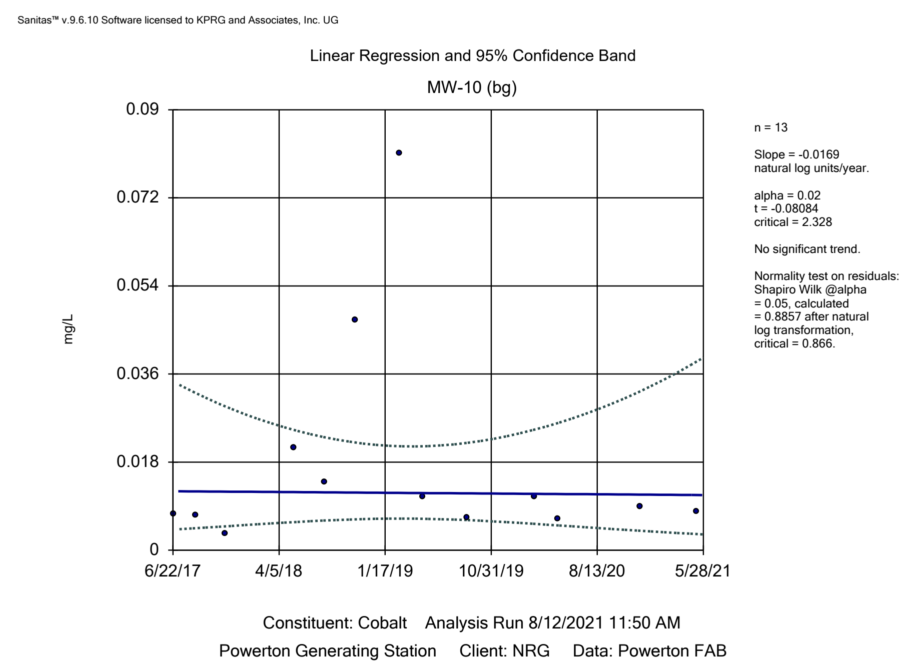
Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG



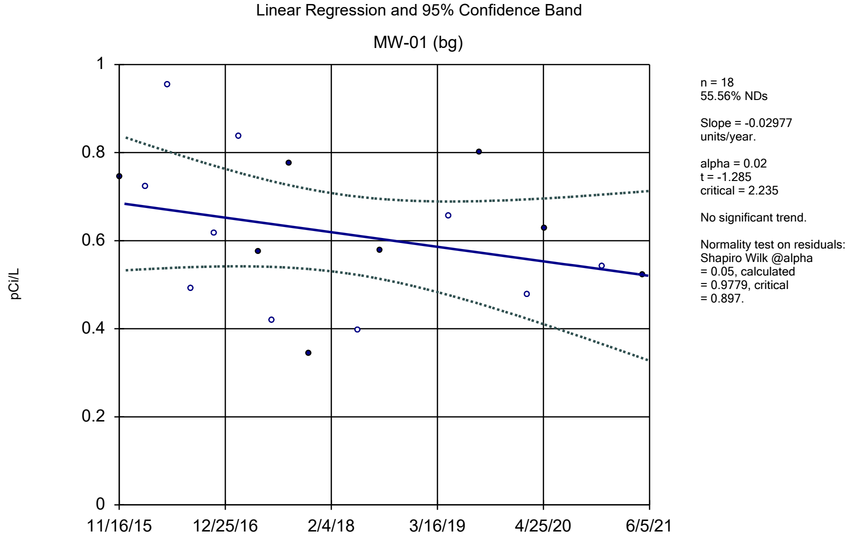

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-01 (bg)
0.007
0.0056
0.0042
0.0028
0.0014
0
mg/L
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 18
Slope = 0
units per year.
Mann-Kendall
statistic = -13
critical = -63
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Chromium Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-10 (bg)
0.07
0.056
0.042
0.028
0.014
0
mg/L
6/22/17
4/3/18
1/13/19
10/25/19
8/5/20
5/18/21
n = 13
Slope = 0
units per year.
Mann-Kendall
statistic = 3
critical = 39
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Chromium Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Linear Regression and 95% Confidence Band
MW-01 (bg)
0.006
0.0044
0.0028
0.0012
-0.0004
-0.002
mg/L
11/16/15
12/25/16
2/4/18
3/16/19
4/25/20
6/5/21
n = 18
72.22% NDs
Slope = -0.0003903
units/year.
alpha = 0.02
t = -2.017
critical = 2.235
No significant trend.
Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.9034, critical = 0.897.
Constituent: Cobalt Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

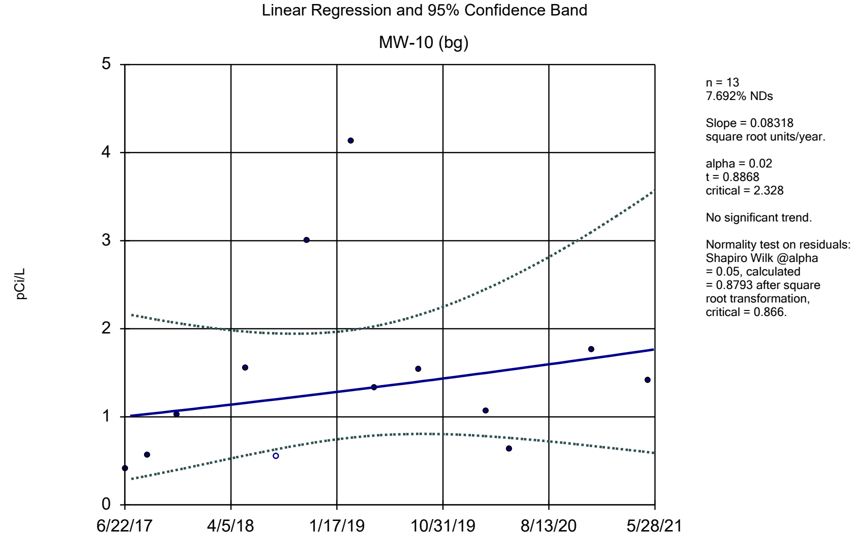

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Linear Regression and 95% Confidence Band
MW-10 (bg)
0.09
0.072
0.054
0.036
0.018
0
mg/L
6/22/17
4/5/18
1/17/19
10/31/19
8/13/20
5/28/21
n = 13
Slope = -0.0169
natural log units/year.
alpha = 0.02
t = -0.08084
critical = 2.328
No significant trend.
Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.8857 after natural log transformation, critical = 0.866.
Constituent: Cobalt Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



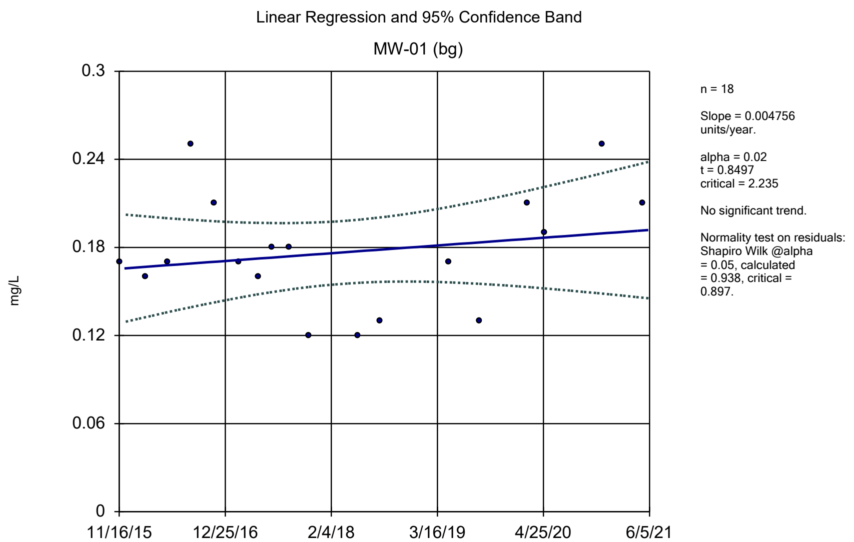
Constituent: Combined Radium 226 + 228 Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



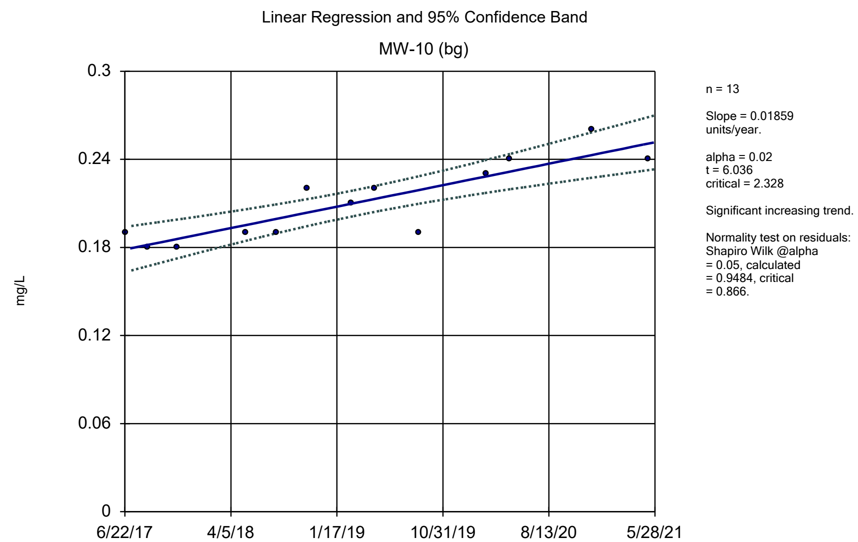
Constituent: Combined Radium 226 + 228 Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

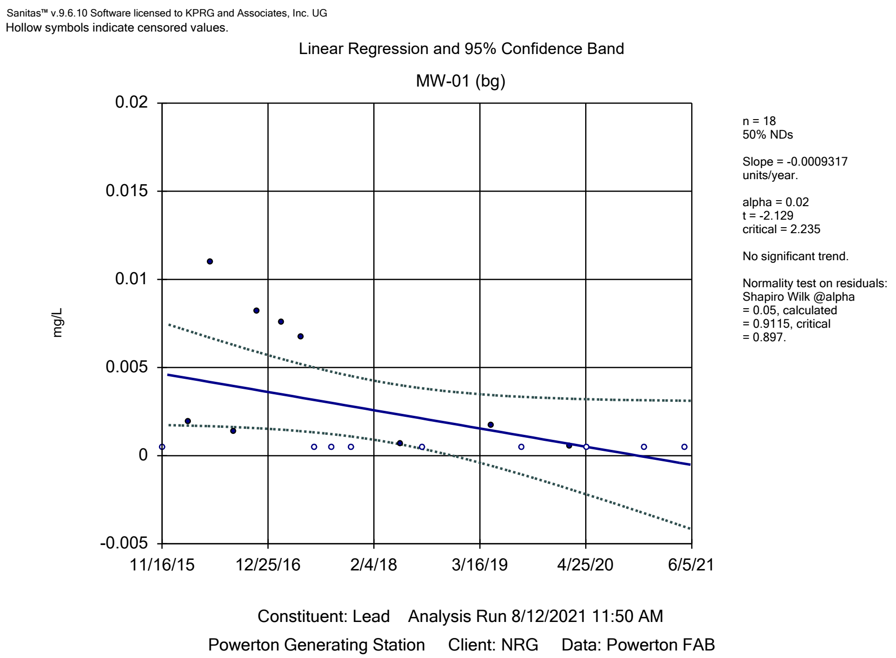


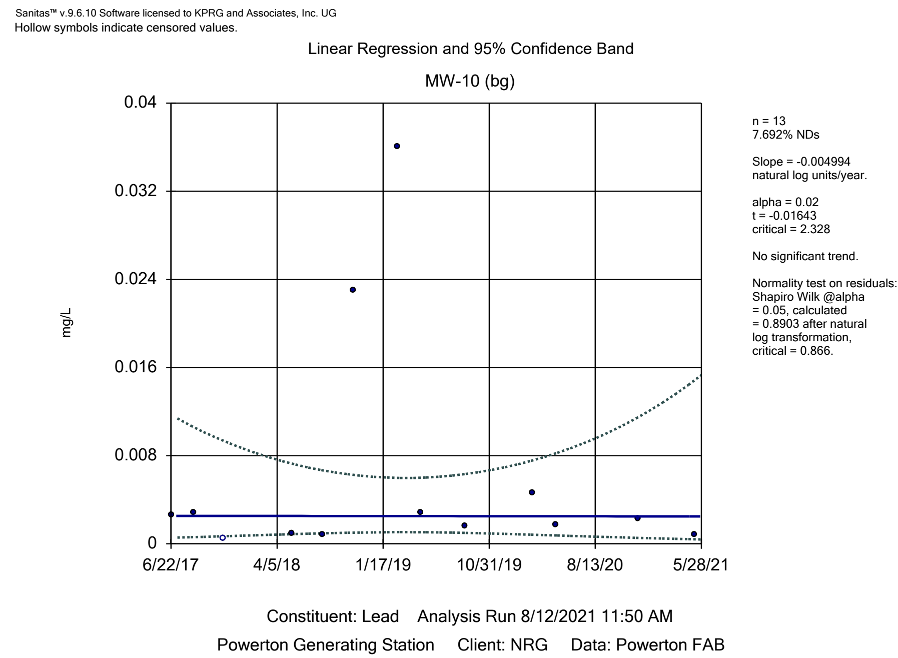
Constituent: Fluoride Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

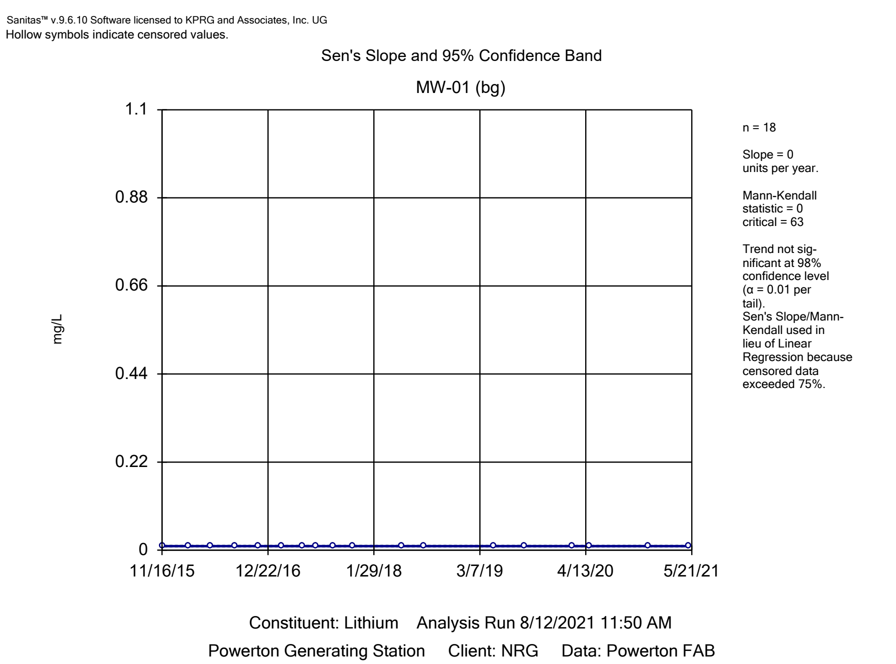
Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

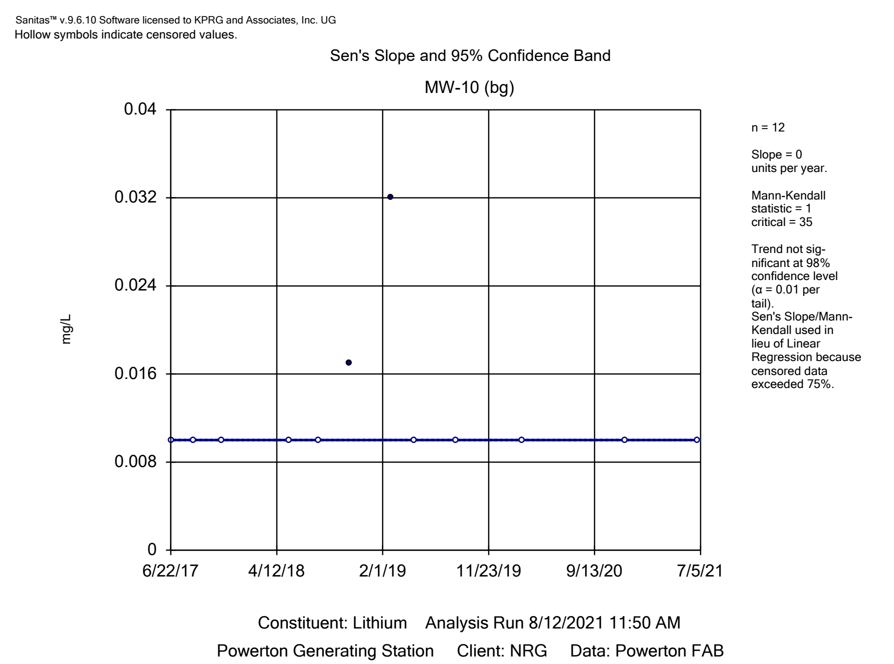


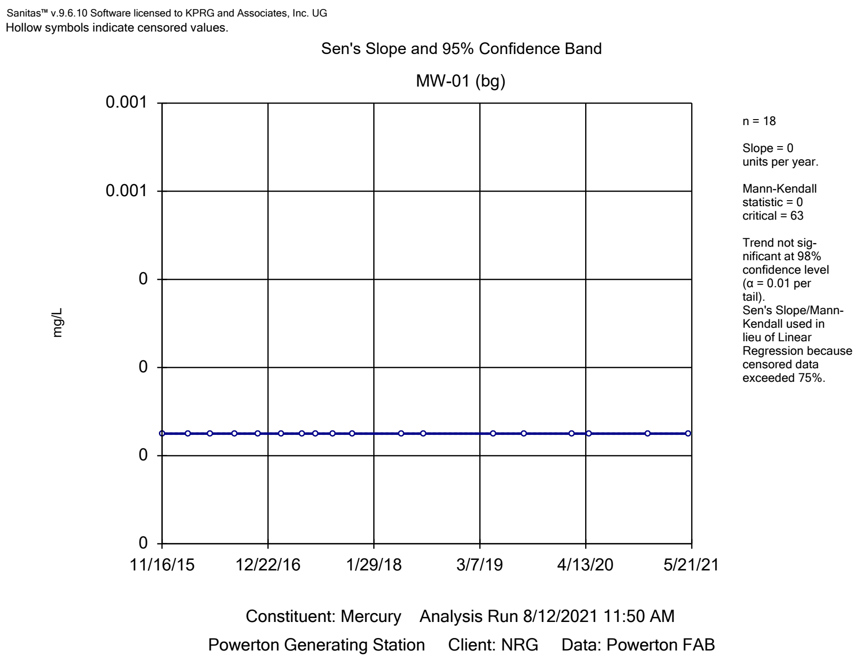
Constituent: Fluoride Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Linear Regression and 95% Confidence Band
MW-01 (bg)
mg/L
0.02
0.015
0.01
0.005
0
-0.005
11/16/15
12/25/16
2/4/18
3/16/19
4/25/20
6/5/21
n = 18
50% NDs
Slope = -0.0009317
units/year.
alpha = 0.02
t = -2.129
critical = 2.235
No significant trend.
Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.9115, critical
= 0.897.
Constituent: Lead Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

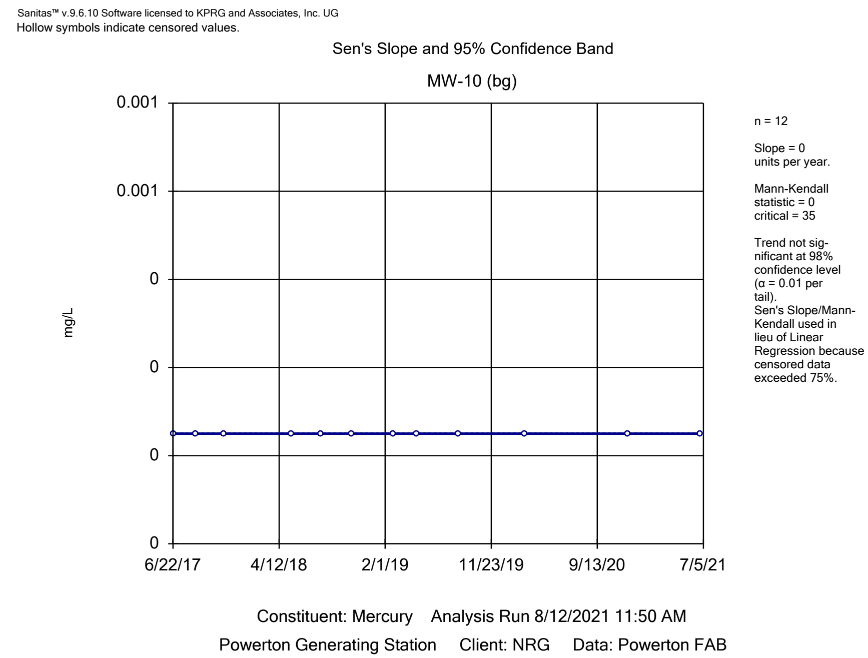

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Linear Regression and 95% Confidence Band
MW-10 (bg)
mg/L
0.04
0.032
0.024
0.016
0.008
0
6/22/17
4/5/18
1/17/19
10/31/19
8/13/20
5/28/21
n = 13
7.692% NDs
Slope = -0.004994
natural log units/year.
alpha = 0.02
t = -0.01643
critical = 2.328
No significant trend.
Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.8903 after natural
log transformation,
critical = 0.866.
Constituent: Lead Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-01 (bg)
mg/L
1.1
0.88
0.66
0.44
0.22
0
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 18
Slope = 0
units per year.
Mann-Kendall
statistic = 0
critical = 63
Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).
Sen's Slope/Mann-
Kendall used in
lieu of Linear
Regression because
censored data
exceeded 75%.
Constituent: Lithium Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

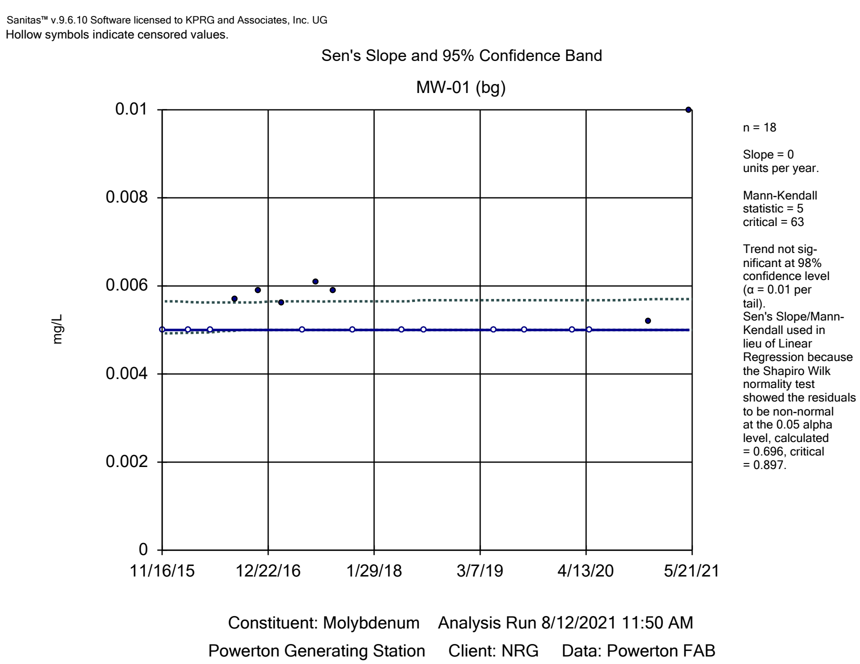

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-10 (bg)
mg/L
0.04
0.032
0.024
0.016
0.008
0
6/22/17
4/12/18
2/1/19
11/23/19
9/13/20
7/5/21
n = 12
Slope = 0
units per year.
Mann-Kendall
statistic = 1
critical = 35
Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).
Sen's Slope/Mann-
Kendall used in
lieu of Linear
Regression because
censored data
exceeded 75%.
Constituent: Lithium Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB



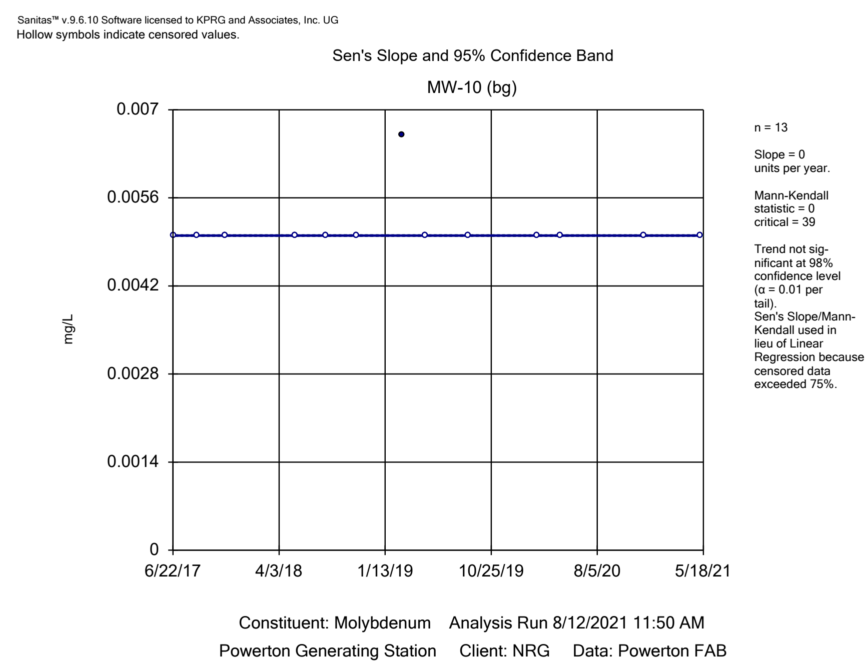
Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-01 (bg)
0.001
0.001
0
0
0
0
mg/L
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 18
Slope = 0 units per year.
Mann-Kendall statistic = 0 critical = 63
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Mercury Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB



Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-10 (bg)
0.001
0.001
0
0
0
0
mg/L
6/22/17
4/12/18
2/1/19
11/23/19
9/13/20
7/5/21
n = 12
Slope = 0 units per year.
Mann-Kendall statistic = 0 critical = 35
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Mercury Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB



Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-01 (bg)
0.01
0.008
0.006
0.004
0.002
0
mg/L
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 18
Slope = 0 units per year.
Mann-Kendall statistic = 5 critical = 63
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.05 alpha level, calculated = 0.696, critical = 0.897.
Constituent: Molybdenum Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB



Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-10 (bg)
0.007
0.0056
0.0042
0.0028
0.0014
0
mg/L
6/22/17
4/3/18
1/13/19
10/25/19
8/5/20
5/18/21
n = 13
Slope = 0 units per year.
Mann-Kendall statistic = 0 critical = 39
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Molybdenum Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

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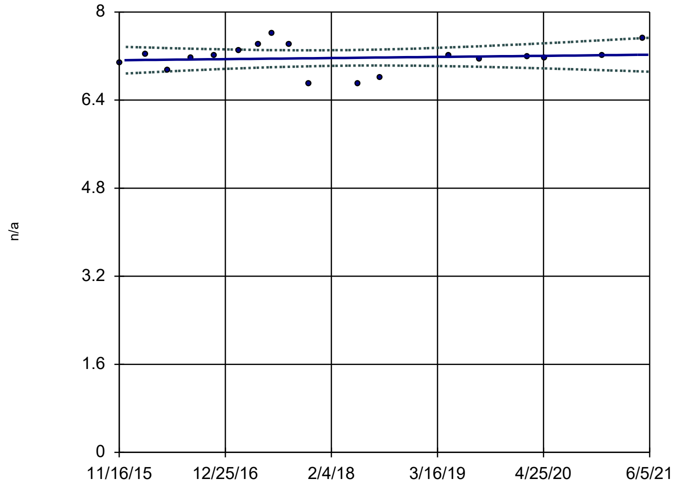
Linear Regression and 95% Confidence Band

MW-01 (bg)



n = 18

Slope = 0.01803
units/year.

alpha = 0.02
t = 0.487
critical = 2.235

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.9419, critical
= 0.897.

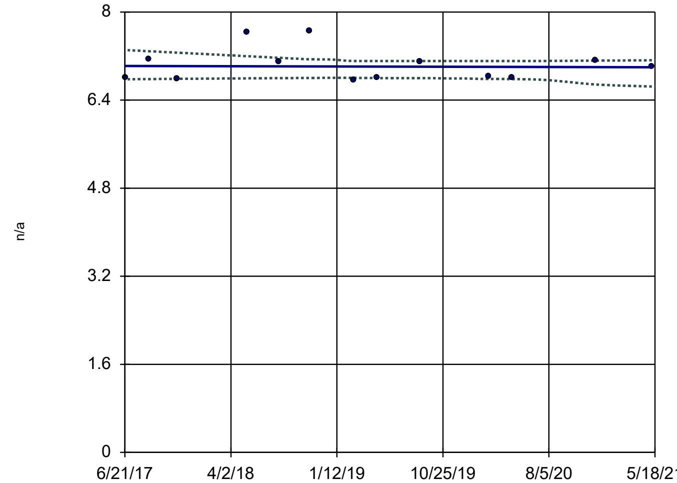
Constituent: pH Analysis Run 8/12/2021 11:50 AM

Powerton Generating Station Client: NRG Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Sen's Slope and 95% Confidence Band

MW-10 (bg)



n = 13

Slope = -0.005602
units per year.

Mann-Kendall
statistic = -3
critical = -39

Trend not significant at 98%
confidence level
(α = 0.01 per
tail).
Sen's Slope/Mann-Kendall used in
lieu of Linear
Regression because
the Shapiro Wilk
normality test
showed the residuals
to be non-normal
at the 0.05 alpha
level, calculated
= 0.8103, critical
= 0.866.

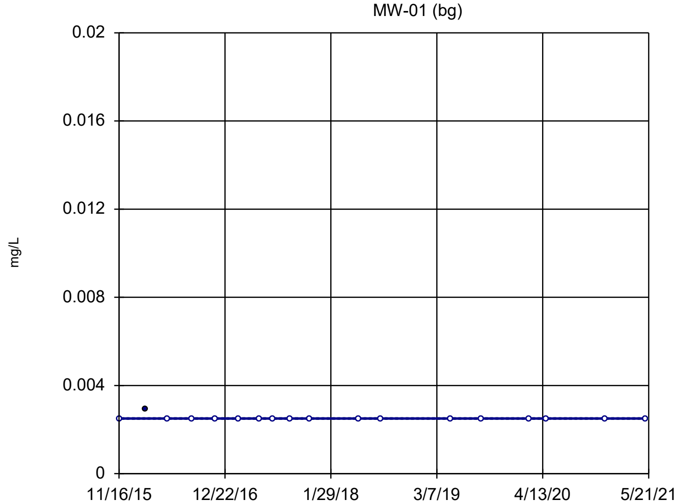
Constituent: pH Analysis Run 8/12/2021 11:50 AM

Powerton Generating Station Client: NRG Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

MW-01 (bg)



n = 18

Slope = 0
units per year.

Mann-Kendall
statistic = -15
critical = -63

Trend not significant at 98%
confidence level
(α = 0.01 per
tail).
Sen's Slope/Mann-Kendall used in
lieu of Linear
Regression because
censored data
exceeded 75%.

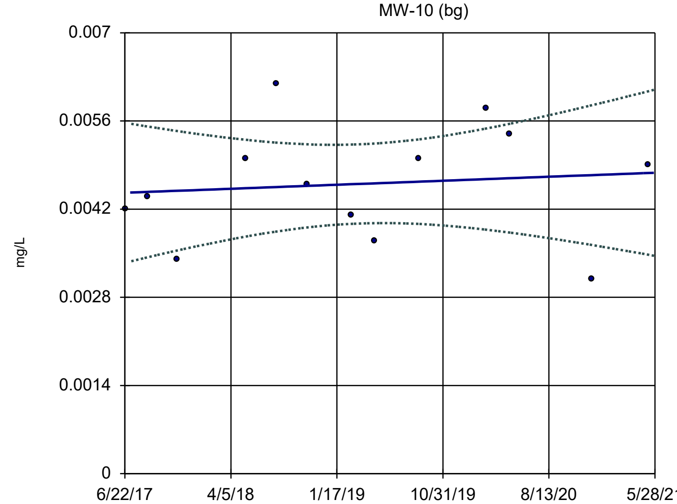
Constituent: Selenium Analysis Run 8/12/2021 11:50 AM

Powerton Generating Station Client: NRG Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Linear Regression and 95% Confidence Band

MW-10 (bg)



n = 13

Slope = 0.00008092
units/year.

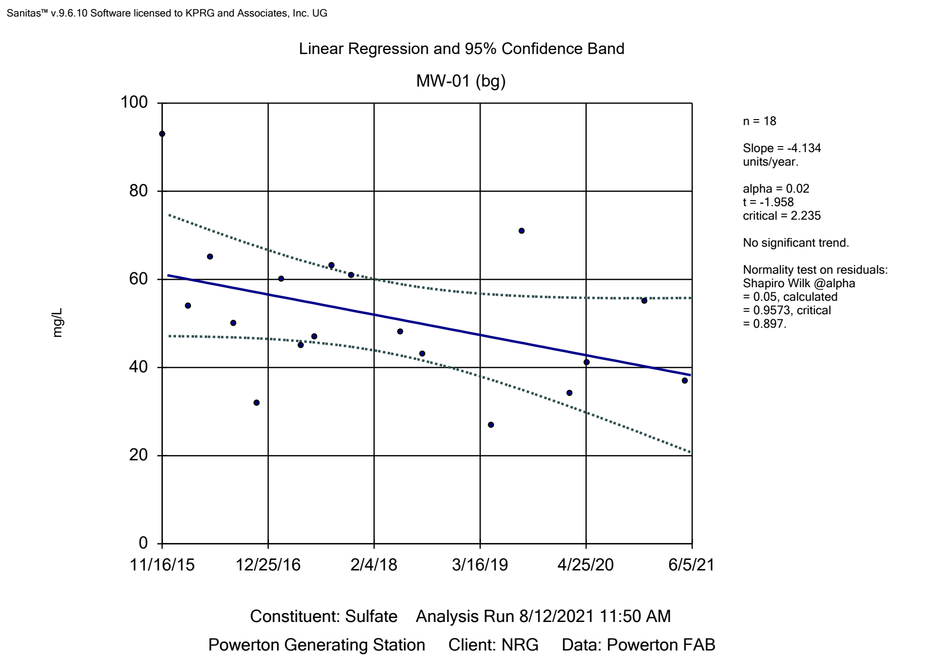
alpha = 0.02
t = 0.3664
critical = 2.328

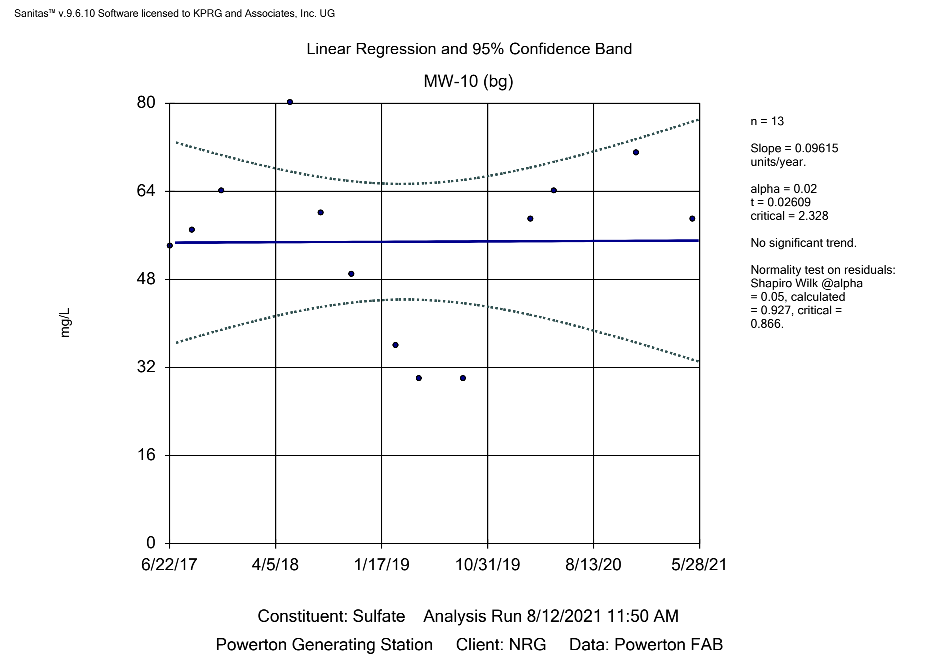
No significant trend.

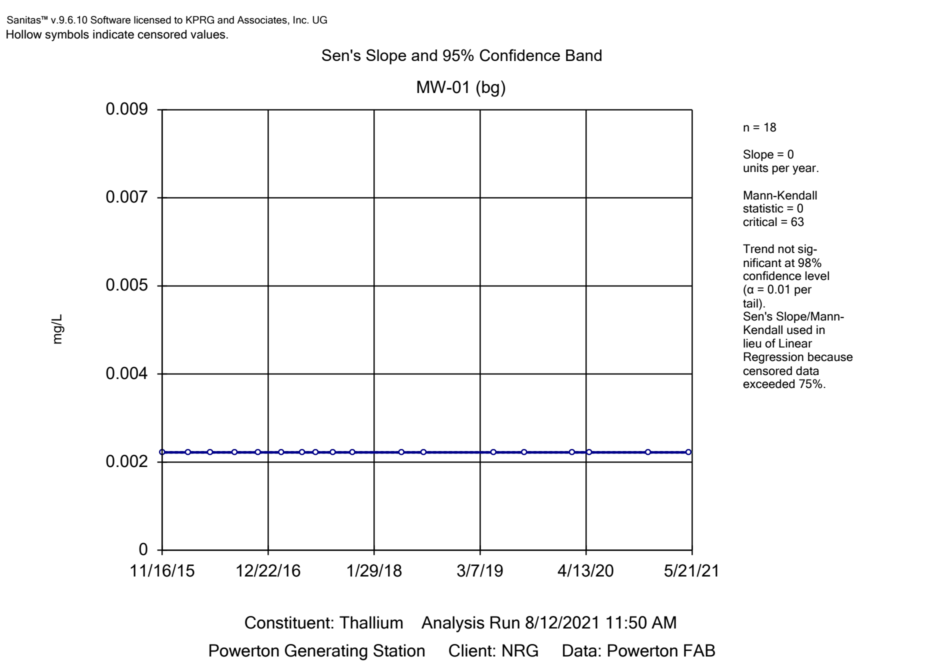
Normality test on residuals:
Shapiro Wilk @alpha
= 0.05, calculated
= 0.9937, critical
= 0.866.

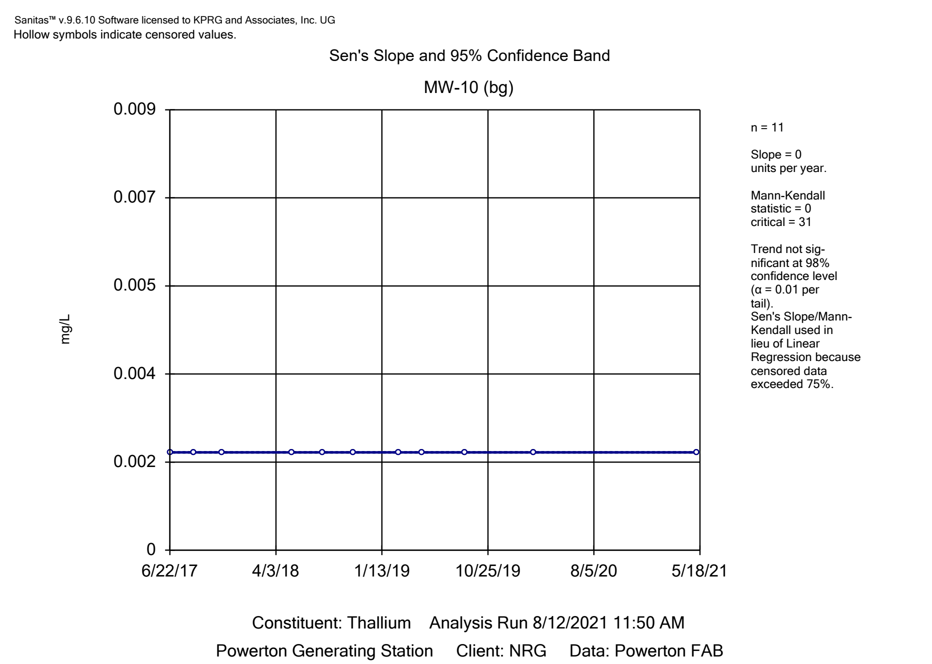
Constituent: Selenium Analysis Run 8/12/2021 11:50 AM

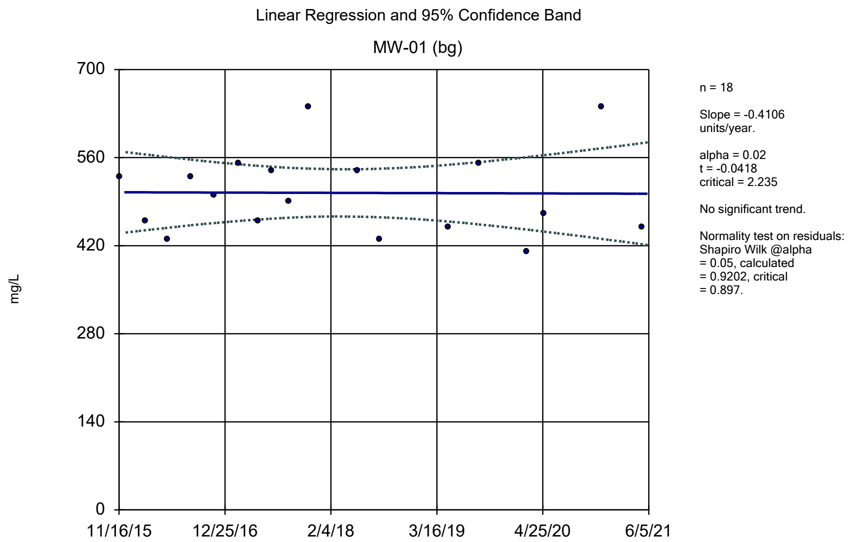
Powerton Generating Station Client: NRG Data: Powerton FAB


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Linear Regression and 95% Confidence Band
MW-01 (bg)
mg/L
100
80
60
40
20
0
11/16/15
12/25/16
2/4/18
3/16/19
4/25/20
6/5/21
n = 18
Slope = -4.134 units/year.
alpha = 0.02
t = -1.958
critical = 2.235
No significant trend.
Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.9573, critical = 0.897.
Constituent: Sulfate Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Linear Regression and 95% Confidence Band
MW-10 (bg)
mg/L
80
64
48
32
16
0
6/22/17
4/5/18
1/17/19
10/31/19
8/13/20
5/28/21
n = 13
Slope = 0.09615 units/year.
alpha = 0.02
t = 0.02609
critical = 2.328
No significant trend.
Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.927, critical = 0.866.
Constituent: Sulfate Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

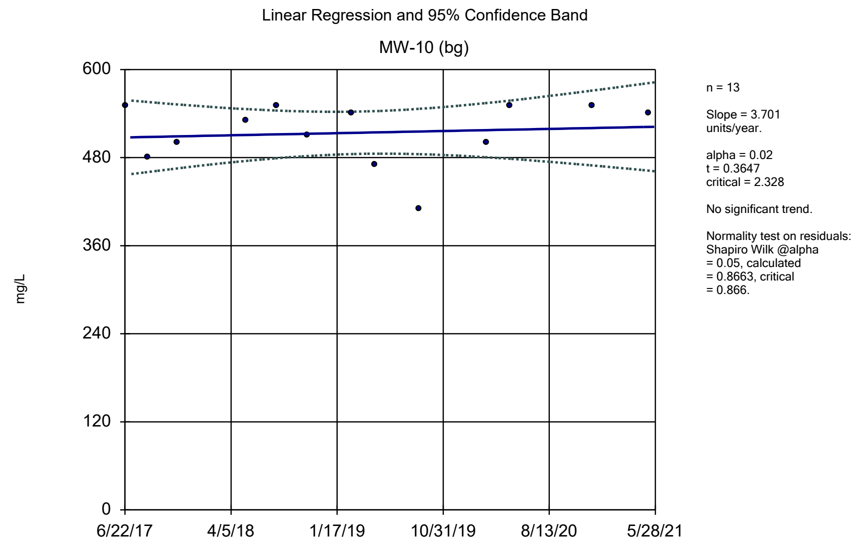

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-01 (bg)
mg/L
0.009
0.007
0.005
0.004
0.002
0
11/16/15
12/22/16
1/29/18
3/7/19
4/13/20
5/21/21
n = 18
Slope = 0 units per year.
Mann-Kendall statistic = 0
critical = 63
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Thallium Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB


Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.
Sen's Slope and 95% Confidence Band
MW-10 (bg)
mg/L
0.009
0.007
0.005
0.004
0.002
0
6/22/17
4/3/18
1/13/19
10/25/19
8/5/20
5/18/21
n = 11
Slope = 0 units per year.
Mann-Kendall statistic = 0
critical = 31
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Thallium Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB



Constituent: Total Dissolved Solids Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG



Constituent: Total Dissolved Solids Analysis Run 8/12/2021 11:50 AM
Powerton Generating Station Client: NRG Data: Powerton FAB

Shapiro-Wilk Normality Test

Constituent: Arsenic   Analysis Run 8/12/2021 3:01 PM
Powerton Generating Station   Client: NRG   Data: Powerton

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 17, alpha = 0.05)				
	no	0.4462	0.892	No
	square root	0.5854	0.892	No
	square	0.3068	0.892	No
	cube root	0.6329	0.892	No
	cube	0.2729	0.892	No
	natural log	0.7088	0.892	No
	x^4	0.2649	0.892	No
	x^5	0.2629	0.892	No
	x^6	0.2624	0.892	No
MW-09 (bg) (n = 17, alpha = 0.05)				
	no	0.6283	0.892	No
	square root	0.6473	0.892	No
	square	0.5802	0.892	No
	cube root	0.6532	0.892	No
	cube	0.5189	0.892	No
	natural log	0.6648	0.892	No
	x^4	0.4571	0.892	No
	x^5	0.4053	0.892	No
	x^6	0.3658	0.892	No
MW-19 (bg) (n = 13, alpha = 0.05)				
	no	0.3111	0.866	No
	square root	0.3111	0.866	No
	square	0.3111	0.866	No
	cube root	0.3111	0.866	No
	cube	0.3111	0.866	No
	natural log	0.3111	0.866	No
	x^4	0.3111	0.866	No
	x^5	0.3111	0.866	No
	x^6	0.3111	0.866	No
Pooled Background (bg) (n = 47, alpha = 0.05)				
	no	0.3354	0.946	No
	square root	0.4843	0.946	No
	square	0.1872	0.946	No
	cube root	0.5305	0.946	No
	cube	0.1564	0.946	No
	natural log	0.5972	0.946	No
	x^4	0.15	0.946	No
	x^5	0.1486	0.946	No
	x^6	0.1483	0.946	No

Shapiro-Wilk Normality Test

Constituent: Barium   Analysis Run 8/12/2021 3:01 PM
Powerton Generating Station   Client: NRG   Data: Powerton

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 17, alpha = 0.05)				
	no	0.83	0.892	No
	square root	0.8727	0.892	No
	square	0.738	0.892	No
	cube root	0.8859	0.892	No
	cube	0.6509	0.892	No
	natural log	0.91	0.892	Yes
	x^4	0.5783	0.892	No
	x^5	0.5219	0.892	No
	x^6	0.4798	0.892	No
MW-09 (bg) (n = 17, alpha = 0.05)				
	no	0.9437	0.892	Yes
	square root	0.9654	0.892	Yes
	square	0.8809	0.892	No
	cube root	0.9709	0.892	Yes
	cube	0.8008	0.892	No
	natural log	0.9795	0.892	Yes
	x^4	0.7152	0.892	No
	x^5	0.6337	0.892	No
	x^6	0.5621	0.892	No
MW-19 (bg) (n = 13, alpha = 0.05)				
	no	0.9654	0.866	Yes
	square root	0.9668	0.866	Yes
	square	0.9509	0.866	Yes
	cube root	0.9664	0.866	Yes
	cube	0.9223	0.866	Yes
	natural log	0.9642	0.866	Yes
	x^4	0.8829	0.866	Yes
	x^5	0.8368	0.866	No
	x^6	0.7875	0.866	No
Pooled Background (bg) (n = 47, alpha = 0.05)				
	no	0.9242	0.946	No
	square root	0.9447	0.946	No
	square	0.8671	0.946	No
	cube root	0.9498	0.946	Yes
	cube	0.8009	0.946	No
	natural log	0.957	0.946	Yes
	x^4	0.7346	0.946	No
	x^5	0.6719	0.946	No
	x^6	0.6138	0.946	No

Shapiro-Wilk Normality Test

Constituent: Molybdenum Analysis Run 8/12/2021 3:01 PM
Powerton Generating Station Client: NRG Data: Powerton

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 17, alpha = 0.05)				
	no	0.6121	0.892	No
	square root	0.6406	0.892	No
	square	0.5533	0.892	No
	cube root	0.6498	0.892	No
	cube	0.4969	0.892	No
	natural log	0.6675	0.892	No
	x^4	0.4471	0.892	No
	x^5	0.4058	0.892	No
	x^6	0.3729	0.892	No
MW-09 (bg) (n = 17, alpha = 0.05)				
	no	0.8912	0.892	No
	square root	0.9179	0.892	Yes
	square	0.8207	0.892	No
	cube root	0.9253	0.892	Yes
	cube	0.7366	0.892	No
	natural log	0.9379	0.892	Yes
	x^4	0.6508	0.892	No
	x^5	0.5725	0.892	No
	x^6	0.5062	0.892	No
MW-19 (bg) (n = 13, alpha = 0.05)				
	no	0.9817	0.866	Yes
	square root	0.9742	0.866	Yes
	square	0.9753	0.866	Yes
	cube root	0.97	0.866	Yes
	cube	0.9459	0.866	Yes
	natural log	0.959	0.866	Yes
	x^4	0.9011	0.866	Yes
	x^5	0.8478	0.866	No
	x^6	0.7914	0.866	No
Pooled Background (bg) (n = 47, alpha = 0.05)				
	no	0.8579	0.946	No
	square root	0.8165	0.946	No
	square	0.8772	0.946	No
	cube root	0.8004	0.946	No
	cube	0.8174	0.946	No
	natural log	0.768	0.946	No
	x^4	0.7292	0.946	No
	x^5	0.6429	0.946	No
	x^6	0.568	0.946	No

Shapiro-Wilk Normality Test

Constituent: Selenium   Analysis Run 8/12/2021 3:01 PM

Powerton Generating Station   Client: NRG   Data: Powerton

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 17, alpha = 0.05)				
	no	0.2622	0.892	No
	square root	0.2622	0.892	No
	square	0.2622	0.892	No
	cube root	0.2622	0.892	No
	cube	0.2622	0.892	No
	natural log	0.2622	0.892	No
	x^4	0.2622	0.892	No
	x^5	0.2622	0.892	No
	x^6	0.2622	0.892	No
MW-09 (bg) (n = 17, alpha = 0.05)				
	no	0.7404	0.892	No
	square root	0.7646	0.892	No
	square	0.6553	0.892	No
	cube root	0.7696	0.892	No
	cube	0.5494	0.892	No
	natural log	0.7758	0.892	No
	x^4	0.4581	0.892	No
	x^5	0.3924	0.892	No
	x^6	0.3485	0.892	No
MW-19 (bg) (n = 13, alpha = 0.05)				
	no	0.832	0.866	No
	square root	0.847	0.866	No
	square	0.785	0.866	No
	cube root	0.8505	0.866	No
	cube	0.7262	0.866	No
	natural log	0.855	0.866	No
	x^4	0.6688	0.866	No
	x^5	0.6195	0.866	No
	x^6	0.5799	0.866	No
Pooled Background (bg) (n = 47, alpha = 0.05)				
	no	0.6219	0.946	No
	square root	0.6509	0.946	No
	square	0.5291	0.946	No
	cube root	0.6578	0.946	No
	cube	0.4161	0.946	No
	natural log	0.6683	0.946	No
	x^4	0.3213	0.946	No
	x^5	0.2569	0.946	No
	x^6	0.2167	0.946	No

Shapiro-Wilk Normality Test

Constituent: Sulfate   Analysis Run 8/12/2021 3:01 PM

Powerton Generating Station   Client: NRG   Data: Powerton

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 17, alpha = 0.05)				
	no	0.9274	0.892	Yes
	square root	0.9662	0.892	Yes
	square	0.8018	0.892	No
	cube root	0.9743	0.892	Yes
	cube	0.6581	0.892	No
	natural log	0.9824	0.892	Yes
	x^4	0.5357	0.892	No
	x^5	0.4458	0.892	No
	x^6	0.3843	0.892	No
MW-09 (bg) (n = 17, alpha = 0.05)				
	no	0.9361	0.892	Yes
	square root	0.9278	0.892	Yes
	square	0.93	0.892	Yes
	cube root	0.9226	0.892	Yes
	cube	0.9091	0.892	Yes
	natural log	0.9084	0.892	Yes
	x^4	0.8848	0.892	No
	x^5	0.8613	0.892	No
	x^6	0.8397	0.892	No
MW-19 (bg) (n = 13, alpha = 0.05)				
	no	0.9049	0.866	Yes
	square root	0.8837	0.866	Yes
	square	0.9315	0.866	Yes
	cube root	0.8753	0.866	Yes
	cube	0.9422	0.866	Yes
	natural log	0.8564	0.866	No
	x^4	0.9421	0.866	Yes
	x^5	0.9343	0.866	Yes
	x^6	0.9206	0.866	Yes
Pooled Background (bg) (n = 47, alpha = 0.05)				
	no	0.8903	0.946	No
	square root	0.8965	0.946	No
	square	0.8603	0.946	No
	cube root	0.8964	0.946	No
	cube	0.8232	0.946	No
	natural log	0.8921	0.946	No
	x^4	0.7884	0.946	No
	x^5	0.7581	0.946	No
	x^6	0.7317	0.946	No

Shapiro-Wilk Normality Test

Constituent: Total Dissolved Solids Analysis Run 8/12/2021 3:01 PM
Powerton Generating Station Client: NRG Data: Powerton

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 17, alpha = 0.05)				
	no	0.9296	0.892	Yes
	square root	0.9426	0.892	Yes
	square	0.8968	0.892	Yes
	cube root	0.9464	0.892	Yes
	cube	0.8568	0.892	No
	natural log	0.953	0.892	Yes
	x^4	0.8126	0.892	No
	x^5	0.7666	0.892	No
	x^6	0.7212	0.892	No
MW-09 (bg) (n = 17, alpha = 0.05)				
	no	0.9497	0.892	Yes
	square root	0.9461	0.892	Yes
	square	0.9474	0.892	Yes
	cube root	0.9442	0.892	Yes
	cube	0.9335	0.892	Yes
	natural log	0.9393	0.892	Yes
	x^4	0.91	0.892	Yes
	x^5	0.8796	0.892	No
	x^6	0.8447	0.892	No
MW-19 (bg) (n = 13, alpha = 0.05)				
	no	0.8879	0.866	Yes
	square root	0.8598	0.866	No
	square	0.931	0.866	Yes
	cube root	0.8497	0.866	No
	cube	0.9514	0.866	Yes
	natural log	0.8288	0.866	No
	x^4	0.9476	0.866	Yes
	x^5	0.9229	0.866	Yes
	x^6	0.8834	0.866	Yes
Pooled Background (bg) (n = 47, alpha = 0.05)				
	no	0.9441	0.946	No
	square root	0.9457	0.946	No
	square	0.9327	0.946	No
	cube root	0.9457	0.946	No
	cube	0.9107	0.946	No
	natural log	0.9447	0.946	No
	x^4	0.879	0.946	No
	x^5	0.839	0.946	No
	x^6	0.7929	0.946	No

Shapiro-Wilk Normality Test

Constituent: Arsenic   Analysis Run 8/12/2021 3:41 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 18, alpha = 0.05)				
	no	0.579	0.897	No
	square root	0.6302	0.897	No
	square	0.4685	0.897	No
	cube root	0.645	0.897	No
	cube	0.3833	0.897	No
	natural log	0.6698	0.897	No
	x^4	0.3302	0.897	No
	x^5	0.2989	0.897	No
	x^6	0.2805	0.897	No
MW-10 (bg) (n = 13, alpha = 0.05)				
	no	0.5495	0.866	No
	square root	0.6674	0.866	No
	square	0.4205	0.866	No
	cube root	0.7142	0.866	No
	cube	0.365	0.866	No
	natural log	0.8093	0.866	No
	x^4	0.3382	0.866	No
	x^5	0.3247	0.866	No
	x^6	0.3179	0.866	No
Pooled Background (bg) (n = 31, alpha = 0.05)				
	no	0.4933	0.929	No
	square root	0.6392	0.929	No
	square	0.3041	0.929	No
	cube root	0.6861	0.929	No
	cube	0.233	0.929	No
	natural log	0.7629	0.929	No
	x^4	0.2057	0.929	No
	x^5	0.1941	0.929	No
	x^6	0.1888	0.929	No

Shapiro-Wilk Normality Test

Constituent: Barium   Analysis Run 8/12/2021 3:41 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 18, alpha = 0.05)				
	no	0.8659	0.897	No
	square root	0.9058	0.897	Yes
	square	0.7676	0.897	No
	cube root	0.9173	0.897	Yes
	cube	0.6604	0.897	No
	natural log	0.9373	0.897	Yes
	x^4	0.5612	0.897	No
	x^5	0.4793	0.897	No
	x^6	0.4162	0.897	No
MW-10 (bg) (n = 13, alpha = 0.05)				
	no	0.6898	0.866	No
	square root	0.7487	0.866	No
	square	0.5807	0.866	No
	cube root	0.7682	0.866	No
	cube	0.495	0.866	No
	natural log	0.8059	0.866	No
	x^4	0.4342	0.866	No
	x^5	0.3932	0.866	No
	x^6	0.3661	0.866	No
Pooled Background (bg) (n = 31, alpha = 0.05)				
	no	0.7694	0.929	No
	square root	0.8102	0.929	No
	square	0.5784	0.929	No
	cube root	0.816	0.929	No
	cube	0.3976	0.929	No
	natural log	0.8213	0.929	No
	x^4	0.2991	0.929	No
	x^5	0.2498	0.929	No
	x^6	0.2238	0.929	No

Shapiro-Wilk Normality Test

Constituent: Boron   Analysis Run 8/12/2021 3:41 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 18, alpha = 0.05)				
	no	0.8254	0.897	No
	square root	0.9095	0.897	Yes
	square	0.6332	0.897	No
	cube root	0.9306	0.897	Yes
	cube	0.4787	0.897	No
	natural log	0.9549	0.897	Yes
	x^4	0.381	0.897	No
	x^5	0.325	0.897	No
	x^6	0.2937	0.897	No
MW-10 (bg) (n = 13, alpha = 0.05)				
	no	0.6516	0.866	No
	square root	0.7274	0.866	No
	square	0.5131	0.866	No
	cube root	0.7514	0.866	No
	cube	0.4223	0.866	No
	natural log	0.7958	0.866	No
	x^4	0.3719	0.866	No
	x^5	0.3448	0.866	No
	x^6	0.3301	0.866	No
Pooled Background (bg) (n = 31, alpha = 0.05)				
	no	0.6786	0.929	No
	square root	0.8599	0.929	No
	square	0.4011	0.929	No
	cube root	0.9106	0.929	No
	cube	0.2804	0.929	No
	natural log	0.9747	0.929	Yes
	x^4	0.2306	0.929	No
	x^5	0.208	0.929	No
	x^6	0.1969	0.929	No

Shapiro-Wilk Normality Test

Constituent: Cobalt   Analysis Run 8/12/2021 3:41 PM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 18, alpha = 0.05)				
	no	0.5809	0.897	No
	square root	0.5851	0.897	No
	square	0.5673	0.897	No
	cube root	0.5862	0.897	No
	cube	0.5461	0.897	No
	natural log	0.588	0.897	No
	x^4	0.5196	0.897	No
	x^5	0.4907	0.897	No
	x^6	0.4619	0.897	No
MW-10 (bg) (n = 13, alpha = 0.05)				
	no	0.6229	0.866	No
	square root	0.7486	0.866	No
	square	0.4693	0.866	No
	cube root	0.7951	0.866	No
	cube	0.3977	0.866	No
	natural log	0.8826	0.866	Yes
	x^4	0.3606	0.866	No
	x^5	0.3398	0.866	No
	x^6	0.3278	0.866	No
Pooled Background (bg) (n = 31, alpha = 0.05)				
	no	0.5027	0.929	No
	square root	0.7259	0.929	No
	square	0.2954	0.929	No
	cube root	0.7905	0.929	No
	cube	0.2385	0.929	No
	natural log	0.8473	0.929	No
	x^4	0.2144	0.929	No
	x^5	0.2015	0.929	No
	x^6	0.1942	0.929	No

Shapiro-Wilk Normality Test

Constituent: Combined Radium 226 + 228   Analysis Run 8/12/2021 3:41 PM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 18, alpha = 0.05)				
	no	0.9828	0.897	Yes
	square root	0.9883	0.897	Yes
	square	0.947	0.897	Yes
	cube root	0.988	0.897	Yes
	cube	0.8882	0.897	No
	natural log	0.9842	0.897	Yes
	x^4	0.8182	0.897	No
	x^5	0.746	0.897	No
	x^6	0.6771	0.897	No
MW-10 (bg) (n = 13, alpha = 0.05)				
	no	0.8283	0.866	No
	square root	0.9187	0.866	Yes
	square	0.6332	0.866	No
	cube root	0.9396	0.866	Yes
	cube	0.5098	0.866	No
	natural log	0.9618	0.866	Yes
	x^4	0.4417	0.866	No
	x^5	0.4015	0.866	No
	x^6	0.3754	0.866	No
Pooled Background (bg) (n = 31, alpha = 0.05)				
	no	0.6731	0.929	No
	square root	0.8077	0.929	No
	square	0.4452	0.929	No
	cube root	0.848	0.929	No
	cube	0.3262	0.929	No
	natural log	0.9147	0.929	No
	x^4	0.2704	0.929	No
	x^5	0.2413	0.929	No
	x^6	0.2239	0.929	No

Shapiro-Wilk Normality Test

Constituent: Fluoride   Analysis Run 8/12/2021 3:41 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 18, alpha = 0.05)				
	no	0.9349	0.897	Yes
	square root	0.9408	0.897	Yes
	square	0.9032	0.897	Yes
	cube root	0.9412	0.897	Yes
	cube	0.8516	0.897	No
	natural log	0.9395	0.897	Yes
	x^4	0.7905	0.897	No
	x^5	0.7287	0.897	No
	x^6	0.6716	0.897	No
MW-10 (bg) (n = 13, alpha = 0.05)				
	no	0.9049	0.866	Yes
	square root	0.9067	0.866	Yes
	square	0.8988	0.866	Yes
	cube root	0.9071	0.866	Yes
	cube	0.889	0.866	Yes
	natural log	0.9077	0.866	Yes
	x^4	0.8756	0.866	Yes
	x^5	0.8586	0.866	No
	x^6	0.8382	0.866	No
Pooled Background (bg) (n = 31, alpha = 0.05)				
	no	0.959	0.929	Yes
	square root	0.9517	0.929	Yes
	square	0.9539	0.929	Yes
	cube root	0.9477	0.929	Yes
	cube	0.9284	0.929	No
	natural log	0.9374	0.929	Yes
	x^4	0.8909	0.929	No
	x^5	0.8485	0.929	No
	x^6	0.8057	0.929	No

Shapiro-Wilk Normality Test

Constituent: Lead   Analysis Run 8/12/2021 3:41 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 18, alpha = 0.05)				
	no	0.6428	0.897	No
	square root	0.6889	0.897	No
	square	0.5722	0.897	No
	cube root	0.7041	0.897	No
	cube	0.5116	0.897	No
	natural log	0.7293	0.897	No
	x^4	0.4515	0.897	No
	x^5	0.3995	0.897	No
	x^6	0.359	0.897	No
MW-10 (bg) (n = 13, alpha = 0.05)				
	no	0.5589	0.866	No
	square root	0.6956	0.866	No
	square	0.4557	0.866	No
	cube root	0.7595	0.866	No
	cube	0.411	0.866	No
	natural log	0.8897	0.866	Yes
	x^4	0.3789	0.866	No
	x^5	0.3559	0.866	No
	x^6	0.3402	0.866	No
Pooled Background (bg) (n = 31, alpha = 0.05)				
	no	0.5255	0.929	No
	square root	0.7179	0.929	No
	square	0.3236	0.929	No
	cube root	0.7793	0.929	No
	cube	0.2579	0.929	No
	natural log	0.8608	0.929	No
	x^4	0.2286	0.929	No
	x^5	0.2122	0.929	No
	x^6	0.202	0.929	No

Shapiro-Wilk Normality Test

Constituent: Selenium   Analysis Run 8/12/2021 3:41 PM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 18, alpha = 0.05)				
	no	0.2528	0.897	No
	square root	0.2528	0.897	No
	square	0.2528	0.897	No
	cube root	0.2528	0.897	No
	cube	0.2528	0.897	No
	natural log	0.2528	0.897	No
	x^4	0.2528	0.897	No
	x^5	0.2528	0.897	No
	x^6	0.2528	0.897	No
MW-10 (bg) (n = 13, alpha = 0.05)				
	no	0.9846	0.866	Yes
	square root	0.9837	0.866	Yes
	square	0.9719	0.866	Yes
	cube root	0.9822	0.866	Yes
	cube	0.9426	0.866	Yes
	natural log	0.9777	0.866	Yes
	x^4	0.9018	0.866	Yes
	x^5	0.8551	0.866	No
	x^6	0.8068	0.866	No
Pooled Background (bg) (n = 31, alpha = 0.05)				
	no	0.7556	0.929	No
	square root	0.7573	0.929	No
	square	0.7413	0.929	No
	cube root	0.7571	0.929	No
	cube	0.7118	0.929	No
	natural log	0.7559	0.929	No
	x^4	0.6704	0.929	No
	x^5	0.6226	0.929	No
	x^6	0.5739	0.929	No

ANOVA - Powerton ABB ASB UG Wells All Data

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 8/10/2021, 9:04 AM

Constituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
Arsenic (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (normality)
Barium (mg/L)	n/a	n/a	n/a	n/a	n/a	x^(1/3)	Yes	0.05	Param.
Boron (mg/L)	n/a	n/a	n/a	n/a	n/a	x^(1/3)	Yes	0.05	Param.
Cadmium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Calcium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Chloride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (eq. var.)
Chromium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Cobalt (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Fluoride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Lead (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Lithium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Mercury (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Molybdenum (mg/L)	n/a	n/a	n/a	n/a	n/a	ln(x)	Yes	0.05	Param.
pH (n/a)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Selenium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Sulfate (mg/L)	n/a	n/a	n/a	n/a	n/a	sqrt(x)	Yes	0.05	Param.
Total Dissolved Solids (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.

Non-Parametric ANOVA

Constituent: Arsenic   Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 5.642

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 3 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 4.069
Adjusted Kruskal-Wallis statistic (H') = 5.642

Parametric ANOVA

Constituent: Barium   Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test (after cube root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 53.55

Tabulated F statistic = 3.206 with 2 and 46 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	169251	2	84626	8.632
Error Within Groups	450969	46	9804	
Total	620220	48		

The Shapiro Wilk normality test on the residuals passed after cube root transformation. Alpha = 0.01, calculated = 0.9325, critical = 0.929. Levene's Equality of Variance test passed. Calculated = 0.5837, tabulated = 3.206.

Parametric ANOVA

Constituent: Boron Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test (after cube root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 179.4

Tabulated F statistic = 3.206 with 2 and 46 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	169251	2	84626	8.632
Error Within Groups	450969	46	9804	
Total	620220	48		

The Shapiro Wilk normality test on the residuals passed after cube root transformation. Alpha = 0.01, calculated = 0.9492, critical = 0.929. Levene's Equality of Variance test passed. Calculated = 1.023, tabulated = 3.206.

Non-Parametric ANOVA

Constituent: Cadmium   Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 1.579

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.09474
Adjusted Kruskal-Wallis statistic (H') = 1.579

Parametric ANOVA

Constituent: Calcium   Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 8.733

Tabulated F statistic = 3.206 with 2 and 46 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	169251	2	84626	8.632
Error Within Groups	450969	46	9804	
Total	620220	48		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9529, critical = 0.929. Levene's Equality of Variance test passed. Calculated = 1.684, tabulated = 3.206.

Non-Parametric ANOVA

Constituent: Chloride   Analysis Run 8/10/2021 9:04 AM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 27.75

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 10 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 27.52
Adjusted Kruskal-Wallis statistic (H') = 27.75

Non-Parametric ANOVA

Constituent: Chromium   Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 2.799

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.357
Adjusted Kruskal-Wallis statistic (H') = 2.799

Non-Parametric ANOVA

Constituent: Cobalt Analysis Run 8/10/2021 9:04 AM

Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 5.672

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 2.768
Adjusted Kruskal-Wallis statistic (H') = 5.672

Parametric ANOVA

Constituent: Combined Radium 226 + 228   Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 4.311

Tabulated F statistic = 3.206 with 2 and 46 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	169251	2	84626	8.632
Error Within Groups	450969	46	9804	
Total	620220	48		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9598, critical = 0.929. Levene's Equality of Variance test passed. Calculated = 0.6873, tabulated = 3.206.

Parametric ANOVA

Constituent: Fluoride   Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 2.808

Tabulated F statistic = 3.206 with 2 and 46 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	169251	2	84626	8.632
Error Within Groups	450969	46	9804	
Total	620220	48		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9717, critical = 0.929. Levene's Equality of Variance test passed. Calculated = 1.034, tabulated = 3.206.

Non-Parametric ANOVA

Constituent: Lead   Analysis Run 8/10/2021 9:04 AM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 11.82

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 8.101
Adjusted Kruskal-Wallis statistic (H') = 11.82

Non-Parametric ANOVA

Constituent: Lithium   Analysis Run 8/10/2021 9:04 AM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 1.579

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.09474
Adjusted Kruskal-Wallis statistic (H') = 1.579

Non-Parametric ANOVA

Constituent: Mercury Analysis Run 8/10/2021 9:04 AM

Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 1.882

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.1129
Adjusted Kruskal-Wallis statistic (H') = 1.882

Parametric ANOVA

Constituent: Molybdenum   Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test (after natural log transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 493.3

Tabulated F statistic = 3.206 with 2 and 46 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	169251	2	84626	8.632
Error Within Groups	450969	46	9804	
Total	620220	48		

The Shapiro Wilk normality test on the residuals passed after natural log transformation. Alpha = 0.01, calculated = 0.947, critical = 0.929. Levene's Equality of Variance test passed. Calculated = 0.5329, tabulated = 3.206.

Parametric ANOVA

Constituent: pH   Analysis Run 8/10/2021 9:04 AM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 1.896

Tabulated F statistic = 3.206 with 2 and 46 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	169251	2	84626	8.632
Error Within Groups	450969	46	9804	
Total	620220	48		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9518, critical = 0.929. Levene's Equality of Variance test passed. Calculated = 0.3074, tabulated = 3.206.

Non-Parametric ANOVA

Constituent: Selenium   Analysis Run 8/10/2021 9:04 AM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 12.3

Tabulated Chi-Squared value = 5.991 with 2 degrees of freedom at the 5% significance level.

There were 3 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 8.873
Adjusted Kruskal-Wallis statistic (H') = 12.3

Parametric ANOVA

Constituent: Sulfate Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test (after square root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 64.91

Tabulated F statistic = 3.206 with 2 and 46 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	169251	2	84626	8.632
Error Within Groups	450969	46	9804	
Total	620220	48		

The Shapiro Wilk normality test on the residuals passed after square root transformation. Alpha = 0.01, calculated = 0.9657, critical = 0.929. Levene's Equality of Variance test passed. Calculated = 2.905, tabulated = 3.206.

Parametric ANOVA

Constituent: Total Dissolved Solids   Analysis Run 8/10/2021 9:04 AM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 8.632

Tabulated F statistic = 3.206 with 2 and 46 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	169251	2	84626	8.632
Error Within Groups	450969	46	9804	
Total	620220	48		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9653, critical = 0.929. Levene's Equality of Variance test passed. Calculated = 2.361, tabulated = 3.206.

ANOVA ABBASB MW-1 & 9 All data

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 8/12/2021, 12:56 PM

Constituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
Arsenic (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (normality)
Barium (mg/L)	n/a	n/a	n/a	n/a	n/a	sqrt(x)	Yes	0.05	Param.
Boron (mg/L)	n/a	n/a	n/a	n/a	n/a	x^(1/3)	Yes	0.05	Param.
Cadmium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Calcium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Chloride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (eq. var.)
Chromium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Cobalt (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (eq. var.)
Combined Radium 226 + 228 (pCi/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Fluoride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Lead (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Lithium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Mercury (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Molybdenum (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
pH (n/a)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Selenium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Sulfate (mg/L)	n/a	n/a	n/a	n/a	n/a	x^(1/3)	Yes	0.05	Param.
Total Dissolved Solids (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (eq. var.)

Non-Parametric ANOVA

Constituent: Arsenic Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.2355

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 3 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.2005
Adjusted Kruskal-Wallis statistic (H') = 0.2355

Parametric ANOVA

Constituent: Barium   Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test (after square root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 21.79

Tabulated F statistic = 4.152 with 1 and 32 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	1.8e22	1	1.8e22	10.41
Error Within Groups	5.5e22	32	1.7e21	
Total	7.3e22	33		

The Shapiro Wilk normality test on the residuals passed after square root transformation. Alpha = 0.01, calculated = 0.9109, critical = 0.908. Levene's Equality of Variance test passed. Calculated = 1.33, tabulated = 4.152.

Parametric ANOVA

Constituent: Boron   Analysis Run 8/12/2021 12:56 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test (after cube root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 231.2

Tabulated F statistic = 4.152 with 1 and 32 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	1.8e22	1	1.8e22	10.41
Error Within Groups	5.5e22	32	1.7e21	
Total	7.3e22	33		

The Shapiro Wilk normality test on the residuals passed after cube root transformation. Alpha = 0.01, calculated = 0.9417, critical = 0.908. Levene's Equality of Variance test passed. Calculated = 0.3902, tabulated = 4.152.

Non-Parametric ANOVA

Constituent: Cadmium   Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 1

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.08571
Adjusted Kruskal-Wallis statistic (H') = 1

Parametric ANOVA

Constituent: Calcium Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 17.1

Tabulated F statistic = 4.152 with 1 and 32 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	1.8e22	1	1.8e22	10.41
Error Within Groups	5.5e22	32	1.7e21	
Total	7.3e22	33		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9506, critical = 0.908. Levene's Equality of Variance test passed. Calculated = 4.137, tabulated = 4.152.

Non-Parametric ANOVA

Constituent: Chloride   Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 22.8

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 7 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 22.59
Adjusted Kruskal-Wallis statistic (H') = 22.8

Non-Parametric ANOVA

Constituent: Chromium   Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 1.822

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.3209
Adjusted Kruskal-Wallis statistic (H') = 1.822

Non-Parametric ANOVA

Constituent: Cobalt Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 3.99

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 2.355
Adjusted Kruskal-Wallis statistic (H') = 3.99

Parametric ANOVA

Constituent: Combined Radium 226 + 228 Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 8.547

Tabulated F statistic = 4.152 with 1 and 32 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	1.8e22	1	1.8e22	10.41
Error Within Groups	5.5e22	32	1.7e21	
Total	7.3e22	33		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9704, critical = 0.908. Levene's Equality of Variance test passed. Calculated = 1.213, tabulated = 4.152.

Parametric ANOVA

Constituent: Fluoride   Analysis Run 8/12/2021 12:56 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 1.187

Tabulated F statistic = 4.152 with 1 and 32 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	1.8e22	1	1.8e22	10.41
Error Within Groups	5.5e22	32	1.7e21	
Total	7.3e22	33		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9658, critical = 0.908. Levene's Equality of Variance test passed. Calculated = 0.07263, tabulated = 4.152.

Non-Parametric ANOVA

Constituent: Lead   Analysis Run 8/12/2021 12:56 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 10.28

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 6.972
Adjusted Kruskal-Wallis statistic (H') = 10.28

Non-Parametric ANOVA

Constituent: Lithium   Analysis Run 8/12/2021 12:56 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 1

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.08571
Adjusted Kruskal-Wallis statistic (H') = 1

Non-Parametric ANOVA

Constituent: Mercury   Analysis Run 8/12/2021 12:56 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 1

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.08571
Adjusted Kruskal-Wallis statistic (H') = 1

Non-Parametric ANOVA

Constituent: Molybdenum Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 25.26

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 7 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 24.77
Adjusted Kruskal-Wallis statistic (H') = 25.26

Parametric ANOVA

Constituent: pH   Analysis Run 8/12/2021 12:56 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 2.138

Tabulated F statistic = 4.152 with 1 and 32 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	1.8e22	1	1.8e22	10.41
Error Within Groups	5.5e22	32	1.7e21	
Total	7.3e22	33		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9606, critical = 0.908. Levene's Equality of Variance test passed. Calculated = 0.9151, tabulated = 4.152.

Non-Parametric ANOVA

Constituent: Selenium   Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 7.936

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 4.784
Adjusted Kruskal-Wallis statistic (H') = 7.936

Parametric ANOVA

Constituent: Sulfate Analysis Run 8/12/2021 12:56 PM

Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/13/2021 the parametric analysis of variance test (after cube root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 91.98

Tabulated F statistic = 4.152 with 1 and 32 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	1.8e22	1	1.8e22	10.41
Error Within Groups	5.5e22	32	1.7e21	
Total	7.3e22	33		

The Shapiro Wilk normality test on the residuals passed after cube root transformation. Alpha = 0.01, calculated = 0.9826, critical = 0.908. Levene's Equality of Variance test passed. Calculated = 3.474, tabulated = 4.152.

Non-Parametric ANOVA

Constituent: Total Dissolved Solids   Analysis Run 8/12/2021 12:56 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/13/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 4.281

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 9 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 4.271
Adjusted Kruskal-Wallis statistic (H') = 4.281

ANOVA ABBASB MW-1 & 19 All data

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 8/12/2021, 12:59 PM

Constituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
Arsenic (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (eq. var.)
Barium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Boron (mg/L)	n/a	n/a	n/a	n/a	n/a	sqrt(x)	Yes	0.05	Param.
Cadmium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Calcium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Chloride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Chromium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Cobalt (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Combined Radium 226 + 228 (pCi/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Fluoride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Lead (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Lithium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Molybdenum (mg/L)	n/a	n/a	n/a	n/a	n/a	ln(x)	Yes	0.05	Param.
pH (n/a)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Selenium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Sulfate (mg/L)	n/a	n/a	n/a	n/a	n/a	sqrt(x)	Yes	0.05	Param.
Total Dissolved Solids (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.

Non-Parametric ANOVA

Constituent: Arsenic   Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 5.769

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 3.787
Adjusted Kruskal-Wallis statistic (H') = 5.769

Parametric ANOVA

Constituent: Barium   Analysis Run 8/12/2021 12:59 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 25.13

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	150803	1	150803	17.68
Error Within Groups	238877	28	8531	
Total	389680	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9046, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.3107, tabulated = 4.2.

Parametric ANOVA

Constituent: Boron   Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test (after square root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 278.9

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	150803	1	150803	17.68
Error Within Groups	238877	28	8531	
Total	389680	29		

The Shapiro Wilk normality test on the residuals passed after square root transformation. Alpha = 0.01, calculated = 0.9659, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.582, tabulated = 4.2.

Non-Parametric ANOVA

Constituent: Cadmium   Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.7647

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.074
Adjusted Kruskal-Wallis statistic (H') = 0.7647

Parametric ANOVA

Constituent: Calcium   Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 0.0867

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	150803	1	150803	17.68
Error Within Groups	238877	28	8531	
Total	389680	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9487, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.005625, tabulated = 4.2.

Parametric ANOVA

Constituent: Chloride   Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 16.71

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	150803	1	150803	17.68
Error Within Groups	238877	28	8531	
Total	389680	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9326, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 3.807, tabulated = 4.2.

Non-Parametric ANOVA

Constituent: Chromium   Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 1.342

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.2677
Adjusted Kruskal-Wallis statistic (H') = 1.342

Non-Parametric ANOVA

Constituent: Cobalt   Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 4.332

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 2.564
Adjusted Kruskal-Wallis statistic (H') = 4.332

Parametric ANOVA

Constituent: Combined Radium 226 + 228   Analysis Run 8/12/2021 12:59 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 2.649

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	150803	1	150803	17.68
Error Within Groups	238877	28	8531	
Total	389680	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9592, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.0186, tabulated = 4.2.

Parametric ANOVA

Constituent: Fluoride   Analysis Run 8/12/2021 12:59 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 5.481

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	150803	1	150803	17.68
Error Within Groups	238877	28	8531	
Total	389680	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9509, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 1.114, tabulated = 4.2.

Non-Parametric ANOVA

Constituent: Lead   Analysis Run 8/12/2021 12:59 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 4.329

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 3.616
Adjusted Kruskal-Wallis statistic (H') = 4.329

Non-Parametric ANOVA

Constituent: Lithium   Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.7647

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.074
Adjusted Kruskal-Wallis statistic (H') = 0.7647

Parametric ANOVA

Constituent: Molybdenum   Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test (after natural log transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 678.1

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	150803	1	150803	17.68
Error Within Groups	238877	28	8531	
Total	389680	29		

The Shapiro Wilk normality test on the residuals passed after natural log transformation. Alpha = 0.01, calculated = 0.9164, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.5944, tabulated = 4.2.

Parametric ANOVA

Constituent: pH   Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 2.453

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	150803	1	150803	17.68
Error Within Groups	238877	28	8531	
Total	389680	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9497, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.01538, tabulated = 4.2.

Non-Parametric ANOVA

Constituent: Selenium   Analysis Run 8/12/2021 12:59 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 11.09

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 7.287
Adjusted Kruskal-Wallis statistic (H') = 11.09

Parametric ANOVA

Constituent: Sulfate Analysis Run 8/12/2021 12:59 PM

Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test (after square root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 118.1

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	150803	1	150803	17.68
Error Within Groups	238877	28	8531	
Total	389680	29		

The Shapiro Wilk normality test on the residuals passed after square root transformation. Alpha = 0.01, calculated = 0.9771, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 2.828, tabulated = 4.2.

Parametric ANOVA

Constituent: Total Dissolved Solids   Analysis Run 8/12/2021 12:59 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 17.68

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	150803	1	150803	17.68
Error Within Groups	238877	28	8531	
Total	389680	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9507, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 1.602, tabulated = 4.2.

ANOVA ABBASB MW-9 & 19 All data

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 8/12/2021, 1:00 PM

Constituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
Arsenic (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Barium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Boron (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Calcium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Chloride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (normality)
Cobalt (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Fluoride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Lead (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Mercury (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Molybdenum (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
pH (n/a)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Selenium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (normality)
Sulfate (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Total Dissolved Solids (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.

Non-Parametric ANOVA

Constituent: Arsenic   Analysis Run 8/12/2021 1:00 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 5.049

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 3.314
Adjusted Kruskal-Wallis statistic (H') = 5.049

Parametric ANOVA

Constituent: Barium   Analysis Run 8/12/2021 1:00 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 144.5

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	28227	1	28227	2.179
Error Within Groups	362653	28	12952	
Total	390880	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9639, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 1.239, tabulated = 4.2.

Parametric ANOVA

Constituent: Boron Analysis Run 8/12/2021 1:00 PM
Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/18/2015 and 5/13/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 0.3445

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	28227	1	28227	2.179
Error Within Groups	362653	28	12952	
Total	390880	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.902, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 1.914, tabulated = 4.2.

Parametric ANOVA

Constituent: Calcium Analysis Run 8/12/2021 1:00 PM

Powerton Generating Station Client: NRG Data: Powerton

For observations made between 11/18/2015 and 5/13/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 11.98

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	28227	1	28227	2.179
Error Within Groups	362653	28	12952	
Total	390880	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9372, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 2.668, tabulated = 4.2.

Non-Parametric ANOVA

Constituent: Chloride   Analysis Run 8/12/2021 1:00 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.04478

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 7 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.04379
Adjusted Kruskal-Wallis statistic (H') = 0.04478

Non-Parametric ANOVA

Constituent: Cobalt   Analysis Run 8/12/2021 1:00 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.1308

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.03547
Adjusted Kruskal-Wallis statistic (H') = 0.1308

Parametric ANOVA

Constituent: Combined Radium 226 + 228   Analysis Run 8/12/2021 1:00 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 0.6835

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	28227	1	28227	2.179
Error Within Groups	362653	28	12952	
Total	390880	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9045, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.6608, tabulated = 4.2.

Parametric ANOVA

Constituent: Fluoride   Analysis Run 8/12/2021 1:00 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 2.395

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	28227	1	28227	2.179
Error Within Groups	362653	28	12952	
Total	390880	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.938, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 1.815, tabulated = 4.2.

Non-Parametric ANOVA

Constituent: Lead   Analysis Run 8/12/2021 1:00 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 2.918

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 1.23
Adjusted Kruskal-Wallis statistic (H') = 2.918

Non-Parametric ANOVA

Constituent: Mercury   Analysis Run 8/12/2021 1:00 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.7647

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.074
Adjusted Kruskal-Wallis statistic (H') = 0.7647

Parametric ANOVA

Constituent: Molybdenum   Analysis Run 8/12/2021 1:00 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 4.333

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	28227	1	28227	2.179
Error Within Groups	362653	28	12952	
Total	390880	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9685, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.23, tabulated = 4.2.

Parametric ANOVA

Constituent: pH   Analysis Run 8/12/2021 1:00 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 0.1385

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	28227	1	28227	2.179
Error Within Groups	362653	28	12952	
Total	390880	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.951, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.5229, tabulated = 4.2.

Non-Parametric ANOVA

Constituent: Selenium   Analysis Run 8/12/2021 1:00 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.03948

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 3 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.03547
Adjusted Kruskal-Wallis statistic (H') = 0.03948

Parametric ANOVA

Constituent: Sulfate   Analysis Run 8/12/2021 1:00 PM

Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 0.5729

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	28227	1	28227	2.179
Error Within Groups	362653	28	12952	
Total	390880	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9309, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.4422, tabulated = 4.2.

Parametric ANOVA

Constituent: Total Dissolved Solids   Analysis Run 8/12/2021 1:00 PM
Powerton Generating Station   Client: NRG   Data: Powerton

For observations made between 11/18/2015 and 5/13/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 2.179

Tabulated F statistic = 4.2 with 1 and 28 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	28227	1	28227	2.179
Error Within Groups	362653	28	12952	
Total	390880	29		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9463, critical = 0.9. Levene's Equality of Variance test passed. Calculated = 0.3286, tabulated = 4.2.

Analysis of Variance FAB

Powerton Generating Station   Client: NRG   Data: Powerton FAB   Printed 8/13/2021, 12:34 PM

Constituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
Arsenic (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Barium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Beryllium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Boron (mg/L)	n/a	n/a	n/a	n/a	n/a	ln(x)	Yes	0.05	Param.
Cadmium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Calcium (mg/L)	n/a	n/a	n/a	n/a	n/a	sqrt(x)	No	0.05	Param.
Chloride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (eq. var.)
Chromium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Cobalt (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (eq. var.)
Combined Radium 226 + 228 (pCi/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (eq. var.)
Fluoride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Lead (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Lithium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Molybdenum (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (normality)
pH (n/a)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Selenium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Sulfate (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Total Dissolved Solids (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.

Non-Parametric ANOVA

Constituent: Arsenic Analysis Run 8/13/2021 12:34 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 4.414

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 4 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 4.087
Adjusted Kruskal-Wallis statistic (H') = 4.414

Non-Parametric ANOVA

Constituent: Barium   Analysis Run 8/13/2021 12:34 PM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 22.01

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 7 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 21.94
Adjusted Kruskal-Wallis statistic (H') = 22.01

Non-Parametric ANOVA

Constituent: Beryllium   Analysis Run 8/13/2021 12:34 PM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 1.455

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.1558
Adjusted Kruskal-Wallis statistic (H') = 1.455

Parametric ANOVA

Constituent: Boron   Analysis Run 8/13/2021 12:34 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test (after natural log transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 7.898

Tabulated F statistic = 4.18 with 1 and 29 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	748.4	1	748.4	0.2234
Error Within Groups	97135	29	3349	
Total	97884	30		

The Shapiro Wilk normality test on the residuals passed after natural log transformation. Alpha = 0.01, calculated = 0.9207, critical = 0.902. Levene's Equality of Variance test passed. Calculated = 0.02023, tabulated = 4.18.

Non-Parametric ANOVA

Constituent: Cadmium   Analysis Run 8/13/2021 12:34 PM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 3.39

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.6545
Adjusted Kruskal-Wallis statistic (H') = 3.39

Parametric ANOVA

Constituent: Calcium   Analysis Run 8/13/2021 12:34 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test (after square root transformation) indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 2.585

Tabulated F statistic = 4.18 with 1 and 29 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	748.4	1	748.4	0.2234
Error Within Groups	97135	29	3349	
Total	97884	30		

The Shapiro Wilk normality test on the residuals passed after square root transformation. Alpha = 0.01, calculated = 0.909, critical = 0.902. Levene's Equality of Variance test passed. Calculated = 0.007497, tabulated = 4.18.

Non-Parametric ANOVA

Constituent: Chloride   Analysis Run 8/13/2021 12:34 PM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.1034

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 8 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.1026
Adjusted Kruskal-Wallis statistic (H') = 0.1034

Non-Parametric ANOVA

Constituent: Chromium   Analysis Run 8/13/2021 12:34 PM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 2.285

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.7756
Adjusted Kruskal-Wallis statistic (H') = 2.285

Non-Parametric ANOVA

Constituent: Cobalt   Analysis Run 8/13/2021 12:34 PM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 22.48

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 20.83
Adjusted Kruskal-Wallis statistic (H') = 22.48

Non-Parametric ANOVA

Constituent: Combined Radium 226 + 228   Analysis Run 8/13/2021 12:34 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 8.308

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.

Parametric ANOVA

Constituent: Fluoride Analysis Run 8/13/2021 12:34 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 7.467

Tabulated F statistic = 4.18 with 1 and 29 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	748.4	1	748.4	0.2234
Error Within Groups	97135	29	3349	
Total	97884	30		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9632, critical = 0.902. Levene's Equality of Variance test passed. Calculated = 0.9797, tabulated = 4.18.

Non-Parametric ANOVA

Constituent: Lead Analysis Run 8/13/2021 12:34 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 4.314

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 3 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 4.168
Adjusted Kruskal-Wallis statistic (H') = 4.314

Non-Parametric ANOVA

Constituent: Lithium   Analysis Run 8/13/2021 12:34 PM
Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 6/28/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 3.103

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.5806
Adjusted Kruskal-Wallis statistic (H') = 3.103

Non-Parametric ANOVA

Constituent: Molybdenum   Analysis Run 8/13/2021 12:34 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 3.131

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 1.853
Adjusted Kruskal-Wallis statistic (H') = 3.131

Parametric ANOVA

Constituent: pH   Analysis Run 8/13/2021 12:34 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 1.561

Tabulated F statistic = 4.18 with 1 and 29 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	748.4	1	748.4	0.2234
Error Within Groups	97135	29	3349	
Total	97884	30		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9495, critical = 0.902. Levene's Equality of Variance test passed. Calculated = 0.5011, tabulated = 4.18.

Non-Parametric ANOVA

Constituent: Selenium   Analysis Run 8/13/2021 12:34 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 26.26

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 21.94
Adjusted Kruskal-Wallis statistic (H') = 26.26

Parametric ANOVA

Constituent: Sulfate Analysis Run 8/13/2021 12:34 PM
Powerton Generating Station Client: NRG Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 0.3565

Tabulated F statistic = 4.18 with 1 and 29 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	748.4	1	748.4	0.2234
Error Within Groups	97135	29	3349	
Total	97884	30		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9676, critical = 0.902. Levene's Equality of Variance test passed. Calculated = 0.04014, tabulated = 4.18.

Parametric ANOVA

Constituent: Total Dissolved Solids   Analysis Run 8/13/2021 12:34 PM

Powerton Generating Station   Client: NRG   Data: Powerton FAB

For observations made between 11/16/2015 and 5/11/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 0.2234

Tabulated F statistic = 4.18 with 1 and 29 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	748.4	1	748.4	0.2234
Error Within Groups	97135	29	3349	
Total	97884	30		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.01, calculated = 0.9373, critical = 0.902. Levene's Equality of Variance test passed. Calculated = 3.38, tabulated = 4.18.

Interwell Prediction Limit - ABBASB UG Wells

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 8/10/2021, 3:25 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony (mg/L)	n/a	0.003	n/a	n/a	6 future	n/a	41	100	n/a	0.001061	NP (NDs) 1 of 2
Beryllium (mg/L)	n/a	0.001	n/a	n/a	6 future	n/a	41	100	n/a	0.001061	NP (NDs) 1 of 2
Cadmium (mg/L)	n/a	0.00085	n/a	n/a	6 future	n/a	47	97.87	n/a	0.000...	NP (NDs) 1 of 2
Chromium (mg/L)	n/a	0.025	n/a	n/a	6 future	n/a	43	95.35	n/a	0.000986	NP (NDs) 1 of 2
Cobalt (mg/L)	n/a	0.016	n/a	n/a	6 future	n/a	48	77.08	n/a	0.000...	NP (NDs) 1 of 2
Lithium (mg/L)	n/a	0.012	n/a	n/a	6 future	n/a	47	97.87	n/a	0.000...	NP (NDs) 1 of 2
Mercury (mg/L)	n/a	0.00029	n/a	n/a	6 future	n/a	47	97.87	n/a	0.000...	NP (NDs) 1 of 2
pH (n/a)	n/a	7.902	6.649	n/a	6 future	n/a	47	0	No	0.000...	Param 1 of 2
Thallium (mg/L)	n/a	0.002	n/a	n/a	6 future	n/a	47	100	n/a	0.000...	NP (NDs) 1 of 2

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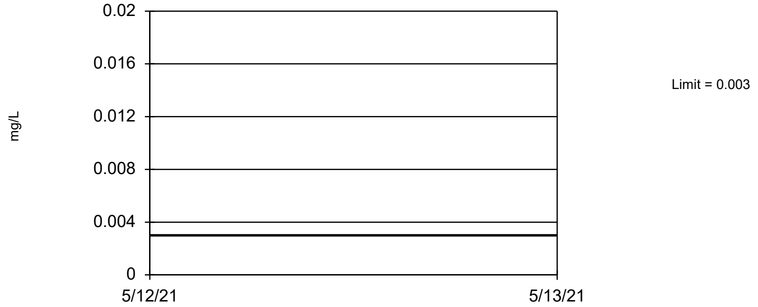
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 41) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.02515. Individual comparison alpha = 0.001061 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Antimony Analysis Run 8/10/2021 3:22 PM

Powerton Generating Station Client: NRG Data: Powerton

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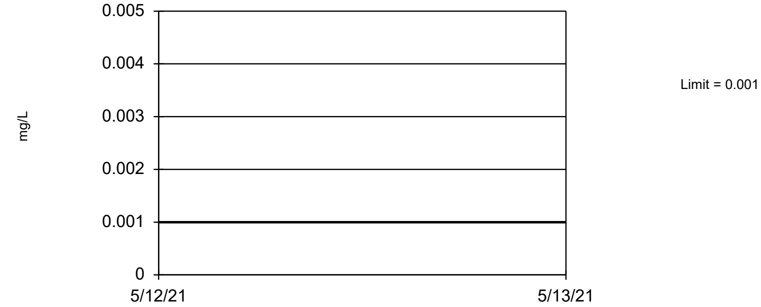
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 41) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.02515. Individual comparison alpha = 0.001061 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Beryllium Analysis Run 8/10/2021 3:22 PM

Powerton Generating Station Client: NRG Data: Powerton

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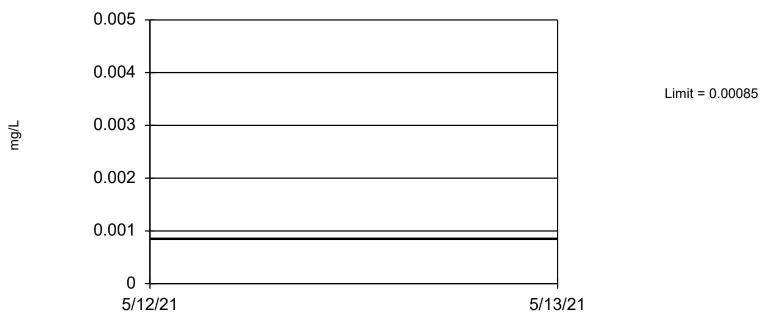
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 47 background values. 97.87% NDs. Annual per-constituent alpha = 0.0199. Individual comparison alpha = 0.0008372 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Cadmium Analysis Run 8/10/2021 3:22 PM

Powerton Generating Station Client: NRG Data: Powerton

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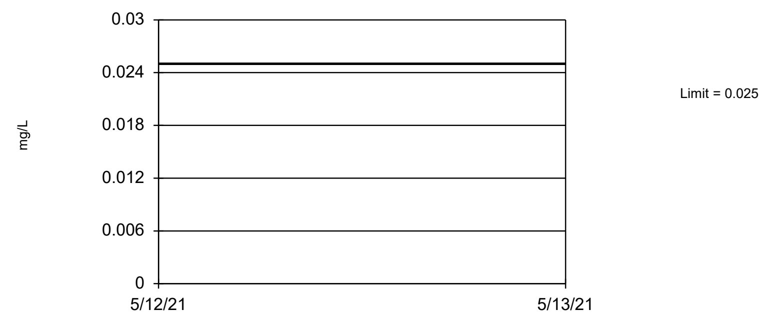
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 43 background values. 95.35% NDs. Annual per-constituent alpha = 0.0234. Individual comparison alpha = 0.000986 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Chromium Analysis Run 8/10/2021 3:22 PM

Powerton Generating Station Client: NRG Data: Powerton

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Prediction Limit

Interwell Non-parametric

Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 48 background values. 77.08% NDs. Annual per-constituent alpha = 0.01903. Individual comparison alpha = 0.0008001 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Cobalt Analysis Run 8/10/2021 3:22 PM

Powerton Generating Station Client: NRG Data: Powerton

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Prediction Limit

Interwell Non-parametric

Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 47 background values. 97.87% NDs. Annual per-constituent alpha = 0.0199. Individual comparison alpha = 0.0008372 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Lithium Analysis Run 8/10/2021 3:22 PM

Powerton Generating Station Client: NRG Data: Powerton

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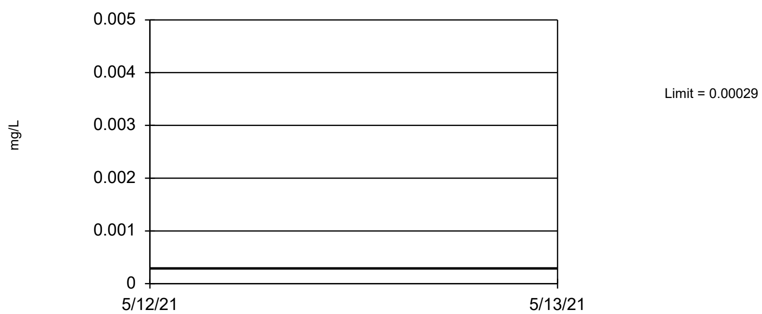
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 47 background values. 97.87% NDs. Annual per-constituent alpha = 0.0199. Individual comparison alpha = 0.0008372 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Mercury Analysis Run 8/10/2021 3:22 PM

Powerton Generating Station Client: NRG Data: Powerton

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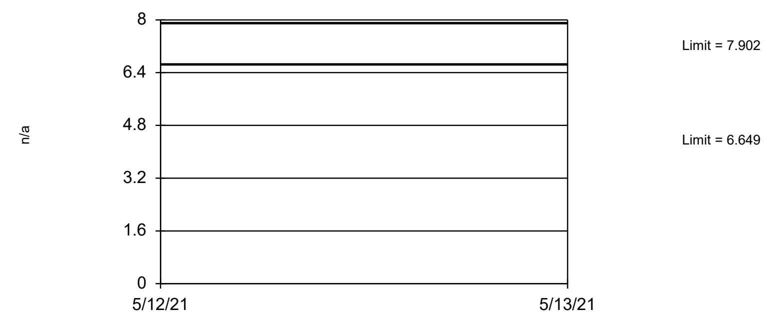
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=7.276, Std. Dev.=0.2634, n=47. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9677, critical = 0.946. Kappa = 2.379 (c=22, w=6, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.00009976. Assumes 6 future values.

Constituent: pH Analysis Run 8/10/2021 3:22 PM

Powerton Generating Station Client: NRG Data: Powerton

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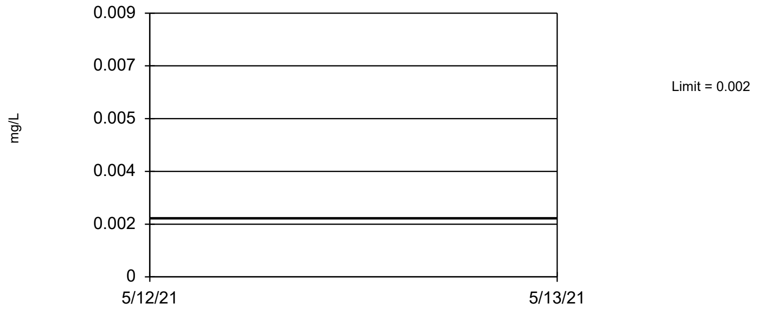
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 47) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.0199. Individual comparison alpha = 0.0008372 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Thallium Analysis Run 8/10/2021 3:22 PM

Powerton Generating Station Client: NRG Data: Powerton

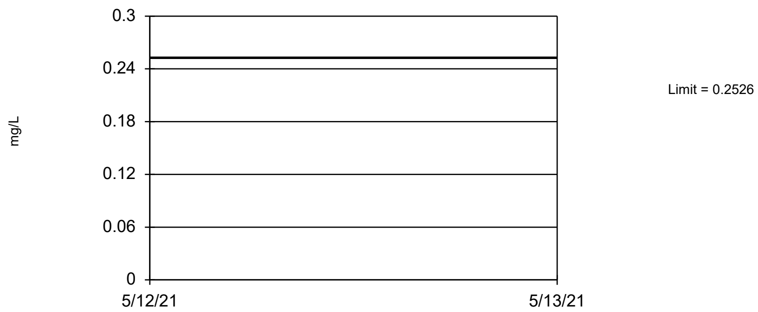
Interwell Prediction Limit - ABBASB MW-01 & 9

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 8/10/2021, 3:26 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Fluoride (mg/L)	n/a	0.2526	n/a	n/a	6 future	n/a	34	0	No	0.000...	Param 1 of 2

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.1709, Std. Dev.=0.03315, n=34. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9449, critical = 0.933. Kappa = 2.463 (c=22, w=6, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001995. Assumes 6 future values.

Constituent: Fluoride Analysis Run 8/10/2021 3:26 PM

Powerton Generating Station Client: NRG Data: Powerton

Interwell Prediction Limit - ABBASB MW-01 & 19

Powerton Generating Station Client: NRG Data: Powerton Printed 8/10/2021, 3:28 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Calcium (mg/L)	n/a	132.3	n/a	n/a	6 future	n/a	30	0	No	0.000...	Param 1 of 2
Combined Radium 226 + 228 (pCi/L)	n/a	0.953	n/a	n/a	6 future	n/a	30	53.33	n/a	0.001842	NP (NDs) 1 of 2

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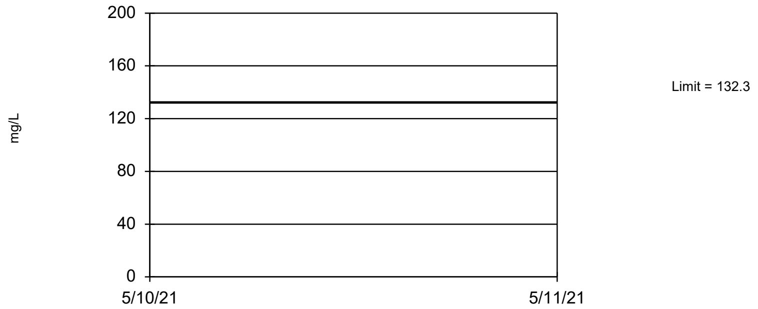
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=95.23, Std. Dev.=14.82, n=30. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9401, critical = 0.927. Kappa = 2.501 (c=22, w=6, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001995. Assumes 6 future values.

Constituent: Calcium Analysis Run 8/10/2021 3:27 PM

Powerton Generating Station Client: NRG Data: Powerton

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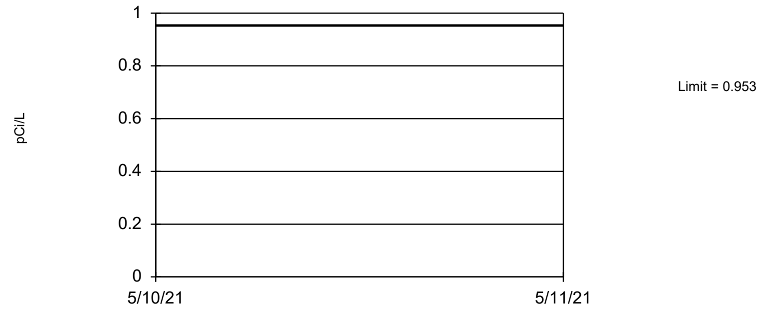
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 30 background values. 53.33% NDs. Annual per-constituent alpha = 0.04327. Individual comparison alpha = 0.001842 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Combined Radium 226 + 228 Analysis Run 8/10/2021 3:27 PM

Powerton Generating Station Client: NRG Data: Powerton

Interwell Prediction Limit - ABBASB MW-09 & 19

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 8/10/2021, 3:29 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (mg/L)	n/a	4.7	n/a	n/a	6 future	n/a	30	0	n/a	0.001842	NP (normality) 1 of 2
Chloride (mg/L)	n/a	53	n/a	n/a	6 future	n/a	30	0	n/a	0.001842	NP (normality) 1 of 2
Lead (mg/L)	n/a	0.0012	n/a	n/a	6 future	n/a	30	83.33	n/a	0.001842	NP (NDs) 1 of 2

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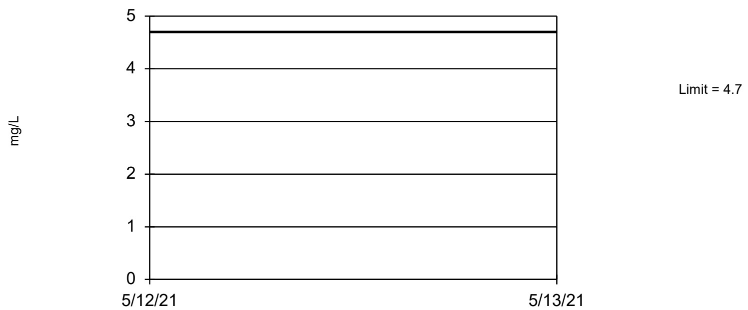
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 30 background values. Annual per-constituent alpha = 0.04327. Individual comparison alpha = 0.001842 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Boron Analysis Run 8/10/2021 3:29 PM

Powerton Generating Station Client: NRG Data: Powerton

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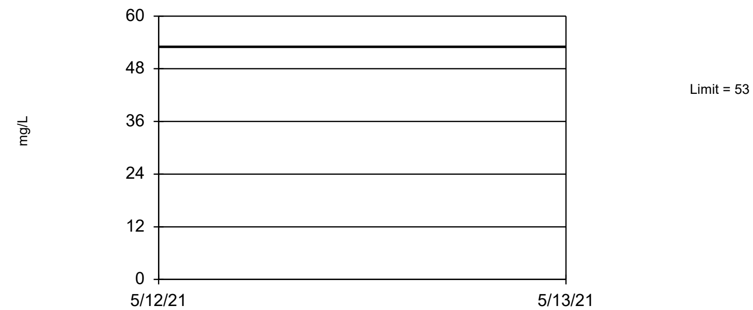
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 30 background values. Annual per-constituent alpha = 0.04327. Individual comparison alpha = 0.001842 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Chloride Analysis Run 8/10/2021 3:29 PM

Powerton Generating Station Client: NRG Data: Powerton

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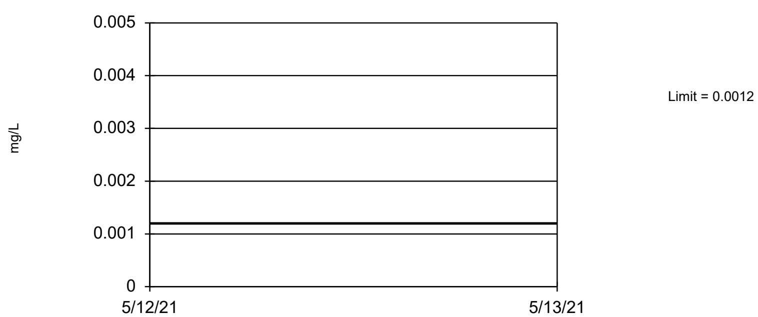
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 30 background values. 83.33% NDs. Annual per-constituent alpha = 0.04327. Individual comparison alpha = 0.001842 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Lead Analysis Run 8/10/2021 3:29 PM

Powerton Generating Station Client: NRG Data: Powerton

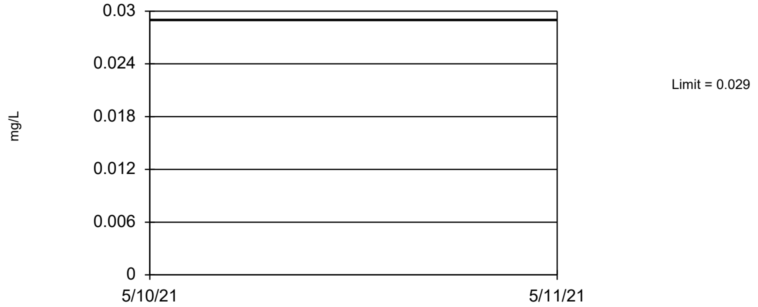
Interwell Prediction Limit - ABBASB MW-01

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 8/10/2021, 3:35 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Arsenic (mg/L)	n/a	0.029	n/a	n/a	6 future	n/a	17	52.94	n/a	0.004808	NP (NDs) 1 of 2
Barium (mg/L)	n/a	0.08244	n/a	n/a	6 future	n/a	17	0	No	0.000...	Param 1 of 2 Deseas
Selenium (mg/L)	n/a	0.0029	n/a	n/a	6 future	n/a	17	94.12	n/a	0.004808	NP (NDs) 1 of 2
Sulfate (mg/L)	n/a	93.67	n/a	n/a	6 future	n/a	17	0	No	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	n/a	695.7	n/a	n/a	6 future	n/a	17	0	No	0.000...	Param 1 of 2

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 17 background values. 52.94% NDs. Annual per-constituent alpha = 0.1092. Individual comparison alpha = 0.004808 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Arsenic Analysis Run 8/10/2021 3:33 PM

Powerton Generating Station Client: NRG Data: Powerton

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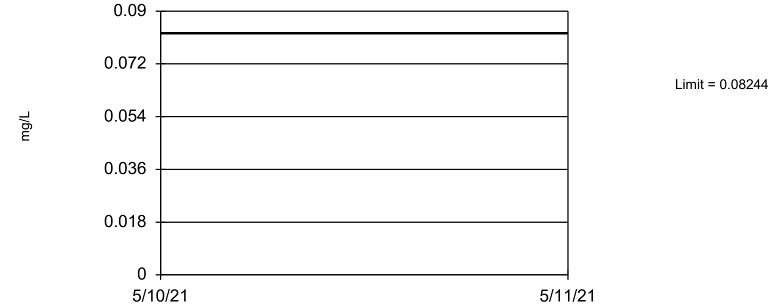
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.05453, Std. Dev.=0.009948, n=17. Seasonality was detected with 95% confidence and data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9332, critical = 0.892. Kappa = 2.806 (c=22, w=6, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001995. Assumes 6 future values.

Constituent: Barium Analysis Run 8/10/2021 3:33 PM

Powerton Generating Station Client: NRG Data: Powerton

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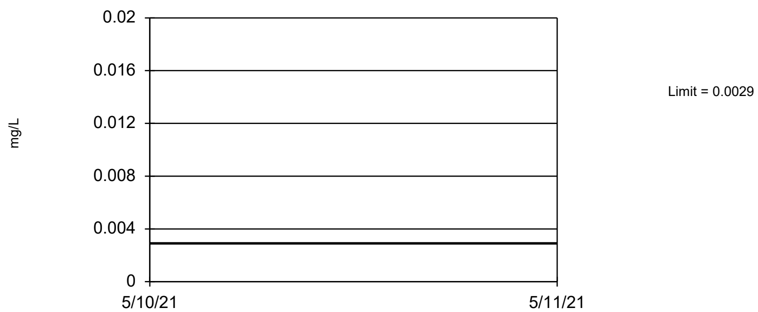
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 17 background values. 94.12% NDs. Annual per-constituent alpha = 0.1092. Individual comparison alpha = 0.004808 (1 of 2). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: Selenium Analysis Run 8/10/2021 3:33 PM

Powerton Generating Station Client: NRG Data: Powerton

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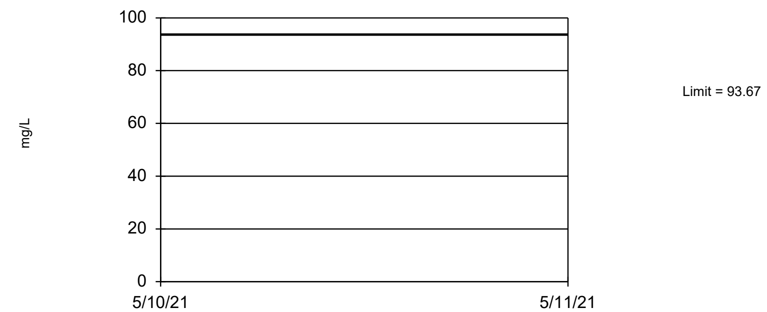
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=50.76, Std. Dev.=15.29, n=17. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9274, critical = 0.892. Kappa = 2.806 (c=22, w=6, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001995. Assumes 6 future values.

Constituent: Sulfate Analysis Run 8/10/2021 3:33 PM

Powerton Generating Station Client: NRG Data: Powerton

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Prediction Limit

Interwell Parametric

Background Data Summary: Mean=500, Std. Dev.=69.73, n=17. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9296, critical = 0.892. Kappa = 2.806 (c=22, w=6, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001995. Assumes 6 future values.

Constituent: Total Dissolved Solids Analysis Run 8/10/2021 3:33 PM

Powerton Generating Station Client: NRG Data: Powerton

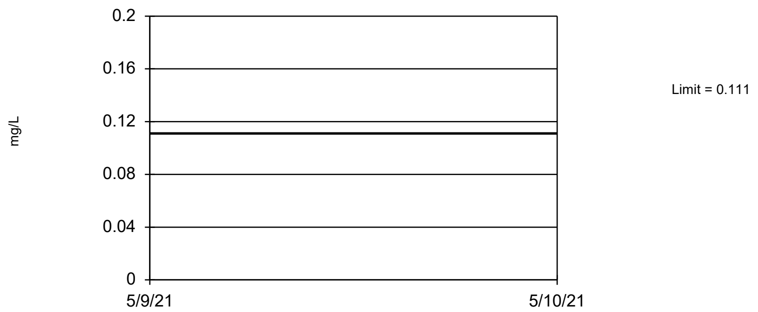
Interwell Prediction Limit - ABBASB MW-19

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 8/10/2021, 4:58 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Barium (mg/L)	n/a	0.111	n/a	n/a	6 future	n/a	13	0	No	0.000...	Param 1 of 2
Molybdenum (mg/L)	n/a	0.06276	n/a	n/a	6 future	n/a	13	0	No	0.000...	Param 1 of 2

Prediction Limit

Interwell Parametric



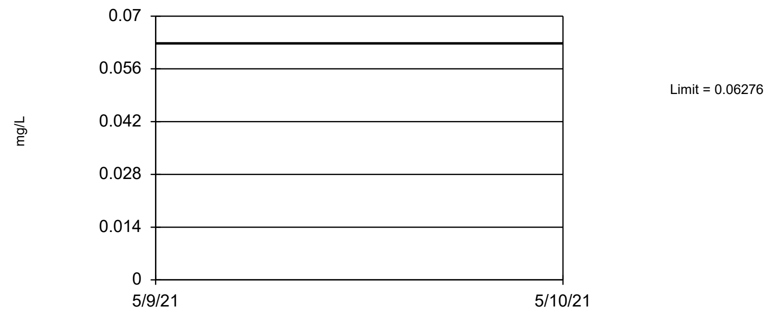
Background Data Summary: Mean=0.07792, Std. Dev.=0.01082, n=13. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9654, critical = 0.866. Kappa = 3.055 (c=22, w=6, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001995. Assumes 6 future values.

Constituent: Barium Analysis Run 8/10/2021 4:58 PM

Powerton Generating Station Client: NRG Data: Powerton

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.039, Std. Dev.=0.007778, n=13. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9817, critical = 0.866. Kappa = 3.055 (c=22, w=6, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001995. Assumes 6 future values.

Constituent: Molybdenum Analysis Run 8/10/2021 4:58 PM

Powerton Generating Station Client: NRG Data: Powerton

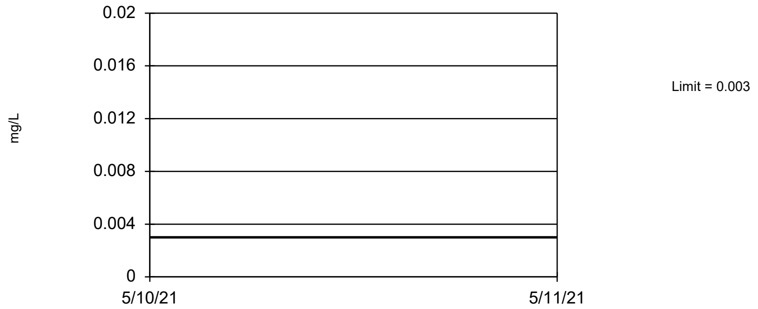
Prediction Limit - UG Wells All Data

Powerton Generating Station   Client: NRG   Data: Powerton FAB   Printed 8/10/2021, 12:58 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony (mg/L)	n/a	0.003	n/a	n/a	4 future	n/a	27	100	n/a	0.00233	NP Inter (NDs) 1 of 2
Beryllium (mg/L)	n/a	0.001	n/a	n/a	4 future	n/a	27	100	n/a	0.00233	NP Inter (NDs) 1 of 2
Cadmium (mg/L)	n/a	0.0015	n/a	n/a	4 future	n/a	29	93.1	n/a	0.00204	NP Inter (NDs) 1 of 2
Calcium (mg/L)	n/a	139	n/a	n/a	4 future	n/a	31	0	x^(1/3)	0.000...	Param Inter 1 of 2
Chloride (mg/L)	n/a	63.49	n/a	n/a	4 future	n/a	31	0	No	0.000...	Param Inter 1 of 2
Chromium (mg/L)	n/a	0.063	n/a	n/a	4 future	n/a	31	87.1	n/a	0.001802	NP Inter (NDs) 1 of 2
Lithium (mg/L)	n/a	0.032	n/a	n/a	4 future	n/a	30	93.33	n/a	0.001895	NP Inter (NDs) 1 of 2
Mercury (mg/L)	n/a	0.0002	n/a	n/a	4 future	n/a	30	100	n/a	0.001895	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	n/a	0.01	n/a	n/a	4 future	n/a	31	74.19	n/a	0.001802	NP Inter (NDs) 1 of 2
pH (n/a)	n/a	7.778	6.449	n/a	4 future	n/a	31	0	No	0.000...	Param Inter 1 of 2
Sulfate (mg/L)	n/a	89.86	n/a	n/a	4 future	n/a	31	0	No	0.000...	Param Inter 1 of 2
Thallium (mg/L)	n/a	0.002	n/a	n/a	4 future	n/a	29	100	n/a	0.00204	NP Inter (NDs) 1 of 2
Total Dissolved Solids (mg/L)	n/a	644.5	n/a	n/a	4 future	n/a	31	0	No	0.000...	Param Inter 1 of 2

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 27) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.03664. Individual comparison alpha = 0.00233 (1 of 2). Assumes 4 future values. Seasonality was not detected with 95% confidence.

Constituent: Antimony Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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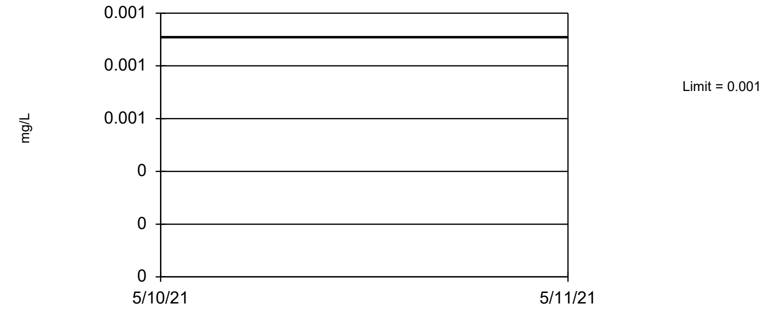
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 27) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.03664. Individual comparison alpha = 0.00233 (1 of 2). Assumes 4 future values. Seasonality was not detected with 95% confidence.

Constituent: Beryllium Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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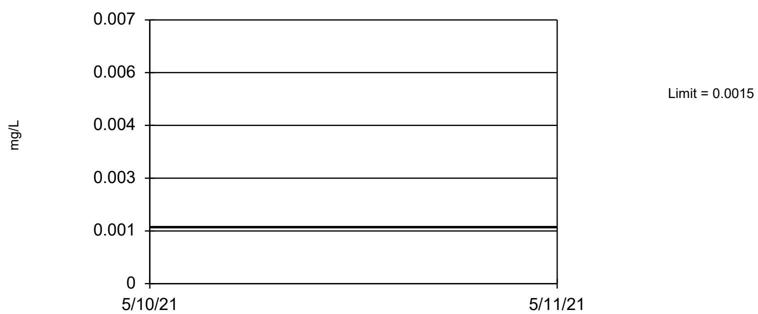
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 29 background values. 93.1% NDs. Annual per-constituent alpha = 0.03214. Individual comparison alpha = 0.00204 (1 of 2). Assumes 4 future values. Seasonality was not detected with 95% confidence.

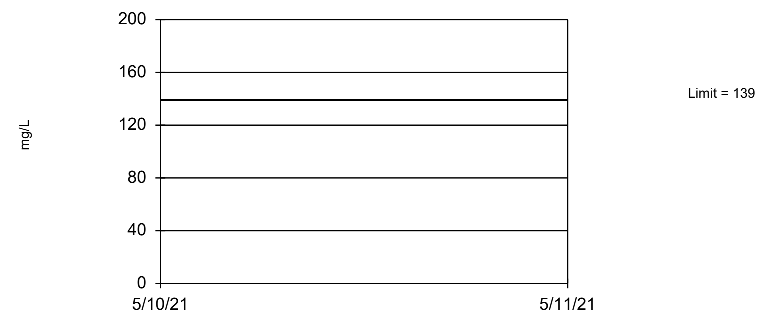
Constituent: Cadmium Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

Sanitas™ v.9.6.10 Software licensed to KPRG and Associates, Inc. UG

Prediction Limit

Interwell Parametric



Background Data Summary (based on cube root transformation): Mean=4.621, Std. Dev.=0.234, n=31. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9321, critical = 0.929. Kappa = 2.389 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Calcium Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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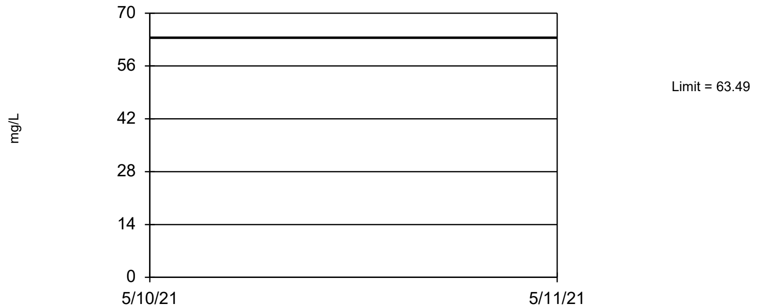
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=47.97, Std. Dev.=6.499, n=31. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9604, critical = 0.929. Kappa = 2.389 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Chloride Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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Prediction Limit

Interwell Non-parametric

Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 31 background values. 87.1% NDs. Annual per-constituent alpha = 0.02845. Individual comparison alpha = 0.001802 (1 of 2). Assumes 4 future values. Seasonality was not detected with 95% confidence.

Constituent: Chromium Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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Prediction Limit

Interwell Non-parametric

Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 30 background values. 93.33% NDs. Annual per-constituent alpha = 0.0299. Individual comparison alpha = 0.001895 (1 of 2). Assumes 4 future values. Seasonality was not detected with 95% confidence.

Constituent: Lithium Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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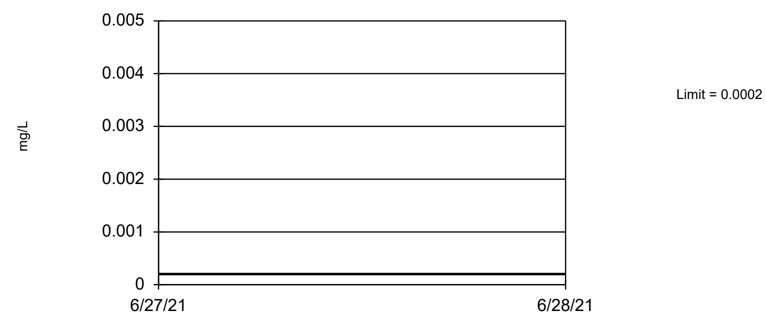
Prediction Limit

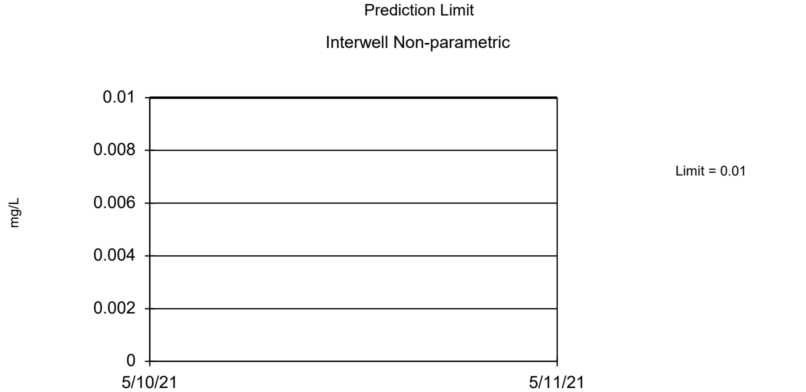
Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 30) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.0299. Individual comparison alpha = 0.001895 (1 of 2). Assumes 4 future values. Seasonality was not detected with 95% confidence.

Constituent: Mercury Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 31 background values. 74.19% NDs. Annual per-constituent alpha = 0.02845. Individual comparison alpha = 0.001802 (1 of 2). Assumes 4 future values. Seasonality was not detected with 95% confidence.

Constituent: Molybdenum Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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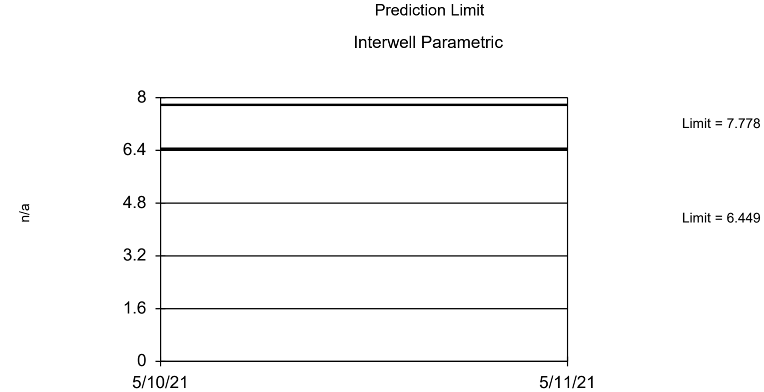

Background Data Summary: Mean=7.114, Std. Dev.=0.2782, n=31. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9366, critical = 0.929. Kappa = 2.389 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 4 future values.

Constituent: pH Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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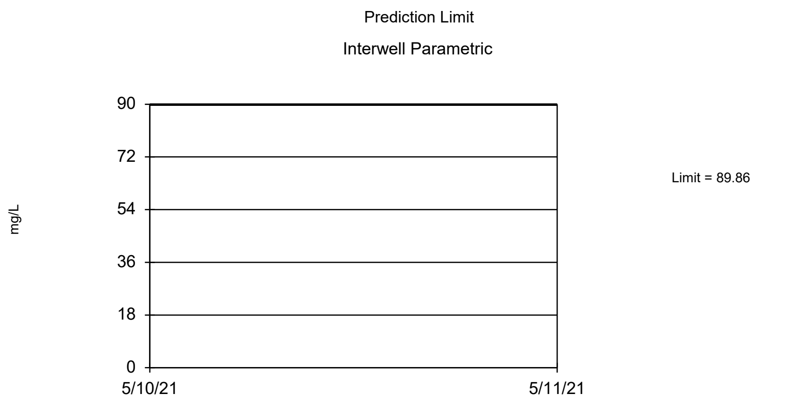

Background Data Summary: Mean=52.87, Std. Dev.=15.48, n=31. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9693, critical = 0.929. Kappa = 2.389 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Sulfate Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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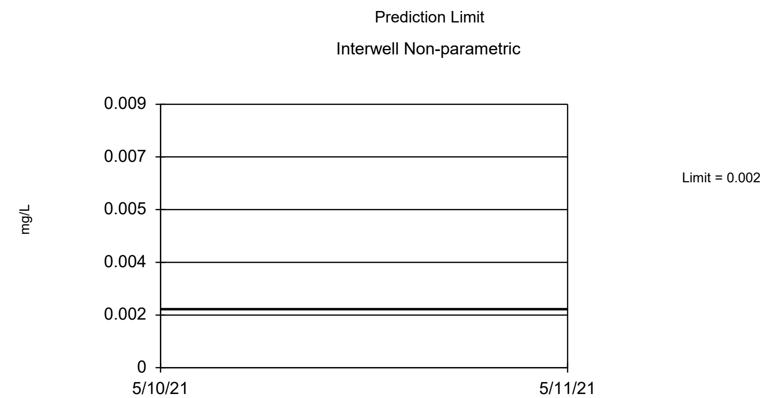


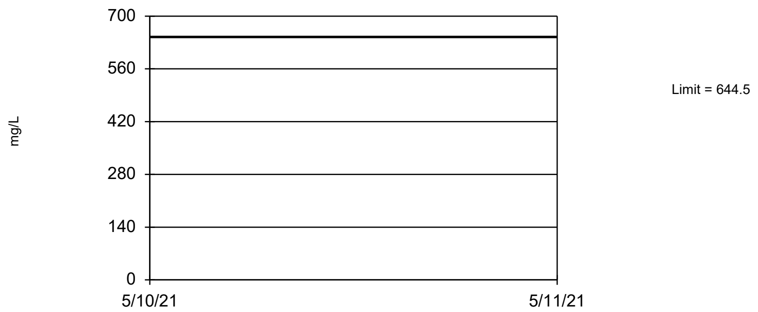
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 29) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.03214. Individual comparison alpha = 0.00204 (1 of 2). Assumes 4 future values. Seasonality was not detected with 95% confidence.

Constituent: Thallium Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=508.1, Std. Dev.=57.12, n=31. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9357, critical = 0.929. Kappa = 2.389 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Total Dissolved Solids Analysis Run 8/10/2021 12:57 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

Interwell Prediction Limit - MW-01 All Data

Powerton Generating Station   Client: NRG   Data: Powerton FAB   Printed 8/10/2021, 1:01 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Barium (mg/L)	n/a	0.07976	n/a	n/a	4 future	n/a	18	0	sqrt(x)	0.000...	Param Inter 1 of 2
Boron (mg/L)	n/a	1.086	n/a	n/a	4 future	n/a	18	0	sqrt(x)	0.000...	Param Inter 1 of 2
Combined Radium 226 + 228 (pCi/L)	n/a	0.953	n/a	n/a	4 future	n/a	18	55.56	n/a	0.004697	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	n/a	0.2794	n/a	n/a	4 future	n/a	18	0	No	0.000...	Param Inter 1 of 2

Prediction Limit

Interwell Parametric

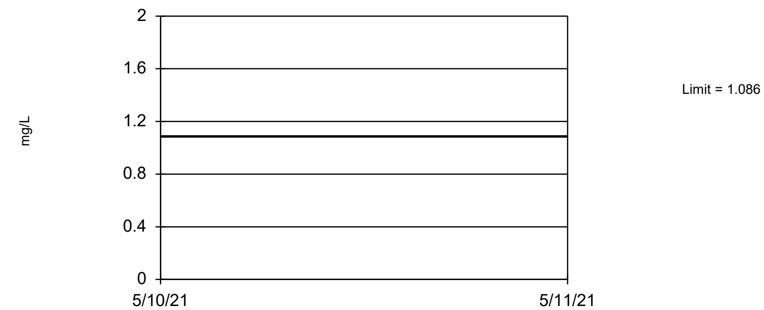
Background Data Summary (based on square root transformation): Mean=0.2267, Std. Dev.=0.02111, n=18. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9058, critical = 0.897. Kappa = 2.638 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Barium Analysis Run 8/10/2021 1:00 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

Prediction Limit

Interwell Parametric



Background Data Summary (based on square root transformation): Mean=0.5485, Std. Dev.=0.187, n=18. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9095, critical = 0.897. Kappa = 2.638 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Boron Analysis Run 8/10/2021 1:00 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

Prediction Limit

Interwell Non-parametric

Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 18 background values. 55.56% NDs. Annual per-constituent alpha = 0.07256. Individual comparison alpha = 0.004697 (1 of 2). Assumes 4 future values. Seasonality was not detected with 95% confidence.

Constituent: Combined Radium 226 + 228 Analysis Run 8/10/2021 1:00 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

Prediction Limit

Interwell Parametric

Background Data Summary: Mean=0.1767, Std. Dev.=0.03896, n=18. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9349, critical = 0.897. Kappa = 2.638 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Fluoride Analysis Run 8/10/2021 1:00 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

Interwell Prediction Limit - MW-10 All Data

Powerton Generating Station   Client: NRG   Data: Powerton FAB   Printed 8/10/2021, 1:00 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Arsenic (mg/L)	n/a	0.04049	n/a	n/a	4 future	n/a	13	7.692	ln(x)	0.000...	Param Inter 1 of 2
Cobalt (mg/L)	n/a	0.1427	n/a	n/a	4 future	n/a	13	0	ln(x)	0.000...	Param Inter 1 of 2
Lead (mg/L)	n/a	0.1164	n/a	n/a	4 future	n/a	13	7.692	ln(x)	0.000...	Param Inter 1 of 2
Selenium (mg/L)	n/a	0.007258	n/a	n/a	4 future	n/a	13	0	No	0.000...	Param Inter 1 of 2

Prediction Limit

Interwell Parametric

Background Data Summary (based on natural log transformation): Mean=-6.112, Std. Dev.=0.9978, n=13, 7.692% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8908, critical = 0.866. Kappa = 2.911 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Arsenic Analysis Run 8/10/2021 12:59 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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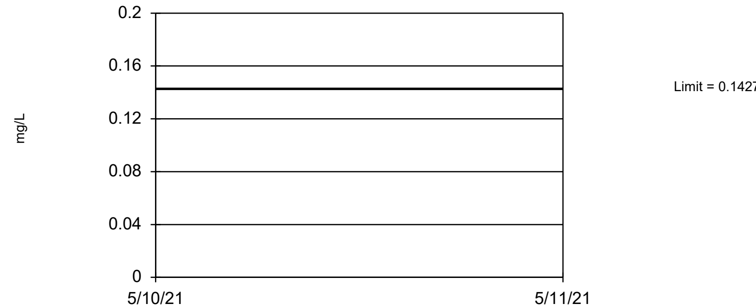
Prediction Limit

Interwell Parametric



Background Data Summary (based on natural log transformation): Mean=-4.448, Std. Dev.=0.859, n=13. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8826, critical = 0.866. Kappa = 2.911 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Cobalt Analysis Run 8/10/2021 12:59 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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Prediction Limit

Interwell Parametric

Background Data Summary (based on natural log transformation): Mean=-6.038, Std. Dev.=1.335, n=13, 7.692% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9262, critical = 0.866. Kappa = 2.911 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Lead Analysis Run 8/10/2021 12:59 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

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Prediction Limit

Interwell Parametric

Background Data Summary: Mean=0.0046, Std. Dev.=0.0009129, n=13. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9846, critical = 0.866. Kappa = 2.911 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Selenium Analysis Run 8/10/2021 12:59 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

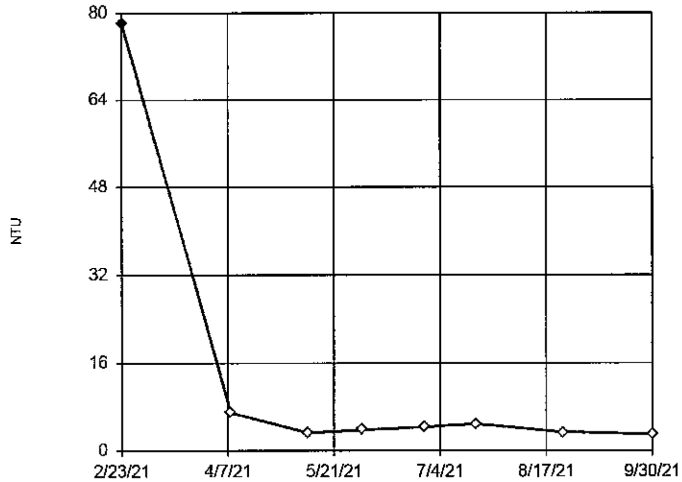
Outlier Analysis - Powerton ABB/ASB - UG Wells - Turbidity

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 10/5/2021, 12:49 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Turbidity (NTU)	**MW-01 (bg)**	**Yes**	**78.2**	**2/23/2021**	**Dixon`s**	**0.05**	**8**	**13.47**	**26.19**	**normal**	**ShapiroWilk**
Turbidity (NTU)	MW-09 (bg)	No	n/a	n/a	EPA 1989	0.05	8	6.999	6.301	ln(x)	ShapiroWilk
Turbidity (NTU)	MW-19 (bg)	No	n/a	n/a	EPA 1989	0.05	8	7.788	9.741	ln(x)	ShapiroWilk

Dixon's Outlier Test

MW-01 (bg)



n = 8

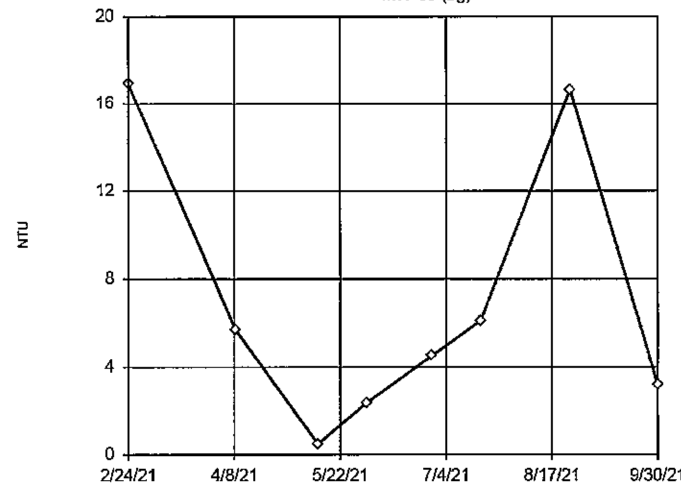
Statistical outlier is drawn as solid.
Testing for 1 high outlier.
Mean = 13.47.
Std. Dev. = 26.19.
78.2: c = 0.9504
tabl = 0.554.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8402
Critical = 0.838
The distribution, after removal of suspect value, was found to be normally distributed.

Constituent: Turbidity   Analysis Run 10/5/2021 12:47 PM
Powerton Generating Station   Client: NRG   Data: Powerton

EPA Screening (suspected outliers for Dixon's Test)

MW-09 (bg)



n = 8

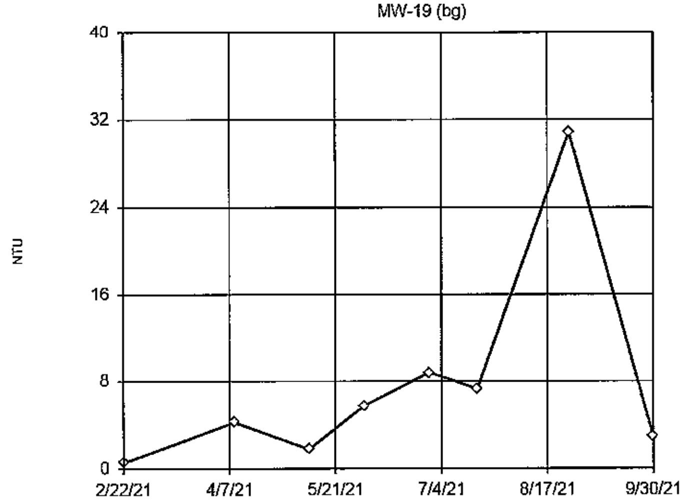
Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 6.999, std. dev. 6.301, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9192
Critical = 0.851 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Turbidity   Analysis Run 10/5/2021 12:47 PM
Powerton Generating Station   Client: NRG   Data: Powerton

EPA Screening (suspected outliers for Dixon's Test)

MW-19 (bg)



n = 8

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 7.788, std. dev. 9.741, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8817
Critical = 0.851 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Turbidity   Analysis Run 10/5/2021 12:47 PM
Powerton Generating Station   Client: NRG   Data: Powerton

Trend Test Powerton ABB/ASB UG Wells Turbidity

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 10/5/2021, 12:55 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Turbidity (NTU)	MW-01 (bg)	-86.67	-2.089	2.612	No	8	0	Yes	no	0.02	Param.
Turbidity (NTU)	MW-09 (bg)	-5.337	-0.4102	2.612	No	8	0	Yes	no	0.02	Param.
Turbidity (NTU)	MW-19 (bg)	24.25	1.381	2.612	No	8	0	Yes	no	0.02	Param.

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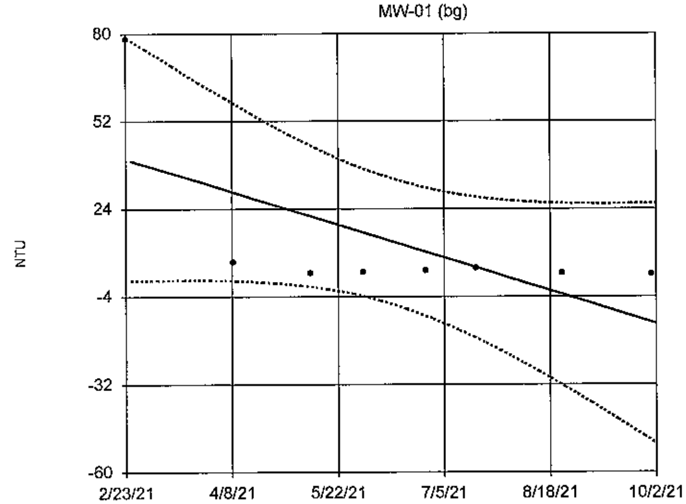
Linear Regression and 95% Confidence Band

MW-01 (bg)



n = 8

Slope = -86.67 units/year.

alpha = 0.02
t = -2.089
critical = 2.612

No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.9368, critical = 0.818.

Constituent: Turbidity Analysis Run 10/5/2021 12:54 PM

Powerton Generating Station Client: NRG Data: Powerton

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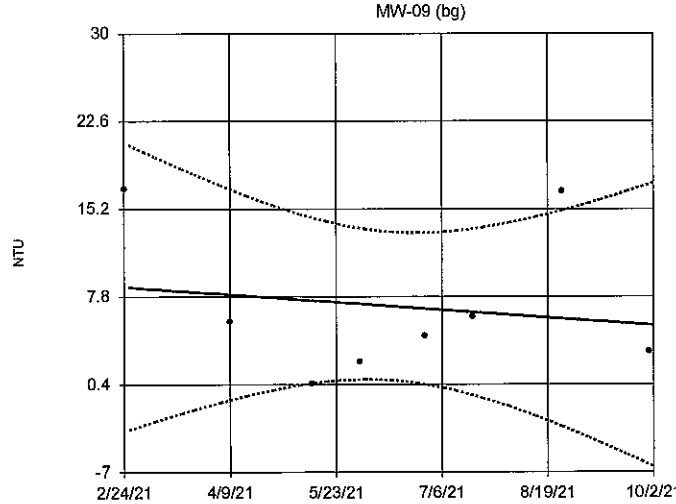
Linear Regression and 95% Confidence Band

MW-09 (bg)



n = 8

Slope = -5.337 units/year.

alpha = 0.02
t = -0.4102
critical = 2.612

No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.852, critical = 0.818.

Constituent: Turbidity Analysis Run 10/5/2021 12:54 PM

Powerton Generating Station Client: NRG Data: Powerton

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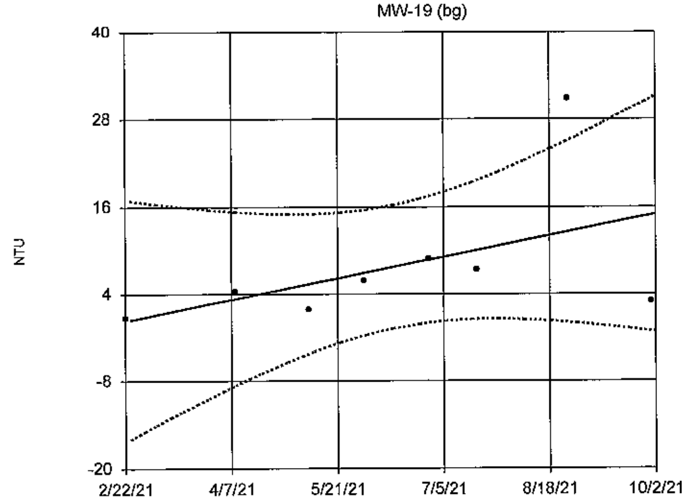
Linear Regression and 95% Confidence Band

MW-19 (bg)



n = 8

Slope = 24.25 units/year.

alpha = 0.02
t = 1.381
critical = 2.612

No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.05, calculated = 0.8256, critical = 0.818.

Constituent: Turbidity Analysis Run 10/5/2021 12:54 PM

Powerton Generating Station Client: NRG Data: Powerton

ANOVA Powerton ABB/ASB UG Wells

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 10/5/2021, 12:59 PM

Constituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
Turbidity (NTU)	n/a	n/a	n/a	n/a	n/a	ln(x)	No	0.05	Param.

Parametric ANOVA

Constituent: Turbidity Analysis Run 10/5/2021 12:59 PM
Powerton Generating Station Client: NRG Data: Powerton

For observations made between 2/22/2021 and 9/30/2021 the parametric analysis of variance test (after natural log transformation) indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 0.1608

Tabulated F statistic = 3.47 with 2 and 21 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	0.4141	2	0.2071	0.1608
Error Within Groups	27.04	21	1.288	
Total	27.46	23		

The Shapiro Wilk normality test on the residuals passed after natural log transformation. Alpha = 0.01, calculated = 0.9488, critical = 0.884. Levene's Equality of Variance test passed. Calculated = 0.0943, tabulated = 3.47.

Shapiro-Wilk Normality Test

Constituent: Turbidity Analysis Run 10/5/2021 1:04 PM
Powerton Generating Station Client: NRG Data: Powerton

Well	Transformation	Calculated	Critical	Normal
MW-01 (bg) (n = 8, alpha = 0.05)				
	no	0.4595	0.818	No
	square root	0.5222	0.818	No
	square	0.4233	0.818	No
	cube root	0.5547	0.818	No
	cube	0.419	0.818	No
	natural log	0.6374	0.818	No
	x^4	0.4186	0.818	No
	x^5	0.4186	0.818	No
	x^6	0.4186	0.818	No
MW-09 (bg) (n = 8, alpha = 0.05)				
	no	0.8125	0.818	No
	square root	0.9167	0.818	Yes
	square	0.6617	0.818	No
	cube root	0.937	0.818	Yes
	cube	0.6058	0.818	No
	natural log	0.9192	0.818	Yes
	x^4	0.5875	0.818	No
	x^5	0.5825	0.818	No
	x^6	0.5821	0.818	No
MW-19 (bg) (n = 8, alpha = 0.05)				
	no	0.6912	0.818	No
	square root	0.8828	0.818	Yes
	square	0.4911	0.818	No
	cube root	0.9393	0.818	Yes
	cube	0.4375	0.818	No
	natural log	0.9817	0.818	Yes
	x^4	0.4236	0.818	No
	x^5	0.4199	0.818	No
	x^6	0.419	0.818	No
Pooled Background (bg) (n = 24, alpha = 0.05)				
	no	0.491	0.916	No
	square root	0.7357	0.916	No
	square	0.2868	0.916	No
	cube root	0.8274	0.916	No
	cube	0.2349	0.916	No
	natural log	0.937	0.916	Yes
	x^4	0.2192	0.916	No
	x^5	0.2138	0.916	No
	x^6	0.2119	0.916	No

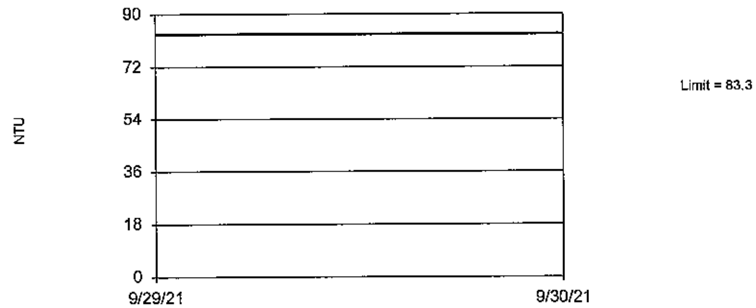
Interwell Prediction Limit Powerton ABB/ASB Turbidity

Powerton Generating Station   Client: NRG   Data: Powerton   Printed 10/5/2021, 1:06 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Turbidity (NTU)	n/a	83.3	n/a	n/a	6 future	n/a	24	0	ln(x)	0.000...	Param 1 of 2

Prediction Limit

Interwell Parametric



Background Data Summary (based on natural log transformation): Mean=1.586, Std. Dev.=1.093, n=24. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.937, critical = 0.916. Kappa = 2.596 (c=22, w=6, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001995. Assumes 6 future values.

Constituent: Turbidity Analysis Run 10/5/2021 1:05 PM

Powerton Generating Station Client: NRG Data: Powerton

Interwell Prediction Limit Powerton FAB MW-10 UG Turbidity

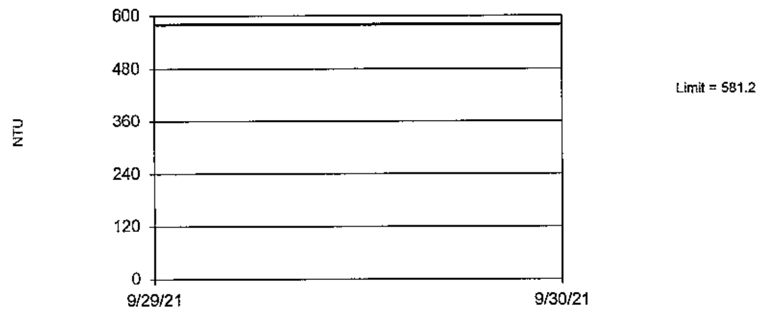
Powerton Generating Station   Client: NRG   Data: Powerton FAB   Printed 10/5/2021, 2:00 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Turbidity (NTU)	n/a	581.2	n/a	n/a	4 future	n/a	8	0	x^(1/3)	0.000...	Param Inter 1 of 2

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG

Prediction Limit

Interwell Parametric



Background Data Summary (based on cube root transformation): Mean=3.244, Std. Dev.=1.403, n=8. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8198, critical = 0.818. Kappa = 3.636 (c=22, w=4, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0002993. Assumes 4 future values.

Constituent: Turbidity Analysis Run 10/5/2021 1:58 PM

Powerton Generating Station Client: NRG Data: Powerton FAB

ATTACHMENT 10
WRITTEN CLOSURE PLAN

Attachment 10-1 – ASB and ABB Closure Plan

MWG

Midwest Generation, LLC
Powerton Generating Station

Preliminary Written Closure Plan for Ash Surge Basin

Revision 1

October 29, 2021

Issue Purpose: Use

Project No.: 12661-122

55 East Monroe Street
Chicago, IL 60603-5780 USA
312-269-2000
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Sargent & Lundy

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1.0 PURPOSE & SCOPE

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.720(a)
Federal CCR Rule Reference: 40 CFR 257.102(b)

1.1 PURPOSE

The Ash Surge Basin at Midwest Generation, LLC's (MWG) Powerton Generating Station ("Powerton" or the "Station") is an existing coal combustion residual (CCR) surface impoundment that is regulated by the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in CCR Surface Impoundments." These regulations are codified in Part 845 to Title 35 of the Illinois Administrative Code (35 Ill. Adm. Code 845, Ref. 1) and are also referred to herein as the "Illinois CCR Rule." The Ash Surge Basin is also regulated by the U.S. Environmental Protection Agency's (EPA) "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," 40 CFR Part 257 Subpart D (Ref. 2), also referred to herein as the "Federal CCR Rule."

Pursuant to 35 Ill. Adm. Code 845.720(a) and 40 CFR 257.102(b), this document provides the preliminary written closure plan for the Ash Surge Basin at Powerton. In accordance with both sets of regulations, this document describes the steps necessary to close the CCR unit at any point during its active life. MWG intends to first retrofit the Ash Surge Basin with a composite liner and a leachate collection and removal system (LCRS) in accordance with 35 Ill. Adm. Code 845.770(a) and 40 CFR 257.102(k) and then use the basin to manage CCR wastestreams and several non-CCR wastestreams from the Station. After Powerton ceases coal-fired power generating operations, the Station will initiate closure of the CCR surface impoundment. Therefore, this preliminary written closure plan describes the steps necessary to close the Ash Surge Basin after it has been retrofitted. In accordance with 40 CFR 257.102(k)(2)(ii)(A), MWG will prepare a corresponding retrofit plan for the Ash Surge Basin no later than 60 days prior to submitting a retrofit construction permit application to the Illinois EPA.

MWG intends to close the retrofitted Ash Surge Basin by removing CCR and CCR-mixed materials remaining in the basin at the time of closure and decontaminating affected areas pursuant to 35 Ill. Adm. Code 845.740(a) and 40 CFR 257.102(c). This plan describes the steps necessary to close the Ash Surge Basin in this manner.

1.2 SCOPE

Per the 2016 Water Infrastructure Improvements for the Nation (WIIN) Act, the retrofitted Ash Surge Basin will continue to be subject to both the Illinois and Federal CCR Rules until the U.S. EPA approves the Illinois EPA's CCR permit program. The Illinois EPA has yet to publish a timeline for submitting its proposed CCR permit program to the U.S. EPA for approval, and so this preliminary written closure plan has been prepared pursuant to both sets of regulations.

2.0 CLOSURE PLAN NARRATIVE DESCRIPTION

Illinois CCR Rule References: 35 Ill. Adm. Code 845.720(a)(1)(A) & 845.740(a)
Federal CCR Rule References: 40 CFR 257.102(b)(1)(i) & 257.102(c)

MWG plans to close the retrofitted Ash Surge Basin by removing CCR and CCR-mixed materials remaining in the basin at the time of closure and decontaminating affected areas pursuant to 35 Ill. Adm. Code 845.740(a) and 40 CFR 257.102(c). The Ash Surge Basin closure will be executed according to the following sequential steps:

1. Obtaining a construction permit from the Illinois EPA for closing the retrofitted basin;
2. Ceasing all CCR and non-CCR inflows to the basin;
3. Drawing down free surface water in the basin by evaporation and by draining water into the existing outlet structure at the north end of the basin;
4. Once the water elevation is below the invert elevation of the basin's outlet structure, promoting additional drainage and dewatering by:
    a. Excavating sumps and trenches within the ash material,
    b. Using portable pumps as necessary to remove additional water by pumping water into the basin's outlet structure, and/or
    c. Utilizing earthmoving equipment to pile the ash within the basin to promote drainage;
5. Removing the CCR from the retrofitted basin, loading the material onto trucks, and transporting the material to a beneficial-use facility or a permitted disposal facility;
6. Removing the retrofitted basin's LCRS, the filter layer installed over the LCRS, and any soil and geosynthetic materials installed over the filter layer and transporting the materials to a permitted disposal facility;
7. Removing the retrofitted basin's composite liner system;
8. Removing the original geomembrane liner (which MWG plans to use as a supplemental liner for the retrofitted basin pursuant to 35 Ill. Adm. Code 845.770(a)(4));
9. Inspecting the basin subgrade to verify it is not contaminated with CCR constituents;
10. Removing the retrofitted basin's appurtenant structures (*e.g.*, inlet troughs, outlet structures, piping);
11. Sampling the groundwater at the basin site to verify the groundwater monitoring concentrations do not exceed the groundwater protection standards established for constituents in accordance with the operating permit issued by the Illinois EPA for the basin; and
12. Certifying (via a qualified professional engineer licensed in the State of Illinois) that the CCR has been removed from the basin and the CCR surface impoundment has been decontaminated in

accordance with the closure plan in effect at the time of closure and in accordance with the corresponding construction permit issued by the Illinois EPA.

3.0 CCR REMOVAL & DECONTAMINATION PROCEDURES

Illinois CCR Rule References: 35 Ill. Adm. Code 845.720(a)(1)(B) & 845.740(a)
Federal CCR Rule References: 40 CFR 257.102(b)(1)(ii) & 257.102(c)

The preliminary closure plan for the retrofitted Ash Surge Basin is to follow the sequential steps outlined in Section 2.0.

Upon receipt of the construction permit from the Illinois EPA for closing the retrofitted Ash Surge Basin and after permanent cessation of all flows into the impoundment, MWG will first draw down the free surface water remaining in the CCR surface impoundment and dewater the CCR stored therein. Initially, free water remaining in the retrofitted basin will be drawn down by allowing the water to drain to the outlet structure at the northern end of the basin. Once the water level falls below the outlet structure's invert elevation, additional drainage and dewatering may be facilitated by:

- Excavating sumps and trenches within the ash,
- Using portable pumps to pump water into the basin's outlet structure, and/or
- Utilizing earthmoving equipment to pile the CCR within the retrofitted basin to promote drainage.

Once the CCR within the impoundment is sufficiently dewatered to handle, construction equipment will then be used to load CCR materials onto trucks and transported to a beneficial-use facility or a permitted disposal facility. Trucks transporting the CCR materials off-site will carry manifests pursuant to 35 Ill. Adm. Code 845.740(c)(1)(A) and as specified in 35 Ill. Adm. Code 809. In addition, a CCR transportation plan will be prepared in accordance with 35 Ill. Adm. Code 845.740(c)(1)(B) which will include:

- Identification of the transportation method selected;
- The frequency, time of day, and routes of CCR transportation;
- Any measures to minimize noise, traffic, and safety concerns caused by the transportation of the CCR;
- Measures to limit fugitive dust from any transportation of CCR;
- Installation and use of a vehicle washing station;
- A means of covering the CCR for any mode of CCR transportation;
- A requirement that the CCR is transported by a permitted special waste hauler under 35 Ill. Adm. Code 809.201.

On-site fugitive dust control measures will also be implemented as necessary to minimize airborne CCR particulates while CCR materials are being handled. Pursuant to 35 Ill. Adm. Code 845.740(c)(2)(A), these dust control measures will include a water spray, commercial dust suppressant, or a combination of these.

Prior to the removal of CCR materials from the retrofitted Ash Surge Basin, signage will be posted at the Station's entrance warning of the hazards of CCR dust inhalation in accordance with 35 Ill. Adm. Code 845.740(c)(3)(A). Pursuant to 35 Ill. Adm. Code 845.740(c)(3)(B), a written notice will be issued to each of the local governments through which the CCR materials will be transported. This written notice will include an explanation of the hazards of CCR dust inhalation, the aforementioned CCR transportation plan, and a tentative transportation schedule.

The containment systems installed within the retrofitted Ash Surge Basin (*i.e.*, LCRS, composite liner, filter layer over the LCRS, *etc*.) will be removed from the impoundment. The original geomembrane liner and appurtenant structures (*i.e.*, inlet trough, outlet structure, piping, *etc*.) will also be removed. Materials removed from the impoundment site will be loaded onto trucks and transported to permitted disposal facilities in accordance with the aforementioned CCR transportation plan developed for the closure work. Finally, the basin subgrade will be visually inspected to verify that the area is not contaminated with CCR constituents.

In accordance with 35 Ill. Adm. Code 845.740(e) and 40 CFR 257.102(c), CCR removal and decontamination will be complete when constituent concentrations throughout the retrofitted Ash Surge Basin and areas that may have been affected by releases from the basin have been removed and groundwater monitoring concentrations do not exceed the groundwater protection standards established under 35 Ill. Adm. Code 845.600. After CCR removal and decontamination of the retrofitted Ash Surge Basin has been completed, MWG will submit a report documenting the completion of CCR removal and decontamination of the unit, which will include a certification from a qualified professional engineer licensed in the State of Illinois that CCR removal and decontamination was completed in accordance with 35 Ill. Adm. Code 845.740.

In accordance with 35 Ill. Adm. Code 845.740(b), MWG will continue groundwater monitoring in accordance with Subpart F of the Illinois CCR Rule ("Groundwater Monitoring and Corrective Action") for three years after the completion of CCR removal and decontamination. After groundwater monitoring has been completed, MWG will submit a report documenting the completion of groundwater monitoring, which will include a certification from a qualified professional engineer licensed in the State of Illinois that groundwater monitoring was completed in accordance with 35 Ill. Adm. Code 845.740.

4.0 ESTIMATED MAXIMUM INVENTORY OF CCR

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.720(a)(1)(D)
Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(iv)

Detailed records of the maximum inventory of CCR ever stored in the Ash Surge Basin are not available. For the purposes of this preliminary written closure plan, the maximum inventory of CCR ever on-site over the active life of the Ash Surge Basin is conservatively based on the estimated maximum capacity of the basin prior to retrofit: 162,000 cubic yards.

5.0 CLOSURE SCHEDULE

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.720(a)(1)(F)
Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(vi)

Closure activities for the retrofitted Ash Surge Basin are expected to be completed by 2030. Table 1 lists the major milestones necessary for closing the basin and the expected duration for completing each milestone.

Table 1 – Planning Level Schedule for Closing the Retrofitted Ash Surge Basin

Activity	Estimated Duration
Prepare Closure Construction Design Documents	6 Months
Obtain Closure Construction Permit from Illinois EPA	13 Months
Hire Contractor to Complete Closure Activities in Accordance with Illinois EPA Permit	4 Months
Cease All Flows into Retrofitted Ash Surge Basin	--
Draw Down Water & Dewater Impounded Ash	14 Months
Remove Impounded Ash	4 Months
Remove Basin Containment Systems and Appurtenant Structures	6 Months
Submit Completion of CCR Removal and Decontamination Report and Certification to Illinois EPA	2 Weeks
Obtain Approval of Completion of CCR Removal and Decontamination Report from Illinois EPA	3 Months
Complete and Certify Closure of the Retrofitted Ash Surge Basin	--

6.0 AMENDMENTS TO CLOSURE PLAN

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.720(a)(3)
Federal CCR Rule Reference: 40 CFR 257.102(b)(3)

This closure plan will be amended in accordance with 35 Ill. Adm. Code 845.720(a)(3) and 40 CFR 257.102(b)(3) if a change in the operation of the Ash Surge Basin would substantially affect this closure plan or if an unanticipated event necessitates a revision to this closure plan. Any and all amendments to this closure plan will be certified by a qualified professional engineer registered in the State of Illinois in accordance with 35 Ill. Adm. Code 845.720(a)(4) and 40 CFR 257.102(b)(4).

7.0 COMPLETION OF CLOSURE ACTIVITIES

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.760
Federal CCR Rule Reference: 40 CFR 257.102(f)

Upon completion of all CCR removal and decontamination activities required by 35 Ill. Adm. Code Part 845 and 40 CFR 257.102(c) and approved by the Illinois EPA in a construction permit, a closure report and a closure certification for the retrofitted Ash Surge Basin will be submitted to the Illinois EPA in accordance with 35 Ill. Adm. Code 845.760(e). The closure report will include (1) the engineering and hydrogeology reports containing any monitoring well completion reports, boring logs, all construction quality assurance (CQA) reports, certifications, designations of CQA officers-in-absentia required by 35 Ill. Adm. Code 845.290; (2) photographs with time, date, and location information relied upon for documentation of construction activities; (3) a written summary of the closure requirements and completed activities as stated in the closure plan in effect and 35 Ill. Adm. Code Part 845; and (4) any other information relied upon by the qualified professional engineer for the certification. Pursuant to 35 Ill. Adm. Code 845.760(e)(2) and 40 CFR 257.102(f)(3), the certification will be prepared by an independent, qualified professional engineer licensed in the State of Illinois and will verify that the retrofitted Ash Surge Basin has been closed in accordance with the closure plan in effect at the time of the closure work, the requirements of 35 Ill. Adm. Code Part 845, and the requirements of 40 CFR 257.102. Finally, within 30 days of the Illinois EPA approving the closure report and closure certification, a notification of completion of closure will be prepared in accordance with 35 Ill. Adm. Code 845.760(f).

8.0 CERTIFICATION

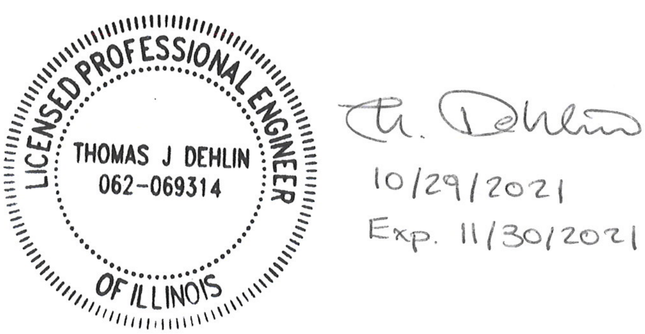
Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.720(a)(4)
Federal CCR Rule Reference: 40 CFR 257.102(b)(4)

I certify that:

- This preliminary written closure plan for the Ash Surge Basin was prepared by me or under my direct supervision.
- The work was conducted in accordance with the requirements of 35 Ill. Adm. Code Part 845 and with the requirements of 40 CFR 257.102.
- I am a registered professional engineer under the laws of the State of Illinois.

Certified By: Thomas J. Dehlin   Date: October 29, 2021

Seal:



9.0 REFERENCES

1. Illinois Pollution Control Board. "Standards for Disposal of Coal Combustion Residuals in CCR Surface Impoundments." 35 Ill. Adm. Code 845. Accessed October 19, 2021.

2. U.S. Environmental Protection Agency. "Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments." 40 CFR Part 257 Subpart D. https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-257/subpart-D. Accessed October 19, 2021.

MWG

Midwest Generation, LLC
Powerton Generating Station

Preliminary Written Closure Plan for Bypass Basin

Revision 1

October 29, 2021

Issue Purpose: Use

Project No.: 12661-122

55 East Monroe Street
Chicago, IL 60603-5780 USA
312-269-2000
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1.0 PURPOSE & SCOPE

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.720(a)
Federal CCR Rule Reference: 40 CFR 257.102(b)

1.1 PURPOSE

The Bypass Basin at Midwest Generation, LLC's (MWG) Powerton Generating Station ("Powerton" or the "Station") is an existing coal combustion residual (CCR) surface impoundment that is regulated by the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in CCR Surface Impoundments." These regulations are codified in Part 845 to Title 35 of the Illinois Administrative Code (35 Ill. Adm. Code 845, Ref. 1) and are also referred to herein as the "Illinois CCR Rule." The Bypass Basin is also regulated by the U.S. Environmental Protection Agency's (EPA) "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," 40 CFR Part 257 Subpart D (Ref. 2), also referred to herein as the "Federal CCR Rule."

Pursuant to 35 Ill. Adm. Code 845.720(a) and 40 CFR 257.102(b), this document provides the preliminary written closure plan for the Bypass Basin at Powerton. In accordance with both sets of regulations, this document describes the steps necessary to close the CCR unit at any point during its active life. MWG intends to first retrofit the Bypass Basin with a composite liner and a leachate collection and removal system (LCRS) in accordance with 35 Ill. Adm. Code 845.770(a) and 40 CFR 257.102(k) and then use the basin to manage CCR wastestreams and several non-CCR wastestreams from the Station. After Powerton ceases coal-fired power generating operations, the Station will initiate closure of the CCR surface impoundment. Therefore, this preliminary written closure plan describes the steps necessary to close the Bypass Basin after it has been retrofitted. In accordance with 40 CFR 257.102(k)(2)(ii)(A), MWG will prepare a corresponding retrofit plan for the Bypass Basin no later than 60 days prior to submitting a retrofit construction permit application to the Illinois EPA.

MWG intends to close the retrofitted Bypass Basin by removing CCR and CCR-mixed materials remaining in the basin at the time of closure and decontaminating affected areas pursuant to 35 Ill. Adm. Code 845.740(a) and 40 CFR 257.102(c). This plan describes the steps necessary to close the Bypass Basin in this manner.

1.2 SCOPE

Per the 2016 Water Infrastructure Improvements for the Nation (WIIN) Act, the retrofitted Bypass Basin will continue to be subject to both the Illinois and Federal CCR Rules until the U.S. EPA approves the Illinois EPA's CCR permit program. The Illinois EPA has yet to publish a timeline for submitting its proposed CCR permit program to the U.S. EPA for approval, and so this preliminary written closure plan has been prepared pursuant to both sets of regulations.

2.0 CLOSURE PLAN NARRATIVE DESCRIPTION

Illinois CCR Rule References: 35 Ill. Adm. Code 845.720(a)(1)(A) & 845.740(a)
Federal CCR Rule References: 40 CFR 257.102(b)(1)(i) & 257.102(c)

MWG plans to close the retrofitted Bypass Basin by removing CCR and CCR-mixed materials remaining in the basin at the time of closure and decontaminating affected areas pursuant to 35 Ill. Adm. Code 845.740(a) and 40 CFR 257.102(c). The Bypass Basin closure will be executed according to the following sequential steps:

1. Obtaining a construction permit from the Illinois EPA for closing the retrofitted basin;
2. Ceasing all CCR and non-CCR inflows to the basin;
3. Drawing down free surface water in the basin by draining water into the existing outlet structure in the southeast corner of the basin;
4. Once the water elevation is below the invert elevation of the basin's outlet structure, promoting additional drainage and dewatering by:
    a. Excavating sumps and trenches within the ash material,
    b. Using portable pumps as necessary to remove additional water by pumping water into the basin's outlet structure, and/or
    c. Utilizing earthmoving equipment to pile the ash within the basin to promote drainage;
5. Removing the CCR from the retrofitted basin, loading the material onto trucks, and transporting the material to a beneficial-use facility or a permitted disposal facility;
6. Removing the retrofitted basin's LCRS, filter layer installed over the LCRS, and any soil and geosynthetic materials installed over the filter layer and transporting the materials to a permitted disposal facility;
7. Removing the retrofitted basin's composite liner system;
8. Removing the original geomembrane liner (which MWG plans to use as a supplemental liner for the retrofitted basin pursuant to 35 Ill. Adm. Code 845.770(a)(4));
9. Inspecting the basin subgrade to verity it is not contaminated with CCR constituents;
10. Removing the retrofitted basin's appurtenant structures (*e.g.*, inlet troughs, outlet structures, piping);
11. Sampling the groundwater at the basin site to verify the groundwater monitoring concentrations do not exceed the groundwater protection standards established for constituents in accordance with the operating permit issued by the Illinois EPA for the basin; and
12. Certifying (via a qualified professional engineer licensed in the State of Illinois) that the CCR has been removed from the basin and the CCR surface impoundment has been decontaminated in accordance with the closure plan in effect at the time of closure and in accordance with the corresponding construction permit issued by the Illinois EPA.

3.0 CCR REMOVAL & DECONTAMINATION PROCEDURES

Illinois CCR Rule References: 35 Ill. Adm. Code 845.720(a)(1)(B) & 845.740(a)
Federal CCR Rule References: 40 CFR 257.102(b)(1)(ii) & 257.102(c)

The preliminary closure plan for the retrofitted Bypass Basin is to follow the sequential steps outlined in Section 2.0.

Upon receipt of the construction permit from the Illinois EPA for closing the retrofitted Bypass Basin and after permanent cessation of all flows into the impoundment, MWG will first draw down the free surface water remaining in the CCR surface impoundment and dewater the CCR stored therein. Initially, free water remaining in the retrofitted basin will be drawn down by allowing the water to drain to the outlet structure at the southeast corner of the basin. Once the water level falls below the outlet structure's invert elevation, additional drainage and dewatering may be facilitated by:

- Excavating sumps and trenches within the ash,
- Using portable pumps to pump water into the basin's outlet structure, and/or
- Utilizing earthmoving equipment to pile the CCR within the retrofitted basin to promote drainage.

Once the CCR within the impoundment is sufficiently dewatered to handle, construction equipment will then be used to load CCR materials onto trucks and transported to a beneficial-use facility or a permitted disposal facility. Trucks transporting the CCR materials off-site will carry manifests pursuant to 35 Ill. Adm. Code 845.740(c)(1)(A) and as specified in 35 Ill. Adm. Code 809. In addition, a CCR transportation plan will be prepared in accordance with 35 Ill. Adm. Code 845.740(c)(1)(B) which will include:

- Identification of the transportation method selected;
- The frequency, time of day, and routes of CCR transportation;
- Any measures to minimize noise, traffic, and safety concerns caused by the transportation of the CCR;
- Measures to limit fugitive dust from any transportation of CCR;
- Installation and use of a vehicle washing station;
- A means of covering the CCR for any mode of CCR transportation;
- A requirement that the CCR is transported by a permitted special waste hauler under 35 Ill. Adm. Code 809.201.

On-site fugitive dust control measures will also be implemented as necessary to minimize airborne CCR particulates while CCR materials are being handled. Pursuant to 35 Ill. Adm. Code 845.740(c)(2)(A), these dust control measures will include a water spray, commercial dust suppressant, or a combination of these.

Prior to the removal of CCR materials from the retrofitted Bypass Basin, signage will be posted at the Station's entrance warning of the hazards of CCR dust inhalation in accordance with 35 Ill. Adm. Code 845.740(c)(3)(A). Pursuant to 35 Ill. Adm. Code 845.740(c)(3)(B), a written notice will be issued to each of the local governments through which the CCR materials will be transported. This written notice will include an explanation of the hazards of CCR dust inhalation, the aforementioned CCR transportation plan, and a tentative transportation schedule.

The containment systems installed within the retrofitted Bypass Basin (*i.e.*, LCRS, composite liner, filter layer over the LCRS, *etc*.) will be removed from the impoundment. The original geomembrane liner and appurtenant structures (*i.e.*, inlet trough, outlet structure, piping, *etc*.) will also be removed. Materials removed from the impoundment site will be loaded onto trucks and transported to permitted disposal facilities in accordance with the aforementioned CCR transportation plan developed for the closure work. Finally, the basin subgrade will be visually inspected to verify the area is not contaminated with CCR constituents.

In accordance with 35 Ill. Adm. Code 845.740(e) and 40 CFR 257.102(c), CCR removal and decontamination will be complete when constituent concentrations throughout the retrofitted Bypass Basin and areas that may have been affected by releases from the basin have been removed and groundwater monitoring concentrations do not exceed the groundwater protection standards established under 35 Ill. Adm. Code 845.600. After CCR removal and decontamination of the retrofitted Bypass Basin has been completed, MWG will submit a report documenting the completion of CCR removal and decontamination of the unit, which will include a certification from a qualified professional engineer licensed in the State of Illinois that CCR removal and decontamination was completed in accordance with 35 Ill. Adm. Code 845.740.

In accordance with 35 Ill. Adm. Code 845.740(b), MWG will continue groundwater monitoring in accordance with Subpart F of the Illinois CCR Rule ("Groundwater Monitoring and Corrective Action") for three years after the completion of CCR removal and decontamination. After groundwater monitoring has been completed, MWG will submit a report documenting the completion of groundwater monitoring, which will include a certification from a qualified professional engineer licensed in the State of Illinois that groundwater monitoring was completed in accordance with 35 Ill. Adm. Code 845.740.

4.0 ESTIMATED MAXIMUM INVENTORY OF CCR

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.720(a)(1)(D)
Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(iv)

Detailed records of the maximum inventory of CCR ever stored in the Bypass Basin are not available. For the purposes of this preliminary written closure plan, the maximum inventory of CCR ever on-site over the active life of the Bypass Basin is conservatively based on the estimated maximum capacity of the basin prior to retrofit: 9,000 cubic yards.

5.0 CLOSURE SCHEDULE

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.720(a)(1)(F)
Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(vi)

Closure activities for the retrofitted Bypass Basin are expected to be completed by 2030. Table 1 lists the major milestones necessary for closing the basin and the expected duration for completing each milestone.

Table 1 – Planning Level Schedule for Closing the Retrofitted Bypass Basin

Activity	Estimated Duration
Prepare Closure Construction Design Documents	6 Months
Obtain Closure Construction Permit from Illinois EPA	13 Months
Hire Contractor to Complete Closure Activities in Accordance with Illinois EPA Permit	4 Months
Cease All Flows into Retrofitted Bypass Basin	--
Draw Down Water & Dewater Impounded Ash	5 Months
Remove Impounded Ash	1 Month
Remove Basin Containment Systems and Appurtenant Structures	2 Months
Submit Completion of CCR Removal and Decontamination Report and Certification to Illinois EPA	2 Weeks
Obtain Approval of Completion of CCR Removal and Decontamination Report from Illinois EPA	3 Months
Complete and Certify Closure of the Retrofitted Bypass Basin	--

6.0 AMENDMENTS TO CLOSURE PLAN

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.720(a)(3)
Federal CCR Rule Reference: 40 CFR 257.102(b)(3)

This closure plan will be amended in accordance with 35 Ill. Adm. Code 845.720(a)(3) and 40 CFR 257.102(b)(3) if a change in the operation of the Bypass Basin would substantially affect this closure plan or if an unanticipated event necessitates a revision to this closure plan. Any and all amendments to this closure plan will be certified by a qualified professional engineer registered in the State of Illinois in accordance with 35 Ill. Adm. Code 845.720(a)(4) and 40 CFR 257.102(b)(4).

7.0 COMPLETION OF CLOSURE ACTIVITIES

Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.760
Federal CCR Rule Reference: 40 CFR 257.102(f)

Upon completion of all CCR removal and decontamination activities required by 35 Ill. Adm. Code Part 845 and 40 CFR 257.102(c) and approved by the Illinois EPA in a construction permit, a closure report and a closure certification for the retrofitted Bypass Basin will be submitted to the Illinois EPA in accordance with 35 Ill. Adm. Code 845.760(e). The closure report will include (1) the engineering and hydrogeology reports containing any monitoring well completion reports, boring logs, all construction quality assurance (CQA) reports, certifications, designations of CQA officers-in-absentia required by 35 Ill. Adm. Code 845.290; (2) photographs with time, date, and location information relied upon for documentation of construction activities; (3) a written summary of the closure requirements and completed activities as stated in the closure plan in effect and 35 Ill. Adm. Code Part 845; and (4) any other information relied upon by the qualified professional engineer for the certification. Pursuant to 35 Ill. Adm. Code 845.760(e)(2) and 40 CFR 257.102(f)(3), the certification will be prepared by an independent, qualified professional engineer licensed in the State of Illinois and will verify that the retrofitted Bypass Basin has been closed in accordance with the closure plan in effect at the time of the closure work, the requirements of 35 Ill. Adm. Code Part 845, and the requirements of 40 CFR 257.102. Finally, within 30 days of the Illinois EPA approving the closure report and closure certification, a notification of completion of closure will be prepared in accordance with 35 Ill. Adm. Code 845.760(f).

8.0 CERTIFICATION

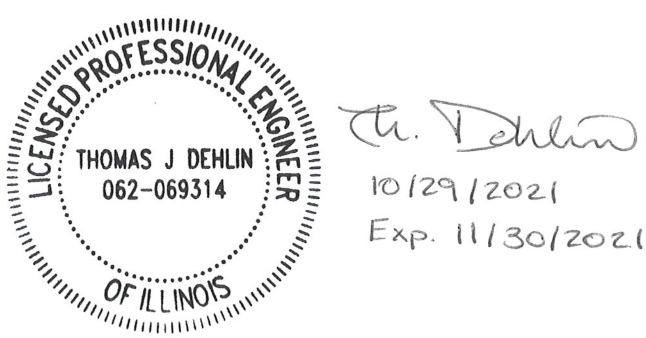
Illinois CCR Rule Reference: 35 Ill. Adm. Code 845.720(a)(4)
Federal CCR Rule Reference: 40 CFR 257.102(b)(4)

I certify that:

- This preliminary written closure plan for the Bypass Basin was prepared by me or under my direct supervision.
- The work was conducted in accordance with the requirements of 35 Ill. Adm. Code Part 845 and with the requirements of 40 CFR 257.102.
- I am a registered professional engineer under the laws of the State of Illinois.

Certified By: Thomas J. Dehlin Date: October 29, 2021

Seal:



9.0 REFERENCES

1. Illinois Pollution Control Board. “Standards for Disposal of Coal Combustion Residuals in CCR Surface Impoundments.” 35 Ill. Adm. Code 845. Accessed October 19, 2021.

2. U.S. Environmental Protection Agency. “Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments.” 40 CFR Part 257 Subpart D. https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-257/subpart-D. Accessed October 19, 2021.

Attachment 10-2 – FAB Amended Closure Plan

CLOSURE PLAN
FORMER ASH BASIN
POWERTON STATION
MAY 2019

This closure plan has been prepared in accordance with 40 CFR Part 257.102(b) for the Former Ash Basin (FAB) at the Powerton Station, operated by Midwest Generation, LLC in Pekin, IL. This closure plan describes the schedule and steps necessary for closure and methods for compliance with closure requirements for final closure of the FAB.

1.0 Closure Narrative [257.102(b)(i)]

The Powerton FAB has been an inactive pond for several decades. In 2010, the FAB was bifurcated by an onsite rail loop into two separate ponds: the South Pond and the North Pond. The closure of the FAB will be accomplished by the in-place closure both the North and South Ponds in accordance with 40 CFR Part 257.102(d).

2.0 In Place Closure of CCR [257.102(b)(1)(iii)]

The Coal Combustion Residuals (CCR) in both the South and North Ponds will be closed in place in accordance with 40 CFR Part 257.102(d). As required, a final cover system (FCS) will be installed over the CCR in accordance with 257.102(d)(3)(ii). The closure will be implemented using the following methods and procedures:

1. The CCR in the South and North Ponds will be graded in order to achieve more efficient storm water drainage after a capping system is installed, and to provide a stabilized subsurface for the final cap.
2. The FCS will be installed over the regraded and compacted CCR in both ponds. The FCS will consist of the following components (from the bottom layer to the top layer):

    - An geocomposite layer with a permeability no greater than 1×10^{-5} cm/sec;
    - A protective soil cover ranging from 6" to 18" thick of imported clean material; and
    - An erosion control layer consisting of six (6") inches of topsoil with vegetation (mulch, fertilizer, and seed).

3. The CCR in the South and North Ponds will be graded in order to achieve more efficient storm water drainage after a capping system is installed, and to provide a stabilized subsurface for the final cap.

3.0 Maximum Inventory of CCR [257.102(b)(1)(iv)]

The estimated maximum inventory of CCR on-site contained in the North Pond and South Pond are estimated at less than 300,000 cubic yards (CY) and 200,000 CY, respectively.

3.0 Largest Area of CCR Requiring a Final Cover [257.102(b)(1)(v)]

The FCS will cover a maximum area of approximately 16.6 acres over the North Pond, and 14.7 acres over the South Pond.

4.0 Closure Schedule [257.102(b)(1)(vi)]

Implementation of closure of the FAB is estimated to require 14 months. Closure is anticipated to begin in 2019 and estimated to be completed in 2020. Prior to initiation of closure, a notice of intent to close will be prepared in accordance with §257.102(g). If necessary, closure design documents will be prepared to support applications for required local, state, and federal permits. Closure construction design documents may include construction drawings and other technical specifications. The permits required for closure construction will be evaluated at the time of closure, and may include permits from the Illinois Environmental Protection Agency (Illinois EPA), Illinois Department of Natural Resources (IDNR), and Tazewell County. A preliminary schedule of anticipated closure activities is included below.

CLOSURE ACTIVITY	SCHEDULE
Permitting	6 Months
Site Preparation	1 Month
CCR Consolidation & Regrading	2 Months
Install Final Cover System	3 Months
Install Storm Water Drainage System	1 Month
Closure Certification	1 Month

5.0 Closure Activities Initiation and Completion [257.102(e) and 257.102(f)]

Closure activities are anticipated to begin during 2019, and are estimated to be completed during 2020. In accordance with §257.102(h), notification of closure of a CCR unit will be made within 30 days of the completion of closure of the CCR unit. The notification will include certification from a qualified professional engineer, as required by §257.102(f)(3).

6.0 Closure Plan Amendments [257.102(b)(3)]

This Closure Plan will be amended in accordance with §257.102(b)(3) if a change in the operation of the FAB would substantially affect the content of this Closure Plan or if unanticipated events necessitate revision of the plan. If a change in operation requires amendment to the Closure Plan, the plan will be amended no later than 60 days prior to the change in operation being implemented. If an unexpected event occurs that requires amendment of the Closure Plan, the plan will be amended within 60 days of the unexpected event or within 30 days of the unexpected event if the event occurs after closure activities have commenced. Amendments to this Closure Plan will be certified by a professional engineer registered in the State of Illinois in accordance with §257.102(b)(4).

7.0 Professional Engineer's Certification [257.102(b)(4)]

I certify that this Closure Plan has been prepared to meet the requirements of 40 CFR §257.105(b)(1).

Richard M. Frendt, P.E.
Illinois Professional Engineer

SEAL

RICHARD M. FRENDT
062-051349
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS

ATTACHMENT 11
POST-CLOSURE PLAN

POST-CLOSURE PLAN
FORMER ASH BASIN
POWERTON STATION
OCTOBER 2021

This post-closure plan has been prepared in accordance with 35 Ill. Adm. Code 845.780(d) for the Former Ash Basin (FAB) at the Powerton Generating Station, operated by Midwest Generation, LLC (Midwest Generation), in Pekin, IL. This post-closure plan describes the steps necessary for post-closure and methods for compliance with post-closure requirements for the FAB. The post-closure care will be conducted following completion of closure for the FAB.

1.0 POST-CLOSURE MONITORING AND MAINTENANCE DESCRIPTION [845.780(d)(1)(A)]

The FAB post-closure monitoring and maintenance activities will be performed in compliance with 845.780(b). The post-closure care will consist of the following:

- Maintaining the integrity and effectiveness of the final cover system (FCS), including making repairs as necessary to correct the effects of settlement, subsidence, erosion, or other events;
- Efforts will be made to prevent run-on and run-off from eroding or otherwise damaging the FCS; and
- Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with 35 Ill. Adm. Code Subpart F.

This post-closure care plan is based upon the regulatory requirement to maintain and monitor the site for 30 years after closure. If at the end of the 30-year post-closure care period, the groundwater monitoring activities will continue until the conditions of 845.780(c)(2) are met.

2.0 POST-CLOSURE CARE CONTACT INFORMATION [845.780(d)(1)(B)]

Mr. Dale Green
Station Manager
Powerton Generating Station
13082 East Manito Road, Pekin, IL 61554
309-477-5212
dale.green@nrg.com

3.0 PLANNED USES OF THE PROPERTY [845.780(d)(1)(C)]

The FAB will not be developed during the post-closure care period. The FAB will be inactive during the post-closure care period and it will only be accessed to perform groundwater monitoring or inspections, as noted above. The groundwater monitoring will not involve access onto the FCS. Access onto the FCS for inspections will be kept to a minimum.

4.0 CLOSURE PLAN AMENDMENTS [845.780(d)(3)]

This Post-Closure Plan may be amended in accordance with 845.780(d)(3) if a change in the operation of the FAB would substantially affect the content of this Post-Closure Plan or if unanticipated events necessitate revision of the plan. If a change in operation requires amendment to the Post-Closure Plan, the plan will be amended no later than 60 days prior to the change in operation being implemented. If an unexpected event occurs that requires amendment of the Closure Plan, the plan will be amended within 60 days of the unexpected event. Within 30 days of the unexpected event, a request to modify the operating permit will be submitted to IEPA. Amendments to this Post-Closure Plan will be certified by a professional engineer registered in the State of Illinois in accordance with 845.780(d)(4).

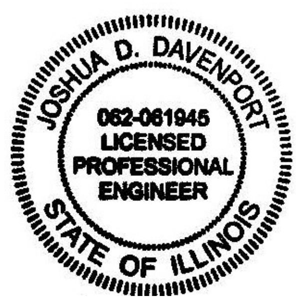
5.0 CERTIFICATION [845.780(d)(4)]

This post-closure plan has been prepared to meet the requirements of 35 Ill. Adm. Code 845.780(d).

10/29/21

Joshua D. Davenport, P.E.

SEAL:



ATTACHMENT 12
LINER CERTIFICAITON

Attachment 12: Liquid Flow Rate through Alternative Composite Liner
Powerton Ash Surge Basin

Darcy's Law for Gravity Flow through Porous Media

Q/A = q = k((h/t)+1)

Q= flow rate (cubic centimeters/second)
A = Surface area of the liner (squared centimeters)
q = flow rate per unit area (cubic centimeters/second/squared centimeter)
k = hydraulic conductivity of the liner (centimeters/second)
h = hydraulic head above the liner (centimeters)
t = thickness of the liner (centimeters)

Section 845.400(c) Comparison Flow Rate

Q/A = q = k((h/t)+1)

Q= calculated
A = 223,906 ft^2 = 208,015,481 cm^2 Based on surface area at toe of embankment
q = calculated
k = 1.00E-07 cm/s
h = 14 ft = 426.72 cm
t = 2 ft = 60.96 cm

Q = 1.00E-07 (426.72 / 60.96 +1) * 208,015,481

Q = 166.41 cm^3/s	Compare to Surface Impoundment Flow Rate

Pond Profile

Layers	Depth (ft)	Elevation (ft msl) From	Elevation (ft msl) To	Layer Description	Permeability (cm/s)	Layer Thickness (inch)	Layer Thickness (cm)	Product of Permeability & Layer Thickness
Pond	0	466	452.06	Pond embankment crest	--	--	--	--
	14.6	452.06	452.06	Pond bottom	--	--	--	--
Upper Liner Component	14.6-14	452.06	452	60-mil HDPE geomembrane	1.1E-11	0.06	0.1524	1.6764E-12
Lower Liner Component	14-15	452	451	Poz-O-Pac	3.12E-05	12	30.48	9.51E-04
	15-17	451	449	sand with silt and gravel, dark brown and black, some cinders, metal shavings	1.27E-02	60	152.4	1.92786
						Totals	182.88	1.93E+00

Permeability (weighted) =	1.05E-02

Powerton Ash Surge Basin Flow Rate Calculation

Q/A = q = k((h/t)+1)

Q= calculated
A = 223,906 ft^2 = 208,015,481 cm^2 Based on surface area at toe of embankment
q = calculated
k = 1.05E-02 cm/s
h = 14 ft = 426.72 cm
t = 2 ft = 60.96 cm

Q = 1.05E-02 (426.72 / 60.96 +1) * 208,015,481

Q = 17,551,292.32 cm^3/s	Compare to Section 845.400(c) Comparison Flow Rate

Comparison of Surface Impoundment Flow Rate vs Section 845.400(c) Flow Rate

Is the Surface Impoundment Flow Rate of 17,551,292.32 less than the Section 845.400(c) Comparison Flow Rate of 166.41 **NO**

Powerton Ash Bypass Basin

Darcy's Law for Gravity Flow through Porous Media

Q/A = q = k((h/t)+1)

Q= flow rate (cubic centimeters/second)

A = Surface area of the liner (squared centimeters)

q = flow rate per unit area (cubic centimeters/second/squared centimeter)

k = hydraulic conductivity of the liner (centimeters/second)

h = hydraulic head above the liner (centimeters)

t = thickness of the liner (centimeters)

Section 845.400(c) Comparison Flow Rate

Q/A = q = k((h/t)+1)

Q= calculated

A = 16,938 ft^2 = 15,735,917 cm^2 Based on surface area at toe of embankment

q = calculated

k = 1.00E-07 cm/s

h = 9 ft = 274.32 cm

t = 2 ft = 60.96 cm

Q = 1.00E-07 274.32 / 60.96 +1 * 15,735,917

Q = 8.65 cm^3/s	Compare to Surface Impoundment Flow Rate

Pond Profile

Layers	Depth (ft)	Elevation (ft msl) From	To	Layer Description	Permeability (cm/s)	Layer Thickness (inch)	Layer Thickness (cm)	Product of Permeability & Layer Thickness
Pond	0	468	457.5	Pond embankment crest	--	--	--	--
	10.5	457.5	457.5	Pond bottom	--	--	--	--
Upper Liner Component	10.5-11.6	457.5	457.44	60-mil HDPE geomembrane	1E-11	0.06	0.1524	1.524E-12
Lower Liner Component	11.6-15	457.44	453	Fill: cinders, metal shavings, glass, black, silty sand, trace clay, dark gray	2.31E-02	4.44	11.2776	0.26051256

Totals	11.2776	2.61E-01

Permeability (weighted) =	2.31E-02

Powerton Ash Bypass Basin *Flow Rate Calculation*

Q/A = q = k((h/t)+1)

Q= calculated

A = 16,938 ft^2 = 15,735,917 cm^2 Based on surface area at toe of embankment

q = calculated

k = 2.31E-02 cm/s

h = 9 ft = 274.32 cm

t = 4.44 ft = 135.3312 cm

Q = 2.31E-02 274.32 / 135.3312 +1 * 15,735,917

Q = 1,100,323.36 cm^3/s	Compare to Section 845.400(c) Comparison Flow Rate

Comparison of Surface Impoundment Flow Rate vs Section 845.400(c) Flow Rate

Is the Surface Impoundment Flow Rate of 1,100,323.36 less than the Section 845.400(c) Comparison Flow Rate of 8.65 **NO**

ATTACHMENT 14
FINANCIAL ASSURANCE

CERTIFICATION
35 Ill. Adm. Code 845 Subpart I

In accordance with Section 35 Ill. Adm. Code 845.230(a)(17), Midwest Generation, LLC meets the financial assurance requirements of 35 Ill. Adm. Code 845 Subpart I: Financial Assurance for the Powerton Generating Station. The performance bond is attached.

PERFORMANCE BOND

Date bond executed:	06/21/2021

Effective date:	06/21/2021

Principal:	NRG Energy, Inc. on behalf of Midwest Generation, LLC

Type of organization:	Corporation

State of incorporation:	Delaware

Surety:	Arch Insurance Company

Site Powerton

Name	Powerton Generating Station

Address	13082 E. Manito Road

City	Pekin, IL 61554

Amount guaranteed by this bond:	$11,951,599.78		

Name	

Address	

City	

Amount guaranteed by this bond:	$		

Please attach a separate page if more space is needed for all sites.

Total penal sum of bond:	$ 11,951,599.78	

Surety's bond number:	SU1174124	

The Principal and the Surety promise to pay the Illinois Environmental Protection Agency ("IEPA") the above penal sum unless the Principal or Surety provides closure and post-closure care for each site in accordance with the closure and post-closure care plans for that site. To the payment of this obligation the Principal and Surety jointly and severally bind themselves, their heirs, executors, administrators, successors and assigns.

Whereas the Principal is required, under Section 21(d) of the Environmental Protection Act [415 ILCS 5/21(d)], to have a permit to conduct a waste disposal operation;

Whereas the Principal is required, under Section 21.1 of the Environmental Protection Act [415 ILCS 5/21.1], to provide financial assurance for closure and post-closure care;

Whereas the Surety is licensed by the Illinois Department of Insurance or is licensed to transact the business of insurance, or approved to provide insurance as an excess or surplus lines insurer, by the insurance department in one or more states; and

Whereas the Principal and Surety agree that this bond shall be governed by the laws of the State of Illinois;

The Surety shall pay the penal sum to the IEPA or provide closure and post-closure care in accordance with the closure and post-closure care plans for the site if, during the term of the bond, the Principal fails to provide closure or post-closure care for any site in accordance with the closure and post-closure care plans for that site as guaranteed by this bond. The Principal fails to so provide when the Principal:

a) Abandons the site;

b) Is adjudicated bankrupt;

c) Fails to initiate closure of the site or post-closure care when ordered to do so by the Illinois Pollution Control Board or a court of competent jurisdiction;

d) Notifies the IEPA that it has initiated closure, or initiates closure, but fails to close the site or provide post-closure care in accordance with the closure and post-closure care plans; or

e) Fails to provide alternate financial assurance and obtain the IEPA written approval of the assurance provided within 90 days after receipt by both the Principal and the IEPA of a notice from the Surety that the bond will not be renewed for another term.

The Surety shall pay the penal sum of the bond to the IEPA or notify the IEPA that it intends to provide closure and post-closure care in accordance with the closure and post-closure care plans for the site within 30 days after the IEPA mails notice to the Surety that the Principal has met one or more of the conditions described above. Payment shall be made by check or draft payable to the State of Illinois, Landfill Closure and Post-Closure Fund.

If the Surety notifies the IEPA that it intends to provide closure and post-closure care, then the Surety must initiate closure and post-closure care within 60 days after the IEPA mailed notice to the Surety that the Principal met one or more of the conditions described above. The Surety must complete closure and post-closure care in accordance with the closure and post-closure care plans, or pay the penal sum.

The liability of the Surety shall not be discharged by any payment or succession of payments unless and until such payment or payments shall amount in the aggregate to the penal sum of the bond. In no event shall the obligation of the Surety exceed the amount of the penal sum.

This bond shall expire on the __21st day of June__________, 2022 [date]; but such expiration date shall be automatically extended for a period of One [at least one year] on __21st day of June, 2022____ [date] and on each successive expiration date, unless, at least 120 days before the current expiration date, the Surety notifies both the IEPA and the Principal by certified mail that the Surety has decided not to extend the term of this surety bond beyond the current expiration date. The 120 days will begin on the date when both the Principal and the IEPA have received the notice, as evidenced by the return receipts.

The Principal may terminate this bond by sending written notice to the Surety; provided, however, that no such notice shall become effective until the Surety receives written authorization for termination of the bond from the IEPA in accordance with 35 Ill. Adm. Code 807.604.

In Witness Whereof, the Principal and Surety have executed this Performance Bond and have affixed their seals on the date set forth above.

The persons whose signatures appear below certify that they are authorized to execute this surety bond on behalf of the Principal and Surety and that the wording of this surety bond is identical to the wording specified in 35 Ill. Adm. Code 807.Appendix A, Illustration D as such regulation was constituted on the date this bond was executed.

Principal: NRG Energy, Inc. on behalf of Midwest Generation, LLC		Corporate Surety		
Signature [signature]		Name: Arch Insurance Company		
Typed Name [illegible]d[illegible]rd [illegible]rist[illegible]er [illegible]r[illegible]		Address: Harborside 3, 210 Hudson Street, Suite 300, Jersey City, NJ 07311-1107		
Title Vice President		State of Incorporation: Missourt		
Date 6/21/2021		Signature [signature]		
		Typed Name: Mark W. Edwards, II		
		Title-Attorney-in-Fact		
Corporate seal		Corporate seal		
		Bond premium:	$	83,662.00

(Source: Amended at 35 Ill. Reg. 18867, effective October 24, 2011)

Section 807.APPENDIX A Financial Assurance Forms

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated. Not valid for Note, Loan, Letter of Credit, Currency Rate, Interest Rate or Residential Value Guarantees.

POWER OF ATTORNEY

Know All Persons By These Presents:

That the Arch Insurance Company, a corporation organized and existing under the laws of the State of Missouri, having its principal administrative office in Jersey City, New Jersey (hereinafter referred to as the "Company") does hereby appoint:

Alisa B. Ferris, Anna Childress, Jeffrey M. Wilson, Mark W. Edwards II, Richard H. Mitchell, Robert R. Freel and William M. Smith of Birmingham, AL (EACH)

R. E. Daniels and Shelby E. Daniels of Pensacola, FL (EACH)

its true and lawful Attorney(s)in-Fact, to make, execute, seal, and deliver from the date of issuance of this power for and on its behalf as surety, and as its act and deed:
Any and all bonds, undertakings, recognizances and other surety obligations, in the penal sum not exceeding Ninety Million Dollars ($90,000,000.00).
This authority does not permit the same obligation to be split into two or more bonds In order to bring each such bond within the dollar limit of authority as set forth herein.

The execution of such bonds, undertakings, recognizances and other surety obligations in pursuance of these presents shall be as binding upon the said Company as fully and amply to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal administrative office in Jersey City, New Jersey.

This Power of Attorney is executed by authority of resolutions adopted by unanimous consent of the Board of Directors of the Company on December 10, 2020, true and accurate copies of which are hereinafter set forth and are hereby certified to by the undersigned Secretary as being in full force and effect:
"**VOTED**, That the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, or the Secretary shall have the power and authority to appoint agents and attorneys-in-fact, and to authorize them subject to the limitations set forth in their respective powers of attorney, to execute on behalf of the Company, and attach the seal of the Company thereto, bonds, undertakings, recognizances and other surety obligations obligatory in the nature thereof, and any such officers of the Company may appoint agents for acceptance of process."

This Power of Attorney is signed, sealed and certified by facsimile under and by authority of the following resolution adopted by the unanimous consent of the Board of Directors of the Company on December 10, 2020:

VOTED, That the signature of the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, and the signature of the Secretary, the seal of the Company, and certifications by the Secretary, may be affixed by facsimile on any power of attorney or bond executed pursuant to the resolution adopted by the Board of Directors on December 10, 2020, and any such power so executed, sealed and certified with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding upon the Company. **In Testimony Whereof**, the Company has caused this instrument to be signed and its corporate seal to be affixed by their authorized officers, this **23rd day of April, 2021**.

Attested and Certified

Regan A. Shulman, Secretary

Arch Insurance Company Corporate Seal 1971 Missouri

Arch Insurance Company

Stephen C. Ruschak, Executive Vice President

STATE OF PENNSYLVANIA SS
COUNTY OF PHILADELPHIA SS

I, **Michele Tripodi**, a Notary Public, do hereby certify that Regan A. Shulman and Stephen C. Ruschak personally known to me to be the same persons whose names are respectively as Secretary and Executive Vice President of the Arch Insurance Company, a Corporation organized and existing under the laws of the State of Missouri, subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that they being thereunto duly authorized signed, sealed with the corporate seal and delivered the said instrument as the free and voluntary act of said corporation and as their own free and voluntary acts for the uses and purposes therein set forth.

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
MICHELE TRIPODI, Notary Public
City of Philadelphia, Phila. County
My Commission Expires July 31, 2021

Michele Tripodi, Notary Public
My commission expires 07/31/2021

CERTIFICATION

I, **Regan A. Shulman**, Secretary of the Arch Insurance Company, do hereby certify that the attached **Power of Attorney dated April 23, 2021** on behalf of the person(s) as listed above is a true and correct copy and that the same has been in full force and effect since the date thereof and is in full force and effect on the date of this certificate; and I do further certify that the said Stephen C. Ruschak, who executed the Power of Attorney as Executive Vice President, was on the date of execution of the attached Power of Attorney the duly elected Executive Vice President of the Arch Insurance Company.
IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the Arch Insurance Company on this 21st day of June, 20 21.

Regan A. Shulman, Secretary

This Power of Attorney limits the acts of those named therein to the bonds and undertakings specifically named therein and they have no authority to bind the Company except in the manner and to the extent herein stated.

PLEASE SEND ALL CLAIM INQUIRIES RELATING TO THIS BOND TO THE FOLLOWING ADDRESS:
Arch Insurance – Surety Division
3 Parkway, Suite 1500
Philadelphia, PA 19102

Arch Insurance Company Corporate Seal 1971 Missouri

***To verify the authenticity of this Power of Attorney, please contact Arch Insurance Company at* SuretyAuthentic@archinsurance.com**
Please refer to the above named Attorney-in-Fact and the details of the bond to which the power is attached.

ATTACHMENT 15
HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

MWG

Midwest Generation, LLC
Powerton Generating Station

2021 Hazard Potential Classification Assessment for Ash Surge Basin, Bypass Basin, & Former Ash Basin

Revision 0

October 14, 2021

Issue Purpose: Use

Project No.: 12661-122

55 East Monroe Street
Chicago, IL 60603-5780 USA
312-269-2000
www.sargentlundy.com

Sargent & Lundy

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

The Ash Surge Basin, Bypass Basin, and Former Ash Basin at Midwest Generation, LLC's (MWG) Powerton Generating Station ("Powerton" or the "Station") are existing coal combustion residual (CCR) surface impoundments that are regulated by the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in CCR Surface Impoundments." These regulations are codified in Part 845 to Title 35 of the Illinois Administrative Code (35 Ill. Adm. Code 845, Ref. 1) and are also referred to herein as the "Illinois CCR Rule." Pursuant to 35 Ill. Adm. Code 845.440(a)(1), MWG must conduct and complete a hazard potential classification assessment that assigns hazard potential classifications to the Ash Surge Basin, Bypass Basin, and Former Ash Basin in accordance with the hazard potential classifications defined in 35 Ill. Adm. Code 845.120.

The Ash Surge, Bypass, and Former Ash Basins are also regulated by the U.S. Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," 40 CFR Part 257 Subpart D (Ref. 2), also referred to herein as the "Federal CCR Rule." It should be noted that the Former Ash Basin is regulated under the Federal CCR Rule as an "inactive CCR surface impoundment," while it is regulated as an "existing CCR surface impoundment" under the Illinois CCR Rule. Pursuant to 40 CFR 257.73(f)(3), the Federal CCR Rule requires MWG to conduct and complete a hazard potential classification assessment in accordance with 40 CFR 257.73(a)(2) for the Ash Surge, Bypass, and Former Ash Basins every five years.

This report documents the 2021 hazard potential classification assessment conducted and completed in accordance with the Illinois and Federal CCR Rules by Sargent & Lundy (S&L) on behalf of MWG for the Ash Surge, Bypass, and Former Ash Basins at Powerton. This report:

- Lists the inputs and assumptions used in the 2021 hazard potential classification assessment,
- Discusses the methodology used to conduct the 2021 hazard potential classification assessment,
- Lists and compares the definitions for the hazard potential classifications for CCR surface impoundments promulgated by the Illinois and Federal CCR Rules,
- Summarizes the results from the initial hazard potential classification assessments completed for the Ash Surge, Bypass, and Former Ash Basins that were conducted in accordance with the Federal CCR Rule,
- Evaluates potential changes to the factors used as the bases for the initial federal hazard potential classifications assigned to the Ash Surge, Bypass, and Former Ash Basins to determine whether revised federal hazard potential classifications are warranted, and
- Provides the 2021 hazard potential classifications for the Ash Surge, Bypass, and Former Ash Basins in accordance with 35 Ill. Adm. Code 845.440(a)(1) and 40 CFR 257.73(a)(2).

1.2 SCOPE

Per the 2016 Water Infrastructure Improvements for the Nation (WIIN) Act, the Ash Surge, Bypass, and Former Ash Basins will continue to be subject to both the Illinois and Federal CCR Rules until the U.S. EPA approves the Illinois EPA's CCR permit program. The Illinois EPA has yet to publish a timeline for submitting its proposed CCR permit program to the U.S. EPA for approval, and so MWG must provide hazard potential classifications pursuant to both sets of regulations at this time.

2.0 INPUTS

Hazard Potential Classifications

The Illinois CCR Rule (Ref. 1, § 845.120) defines "hazard potential classification" as "the possible adverse incremental consequences that result from the release of water or stored contents due to failure of the diked CCR surface impoundment or mis-operation of the diked CCR surface impoundment or its appurtenances." The Illinois CCR Rule (Ref. 1, § 845.440(a)(1)) requires a CCR surface impoundment be designated as either a Class 1 CCR surface impoundment or a Class 2 CCR surface impoundment. Per 35 Ill. Adm. Code 845.120, the two Illinois hazard potential classifications are defined as follows:

- *Class 1 CCR surface impoundment* means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.
- *Class 2 CCR surface impoundment* means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

The Federal CCR Rule (Ref. 2, § 257.53) has the same definition for "hazard potential classification" as the Illinois CCR Rule. However, the Federal CCR Rule has three hazard potential classifications instead of the two designations promulgated by the Illinois CCR Rule. Per 40 CFR 257.53, the three federal hazard potential classifications are defined as follows:

- *High hazard potential CCR surface impoundment* means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.
- *Low hazard potential CCR surface impoundment* means a diked surface impoundment where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner's property.
- *Significant hazard potential CCR surface impoundment* means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Per the preceding sets of definitions for the federal and Illinois hazard potential classifications, a high hazard potential CCR surface impoundment per the Federal CCR Rule is the same as a Class 1 CCR surface impoundment per the Illinois CCR Rule. Similarly, a CCR surface impoundment that is classified as a low or significant hazard potential per the Federal CCR Rule is considered to be a Class 2 CCR surface impoundment per the Illinois CCR Rule.

Site Topography

Topographic data for the Ash Surge Basin, Bypass Basin, and surrounding areas was obtained from an aerial survey performed by Aero-Metric, Inc. in 2008 (Ref. 5). Topographic data for the Former Ash Basin and surrounding areas was obtained from a survey performed by Ridgeline Consultants in 2016 (Ref. 6).

Impacted Areas

Areas impacted by hypothetical failures at different breach points of the Ash Surge, Bypass, and Former Ash Basins were obtained from the basins' initial hazard potential classification assessments (Refs. 3 and 4), the dike breach analysis conducted in 2016 for the Ash Surge Basin's eastern dike (Ref. 7), and the dike breach inundation map prepared for the Ash Surge and Bypass Basins' Emergency Action Plan (Ref. 8). The inputs, assumptions, and methodology utilized to identify areas impacted by failures at each of the basins' dikes were evaluated to determine whether any updates to these analyses were warranted.

Appendix A provides the initial hazard potential classification assessment conducted by Geosyntec Consultants in 2016 for the Ash Surge and Bypass Basins. Meanwhile, Appendix B provides the initial hazard potential classification assessment conducted by Civil & Environmental Consultants, Inc. in 2018 for the Former Ash Basin.

Aerial Images

Historical and recent aerial images of the Station and surrounding areas were obtained from Google Earth Pro (Ref. 9).

Property Boundaries

Boundaries for the Station's property and adjacent properties were obtained from the geographic information system (GIS) for Tazewell County, Illinois (Ref. 10).

100-Year Floodway & Floodplain

Delineations for the floodway and floodplain for the 1% annual chance flood ("100-year flood") at and downstream from the Powerton site were obtained from the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) for the subject area (Ref. 11).

Ash Pond Conditions

The operating and physical conditions for the Ash Surge, Bypass, and Former Ash Basins were based on discussions with MWG personnel and on the annual inspection reports prepared for the three CCR surface impoundments in accordance with 40 CFR 257.83(b) (Refs. 12 through 21).

Illinois & Midland (I&M) Railroad

Information on the Illinois & Midland (I&M) Railroad, which is owned by Genesee & Wyoming, Inc. (G&W), was obtained from G&W's website for the railroad (Ref. 22), as well as information published on Union Pacific's website (Ref. 23).

3.0 ASSUMPTIONS

There are no assumptions in this document that require verification.

4.0 METHODOLOGY

The bases for the Ash Surge, Bypass, and Former Ash Basins' initial hazard potential classifications as documented within their respective initial hazard potential classification assessments were reviewed to determine if any changes have occurred since the initial assessments were completed. Identified changes were then evaluated to determine if the basins' previous hazard potential classifications warrant an adjustment. Where no changes were noted for a given input, or where identified changes were determined to have no impact to the results and conclusions of the initial hazard potential classification assessment, the previous evaluation of that input was considered to still be valid for this 2021 assessment.

In instances where changes to one or more factors used as the bases for the initial hazard potential classifications were identified (*e.g.*, downstream development that was not present in 2016), hypothetical dike breaches were considered at each of the three CCR surface impoundments to evaluate the impacts that a release of CCR and CCR wastewater would have on the identified factor(s). These hypothetical dike breaches were evaluated regardless of potential causes and/or apparent dike stability. When evaluating a hypothetical dike breach at a subject CCR surface impoundment, the solid waste materials in the given CCR surface impoundment were conservatively considered as an equivalent volume of liquid, and the CCR surface impoundment was assumed to be entirely filled with liquid.

When evaluating the downstream impacts from a hypothetical dike breach at a CCR surface impoundment, the first consideration examined was whether a loss of human life is probable under the given hypothetical failure scenario. Loss of human life is the critical aspect of a federal high hazard potential classification. If a loss of human life is unlikely to occur, then the CCR surface impoundment was not considered to be a federal high hazard potential. In that case, the next consideration examined was the extent of environmental and economic losses resulting from the hypothetical dike breach. If the losses are low and principally contained to MWG's property, then the CCR surface impoundment was considered to be a federal low hazard potential. If the environmental and/or economic losses extend beyond MWG's property, then the CCR surface impoundment was considered to be a federal significant hazard potential.

After assigning a federal hazard potential classification to each CCR surface impoundment, an Illinois CCR Rule hazard potential classification (either Class 1 or Class 2) was assigned based on the assigned federal hazard potential classification. An Illinois Class 1 hazard potential classification was assigned to a CCR surface impoundment if the basin was classified as a federal high hazard potential. Alternatively, the CCR surface impoundment was classified as an Illinois Class 2 hazard potential if the basin was classified as either a federal significant or low hazard potential.

5.0 ASSESSMENT

5.1 SUMMARY OF INITIAL HAZARD POTENTIAL CLASSIFICATION ASSESSMENTS

The initial hazard potential classification assessment for the Ash Surge and Bypass Basins was completed in October 2016 and is included in its entirety in Appendix A. This assessment evaluated the potential consequences of hypothetical dike failures for both basins. A quantitative dike breach analysis was also conducted for the southern portion of the Ash Surge Basin's east dike, which was determined to pose the most risk to human life amongst the eight dikes between the two basins. This 2016 dike breach analysis also assumed the Ash Surge Basin was at capacity at the time of the hypothetical failure. Ultimately, these 2016 assessments concluded that the worst-case, hypothetical failure at the Ash Surge and Bypass Basins would not result in a probable loss of human life due to the lack of occupied buildings near the CCR surface impoundments. However, it was determined that hypothetical failures at each of these two CCR surface impoundments could result in environmental damage to Lost Creek and the Illinois River. Therefore, the Ash Surge and Bypass Basins were classified as significant hazard potential CCR surface impoundments.

The initial hazard potential classification assessment for the Former Ash Basin was completed in April 2018 and is included in its entirety in Appendix B. This assessment evaluated the potential consequences of hypothetical dike failures at each of the exterior dikes for the basin's two impoundment areas, the North Pond and the South Pond. Potential dike failure scenarios were not considered for the South Pond because the pond's perimeter was determined to be effectively incised into the adjacent ground surface. Ultimately, the 2018 assessment concluded that a failure along the North Pond's perimeter dike would not result in a probable loss of human life but could cause wastewater to be released into the Illinois River. Consequently, the Former Ash Basin was classified as a significant hazard potential CCR surface impoundment.

5.2 CHANGES IN BASES FOR INITIAL HAZARD POTENTIAL CLASSIFICATIONS

5.2.1 CHANGES IN ASH POND OPERATIONS & EMBANKMENT GEOMETRY

In early October 2020, Powerton took the Bypass Basin out of service for routine cleaning. During a site visit in September 2021, it was noted that most of the CCR previously stored in the Bypass Basin had been removed and minimal surface water remained. MWG currently plans to retrofit the Bypass Basin with a new composite liner system and a new leachate collection and removal system. Retrofit construction activities will commence at the basin upon receipt of a retrofit construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule.

Powerton continues to operate the Ash Surge Basin to manage the Station's ash dewatering bin effluent and various non-CCR wastestreams in accordance with 40 CFR 257.103(f)(1). Operating conditions at this basin have not changed since the basin's initial hazard potential classification assessment was conducted in 2016.

Finally, the Former Ash Basin is regulated by the Federal CCR Rule as an inactive CCR surface impoundment and, therefore, is not used by the Station to manage any of Powerton's wastestreams. However, the basin still collects stormwater from direct precipitation and run-off from adjacent areas. During the basin's most recent annual inspection in July 2021 (Ref. 21), the volumes of water impounded in the North and South Ash Ponds were estimated to be at 9.7 acre-feet and 22.8 acre-feet, respectively.

Of the three CCR surface impoundments, only the operating conditions at the Bypass Basin have changed since the initial hazard potential classification assessments were completed for the three basins. As previously mentioned in Section 5.1, the Bypass Basin's 2016 hazard potential classification assessment examined hypothetical breach scenarios assuming the basin was at capacity; therefore, the assumed operating condition used for the initial assessment is conservative for the basin's current operating condition. Therefore, it is not necessary to reevaluate the surface water elevation used to conduct the initial hazard potential classification assessment for the Bypass Basin. Because the operating conditions at the Ash Surge and Former Ash Basins have not changed since their initial hazard potential classification assessments were completed, there is no basis to reevaluate the surface water elevations for this 2021 assessment.

Based on reviews of the annual inspection reports (Refs. 12 through 21) and Google Earth aerial images (Ref. 9), there have been no significant modifications to the Ash Surge, Bypass, and Former Ash Basins (mass excavations, major embankment modifications, *etc*.) since the initial hazard potential classification assessments were completed. Therefore, there is no basis to reevaluate the embankment geometry for this 2021 assessment.

5.2.2 CHANGES IN SITE TOPOGRAPHY

Based on reviews of the annual inspection reports (Refs. 12 through 21) and Google Earth aerial images (Ref. 9), there have been no significant modifications to the ground surfaces (mass excavations, mass fill placement, *etc*.) adjacent to the Ash Surge, Bypass, and Former Ash Basins or within the dike breach impact areas since the initial hazard potential classification assessments were completed. Therefore, the topographic data collected for the site in 2008 (Ref. 5) and 2016 (Ref. 6) remains valid for use in this 2021 assessment.

5.2.3 CHANGES IN DOWNSTREAM PROPERTY DEVELOPMENTS

Based on reviews of Google Earth aerial images (Ref. 9) and the Tazewell County, Illinois GIS (Ref. 10), no new buildings, roads, or rail lines have been constructed within the dike breach impact areas identified in the initial hazard potential classification assessments since assessments were conducted in 2016 and 2018. Thus, there is no basis to reevaluate the potential impacts to the areas downstream of the Ash Surge, Bypass, and Former Ash Basins for this 2021 assessment.

5.3 2021 HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

Other than the change in the operational status of the Bypass Basin, there have been no significant modifications to the Ash Surge, Bypass, and Former Ash Basins; no significant modifications to the topography adjacent to and downstream of the CCR surface impoundments; and no significant buildings, roads, or rail lines that have been constructed in the areas downstream of the CCR surface impoundments that would be impacted by a hypothetical dike breach. Therefore, the initial hazard potential classification assessments completed in 2016 and 2018 for these three CCR surface impoundments remain valid. In addition, the 2016 dike breach analysis for the southern portion of the Ash Surge Basin's eastern dike still represents the worst-case failure scenario for the Ash Surge and Bypass Basin dikes since the Ash Surge Basin has 18 times more storage capacity than the Bypass Basin (Ref. 16, Tables 1 and 2) and, at approximately 9-feet tall, the Ash Surge Basin's southern dike is the tallest of the basin's four dikes.

In addition to the lack of human-occupied buildings downstream of the CCR surface impoundments, it was further noted that the only transport corridors that would be impacted by a hypothetical failure at either of the Ash Surge, Bypass, and Former Ash Basins are the Station's coal yard rail loop between the Former Ash Basin's North and South Ponds and the I&M Railroad line southeast of the CCR surface impoundments. A review of publicly-available information on the I&M Railroad published by its owner, Genesee & Wyoming, Inc., and by Union Pacific indicated that trains traveling along the rail line predominately carry coal and agricultural commodities and do not provide public transportation services. Therefore, a loss of human life along the identified rail lines would be unlikely as a result of a hypothetical failure or mis-operation at the Ash Surge, Bypass, or Former Ash Basins.

Based on the preceding observations, the initial federal significant hazard potential classification assigned to the Ash Surge, Bypass, and Former Ash Basins in accordance with 40 CFR 257.73(a)(2) and the bases for these assignments remain valid for this 2021 assessment. A loss of human life is unlikely to result from a hypothetical failure at these three CCR surface impoundments, but potential offsite environmental damage could occur to Lost Creek and the Illinois River. As discussed in Section 2.0, a CCR surface impoundment classified as a significant hazard potential per the Federal CCR Rule is considered to be an Illinois Class 2 CCR surface impoundment. Therefore, the Ash Surge, Bypass, and Former Ash Basins were classified as Class 2 CCR surface impoundments pursuant to 35 Ill. Adm. Code 845.440(a)(1).

6.0 CONCLUSIONS

This evaluation reviewed the factors and design inputs used as the bases for the initial hazard potential classification assessments completed in accordance with the Federal CCR Rule for Powerton's Ash Surge, Bypass, and Former Ash Basins. It was determined that no significant operational or physical changes to the CCR surface impoundments and no new downstream developments have occurred within the last five years that would necessitate changing any of the basins' initial federal hazard potential classifications. Therefore, the initial federal hazard potential classifications assigned to the Ash Surge, Bypass, and Former Ash Basins and the bases for these assignments remain valid for 2021. These federal hazard potential classifications were then used to determine the hazard potential classifications pursuant to the Illinois CCR Rule based on the similarities between the Federal and Illinois CCR Rules' hazard potential classifications for CCR surface impoundments.

Table 6-1 presents the 2021 hazard potential classifications assigned to the Ash Surge, Bypass, and Former Ash Basins at Powerton in accordance with 35 Ill. Adm. Code 845.440(a)(1) and 40 CFR 257.73(a)(2).

Table 6-1 – 2021 Illinois & Federal Hazard Potential Classifications for the Ash Surge Basin, Bypass Basin, & Former Ash Basin at the Powerton Generating Station

CCR Surface Impoundment	Illinois Hazard Potential Classification	Federal Hazard Potential Classification
Ash Surge Basin	Class 2	Significant
Bypass Basin	Class 2	Significant
Former Ash Basin	Class 2	Significant

7.0 CERTIFICATION

I certify that:

- This hazard potential classification assessment was prepared by me or under my direct supervision.
- The work was conducted in accordance with the requirements of 35 Ill. Adm. Code 845.440 and with the requirements of 40 CFR 257.73(a)(2).
- I am a registered professional engineer under the laws of the State of Illinois.

Certified By: Thomas J. Dehlin   Date: October 14, 2021

Seal:

Th. Dehlin
10/14/2021
Exp. 11/30/2021

8.0 REFERENCES

1. Illinois Pollution Control Board. "Standards for Disposal of Coal Combustion Residuals in CCR Surface Impoundments." 35 Ill. Adm. Code 845. Accessed October 13, 2021.
2. U.S. Environmental Protection Agency. "Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments." 40 CFR Part 257 Subpart D. https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-257/subpart-D. Accessed October 13, 2021.
3. Geosyntec Consultants. "Hazard Potential Classification Assessment, Ash Surge and Bypass Basins, Powerton Station." October 2016.
4. Civil & Environmental Consultants, Inc. "Initial Hazard Potential Classification Assessment, Former Ash Basin, Powerton Station." April 2018.
5. Aero-Metric, Inc. Aerial Survey of Powerton Generating Station Dated June 19, 2008.
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16. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Ash Surge Basin and Ash Bypass Basin, Powerton Station." October 9, 2020.

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18. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Powerton Station - Former Ash Basin" July 13, 2018.

19. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Powerton Station - Former Ash Basin" July 29, 2019.

20. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Powerton Station - Former Ash Basin" July 10, 2020.

21. Civil & Environmental Consultants, Inc. "Annual Inspection Report, Powerton Station - Former Ash Basin" July 13, 2021.

22. Genesee & Wyoming, Inc. "Illinois & Midland Railroad (IMRR)." https://www.gwrr.com/imrr/. Accessed October 13, 2021.

23. Union Pacific. "Illinois & Midland Railway Company IMRR #61." https://www.up.com/customers/shortline/profiles_d-k/imrr/index.htm. Accessed October 13, 2021.

APPENDIX A: 2016 ASH SURGE BASIN & BYPASS BASIN HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

APPENDIX B: 2018 FORMER ASH BASIN HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

<u>ATTACHMENT 16</u>
<u>STRUCTURAL STABILITY ASSESSMENT</u>

MWG

Midwest Generation, LLC
Powerton Generating Station

2021 Structural Stability Assessment for Ash Surge Basin, Bypass Basin, & Former Ash Basin

Revision 0

October 14, 2021

Issue Purpose: Use

Project No.: 12661-122

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

The Ash Surge Basin, Bypass Basin, and Former Ash Basin at Midwest Generation, LLC's (MWG) Powerton Generating Station ("Powerton" or the "Station") are existing coal combustion residual (CCR) surface impoundments that are regulated by the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in CCR Surface Impoundments." These regulations are codified in Part 845 to Title 35 of the Illinois Administrative Code (35 Ill. Adm. Code 845, Ref. 1) and are also referred to herein as the "Illinois CCR Rule." Pursuant to 35 Ill. Adm. Code 845.450(a), MWG must conduct and complete a structural stability assessment that documents whether the design, construction, operation, and maintenance of the Ash Surge, Bypass, and Former Ash Basins are consistent with recognized and generally accepted engineering practices for the CCR surface impoundments' storage capacities.

The Ash Surge, Bypass, and Former Ash Basins are also regulated by the U.S. Environmental Protection Agency's (EPA) "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," 40 CFR Part 257 Subpart D (Ref. 2), also referred to herein as the "Federal CCR Rule." It should be noted that the Former Ash Basin is regulated under the Federal CCR Rule as an "inactive CCR surface impoundment," while it is regulated as an "existing CCR surface impoundment" under the Illinois CCR Rule. Pursuant to 40 CFR 257.73(f)(3), the Federal CCR Rule requires MWG to conduct and complete a structural stability assessment in accordance with 40 CFR 257.73(d) for the Ash Surge, Bypass, and Former Ash Basins every five years.

This report documents the 2021 structural stability assessment conducted and completed in accordance with the Illinois and Federal CCR Rules by Sargent & Lundy (S&L) on behalf of MWG for the Ash Surge, Bypass, and Former Ash Basins at Powerton.

1.2 SCOPE

Per the 2016 Water Infrastructure Improvements for the Nation (WIIN) Act, the Ash Surge, Bypass, and Former Ash Basins will continue to be subject to both the Illinois and Federal CCR Rules until the U.S. EPA approves the Illinois EPA's CCR permit program. The Illinois EPA has yet to publish a timeline for submitting its proposed CCR permit program to the U.S. EPA for approval, and so MWG must conduct structural stability assessments pursuant to both sets of regulations at this time.

2.0 ASSESSMENT

2.1 INPUTS & 2021 ASH POND CONDITIONS

The findings documented in this 2021 structural stability assessment for the Ash Surge, Bypass, and Former Ash Basins are based on visual observations made during a site visit by S&L on September 7, 2021; discussions with MWG personnel; historical and recent aerial images obtained from Google Earth Pro (Ref. 3); and the following documents:

- Initial structural stability assessment for the Ash Surge and Bypass Basins (Ref. 4),
- Annual inspection reports for the Ash Surge and Bypass Basins (Refs. 5 through 9),
- History of construction for the Ash Surge and Bypass Basins (Ref. 10),
- Initial structural stability assessment for the Former Ash Basin (Ref. 11),
- Annual inspection reports for the Former Ash Basin (Refs. 12 through 16), and
- History of construction for the Former Ash Basin (Ref. 17).

The initial structural stability assessment for the Ash Surge and Bypass Basins, which was completed in October 2016, is included in its entirety in Appendix A. The initial structural stability assessment for the Former Ash Basin, which was completed in April 2018, is included in its entirety in Appendix B.

In early October 2020, Powerton took the Bypass Basin out of service for routine cleaning. During the September 2021 site visit, it was noted that most of the CCR previously stored in the Bypass Basin had been removed and minimal surface water remained in the basin. MWG currently plans to retrofit the Bypass Basin with a new composite liner system and a new leachate collection and removal system (LCRS). Retrofit construction activities will commence at the basin upon receipt of a retrofit construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule.

Powerton continues to operate the Ash Surge Basin to manage the Station's ash dewatering bin effluent and various non-CCR wastestreams in accordance with 40 CFR 257.103(f)(1). Operating conditions at this basin have not changed since the basin's initial structural stability assessment was completed in 2016. MWG plans to either retrofit the Ash Surge Basin with a new composite liner system and a new LCRS or close and subsequently repurpose the basin as a new low volume waste basin. Finally, the Former Ash Basin is regulated by the Federal CCR Rule as an inactive CCR surface impoundment and, therefore, is not used by the Station to manage any of Powerton's wastestreams. However, the basin still collects stormwater from direct precipitation and run-off from adjacent areas. During the basin's most recent annual inspection in July 2021 (Ref. 16), the volumes of water impounded in the basin's North and South Ponds were estimated to be 9.7 acre-feet and 22.8 acre-feet, respectively.

2.2 ASH SURGE & BYPASS BASINS

2.2.1 STABLE FOUNDATIONS & ABUTMENTS

(35 Ill. Adm. Code 845.450(a)(1); 40 CFR 257.73(d)(1)(i))

The Ash Surge and Bypass Basins are comprised of earthen dikes on all sides and do not have any abutments. Detailed information on the soils supporting the Ash Surge and Bypass Basins' dikes is provided in the basins' initial structural stability assessment in Appendix A. Based on reviews of the basins' annual inspection reports (Refs. 5 through 9) and Google Earth aerial images (Ref. 3), there have been no significant modifications to Ash Surge and Bypass Basins' geometries since their initial structural stability assessment was completed. Therefore, the details of the soils supporting the Ash Surge and Bypass Basins' dikes and corresponding conclusions documented in the basins' initial structural stability assessment remain valid for this 2021 assessment (see Appendix A). Thus, the soils supporting the Ash Surge and Bypass Basins' dikes are considered to be stable for the maximum volume of CCR and CCR wastewater which can be impounded therein.

2.2.2 SLOPE PROTECTION

(35 Ill. Adm. Code 845.450(a)(2) & (4); 40 CFR 257.73(d)(1)(ii) & (iv))

The upstream slopes of the Ash Surge and Bypass Basins are lined with high-density polyethylene (HDPE) geomembrane. A layer of gravel has also been installed on a second geomembrane liner around the perimeter of the Ash Surge Basin near the crests of the basin's upstream slopes. These forms of cover protect the upstream slopes of the basins' dikes against surface erosion, wave action, and adverse effects of sudden (rapid) drawdown.

Slope protection for the downstream slopes of the Ash Surge and Bypass Basin consists of either the HDPE geomembrane liner of an adjacent surface impoundment or vegetative cover. Both forms of cover protect the downstream slopes of the basins' dikes against surface erosion, wave action, and adverse effects of sudden (rapid) drawdown. As of the date of this structural stability assessment, the vegetation along the Ash Surge Basin's downstream slopes is less than 12-inches tall and no woody vegetation is present. During the September 2021 site visit, vegetation greater than 12 inches and woody vegetation were observed along portions of the Bypass Basin's downstream slopes. In accordance with the Illinois CCR Rule (Ref. 1, §§ 845.430(b)(4) and 845.430(b)(5)), the Station should remove the woody vegetation and mow the areas where the height of vegetative cover exceeds 12 inches.

It should be noted that the Federal CCR Rule requirement that vegetation on slopes of dikes and surrounding areas not exceed a height of six inches (Ref. 2, § 257.73(d)(1)(iv)) was vacated by the U.S. Court of Appeals, District of Columbia Circuit after the provision was challenged following publication of the

Federal CCR Rule in April 2015. See *USWAG et al.* v. *EPA*, No. 15-1219 (D.C. Circ. 2015). The U.S. EPA has yet to finalize a rule that re-establishes federal limitations for the height of vegetation above the surfaces of CCR surface impoundment dikes.

2.2.3 DIKE COMPACTION

(35 Ill. Adm. Code 845.450(a)(3); 40 CFR 257.73(d)(1)(iii))

As documented in the Ash Surge and Bypass Basins' initial and 2021 safety factor assessments (Refs. 4 and 18), the basins' dikes are sufficiently compacted to withstand the range of loading conditions in the CCR surface impoundments.

2.2.4 SPILLWAYS

(35 Ill. Adm. Code 845.450(a)(5); 40 CFR 257.73(d)(1)(v))

The Ash Surge Basin has an emergency spillway structure located at the northeast corner of the basin. Similarly, the Bypass Basin has an emergency overflow riser pipe located at the northeast corner of the basin. However, as documented in the basins' 2021 inflow design flood control system plan (Ref. 19), both basins are capable of containing the design flood event (1000-year, 24-hour storm) without discharging water from their respective emergency spillway structures. Therefore, the capacities of these spillways were not evaluated for this 2021 assessment.

2.2.5 EMBEDDED HYDRAULIC STRUCTURES

(35 Ill. Adm. Code 845.450(a)(6); 40 CFR 257.73(d)(1)(vi))

There are four pipes that underlie or pass through the Ash Surge Basin's dikes that convey wastewater to or from the Ash Surge and Bypass Basins. Meanwhile the Bypass Basin has three discharge pipes that pass through the basin's dikes. The locations of these pipes are shown on Figure 2 of the basins' initial structural stability assessment in Appendix A. As documented in the initial assessment, visual surveillance of the pipes passing through the Ash Surge and Bypass Basins' dikes was performed in May 2016. No significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, or debris that may negatively affect the basins were identified during the surveillance program.

No similar pipe surveillance programs have been performed since the initial video camera inspection in June 2016. However, no visual signs of distress at the dike surfaces that could be indicative of deterioration, failure, deformation, *etc*. (*e.g.*, soft spots caused by leaking water, distortions in dike alignment) were observed during the September 2021 site visit. Moreover, since the Bypass Basin has been taken out of service and had minimal surface water remaining in it as of the September 2021 site visit, the Bypass Basin's pipes that pass through or underlie the Ash Surge and Bypass Basins' dikes are not expected to convey water again until the basin has been retrofitted with a new composite liner system and a new LCRS. Therefore, it is recommended that the Station conduct a visual surveillance program to confirm the Bypass Basin's discharge pipes are in good, working condition and are free of significant material defects that could impact the pipes' integrities as part of the retrofit construction activities for the basin. It is also recommended that the Station conduct a similar visual surveillance program for the Ash Surge Basin's discharge pipes prior to retrofitting the basin or repurposing it as a new low volume waste basin.

2.2.6 LOW POOL & RAPID DRAWDOWN STABILITY
(35 Ill. Adm. Code 845.450(a)(7); 40 CFR 257.73(d)(1)(vii))

As documented in the Ash Surge and Bypass Basins' initial safety factor assessment (Ref. 4), the results of which were revalidated in their 2021 safety factor assessment (Ref. 18), the structural stabilities of the basins' downstream slopes are maintained during low pool conditions at each of the basins that are adjacent to the Ash Surge and Bypass Basins. These basins are:

- Metal Cleaning Waste Basin,
- East Roof and Yard Runoff Basin,
- Limestone Basin, and
- Former Ash Basin.

The Ash Surge and Bypass Basins' initial safety factor assessment also concluded that the structural stabilities of the basins' downstream slopes are maintained during sudden (rapid) drawdown conditions at the East Roof and Yard Runoff Basin and the Former Ash Basin. Because the Metal Cleaning Waste Basin is lined with an HDPE geomembrane, a sudden (rapid) drawdown condition was determined to not be an applicable loading condition for the basins since the Metal Cleaning Waste Basin's liner precludes the infiltration of water into the Ash Surge and Bypass Basin dikes. A sudden (rapid) drawdown condition was also not evaluated in the Limestone Basin since the basin is not used as a part of Station operations, only contains minimal surface water (if any) from direct precipitation, and does not have an outlet structure that could create a sudden (rapid) drawdown condition for the Ash Surge Basin's eastern dike.

Based on reviews of the Ash Surge and Bypass Basins' annual inspection reports (Refs. 5 through 9) and Google Earth aerial images (Ref. 3), there have been no significant modifications to the Metal Cleaning Waste Basin, East Roof and Yard Runoff Basin, Limestone Basin, and Former Ash Basin since the Ash Surge and Bypass Basins' initial structural stability assessment was completed. Therefore, the conclusions documented therein regarding the stability of the basins' dikes during low pool and sudden (rapid) drawdown conditions (where applicable) at the identified basins remain valid for this 2021 assessment (see Appendix A).

2.3 FORMER ASH BASIN

2.3.1 STABLE FOUNDATIONS & ABUTMENTS

(35 Ill. Adm. Code 845.450(a)(1); 40 CFR 257.73(d)(1)(i))

The Former Ash Basin is comprised of one earthen dike along its northern edge (“northern dike”) and is effectively incised into the adjacent topography elsewhere. The basin does not have any abutments. Detailed information on the soils supporting the Former Ash Basin’s dike is provided in the basin’s initial structural stability assessment in Appendix B. Based on reviews of the basin’s annual inspection reports (Refs. 11 through 16) and Google Earth aerial images (Ref. 3), there have been no significant modifications to the Former Ash Basin’s geometry since its initial structural stability assessment was completed. Therefore, the details of the soils supporting the Former Ash Basin’s northern dike and corresponding conclusions documented in the basin’s initial structural stability assessment remain valid for this 2021 assessment (see Appendix A).

2.3.2 SLOPE PROTECTION

(35 Ill. Adm. Code 845.450(a)(2) & (4); 40 CFR 257.73(d)(1)(ii) & (iv))

Slope protection for the upstream slopes of the Former Ash Basin consists of vegetation which protects the basin’s interior slopes from surface erosion, wave action, and the adverse effects of sudden (rapid) drawdown. Similarly, the downstream slopes of the basin’s northern dike are vegetated which offers protection from surface erosion. It is unknown whether the established vegetation provides adequate protection from wave action during a flood event at the Illinois River and/or Lost Creek or from sudden (rapid) drawdown conditions.

During the September 2021 site visit, vegetation greater than 12 inches was observed along portions of the pond’s interior slopes and the northern dike’s downstream slopes. Very dense, woody vegetation was also prevalent within the basin and along its slopes due to how long the basin has been inactive.

2.3.3 DIKE COMPACTION

(35 Ill. Adm. Code 845.450(a)(3); 40 CFR 257.73(d)(1)(iii))

As documented in the Former Ash Basin’s initial and 2021 safety factor assessments (Refs. 20 and 18), an engineering analysis to calculate the safety factors for the basin’s northern dike could not be performed given the lack of necessary information due to the construction age of the basin. Therefore, it is unknown whether the basin’s northern dike was sufficiently compacted to withstand the range of loading conditions in the CCR surface impoundment.

2.3.4 SPILLWAYS

(35 Ill. Adm. Code 845.450(a)(5); 40 CFR 257.73(d)(1)(v))

The Former Ash Basin does not have spillways. As documented in the basin's 2021 inflow design flood control system plan (Ref. 19), the basin is capable of containing the design flood event (1000-year, 24-hour storm) without a spillway.

2.3.5 EMBEDDED HYDRAULIC STRUCTURES

(35 Ill. Adm. Code 845.450(a)(6); 40 CFR 257.73(d)(1)(vi))

No hydraulic structures are known to underlie the base of the Former Ash Basin or pass through the basin's northern dike.

2.3.6 LOW POOL & RAPID DRAWDOWN STABILITY

(35 Ill. Adm. Code 845.450(a)(7); 40 CFR 257.73(d)(1)(vii))

As previously stated, an engineering analysis to calculate the safety factors for the Former Ash Basin's northern dike could not be performed given the lack of necessary information due to the construction age of the basin. Therefore, it is unknown whether the basin's northern dike was designed and constructed to maintain structural stability during low pool and sudden (rapid) drawdown conditions when inundated by flooding at the Illinois River and/or Lost Creek.

3.0 RECOMMENDED CORRECTIVE MEASURES

(35 Ill. Adm. Code 845.450(b)(1); 40 CFR 257.73(d)(1)(2))

Based on the findings documented in this 2021 structural stability assessment, the following corrective measures are recommended for the Ash Surge and Bypass Basins:

- Mow vegetation that is greater than 12-inches tall along the Bypass Basin's downstream slopes,
- Remove woody vegetation near the Bypass Basin in accordance with 35 Ill. Adm. Code 845.430(b)(4),
- Conduct a visual surveillance program to verify that the Bypass Basin's discharge pipes are in good, working condition and are free of significant material defects that could compromise the pipes' integrities during retrofit construction activities for the Bypass Basin, and
- Conduct a visual surveillance program to verify that the Ash Surge Basin's discharge pipes are in good, working condition and are free of significant material defects that could compromise the pipes' integrities prior to retrofitting the basin or repurposing it as a new low volume waste basin.

Given the noted deficiencies in available information for the Former Ash Basin which preclude verifying the basin's northern dike has adequate slope protection, material compaction, and stability, it is unknown whether the Former Ash Basin was designed and constructed in accordance with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded therein. Consequently, it is recommended that the Station continue with its plans to close the Former Ash Basin in accordance with the closure criteria promulgated by the Illinois and Federal CCR Rules.

4.0 CERTIFICATION

I certify that:

- This structural stability assessment was prepared by me or under my direct supervision.
- The work was conducted in accordance with the requirements of 35 Ill. Adm. Code 845.450 and with the requirements of 40 CFR 257.73(d).
- I am a registered professional engineer under the laws of the State of Illinois.

Certified By: Thomas J. Dehlin   Date: October 14, 2021

Seal:

LICENSED PROFESSIONAL ENGINEER
THOMAS J DEHLIN
062-069314
OF ILLINOIS

Th. Dehlin
10/14/2021
Exp. 11/30/2021

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APPENDIX A: 2016 ASH SURGE & BYPASS BASINS STRUCTURAL STABILITY ASSESSMENT

APPENDIX B: 2018 FORMER ASH BASIN STRUCTURAL STABILITY ASSESSMENT

ATTACHMENT 17
SAFETY FACTOR ASSESSMENT

MWG

Midwest Generation, LLC
Powerton Generating Station

2021 Safety Factor Assessment for Ash Surge Basin, Bypass Basin, & Former Ash Basin

Revision 0

October 15, 2021

Issue Purpose: Use

Project No.: 12661-122

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

The Ash Surge Basin, Bypass Basin, and Former Ash Basin (the Basins) at Midwest Generation, LLC's (MWG) Powerton Generating Station ("Powerton" or the "Station") are existing coal combustion residual (CCR) surface impoundments that are regulated by the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in CCR Surface Impoundments." These regulations are codified in Part 845 to Title 35 of the Illinois Administrative Code (35 Ill. Adm. Code 845, Ref. 1) and are also referred to herein as the "Illinois CCR Rule." Pursuant to 35 Ill. Adm. Code 845.460(a), MWG must conduct and complete a safety factor assessment that documents whether the critical cross section at each of the Basins achieves the minimum safety factors specified in 35 Ill. Adm. Code 845.460(a).

The Ash Surge, Bypass, and Former Ash Basins at Powerton are also regulated by the U.S. Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," 40 CFR Part 257 Subpart D (Ref. 2), also referred to herein as the "Federal CCR Rule." It should be noted that the Former Ash Basin is regulated under the Federal CCR Rule as an "inactive CCR surface impoundment," while it is regulated as an "existing CCR surface impoundment" under the Illinois CCR Rule. Pursuant to 40 CFR 257.73(f)(3), the Federal CCR Rule requires MWG to conduct and complete a safety factor assessment in accordance with 40 CFR 257.73(e) for the Basins every five years.

This report documents the 2021 safety factor assessment conducted and completed in accordance with the Illinois and Federal CCR Rules by Sargent & Lundy (S&L) on behalf of MWG for the Ash Surge, Bypass, and Former Ash Basins at Powerton. This report:

- Lists the inputs and assumptions used in the 2021 safety factor assessment,
- Discusses the methodology used to conduct the 2021 safety factor assessment,
- Lists and compares the safety factor acceptance criteria for CCR surface impoundments promulgated by the Illinois and Federal CCR Rules,
- Summarizes the results from the initial safety factor assessments completed for the Basins that were conducted in accordance with the Federal CCR Rule,
- Evaluates potential changes to the inputs used in the initial safety factor assessments to determine whether new or updated liquefaction and/or structural stability analyses are warranted, and
- Provides the 2021 factors of safety for the Ash Surge, Bypass, and Former Ash Basins in accordance with 35 Ill. Adm. Code 845.460(a) and 40 CFR 257.73(e).

1.2 SCOPE

Per the 2016 Water Infrastructure Improvements for the Nation (WIIN) Act, the Ash Surge, Bypass, and Former Ash Basins will continue to be subject to both the Illinois and Federal CCR Rules until the U.S. EPA approves the Illinois EPA's CCR permit program. The Illinois EPA has yet to publish a timeline for submitting its proposed CCR permit program to the U.S. EPA for approval, and so MWG must conduct safety factor assessments pursuant to both sets of regulations at this time.

2.0 INPUTS

Safety Factor Acceptance Criteria for CCR Surface Impoundments

The Illinois CCR Rule (Ref. 1, § 845.460) requires each existing CCR surface impoundment to achieve four minimum safety factors at the impoundment's critical cross section, which is defined by the Illinois CCR Rule as "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 Federal CCR Rule (Ref. 2, § 257.73(e)) has the same safety factor acceptance criteria as the Illinois CCR Rule. Table 2-1 presents the safety factor acceptance criteria promulgated by both sets of regulations for existing CCR surface impoundments.

Table 2-1 – Safety Factor Acceptance Criteria for Existing CCR Surface Impoundments

Loading Condition	Minimum Allowable Factor of Safety	Illinois CCR Rule Reference	Federal CCR Rule Reference
Long-Term, Maximum Storage Pool	1.50	§ 845.460(a)(2)	§ 257.73(e)(1)(i)
Maximum Surcharge Pool	1.40	§ 845.460(a)(3)	§ 257.73(e)(1)(ii)
Seismic	1.00	§ 845.460(a)(4)	§ 257.73(e)(1)(iii)
Liquefaction	1.20	§ 845.460(a)(5)	§ 257.73(e)(1)(iv)

Initial Safety Factor Assessments

Appendix A provides the initial safety factor assessment conducted by Geosyntec Consultants in 2016 for the Ash Surge Basin and the Bypass Basin (Ref. 3). The inputs, assumptions, and methodology utilized in the Ash Surge and Bypass Basins' initial safety factor assessment were evaluated to determine whether any updates to the analysis was warranted.

Appendix B provides the initial safety factor assessment conducted by Geosyntec Consultants in 2018 for the Former Ash Basin (Ref. 4). The 2018 assessment for the Former Ash Basin concluded that an engineering analysis to calculate the safety factors for the basin could not be performed given the lack of necessary information due to the construction age of the basin. Since the minimum safety factors of the Former Ash Basin could not be demonstrated, MWG is closing the Former Ash Basin in accordance with 40 CFR 257.102. Consequently, the inputs, assumptions, and methodology utilized in the Former Ash Basin's initial safety factor assessment were not evaluated.

Site Topography

Topographic data for the Ash Surge Basin, Bypass Basin, and surrounding areas was obtained from an aerial survey performed by Aero-Metric, Inc. in 2008 (Ref. 5).

Groundwater

Groundwater data for the Ash Surge Basin, Bypass Basin, and surrounding areas was obtained from annual groundwater monitoring reports prepared by KPRG and Associates, Inc. for the CCR surface impoundments in accordance with 40 CFR 257.90(e) (Refs. 18 through 21).

Aerial Images

Historical and recent aerial images of the Basins and adjacent areas were obtained from Google Earth Pro (Ref. 6).

Ash Pond Conditions

The operating and physical conditions for the Ash Surge and Bypass Basins were based on discussions with MWG personnel and on the annual inspection reports prepared for the two CCR surface impoundments in accordance with 40 CFR 257.83(b) (Refs. 8 through 11).

Horizontal Seismic Coefficient

Pursuant to 35 Ill. Adm. Code 845.460(a)(4) and 40 CFR 257.73(e)(1)(iii), the Basins must have a minimum factor of safety of 1.00 when analyzed under a seismic loading condition. This loading condition is represented by a horizontal seismic coefficient that is based on a peak ground acceleration (PGA) with a 2 percent probability of exceedance in 50 years in accordance with the definition of "[m]aximum horizontal acceleration in lithified earth material" promulgated by 35 Ill. Adm. Code 845.120 and 40 CFR 257.53. The design horizontal seismic coefficient is also based on the mapped spectral response acceleration at a period of 1 second (S_1) and on a site correction factor (F_v) that accounts for the impacts of site-specific soil conditions on the mapped PGA and spectral response acceleration. Table 2-2 presents the seismic response parameters obtained from ASCE 7-16 (Ref. 16) on which the Basins' seismic loading condition was based.

Table 2-2 – Horizontal Seismic Coefficient Inputs

Parameter	Symbol	Value
Peak Ground Acceleration	PGA	0.104
Mapped Spectral Response, 1-Second Period	S_1	0.079
Site Correction Factor for 1-Second Period	F_v	2.4

3.0 ASSUMPTIONS

There are no assumptions in this document that require verification.

4.0 METHODOLOGY

The inputs for the Ash Surge and Bypass Basins' initial safety factor assessment were reviewed to determine if any changes have occurred since the initial assessment was completed. Identified changes were then evaluated to determine if updates to the basins' previous structural stability and/or liquefaction analyses were warranted. Where no changes were noted for a given input, or where identified changes were determined to have no impact to the results and conclusions of the initial safety factor assessment, the previous evaluation of that input was considered to still be valid.

5.0 ASSESSMENT

5.1 SUMMARY OF INITIAL SAFETY FACTOR ASSESSMENTS

The initial safety factor assessment for the Ash Surge and Bypass Basins was completed in October 2016 and is included in its entirety in Appendix A. The results of this assessment indicated that the critical cross-sections for these basins are stable and meet the factor of safety requirements presented in 40 CFR 257.73(e)(1)(i) through 257.73(e)(1)(iv). Because the Illinois and Federal CCR Rules have the same safety factor acceptance criteria, it is noted that the factors of safety calculated in the initial safety factor assessment also comply with the factor of safety requirements promulgated under 35 Ill. Adm. Code 845.460(a)(2) through 845.460(a)(5).

5.2 CHANGES IN BASES FOR INITIAL FACTORS OF SAFETY

The following subsections summarize the evaluation conducted to determine if changes to the design inputs used in the Ash Surge and Bypass Basins' initial safety factor assessment have occurred since the assessment was completed, and to determine whether the initial structural stability and liquefaction analyses can be accepted as-is for this 2021 assessment or if further analysis is required.

5.2.1 CHANGES IN GEOTECHNICAL DATA

Based on reviews of the annual inspection reports (Refs. 7 through 11) and Google Earth aerial images (Ref. 6), there have been no changes to the embankments or underlying soils that would require updating the geotechnical parameters used in the 2016 analysis (Ref. 3).

5.2.2 CHANGES IN TOPOGRAPHY ADJACENT TO ASH PONDS

Based on reviews of the annual inspection reports (Refs. 7 through 11) and Google Earth aerial images (Ref. 6), there have been no significant modifications to the ground surfaces adjacent to the Ash Surge and Bypass Basins (mass excavations, mass fill placement, *etc.*) since the initial safety factor assessment was completed. Therefore, the topographic data collected for the site in 2008 (Ref. 5) remains valid for use in this 2021 assessment.

5.2.3 CHANGES IN GROUNDWATER TABLE

Based on reviews of the annual groundwater monitoring and corrective action reports for the Ash Surge and Bypass Basins (Refs. 18 through 21), no significant variations in the groundwater were noted. Because these two CCR surface impoundments are lined with a geomembrane, the embankments are not hydraulically connected to the water levels within the Basins, and a typical phreatic surface normally associated with seepage through an earthen embankment is not applicable. The reported static groundwater elevation is valid for this analysis, and there have been no significant changes in the surface water conditions near the site that would impact the site's groundwater levels.

5.2.4 CHANGES IN EMBANKMENT GEOMETRY

Based on reviews of the annual inspection reports (Refs. 8 through 11), Google Earth aerial images (Ref. 6), and visual observations made in September 2021, there have been no significant modifications to the embankments for the Ash Surge Basin and Bypass Basin since the initial safety factor assessments were completed. Therefore, there is no basis to reevaluate the embankment geometry of the Basins for this 2021 assessment.

5.2.5 CHANGES IN EARTHQUAKE DESIGN BASIS

The design horizontal seismic coefficient utilized in the existing technical analysis (Ref. 3) is based on published data in ASCE 7-10 (Ref. 18). Since developing the technical analysis, an updated publication of the reference material has been produced (ASCE 7-16 (Ref. 17)), which provides updated values for the parameters used to determine the design horizontal seismic coefficient (see Tables 2-2 and 5-1). Based on the reduction in the site seismic loading parameters from ASCE 7-10 to ASCE 7-16, the horizontal seismic coefficient for the Basins' seismic loading condition will be less than the value used in the initial safety factor assessment. Therefore, the horizontal seismic coefficient used for the 2016 analysis is conservative. Thus, it is not necessary to change the earthquake design basis used to conduct the initial safety factor assessment for the Basins.

Table 5-1 – Seismic Loading Parameters Comparison

Parameter	Symbol	2016 Values per ASCE 7-10	2021 Values per ASCE 7-16
Peak Ground Acceleration	PGA	0.11	0.104
Mapped Spectral Response, 1-Second Period	S_1	0.083	0.079
Site Correction Factor for 1-Second Period	F_v	2.4	2.4

5.2.6 CHANGES IN ASH POND OPERATIONS

In early October 2020, Powerton took the Bypass Basin out of service for routine cleaning. During a site visit in September 2021 conducted by S&L, it was noted that most of the CCR previously stored in the Bypass Basin had been removed and minimal surface water remained. MWG currently plans to retrofit the Bypass Basin with a new composite liner system and a new leachate collection and removal system (LCRS). Retrofit construction activities will commence at the basin upon receipt of a retrofit construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule. Meanwhile, Powerton continues to operate the Ash Surge Basin to manage the Station's ash dewatering bin effluent and various non-CCR wastestreams in accordance with 40 CFR 257.103(f)(1). Operating conditions at this basin have not changed since the basin's initial safety factor assessment was conducted in 2016.

Of the two CCR surface impoundments, only the operating conditions at the Bypass Basin have changed since the initial safety factor assessment was completed for the Ash Surge and Bypass Basins. The decrease in surface water elevation in the Bypass Basin decreases the driving forces in the embankment; therefore, the surface water elevation used for the 2016 analysis is conservative for the basin's current operating condition. Because the operating conditions at the Ash Surge Basin have not changed since the initial hazard potential classification assessment was completed, the 2016 structural stability analysis for the basin remains valid. Therefore, there is no basis to reevaluate the surface water elevations used to conduct the initial safety factor assessment for the Ash Surge and Bypass Basins.

6.0 2021 SAFETY FACTOR ASSESSMENT CONCLUSIONS

6.1.1 ASH SURGE & BYPASS BASINS

The initial safety factor analyses for the Ash Surge and Bypass Basins (Ref. 3) were reviewed and validated for compliance with Illinois and Federal CCR Rules' safety factor acceptance criteria for existing CCR surface impoundments. No changes that would invalidate the conclusions of the initial safety factor assessment for the Ash Surge Basin and Bypass Basin or its supporting calculations were identified in reviews of available information and reports completed for the CCR surface impoundments since the initial assessment was completed in 2016. Therefore, the results reported in the initial safety factor assessment for the Ash Surge and Bypass Basins remain valid for this 2021 assessment.

Table 6-1 presents the 2021 factors of safety for the Ash Surge Basin and Bypass Basin as determined in accordance with 35 Ill. Adm. Code 845.460(a) and 40 CFR 257.73(e).

Table 6-1 – 2021 Illinois & Federal CCR Rule Factors of Safety for the Ash Surge Basin and Bypass Basin at the Powerton Generating Station

Loading Condition	Ash Surge Basin	Bypass Basin	Min. Allowable Factor of Safety
Long-Term, Maximum Storage Pool	≥ 1.50	≥ 1.50	**1.50**
Maximum Surcharge Pool	≥ 1.40	≥ 1.40	**1.40**
Seismic	≥ 1.00	≥ 1.00	**1.00**
Liquefaction	Note 1	Note 1	**1.20**

Notes: 1) The embankment soils for the Basins are not considered susceptible to liquefaction because saturation of the embankment soils is unlikely based on the installed geomembrane liner system. A limited portion of the bottom of the embankments may become saturated with groundwater based on the design phreatic surface. Liquefaction triggering analyses of these saturated soils show that liquefaction and associated post-liquefaction shear strength loss is unlikely for the design seismic event (Ref. 3). Thus, liquefaction safety factors are not reported.

6.1.2 FORMER ASH SURGE BASIN

The initial safety factor assessment completed for the Former Ash Basin in 2018 (Ref. 4) concluded that an engineering analysis to calculate the safety factors for the basin could not be performed given the lack of necessary information due to the construction age of the Former Ash Basin. Since the minimum safety factors of the Former Ash Basin could not be demonstrated, MWG is closing the Former Ash Basin in accordance with 40 CFR 257.102. Closure of the Former Ash Basin will also comply with the requirements promulgated under 35 Ill. Adm. Code Part 845 Subpart G.

7.0 CERTIFICATION

I certify that:

- This safety factor assessment was prepared by me or under my direct supervision.
- The work was conducted in accordance with the requirements of 35 Ill. Adm. Code 845.460 and with the requirements of 40 CFR 257.73(e).
- I am a registered professional engineer under the laws of the State of Illinois.

Certified By: Thomas J. Dehlin Date: October 15, 2021

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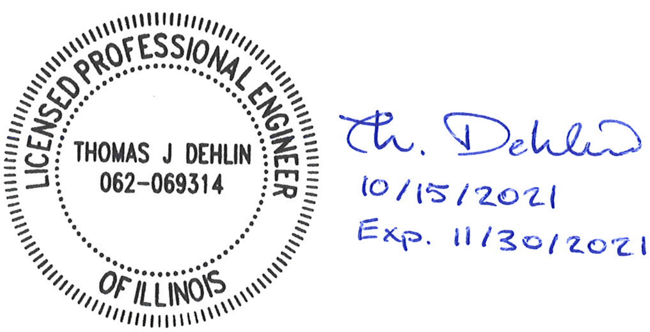

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APPENDIX A: 2016 ASH SURGE BASIN & BYPASS BASIN SAFETY FACTOR ASSESSMENT

APPENDIX B: 2018 FORMER ASH BASIN SAFETY FACTOR ASSESSMENT

ATTACHMENT 18
INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

MWG

Midwest Generation, LLC
Powerton Generating Station

2021 Inflow Design Flood Control System Plan for Ash Surge Basin, Bypass Basin, & Former Ash Basin

Revision 0

October 14, 2021

Issue Purpose: Use

Project No.: 12661-122

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

The Ash Surge Basin, Bypass Basin, and Former Ash Basin at Midwest Generation, LLC's (MWG) Powerton Generating Station ("Powerton" or the "Station") are existing coal combustion residual (CCR) surface impoundments that are regulated by the Illinois Pollution Control Board's "Standards for the Disposal of Coal Combustion Residuals in CCR Surface Impoundments." These regulations are codified in Part 845 to Title 35 of the Illinois Administrative Code (35 Ill. Adm. Code 845, Ref. 1) and are also referred to herein as the "Illinois CCR Rule." Pursuant to 35 Ill. Adm. Code 845.510(c)(1), MWG must prepare an inflow design flood control system plan that documents how the inflow design flood control systems for the Ash Surge, Bypass, and Former Ash Basins have been designed and constructed to meet the hydrologic and hydraulic capacity requirements for CCR surface impoundments promulgated by 35 Ill. Adm. Code 845.510.

The Ash Surge, Bypass, and Former Ash Basins are also regulated by the U.S. Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," 40 CFR Part 257 Subpart D (Ref. 2), also referred to herein as the "Federal CCR Rule." It should be noted that the Former Ash Basin is regulated under the Federal CCR Rule as an "inactive CCR surface impoundment," while it is regulated as an "existing CCR surface impoundment" under the Illinois CCR Rule. Pursuant to 40 CFR 257.82(c)(4), the Federal CCR Rule requires MWG to prepare a periodic inflow design flood control system plan in accordance with 40 CFR 257.82(c)(1) for the Ash Surge, Bypass, and Former Ash Basins every five years.

This report documents the 2021 inflow design flood control system plan prepared in accordance with the Illinois and Federal CCR Rules by Sargent & Lundy (S&L) on behalf of MWG for the Ash Surge, Bypass, and Former Ash Basins at Powerton. This report:

- Lists the inputs and assumptions used to determine whether the Ash Surge, Bypass, and Former Ash Basins can manage the inflow design flood,
- Discusses the methodology used to determine whether the Ash Surge, Bypass, and Former Ash Basins can manage the inflow design flood,
- Evaluates potential changes to the design inputs used in the initial hydrologic and hydraulic assessments completed for the Ash Surge, Bypass, and Former Ash Basins that were conducted in accordance with the Federal CCR Rule, and
- Summarizes the results of the hydrologic and hydraulic calculations performed to support the conclusions of whether the Ash Surge, Bypass, and Former Ash Basins meet the hydrologic and hydraulic requirements for CCR surface impoundments promulgated by both the Federal and Illinois CCR Rules.

1.2 SCOPE

Per the 2016 Water Infrastructure Improvements for the Nation (WIIN) Act, the Ash Surge, Bypass, and Former Ash Basins will continue to be subject to both the Illinois and Federal CCR Rules until the U.S. EPA approves the Illinois EPA's CCR permit program. The Illinois EPA has yet to publish a timeline for submitting its proposed CCR permit program to the U.S. EPA for approval, and so MWG must prepare an inflow design flood control system plan pursuant to both sets of regulations at this time.

2.0 INPUTS

Inflow Design Flood Control Systems

The inflow design flood control systems for the Ash Surge and Bypass Basins are documented in the basins' initial inflow design flood control system plan, which was prepared by Geosyntec Consultants in October 2016 (Ref. 3). This plan is provided in its entirety in Appendix A.

The inflow design flood control system for the Former Ash Basin is documented in the basin's initial inflow design flood control system plan, which was prepared by Geosyntec Consultants in May 2018 (Ref. 4). This plan is provided in its entirety in Appendix B.

Inflow Design Flood Event

Per their 2021 hazard potential classification assessment (Ref. 5), the Ash Surge, Bypass, and Former Ash Basins are classified as Class 2 CCR surface impoundments pursuant to 35 Ill. Adm. Code 845.440(a)(1) and as significant hazard potential CCR surface impoundments pursuant to 40 CFR 257.73(a)(2). Therefore, the inflow design flood event used in this hydrologic and hydraulic assessment of the Ash Surge, Bypass, and Former Ash Basins was based on the 1,000-year storm (Ref. 1, § 845.510(a)(3); Ref. 2, § 257.82(a)(3)). Per the National Oceanic and Atmospheric Administration's Atlas 14 (Ref. 6), the precipitation depth for the 1,000-year, 24-hour storm event at the Powerton site is 9.00 inches.

Site Topography

Topographic data for the Ash Surge Basin, Bypass Basin, and surrounding areas was obtained from an aerial survey performed by Aero-Metric, Inc. in 2008 (Ref. 7). Topographic data for the Former Ash Basin and surrounding areas was obtained from a survey performed by Ridgeline Consultants in 2016 (Ref. 8).

Aerial Images

Historical and recent aerial images of the Station and surrounding areas were obtained from Google Earth Pro (Ref. 9).

Ash Pond Conditions

The operating and physical conditions for the Ash Surge, Bypass, and Former Ash Basins were based on discussions with MWG personnel, the histories of construction prepared for the CCR surface impoundments in accordance with 40 CFR 257.73(c) (Refs. 10 and 11), and the annual inspection reports prepared for the CCR surface impoundments in accordance with 40 CFR 257.83(b) (Refs. 12 through 21).

3.0 ASSUMPTIONS

There are no assumptions in this document that require verification.

4.0 HYDROLOGIC & HYDRAULIC ASSESSMENT

4.1 CHANGES SINCE INITIAL INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

4.1.1 CHANGES IN ASH POND OPERATIONS

In early October 2020, Powerton took the Bypass Basin out of service for routine cleaning. During a site visit in September 2021, it was noted that most of the CCR previously stored in the Bypass Basin had been removed and minimal surface water remained. MWG currently plans to retrofit the Bypass Basin with a new composite liner system and a new leachate collection and removal system (LCRS). Retrofit construction activities will commence at the basin upon receipt of a retrofit construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule.

Powerton continues to operate the Ash Surge Basin in accordance with 40 CFR 257.103(f)(1) to manage the Station's ash dewatering bin effluent and various non-CCR wastestreams. Operating conditions at this basin have not changed since the basin's initial inflow design flood control system plan was completed in 2016. Finally, the Former Ash Basin is regulated by the Federal CCR Rule as an inactive CCR surface impoundment and, therefore, is not used by the Station to manage any of Powerton's wastestreams. However, the basin still collects stormwater from direct precipitation and run-off from adjacent areas. During the basin's most recent annual inspection in July 2021 (Ref. 21), the surface water elevation in the basin's North and South Ash Ponds was estimated to be at approximately EL. 444 feet.

Based on reviews of the annual inspection reports (Refs. 12 through 21) and Google Earth aerial images (Ref. 9), there have been no significant modifications to the Ash Surge, Bypass, and Former Ash Basins (mass excavations, major embankment modifications, *etc*.) since the basins' initial inflow design flood control system plans were completed. Therefore, there is no basis to reevaluate the basins' embankment geometry for this 2021 assessment.

4.1.2 CHANGES IN ASH POND TOPOGRAPHY

Based on reviews of the annual inspection reports (Refs. 12 through 21) and Google Earth aerial images (Ref. 9), there have been no significant modifications to the Ash Surge, Bypass, and Former Ash Basins' embankments (mass excavations, mass fill placement, *etc*.) since the basins' initial inflow design flood control system plans were completed. Therefore, the topographic data collected for the site in 2008 and 2016 (Refs. 7 and 8) and the area-capacity curves documented in the basins' histories of construction (Refs. 10 and 11) remain valid for use in this 2021 assessment.

4.2 METHODOLOGY

PondPack (Ref. 22) was used to analyze abilities of the Ash Surge and Bypass Basins to manage direct precipitation and stormwater run-on from the 1000-year, 24-hour storm event. The analysis evaluated whether the Ash Surge and Bypass Basins could contain the inflow design flood without surface water overflowing into their emergency spillway structures at EL. 466.00 feet and EL. 466.75 feet, respectively. The surface water elevations in the basins at the time of the design storm event was assumed to be at their maximum design operating levels: EL. 465.00 feet and EL. 465.50 feet, respectively. This initial surface water elevation for the Bypass Basin is conservative since, as previously mentioned, most of the CCR previously stored in the basin has been removed, minimal surface water remains, and MWG plans to retrofit the basin with a new composite liner system and a new LCRS. Finally, the time of concentration for this hydrologic and hydraulic assessment was assumed to be 5 minutes in accordance with the minimum time of concentration recommended in the U.S. Department of Agriculture's (USDA) Technical Release No. 55 (TR-55), *Urban Hydrology for Small Watersheds* (Ref. 23).

PondPack was also used to analyze the Former Ash Basin's ability to manage direct precipitation and stormwater run-on from the 1000-year, 24-hour storm event. The analysis evaluated whether the basin's North and South Ponds could contain the inflow design flood without surface water overtopping the ponds' embankments, which have approximate crest elevations of EL. 455.00 feet and EL. 458.00 feet, respectively. The surface water elevation in the ponds at the time of the design storm event was assumed to be at EL. 450.00 feet, which is four feet higher than the maximum surface water elevation recorded in the basin's annual inspection reports (Refs. 17 through 21). Similar to the hydrologic and hydraulic assessment conducted for the Ash Surge and Bypass Basins, the time of concentration was assumed to be 5 minutes in accordance with the minimum time of concentration recommended in the USDA's TR-55 (Ref. 23).

4.3 RESULTS

Table 4-1 summarizes the results from the hydrologic and hydraulic calculations performed for the Ash Surge, Bypass, and Former Ash Basins (Ref. 24). Based on these results, water entering the Ash Surge and Bypass Basins during the inflow design flood event will not overflow the basins' emergency spillway structures. The freeboards in the Ash Surge and Bypass Basins during the design event were estimated to be 2.12 feet and 1.54 feet, respectively. Meanwhile, water entering the Former Ash Basin during the inflow design flood event will not overtop the North Pond's or South Pond's dikes. The freeboards in the North and South Ponds during the design event were estimated to be 4.13 feet and 6.77 feet, respectively.

Table 4-1 – Summary of Hydrologic & Hydraulic Assessment Results for Ash Surge Basin, Bypass Basin, & Former Ash Basin

CCR Surface Impoundment	Ash Surge Basin	Bypass Basin	Former Ash Basin, North Pond	Former Ash Basin, South Pond
IL Hazard Potential Classification	Class 2	Class 2	Class 2	Class 2
Fed. Hazard Potential Classification	Significant	Significant	Significant	Significant
Inflow Design Flood	1,000 Year	1,000 Year	1,000 Year	1,000 Year
Maximum Surface Water EL.	465.88 feet	466.46 feet	450.87 feet	451.23 feet
Emergency Spillway EL.	466.00 feet	466.75 feet	N/A	N/A
Pond Crest / Rim EL.	468.00 feet	468.00 feet	455.00 feet	458.00 feet

5.0 CONCLUSIONS

Based on the hydrologic and hydraulic calculations performed for the Ash Surge, Bypass, and Former Ash Basins (Ref. 24), the basins have adequate hydraulic capacities to retain the 1000-year flood event without water overflowing the basins' emergency spillway structures (Ash Surge and Bypass Basins only) or overtopping the basins' dikes. Therefore, the Ash Surge Basin, Bypass Basin, and Former Ash Basin are able to collect and control the inflow design flood event specified in 35 Ill. Adm. Code 845.510(a)(3) and 40 CFR 257.82(a)(3).

6.0 CERTIFICATION

I certify that:

- This inflow design flood control system plan was prepared by me or under my direct supervision.
- The work was conducted in accordance with the requirements of 35 Ill. Adm. Code 845.510 and with the requirements of 40 CFR 257.82.
- I am a registered professional engineer under the laws of the State of Illinois.

Certified By: Thomas J. Dehlin Date: October 14, 2021

Seal:

LICENSED PROFESSIONAL ENGINEER
THOMAS J DEHLIN
062-069314
OF ILLINOIS

Th. Dehlin
10/14/2021
Exp. 11/30/2021

7.0 REFERENCES

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APPENDIX A: 2016 ASH SURGE & BYPASS BASIN INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

APPENDIX B: 2018 FORMER ASH BASIN INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

ATTACHMENT 19
SAFETY AND HEALTH PLAN

1.0 **SAFETY REQUIREMENTS**

1.1 The entire performance of the Work shall comply with the standards authorized by the latest issue of the U.S. Department of Labor Occupational Safety and Health Act (OSHA), as well as state and local jurisdictional requirements.

1.2 CONTRACTORS SAFETY MANUAL

A. The Contractor shall have on file with the Midwest Generation corporate safety office a copy of the most current Safety and Industrial Hygiene Manual. As a minimum, this Manual must address the following items when applicable to their trade: OSHA Compliance, Accident Investigation, Corrective Action, First Aid Treatment, Inspections and Reporting of Deficiencies, Material Handling and Rigging, Performance and Accountability, Personal Safety Equipment, Safety Guidelines, Safety Meetings, Training, Housekeeping, Hearing Protection, Respiratory Protection, Fire Prevention, Grounding Program, Confined Space Entry, Hazard Communication, Fall Protection, Working on or near water and Trenching and Shoring.

B. The Contractor's superintendent or other responsible person must have a copy of the Contractor's most current Safety and Industrial Hygiene Manual available at the job site.

1.3 PRE-MOBILIZATION MEETING

A. The Contractor shall meet with the Purchasers Representative(s) for a pre-mobilization meeting. The pre-mobilization meeting will include a review of safety requirements, job hazard identification, a job specific safety plan (to be developed by the Contractor and provided to Midwest Generation), and submittal requirements for health & safety records, scope and schedule. Hazard identification and assessment will include all chemical constituents found present in the analyses of the CCR and/or other waste streams within the impoundment(s). Recommendations within the NIOSH Pocket Guide to Chemical Hazards will be reviewed and considered. Applicable safety data sheets will be provided, as necessary.

B. Prior to the start of the work at the job site, the Contractor shall contact Purchaser's Representative to arrange to receive Purchasers site safety orientation. This session will last approximately 2 hours. The Contractor will be provided with information on the potential hazardous constituents of the CCR

C. Contractor shall provide his employees with orientation in all Contractor, and job specific safety requirements related to their work area. Contractor shall provide Purchaser with completed training documents showing date of training and each employees craft related training as it relates to OSHA requirements. (i.e. competent person, scaffold builder, fork truck and crane operators)

D. The Contractor Shall provide proof of training for all on site personnel in the following:

- HAZWOPER 29CFR1910.120/29CFR1926.65.

- OSHA 10 Hour or 30 Hour Voluntary Compliance Training for Construction.

- Hazard Communication 29 CFR 1910.1200.

- Contractor's Safety Plan.

E. A Competent Person shall be identified by name for Excavations, Fall Protection, etc. if applicable.

1.4 FITNESS FOR DUTY

A. The Contractor/Sub-Contractor/Supplier is required to have a drug and alcohol screening program for all employees assigned to work on Purchaser's property. The program must provide screening for pre-access testing, "for cause" testing and random testing. The Contractor/Sub-Contractor/Supplier shall certify that their employees have passed the appropriate screening test in accordance with their programs.

B. Personnel covered by this program shall be denied access to, or may be required to leave the Purchaser's location if there are reasonable grounds to believe that the individual is:

1. Under the influence of using, possessing, buying, selling, or otherwise exchanging (whether or not for profit) controlled substances or drug paraphernalia.

2. Under the influence of consuming, possessing, buying, selling, or otherwise exchanging (whether or not for profit) alcoholic beverages.

1.5 PERSONNEL PROTECTIVE EQUIPMENT (PPE)

A. Prior to starting work, the contractor shall perform a Hazard assessment for PPE

1. The Contractor will conduct a walk-through survey of each work area to identify sources of work hazards. Each survey will be documented in which it will identify the work area surveyed, the relevant task, the person conducting the survey, findings of potential hazards, control measures, and date of the survey.

2. The Contractor will conduct, review, and update the hazard assessment for PPE whenever:

   - A job changes
   - New equipment or process is installed
   - There has been an accident
   - Whenever a supervisor or employee requests it
   - Or at least every year
   - Any new PPE requirements that are developed will be added into the Contractors written
   - safety program

B. Head Protection/Hard Hats: Hard hats shall be worn in all work areas.

1. Hard hats must not be more than 5 years old, and the harness shall not be more than 1 year old.

2. Hard hats must be worn with brim forward.

3. Hard hats must be assigned and used in accordance with ANSI/ISEA Z89.1-2014(R2019).

4. Hard Hats must be cleaned and maintained in accordance with the manufacturer's instruction.

C. Eye Protection: Eye protection shall be worn in all work areas.

1. At a minimum, ANSI Z87-1-2020 compliant Safety Glasses shall be worn.

2. Goggles and face shields shall be used for splash hazards.

3. Fogging potential shall be considered for humid conditions and appropriate anti-fog materials may be used.

4. Detachable side protectors (e.g. clip-on or slide on side shields) that meet OSHA Rule 29 CFR Part 1910.133 and ANSI Z87.1 specifications are also acceptable to wear with prescription glasses. Prescription glasses used with detachable side shields must conform to ANSI Z87.1.

5. Employees must keep eyewear in clean condition and fit for use at all times.

D. Protection Foot Wear

1. All foot wear must be compliant with ASTM F2413-18: Performance Requirements For Protective (Safety) Toe Cap Footwear.

2. For work on or near the CCR impoundments, consideration shall be given to traction and slip issues.

3. Safety shoes must be maintained and cleaned in accordance with the manufacturer's guidelines.

4. Boot covers or Rubber boots shall be used in all areas that do or may contain CCR. These covers or boots must be cleaned or disposed of prior to leaving the work area.

E. Hand Protection

1. Employers shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

2. Impervious disposable gloves shall be used when working with CCR. Leather, Cotton or other readily absorbable gloves shall not be used.

F. Personal Flotation Devices

1. When working with 10 feet of the water in the impoundments the following shall apply:

   a. All personnel shall wear a Coast Guard Approved PFD

      - Type I: Off-Shore Life Jacket; effective for all waters or where rescue may be delayed.

      - Type II: Near-Shore Buoyant Vest; intended for calm, inland water or where there is a good chance of quick rescue.

      - Type III: Flotation aid; good for calm, inland water, or where there is a good chance of rescue.

      - Type IV: PFD's are throwable devices. They are used to aid persons who have fallen into the water.

      - Type V: Flotation aids such as boardsailing vests, deck suits, work vests, and inflatable PFD's marked for commercial use.

2. Serviceable condition: A PFD is considered to be in serviceable condition only if the following conditions are met.

   a. No PFD may exhibit deterioration that could diminish the performance of the PFD, including:

      1. Metal or plastic hardware used to secure the PFD on the wearer that is broken, deformed, or weakened by corrosion.

      2. Webbings or straps used to secure the PFD on the wearer that are ripped, torn, or which have become separated from an attachment point on the PFD; or

      3. Any other rotted or deteriorated structural component that fails when tugged.

      4. Rips, tears, or open seams in fabric or coatings, that are large enough to allow the loss of buoyant material.

      5. Buoyant material that has become hardened, non-resilient, permanently compressed, waterlogged, oil-soaked, or which shows evidence of fungus or mildew; or

      6. Loss of buoyant material or buoyant material that is not securely held in position.

1.6 EXISTING PLANT FACILITIES

A. Contractor shall be aware that Work may be performed in and around operating equipment.

B. The Contractor shall give proper notices, make all necessary arrangements, and perform all other services required to avoid damage to all utilities, including gas mains, water pipes, sewer pipes, electric cables, fire hydrants, lamp posts, etc., for which Purchaser could be held liable.

C. The Contractor shall barricade or cover any opening created during the course of work for excavations, or grating removal. Barricades shall be a "hard" barrier such as cable or pipe and clamp, safety barrier tape is unacceptable. In addition, any openings creating a fall hazard of 4 feet or more must have a permit authorized before the barrier can be removed. See section 11.4 below for permit requirements.

D. Housekeeping, walkways and tripping hazards

All equipment and material must be kept in an orderly manner. Aisles, exits, stairways, and emergency equipment must never be obstructed. Hoses and welding cables must be tied above walkways so as to not pose as a trip hazard. Barricades, signs and notifications provided by the contractor when required. The owner and contractor will conduct periodic housekeeping audits to assure compliance.

E. Contractor's personnel shall observe all safety, warning, equipment identification instructional signs and tags. Do not remove any tag without prior consent of Purchaser's Representative.

F. When work has been completed, and Contractor decides equipment is ready to be returned to service, Contractor employees shall have all of their employees (working party members) sign off the permit. Contractor shall notify Purchaser's Representative in whose name the outage is being held.

1.7 WELDING, CUTTING and BURNING PERMITS

A. Contractor shall not start welding or cutting operations without a "Welding and Cutting (Hot Works) Permit". Permits shall be obtained from Purchaser and posted in accordance with Station site-specific Safety Training requirements.

B. Contractor shall use non-asbestos, fire retardant blankets as required to protect Purchaser's equipment, cable trays, coal transport and storage areas, etc. and to cover gratings (for personnel safety) when welding, grinding and flame cutting processes are used overhead or in such close proximity as to pose a hazard.

C. Contractor shall supply appropriate portable fire extinguishers in welding and cutting areas.

D. Contractor shall furnish a designated "Fire-watch" employee to monitor the area above to the sides and below the cutting and burning area. The fire-watch is to extinguish fires started by sparks from the acts of cutting or welding. The fire-watch employee is to continue monitoring on the job 30 minutes after cutting or burning has been completed.

1.8 SAFETY DATA SHEETS

A. The Purchaser shall make Safety Data Sheets (SDS's) readily available to the Contractor for those substances to which the Contractor's employees may be exposed during normal working conditions and which are under the Purchaser's control.

B. The Contractor shall make Safety Data Sheets (SDS's) readily available to the Purchaser for those substances which are furnished by and under the control of the Contractor. These are to be available at the time of delivery of the substance to the Purchaser's Premises.

C. It is the responsibility of the Contractor to train their employees on SDS's.

1.9 CHEMICALS, SOLVENTS AND GASES

A. Contractor shall comply with all federal, state and local regulations and codes pertaining to handling and storage of flammable liquids and gases.

B. Cleaning agents, solvents, or other substances brought by Contractor onto any of Purchaser's properties by Contractor shall be stored, handled and used in accordance with applicable standards.

C. Contractor shall ensure that liquids or solids will not be poured (disposed of) into Purchaser's drain, sewer systems, lake (where applicable), or onto ground. Contractor shall be liable for any damage and cleanup of improperly disposed liquids or solids.

D. The Contractor is to provide the Purchaser with the name and quantity of usage of any listed Section 313 Toxic Chemical of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).

E. Signage must be posted detailing the presence of and hazards of CCR.

1.10 DISTURBANCE OF DUST

Contractor's work practices shall minimize dust generated while working with CCR. A fugitive dust mitigation plan shall be submitted to the facility prior to activities beginning.

1.11 FALL PROTECTION

Mandatory fall protection is required when working near and area where a fall hazard of **four (4)** feet or more exists.

1.12 BARRIERS AND WARNING SYSTEMS

A. Warning and barricade systems shall be used to divert personnel from a work area. All warning barriers shall be tagged with yellow “Caution Cards”. The caution card shall state the hazard, the date erected and a contact name, company and phone number. There are two levels of barricade systems. The barricade systems shall be taken down immediately when the hazard has been removed or at the end of the work shift.

B. A conditional warning is designated with ‘Yellow” safety warning tape. This is used to warn workers of a hazard such as wet floors, welding and cutting in an area, or other hazards that with an awareness and proper PPE can be approached.

C. An Unconditional warning is designated with “Red” safety warning tape. This is used to worn workers of a hazard such as a crane lift or overhead work. Red safety tape barriers cannot be access or removed until permission is granted from the person responsible for installing it.

D. Fire and Evacuation warning sirens. Each plant has a siren for fire notification and evacuation notification. The response location and procedure will be addressed in the pre-mobilization meeting and plant site-specific orientation.

1.13 For Contractor's and subcontractor's employees, visitors and any other individuals: Smoking is prohibited on the work site.

1.14 The Contractor is expected to pre-arrange medical emergency services for on-site and off-site treatment. This includes, but is not limited to, first aid and confined space rescue.

1.15 WORKING ON OR NEAR WATER:

A. Life jackets and work vests shall be inspected before and after each use.

B. Ring buoys or Class IV rescue device with at least 90 feet of line shall be provided and readily available for employee rescue operations.

C. The distance from ring buoys to each worker shall not exceed 200 feet.

D. At least one lifesaving skiff shall be immediately available at locations where employees are working over water and/or the local coast guard shall be notified when working in navigable waterways.

E. Under no circumstances will team members enter water bodies without protective clothing (e.g.; waders, wet suit).

F. At least one person should remain on shore as a lookout if other methods of rescue are not available.

1.16 EXCAVATIONS

A. A Competent person shall determine the proper slope or identify engineering controls for all excavations in the CCR area.

B. An inspection of the banks shall be made and documented at least daily to determine any impact of the excavation.

2.0 **CONTRACTOR'S FACILITIES**

2.1 Temporary chemical toilet accommodations shall be furnished and maintained by Contractor for the use of his employees. Location shall be as directed by Purchaser's Representative. Use of Purchaser's toilet facilities by Contractor's employees is not permitted.

2.2 Contractor shall provide his own storage vessels, coolers, ice, water containers, etc., as required for his own drinking water use. Contractor shall supply a trash can with each drinking water container to receive used paper cups. Contractor shall maintain drinking water container, supply suitable water cups and dispose of trash as required. Open drinking cups and containers in the plant areas are not permitted.

2.3 Each Contractor is expected to pre-arrange medical emergency services for on-site and off-site treatment. This includes, but is not limited to, first aid and confined space rescue.

2.4 FIRE PROTECTION FACILITIES

A. Contractor shall provide his own temporary fire protection facilities for the equipment and materials furnished by him or by Purchaser and for his temporary construction buildings and structures. This equipment shall be maintained and inspected in accordance with applicable NFPA codes.

B. Furnish a suitable quantity and type of portable fire extinguishers and equipment, to meet OSHA and applicable codes.

2.5 Purchaser will not furnish any additional illumination of aisles, passages in the buildings, floodlighting of outdoor areas or lighting inside equipment other than that which is existing. Any additional lighting required by the Contractor shall be provided by the Contractor.

2.6 Contractor shall provide and maintain suitably located distribution centers with fused switching equipment and Ground Fault Interruption protection. The equipment supplied shall comply with OSHA regulations and standards.

2.7 Contractor shall supply all adapters and equipment required to connect to station air, water, and electrical systems. All air hoses shall be safety clipped together.

2.8 Any heating facilities required for the performance of the Work shall be furnished, maintained, and removed by Contractor. Open fires WILL NOT BE PERMITTED at any time. Heating equipment shall be as approved by Purchaser's Representative.

3.0 CONTRACTOR'S TOOLS AND EQUIPMENT

3.1 TOOLS AND EQUIPMENT

A. Contractor shall maintain, inspect and store tools and equipment for safe and proper use. This includes guards, shields, safety switches and electrical cords.

B. Contractor shall provide hoisting equipment as required to perform the Work. Provide all the necessary guards, signals, and safety devices required for its safe operation. Construction and operation of hoisting equipment shall comply with all applicable requirements of ANSI A10.5, the AGC Manual of Accident Prevention in Construction, and to all applicable federal, state, and local codes. Hoisting equipment shall not be used to transport personnel.

3.2 RIGGING

A. Contractor shall design, furnish, and maintain rigging required for the Work. All rigging plans must be designed by an Illinois licensed structural engineer.

B. Purchaser reserves the right to examine Contractor's design calculations, engineering data, plans, and procedures. Contractor shall submit any documentation requested by the Purchaser for the purpose of this review, including, but not limited to, calculations, diagrams and documents associated with computer-aided analyses and programs. If requested information is considered proprietary by Contractor, Contractor shall allow the Purchaser to review the information at Contractor's offices with the understanding that no copies of proprietary information will be given to the Purchaser. Purchaser's review and approval of submitted information is for general detail only and will not relieve the Contractor of responsibility for meeting all requirements and for accuracy.

C. Lifting and rigging areas shall have the target area and corresponding personnel access landings barricaded with "red" safety tape or hard barriers. No one is allowed under the load or in the target area during lifts.

D. All cranes, hoists, or derricks shall be operated in compliance with existing State and Federal regulations or orders. Cranes and hoists shall be inspected in accordance with OSHA and ANSI requirements. Cranes and hoists shall not be operated near high voltage lines or equipment until a safe operating clearance plan has been established.

ATTACHMENT 20
CLOSURE PRIORITY CATEGORIZATION

Attachment 20-No Attachment