Form CCR 1

Illinois Environmental Protection Agency

CCR Residual Surface Impoundment Permit Application

CCR Form 1 – General Provisions

Bureau of Water ID Number:

a

CCR Permit Number:

Facility Name: Joliet 29 Generating Station

For IEPA Use Only

SECTION 1: FACILITY, OPERATOR, AND OWNER INFORMATION (35 IAC 845.210(b))

Facility, Operator, and Owner Information

1.1 Facility Name

Joliet 29 Generating Station

1.2 Illinois EPA CCR Permit Number (if applicable)

Initial Permit

1.3 Facility Contact Information

Name (first and last) DeAndre Cooley	Title Environmental Specialist	Phone Number 779-279-2321

Email address
DeAndre.Cooley@NRG.com

1.4 Facility Mailing Address

Street or P.O. box
1800 Channahon Road

City or town Joliet	State Illinois	Zip Code 60436

1.5 Facility Location

Street, route number, or other specific identifier
1800 Channahon Road

County name Will	County code (if known)	
City or town Joliet	State Illinois	Zip Code 60436

1.6 Name of Owner/Operator

Midwest Generation, LLC

Facility, Operator, and Owner Info

1.7 Owner/Operator Contact Information

Name (first and last): William Naglosky

Title: Plant Manager

Phone Number: 815-207-5412

Email address: william.naglosky@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

ALL THT PRT OF THE SE1/4 OF SEC 19, T35N-R10E., LYING S'LY OF THE CENTERLINE OF CHANNAHON RD; NW'LY OF A LINE DESCRIBED AS COMM AT THE SW COR OF THE SE1/4 OF SD SEC 19; THC RUNNING E ON THE S LN OF SD SEC 1629 FT; THC N 41 DEG 22' E, 249.3 FT; THC N 47 DEG 46' E, 587.6 FT; THC N 53 DEG 5' 30" E, 371.1 FT; THC N 64 DEG 28' 30" E, 545.9 FT TO A PT ON THE E LN OF SD SEC 19, WHICH IS 709.6 FT S OF THE CENTERLINE OF THE PUBLIC HIGHWAY KNOWN AS CHANNAHON RD. (EX THT PRT TAKEN BY THE STATE OF ILLINOIS BY DOC# R68-013815) & (EX THEREFROM THE FOLLOWING DESCRIBED PARCEL TO WIT; THT PRT OF THE SE1/4 OF SEC 19, T35N-R10E. DAF: COMM AT A PT ON THE S LN OF SD SEC 19, BEING A CONCRETE MONUMENT 1963.03 FT (RECORD) EAST (AS MEASURED ALG THE SOUTH LN OF SD SEC 19) OF THE SW COR OF SD SEC 19 SD MONUMENT BEING ON THE BOUNDARY LN PER THE BOUNDARY LN AGREEMENT RECORDED MARCH 21, 1951 AS DOC # 688037 BETWEEN CATERPILLAR TRACTOR CO. & PUBLIC SERVICE CO. OF NORTHERN ILLINOIS; THC N 01 DEG 48' 09" W ALG THE SD BOUNDARY LN 594.54 FT; THC N 73 DEG 47' 26" E ALG THE S ROW OF RTE 6 (FORMERLY KNOWN AS CHANNAHON RD) AS HERETOFORE CONVEYED TO THE STATE OF ILLINOIS PER QUIT CLAIM AUGUST 19. 1968 AS DOC# R68-13815, A DIST OF 870.57 FT TO A PT OF CURVATURE; THC E'LY ALG THE ARC OF CURVE CONCAVE TO THE NORTH, BEING THE S ROW LN OF SD RTE 6, HAVING A RADIUS OF 38,307.20 FT, HAVING A CHORD BEARING OF N 73 DEG 38' 36" E, 196.99 FT FOR A POB; THC CONT E'LY ALG THE ARC OF A CURVE CONCAVE TO THE N, BEING THE SD S'LY ROW LN OF RTE 6, HAVING A RADIUS OF 38,307.20 FT, HAVING A CHORD BEARING OF N 72 DEG 43' 48" E, 1024.21 FT; THC S 37 DEG 17' 59" E, 391.37 FT; THC S 42 DEG 57' 20" W, 785.70 FT; THC N 55 DEG 05' 38" W, 553.84 FT; THC N 40 DEG 21' 51" W, 348.30 FT TO THE POB. NEW PARCEL ASSESSMENT DESCRIPTION NDA:

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] 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.

W1970450047-02	☑	Attached written description
	☐	Attached written description
	☐	Attached written description
	☐	Attached written description
	☐	Attached written description
	☐	Attached written description
	☐	Attached written description

☐ Attached written description

☐ Attached written description

☐ Attached written description

SECTION 5: CHECKLIST AND CERTIFICATION STATEMENT

Checklist and Certification Statement

5.1 In 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 William Naglosky	Official Title Plant Manager.
Signature William Naglosky	Date Signed 10/28/21

Form CCR 2E

Illinois Environmental Protection Agency

CCR Residual 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:
Joliet 29 Generating Station

CCR Permit Number:
Joliet 29 Generating Station

Facility Name:
Joliet 29 Generating Station

For IEPA Use Only

SECTION 1: CONSTRUCTION HISTORY (35 IAC 845.220 AND 35 IAC 845.230)

Construction History

1.1 CCR Surface Impoundment Name

Pond 2

1.2 Identification number of the CCR surface impoundment (if one has been assigned by the Agency)

W1970450047-02

1.3 Description of the boundaries of the CCR surface impoundment (35 IAC 845.210 (c))

ALL THT PRT OF THE SE1/4 OF SEC 19, T35N-R10E., LYING S'LY OF THE CENTERLINE OF CHANNAHON RD; NW'LY OF A LINE DESCRIBED AS COMM AT THE SW COR OF THE SE1/4 OF SD SEC 19; THC RUNNING E ON THE S LN OF SD SEC 1629 FT; THC N 41 DEG 22' E, 249.3 FT; THC N 47 DEG 46' E, 587.6 FT; THC N 53 DEG 5' 30" E, 371.1 FT; THC N 64 DEG 28' 30" E, 545.9 FT TO A PT ON THE E LN OF SD SEC 19, WHICH IS 709.6 FT S OF THE CENTERLINE OF THE PUBLIC HIGHWAY KNOWN AS CHANNAHON RD. (EX THT PRT TAKEN BY THE STATE OF ILLINOIS BY DOC# R68-013815) & (EX THEREFROM THE FOLLOWING DESCRIBED PARCEL TO WIT; THT PRT OF THE SE1/4 OF SEC 19, T35N-R10E. DAF: COMM AT A PT ON THE S LN OF SD SEC 19, BEING A CONCRETE MONUMENT 1963.03 FT (RECORD) EAST (AS MEASURED ALG THE SOUTH LN OF SD SEC 19) OF THE SW COR OF SD SEC 19 SD MONUMENT BEING ON THE BOUNDARY LN PER THE BOUNDARY LN AGREEMENT RECORDED MARCH 21, 1951 AS DOC # 688037 BETWEEN CATERPILLAR TRACTOR CO. & PUBLIC SERVICE CO. OF NORTHERN ILLINOIS; THC N 01 DEG 48' 09" W ALG THE SD BOUNDARY LN 594.54 FT; THC N 73 DEG 47' 26" E ALG THE S ROW OF RTE 6 (FORMERLY KNOWN AS CHANNAHON RD) AS HERETOFORE CONVEYED TO THE STATE OF ILLINOIS PER QUIT CLAIM AUGUST 19. 1968 AS DOC# R68-13815, A DIST OF 870.57 FT TO A PT OF CURVATURE; THC E'LY ALG THE ARC OF CURVE CONCAVE TO THE NORTH, BEING THE S ROW LN OF SD RTE 6, HAVING A RADIUS OF 38,307.20 FT, HAVING A CHORD BEARING OF N 73 DEG 38' 36" E, 196.99 FT FOR A POB; THC CONT E'LY ALG THE ARC OF A CURVE CONCAVE TO THE N, BEING THE SD S'LY ROW LN OF RTE 6, HAVING A RADIUS OF 38,307.20 FT, HAVING A CHORD BEARING OF N 72 DEG 43' 48" E, 1024.21 FT; THC S 37 DEG 17' 59" E, 391.37 FT; THC S 42 DEG 57' 20" W, 785.70 FT; THC N 55 DEG 05' 38" W, 553.84 FT; THC N 40 DEG 21' 51" W, 348.30 FT TO THE POB. NEW PARCEL ASSESSMENT DESCRIPTION NDA:

1.4 State the purpose for which the CCR surface impoundment is being used.

Ash Pond 2 is currently not in service and will not be used in the future for CCR storage.

1.5 How long has the CCR surface impoundment been in operation?

41 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.	
	Des Plaines watershed	
1.8	Size in acres of the watershed within which the CCR surface impoundment is located.	
	28,808 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 IAC 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 record(s) 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 IAC 845(d)(2))

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 IAC 845(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 845.300 (Placement Above the Uppermost Aquifer)	☑	Demonstration	☐	Explanation
		Section 845.310 (Wetlands)	☑	Demonstration	☐	Explanation
		Section 845.320 (Fault Areas)	☑	Demonstration	☐	Explanation
		Section 845.330 (Seismic Impact Zones)	☑	Demonstration	☐	Explanation
		Section 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 Section 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 Section 845.430.
		☑	Initial Emergency Action Plan and accompanying certification required by Section 845.520(e).
		☑	Fugitive Dust Control Plan and accompanying certification required by Section 845.500(b)(7).
		☑	Preliminary written closure plan as specified in Section 845.720(a).
		☑	Initial written post-closure care plan as specified in Section 845.780(d), if applicable.
		☑	A certification as specified in Section 845.400(h), or a statement that the CCR surface impoundment does not have a liner than meets the requirements of Section 845.400(b) as specified in Section 845.400(c).
		☑	History of known exceedances of the groundwater protection standards in Section 845.600, and any corrective action taken to remediate the groundwater.
		☑	Safety and health plan, as required by Section 845.530.
		☑	For CCR surface impoundments required to close under 845.700, the proposed closure priority categorization required by Section 845.700(g).

SECTION 5: GROUNDWATER MONITORING

Groundwater Monitoring	5.1	Check the corresponding boxes to Indicate you have attached the following groundwater monitoring information:	
		☑	A hydrogeologic site characterization meeting the requirements of Section 845.620
		☑	Design and construction plans of a groundwater monitoring system meeting the requirements of Section 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 Section 845.640

		☑	Proposed groundwater monitoring program that includes a minimum of eight independent samples for each background and downgradient well, required by Section 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 845.230(d)(2)(N).
		☑	Hazard potential classification assessment and accompanying certifications required by Section 845.440(a)(2).
		☑	Structural stability assessment and accompanying certification, required by Section 845.450(c).
		☑	Safety factor assessment and accompanying certification, as required by Section 845.460(b).
		☑	Inflow design flood control system plan and accompanying certification, as required by Section 845.510(c)(3).

K P R G

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

APPLICATION FOR INITIAL OPERATING PERMIT

JOLIET #29 GENERATING STATION
MIDWEST GENERATION, LLC
JOLIET, ILLINOIS

Illinois EPA Site No. W1970450047-02

October 29, 2021

Submitted To:

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

Prepared For:

Midwest Generation, LLC
1800 Channahon Rd.
Joliet, IL 60436

Prepared By:

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

Table of Contents

<u>TABLES</u>

<u>FIGURES</u>

<u>ATTACHMENTS</u>

Introduction

Midwest Generation, LLC (Midwest Generation) currently operates the natural gas-fired generating station, referred to as Joliet #29 Generating Station, located in Joliet, Illinois ("site" or "generating station"). MWG converted the generating station from coal to natural gas in 2016. As part of the previous coal-fired operations, the station operated two ash ponds (Ponds 1 and 2) and a service water basin (Pond 3). MWG removed all of the coal combustion residuals ("CCR") from Pond 1 and decontaminated the liner before October 2015, and repurposed the pond as a low volume wastewater pond.[1] Pond 3 is a *de minimis* pond and is not a CCR surface impoundment. Pond 2 was used for CCR management/storage until 2019. In 2019, the CCR was removed and all other portions of the exposed liner have been decontaminated. Because Pond 2 was used as a CCR surface impoundment after October 2015, Pond 2 is regulated under the newly promulgated Ill. Adm. Code Title 35, Part 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (State CCR Rule). Pond 2 is not currently in service, and no liquids or wastewater is directed into the pond.

The objective of this submittal is to apply for the initial operating permit for Pond 2 at the Joliet #29 Generating Station. Midwest Generation seeks to receive the operating permit to continue operating the Pond 2 in compliance with the State CCR Rule. The information required for an initial operating permit application for existing surface impoundments as specified under 35 Ill. Adm. Code 845.230(d) of the State CCR Rule is provided in the following sections.

The Permit 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 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.

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[1] As a low volume wastewater pond, Pond 1 receives wastewater from other sources at the Station except CCR.

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 Pond 2	Midwest Generation 804 Carnegie Center Princeton, NJ 08540	W1970450047

1.2 Purpose of CCR Surface Impoundment

Pond 2 formerly served as a settling pond for sluiced CCR and other process water associated with the electrical power generating process occurring at the site. As stated in the Introduction, MWG converted the generating station to natural gas and it no longer burns coal for electrical power generation. All CCR has been removed from Pond 2 down to the warning layer and all exposed liner has been decontaminated. Pond 2 is not in service and will not be used in the future for CCR storage.

1.3 CCR Surface Impoundment Length of Operation

Pond 2 was constructed circa 1978 and operated as a CCR surface impoundment until 2019, thus operated for approximately 41 years. The Notice of Intent to Initiate Closure was submitted on April 11, 2021.

1.4 Type of CCR in Surface Impoundment

The type of CCR formerly stored in Pond 2 was bottom ash that was sluiced into the impoundment. The chemical constituents that make up the bottom ash is discussed in further detail in Section 2.0.

1.5 Name and Size of the Watershed

Pond 2 is located within the Des Plaines River watershed, which is approximately 28,808 acres in size.

1.6 Description of CCR Surface Impoundment Foundation

The Geosyntec October 2016 Federal CCR Rule History of Construction submittal summarized the foundation for Pond 2 as follows:

> "Site observations and construction documents show Pond 2 is surrounded by embankments on the south, east, and west. There are no embankments on the north side of the pond where existing ground elevations generally increase to the north; however, Site investigations indicate that fill material may be present along the northern boundary. For engineering purposes, material located along the northern embankment is considered consistent with embankment fill. Native materials do not provide any lateral support for the embankments and therefore the pond does not contain abutments."

The following sections discuss the foundation materials' physical and engineering properties. KPRG reviewed the previously developed History of Construction for the East Ash Pond and the West Ash Pond, along with previously completed site investigations and concurred with Geosyntec's observations and conclusions.

1.6.1 Physical Properties of Foundation Materials

The physical properties of the foundation materials in which the pond is constructed ranges from clay to sand and gravel. Silurian Dolomite is noted at approximately 40 feet below the top of the pond embankments. This information was obtained from published geologic information and field investigations performed by KPRG (2005), Patrick Engineering, and Geosyntec (2015). No abutments are present.

1.6.2 Engineering Properties of Foundation Materials

The engineering properties for the foundation materials listed in the following table are from the periodic structural stability and safety factor assessments performed by Geosyntec for Pond 2. The properties were determined from the site investigation, published correlations, and laboratory testing of samples collected during the site investigations.

Material	Unit Weight (pcf)	Drained friction angle (degrees)	Effective cohesion (psf)
Sand/Gravel	125	38	25

Based on Geosyntec's structural stability analysis, engineering properties were not determined for the dolomite because of its negligible contributions to the structural stability of the pond. KPRG agrees with this assessment.

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 1979, the liner replacement drawings created by NRT in 2007 and 2008 and various site investigations referenced as appropriate. The drawings discussed in the following sections are located in Attachment 1.

1.7.1 Physical and Engineering Properties of Construction Materials

Pond 2 was constructed with embankments on the south, east, and west sides, so the physical properties of the construction materials for this section are the same as the physical properties of the foundation materials. As described in Section 1.6.1, the physical properties for the foundation materials were described as clay to sand and gravel, so for this section, the physical properties for the construction materials will also be described as clay to sand and gravel. The pond inlet structure, outlet structure, and inlet apron are constructed of concrete. The liner was originally constructed as a 1-foot Poz-O-Pac liner system on the bottom and the side slopes with the addition of a bituminous curing coat applied on the Poz-O-Pac side slopes.

Engineering properties for the design and construction of the embankment materials were not available. Engineering properties were estimated by Geosyntec for use in the factor of safety assessment performed for the pond. Those engineering properties are listed in the following table:

Material	Unit Weight (pcf)	Drained friction angle (degrees)	Effective cohesion (psf)
Brown Clay	115	30	25
Silty Gravel	125	32	25

In 2008, MWG relined Pond 2 by removing the Poz-O-Pac liner system side slopes and covering the Poz-o-Pac liner bottom with the existing high-density polyethylene (HDPE) geomembrane liner system that is now present. In 2016, approximately 100 cubic yards of engineered fill was placed on the Pond 2 embankment crest in the southeast corner to provide additional freeboard for Pond 2.

1.7.2 Construction Methods

Based on construction drawings by NUS, 1978 (Attachment 1-1), Pond 2 was constructed by excavating down from the original ground surface to achieve the side slopes and elevations. Reviewing the drawings shows the original ground surface ranged from 526 ft above mean sea level (amsl) to 535 ft amsl. Section S on drawing 5079 C 5019 Sheet 2 shows the original ground surface was approximately 531 ft amsl in the north-south direction. Section V on drawing 5079 C 5019 Sheet 3 shows the original ground surface was approximately 526 ft amsl on the east side of Pond 2, and Section W on drawing 5079 C 5019 Sheet 3 shows the original ground surface was approximately 535 ft amsl on the west side of Pond 2. The embankment crest of Pond 2 was constructed at approximately 535 ft amsl and the bottom was constructed at approximately 516 ft amsl. The construction drawings for Pond 2 indicate that the pond was not constructed with multiple zones of different soil types, therefore discussing the size and range of each construction zone is not applicable.

The interior side slopes of Pond 2 were designed with 3H:1V (horizontal:vertical) slopes, except for the concrete inlet apron which was designed with slopes of 2H:1V. The exterior side slopes of Pond 2 along the south side were designed at 3H:1V based on the construction drawings. The interior side slopes and bottom of Pond 2 were originally designed with a 1-foot thick Poz-O-Pac liner system based on the 1978 NUS construction drawings; Pond 2’s concrete inlet apron does not have the Poz-O-Pac liner. The side slopes also had a bituminous curing coat applied to the Poz-O-Pac liner system.

The west embankment for Pond 2 is topped by the access road that divides Pond 1 from Pond 2 and the west side of the embankment is the outlet side/outlet structure of Pond 1. The original ground surface of the west embankment was approximately 535 ft amsl and the as-built embankment elevation was documented to be approximately 535 ft amsl. The east embankment of Pond 2 is the outlet side/outlet structure of the pond and abuts an access road from Channahon Road that enters the station. The original ground elevation of the east embankment ranged from approximately 530 ft amsl to 536 ft amsl. The as-built elevation of the access road was documented to range from approximately 539 ft amsl to 535 ft amsl, which is equal to or greater than the east embankment crest elevation of 535 ft amsl.

1.7.3 Construction Dates

Based upon the available construction drawings, Pond 2 was likely built in 1978. As stated above, the original Poz-O-Pac liner was overlain in 2008 with a HDPE geomembrane liner and the improvements to the southeast corner of the embankment occurred in 2016.

1.8 Detailed Dimensional Drawings

The detailed dimensional drawings associated with the construction work that has occurred on Pond 2 are located in Attachment 1. The list of the drawings in Attachment 1 are as follows:

- Construction drawings prepared by NUS, dated 1977 and 1978 (Attachment 1-1);
- Liner replacement construction and as-built drawings prepared by NRT, dated 2007 with revision notes dated 2008 (Attachment 1-1);
- The as-built survey prepared by Ruettiger, Tonelli & Associates, Inc, dated 2008 (Attachment 1-1);
- The construction drawings for the liner replacement of Pond 1, which relates to the western boundary of Ash Pond 2, prepared by NRT, dated 2008 (Attachment 1-1); and
- The construction drawing for the improvements to the embankment’s southeast corner, prepared by Geosyntec, dated 2016 (Attachment 1-1).

1.9 Instrumentation

A staff gauge will be installed within Pond 2 to allow for the determination of Pond 2’s water level. The staff gauge installation is intended to meet new requirements under Section 845.650(b)(3) to allow water level estimates to be made concurrent with monthly groundwater level measurements. Because Pond 2 is not in service, low volume wastewater is not directed to Pond 2 and the water in the pond is either rainfall or runoff. There is no other instrumentation present at Pond 2.

1.10 Area-Capacity Curve

An area-capacity curve created by Geosyntec is provided as Figure 1.

1.11 Spillway and Diversion Capacities and Calculations

The only spillway and/or diversion features at Pond 2 is the existing outlet structure. The outlet structure consists of a rectangular structure in which the water flows over a concrete weir into a trough that is connected to the discharge piping. The outlet structure is gravity drained. Details of the outlet structure are located on Drawing No. 5079 C5503 created by NUS Corporation in

Attachment 1-1. The calculations for the design of the outlet structure are not available. The drainage capacity for the outlet structure and discharge pipe for Pond 2 have adequately discharged water from Pond 2 without affecting the functionality of the pond.

1.12 Surveillance, Maintenance, and Repair Construction Specifications

Specifications for the original construction of Pond 2 were not available for this application. The specifications that were available are from the 2008 replacement of the original liner with a HDPE geomembrane liner. The specifications are included as part of this application in Attachment 1-2. The specifications indicated that a 60-mil HDPE geomembrane be used along with the associated installation and quality control requirements.

The CCR material was removed from Pond 2 in 2019 and the geomembrane liner was repaired as needed and decontaminated. The specifications for the geomembrane liner repair is included in Attachment 1-3.

1.13 Record of Structural Instability

There is no record or knowledge of structural instability associated with Pond 2.

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

The CCR in Pond 2 was removed in 2019 with the warning layer and the high-density polyethylene (HDPE) liner remaining. Prior to 2016 when the station was converted to natural gas, Pond 2 did occasionally receive bottom ash CCR when it could not be sluiced to Lincoln Stone Quarry. The bottom ash CCR that was sluiced to Lincoln Stone Quarry was sampled on August 31, 2021 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. The laboratory data package is included in Attachment 2.

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

The other waste streams that enter Pond 2 when it is in service are service water/low volume wastewater from the reverse osmosis (RO) sand filter backwash, the west area basin, the former coal pile runoff pump discharge, and the plant drains, including the Station floor drains, and roof drains and area drains (see Joliet 29 Flow Diagram in Attachment 3.) All of the water flow processes and stormwater flow contain total suspended solids (TSS) which can include sand sized and smaller sized particles. The RO sand filter backwash contains the suspended solids removed by the stations water treatment system. The Station floor drains, roof drains, and area drains, are likely to contain TSS from operations and runoff during storm events. Similarly, the runoff pumped from the coal pile area retention pond contains TSS.

4.0 Location Standards Demonstration, 845.230(d)(2)(D)

4.1 Placement Above the Uppermost Aquifer

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in October of 2018 the base of Ash Pond 2 is separated from the upper limit of the uppermost aquifer by a minimum distance of five (5) feet. Therefore, the location of Pond 2 complies with Section 845.300. This determination by Geosyntec is included in Attachment 4. KPRG agrees with this determination.

4.2 Wetlands

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in October of 2018, Ash Pond 2 is 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 Pond 2 complies with Section 845.310. This determination is included in Attachment 4. KPRG agrees with this determination.

4.3 Fault Areas

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in October of 2018, Ash Pond 2 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, 2018]. Therefore, the location of Pond 2 complies with Section 845.320. This determination is included in Attachment 4. KPRG agrees with this determination.

4.4 Seismic Impact Zones

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in October of 2018, Ash Pond 2 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, 2014]. Therefore, the location of Pond 2 complies with Section 845.330. This determination is included in Attachment 4. KPRG agrees with this determination.

4.5 Unstable Areas

According to the Location Restrictions Compliance Demonstration performed by Geosyntec in October of 2018, Ash Pond 2 is not located in an unstable area [Geosyntec, 2016]. Therefore, the location of Pond 2 complies with Section 845.340. This determination is included in Attachment 4. KPRG agrees with this determination.

4.6 Floodplains

Pond 2 is not located in a floodplain according to the National Flood Hazard Layer FIRMette Map No. 17197C0280G as mapped by the Federal Emergency Management Agency. Therefore, the location of Pond 2 complies with Section 845.340. The relevant FIRMette is located in Attachment 4.

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

The permanent marker in accordance with 35 Ill. Adm Code 845.130 has been installed. Photographic documentation of this requirement is included in Attachment 5.

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

Pond 2 was visually observed and determined to have embankments on the west, south, and east sides. The northern slope does not have an embankment because the elevations on the northern side of Pond 2 are higher than the north slope embankment crest and generally increase moving north. The interior slopes are lined with a 60-mil high-density polyethylene geomembrane, which protects the slopes from erosion, the effects of wave action, and mitigation effects of rapid drawdown. The western exterior slope of Pond 2 is the interior slope of Pond 1, which is lined with a geomembrane that provides erosion protection. Based on site observations from 2015, the eastern and southern downstream slope embankment surfaces consist of sandy gravel, gravelly sand, gravel, and some cobbles and include sparse vegetation. Based on site observations by KPRG in 2021, this existing surface condition provides adequate slope protection. Photo documentation is included in Attachment 6.

7.0 Emergency Action Plan

The Emergency Action Plan for Pond 2 was completed by Civil and Environmental Consultants, Inc. (CEC) to comply with Section 845.520. The EAP is included in Attachment 7.

8.0 Fugitive Dust Control Plan

The facility ceased burning coal on March 20, 2016, and converted to burning natural gas to generate electricity. As a result, the CCR from Pond 2 was cleaned out and closure procedures have been initiated. A fugitive dust plan was previously completed for the Joliet #29 station to comply with the Federal CCR Rule. KPRG reviewed the fugitive dust plan and updated it to comply with 35 Ill. Adm. Code 845.500(b) in relation to non-CCR fugitive dust. It is included in Attachment 8.

9.0 Groundwater Monitoring Information

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.

9.1.1 Geology

The physiography of Will County is made up of ground moraines, end moraines, outwash plains, stream terraces, flood plains and bogs. It is in the Till Plaines and Great Lakes Sections of the Central Lowland Province. Near surface soils in the vicinity of the subject impoundment have been grouped as Kankakee Fine Sandy Loam and Romeo Silt Loam. These soils are well to poorly drained, respectively. Organic content ranges from 2 to 5 percent and have a low to negligible accelerated erosion rate, a moderate to high corrosivity rate and a pH range from slightly acidic to slightly basic (5.6 to 8.4). Surface runoff class is low (Soil Survey of Will County Illinois). Based on the Surficial Geology Map of the Chicago Region (ISGS Circular No. 460, 1971) the surficial deposits in the vicinity of the subject surface impoundment are identified as part of the Henry Formation, which is generally described as sand and gravel with local beds of silt and/or exposed Silurian dolomite bedrock.

The general stratigraphy in the area consists of unconsolidated glacial deposits, which overlay Silurian dolomite. The Silurian dolomite is underlain by the Maquoketa Group, which includes the Scales Shale, which is considered a regional aquitard separating the overlying Silurian dolomite from the deeper Cambro-Ordovician sandstone and limestone aquifers. 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 Joliet #29 Generation Station (it is noted that all of these wells are upgradient or side gradient of the Station and two wells on property [see Section 9.1.2]). The depths of these wells range from 43 feet to 605 feet. The stratigraphy data from these boring logs and the well locations are provided in Attachment 9-1. In addition, well logs from 11 monitoring wells that were installed in the vicinity of the subject surface impoundment (MW-1 through MW-11; see Figure 9-1) with those borings ranging in depth from 27.5 feet to 41 feet. This information is also included in the stratigraphy table 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, 9-3, and 9-4 based on the 11 on-site monitoring well boring logs:

- Fill (approx. 0’ to 8.5’ thick) – Consisting of a thin layer of top soil and/or coarse gravel fill.

- Silty clay to clay (approx. 0’ – 15’ thick) – Consisting of black/brown silty clay and clay with a trace of coarse gravel or sand. Not continuous across site along east-west transect.

- Sand and Gravel (approx. 14’ to 40’ thick) – Consisting of black/brown fine to coarse sand and gravel with limestone fragments noted throughout. May locally include some lenses or interlayering of black silty clay and/or tan silty sand (wells MW-1 and MW-2).

- Sandy silt/silty clay (approx. 0’ to 34’ thick) – Consisting of black/gray sandy silt grading downward to a gray silty clay with coarse sand. Not continuous across site.

- Bedrock – Consisting of Silurian dolomite – Top of unit encountered at approximately 38.5 feet below ground surface (bgs) at boring location MW-6. Borings noted with increased limestone fragment at base interpreted to be at or near top of weathered bedrock surface. Description of the dolomite discussed in detail below.

Although no specific borings were extended into the dolomite bedrock at this facility, extensive drilling and investigation of the bedrock was completed at the Joliet #9 Station, Lincoln Stone Quarry facility immediately to the south of the Des Plaines River from the subject site. The Silurian dolomite formation is generally consistent regionally, especially over fairly short distances. Based on that work, the following additional bedrock information is provided.

The Silurian dolomite is divided into four units identified as a weathered bedrock rind, Joliet Formation dolomite, Kankakee Formation dolomite and the Elwood/Wilhelmi dolomite. Beneath the Silurian dolomite is the Ordovician age Maquoketa Group consisting of the Brainerd Shale, Fort Atkinson dolomite and the Scales Shale. Although the Brainerd Shale was identified at the above referenced Lincoln Stone Quarry facility with a thickness of approximately 10 feet, this unit is not necessarily regionally continuous; therefore, it may or may not be present beneath the subject site. The Scales Shale unit, however, is extensive and is a recognized regional aquitard, which hydraulically isolates the deeper bedrock aquifers from the shallower Silurian dolomite. Based on the available information, the dolomite bedrock thickness to the top of the Scales Shale beneath the Joliet #29 site is estimated to be 95 to 115 feet.

Regional and local studies and investigations document fractures in the Silurian dolomite describing a primary joint set that is vertical and oriented about N52ºE and N40ºW. The N40ºW joints are described as “more distinct”. Natural spacing between the joint sets ranges from 3 to more than 10 feet, and joint apertures are described as less than 1/16th -inch. Bedding plane fractures are also described. Descriptions from various bedrock quarry walls and from cores obtained during drilling at the Lincoln Stone Quarry site show significant clay infilling of the vertical joints and bedding plane fractures. Evidence of water movement through fractures is interpreted from iron staining and mineralization (primarily calcite, with some pyrite and marcasite).

Silurian dolomite is a calcium-magnesium carbonate rock that includes horizons of cherty (silica) nodules and is documented both regionally and locally to include mineralization along fractures and within vugs. The mineralization includes, but is not limited to calcite (calcium carbonate) and various sulfide minerals such as pyrite, marcasite, etc. As such, the presence of these minerals and associated weathering products can also be expected within the overlying unconsolidated materials.

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

9.1.2 Hydrogeology

Based on information from the Soil Survey of Will County, the average annual precipitation is approximately 37 inches with about 63% of that total falling between April and October of any given year. The average seasonal snowfall is approximately just over 10 inches. More site-specific precipitation data from four water stations located in Joliet and Elgin, Illinois, is provided in Table 9-1.

The nearest surface water body is the facility intake channel and Des Plaines River located to the south of the subject CCR unit (see Figure 9-1). This reach of river is further identified as the Lower Des Plaines River, which starts upstream of the site at the confluence of the river with the Chicago Ship and Sanitary Canal (CSSC) at the E.J. & E railroad bridge (river mile 290.1). The CSSC is the main tributary to this segment of river contributing approximately 80% of the flow to the river. The segment of river adjacent to the subject site is part of the Dresden Island Pool, which starts at the Brandon Road Lock and Dam (river mile 286) which is immediately upstream of the subject CCR surface impoundment. The Dresden Island Pool is 14 miles in length, approximately 800 feet wide with depth varying between 2 to 15 feet (Lower Des Plaines River Use Attainability Analysis Final Report, IEPA, December 2003). There are no drinking water intakes within the Dresden Island Pool and for that matter on any portion of the Des Plaines River downstream of the site (Meet Your Water – An Introduction to Understanding Drinking Water in Northeastern Illinois, Metropolitan Planning Council, 2017).

Groundwater beneath the subject unit occurs under water table conditions. Saturated conditions are generally encountered between 25 and 35 feet bgs, depending on the well location, within the lower portion of the above-defined sand and gravel unit. Table 9-2 provides groundwater elevation measurements obtained for the 11 on-site monitoring wells in the vicinity of the subject CCR surface impoundment which includes data for the monitoring wells associated specifically with the subject surface impoundment (Pond 2; upgradient well MW-10 and downgradient wells MW-3 thru MW-5). A hydrograph of water levels is provided as Figure 9-5. A review of the hydrograph shows some potential temporal fluctuations with the highest water levels generally occurring within the second or third quarters of the year.

Groundwater flow maps for the four quarters from 3rd quarter 2020 through the 2nd quarter 2021 are provided as Figures 9-6 through 9-9. The maps include groundwater elevation data from all 11 wells in the area, including the specific CCR monitoring wells associated with the subject surface impoundment. Based on a review of the maps groundwater flow is in a southerly direction towards the associated facility water intake channel and the Des Plaines River. These maps are consistent with historical flow data for the site. The horizontal hydraulic gradient is fairly shallow. Table 9-3 provides a summary of the flow direction, gradient and an estimated rate of groundwater flow for each sampling event. The flow rate was calculated using the following equation:

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

Where:

$\mathrm{V_s}$ = seepage velocity (distance/time)
K = hydraulic conductivity (distance/time)

dh/dl = hydraulic gradient (unitless)
n_e = effective porosity (unitless)

Hydraulic conductivity values were initially estimated for monitor wells MW-4, -6, -9, and -11 from slug tests completed by Patrick Engineering in 2010. The geometric mean of the test data for these wells was approximately 310 feet per day (ft/d; 3.59 x10^{-3} ft/sec) for each well, as calculated by Patrick Engineering in the Hydrogeologic Assessment Report – Joliet #29 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 170 ft/d (1.97 x 10^{-3} ft/sec) for each well. This revised value was used in Table 9-3. The estimated effective porosity of the aquifer materials (0.35) was 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 discussions above, the groundwater beneath the CCR surface impoundment is considered as Class I Potable Resource Groundwater in accordance with Section 620.210. It is noted, however, that a Groundwater Management Zone (GMZ) has been established in the vicinity of the subject CCR surface impoundment in accordance with Section 620.250 as part of a Compliance Commitment Agreement (CCA) between Midwest Generation and Illinois EPA. The extent of the established and approved GMZ is provided on Figure 9-10.

A survey of all potable water sources within a 2,500 feet radius of the Midwest Generation Joliet #29 Generating Station was completed by Natural Resources Technology (NRT) in 2009. The following databases and sources of information were utilized 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 9-11. Fifteen potable/industrial use wells are within a 2,500-foot radius of the Station's subject CCR surface impoundment. There are no wells directly downgradient of the subject surface impoundment. Eight of the wells are located 1,500 to 2,500 feet north and northwest of the impoundment (upgradient). Two wells, both owned by Midwest Generation, which service the Station, are located to the west and southwest (sidegradient). Both of these wells are greater than 1500 feet deep and screened within the Cambro-Ordovician limestones/sandstones beneath the Maquoketa Shale. There are several wells south of the Des

Plaines River, a hydrogeologic discharge boundary, which service the Joliet #9 Generating Station all of which are also greater than 1,500 feet deep. The well that is located within the Des Plaines River (well 00563) is incorrectly located within the ILWATER database and is actually part of the Olin Chemical operations located approximately 0.3 miles to the south of the location shown on the figure.

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 dedicated nature preserve nearby. No dedicated nature preserves were identified in the vicinity of the subject CCR surface impoundment.

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 impoundment would be downward migration to groundwater within the unconsolidated sand and gravel aquifer. Due to its proximity to the facility intake channel and Des Plaines River, which is a hydrogeologic flow boundary, minimal to no downward vertical flow mixing would be anticipated within the aquifer. 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 to the south. There are no potable water wells downgradient of the subject CCR surface impoundment screened within the aquifer of concern. Also, as previously discussed, there are no potable surface water intakes on the Des Plaines River either along or downstream of the subject site.

There is quarterly groundwater quality data associated with the subject CCR surface impoundment and the two other ponds in the area dating back to December 2011 associated with an Illinois EPA request for evaluation of potential ash pond groundwater impacts and subsequently the negotiated CCA. However, that Illinois EPA required 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 Pond 2 is 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 impoundment (MW-3 through MW-5 and MW-10). This included the full list of Appendix III (detection monitoring) and IV (assessment monitoring) parameters. Subsequently, quarterly groundwater monitoring of these wells was continued for only Appendix III detection monitoring parameters since there were no detections of Appendix III parameters above the established statistical background for those wells. Since the effective date of the new State CCR Rule, quarterly groundwater monitoring for the full list of parameters specified in 845.600, which includes all parameters in the Federal CCR Rule Appendix III/IV, has continued. This data is provided in Table 9-4. 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. The turbidity data is provided in Table 9-5.

9.2 Groundwater Monitoring System Design and Construction Plans

A comprehensive monitoring well network that includes other ponds in the vicinity of Pond 2 was established in response to a previous Illinois EPA request in 2010. The well spacing was developed as part of a previous hydrogeologic assessment completed by Patrick Engineering, Inc. The well depths were determined based on depth to groundwater and the base elevations of the ponds being monitored and were approved by Illinois EPA. Groundwater flow in the area is generally to the south towards the facility water intake channel and Des Plaines River. Monitoring well MW-10 (see Figure 9-1) is the established up-gradient water quality monitoring point for Pond 2. Groundwater data from this well will be evaluated to provide a statistically representative upgradient water quality prior to that water passing beneath the regulated unit. Wells MW-3, MW-4 and MW-5, which are located essentially at the pond boundary, will serve as down-gradient monitoring points for Pond 2. This proposed monitoring well network will be utilized for determining whether potential pond leakage may be causing or contributing to groundwater impacts in the vicinity of the units.

MW-3, MW-4, MW-5, and MW-10, installed in 2010, 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 (Table 9-2).

MW-3, MW-4, MW-5, and MW-10 are 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

9.3.1 Sample Frequency

Pond 2 is 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 site-specific Groundwater Protection Standards (GWPSs) for each constituent pursuant to Section 845.600(b) as presented in Section 9.4 below. 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 the 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 the field parameter readings stabilizing, 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 contact 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 9-7 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 10-6. 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 at or below the applicable standards as defined in Section 845.600(a)(1) for that compound, which are also provided in Table 9-6.

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

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 unit consist of four monitoring wells as follows:

- MW-10 – Upgradient
- MW-3 through MW-5 – Downgradient

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 on a quarterly basis for the seven detection monitoring parameters listed under Appendix III of the Federal CCR Rule detection monitoring requirements. All available CCR monitoring data through the end of the second quarter 2021 is summarized in Table 9-5 and the eight rounds of turbidity data collected since the enactment of the State CCR Rule in April 2021 are provided in Table 9-6.

Using the currently available data for the subject CCR surface impoundment, site specific Groundwater Protection Standards (GWPSs) have been established in accordance with Section 845.600(b) and are summarized in Table 9-7. The background concentrations noted in Table 9-7 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 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/approved GWPS, that well will be resampled for the specific constituent(s) in accordance with the statistical evaluation procedures outlined in Attachment 9-5. 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.

<u>10.0 Written Closure Plan, 845.230(d)(2)(J)</u>

According to the Closure Plan prepared by KPRG in October 2016, "the closure of Ash Pond 2 will be by removal of the CCR" as defined in Section 845.740(a). "Midwest Generation plans to keep the structure of the pond intact for use for non-CCR material". MWG has filed a Petition for an Adjusted Standard with the Illinois Pollution Control Board requesting that MWG may reuse the HDPE liner in Pond 2. *In the Matter of: Petition of Midwest Generation for an Adjusted Standard from 845.740(a) and Finding of Inapplicability of Part 845*, PCB AS21-02. The Closure Plan as written complies with Section 845.720(a). The Closure Plan is included as part of this application in Attachment 10.

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

The CCR was removed from Pond 2 but Illinois EPA has not issued a construction permit for closure by removal pursuant to Section 845.740. As a result, Pond 2 has not completed closure by removal as required in Section 845.740(a) and a post-closure plan has been prepared in accordance with 845.780(a). The post-closure plan is located in Attachment 11.

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

The upper liner component for Pond 2 consists of white 60-mil high-density polyethylene (HDPE) topped with a sand cushion and then a limestone screenings warning layer. The lower liner component below the 60-mil HDPE liner is the original 12-inch thick Poz-O-Pac liner followed by five feet of brown and dark brown gravelly sand, some fine sand with traces of brown clay and gray lean clay. This composition of the liner components of Pond 2 were evaluated against the liner design criteria using the process outlined in Section 845.400(c) to determine if the pond is considered lined or unlined. The calculations showing the flow rate calculations and comparison are shown in Attachment 12. The calculations show that the liner components for Pond 2 do not comply with the requirements of Section 845.400 and the surface impoundment is considered unlined. As previously stated, all CCR material has already been removed from Pond 2 and since the station is no longer burning coal as a fuel source, there will be no future placement or storage of CCR within this impoundment.

13.0 History of Known Exceedances

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 Pond 2. As discussed in Section 9 of this permit application, the CCR groundwater monitoring network in the vicinity of Pond 2 includes upgradient well MW-10 and downgradient wells MW-3 through MW-5.

The existing CCR data for Pond 2 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): Chloride and TDS
- MW-03 (downgradient): Chloride and TDS
- MW-04 (downgradient): Chloride
- MW-05 (downgradient): Chloride and TDS

These wells are within the existing GMZ. Channahon Road (Rte 6), located adjacent to and upgradient of Pond 2, is a major four-lane roadway. The use of salt on Channahon Road during the winter for road safety may be the likely source of the chloride and the associated TDS in the monitoring wells. 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 an Alternate Source Demonstration (ASD) for Pond 2. The ASD concluded that the potentially statistically significant increases in the subject Federal CCR Rule Appendix III parameters were not associated with a potential release from Pond 2 but rather an alternate transient source of impacts, potentially from upgradient and offsite. Because the GWPSs 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 initial structural stability assessment was performed for Pond 2 in October of 2016 and has been reviewed and updated 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(b)

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(c)(3)

An Inflow Design Flood Control System Plan was previously completed for Pond 2 by Geosyntec in October 2016. This plan was completed in accordance with the federal CCR rule, 40 CFR Part 257.82(c). The plan demonstrates that the existing outlets structures, conveyance piping, and downstream hydraulic structures for Pond 2 adequately manage the inflow from the design event. The previously completed plan was updated by Sargent & Lundy, LLC 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 included in Attachment 19.

20.0 Closure Priority Categorization, 845.230(d)(2)(T) & 845.700(g)

Based on Section 845.700(g), the category designation for Pond 2 is Category 3. The Category 3 designation for Pond 2 is based on the following:

- Pond 2 is an inactive surface impoundment;
- There are no potable wells or setbacks of existing water supply wells downgradient, and as such Midwest Generation, LLC ("MWG") 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 Pond 2 is located within one mile of an area of environmental justice concern.

A Notice of Intent to Initiate Closure for Pond 2 was submitted on April 11, 2021 by Midwest Generation.

OPERATING PERMIT TABLES

Table 2. Joliet 29 Generating Station
Pond 2 CCR Chemical Constituents Analytical Results

Parameter Name	Bottom Ash Sample 8/31/2021
Antimony	<1.8 F1
Arsenic	1.5 F1
Barium	3,000
Beryllium	1.5 F1
Boron	130 F1 V
Cadmium	<0.18
Calcium	100,000
Chloride	<20
Chromium	12 F1
Cobalt	15
Fluoride	<1.0
Lead	5.6
Lithium	20 V
Mercury	<0.016
Molybdenum	1.1 F1
Selenium	<0.89 F1
Sulfate	560
Thallium	2.9
Radium 226	1.54
Radium 228	1.63
Radium 226 & 228	3.17

Notes:

All results are in milligrams per kilogram (mg/kg), except for radium, which pCi/L

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, Joliet #29 Generating Station, Joliet, Illinois.

Joliet #29 Station	
Month	**Average Monthly Precipitation* (inches)**
January	1.09
February	1.27
March	2.01
April	3.66
May	3.9
June	4.65
July	4.41
August	4.08
September	3.02
October	3.09
November	2.4
December	1.81

Notes:
* - Historical precipitation data was obtained from the National Oceanic and Atmospheric Administration. Precipitation data was averaged from four stations located within Joliet and Elgin, Illinois. Dates of precipitation data range from 1894-2020.

Table 9-2. Groundwater Elevations - Midwest Generation, LLC, Joliet Station #29, Joliet, IL.

Well ID	Date	Top of Casing (TOC) Elevation (ft above MSL)	Ground Elevation (ft above MSL)	Groundwater Elevation (ft above MSL)	Sampling Groundwater Elevation (ft above MSL)	Bottom of Well Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Sampling Depth to Groundwater (ft below TOC)	Depth to Bottom of Well (ft below TOC)
MW-01	02/10/15	534.76	531.46	NM	NM	504.88	NM	NM	29.88
	05/27/15	534.76	531.46	NM	NM	504.88	NM	NM	29.88
	08/04/15	534.76	531.46	NM	NM	504.88	NM	NM	29.88
	10/27/15	534.76	531.46	NM	NM	504.88	NM	NM	29.88
	02/09/16	534.03	531.56	NM	NM	505.50	NM	NM	28.53
	05/10/16	534.03	531.56	505.90	506.18	505.50	28.13	27.85	28.53
	08/30/16	534.03	531.56	506.85	506.91	505.50	27.18	27.12	28.53
	11/01/16	534.03	531.56	505.89	505.53	505.50	28.14	28.50	28.53
	02/06/17	534.03	531.56	NM	NM	505.50	NM	NM	28.53
	04/25/17	534.03	531.56	NM	NM	505.50	NM	NM	28.53
	08/01/17	534.03	531.56	506.59	506.53	505.50	27.44	27.50	28.53
	10/17/17	534.03	531.56	508.87	508.85	505.50	25.16	25.18	28.53
	02/21/18	534.03	531.56	506.37	509.54	505.50	27.66	24.49	28.53
	04/25/18	534.03	531.56	505.89	505.58	505.50	28.14	28.45	28.53
	07/31/18	534.03	531.56	505.75	505.50	505.50	28.28	28.53	28.53
	10/16/18	534.03	531.56	506.22	505.93	505.50	27.81	28.10	28.53
	02/04/19	534.03	531.56	505.73	NM	505.50	28.30	NM	28.53
	05/06/19	534.03	531.56	509.00	509.00	505.50	25.03	25.03	28.53
	08/06/19	534.03	531.56	505.88	NM	505.50	28.15	NM	28.53
	11/06/19	534.03	531.56	507.38	NM	505.50	26.65	NM	28.53
	02/12/20	534.03	531.56	505.69	NM	505.50	28.34	NM	28.53
	05/21/20	534.03	531.56	511.60	NM	505.50	22.43	NM	28.53
	07/30/20	534.03	531.56	505.74	NM	505.50	28.29	NM	28.53
	10/21/20	534.03	531.56	505.73	NM	505.50	28.30	NM	28.53
	02/11/21	534.03	531.56	505.73	NM	505.50	28.30	NM	28.53
	05/17/21	534.03	531.56	505.76	NM	505.50	28.27	NM	28.53
MW-02	02/10/15	534.28	531.19	505.17	510.69	504.05	29.11	23.59	30.23
	05/27/15	534.28	531.19	505.34	505.32	504.05	28.94	28.96	30.23
	08/04/15	534.28	531.19	505.14	505.13	504.05	29.14	29.15	30.23
	10/27/15	534.28	531.19	504.89	505.09	504.05	29.39	29.19	30.23
	02/09/16	534.30	531.17	505.59	505.57	504.07	28.71	28.73	30.23
	05/10/16	534.30	531.17	505.89	506.09	504.07	28.41	28.21	30.23
	08/30/16	534.30	531.17	506.83	506.97	504.07	27.47	27.33	30.23
	11/01/16	534.30	531.17	505.90	505.89	504.07	28.40	28.41	30.23
	02/06/17	534.30	531.17	505.46	505.74	504.07	28.84	28.56	30.23
	04/25/17	534.30	531.17	505.69	505.70	504.07	28.61	28.60	30.23
	08/01/17	534.30	531.17	506.59	506.52	504.07	27.71	27.78	30.23
	10/17/17	534.30	531.17	508.82	508.82	504.07	25.48	25.48	30.23
	02/21/18	534.30	531.17	506.35	509.65	504.07	27.95	24.65	30.23
	04/25/18	534.30	531.17	505.87	505.81	504.07	28.43	28.49	30.23
	08/01/18	534.30	531.17	505.22	505.14	504.07	29.08	29.16	30.23
	10/16/18	534.30	531.17	506.17	506.11	504.07	28.13	28.19	30.23
	02/04/19	534.30	531.17	505.68	505.65	504.07	28.62	28.65	30.23
	05/06/19	534.30	531.17	508.95	508.29	504.07	25.35	26.01	30.23
	08/06/19	534.30	531.17	505.16	NM	504.07	29.14	NM	30.23
	11/06/19	534.30	531.17	507.27	NM	504.07	27.03	NM	30.23
	02/12/20	534.30	531.17	505.49	NM	504.07	28.81	NM	30.23
	05/21/20	534.30	531.17	510.37	NM	504.07	23.93	23.94	30.23
	07/30/20	534.30	531.17	504.98	NM	504.07	29.32	NM	30.23
	10/21/20	534.30	531.17	505.25	NM	504.07	29.05	NM	30.23
	02/11/21	534.30	531.17	505.15	NM	504.07	29.15	NM	30.23
	05/17/21	534.30	531.17	505.68	NM	504.07	28.62	NM	30.23
MW-03	02/10/15	538.78	535.54	505.19	505.20	494.68	33.59	33.58	44.10
	05/27/15	538.78	535.54	505.36	505.35	494.68	33.42	33.43	44.10
	08/04/15	538.78	535.54	505.22	505.22	494.68	33.56	33.56	44.10
	10/27/15	538.78	535.54	504.91	505.04	494.68	33.87	33.74	44.10
	02/09/16	538.79	535.53	505.62	505.51	494.68	33.17	33.28	44.10
	05/10/16	538.79	535.53	505.97	505.99	494.68	32.82	32.80	44.10
	08/30/16	538.79	535.53	506.91	507.22	494.68	31.88	31.57	44.10
	11/01/16	538.79	535.53	505.91	505.94	494.68	32.88	32.85	44.10
	02/06/17	538.79	535.53	505.54	505.54	494.68	33.25	33.25	44.10
	04/26/17	538.79	535.53	505.73	505.78	494.68	33.06	33.01	44.10
	08/01/17	538.79	535.53	506.43	506.44	494.68	32.36	32.35	44.10
	10/18/17	538.79	535.53	508.76	508.54	494.68	30.03	30.25	44.10
	02/20/18	538.79	535.53	506.38	506.56	494.68	32.41	32.23	44.10
	04/24/18	538.79	535.53	505.96	505.96	494.68	32.83	32.83	44.10
	07/31/18	538.79	535.53	505.23	505.25	494.68	33.56	33.54	44.10
	10/17/18	538.79	535.53	506.21	506.09	494.68	32.58	32.70	44.10
	02/04/19	538.79	535.53	505.74	505.81	494.68	33.05	32.98	44.10
	05/06/19	538.79	535.53	508.84	508.61	494.68	29.95	30.18	44.10
	08/06/19	538.79	535.53	505.26	505.29	494.68	33.53	33.50	44.10
	11/06/19	538.79	535.53	505.41	505.29	494.68	33.38	33.50	44.10
	02/12/20	538.79	535.53	505.61	505.29	494.68	33.18	33.50	44.10
	05/20/20	538.79	535.53	511.66	511.66	494.68	27.13	27.13	44.10
	07/30/20	538.79	535.53	505.06	505.04	494.68	33.73	33.75	44.10
	10/21/20	538.79	535.53	505.27	505.46	494.68	33.52	33.33	44.10
	02/11/21	538.79	535.53	504.23	505.46	494.68	34.56	33.33	44.10
	05/17/21	538.79	535.53	505.74	505.73	494.68	33.05	33.06	44.10

Table 9-2. Groundwater Elevations - Midwest Generation, LLC, Joliet Station #29, Joliet, IL.

Well ID	Date	Top of Casing (TOC) Elevation (ft above MSL)	Ground Elevation (ft above MSL)	Groundwater Elevation (ft above MSL)	Sampling Groundwater Elevation (ft above MSL)	Bottom of Well Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Sampling Depth to Groundwater (ft below TOC)	Depth to Bottom of Well (ft below TOC)
MW-04	02/10/15	539.03	535.80	505.19	505.18	496.13	33.84	33.85	42.90
	05/27/15	539.03	535.80	505.39	505.37	496.13	33.64	33.66	42.90
	08/04/15	539.03	535.80	505.19	505.19	496.13	33.84	33.84	42.90
	10/27/15	539.03	535.80	504.98	505.00	496.13	34.05	34.03	42.90
	02/09/16	539.01	535.83	505.59	505.44	496.11	33.42	33.57	42.90
	05/10/16	539.01	535.83	505.94	505.95	496.11	33.07	33.06	42.90
	08/30/16	539.01	535.83	506.93	507.19	496.11	32.08	31.82	42.90
	11/01/16	539.01	535.83	505.85	505.87	496.11	33.16	33.14	42.90
	02/06/17	539.01	535.83	505.50	505.52	496.11	33.51	33.49	42.90
	04/26/17	539.01	535.83	505.72	505.74	496.11	33.29	33.27	42.90
	08/01/17	539.01	535.83	506.92	506.39	496.11	32.09	32.62	42.90
	10/18/17	539.01	535.83	508.73	508.50	496.11	30.28	30.51	42.90
	02/20/18	539.01	535.83	505.37	506.69	496.11	33.64	32.32	42.90
	04/24/18	539.01	535.83	505.91	505.92	496.11	33.10	33.09	42.90
	07/31/18	539.01	535.83	505.20	505.22	496.11	33.81	33.79	42.90
	10/17/18	539.01	535.83	506.16	506.03	496.11	32.85	32.98	42.90
	02/04/19	539.01	535.83	505.72	505.72	496.11	33.29	33.29	42.90
	05/06/19	539.01	535.83	509.18	508.57	496.11	29.83	30.44	42.90
	08/06/19	539.01	535.83	505.22	505.21	496.11	33.79	33.80	42.90
	11/06/19	539.01	535.83	507.36	505.21	496.11	31.65	33.80	42.90
	02/12/20	539.01	535.83	505.56	505.26	496.11	33.45	33.75	42.90
	05/20/20	539.01	535.83	511.61	511.61	496.11	27.40	27.40	42.90
	07/30/20	539.01	535.83	505.01	505.04	496.11	34.00	33.97	42.90
	10/21/20	539.01	535.83	505.53	505.46	496.11	33.48	33.55	42.90
	02/11/21	539.01	535.83	505.16	505.46	496.11	33.85	33.55	42.90
	05/17/21	539.01	535.83	505.69	505.69	496.11	33.32	33.32	42.90
MW-05	02/11/15	539.69	536.43	505.12	505.12	494.64	34.57	34.57	45.05
	05/27/15	539.69	536.43	505.26	505.25	494.64	34.43	34.44	45.05
	08/04/15	539.69	536.43	505.14	505.14	494.64	34.55	34.55	45.05
	10/27/15	539.69	536.43	504.78	504.95	494.64	34.91	34.74	45.05
	02/09/16	539.64	536.36	505.46	505.33	494.59	34.18	34.31	45.05
	05/10/16	539.64	536.36	505.83	505.86	494.59	33.81	33.78	45.05
	08/30/16	539.64	536.36	506.82	507.09	494.59	32.82	32.55	45.05
	11/01/16	539.64	536.36	505.74	505.74	494.59	33.90	33.90	45.05
	02/06/17	539.64	536.36	505.41	505.40	494.59	34.23	34.24	45.05
	04/26/17	539.64	536.36	505.60	505.66	494.59	34.04	33.98	45.05
	08/01/17	539.64	536.36	506.52	506.24	494.59	33.12	33.40	45.05
	10/18/17	539.64	536.36	508.61	508.59	494.59	31.03	31.05	45.05
	02/20/18	539.64	536.36	506.35	506.74	494.59	33.29	32.90	45.05
	04/24/18	539.64	536.36	505.85	505.82	494.59	33.79	33.82	45.05
	07/31/18	539.64	536.36	505.10	505.11	494.59	34.54	34.53	45.05
	10/17/18	539.64	536.36	506.03	505.91	494.59	33.61	33.73	45.05
	02/04/19	539.64	536.36	505.97	505.96	494.59	33.67	33.68	45.05
	05/06/19	539.64	536.36	509.09	508.98	494.59	30.55	30.66	45.05
	08/06/19	539.64	536.36	505.09	505.09	494.59	34.55	34.55	45.05
	11/06/19	539.64	536.36	507.24	505.09	494.59	32.40	34.55	45.05
	02/12/20	539.64	536.36	505.48	504.59	494.59	34.16	35.05	45.05
	05/20/20	539.64	536.36	511.48	511.48	494.59	28.16	28.16	45.05
	07/30/20	539.64	536.36	504.87	504.88	494.59	34.77	34.76	45.05
	10/21/20	539.64	536.36	505.12	506.09	494.59	34.52	33.55	45.05
	02/11/21	539.64	536.36	505.04	506.09	494.59	34.60	33.55	45.05
	05/17/21	539.64	536.36	505.59	505.54	494.59	34.05	34.10	45.05
MW-06	02/10/15	539.06	535.86	505.23	505.23	496.86	33.83	33.83	42.20
	05/28/15	539.06	535.86	505.46	505.45	496.86	33.60	33.61	42.20
	08/05/15	539.06	535.86	505.11	505.12	496.86	33.95	33.94	42.20
	10/27/15	539.06	535.86	504.88	504.93	496.86	34.18	34.13	42.20
	02/09/16	539.05	535.89	505.61	505.46	496.85	33.44	33.59	42.20
	05/10/16	539.05	535.89	506.00	506.94	496.85	33.05	32.11	42.20
	08/30/16	539.05	535.89	506.96	507.36	496.85	32.09	31.69	42.20
	11/01/16	539.05	535.89	505.88	505.91	496.85	33.17	33.14	42.20
	02/06/17	539.05	535.89	505.56	505.57	496.85	33.49	33.48	42.20
	04/27/17	539.05	535.89	505.74	505.77	496.85	33.31	33.28	42.20
	08/01/17	539.05	535.89	506.65	506.28	496.85	32.40	32.77	42.20
	10/19/17	539.05	535.89	508.74	508.14	496.85	30.31	30.91	42.20
	02/21/18	539.05	535.89	506.57	509.45	496.85	32.48	29.60	42.20
	04/25/18	539.05	535.89	505.94	505.86	496.85	33.11	33.19	42.20
	07/31/18	539.05	535.89	505.27	505.25	496.85	33.78	33.80	42.20
	10/18/18	539.05	535.89	506.16	506.00	496.85	32.89	33.05	42.20
	02/04/19	539.05	535.89	506.12	506.12	496.85	32.93	32.93	42.20
	05/06/19	539.05	535.89	509.19	508.22	496.85	29.86	30.83	42.20
	08/06/19	539.05	535.89	505.26	505.33	496.85	33.79	33.72	42.20
	11/06/19	539.05	535.89	507.36	505.33	496.85	31.69	33.72	42.20
	02/12/20	539.05	535.89	505.63	505.60	496.85	33.42	33.45	42.20
	05/21/20	539.05	535.89	511.51	511.45	496.85	27.54	27.60	42.20
	07/30/20	539.05	535.89	505.08	505.08	496.85	33.97	33.97	42.20
	10/21/20	539.05	535.89	505.30	505.37	496.85	33.75	33.68	42.20
	02/11/21	539.05	535.89	505.22	505.37	496.85	33.83	33.68	42.20
	05/17/21	539.05	535.89	505.73	505.73	496.85	33.32	33.32	42.20
MW-07	02/10/15	539.35	535.86	505.24	505.24	496.12	34.11	34.11	43.23
	05/28/15	539.35	535.86	505.50	505.50	496.12	33.85	33.85	43.23
	08/05/15	539.35	535.86	505.18	505.17	496.12	34.17	34.18	43.23
	10/27/15	539.35	535.86	504.93	505.00	496.12	34.42	34.35	43.23
	02/09/16	539.35	535.87	505.66	505.51	496.12	33.69	33.84	43.23
	05/10/16	539.35	535.87	506.34	507.02	496.12	33.01	32.33	43.23
	08/30/16	539.35	535.87	507.04	507.41	496.12	32.31	31.94	43.23
	11/01/16	539.35	535.87	505.91	505.93	496.12	33.44	33.42	43.23
	02/06/17	539.35	535.87	505.59	505.62	496.12	33.76	33.73	43.23
	04/27/17	539.35	535.87	505.77	505.82	496.12	33.58	33.53	43.23
	08/01/17	539.35	535.87	506.68	506.30	496.12	32.67	33.05	43.23
	10/19/17	539.35	535.87	508.76	508.07	496.12	30.59	31.28	43.23
	02/21/18	539.35	535.87	506.67	509.64	496.12	32.68	29.71	43.23
	04/25/18	539.35	535.87	505.98	505.89	496.12	33.37	33.46	43.23
	08/01/18	539.35	535.87	505.30	505.31	496.12	34.05	34.04	43.23
	10/18/18	539.35	535.87	506.17	506.03	496.12	33.18	33.32	43.23
	02/04/19	539.35	535.87	506.19	506.19	496.12	33.16	33.16	43.23
	05/06/19	539.35	535.87	509.22	508.51	496.12	30.13	30.84	43.23
	08/06/19	539.35	535.87	505.33	505.33	496.12	34.02	34.02	43.23
	11/06/19	539.35	535.87	507.40	505.33	496.12	31.95	34.02	43.23
	02/12/20	539.35	535.87	505.65	505.65	496.12	33.70	33.70	43.23
	05/21/20	539.35	535.87	511.53	511.53	496.12	27.82	27.82	43.23
	07/30/20	539.35	535.87	505.14	505.14	496.12	34.21	34.21	43.23
	10/21/20	539.35	535.87	505.32	505.65	496.12	34.03	33.70	43.23
	02/11/21	539.35	535.87	505.25	505.65	496.12	34.10	33.70	43.23
	05/17/21	539.35	535.87	505.63	505.60	496.12	33.72	33.75	43.23

Table 9-2. Groundwater Elevations - Midwest Generation, LLC, Joliet Station #29, Joliet, IL.

Well ID	Date	Top of Casing (TOC) Elevation (ft above MSL)	Ground Elevation (ft above MSL)	Groundwater Elevation (ft above MSL)	Sampling Groundwater Elevation (ft above MSL)	Bottom of Well Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Sampling Depth to Groundwater (ft below TOC)	Depth to Bottom of Well (ft below TOC)
MW-08	02/10/15	536.87	533.72	505.18	505.19	498.81	31.69	31.68	38.06
	05/27/15	536.87	533.72	505.36	505.38	498.81	31.51	31.49	38.06
	08/04/15	536.87	533.72	505.19	505.20	498.81	31.68	31.67	38.06
	10/27/15	536.87	533.72	504.93	504.98	498.81	31.94	31.89	38.06
	02/09/16	536.96	533.77	505.72	505.72	498.90	31.24	31.24	38.06
	05/10/16	536.96	533.77	498.00	498.24	498.90	38.96	38.72	38.06
	08/30/16	536.96	533.77	507.05	507.09	498.90	29.91	29.87	38.06
	11/01/16	536.96	533.77	506.01	506.03	498.90	30.95	30.93	38.06
	02/06/17	536.96	533.77	505.58	505.62	498.90	31.38	31.34	38.06
	04/25/17	536.96	533.77	505.74	505.79	498.90	31.22	31.17	38.06
	08/01/17	536.96	533.77	506.78	506.76	498.90	30.18	30.20	38.06
	10/17/17	536.96	533.77	509.02	508.99	498.90	27.94	27.97	38.06
	02/20/18	536.96	533.77	506.00	506.55	498.90	30.96	30.41	38.06
	08/01/18	536.96	533.77	505.23	505.26	498.90	31.73	31.70	38.06
	10/16/18	536.96	533.77	506.36	506.35	498.90	30.60	30.61	38.06
	02/04/19	536.96	533.77	506.04	506.04	498.90	30.92	30.92	38.06
	05/06/19	536.96	533.77	509.22	509.13	498.90	27.74	27.83	38.06
	08/06/19	536.96	533.77	505.27	505.27	498.90	31.69	31.69	38.06
	11/06/19	536.96	533.77	507.54	507.16	498.90	29.42	29.80	38.06
	02/12/20	536.96	533.77	505.56	505.56	498.90	31.40	31.40	38.06
	05/20/20	536.96	533.77	511.82	511.63	498.90	25.14	25.33	38.06
	07/30/20	536.96	533.77	505.13	505.12	498.90	31.83	31.84	38.06
	10/28/20	536.96	533.77	505.29	505.41	498.90	31.67	31.55	38.06
	02/11/21	536.96	533.77	505.26	505.41	498.90	31.70	31.55	38.06
	05/17/21	536.96	533.77	505.81	505.76	498.90	31.15	31.20	38.06
MW-09	02/10/15	534.44	531.13	505.22	504.70	496.29	29.22	29.74	38.15
	05/27/15	534.44	531.13	505.37	504.98	496.29	29.07	29.46	38.15
	08/04/15	534.44	531.13	505.22	504.91	496.29	29.22	29.53	38.15
	10/27/15	534.44	531.13	504.96	504.83	496.29	29.48	29.61	38.15
	02/09/16	534.41	531.08	505.64	505.49	496.26	28.77	28.92	38.15
	05/10/16	534.41	531.08	505.90	506.39	496.26	28.51	28.02	38.15
	08/30/16	534.41	531.08	506.98	506.94	496.26	27.43	27.47	38.15
	11/01/16	534.41	531.08	505.89	505.32	496.26	28.52	29.09	38.15
	02/06/17	534.41	531.08	505.51	505.66	496.26	28.90	28.75	38.15
	04/25/17	534.41	531.08	505.66	505.54	496.26	28.75	28.87	38.15
	08/01/17	534.41	531.08	506.64	506.27	496.26	27.77	28.14	38.15
	10/17/17	534.41	531.08	508.89	508.73	496.26	25.52	25.68	38.15
	02/20/18	534.41	531.08	506.39	506.99	496.26	28.02	27.42	38.15
	04/26/18	534.41	531.08	505.89	505.58	496.26	28.52	28.83	38.15
	08/01/18	534.41	531.08	505.18	505.05	496.26	29.23	29.36	38.15
	10/16/18	534.41	531.08	506.23	506.12	496.26	28.18	28.29	38.15
	02/04/19	534.41	531.08	506.02	505.99	496.26	28.39	28.42	38.15
	05/06/19	534.41	531.08	509.08	508.09	496.26	25.33	26.32	38.15
	08/06/19	534.41	531.08	505.23	504.61	496.26	29.18	29.80	38.15
	11/06/19	534.41	531.08	507.42	504.61	496.26	26.99	29.80	38.15
	02/12/20	534.41	531.08	505.53	504.89	496.26	28.88	29.52	38.15
	05/20/20	534.41	531.08	511.06	510.76	496.26	23.35	23.65	38.15
	07/30/20	534.41	531.08	505.02	505.05	496.26	29.39	29.36	38.15
	10/21/20	534.41	531.08	505.28	505.05	496.26	29.13	29.36	38.15
	02/11/21	534.41	531.08	505.21	505.05	496.26	29.20	29.36	38.15
	05/17/21	534.41	531.08	505.73	505.36	496.26	28.68	29.05	38.15
MW-10	02/11/15	540.03	536.95	505.27	505.27	496.10	34.76	34.76	43.93
	05/28/15	540.03	536.95	505.48	505.48	496.10	34.55	34.55	43.93
	08/04/15	540.03	536.95	505.29	505.30	496.10	34.74	34.73	43.93
	10/27/15	540.03	536.95	504.93	505.07	496.10	35.10	34.96	43.93
	02/09/16	540.02	536.98	505.70	505.61	496.09	34.32	34.41	43.93
	05/10/16	540.02	536.98	506.00	506.66	496.09	34.02	33.36	43.93
	08/30/16	540.02	536.98	507.05	507.38	496.09	32.97	32.64	43.93
	11/01/16	540.02	536.98	505.98	505.97	496.09	34.04	34.05	43.93
	02/06/17	540.02	536.98	505.60	505.62	496.09	34.42	34.40	43.93
	04/26/17	540.02	536.98	505.80	505.84	496.09	34.22	34.18	43.93
	08/01/17	540.02	536.98	506.84	506.50	496.09	33.18	33.52	43.93
	10/18/17	540.02	536.98	508.89	508.61	496.09	31.13	31.41	43.93
	02/21/18	540.02	536.98	506.19	509.42	496.09	33.83	30.60	43.93
	04/24/18	540.02	536.98	506.05	506.02	496.09	33.97	34.00	43.93
	08/01/18	540.02	536.98	505.27	505.27	496.09	34.75	34.75	43.93
	10/17/18	540.02	536.98	506.29	506.14	496.09	33.73	33.88	43.93
	02/04/19	540.02	536.98	506.11	506.10	496.09	33.91	33.92	43.93
	05/06/19	540.02	536.98	509.44	508.82	496.09	30.58	31.20	43.93
	08/06/19	540.02	536.98	505.32	505.32	496.09	34.70	34.70	43.93
	11/06/19	540.02	536.98	507.60	505.32	496.09	32.42	34.70	43.93
	02/12/20	540.02	536.98	505.67	505.67	496.09	34.35	34.35	43.93
	05/20/20	540.02	536.98	511.83	511.86	496.09	28.19	28.16	43.93
	07/30/20	540.02	536.98	505.14	505.12	496.09	34.88	34.90	43.93
	10/21/20	540.02	536.98	505.30	505.30	496.09	34.72	34.72	43.93
	02/11/21	540.02	536.98	505.25	505.30	496.09	34.77	34.72	43.93
	05/17/21	540.02	536.98	505.79	505.78	496.09	34.23	34.24	43.93
MW-11	02/11/15	539.47	536.52	505.49	505.49	497.14	33.98	33.98	42.33
	05/28/15	539.47	536.52	505.96	505.97	497.14	33.51	33.50	42.33
	08/04/15	539.47	536.52	505.65	505.64	497.14	33.82	33.83	42.33
	10/27/15	539.47	536.52	505.16	505.32	497.14	34.31	34.15	42.33
	02/09/16	539.41	536.62	506.10	505.88	497.08	33.31	33.53	42.33
	05/10/16	539.41	536.62	507.33	506.60	497.08	32.08	32.81	42.33
	08/30/16	539.41	536.62	508.27	508.85	497.08	31.14	30.56	42.33
	11/01/16	539.41	536.62	506.32	506.28	497.08	33.09	33.13	42.33
	02/06/17	539.41	536.62	505.90	505.92	497.08	33.51	33.49	42.33
	04/26/17	539.41	536.62	506.17	506.17	497.08	33.24	33.24	42.33
	08/01/17	539.41	536.62	507.47	507.38	497.08	31.94	32.03	42.33
	10/19/17	539.41	536.62	509.61	509.16	497.08	29.8	30.25	42.33
	02/21/18	539.41	536.62	506.45	509.85	497.08	32.96	29.56	42.33
	04/25/18	539.41	536.62	505.48	506.40	497.08	33.93	33.01	42.33
	08/01/18	539.41	536.62	505.53	505.54	497.08	33.88	33.87	42.33
	10/17/18	539.41	536.62	506.63	506.51	497.08	32.78	32.90	42.33
	02/04/19	539.41	536.62	506.19	506.19	497.08	33.22	33.22	42.33
	05/06/19	539.41	536.62	510.58	509.98	497.08	28.83	29.43	42.33
	08/06/19	539.41	536.62	505.66	505.66	497.08	33.75	33.75	42.33
	11/06/19	539.41	536.62	508.26	505.66	497.08	31.15	33.75	42.33
	02/12/20	539.41	536.62	505.88	505.81	497.08	33.53	33.60	42.33
	05/20/20	539.41	536.62	512.83	512.81	497.08	26.58	26.60	42.33
	07/30/20	539.41	536.62	505.53	505.48	497.08	33.88	33.93	42.33
	10/21/20	539.41	536.62	505.39	505.39	497.08	34.02	34.02	42.33
	02/11/21	539.41	536.62	505.46	505.39	497.08	33.95	34.02	42.33
	05/17/21	539.41	536.62	506.09	506.05	497.08	33.32	33.36	42.33

Note: Values for Depth to Bottom of Well are from prior to the installation of the dedicated pumps.
NM - Not Measured

Table 9-3. Hydraulic Gradient, Direction and Seepage Velocity - Midwest Generation, LLC, Joliet #29 Generating Station, Joliet, IL.

DATE	Groundwater Flow Direction	Kavg (ft/sec)*	Average Hydraulic Gradient (ft/ft)	Porosity (unitless)**	Estimated Seepage Velocity (ft/day)
10/28/2015	Southerly (SSW-SSE)	1.970E-03	0.0003	0.35	0.13
2/10/2016	Southerly (SSW-SSE)	1.970E-03	0.0007	0.35	0.32
5/12/2016	Southerly (SSW-SSE)	1.970E-03	0.0004	0.35	0.17
8/31/2016	Southerly (SSW-SSE)	1.970E-03	0.0004	0.35	0.17
11/2/2016	Southerly (SSW-SSE)	1.970E-03	0.0007	0.35	0.32
2/6/2017	Southerly (SSW-SSE)	1.970E-03	0.0005	0.35	0.22
4/26/2017	Southerly (SSW-SSE)	1.970E-03	0.0006	0.35	0.29
6/14/2017	Southerly (SSW-SSE)	1.970E-03	0.0006	0.35	0.29
8/2/2017	Southerly (SSW-SSE)	1.970E-03	0.0008	0.35	0.39
10/18/2017	Southerly (SSW-SSE)	1.970E-03	0.0004	0.35	0.19
4/24/2018	Southerly (SSW-SSE)	1.970E-03	0.0008	0.35	0.39
10/16/2018	Southerly (SSW)	1.970E-03	0.00053	0.35	0.26
5/6/2019	Southerly (SSW-SSE)	1.970E-03	0.0010	0.35	0.46
11/6/2019	Southerly (SSW-SSE)	1.970E-03	0.00200	0.35	0.97
5/20/2020	Southerly (SSW-SSE)	1.970E-03	0.0043	0.35	2.11
10/21/2020	Southerly (SSW-SSE)	1.970E-03	0.00080	0.35	0.39
5/17/2021	Southerly (SSW-SSE)	1.970E-03	0.00140	0.35	0.68

* Kavg - See Section 9.1.2 discussion for average hydraulic conductivity (feet/second).
** - Porosity estimate from Applied Hydrogeology, Fetter, 1980.
SSW - South-southwest
SSE - South-southeast

Table 9-4. Groundwater Analytical Results - Midwest Generation, LLC, Joliet Station #29, Joliet, IL.

Well	Date	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury	Molybdenum	Radium 226 + 228	Selenium	Thallium
MW-10 up-gradient	10/28/2015	0.47	100	200	0.41	7.04	84	790	< 0.003	< 0.001	0.041	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.41	< 0.0005	0.013	< 0.0002	0.0060	0.2981	< 0.0025	< 0.002
	2/10/2016	0.41	100	210	0.44	7.17	120	820	< 0.003	0.001	0.043	< 0.001	< 0.0005	< 0.005	< 0.001	0.44	< 0.0005	0.011	< 0.0002	0.0067	< 0.438	< 0.0025	< 0.002
	5/12/2016	0.29	100	300	0.42	7.02	110	920	< 0.003	< 0.001	0.046	< 0.001	< 0.0005	< 0.005	< 0.001	0.42	< 0.0005	0.012	< 0.0002	0.0051	< 0.414	< 0.0025	< 0.002
	8/31/2016	0.36	89	170	0.46	6.95	100	760	< 0.003	< 0.001	0.039	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.46	< 0.0005	0.010	< 0.0002	0.0077	< 0.394	< 0.0025	< 0.002
	11/2/2016	0.48	100	130	0.45	6.99	95	720	< 0.003	0.0018	0.035	< 0.001	< 0.0005	< 0.005	< 0.001	0.45	0.0014	0.011	< 0.0002	0.0061	0.626	< 0.0025	< 0.002
	2/6/2017	0.44	120	190	0.36	6.99	88	820	< 0.003	0.0011	0.048	< 0.001	< 0.0005	< 0.005	< 0.001	0.36	0.00086	0.014	< 0.0002	0.0056	< 0.389	< 0.0025	< 0.002
	4/26/2017	0.35	120	200	0.35	7.27	87	760	< 0.003	0.0015	0.046	< 0.001	< 0.0005	< 0.005	< 0.001	0.35	0.0012	< 0.01	< 0.0002	0.006	< 0.34	< 0.0025	< 0.002
	6/14/2017	0.29	91	160	0.43	7.48	75	690	< 0.003	< 0.001	0.034	< 0.001	< 0.0005	< 0.005	< 0.001	0.43	< 0.0005	0.012	< 0.0002	0.0072	< 0.356	< 0.0025	< 0.002
	8/2/2017	0.45	97	170	0.38	7.23	110	750	< 0.003	0.0011	0.036	< 0.001	< 0.0005	< 0.005	< 0.001	0.38	< 0.0005	0.011	< 0.0002	0.0079	0.429	< 0.0025	< 0.002
	10/18/2017	0.61	120	140	0.41	7.11	130	820	< 0.003	0.0012	0.04	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.41	0.00059	0.013	< 0.0002	0.0066	< 0.422	< 0.0025	^ < 0.002
	4/24/2018	0.4	110	260	0.39	7.28	120	910	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	0.63	120	180	0.42	7.30	110	810	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/24/2018 R	0.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/7/2019	0.56	130	410	0.39	7.17	95	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/3/2019 R	NA	NA	230	NA	NA	NA	830	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/7/2019	0.35	90	130	0.36	7.40	59	650	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/20/2020	0.85	120	250	0.41	6.90	100	960	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/11/2020 R	0.26	NA	NA	NA	NA	NA	770	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/22/2020	0.34	110	230	0.41	7.11	93	850	< 0.003	0.001	0.043	< ^ 0.001	< 0.0005	< 0.005	< 0.001	0.41	< 0.0005	0.011	< 0.0002	0.0057	NA	< 0.0025	< 0.002
	5/18/2021	0.33	140	350	0.39	7.16	210	1,200	< 0.003	0.0014	0.06	< 0.001	< 0.0005	< 0.005	< 0.001	0.39	< 0.0005	0.015	< 0.0002	0.0055	< 0.4800	< 0.0025	< 0.002
	6/29/2021 R	NA	160	420	NA	NA	190	1,300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-03 down-gradient	10/28/2015	0.34	110	230	0.41	7.11	110	960	< 0.003	0.0015	0.100	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.41	< 0.0005	0.013	< 0.0002	< 0.0050	0.41	< 0.0025	< 0.002
	2/10/2016	0.49	100	220	0.44	7.31	130	790	< 0.003	0.0017	0.100	< 0.001	< 0.0005	< 0.005	< 0.001	0.44	< 0.0005	0.011	< 0.0002	0.0060	< 1.68	0.0045	< 0.002
	5/10/2016	0.48	95	240	0.44	7.07	130	800	< 0.003	0.0011	0.095	< 0.001	< 0.0005	< 0.005	< 0.001	0.44	< 0.0005	0.012	< 0.0002	0.0062	< 0.326	0.0030	< 0.002
	8/31/2016	0.49	100	250	0.45	7.18	120	920	< 0.003	0.0013	0.095	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.45	< 0.0005	0.012	< 0.0002	0.0086	< 0.373	0.0051	< 0.002
	11/2/2016	0.34	87	190	0.44	7.45	94	780	< 0.003	0.0019	0.082	< 0.001	< 0.0005	0.0051	< 0.001	0.44	< 0.0005	< 0.010	< 0.0002	0.0059	0.965	0.0032	< 0.002
	2/6/2017	0.40	97	140	0.39	7.35	77	720	< 0.003	0.0019	0.093	< 0.001	< 0.0005	< 0.005	< 0.001	0.39	< 0.0005	0.012	< 0.0002	0.0066	< 0.356	0.0028	< 0.002
	4/26/2017	0.54	100	210	0.36	7.03	120	820	< 0.003	0.0017	0.11	< 0.001	< 0.0005	< 0.005	< 0.001	0.36	< 0.0005	0.010	< 0.0002	0.0088	< 0.411	0.0052	< 0.002
	6/14/2017	0.45	88	190	0.44	7.43	75	760	< 0.003	0.0014	0.09	< 0.001	< 0.0005	< 0.005	< 0.001	0.44	< 0.0005	0.012	< 0.0002	0.0072	< 0.358	0.0037	< 0.002
	8/2/2017	0.41	99	200	0.40	7.34	110	850	< 0.003	0.0022	0.10	< 0.001	< 0.0005	< 0.005	< 0.001	0.40	< 0.0005	0.011	< 0.0002	0.0065	0.414	0.005	< 0.002
	10/18/2017	0.35	93	160	0.42	7.11	100	850	< 0.003	0.0015	0.088	< ^ 0.001	< 0.0005	< 0.005	< 0.001	0.42	< 0.0005	0.012	< 0.0002	0.0055	< 0.417	0.0026	^ < 0.002
	4/24/2018	0.52	100	220	0.42	7.2	150	930	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/31/2018 R	NA	NA	NA	NA	NA	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	0.25	100	250	0.4	7.04	110	870	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/7/2019	0.43	120	280	0.4	7.27	140	880	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/3/2019 R	NA	NA	NA	NA	NA	65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/7/2019	0.34	100	150	0.4	7.32	65	660	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/20/2020	0.38	100	230	0.42	7.56	78	960	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/11/2020 R	NA	NA	NA	NA	NA	NA	930	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/22/2020	0.32	110	180	0.43	7.23	90	770	< 0.003	0.0014	0.1	<^ 0.001	< 0.0005	< 0.005	< 0.001	0.43	< 0.0005	0.01	< 0.0002	< 0.005	NA	< 0.0025	< 0.002
	5/18/2021	0.28	130	290	0.4	7.13	190	1,200	< 0.003	0.0016	0.14	< 0.001	< 0.0005	< 0.005	0.0011	0.4	< 0.0005	0.014	< 0.0002	< 0.0050	1.1000	< 0.0025	< 0.002
	6/29/2021 R	NA	NA	NA	NA	NA	210	1,300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-04 down-gradient	10/28/2015	0.34	94	F1 200	0.45	7.07	83	740	< 0.003	0.0013	0.082	^ < 0.001	< 0.0005	< 0.005	0.0063	0.45	< 0.0005	0.013	< 0.0002	0.0065	0.741	< 0.0025	< 0.002
	2/10/2016	0.32	97	210	0.47	7.22	140	810	< 0.003	0.0018	0.088	< 0.001	< 0.0005	< 0.005	0.0074	0.47	0.00062	0.011	< 0.0002	0.0063	< 1.52	< 0.0025	< 0.002
	5/10/2016	0.47	100	260	0.46	6.71	150	900	< 0.003	0.0014	0.088	< 0.001	< 0.0005	< 0.005	0.0086	0.46	< 0.0005	0.012	< 0.0002	0.0088	< 0.365	< 0.0025	< 0.002
	8/31/2016	0.42	100	210	0.45	7.07	120	890	< 0.003	0.0014	0.086	^ < 0.001	< 0.0005	< 0.005	0.0035	0.45	< 0.0005	0.011	< 0.0002	0.0083	0.432	< 0.0025	< 0.002
	11/2/2016	0.32	98	160	0.43	7.25	83	750	< 0.003	0.0025	0.079	< 0.001	< 0.0005	< 0.005	0.0100	0.43	0.0012	0.012	< 0.0002	0.007	< 0.463	< 0.0025	< 0.002
	2/6/2017	0.40	110	200	0.37	7.19	98	790	< 0.003	0.0015	0.100	< 0.001	< 0.0005	< 0.005	0.0160	0.37	< 0.0005	0.013	< 0.0002	0.0071	< 0.356	< 0.0025	< 0.002
	4/26/2017	0.33	100	220	0.37	7.46	89	770	< 0.003	0.0021	0.095	< 0.001	< 0.0005	< 0.005	0.0078	0.37	0.00055	0.012	< 0.0002	0.0069	< 0.35	< 0.0025	< 0.002
	6/14/2017	0.37	92	190	0.47	7.45	80	770	< 0.003	0.0013	0.078	< 0.001	< 0.0005	< 0.005	0.0120	0.47	< 0.0005	0.013	< 0.0002	0.0085	< 0.309	< 0.0025	< 0.002
	8/2/2017	0.35	93	180	0.43	7.41	100	770	< 0.003	0.0013	0.077	< 0.001	< 0.0005	0.04	0.0031	0.43	< 0.0005	0.012	< 0.0002	0.0091	< 0.282	0.0029	< 0.002
	10/18/2017	0.54	97	140	0.45	7.2	120	790	< 0.003	0.0019	0.082	^ < 0.001	< 0.0005	< 0.005	0.0046	0.45	0.00077	0.015	< 0.0002	0.0071	0.423	0.003	^ < 0.002
	4/24/2018	0.4	110	240	0.43	7.21	160	940	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/31/2018 R	NA	NA	NA	NA	NA	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	0.29	100	230	0.45	7.2	130	840	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/7/2019	0.76	120	340	0.42	7.27	120	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/3/2019 R	0.23	NA	250	NA	NA	NA	870	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/6/2019	0.3	77	140	0.41	7.33	53	670	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/20/2020	0.79	110	250	0.45	7.3	110	1,100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/11/2020 R	0.28	NA	NA	NA	NA	NA	850	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/22/2020	0.33	100	190	0.48	7.15	83	770	< 0.003	0.0015	0.089	< ^ 0.001	< 0.0005	< 0.005	0.0082	0.48	< 0.0005	0.013	< 0.0002	0.0061	NA	< 0.0025	< 0.002
	5/18/2021	0.22	120	280	0.42	7.3	190	1,100	< 0.003	0.0019	0.12	< 0.001	< 0.0005	< 0.005	0.0037	0.42	< 0.0005	0.014	< 0.0002	< 0.005	< 0.4450	< 0.0025	< 0.002
	6/29/2021 R	NA	NA	NA	NA	NA	190	1,200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-05 down-gradient	10/28/2015	0.64	100	160	0.39	7.12	120	790	< 0.003	0.0011	0.057	^ < 0.001	< 0.0005	< 0.005	0.0013	0.39	< 0.0005	0.018	< 0.0002	0.0088	0.6231	0.0031	< 0.002
	2/10/2016	0.46	110	220	0.39	7.25	120	790	< 0.003	0.0028	0.071	< 0.001	< 0.0005	0.0062	0.0013	0.39	0.0022	< 0.02	< 0.0002	F1 0.0053	1.09	< 0.0025	< 0.002
	5/10/2016	0.8	150	220	0.46	6.88	290	950	< 0.003	0.0023	0.075	< 0.001	< 0.0005	< 0.005	< 0.001	0.46	0.0022	0.014	< 0.0002	0.008	< 0.40	0.019	< 0.002
	8/31/2016	1.0	140	99	0.56	6.81	260	820	< 0.003	< 0.001	0.07	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.56	< 0.0005	< 0.01	< 0.0002	0.012	< 0.42	0.02	< 0.002
	11/2/2016	0.41	98	130	0.37	7.26	100	700	< 0.003	0.0022	0.056	< 0.001	< 0.0005	0.0051	< 0.001	0.37	0.0017	0.015	< 0.0002	0.0061	0.438	< 0.0025	< 0.002
	2/6/2017	0.48	150	180	0.30	7.22	120	790	< 0.003	0.0016	0.082	< 0.001	< 0.0005	< 0.005	< 0.001	0.30	0.0016	0.021	< 0.0002	< 0.005	0.564	0.0029	< 0.002
	4/26/2017	0.67	110	F1 190	0.37	7.28	170	770	< 0.003	0.0014	0.063	< 0.001	< 0.0005	< 0.005	< 0.001	0.37	0.0008	< 0.01	< 0.0002	0.0066	< 0.411	0.013	< 0.002
	6/14/2017	0.44	75	150	0.46	7.47	110	670	< 0.003	0.0012	0.044	< 0.001	< 0.0005	< 0.005	< 0.001	0.46	< 0.0005	0.013	< 0.0002	0.0076	< 0.316	0.0029	< 0.002
	8/2/2017	0.28	83	170	0.35	7.30	99	770	< 0.003	< 0.001	0.054	< 0.001	< 0.0005	< 0.005	< 0.001	0.35	< 0.0005	0.014	< 0.0002	0.0053	0.659	< 0.0025	< 0.002
	10/18/2017	0.42	110	110	0.38	7.16	95	720	< 0.003	0.002	0.067	< ^ 0.001	< 0.0005	< 0.005	< 0.001	0.38	0.0023	0.018	< 0.0002	< 0.005	< 0.371	0.0029	^ < 0.002
	4/24/2018	0.31	110	300	0.34	7.33	130	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/31/2018 R	NA	NA	NA	NA	NA	NA	940	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	0.31	110	210	0.36	7.29	93	810	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/6/2019	0.38	130	500	0.31	7.11	84	1,300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7/3/2019 R	NA	NA	150	NA	NA	NA	890	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/7/2019	0.31	180	130	0.3	7.44	64	590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12/4/2019 R	NA	89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	5/20/2020	0.32	100	270	0.37	7.03	67	890	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/22/2020	0.52	92	180	0.38	7.16	85	720	< 0.003	0.0012	0.069	<^ 0.001	< 0.0005	< 0.005	< 0.001	0.38	< 0.0005	0.013	< 0.0002	0.0054	NA	0.003	< 0.002
	5/18/2021	0.37	130	410	0.3	7.00	160	1,300	< 0.003	0.0015	0.1	< 0.001	< 0.0005	< 0.0050	< 0.0010	0.3	< 0.0005	0.023	< 0.0002	< 0.005	< 0.5970	< 0.0025	< 0.002
	6/29/2021 R	NA	NA	430	NA	NA	150	1,300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All units are in mg/l except pH is in standard units and radium is in pCi/L

DNYA - Data not yet available.

F1 - MS and/or MSD Recovery outside of limits.

NA - Not analyzed. No confirmation resample required.

Table 9-5.Turbidity Measurement Data, Midwest Generation, LLC, Joliet #29 Generating Station

Well ID	Date	Turbidity (NTU)
MW-03	3/2/2021	0.45
	4/10/2021	22.9
	4/25/2021	2.40
	5/18/2021	2.53
	6/11/2021	2.34
	6/29/2021	2.86
	7/19/2021	37.40
	8/9/2021	2.71
	8/30/2021	5.70
	9/27/2021	10.27
MW-04	3/2/2021	81.89
	4/10/2021	5.96
	4/25/2021	3.02
	5/18/2021	2.52
	6/11/2021	2.8
	6/29/201	3.34
	7/19/2021	47.4
	8/9/2021	4.13
	8/30/2021	18.3
	9/27/2021	1.76
MW-05	2/25/2021	1.57
	4/10/2021	8.36
	4/25/2021	2.42
	5/17/2021	5.2
	6/11/2021	14.22
	6/29/2021	5.33
	7/19/2021	26.9
	8/9/2021	3.69
	8/27/2021	8.7
	9/27/2021	14.92
MW-10	3/2/2021	26.07
	4/10/2021	7.31
	4/25/2021	5.21
	5/18/2021	3.73
	6/11/2021	6.65
	6/29/2021	9.49
	7/19/2021	14.5
	8/9/2021	10.08
	8/30/2021	9.3
	9/27/2021	16.3

Table 9-6. Summary of Sample Bottles, Preservation Holding Time, and Analytical Methods. Midwest Generation, LLC, Joliet #29 Generating Station, Joliet, 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

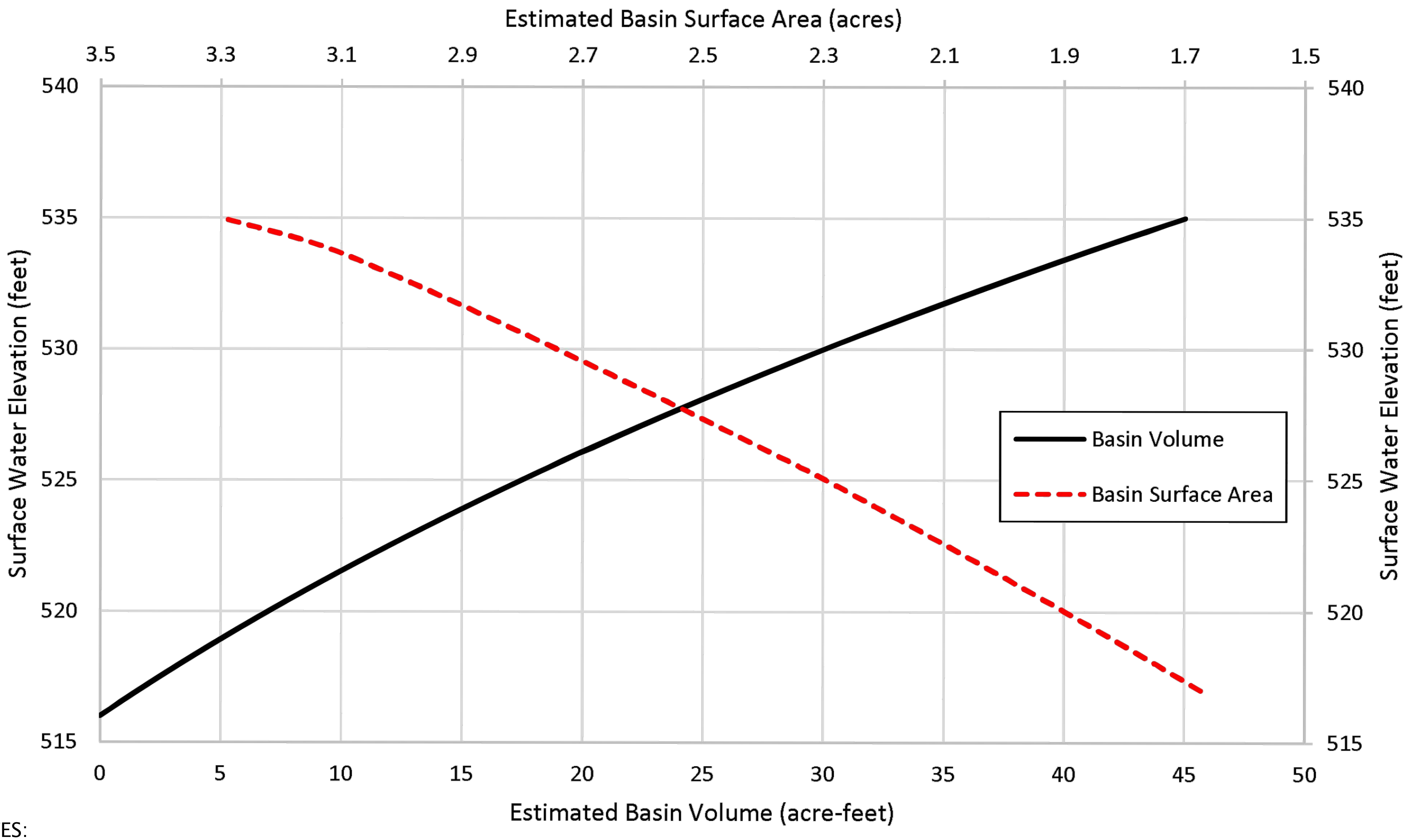
Table 9-7. Proposed Site-Specific Groundwater Protection Standards - Joliet #29

Upgradient Well(s)	Parameter	Section 845.600 Standards	Interwell Background Prediction Limit	**Proposed GWPS**
MW-10	Antimony	0.006	0.003	**0.006**
MW-10	Arsenic	0.01	0.002	**0.01**
MW-10	Barium	2.0	0.063	**2.0**
MW-10	Beryllium	0.004	0.001	**0.004**
MW-10	Boron	2.0	0.831	**2.0**
MW-10	Cadmium	0.005	0.005	**0.005**
MW-10*	Chloride*	200	368	**368**
MW-10	Chromium	0.1	0.005	**0.1**
MW-10	Cobalt	0.006	0.001	**0.006**
MW-10	Combined Radium 226 + 228 (pCi/L)	5.0	0.626	**5.0**
MW-10	Fluoride	4.0	0.486	**4.0**
MW-10	Lead	0.0075	0.0014	**0.0075**
MW-10	Lithium	0.04	0.019	**0.040**
MW-10	Mercury	0.002	0.0002	**0.002**
MW-10	Molybdenum	0.10	0.009	**0.10**
MW-10	pH (standard units)	6.5-9.0	6.733-7.569	**6.5-9.0**
MW-10	Selenium	0.05	0.003	**0.050**
MW-10	Sulfate	400	214.7	**400**
MW-10	Thallium	0.002	0.002	**0.002**
MW-10*	Total Dissolved Solids*	1200	1031	**1200**
MW-10*	Calcium*	NE	143.0	**143.0**
MW-10	Turbidity	NE	31.22	**31.22**

All values are in mg/L (ppm) unless otherwise noted.
* - Limited to original 8 background samples.
NE - Not Established
Bold - Proposed Site-specific Groundwater Protection Standard based on Section 845.600(a)(2)

OPERATING PERMIT FIGURES

Ash Pond 2



NOTES:

1. SURFACE WATER ELEVATIONS ARE NAVD88.
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.

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG

KPRG and Associates, inc.

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414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630-325-1300 Facsimile 630-325-1593

AREA-CAPACITY CURVE

JOLIET 29 GENERATING STATION
JOLIET, ILLINOIS

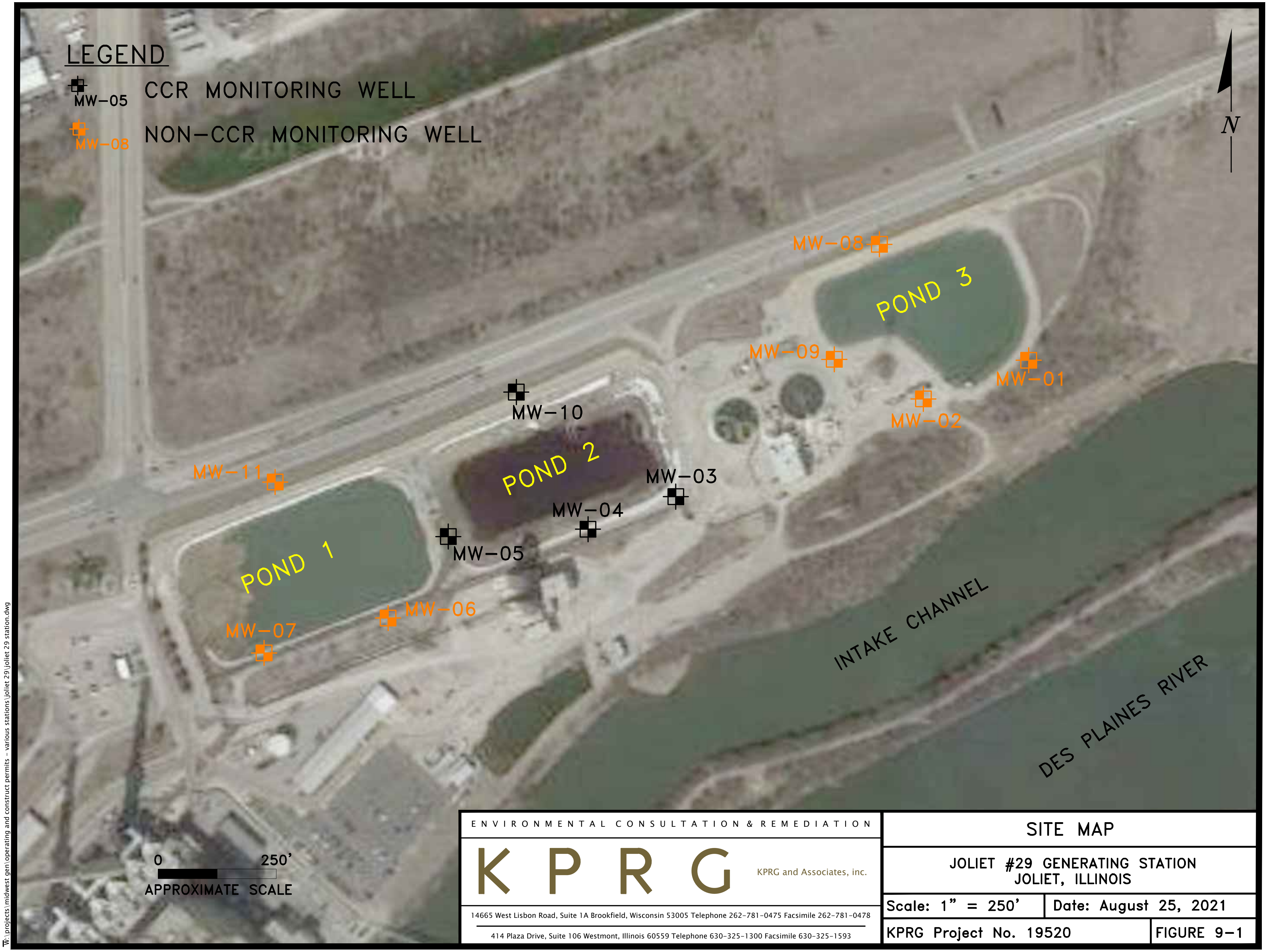
Scale: NTS

Date: August 25, 2021

KPRG Project No. 19520

FIGURE 1

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



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SITE MAP

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

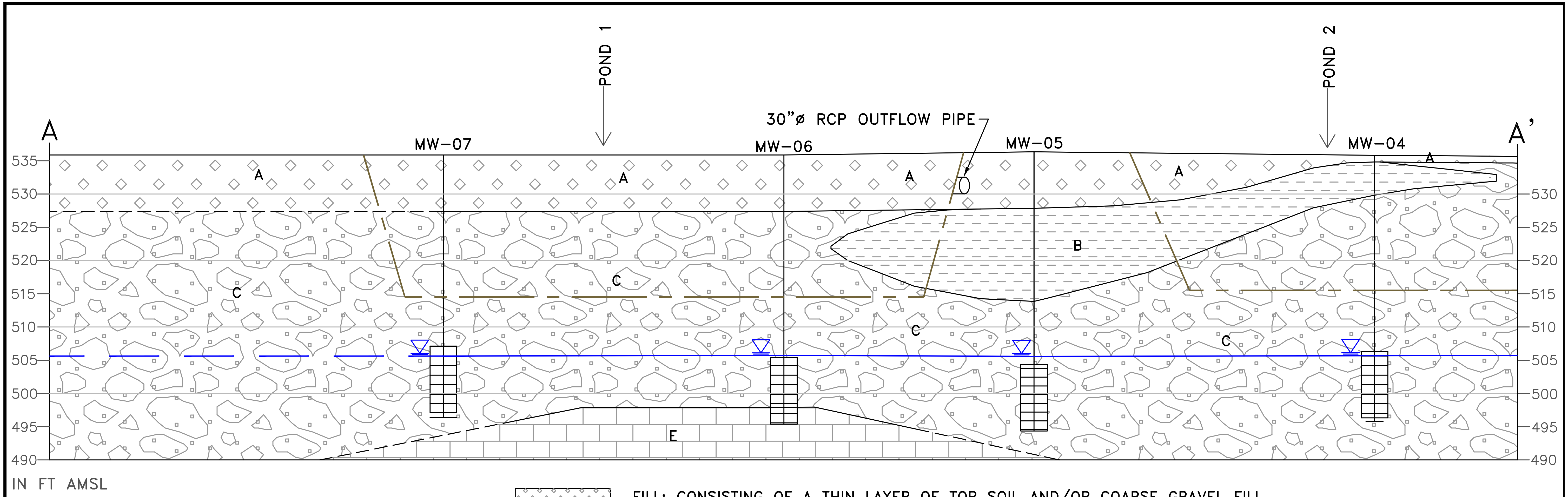
Scale: 1" = 250'

Date: August 25, 2021

KPRG Project No. 19520

FIGURE 9–1

W:\projects\midwest gen\operating and construct permits – various stations\joliet 29\joliet 29 station.dwg



A FILL: CONSISTING OF A THIN LAYER OF TOP SOIL AND/OR COARSE GRAVEL FILL.

B SILTY CLAY TO CLAY: CONSISTING OF BLACK/BROWN SILTY CLAY TO CLAY WITH A TRACE OF COARSE GRAVEL.

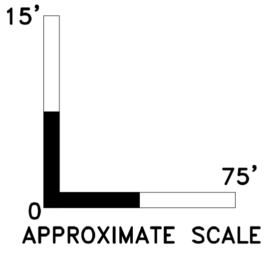
C SAND AND GRAVEL: CONSISTING OF BLACK/BROWN FINE TO COARSE SAND AND GRAVEL WITH LIMESTONE FRAGMENTS NOTED THROUGHOUT. MAY LOCALLY INCLUDE SOME LENSES OR INTERLAYERING OF BLACK SILTY CLAY AND/OR TAN SILTY SAND.

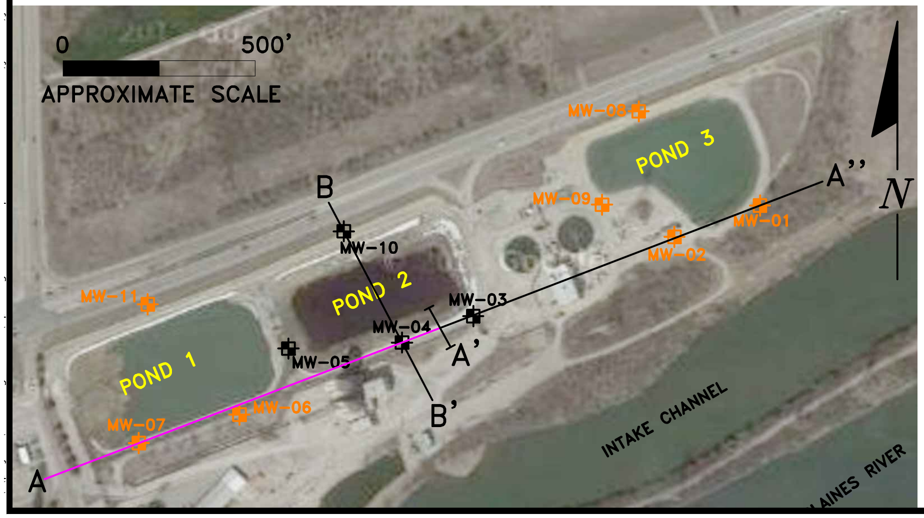
D SANDY SILT/SILTY CLAY: CONSISTING OF BLACK/GRAY SANDY SILT GRADING DOWNWARD TO A GRAY SILTY CLAY WITH COARSE SAND. NOT CONTINUOUS ACROSS SITE.

E BEDROCK: CONSISTING OF SILURIAN DOLOMITE – TOP OF UNIT ENCOUNTERED APPROXIMATELY 38.5 FEET BELOW GROUND SURFACE (BGS) AT BORING LOCATION MW-6. BORINGS NOTED WITH INCREASED LIMESTONE FRAGMENT AT BASE INTERPRETED TO BE AT OR NEAR TOP OF WEATHERED BEDROCK SURFACE.

▽ WATER LEVEL (5/21)

── ─ ── PROJECTED POND OUTLINE





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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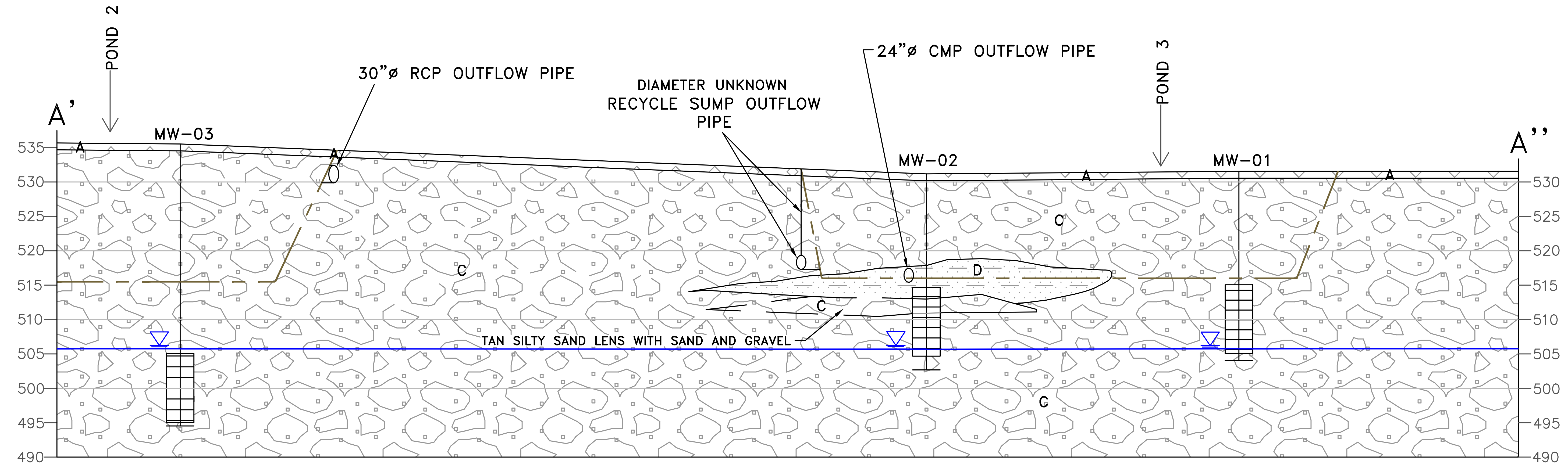
CROSS SECTION A – A'

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

SEE SCALE
Date: August 25, 2021
KPRG Project No. 19520
FIGURE 9-2



IN FT AMSL

A FILL: CONSISTING OF A THIN LAYER OF TOP SOIL AND/OR COARSE GRAVEL FILL.

B SILTY CLAY TO CLAY: CONSISTING OF BLACK/BROWN SILTY CLAY TO CLAY WITH A TRACE OF COARSE GRAVEL.

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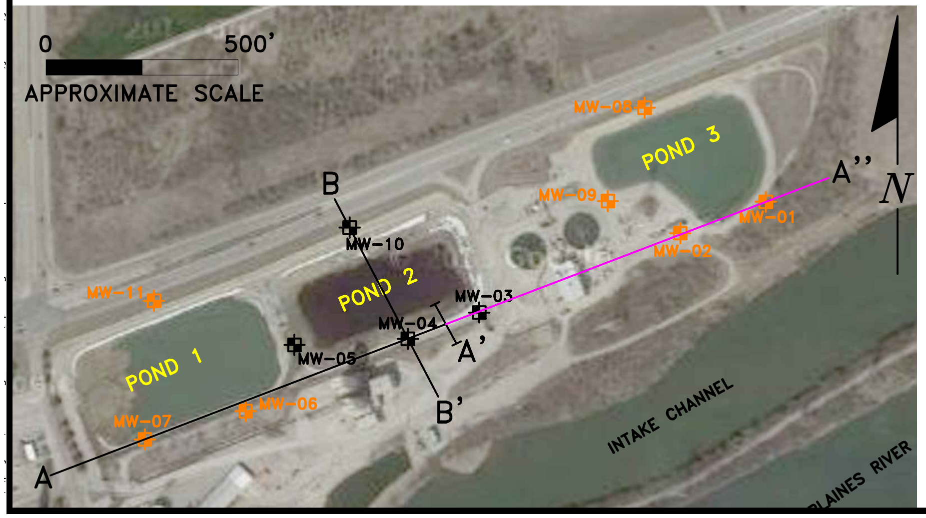
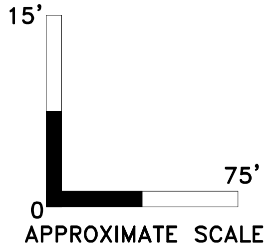
E BEDROCK: CONSISTING OF SILURIAN DOLOMITE – TOP OF UNIT ENCOUNTERED APPROXIMATELY 38.5 FEET BELOW GROUND SURFACE (BGS) AT BORING LOCATION MW–6. BORINGS NOTED WITH INCREASED LIMESTONE FRAGMENT AT BASE INTERPRETED TO BE AT OR NEAR TOP OF WEATHERED BEDROCK SURFACE.

▽ WATER LEVEL (5/21)

—— — —— PROJECTED POND OUTLINE





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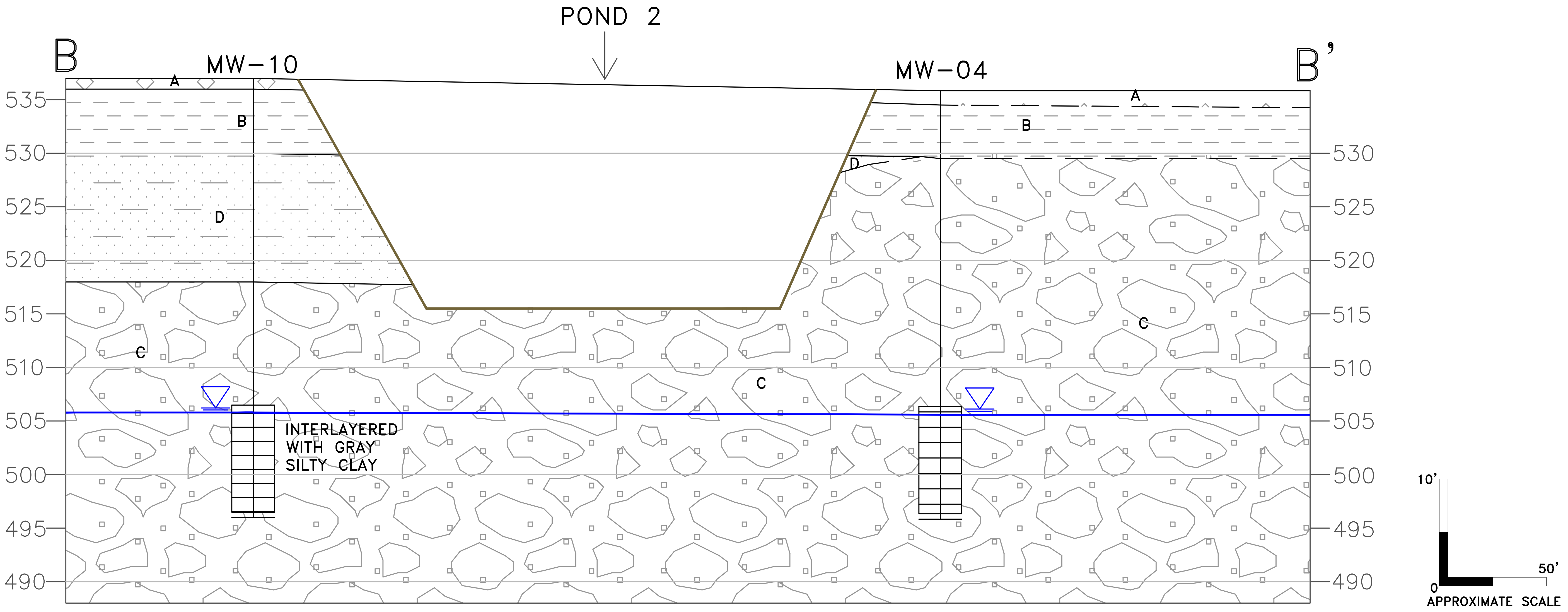
414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630–325–1300 Facsimile 630–325–1593

CROSS SECTION A' – A''

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

SEE SCALE	Date: August 25, 2021
KPRG Project No. 19520	FIGURE 9–3



IN FT AMSL

A	FILL: CONSISTING OF A THIN LAYER OF TOP SOIL AND/OR COARSE GRAVEL FILL.
B	SILTY CLAY TO CLAY: CONSISTING OF BLACK/BROWN SILTY CLAY TO CLAY WITH A TRACE OF COARSE GRAVEL.
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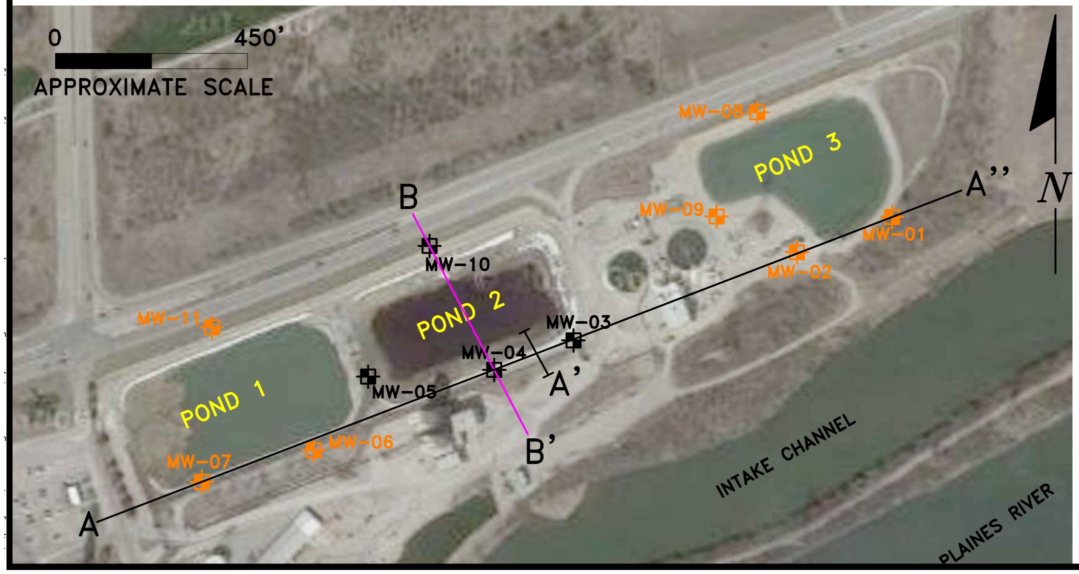
▽	WATER LEVEL (5/21)
—	POND OUTLINE



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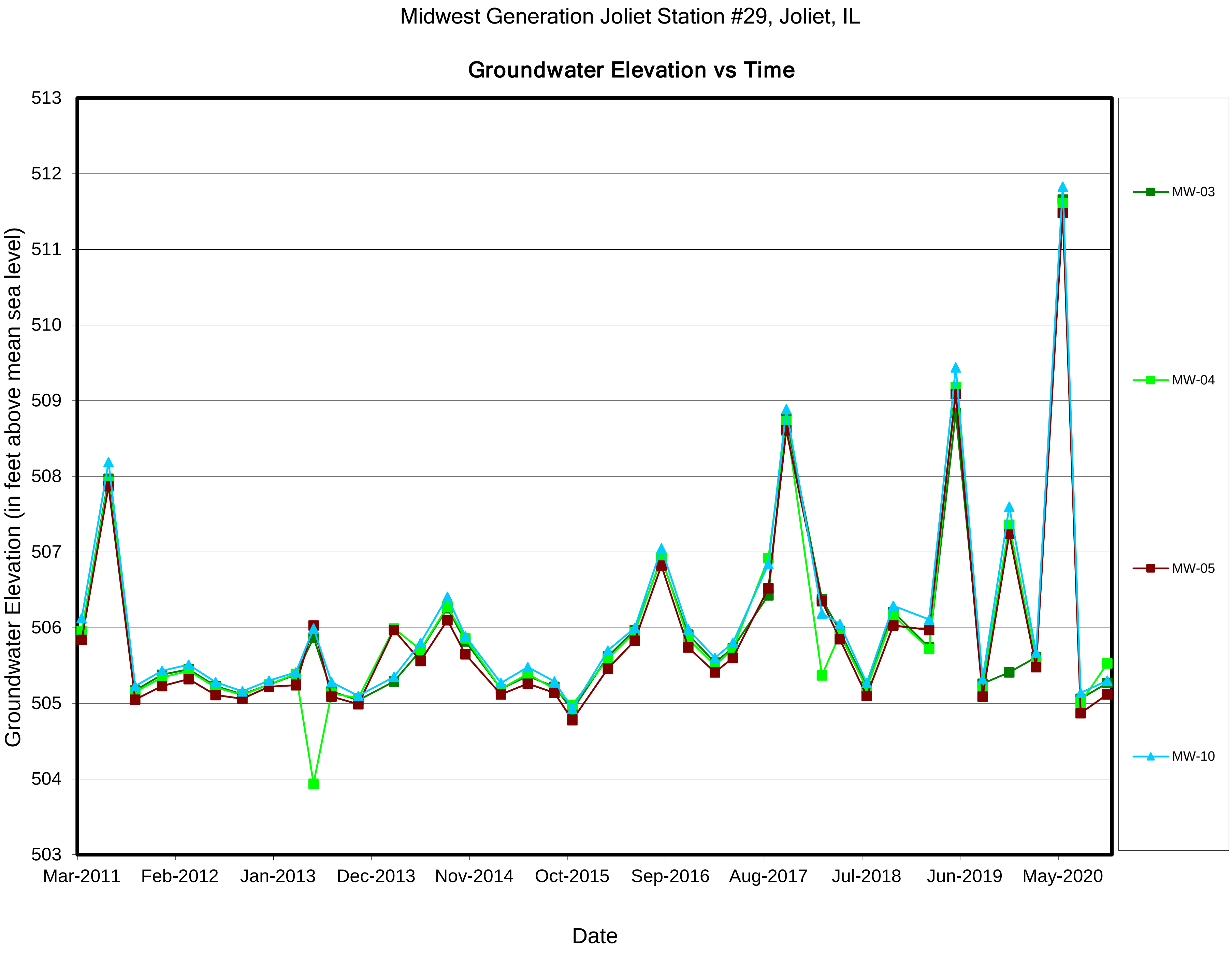
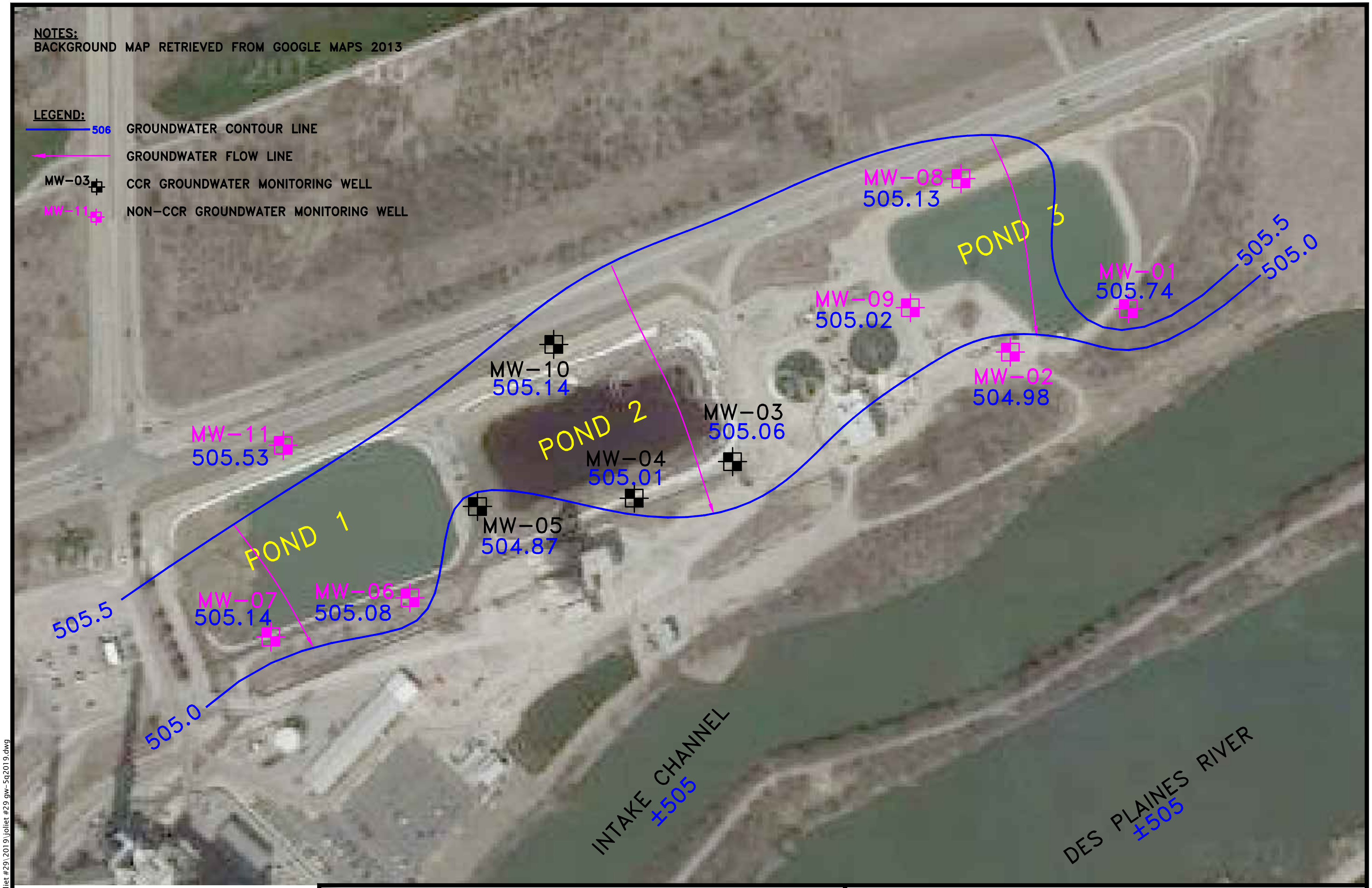
CROSS SECTION B-B'

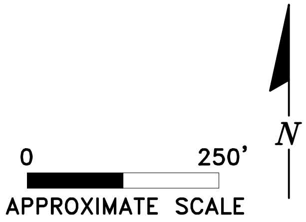
JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

SEE SCALE
Date: August 25, 2021
KPRG Project No. 19520
FIGURE 9-4

Figure 9-5. Hydrograph







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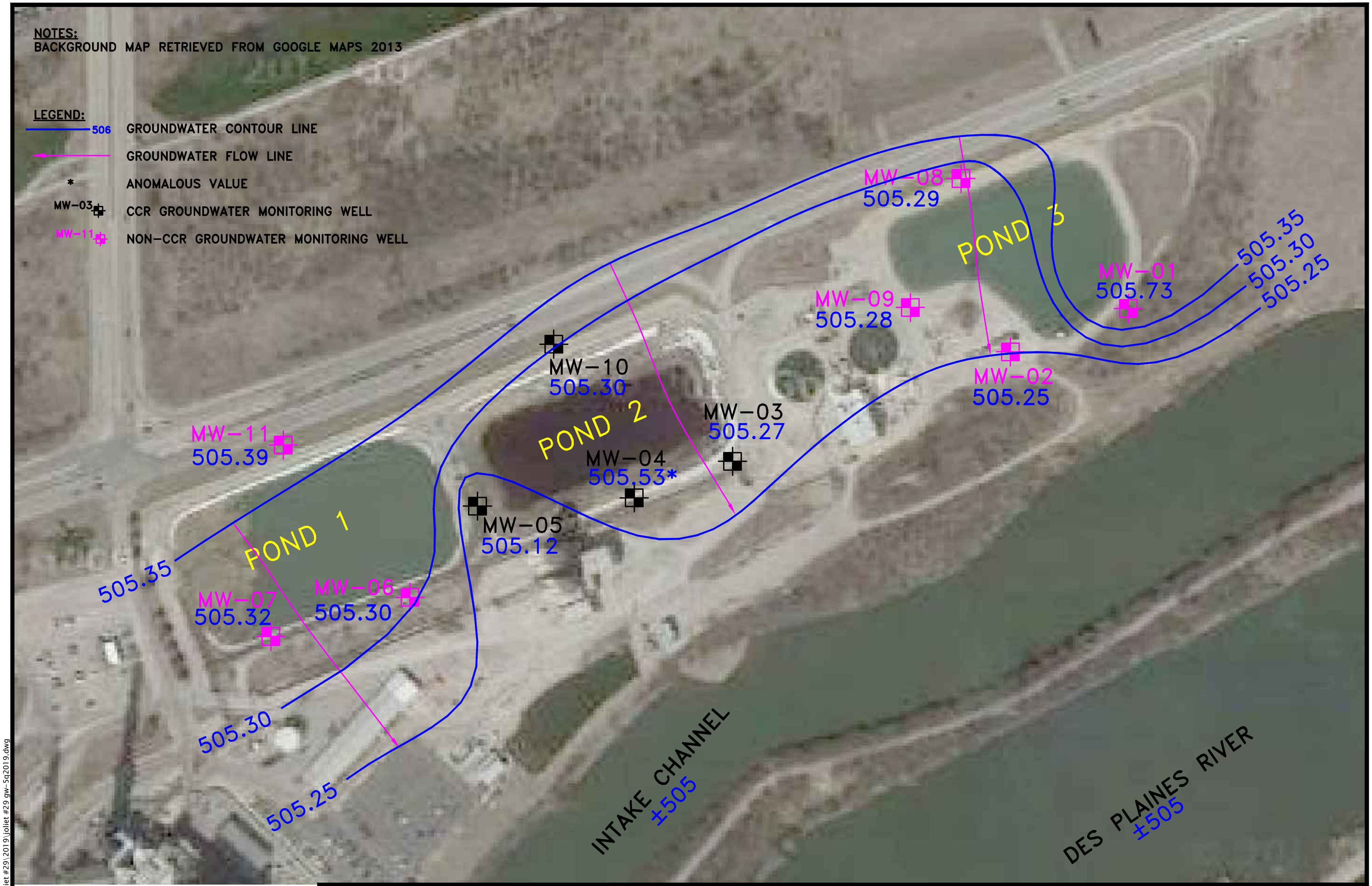
GROUNDWATER CONTOUR MAP 07/2020

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

Scale: 1" = 250'	Date: September 04, 2020
KPRG Project No. 12313.0	FIGURE 9-6

W:\projects\midwest generation\12313\figures\joliet #29\2019\joliet #29 gw-5q2019.dwg



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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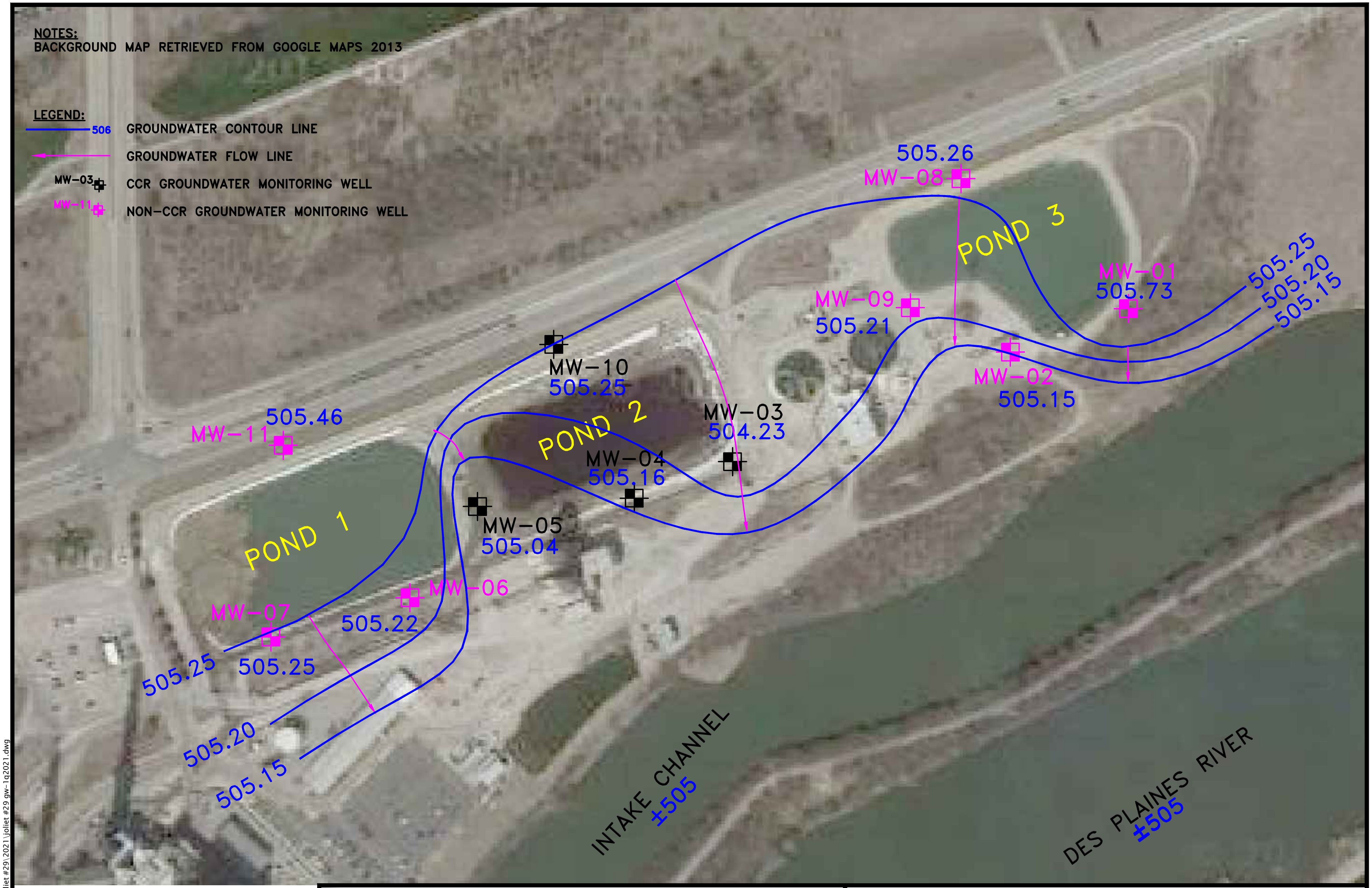
GROUNDWATER CONTOUR MAP 10/2020

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

Scale: 1" = 250'
Date: January 4, 2021

KPRG Project No. 12313.0
FIGURE 9-7

W:\projects\midwest generation\12313\figures\joliet #29\2019\joliet #29 gw-5q2019.dwg



NOTES:
BACKGROUND MAP RETRIEVED FROM GOOGLE MAPS 2013

LEGEND:

506	GROUNDWATER CONTOUR LINE
←	GROUNDWATER FLOW LINE
MW–03 ⊞	CCR GROUNDWATER MONITORING WELL
MW–11 ⊞	NON–CCR GROUNDWATER MONITORING WELL

0 250'
APPROXIMATE SCALE
N

ENVIRONMENTAL CONSULTATION & REMEDIATION

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GROUNDWATER CONTOUR MAP 2/2021

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

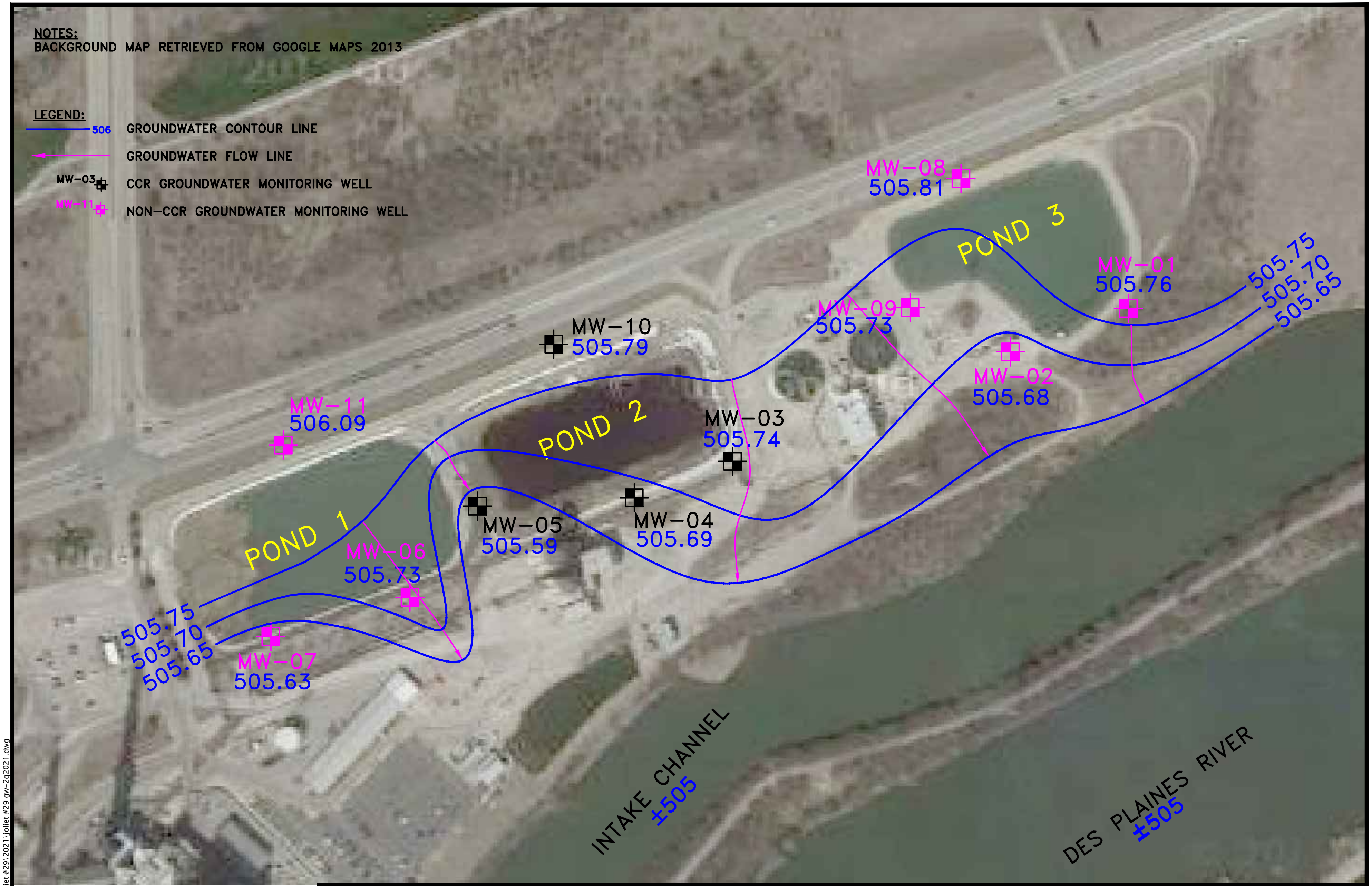
Scale: 1" = 250'

Date: April 2, 2021

KPRG Project No. 12313.0

FIGURE 9–8

W:\projects\midwest generation\12313\figures\joliet #29\2021\joliet #29 gw–1q2021.dwg



0 250'
APPROXIMATE SCALE

N

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG

KPRG and Associates, inc.

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414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630-325-1300 Facsimile 630-325-1593

GROUNDWATER CONTOUR MAP 5/2021

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

Scale: 1" = 250'

Date: July 12, 2021

KPRG Project No. 12313.0

FIGURE 9-9

W:\projects\midwest generation\12313\figures\joliet #29\2021\joliet #29 gw-2q2021.dwg

0 500'
APPROXIMATE SCALE

N

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

GROUNDWATER MANAGEMENT ZONE

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

Scale: 1" = 500'

Date: August 25, 2021

KPRG Project No. 19520

FIGURE 9-10

W:\c-p&p\projects\midwest generation\ash pond issues\eluc & gmz\joliet #29 gmz.dwg(proposed gmz)

LEGEND

—·— SITE BOUNDARY

● WATER WELL

02355 SHORT API WELL ID

1509 TOTAL WELL DEPTH

NOTES: * – THE TOTAL DEPTH NOT GIVEN

0 750'

APPROXIMATE SCALE

ENVIRONMENTAL CONSULTATION & REMEDIATION

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2500' RADIUS POTABLE WELL MAP

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

Scale: 1" = 250'

Date: August 25, 2021

KPRG Project No. 19520

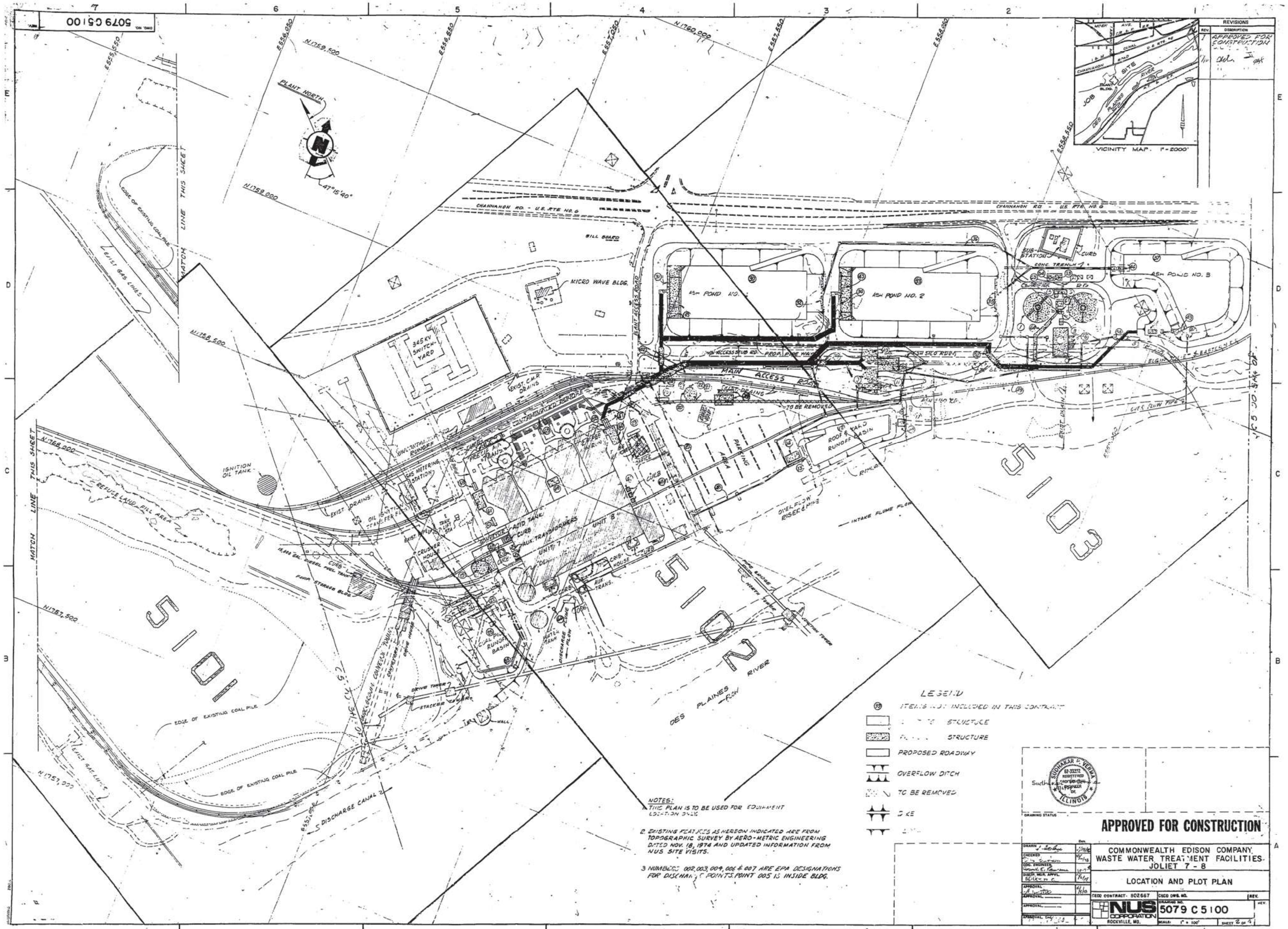
FIGURE 9-11

W:\projects\midwest gen\operating and construct permits – various stations\joliet 29\joliet 29 station.dwg

OPERATING PERMIT ATTACHMENTS

ATTACHMENT 1 HISTORY OF CONSTRUCTION

Attachment 1-1 – Construction Drawings



REVISIONS	
REV.	DESCRIPTION
1	APPROVED FOR CONSTRUCTION

LEGEND

- ㊴ ITEMS NOT INCLUDED IN THIS CONTRACT
- ▭ [illegible] STRUCTURE
- ▨ [illegible] STRUCTURE
- ▭ PROPOSED ROADWAY
- OVERFLOW DITCH
- TO BE REMOVED
- DIKE

NOTES:

1. THIS PLAN IS TO BE USED FOR EQUIPMENT LOCATION ONLY.
2. EXISTING FEATURES AS HEREON INDICATED ARE FROM TOPOGRAPHIC SURVEY BY AERO-METRIC ENGINEERING DATED NOV. 18, 1974 AND UPDATED INFORMATION FROM NUS SITE VISITS.
3. NUMBERS 002, 003, 004, 006 & 007 ARE EPA DESIGNATIONS FOR DISCHARGE POINTS. POINT 005 IS INSIDE BLDG.

SUDHAKAR P. VERMA
62-33272

DRAWING STATUS

APPROVED FOR CONSTRUCTION

COMMONWEALTH EDISON COMPANY
WASTE WATER TREATMENT FACILITIES
JOLIET 7 - 8

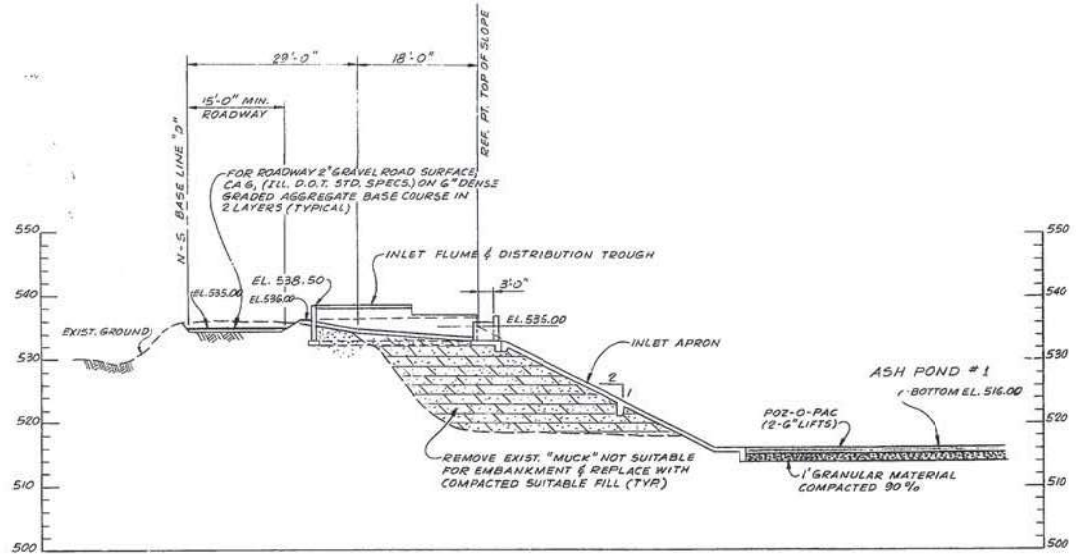
LOCATION AND PLOT PLAN

CECO CONTRACT - 802667
CECO DWG. NO.
REV.
NUS CORPORATION
ROCKVILLE, MD.
DRAWING NO. 5079 C 5100
SCALE: 1" = 100'
SHEET 2 OF 4

CONDITION OF ORIGINAL FAIR - REPRODUCTION CONSULTANTS, LTD.
- BLUELINE PRINT -
30X42

5079C5019 SH3

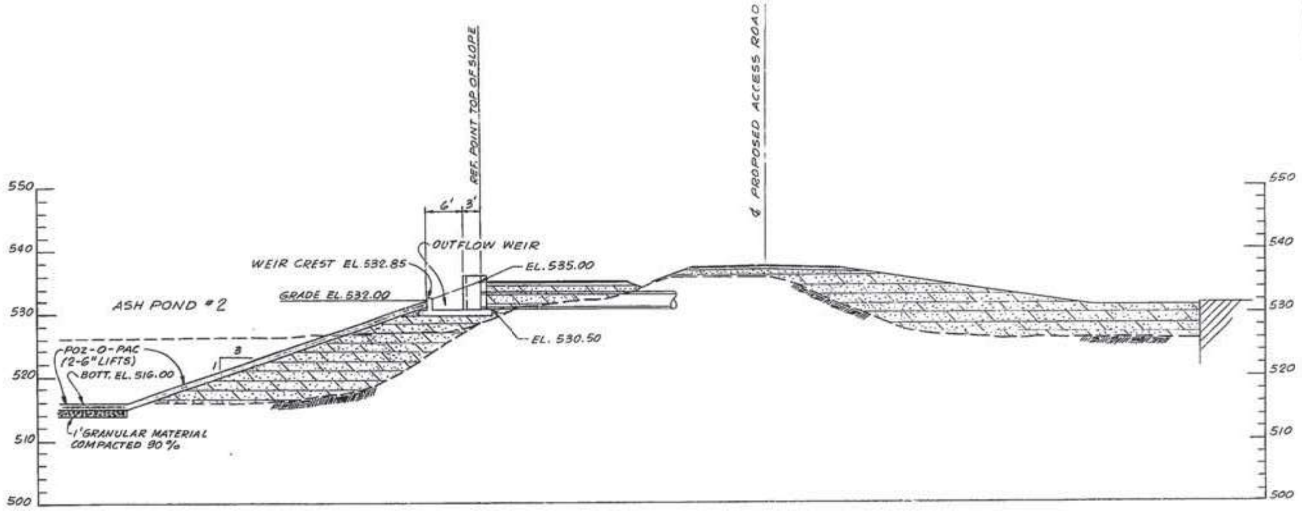
REV.	DESCRIPTION
1	APPROVED FOR CONSTRUCTION
2 7/27/79	REVISED SECTION @ WEIR ASH POND #1 TO SHOW RIPRAP AS PER DCN # 011.



SECTION AT INLET FLUME & DISTRIBUTION THROUGH ASH POND NO. 1

SCALE: HORIZ. 1" = 10'
VERT. 1" = 10'

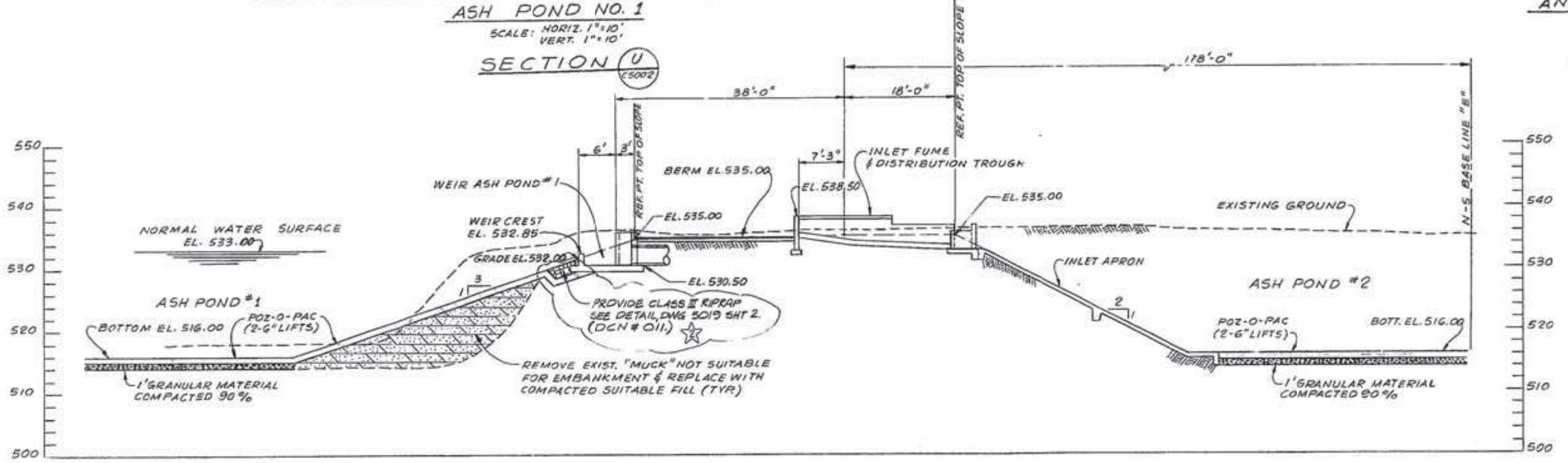
SECTION U C5002



SECTION AT WEIR ASH POND NO. 2 AND ACCESS ROAD

SCALE: HORIZ. 1" = 10'
VERT. 1" = 10'

SECTION V C5003



SECTION AT WEIR ASH POND NO. 1 AND DISTRIBUTION THROUGH ASH POND NO. 2

SCALE: HORIZ. 1" = 10'
VERT. 1" = 10'

SECTION W C5003

FOR POZ-O-PAC NOTES SEE SHEET 2 OF 3

Sudhakar P. Verma
6/17/78

DRAWING STATUS
APPROVED FOR CONSTRUCTION
6/17/78

DRAWN L. Paslawski 5/30/78
CHECKED D. R. Burton 6/10/78
ENG. ENGINEER
DISCIP. MGR. APPVL. SPVerma 6/16/78
APPROVAL
APPROVAL
APPROVAL
APPROVAL, CLIENT

COMMONWEALTH EDISON COMPANY
WASTE WATER TREATMENT FACILITIES
JOLIET 7 – 8

PONDS & BASINS PROFILES
SECTIONS & DETAILS

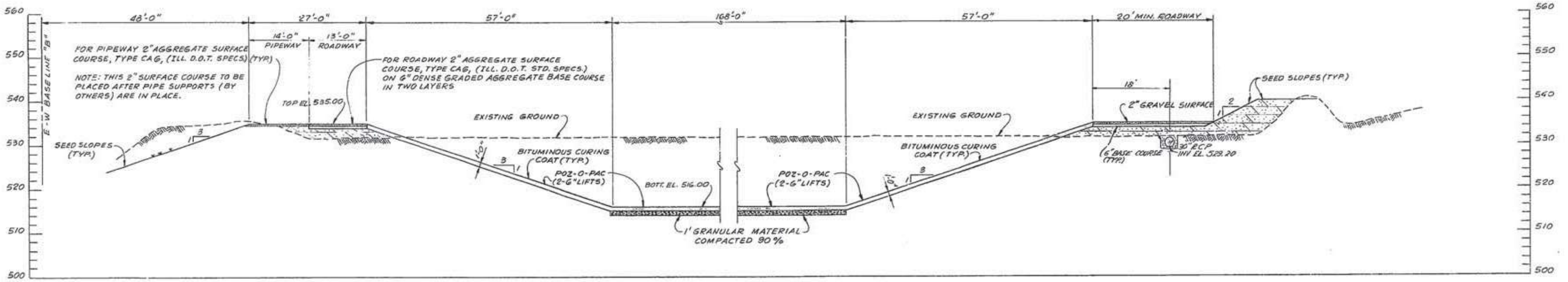
CECO CONTRACT: 802667
CECO DWG. NO.
REV.

NUS CORPORATION
ROCKVILLE, MD.

DRAWING NO. 5079C5019
REV. 2
SCALE: AS NOTED
SHEET 3 OF 3

CONDITION OF ORIGINAL -FAIR- | REPRODUCTION CONSULTANTS, LTD.
30X42

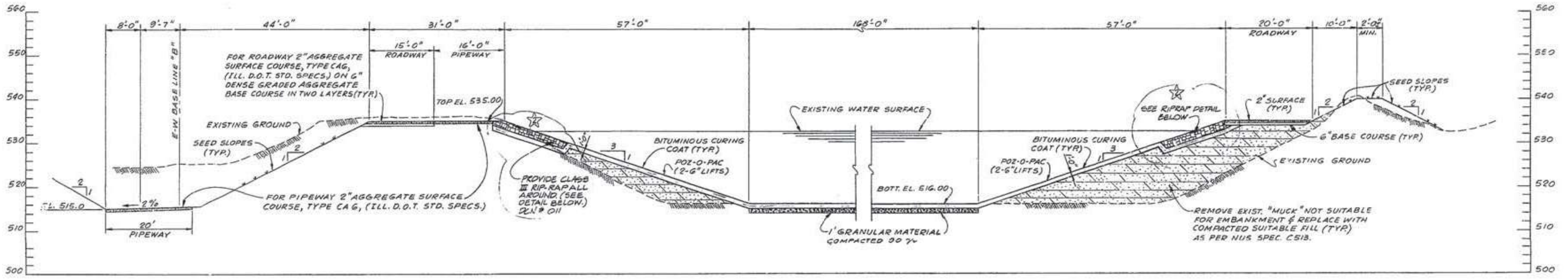
REV.	DESCRIPTION
1 1/17/78	APPROVED FOR CONSTRUCTION [illegible] SPVerma 6/17
2 7/27/79	REVISED POZ-O-PAK MIX IN NOTE 2 AS PER DCN # 002. ADDED RIPRAP DETAIL, ACCESS RAMP DETAIL, & ADDED RIPRAP TO TYP. SECTION THRU ASH POND #1 AS PER DCN # 011. TK SPV 7/27/79



TYPICAL SECTION THROUGH ASH POND NO. 2

SCALE: HORIZ. 1" = 10'
VERT. 1" = 10'

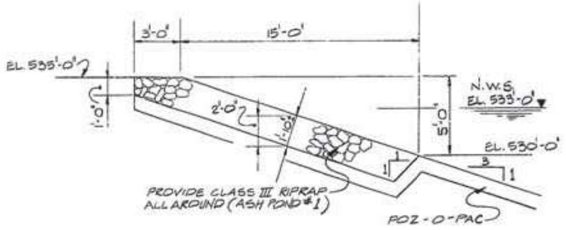
SECTION 5 / C5003



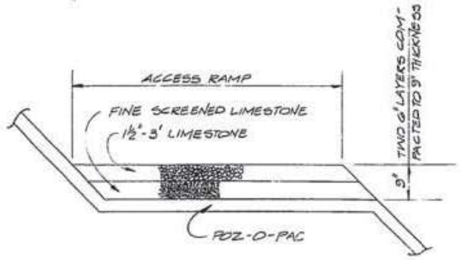
TYPICAL SECTION THROUGH ASH POND NO. 1

SCALE: HORIZ. 1" = 10'
VERT. 1" = 10'

SECTION T / C5003 / 5005



RIPRAP DETAIL (ASH POND #1 ONLY)



ACCESS RAMP DETAIL (ASH POND #1 ONLY)

POZ-O-PAC NOTES:

1. ALLOW A MINIMUM OF 7 DAYS CURING OF POZ-O-PAC PRIOR TO APPLICATION OF THE BITUMINOUS SEAL COAT.
2. THE POZ-O-PAC SHALL BE COMPOSED OF THE FOLLOWING MIX: 1.) HYDRATED LIME 3%. 2) FLY ASH 20%, 3) BOILER SLAG AGGREGATE 77%. POZ-O-PAC DENSITY 136.9 # PER CUBIC FT. DCN 002
3. THE 1 FOOT LAYER OF POZ-O-PAC SHALL BE COMPACTED WITH 2-6" LIFTS UNTIL THE DESIRED DENSITY IS OBTAINED.
4. PRIOR TO THE INSTALLATION OF THE POZ-O-PAC, THE SUBBASE SHALL BE PREPARED BY UNDERCUTTING TO A MINIMUM OF 1 FOOT BELOW THE BOTTOM OF THE POZ-O-PAC FILLING WITH 2-6" LIFTS TO A COMPACTION OF 90% PROCTOR WITH CONSOLIDATION.

Sudhakar P Verma
6/17/78

DRAWING STATUS APPROVED FOR CONSTRUCTION
6/17/78
Date

DRAWN L. Paciaworky 5/14/78
CHECKED D.W. Burden 5/15/78
CIVIL ENGINEER PCR
DISCIP. MGR. APPVL. SPVerma 6/17/78
APPROVAL, CECO 6/16/78
APPROVAL,
APPROVAL PROJ. Wilder 6/14/78
APPROVAL, CLIENT

COMMONWEALTH EDISON COMPANY
WASTE WATER TREATMENT FACILITIES
JOLIET 7-8

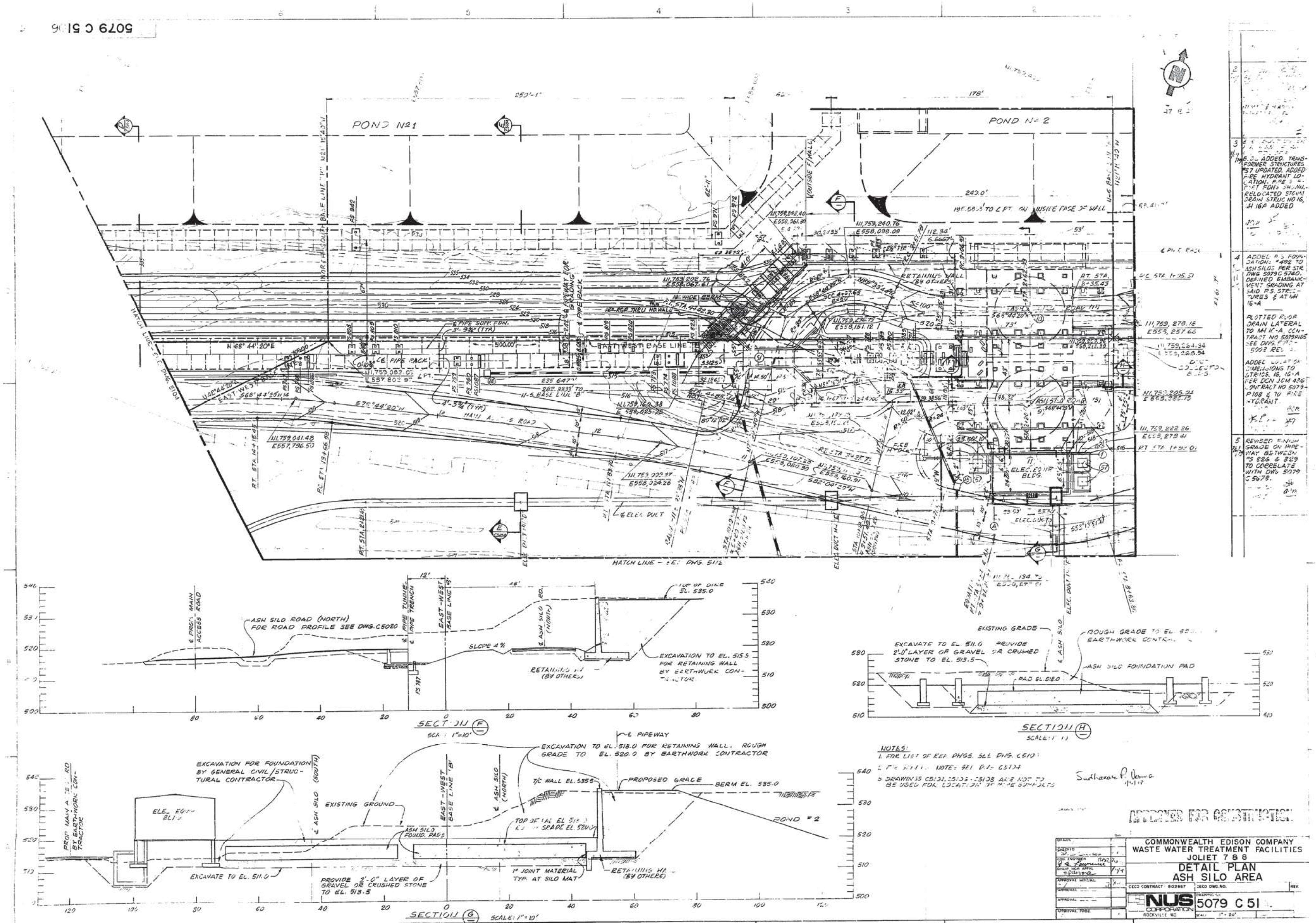
PONDS & BASINS PROFILES
SECTIONS & DETAILS

CECO CONTRACT 80267
CECO DWG. NO.
REV.

NUS CORPORATION
ROCKVILLE, MD.

DRAWING NO. 5079C5019
REV. 2
SCALE: AS NOTED
SHEET 2 OF 3

5079C5106



NOTES:
1. FOR LIST OF REF. DWGS. SEE DWG. C5101
2. FOR [illegible] NOTES SEE DWG. C5104
3. DRAWINGS C5104, C5106 - C5108 ARE NOT TO BE USED FOR LOCATION OF PIPE SUPPORTS

Sudhakar P. Verma
1-1-18

3 — 1/14 [illegible] B. DG ADDED. TRANSFORMER STRUCTURES #57 UPDATED. ADDED FIRE HYDRANT LOCATION. PIPE SUPPORT FDNS SHOWN. RELOCATED STORM DRAIN STRUC NO 16, MH 16A ADDED

4 — ADDED P.S. FOUNDATIONS #492 TO ASH SILOS PER STR DWG 5079C 5740. DEFINED EMBANKMENT GRADING AT SAID P.S. STRUCTURES & AT MH 16-A

PLOTTED ROOF DRAIN LATERAL TO MH 16-A. CONTRACT NO 5079P105 SEE DWG. [illegible] - 5002 REV. [illegible]

ADDED LOCATION DIMENSIONS TO STRUCS. 16, 16-A PER DCN JCM 436 CONTRACT NO 5079-P108 & TO FIRE HYDRANT

5 — 7/6/79 REVISED FINISH GRADE ON PIPEWAY BETWEEN PS 826 & 829 TO CORRELATE WITH DWG 5079 C 5678.

APPROVED FOR CONSTRUCTION

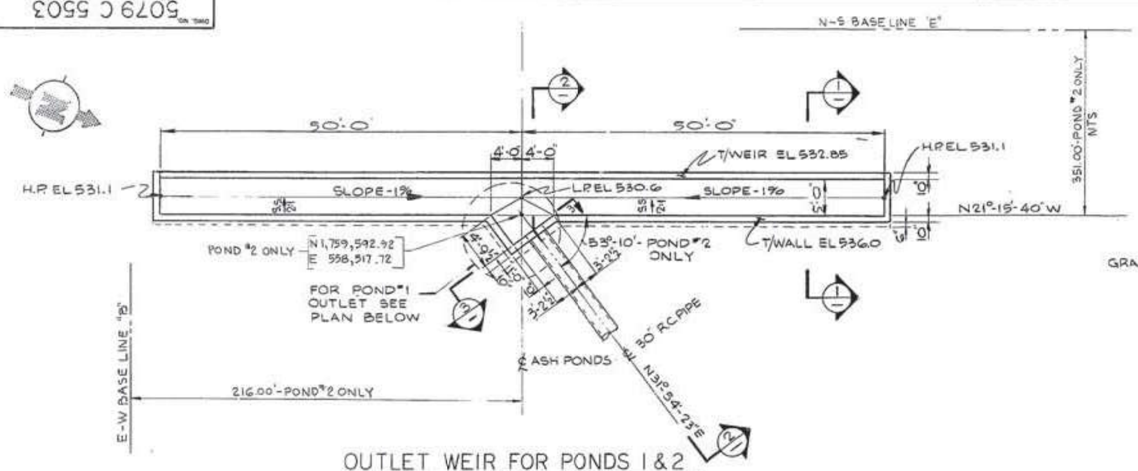
COMMONWEALTH EDISON COMPANY
WASTE WATER TREATMENT FACILITIES
JOLIET 7 & 8

DETAIL PLAN
ASH SILO AREA

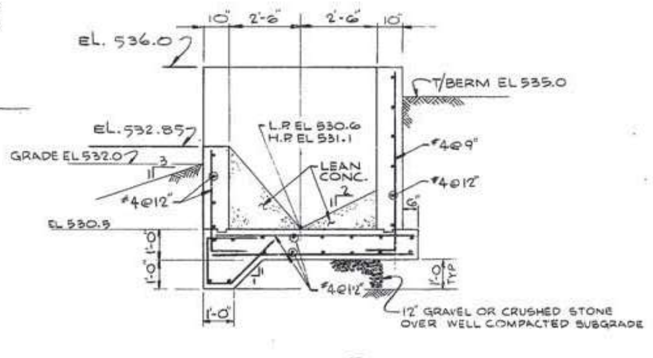
CECO CONTRACT 802667
CECO DWG. NO.
REV.
NUS CORPORATION
ROCKVILLE MD
DRAWING NO 5079 C 51
SCALE 1" = 20'

CONDITION OF ORIGINAL -FAIR- | REPRODUCTION CONSULTANTS, LTD.
30X42

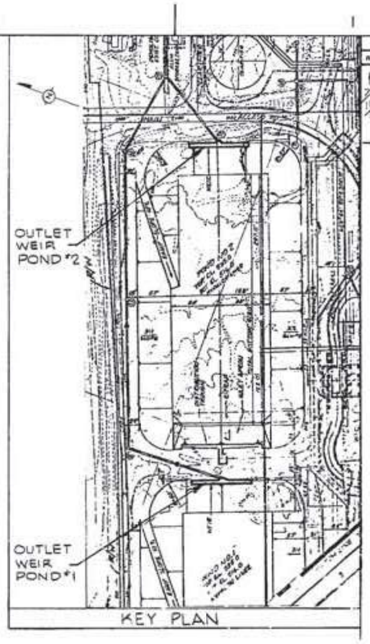
5079C5503



OUTLET WEIR FOR PONDS 1 & 2
SCALE: 1/8" = 1'-0"



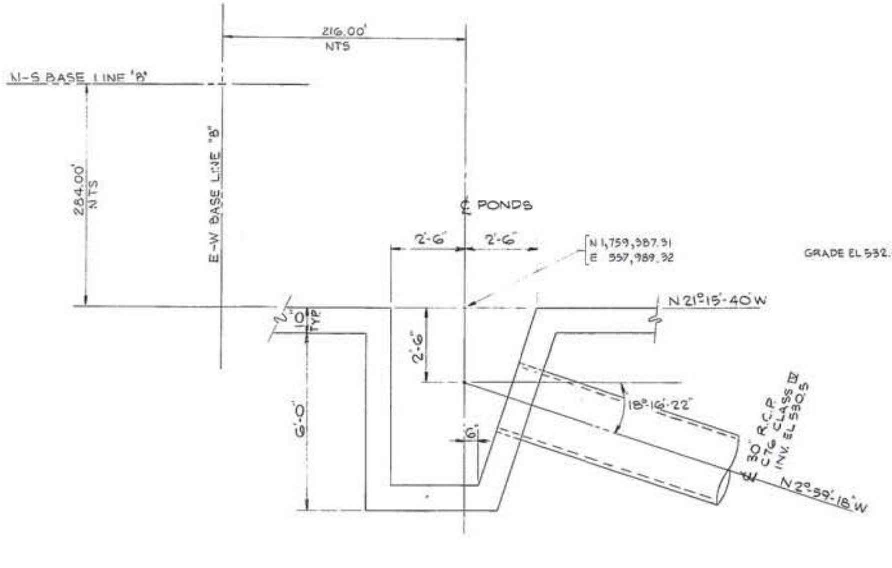
SECTION ①
SCALE: 1/2" = 1'-0"



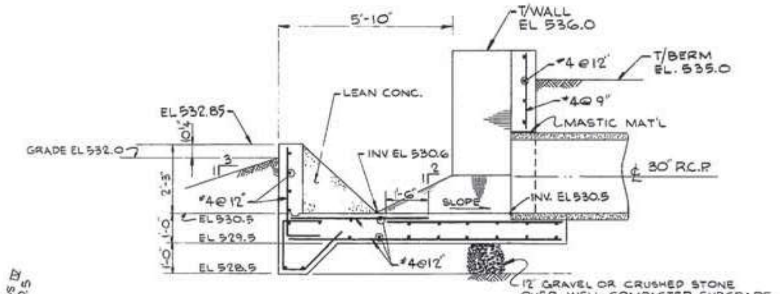
KEY PLAN

REVISIONS

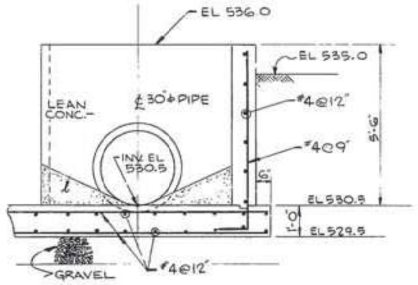
REV.	DESCRIPTION
1 7/11/78	ISSUED FOR CONSTRUCTION



OUTLET PLAN POND I
SCALE: 1/2" = 1'-0"



SECTION ②
SCALE: 1/2" = 1'-0"



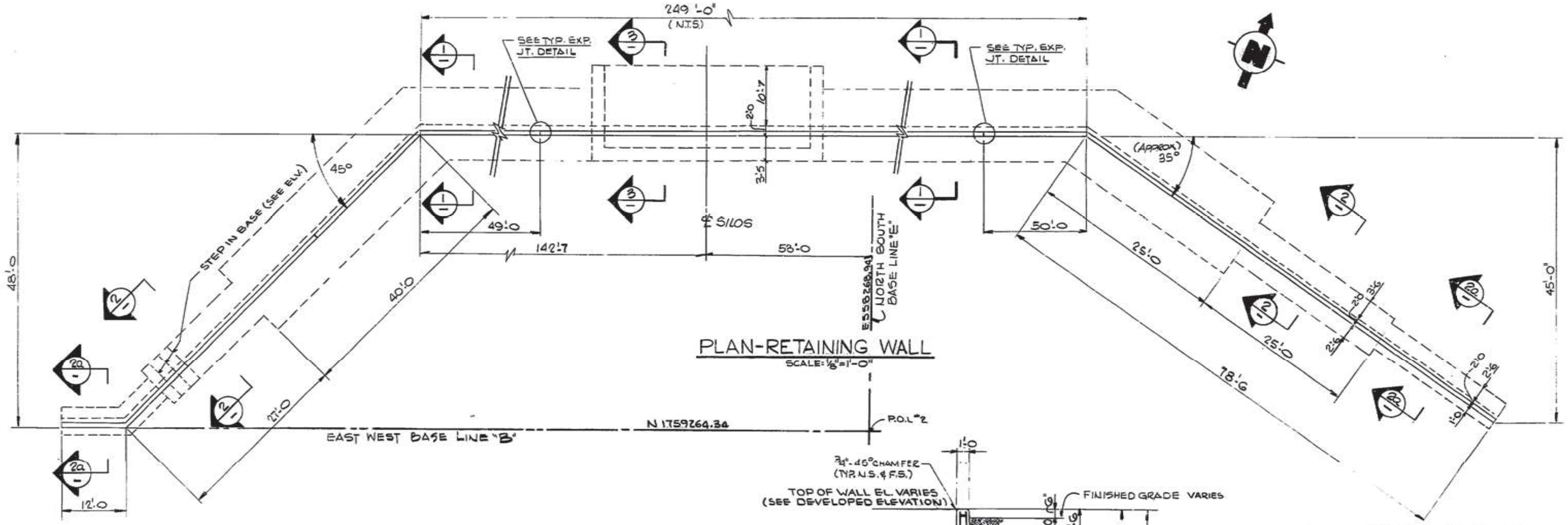
SECTION ③
SCALE: 1/2" = 1'-0"

NOTES
1. FOR GENERAL NOTES SEE DWG. C5509
2. FOR STANDARD DETAILS SEE DWG. C5510
3. FOR CIVIL REFERENCE SEE DWG. 5079-C-5019

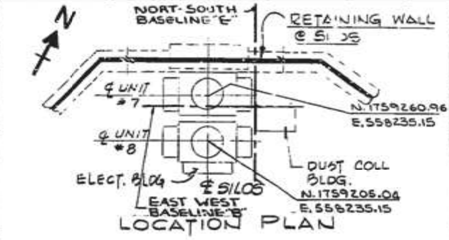
Sudhakar P Verma
7/10/78

DRAWING STATUS
APPROVED FOR CONSTRUCTION
Date 7/11/78

DRAWN	7-78	COMMONWEALTH EDISON COMPANY WASTE WATER TREATMENT FACILITIES JOLIET 7 - 8
CHECKED J. Tokar	7/7/78	
COG. ENGINEER K. Martirossian	7/7/78	ASH POND 1&2 OUTLET WEIRS
DISCIP. MGR. APPVL. SPVerma	7/10/78	
APPROVAL		CECO CONTRACT: 502667
APPROVAL		CECO DWG. NO.
APPROVAL, PROJ.	7-11-78	NUS CORPORATION ROCKVILLE, MD.
APPROVAL, CLIENT		DRAWING NO. 5079 C 5503 — REV. 1
		SCALE: NOTED — SHEET 1 OF 1

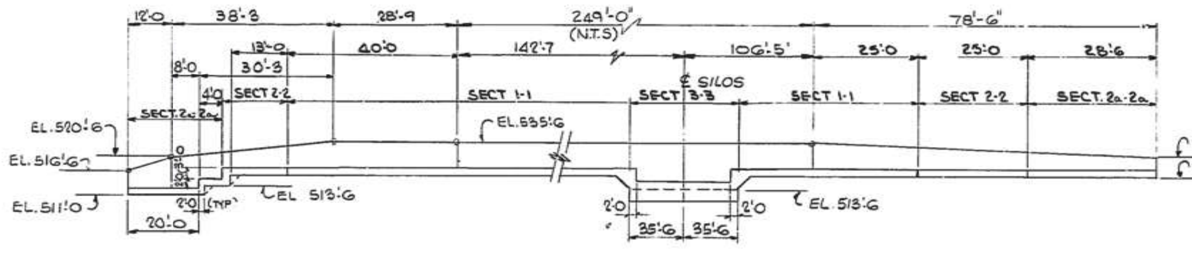


PLAN-RETAINING WALL
SCALE: 1/8"=1'-0"

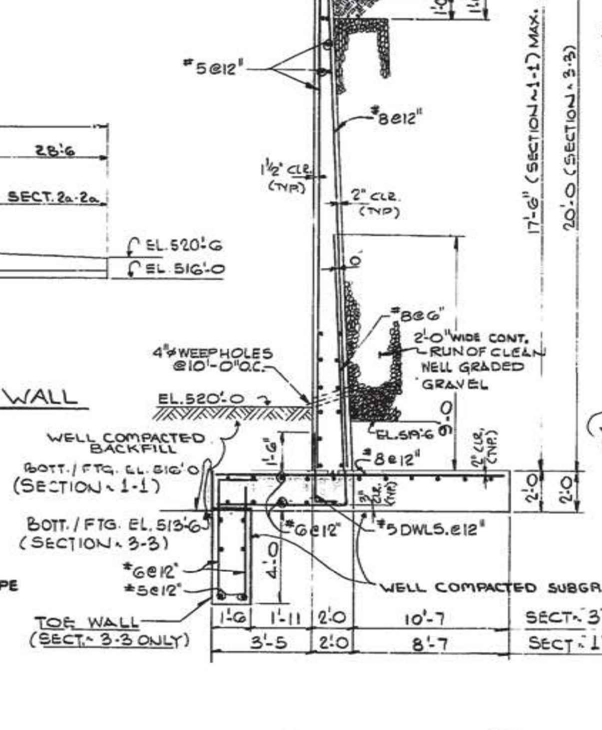


LOCATION PLAN

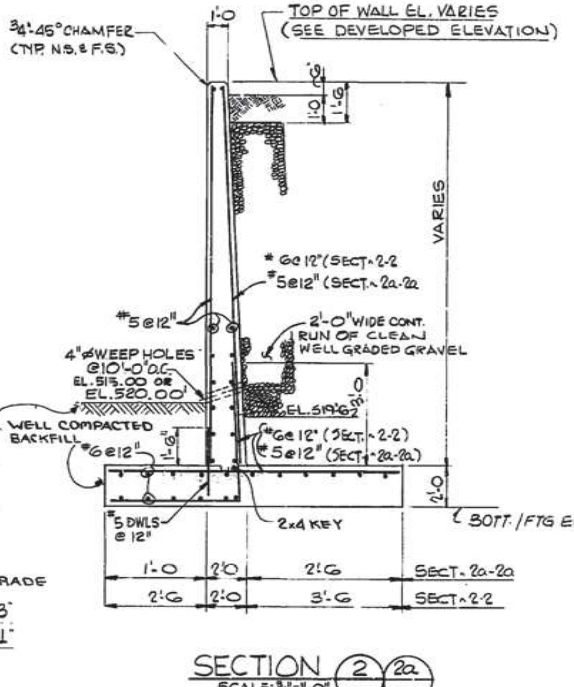
REVISIONS	
REV.	DESCRIPTION
1 5/19/78	APPROVED FOR CONSTRUCTION



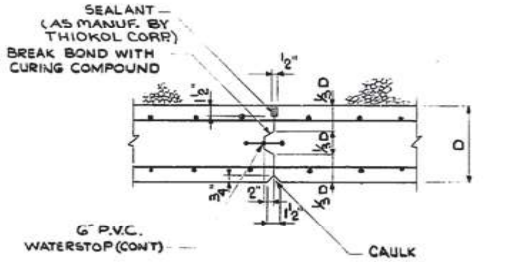
DEVELOPED ELEVATION OF RETAINING WALL
SCALE: 1/16"=1'-0"



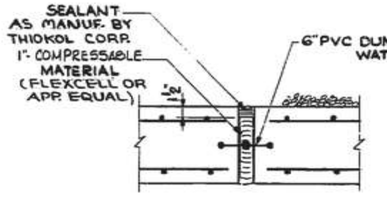
SECTION ① ③
SCALE: 3/8"=1'-0
(AS SHOWN & NOTED)



SECTION ② ②a
SCALE: 3/8"=1'-0"
(AS SHOWN & NOTED)



CONSTRUCTION CONTROL JOINT FOR WALLS



TYPICAL EXPANSION JOINT

NOTE:
PROVIDE CONTROL JOINTS AT EVERY 40'-0

GENERAL NOTES:

1. ALL CONCRETE SHALL HAVE MINIMUM COMPRESSIVE STRENGTH OF 4000 P.S.I. @ 28 DAYS. (TYPE OF CEMENT- I)
2. ALL CONCRETE SHALL BE AIR-ENTRAINED.
3. ALL REBARS SHALL CONFORM TO A.S.T.M. A-615 GRADE 60. (fy=60000 psi)
4. DESIGN SOIL BEARING PRESSURE -5000 p.s.f.
5. SOIL UNDERNEATH THE WALL SHALL BE WELL COMPACTED BEFORE PLACING OF CONCRETE.
6. WORK THIS DWG WITH DWG. C5106 & C5107

Suthanara P. Verma 5/16/78.

DRAWING STATUS
APPROVED FOR CONSTRUCTION
Date 5/16/78

DRAWN FUHR	1/12/78	COMMONOWEALTH EDISON COMPANY WASTE WATER TREATMENT FACILITIES JOILET 7&8
CHECKED ED HELD	5/16/78	
COG. ENGINEER R. Martiressian	1/31/78	RETAINING WALL @ SILOS PLAN, SECTIONS & ELEVATION
DISCIP. MGR. APPVL. SP Verma	5/16/78	
APPROVAL		CECO CONTRACT NO. 802667 / CECO DWG.NO.
APPROVAL		NUS CORPORATION ROCKVILLE, MD.
APPROVAL PROJ.	5/16/78	DRAWING NO. 5079-C-5507 REV. 1
APPROVAL CLIENT		SCALE: AS NOTED SHEET OF

5079C5103

FOR GENERAL NOTES SEE DRAWING 5079 C 5101.

APPROVED FOR CONSTRUCTION

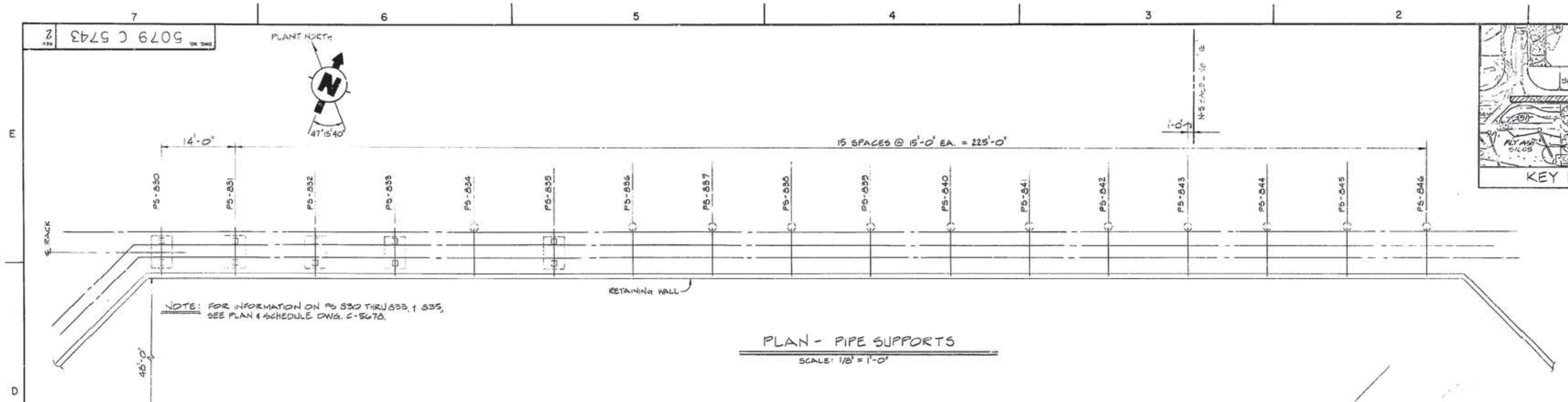
1/23/79

DRAWN		COMMONWEALTH EDISON COMPANY WASTE WATER TREATMENT FACILITIES JOLIET 7 - 8
CHECKED		SITE PLAN EAST YARD AREA
CDG ENGINEER		CECO CONTRACT 802667
DISCIP MGR APPVL		CECO DWG NO
APPROVAL		NUS CORPORATION ROCKVILLE, MD
APPROVAL PROJ.		DRAWING NO 5079C5103
APPROVAL CLIENT		SCALE 1" = 30'

CONDITION OF ORIGINAL -FAIR- | REPRODUCTION CONSULTANTS, LTD.
30X42

5079C5743

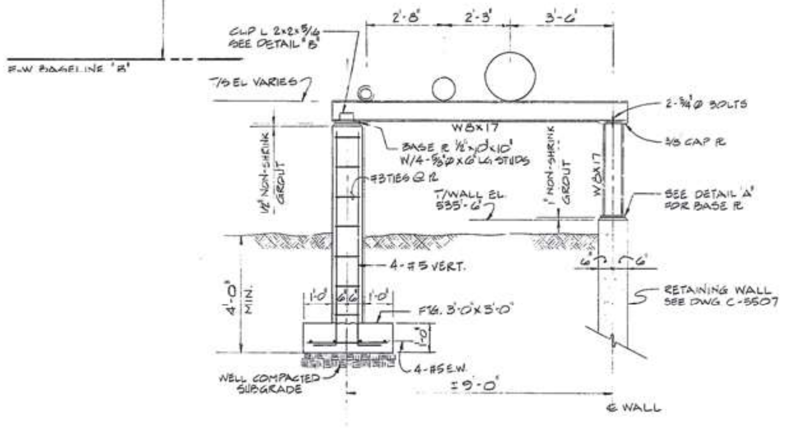
DWG. NO. 5079 C 5743 REV. 2



NOTE: FOR INFORMATION ON PS 830 THRU 833, & 835, SEE PLAN & SCHEDULE DWG. C-5678.

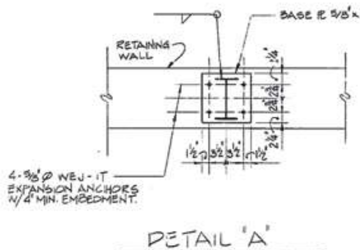
PLAN - PIPE SUPPORTS

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



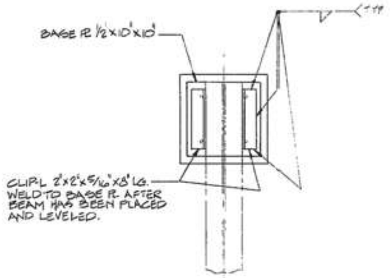
TYPICAL PIPE SUPPORT PS 834, 836 THRU 846

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



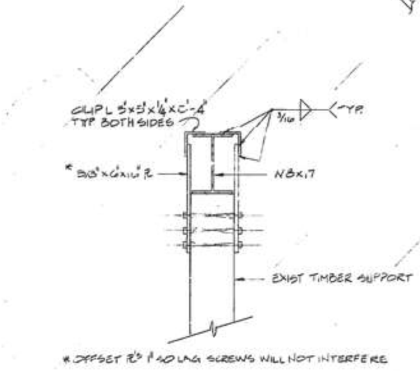
DETAIL 'A'

SCALE: 1" = 1'-0"



DETAIL 'B'

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



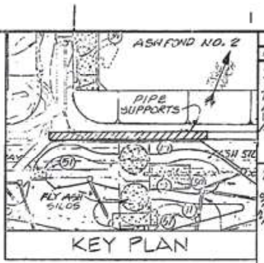
* OFFSET ℞'S 1" SO LAG SCREWS WILL NOT INTERFERE

SECTION ①

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

NOTES:

1 FOR GENERAL NOTES SEE DWG. C-5406
2 FOR STANDARD DETAILS SEE DWG. C-5600.
3 REFERENCE DWGS 5079-ME-3155/2 & 5079-ME-3155/3.



KEY PLAN

REVISIONS	
REV.	DESCRIPTION
1 7/17/79	APPROVED FOR CONSTRUCTION AS PER DCN #296. TK JG7 S.P.Verma 7/19/79
2 9/27/79	REVISED TYPICAL PIPE SUPPORT, REVISED DETAIL 'B', AND OMITTED SECTION 1 AS PER DCN # 316. TK K4 JG7

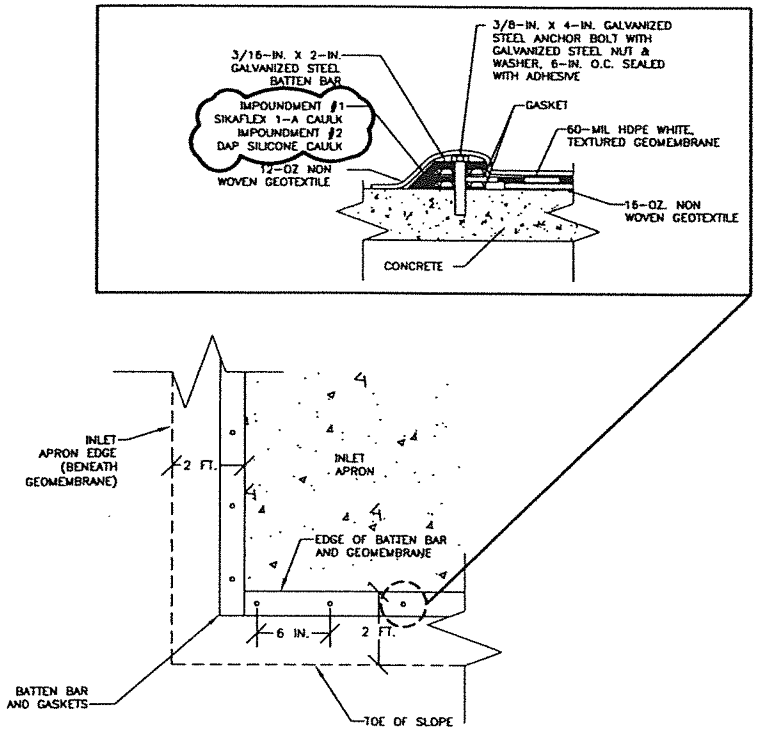
Sudhakar P Verma
7/19/79

DRAWING STATUS

APPROVED FOR CONSTRUCTION

DATE 7-27-79

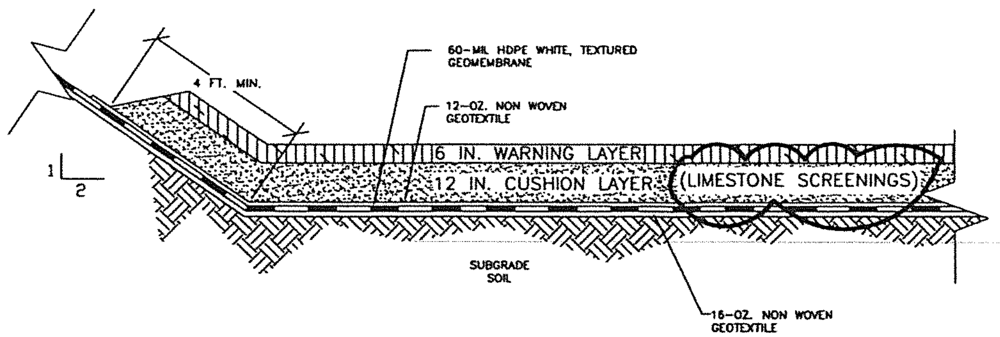
DRAWN T. KREJCI	7-3-79	COMMONWEALTH EDISON COMPANY WASTE WATER TREATMENT FACILITIES JOLIET 7 & 8
CHECKED James R. Johnson	7/3/79	
COG. ENGINEER James R. Johnson	7/3/79	PIPE SUPPORT PLAN AND DETAILS PS 834 836 THRU 846
DISCIP. MGR. APPVL. S.D. Verma	7/19/79	
APPROVAL	7/19/79	CECO CONT 802667
APPROVAL		NUS CORPORATION ROCKVILLE, MD.
APPROVAL PROJ. V.R. Tl	7/17/79	CECO DWG DRAWING NO. 5079 C 5743 REV. 2
APPROVAL, CLIENT		SCALE: AS NOTED SHEET 1 OF 1



2
C030

INLET APRON DETAIL PLAN

NOT TO SCALE

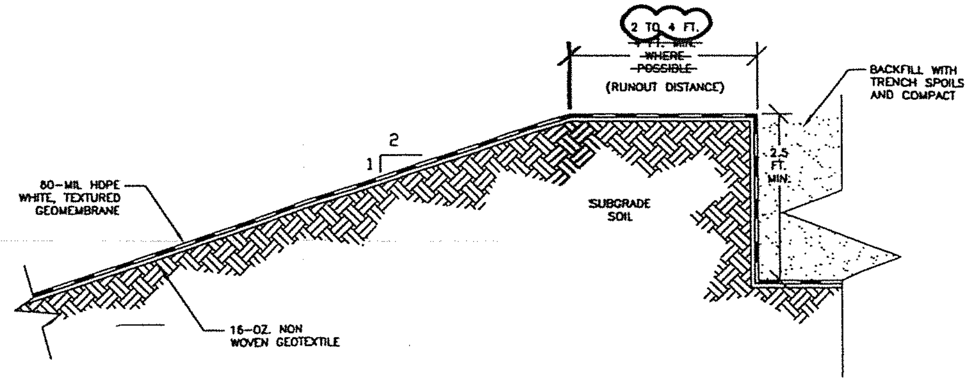


NOTE:
1. GEOMEMBRANE SEAMS SHALL BE PLACED 2 TO 5 FT. FROM TOE OF SLOPE AT A MINIMUM.

A
C030

SLOPE TRANSITION SECTION

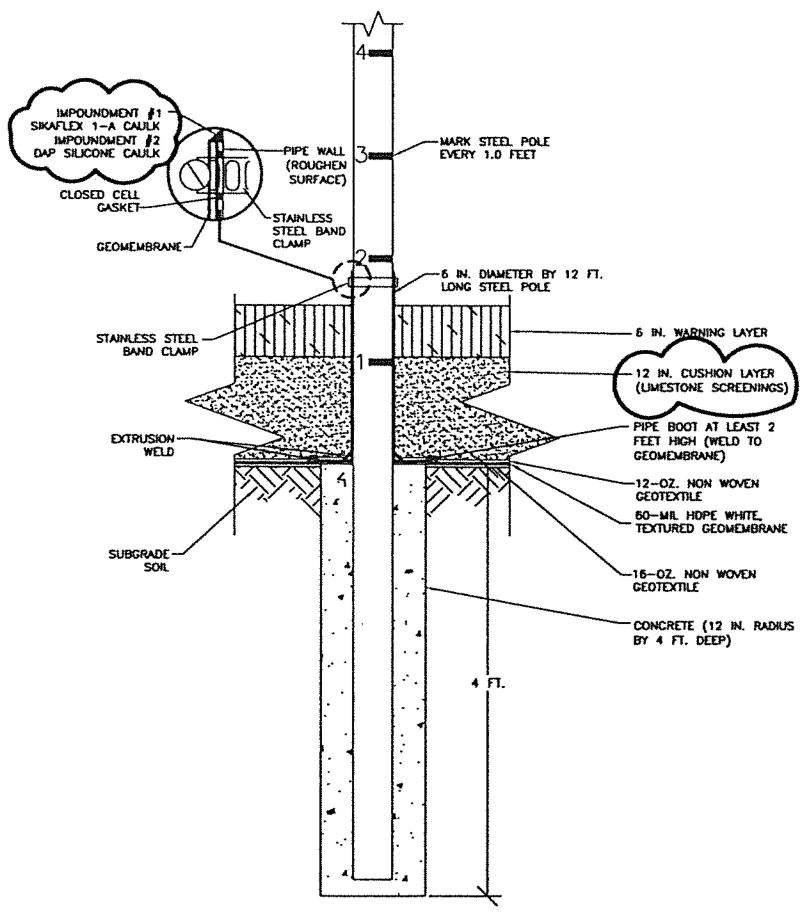
NOT TO SCALE



D
C030

ANCHOR TRENCH SECTION

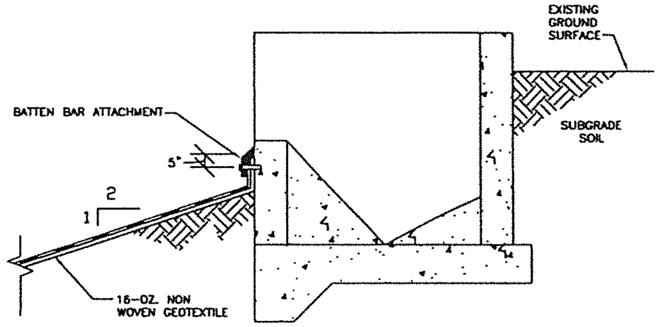
NOT TO SCALE



1
C020

MARKER POST DETAIL

NOT TO SCALE

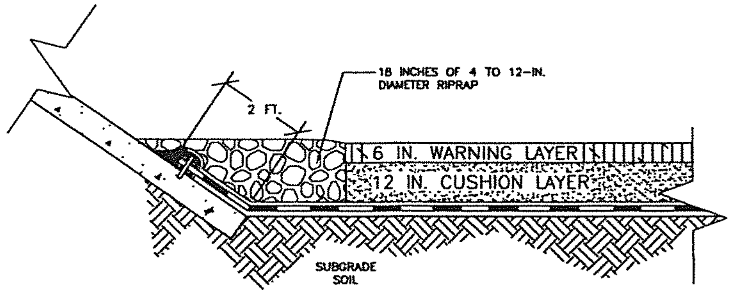


NOTE:
1. REFER TO DETAIL 2 FOR BATTEN BAR ATTACHMENT. EXCLUDE USE OF THE TOP LAYER OF 12-OZ. NON WOVEN GEOTEXTILE.

3
C030

OUTLET WEIR DETAIL

NOT TO SCALE

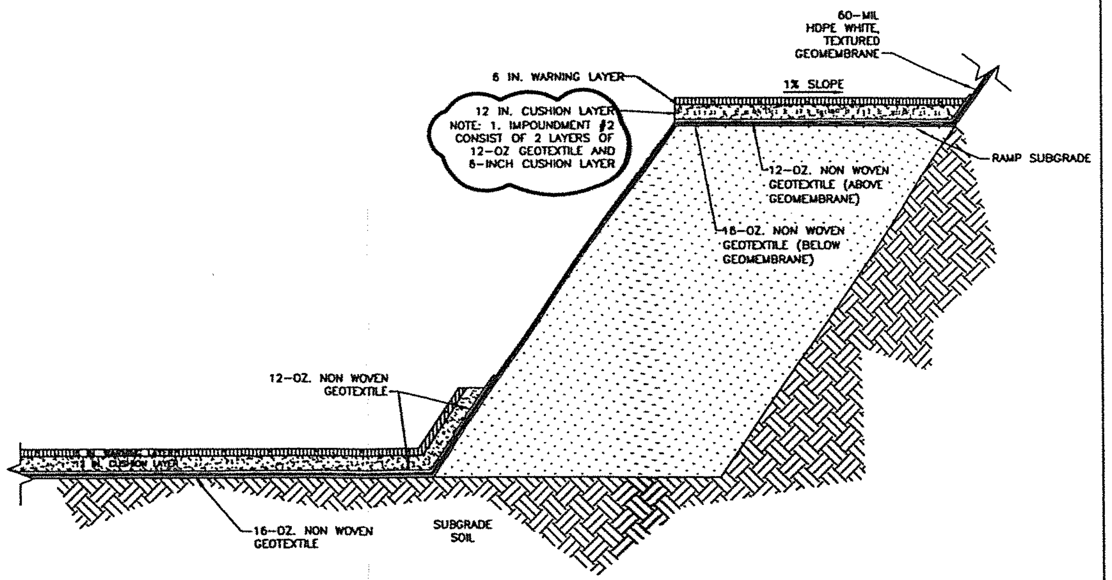


NOTE:
1. REFER TO DETAIL 2 FOR BATTEN BAR ATTACHMENT.

C
--

INLET APRON SECTION

NOT TO SCALE



B
C030

RAMP SECTION

NOT TO SCALE

6.			
5.			
4.			
3.			
2.			
1.			
0.	RECORD DRAWING	12/19/08	HMS
REVISION:		DATE:	APP'D BY:

NATURAL
RESOURCE
TECHNOLOGY

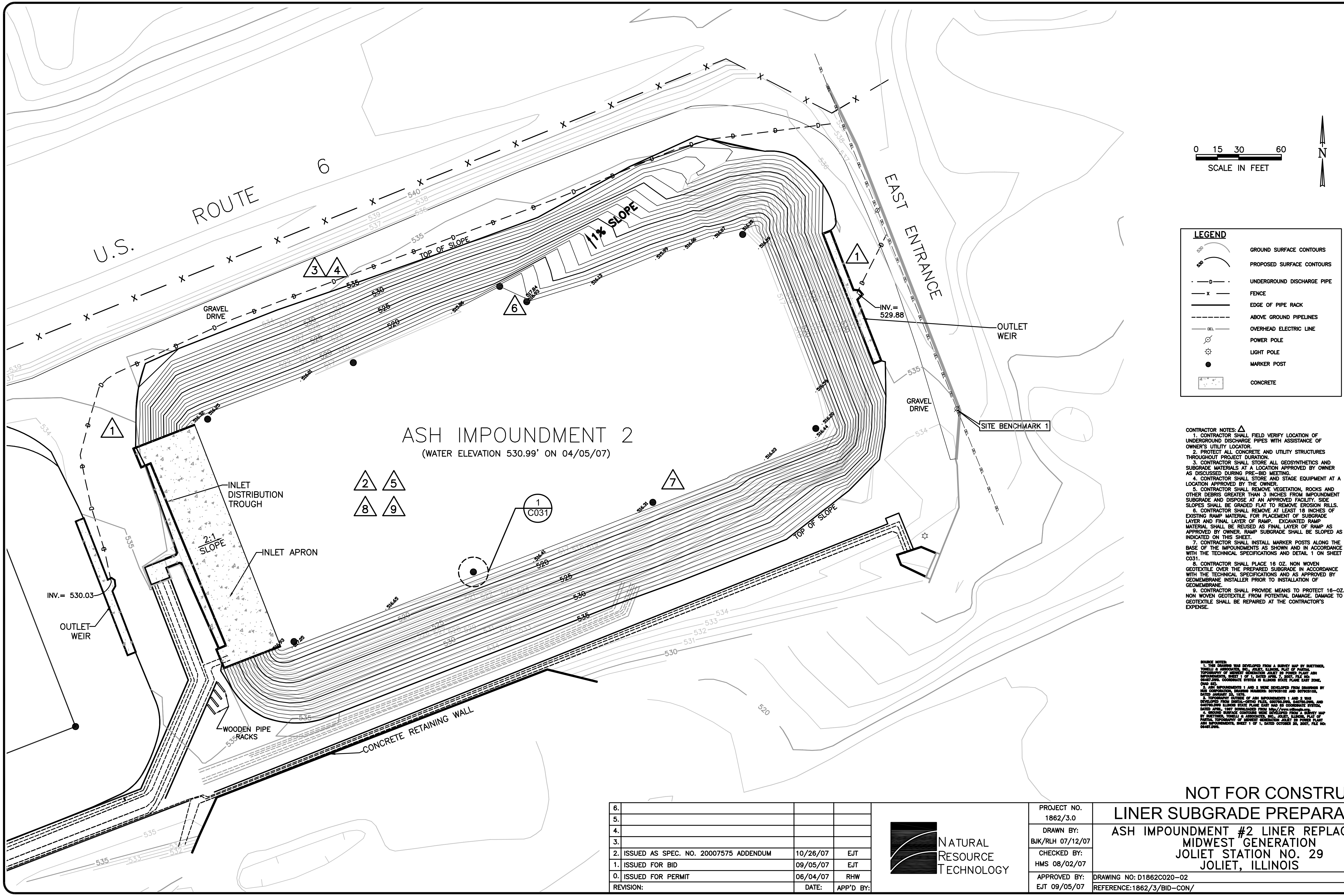
PROJECT NO.
1862/5.2
DRAWN BY:
KNW 12/19/08
CHECKED BY:
HMS 12/19/08
APPROVED BY:
HMS 12/19/08

DETAILS AND SECTIONS

ASH IMPOUNDMENT #1 AND #2 LINER REPLACEMENT
MIDWEST GENERATION, LLC
JOLIET STATION NO. 29
JOLIET, ILLINOIS

DRAWING NO: D1862C031-00
REFERENCE: 1862/RECORD DWGS/

SHEET NO.
C031



LEGEND

530	GROUND SURFACE CONTOURS
530	PROPOSED SURFACE CONTOURS
— D —	UNDERGROUND DISCHARGE PIPE
— x —	FENCE
━━━	EDGE OF PIPE RACK
- - -	ABOVE GROUND PIPELINES
— OEL —	OVERHEAD ELECTRIC LINE
⊘	POWER POLE
☼	LIGHT POLE
●	MARKER POST
▨	CONCRETE

CONTRACTOR NOTES: △

1. CONTRACTOR SHALL FIELD VERIFY LOCATION OF UNDERGROUND DISCHARGE PIPES WITH ASSISTANCE OF OWNER'S UTILITY LOCATOR.
2. PROTECT ALL CONCRETE AND UTILITY STRUCTURES THROUGHOUT PROJECT DURATION.
3. CONTRACTOR SHALL STORE ALL GEOSYNTHETICS AND SUBGRADE MATERIALS AT A LOCATION APPROVED BY OWNER AS DISCUSSED DURING PRE-BID MEETING.
4. CONTRACTOR SHALL STORE AND STAGE EQUIPMENT AT A LOCATION APPROVED BY THE OWNER.
5. CONTRACTOR SHALL REMOVE VEGETATION, ROCKS AND OTHER DEBRIS GREATER THAN 3 INCHES FROM IMPOUNDMENT SUBGRADE AND DISPOSE AT AN APPROVED FACILITY. SIDE SLOPES SHALL BE GRADED FLAT TO REMOVE EROSION RILLS.
6. CONTRACTOR SHALL REMOVE AT LEAST 18 INCHES OF EXISTING RAMP MATERIAL FOR PLACEMENT OF SUBGRADE LAYER AND FINAL LAYER OF RAMP. EXCAVATED RAMP MATERIAL SHALL BE REUSED AS FINAL LAYER OF RAMP AS APPROVED BY OWNER. RAMP SUBGRADE SHALL BE SLOPED AS INDICATED ON THIS SHEET.
7. CONTRACTOR SHALL INSTALL MARKER POSTS ALONG THE BASE OF THE IMPOUNDMENTS AS SHOWN AND IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS AND DETAIL 1 ON SHEET C031.
8. CONTRACTOR SHALL PLACE 16 OZ. NON WOVEN GEOTEXTILE OVER THE PREPARED SUBGRADE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS AND AS APPROVED BY GEOMEMBRANE INSTALLER PRIOR TO INSTALLATION OF GEOMEMBRANE.
9. CONTRACTOR SHALL PROVIDE MEANS TO PROTECT 16-OZ. NON WOVEN GEOTEXTILE FROM POTENTIAL DAMAGE. DAMAGE TO GEOTEXTILE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

SOURCE NOTES:

1. THIS DRAWING WAS DEVELOPED FROM A SURVEY MAP BY RUETTIGER, TONELLI & ASSOCIATES, INC., JOLIET, ILLINOIS, PLAT OF PARTIAL TOPOGRAPHY OF MIDWEST GENERATION JOLIET 29 POWER PLANT ASH IMPOUNDMENTS, SHEET 1 OF 1, DATED APRIL 7, 2007, FILE NO: 06487.DWG. COORDINATE SYSTEM IS ILLINOIS STATE PLANE EAST ZONE, (NAD 83).
2. ASH IMPOUNDMENTS 1 AND 2 WERE DEVELOPED FROM DRAWINGS BY NUS CORPORATION, DRAWING NUMBERS: 5079C5102 AND 5079C5103, DATED JANUARY 23, 1979.
3. TOPOGRAPHY OUTSIDE OF ASH IMPOUNDMENTS 1 AND 2 WAS DEVELOPED FROM DIGITAL-ORTHO FILES, 030750.DWG, 040750.DWG, AND 040760.DWG ILLINOIS STATE PLANE EAST NAD 83 COORDINATE SYSTEM, DATED APRIL, 1997 DOWNLOADED FROM http://www.willcogis.org.
4. GROUND SURFACE CONTOURS WERE DEVELOPED FROM A SURVEY MAP BY RUETTIGER, TONELLI & ASSOCIATES, INC., JOLIET, ILLINOIS, PLAT OF PARTIAL TOPOGRAPHY OF MIDWEST GENERATION JOLIET 29 POWER PLANT ASH IMPOUNDMENTS, SHEET 1 OF 1, DATED OCTOBER 20, 2007, FILE NO: 06487.DWG.

NOT FOR CONSTRUCTION

	REVISION:	DATE:	APP'D BY:
6.			
5.			
4.			
3.			
2.	ISSUED AS SPEC. NO. 20007575 ADDENDUM	10/26/07	EJT
1.	ISSUED FOR BID	09/05/07	EJT
0.	ISSUED FOR PERMIT	06/04/07	RHW

NATURAL
RESOURCE
TECHNOLOGY

PROJECT NO.
1862/3.0

DRAWN BY:
BJK/RLH 07/12/07

CHECKED BY:
HMS 08/02/07

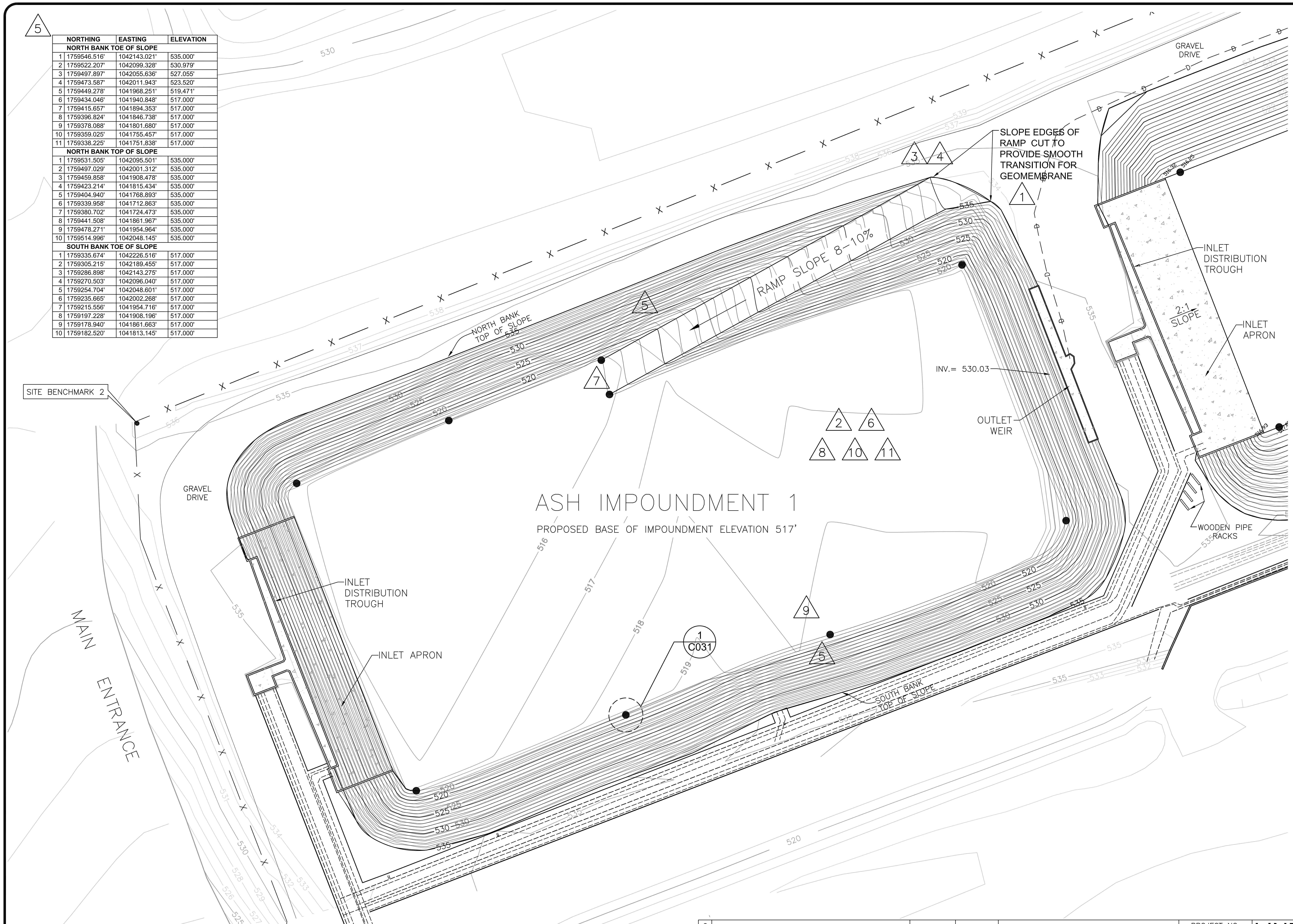
APPROVED BY:
EJT 09/05/07

LINER SUBGRADE PREPARATION

ASH IMPOUNDMENT #2 LINER REPLACEMENT
MIDWEST GENERATION
JOLIET STATION NO. 29
JOLIET, ILLINOIS

DRAWING NO: D1862C020-02
REFERENCE:1862/3/BID-CON/

SHEET NO.
C020



5

	NORTHING	EASTING	ELEVATION
	NORTH BANK TOE OF SLOPE		
1	1759546.516'	1042143.021'	535.000'
2	1759522.207'	1042099.328'	530.979'
3	1759497.897'	1042055.636'	527.055'
4	1759473.587'	1042011.943'	523.520'
5	1759449.278'	1041968.251'	519.471'
6	1759434.046'	1041940.848'	517.000'
7	1759415.657'	1041894.353'	517.000'
8	1759396.824'	1041846.738'	517.000'
9	1759378.088'	1041801.680'	517.000'
10	1759359.025'	1041755.457'	517.000'
11	1759338.225'	1041751.838'	517.000'
	NORTH BANK TOP OF SLOPE		
1	1759531.505'	1042095.501'	535.000'
2	1759497.029'	1042001.312'	535.000'
3	1759459.858'	1041908.478'	535.000'
4	1759423.214'	1041815.434'	535.000'
5	1759404.940'	1041768.893'	535.000'
6	1759339.958'	1041712.863'	535.000'
7	1759380.702'	1041724.473'	535.000'
8	1759441.508'	1041861.967'	535.000'
9	1759478.271'	1041954.964'	535.000'
10	1759514.996'	1042048.145'	535.000'
	SOUTH BANK TOE OF SLOPE		
1	1759335.674'	1042226.516'	517.000'
2	1759305.215'	1042189.455'	517.000'
3	1759286.898'	1042143.275'	517.000'
4	1759270.503'	1042096.040'	517.000'
5	1759254.704'	1042048.601'	517.000'
6	1759235.665'	1042002.268'	517.000'
7	1759215.556'	1041954.716'	517.000'
8	1759197.228'	1041908.196'	517.000'
9	1759178.940'	1041861.663'	517.000'
10	1759182.520'	1041813.145'	517.000'

LEGEND

530 ⌒	EXISTING GROUND SURFACE CONTOURS
530 ⌒	SUBGRADE CONTOURS
- ——D—— -	UNDERGROUND DISCHARGE PIPE
—— x ——	FENCE
———	EDGE OF PIPE RACK
– – – – – – –	ABOVE GROUND PIPELINES
●	MARKER POST
▨	CONCRETE
MWG	MIDWEST GENERATION, LLC

CONTRACTOR NOTES: △

1. CONTRACTOR SHALL FIELD VERIFY LOCATION OF UNDERGROUND DISCHARGE PIPES WITH ASSISTANCE OF MWG'S UTILITY LOCATOR.
2. PROTECT ALL CONCRETE AND UTILITY STRUCTURES THROUGHOUT PROJECT DURATION.
3. CONTRACTOR SHALL STORE ALL GEOSYNTHETICS AND SUBGRADE MATERIALS AT A LOCATION APPROVED BY MWG AS DISCUSSED DURING JOB-START MEETING.
4. CONTRACTOR SHALL STORE AND STAGE EQUIPMENT AT A LOCATION APPROVED BY MWG.
5. CONTRACTOR SHALL PLACE AND COMPACT MWG PROVIDED FILL FROM BOTTOM TO TOP OF NORTH BANKS TO ACHIEVE 2H:1V SLOPES. RESHAPE ALL SIDE SLOPES TO ACHIEVING BETWEEN 2H:1V TO 3H:1V SLOPE, AS APPROVED BY MWG AND/OR ENGINEER. SCARIFY SIDE SLOPES PRIOR TO PLACEMENT OF FILL. SEE TABLE FOR TOP AND BOTTOM SLOPE LOCATION AND ELEVATION.
6. CONTRACTOR SHALL REMOVE VEGETATION, ROCKS AND OTHER DEBRIS GREATER THAN 3 INCHES FROM IMPOUNDMENT SUBGRADE AND DISPOSE AT AN APPROVED FACILITY. SIDE SLOPES SHALL BE GRADED FLAT TO REMOVE EROSION RILLS.
7. CONTRACTOR SHALL REMOVE AT LEAST 18 INCHES OF EXISTING RAMP MATERIAL FOR PLACEMENT OF 16 OZ. GEOTEXTILE AND REPLACEMENT LINER. EXCAVATED RAMP MATERIAL SHALL BE REUSED AS FILL FOR RESHAPING SIDESLOPES, AS APPROVED BY MWG.
8. CONTRACTOR SHALL HAVE LICENSED SURVEYOR PROVIDE TOPOGRAPHIC SURVEY OF PREPARED SUBGRADE FOR ENGINEER APPROVAL PRIOR TO INSTALLATION OF GEOTEXTILE AND GEOMEMBRANE LINER.
9. CONTRACTOR SHALL INSTALL MARKER POSTS ALONG THE BASE OF THE IMPOUNDMENTS AS SHOWN AND IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS AND DETAIL 1 ON SHEET C031.
10. CONTRACTOR SHALL PLACE 16 OZ. NON WOVEN GEOTEXTILE OVER THE PREPARED SUBGRADE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS AND AS APPROVED BY GEOMEMBRANE INSTALLER PRIOR TO INSTALLATION OF GEOMEMBRANE.
11. CONTRACTOR SHALL PROVIDE MEANS TO PROTECT 16-OZ. NON WOVEN GEOTEXTILE FROM POTENTIAL DAMAGE. DAMAGE TO GEOTEXTILE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

SURVEY NOTES:
COORDINATE SYSTEM IS ILLINOIS STATE PLANE EAST ZONE, (NAD 83) VERTICAL DATUM NGVD29.

SOURCE NOTES:

1. **THIS DRAWING WAS DEVELOPED FROM A SURVEY MAP BY RUETTIGER, TONELLI & ASSOCIATES, INC., JOLIET, ILLINOIS, PLAT OF PARTIAL TOPOGRAPHY OF MIDWEST GENERATION JOLIET 29 POWER PLANT ASH IMPOUNDMENTS, SHEET 1 OF 1, DATED APRIL 7, 2007, FILE NO: 06487.DWG. COORDINATE SYSTEM IS ILLINOIS STATE PLANE EAST ZONE, (NAD 83).**
2. **ASH IMPOUNDMENTS 1 AND 2 WERE DEVELOPED FROM DRAWINGS BY NUS CORPORATION, DRAWING NUMBERS: 5079C5102 AND 5079C5103, DATED JANUARY 23, 1979.**
3. **TOPOGRAPHY OUTSIDE OF ASH IMPOUNDMENTS 1 AND 2 WAS DEVELOPED FROM DIGITAL-ORTHO FILES, 030750.DWG, 040750.DWG, AND 040760.DWG ILLINOIS STATE PLANE EAST NAD 83 COORDINATE SYSTEM, DATED APRIL, 1997 DOWNLOADED FROM http://www.willcogis.org.**
4. **GROUND SURFACE CONTOURS WERE DEVELOPED FROM A SURVEY MAP BY RUETTIGER, TONELLI & ASSOCIATES, INC., JOLIET, ILLINOIS, PLAT OF PARTIAL TOPOGRAPHY OF MIDWEST GENERATION JOLIET 29 POWER PLANT ASH IMPOUNDMENTS, SHEET 1 OF 1, DATED OCTOBER 20, 2007, FILE NO: 0648T.DWG.**
5. **TOPOGRAPHY OF ASH IMPOUNDMENT 1 FROM SURVEY POINTS COLLECTED BY MIDWEST GENERATION PERSONNEL, DATE JULY 22, 2008.**

6.			
5.			
4.			
3.			
2.			
1.			
0.	ISSUED FOR CONSTRUCTION	08/13/08	EJT
REVISION:		DATE:	APP'D BY:

NATURAL
RESOURCE
TECHNOLOGY

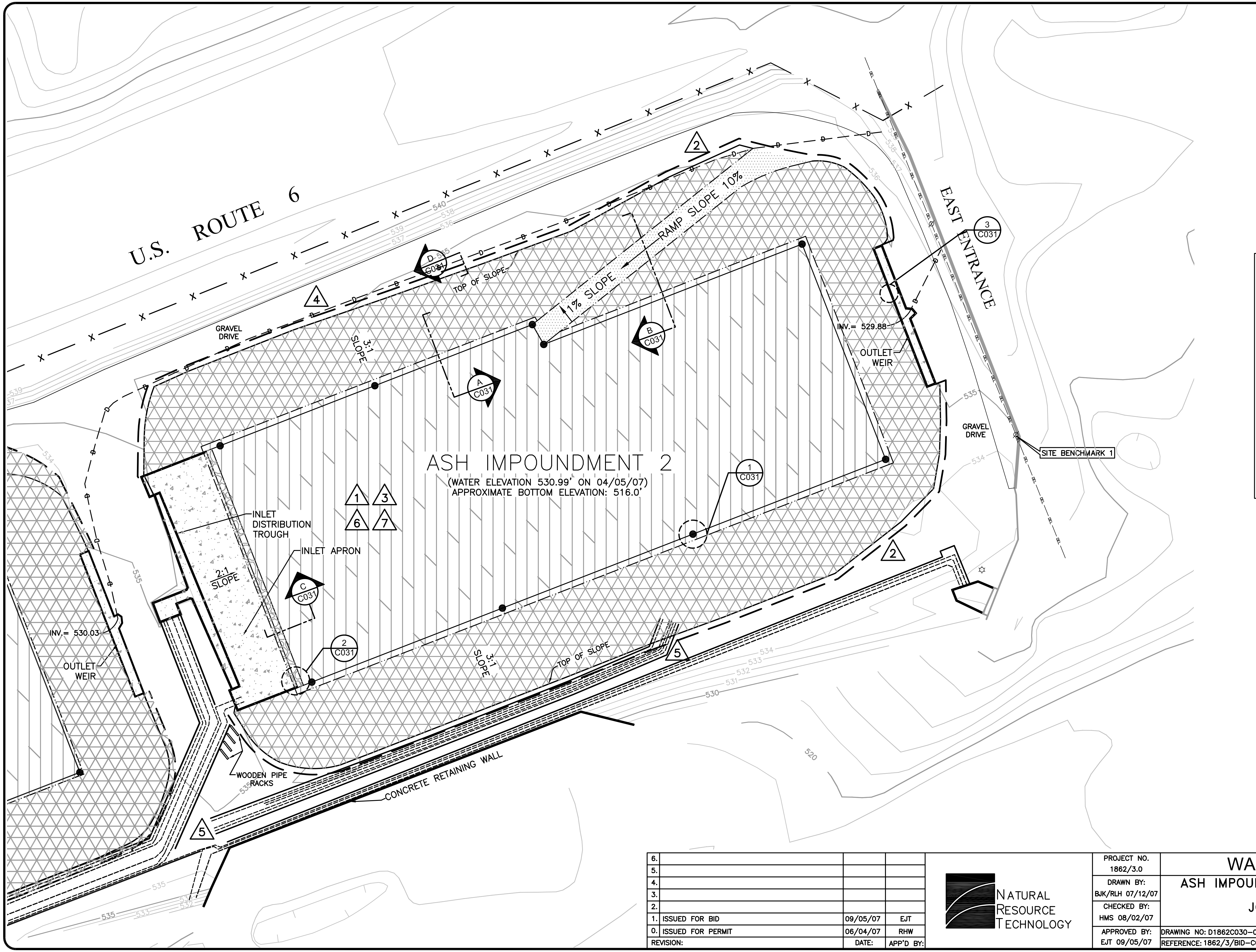
PROJECT NO.
1862/5.3
DRAWN BY:
BJK/RLH 06/24/08
CHECKED BY:
HMS 08/13/08
APPROVED BY:
EJT 08/13/08

LINER SUBGRADE PREPARATION

ASH IMPOUNDMENT #1 LINER REPLACEMENT
MIDWEST GENERATION, LLC
JOLIET STATION NO. 29
JOLIET, ILLINOIS

DRAWING NO: D1862C020-00
REFERENCE: BID-CON IMPOUNDMENT 1\

SHEET NO.
C020



LEGEND

530	GROUND SURFACE CONTOURS
—D—	UNDERGROUND DISCHARGE PIPE
—x—	FENCE
—	EDGE OF PIPE RACK
- - -	ABOVE GROUND PIPELINES
—DEL—	OVERHEAD ELECTRIC LINE
⌀	POWER POLE
☼	LIGHT POLE
●	MARKER POST
— —	ANCHOR TRENCH
-·· -	12 OZ. NON-WOVEN GEOTEXTILE
▨	CONCRETE
░	EXCAVATED RAMP MATERIAL
▩	RIP RAP
▥	WARNING LAYER
▦	HDPE GEOMEMBRANE

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 IMPOUNDMENT BANK, AS SHOWN IN SECTION D ON SHEET C031. CONTRACTOR SHALL ADVISE OWNER AND/OR ENGINEER IF PROPOSED LOCATION NOT POSSIBLE. DISCHARGE PIPE SHALL BE FIELD LOCATED AND CONTRACTOR SHALL NOTIFY OWNER IF ANCHOR TRENCH INTERFERES WITH PIPING.
3. CONTRACTOR SHALL PLACE 12-OZ. NON-WOVEN GEOTEXTILE OVER THE GEOMEMBRANE, SAND MATERIAL AND WARNING LAYER MATERIAL AT BASE AND 4 FEET ON SIDE SLOPES AFTER RECEIVING APPROVAL FROM ENGINEER AND PASSING QUALITY CONTROL RESULTS IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS. (SEE SHEET C031)
4. RESTORE AREAS DISTURBED BY EQUIPMENT AND MATERIAL LAYDOWN.
5. ABOVE GROUND PIPING TO BE INSTALLED BY OTHERS.
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:

1. THIS DRAWING WAS DEVELOPED FROM A SURVEY MAP BY RUETTIGER, TONELLI & ASSOCIATES, INC., JOLIET, ILLINOIS, PLAT OF PARTIAL TOPOGRAPHY OF MIDWEST GENERATION JOLIET 29 POWER PLANT ASH IMPOUNDMENTS, SHEET 1 OF 1, DATED APRIL 7, 2007, FILE NO: 06487.DWG. COORDINATE SYSTEM IS ILLINOIS STATE PLANE EAST ZONE, (NAD 83).
2. ASH IMPOUNDMENTS 1 AND 2 WERE DEVELOPED FROM DRAWINGS BY NUS CORPORATION, DRAWING NUMBERS: 5079C5102 AND 5079C5103, DATED JANUARY 23, 1979.
3. TOPOGRAPHY OUTSIDE OF ASH IMPOUNDMENTS 1 AND 2 WAS DEVELOPED FROM DIGITAL-ORTHO FILES, 030750.DWG, 040750.DWG, AND 040760.DWG ILLINOIS STATE PLANE EAST NAD 83 COORDINATE SYSTEM, DATED APRIL, 1997 DOWNLOADED FROM http://www.willcogis.org.

NOT FOR CONSTRUCTION

6.			
5.			
4.			
3.			
2.			
1.	ISSUED FOR BID	09/05/07	EJT
0.	ISSUED FOR PERMIT	06/04/07	RHW
REVISION:		DATE:	APP'D BY:

NATURAL
RESOURCE
TECHNOLOGY

PROJECT NO.
1862/3.0

DRAWN BY:
BJK/RLH 07/12/07

CHECKED BY:
HMS 08/02/07

APPROVED BY:
EJT 09/05/07

WARNING LAYER PLAN

ASH IMPOUNDMENT #2 LINER REPLACEMENT
MIDWEST GENERATION
JOLIET STATION NO. 29
JOLIET, ILLINOIS

DRAWING NO: D1862C030-01
REFERENCE: 1862/3/BID-CON/

SHEET NO.
C030

0 15 30 60
SCALE IN FEET

N

LEGEND

530	GROUND SURFACE CONTOURS
— D —	UNDERGROUND DISCHARGE PIPE
— x —	FENCE
———	EDGE OF PIPE RACK
- - - -	ABOVE GROUND PIPELINES
●	MARKER POST
— —	ANCHOR TRENCH
— · —	12 OZ. NON-WOVEN GEOTEXTILE
▭	CONCRETE
▨	RIP RAP
▥	WARNING LAYER
▨	HDPE GEOMEMBRANE
MWG	MIDWEST GENERATION, LLC

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 IMPOUNDMENT BANK, AS SHOWN IN SECTION D ON SHEET C031. CONTRACTOR SHALL ADVISE MWG AND/OR ENGINEER IF PROPOSED LOCATION NOT POSSIBLE. DISCHARGE PIPE SHALL BE FIELD LOCATED AND CONTRACTOR SHALL NOTIFY MWG IF ANCHOR TRENCH INTERFERES WITH PIPING.
3. CONTRACTOR SHALL PLACE 12-OZ. NON-WOVEN GEOTEXTILE OVER THE GEOMEMBRANE, CUSHION MATERIAL AND WARNING LAYER MATERIAL AT BASE AND 4 FEET ON SIDE SLOPES, AND RAMP FOLLOWING ENGINEER APPROVAL AND PASSING QUALITY CONTROL RESULTS IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS (SEE SHEET C031)
4. RESTORE AREAS DISTURBED BY EQUIPMENT AND MATERIAL LAYDOWN.
5. CONTRACTOR SHALL PROVIDE SURVEY DOCUMENTATION OF THE ITEMS LISTED IN THE TECHNICAL SPECIFICATIONS.
6. CONTRACTOR SHALL PERFORM A LEAK LOCATION SURVEY IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS.

SOURCE NOTES:

1. THIS DRAWING WAS DEVELOPED FROM A SURVEY MAP BY RUETTIGER, TONELLI & ASSOCIATES, INC., JOLIET, ILLINOIS, PLAT OF PARTIAL TOPOGRAPHY OF MIDWEST GENERATION JOLIET 29 POWER PLANT ASH IMPOUNDMENTS, SHEET 1 OF 1, DATED APRIL 7, 2007, FILE NO: 06487.DWG. COORDINATE SYSTEM IS ILLINOIS STATE PLANE EAST ZONE, (NAD 83).
2. ASH IMPOUNDMENTS 1 AND 2 WERE DEVELOPED FROM DRAWINGS BY NUS CORPORATION, DRAWING NUMBERS: 5079C5102 AND 5079C5103, DATED JANUARY 23, 1979.
3. TOPOGRAPHY OUTSIDE OF ASH IMPOUNDMENTS 1 AND 2 WAS DEVELOPED FROM DIGITAL-ORTHO FILES, 030750.DWG, 040750.DWG, AND 040760.DWG ILLINOIS STATE PLANE EAST NAD 83 COORDINATE SYSTEM, DATED APRIL, 1997 DOWNLOADED FROM http://www.willcogis.org.
4. GROUND SURFACE CONTOURS WERE DEVELOPED FROM A SURVEY MAP BY RUETTIGER, TONELLI & ASSOCIATES, INC., JOLIET, ILLINOIS, PLAT OF PARTIAL TOPOGRAPHY OF MIDWEST GENERATION JOLIET 29 POWER PLANT ASH IMPOUNDMENTS, SHEET 1 OF 1, DATED OCTOBER 20, 2007, FILE NO: 0648T.DWG.
5. TOPOGRAPHY OF ASH IMPOUNDMENT 1 FROM SURVEY POINTS COLLECTED BY MIDWEST GENERATION PERSONNEL, DATE JULY 22, 2008.

6.			
5.			
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1.			
0.	ISSUED FOR CONSTRUCTION	08/13/08	EJT
REVISION:		DATE:	APP'D BY:

NATURAL RESOURCE TECHNOLOGY

PROJECT NO. 1862/5.3
DRAWN BY: BJK 06/24/08
CHECKED BY: HMS 08/13/08
APPROVED BY: EJT 08/13/08

WARNING LAYER PLAN

ASH IMPOUNDMENT #1 LINER REPLACEMENT
MIDWEST GENERATION, LLC
JOLIET STATION NO. 29
JOLIET, ILLINOIS

DRAWING NO: D1862C030-00
REFERENCE: 1862/BID-CON IMPOUNDMENT 1/

SHEET NO. C030

ASBUILT OF
MIDWEST GENERATION JOLIET 29 POWER PLANT
WEST-ASH IMPOUNDMENTS

ASBUILT NOTE:

THE POND ASBUILT EXTENDS TO THE OUTSIDE OF THE NEW LINER, AS SHOWN HEREON. AREAS OUTSIDE THE NEW LINER AND SHOWN HEREON HAVE NOT BEEN REVERIFIED

L E G E N D

mea.	MEASURED
rec.	RECORDED
calc.	CALCULATED
●	FOUND SURVEY MONUMENT
■	SET 5/8" REBAR UNLESS OTHERWISE NOTED
—x—x—x—x—	6' HIGH CHAIN LINK FENCE
●	UTILITY POLE
¤	LIGHT
——P——	UNDERGROUND PIPELINE LOCATED BY OTHERS
XXX	EXISTING CONTOUR
XXX.XX	EXISTING ELEVATION
——OHU——	OVERHEAD UTILITY LINES

SITE BENCHMARK 1:

SET CONCRETE NAIL IN WESTERLY FACE OF UTILITY POLE, WEST SIDE OF EAST ENTRANCE ROAD, 4TH UTILITY POLE SOUTH OF U.S. ROUTE 6.

ELEVATION: 536.39 (NGVD 29)

SITE BENCHMARK 2:

SET REBAR 2' S & 2.5' E OF 6' HIGH CHAIN LINK FENCE CORNER AT SOUTHEAST CORNER OF MAIN ENTRANCE ROAD & U.S. ROUTE 6.

ELEVATION: 536.71 (NGVD 29)

BENCHMARK:

WILL COUNTY CONTROL MONUMENT STATION 6274 CUT SQUARE ON CENTERLINE OF SOUTH HEADWALL IN THE SOUTHEAST CORNER OF THE INTERSECTION OF BRANDON ROAD AND MEADOW AVENUE.

ELEVATION: 550.33 (NGVD 29)

FIELD VERIFY BENCHMARKS WITH BENCHMARK LIST.

STATE OF ILLINOIS)
)SS
COUNTY OF WILL)

RUETTIGER, TONELLI & ASSOCIATES, INC., ILLINOIS PROFESSIONAL DESIGN FIRM No. 184–001251, HEREBY CERTIFIES THAT IT HAS TOPOGRAPHICALLY SURVEYED THE POND AREA NOTED HEREON AND AS SHOWN ON THE ANNEXED PLAT, WHICH IS A TRUE AND CORRECT REPRESENTATION OF SAID TOPOGRAPHY.

SURVEY FIELD WORK COMPLETED 10/20/08

GIVEN UNDER MY HAND AND SEAL THIS 10th DAY OF MAY , 2008 .

BY ______________________________

ILLINOIS PROFESSIONAL LAND SURVEYOR (MY LICENSE EXPIRES 11–30–2008)

TO ENSURE AUTHENTICITY OF THIS DRAWING, IT MUST BEAR THE EMBOSSED SEAL OF THE DESIGN FIRM OR PROFESSIONAL LICENSEE WHO PREPARED THIS DRAWING.

ANY DISCREPANCY IN MEASUREMENT DISCOVERED UPON THE GROUND SHOULD BE PROMPTLY REPORTED TO THE SURVEYOR FOR EXPLANATION OR CORRECTION.

FOR BUILDING LINE AND OTHER RESTRICTIONS NOT SHOWN HEREON REFER TO YOUR ABSTRACT, DEED, CONTRACTS AND ZONING ORDINANCES.

REVISIONS

No.	DATE	DESCRIPTION	BY
1	12/2/08	ADDED NEW ASBUILT INFORMATION	MJ

RT
&A
Ruettiger, Tonelli & Associates, Inc.
Surveyors • Engineers • Planners • Landscape Architects • G.I.S. Consultants
2174 ONEIDA STREET
JOLIET, ILLINOIS 60435
PH. (815) 744-6600 FAX (815) 744-0101
2603 S. WASHINGTON STREET - SUITE 170
NAPERVILLE, ILLINOIS 60565
PH. (630) 420-7740 FAX (630) 420-7741

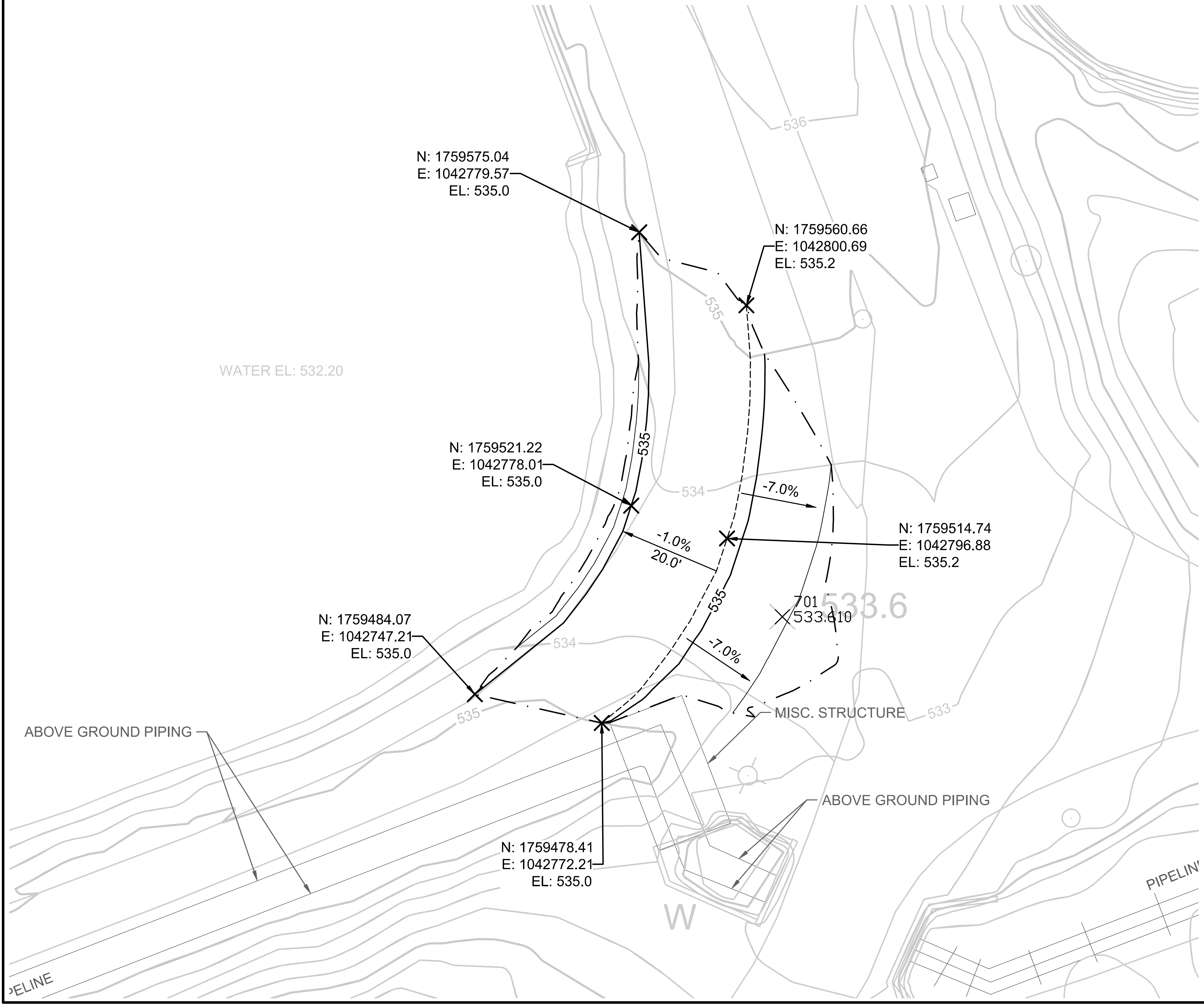
DATE: 6/9/08	SCALE: 1" = 40'	DRAWN BY: MJ	CHECKED BY: EC

PREPARED FOR: BREISER CONSTRUCTION COMPANY
24101 S. MUNICIPAL DRIVE
CHANNAHON, IL

FIELD BOOK: MIDWEST GEN.
PAGE: 11–13

DRAWING TITLE: ASBUILT

DRAWING No.:
308-0363 ASBUILT
WEST-ASH IMP.



LEGEND

——535——	EXISTING GROUND MAJOR CONTOUR (5')
————	EXISTING GROUND MINOR CONTOUR (1')
——535——	PROPOSED GRADING MAJOR CONTOUR (5')
————	PROPOSED GRADING MINOR CONTOUR (1')
— · —	PROPOSED LIMIT OF GRADING
- - - - - - -	GRADE BREAK

NOTES:

1. SOURCE AERIAL TOPOGRAPHY: AERO-METRIC, INC. DATE OF PHOTOGRAPHY: 6/17/2008.
2. EARTHWORK VOLUME = 100 CY
3. FILL (CA-6 AGGREGATE) SHALL BE PLACED WITH A MAXIMUM LOOSE LIFT THICKNESS OF 10 INCHES WITH A MAXIMUM COMPACTED LIFT THICKNESS OF 6 INCHES. FILL SHALL BE COMPACTED BY A MINIMUM OF 3 PASSES WITH A CAT 34B OR EQUIVALENT SMOOTH DRUM ROLLER (MINIMUM OPERATING WEIGHT OF 8,000 lbs. AND MINIMUM CENTRIFUGAL FORCE PER DRUM OF 5,000 lbs.) AND SHALL BE FIRM AND UNYIELDING.

N

0 20' 40'

SCALE IN FEET

PROPOSED BERM GRADING
JOLIET 29 STATION
JOLIET, ILLINOIS

Geosyntec consultants

FIGURE
1

PROJECT NO: SW0251-05
AUGUST 2016

Z:\CADD\FIGURES\JOLIET\SW0251-05 BERM GRADING

Attachment 1-2 – HDPE 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 D1004 – Test Method for Initial Tear Resistance of Plastic Film and Sheeting.

B. ASTM D1238 – Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.

C. ASTM D1505 – Test Method for Density of Plastics by the Density-Gradient Technique.

D. ASTM D1603 – Test Method for Carbon Black in Olefin Plastics.

E. ASTM D4833 – Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.

F. ASTM D5199 – Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.

G. ASTM D5397 – Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test.

H. ASTM D5596 – Test Method for Microscopic Evaluation of Dispersion of Carbon Black in Polyolefin Geosynthetics.

I. ASTM D5994 Standard Test Method for Measuring Core Thickness of Textured Geomembranes.

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

K. ASTM D6693 Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes.

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

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

N. 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 to provide HDPE geomembrane.

C. Geosynthetic Quality Assurance Consultant: Consultant, independent from the Owner, 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): Party, 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.

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 (Bedding Layer): Soil Layer surface which immediately underlies the geosynthetic material(s).

1.04 QUALITY ASSURANCE

A. Qualifications:

1. 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.

B. Quality Assurance Program:

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

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

3. The Owner 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. Corporate background information indicating compliance with qualification requirements.

   b. Training completed by personnel.

   c. 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 indicating compliance with specified requirements.

B. 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.

C. 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.

D. 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.

E. 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. Manufacturer packaging shall be labeled in accordance with Section 02700, 2.02G.

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

b. 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.

c. 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.

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

e. 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 2.03(B) and 2.03(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 2.03(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 roll 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 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 in accordance with Section 01040, Project Administration, to discuss and plan the details of geomembrane installation. This meeting shall be attended by the Geomembrane Installer, Owner, Geosynthetic Quality Assurance Consultant and the General 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 02243, Subgrade Layer Preparation, and excavate and backfill in accordance with Section 02222, Anchor Trenching, Backfilling and Compaction.

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 .05B*)* 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 2.03 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.

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 Geosynthetic Quality Assurance Consultant. Only equipment which has been specifically approved by make and model shall be used, if applicable.

2. The Geomembrane Installer will meet 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 Geosynthetic Quality Assurance Consultant, 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 be performed only if geomembrane is preheated by either sun or a hot air device, provided there is no excessive ambient cooling resulting from high winds. Pre-qualification seams shall be produced under identical conditions.

   c. Above 41 degrees F (5 degrees C), no preheating of geomembrane 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 Geosynthetic Quality Assurance Consultant 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 Geosynthetic Quality Assurance Consultant 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 Geosynthetic Quality Assurance Consultant. 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 Geosynthetic Quality Assurance Consultant and may be submitted for laboratory testing.

    e. The Geomembrane Installer shall complete two shear tests and two peel tests.

    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. For cross seams, 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 Geosynthetic Quality Assurance Consultant in writing.

B. Vacuum Testing – shall be performed in accordance with ASTM D5641, Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.

C. Air Pressure Testing – shall be performed in accordance with ASTM D5820, Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes, 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 Geosynthetic Quality Assurance Consultant 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 seams affected shall be repaired and retested.

3.06 DESTRUCTIVE TESTING

A. The Owner shall have the option to conduct destructive testing of geomembrane panel seams completed in the field. Destructive seam sampling and testing shall be performed by the Geomembrane Installer under the observation of the Geosynthetic Quality Assurance Consultant.

B. Sampling Procedure

1. For each sample location, the Geosynthetic Quality Assurance Consultant will:

a. Assign a sample number and mark the sample accordingly.

b. Record the sample location on the as-built layout drawing.

c. By sample number, record reason for collecting sample (e.g., as part of statistical testing program, suspicious seam, retest, etc.).

   d. Record pertinent information, including date, time, seam number, number of seaming unit, and name of seamer, on both the seam sample and CQA documentation.

2. Each destructive sample shall be at least 12 inches wide (at least 6 inches on each side of seam) by 54 inches long. Samples will be cut by the Geomembrane Installer into three parts and distributed as follows:

   a. A 12-inch by 12-inch portion shall be cut and tested in accordance with subsection 3.06(C) by the Geomembrane Installer.

   b. A 12-inch by 12-inch portion shall be cut and retained by the Geomembrane Installer. The Geomembrane Installer may elect to omit this requirement.

   c. A 12-inch by 12-inch portion shall be cut and retained by the Geosynthetic Quality Assurance Consultant as an archive sample.

   d. A 12-inch by 18-inch portion shall be submitted by the Geosynthetic Quality Assurance Consultant for laboratory testing as described in Part 3.06(D).

3. Ten specimens, each 1 inch wide by 12 inches long with seam centered perpendicular to width, shall be collected and field tested by the Geomembrane Installer prior to shipping the sample to the laboratory. If all samples pass field tensiometer test described in Part 3.06(C), then the laboratory sample shall be collected according to procedure described in Part 3.06(B)(2)(d).

4. Holes cut into geomembrane resulting from destructive seam sampling shall be immediately repaired by Geomembrane Installer in accordance with repair procedures described in Part 3.07.

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).

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

   3. Testing shall be performed in accordance to 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, Table 2.

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 Asssurance 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 ASTM D6392.

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 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.

4. 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, Table 2 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.

3. 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 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 at the discretion of the Geosynthetic Quality Assurance Consultant (in accordance with Part 3.06).

F. Repairs which fail testing shall be redone and retested until a passing result is obtained. The Geomembrane Installer will perform non-destructive testing or 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).

3.08 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 1-ft long membrane pipe boots and steel straps to seal the geomembrane around pole or structure.
2. Use standard welding procedures to seam the membrane boot to the geomembrane.
3. Seaming performed on and around penetrations, and other appurtenances shall be non-destructively tested using the vacuum testing method.

3.09 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 one working day of survey completion and in accordance with Section 01050.

3.10 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.

3.10 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 - Requirements for placement of general fill are described in Sections 02221 and 02222. 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 3.07 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

Attachment 1-3 – Pond 2 Liner Repair Specifications

Final Cleaning of Joliet Pond 2
(CCR Clean Closure of Pond 2)
PHASE 2 Scope-of-Work Performance Testing Requirements
Attachment 1

The performance tests for the repairs of the liner in Pond 2 shall be conducted in accordance with Section 3.05 Field Quality Control located in the Guidelines for Installation of HDPE Geomembrane Installation created by the International Association of Geosynthetic Installers, revised November 1, 2015. The pertinent sections from that document for performance testing are provided below and shall be followed to verify the repair installations.

A. Field Seam Non-destructive Testing

1. All field seams shall be non-destructively tested by the Geomembrane Installer over the full seam length before the seams are covered. Each seam shall be numbered or otherwise designated. The location, date, test unit, name of tester and outcome of all non-destructive testing shall be recorded and submitted to the Owner's Representative.

2. Testing should be done as the seaming work progresses, not at the completion of all field seaming, unless agreed to in advance by the Owner's Representative. All defects found during testing shall be numbered and marked immediately after detection. All defects found should be repaired, retested and remarked to indicate acceptable completion of the repair.

3. Non-destructive testing shall be performed using vacuum box, air pressure or spark testing equipment.

4. Non-destructive tests shall be performed by experienced technicians familiar with the specified test methods. The Geomembrane Installer shall demonstrate to the Owner's Representative all test methods to verify the test procedures are valid.

5. Extrusion seams shall be vacuum box tested by the Geomembrane Installer in accordance with ASTM D 4437 and ASTM D 5641 with the following equipment and procedures:
    a. Equipment for testing extrusion seams shall be comprised of but not limited to: a vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the base, port hole or valve assembly and a vacuum gauge; a vacuum pump assembly equipped with a pressure controller and pipe connections; a rubber pressure/vacuum hose with fittings and connections; a plastic bucket; wide paint brush or mop; and a soapy solution.
    b. The vacuum pump shall be charged and the tank pressure adjusted to approximately 35 kPa (5 psig). c. The Geomembrane Installer shall create a leak tight seal between the gasket and geomembrane interface by wetting a strip of geomembrane approximately 0.3m (12 in) by 1.2m (48 in) (length and width of box) with a soapy solution, placing the box over the wetted area, and then compressing the box against the geomembrane. The Geomembrane Installer shall then close the bleed valve, open the vacuum valve, maintain initial pressure of approximately 35 kPa (5 psig) for approximately five (5) seconds. The geomembrane should be continuously examined through the viewing window for the presence of soap bubbles, indicating a leak. If no bubbles appear after five (5) seconds, the area shall be considered leak free. The box shall be depressurized and moved over the next adjoining area with an appropriate overlap and the process repeated.
    d. All areas where soap bubbles appear shall be marked, repaired and then retested.
    e. At locations where seams cannot be nondestructively tested, such as pipe penetrations, alternate nondestructive spark testing (as outlined in section B below) or equivalent should be substituted.

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

6. Double Fusion seams with an enclosed channel shall be air pressure tested by the Geomembrane Installer in accordance with ASTM D 5820 and ASTM D 4437 and the following equipment and procedures:
   a. Equipment for testing double fusion seams shall be comprised of but not limited to: an air pump equipped with a pressure gauge capable of generating and sustaining a pressure of 210 kPa (30 psig), mounted on a cushion to protect the geomembrane; and a manometer equipped with a sharp hollow needle or other approved pressure feed device.
   b. The testing activities shall be performed by the Geomembrane Installer. Both ends of the seam to be tested shall be sealed and a needle or other approved pressure feed device inserted into the tunnel created by the double wedge fusion weld. The air pump shall be adjusted to a pressure of 210 kPa (30 psig), and the valve closed. Allow two (2) minutes for the injected air to come to equilibrium in the channel, and sustain pressure for five (5) minutes. If pressure loss does not exceed 28 kPa (4 psig) after this five minute period the seam shall be considered leak tight. Release pressure from the opposite end verifying pressure drop on needle to ensure testing of the entire seam. The needle or other approved pressure feed device shall be removed and the feed hole sealed.
   c. If loss of pressure exceeds 28 kPa (4 psig) during the testing period or pressure does not stabilize, the faulty area shall be located, repaired and retested by the Geomembrane Installer.
   d. Results of the pressure testing shall be recorded on the liner at the seam tested and on a pressure testing record.

B. Spark testing should be done in areas where both air pressure testing and vacuum testing are not possible.

   1. Equipment for spark testing shall be comprised of but not limited to a hand held holiday spark tester and conductive wand that generates a high voltage.

   2. The testing activities shall be performed by the Geomembrane Installer by placing an electrically conductive tape or wire beneath the seam prior to welding. A trial seam containing a non-welded segment shall be subject to a calibration test to ensure that such a defect (nonwelded segment) will be identified under the planned machine settings and procedures. Upon completion of the weld, enable the spark tester and hold approximately 25mm (1 in) above the weld moving slowly over the entire length of the weld in accordance with ASTM 6365. If there is no spark the weld is considered to be leak free.

   3. A spark indicates a hole in the seam. The faulty area shall be located, repaired and retested by the Geomembrane Installer.

   4. Care should be taken if flammable gases are present in the area to be tested.

ATTACHMENT 2 CCR CHEMICAL CONSTITUENTS ANALYSIS

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Tel: (708)534-5200

Laboratory Job ID: 500-204544-1
Client Project/Site: Joliet #29 Ash

For:
KPRG and Associates, Inc.
14665 West Lisbon Road,
Suite 1A
Brookfield, Wisconsin 53005

Attn: Richard Gnat

Diana Mockler

Authorized for release by:
9/15/2021 5:41:59 PM

Diana Mockler, Project Manager I
(219)252-7570
Diana.Mockler@Eurofinset.com

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.

Table of Contents

Case Narrative

Job ID: 500-204544-1

Laboratory: Eurofins TestAmerica, Chicago

Narrative

Job Narrative
500-204544-1

Comments

No additional comments.

Receipt

The sample was received on 8/31/2021 1:00 PM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 22.4º C.

Metals

No analytical or quality issues were noted, other than those described 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

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Ash

Job ID: 500-204544-1

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

Sample Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Ash

Job ID: 500-204544-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
500-204544-1	Jolet #29 Ash	Solid	08/31/21 10:00	08/31/21 13:00

Client Sample Results

Client Sample ID: Jolet #29 Ash

Lab Sample ID: 500-204544-1

Date Collected: 08/31/21 10:00
Matrix: Solid
Date Received: 08/31/21 13:00

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.8	F1	1.8		mg/Kg		09/10/21 08:41	09/12/21 15:18	1
Arsenic	**1.5**	**F1**	0.89		mg/Kg		09/10/21 08:41	09/12/21 15:18	1
Barium	**3000**		4.4		mg/Kg		09/10/21 08:41	09/13/21 21:10	5
Beryllium	**1.5**	**F1**	0.35		mg/Kg		09/10/21 08:41	09/12/21 15:18	1
Boron	**130**	**F1 V**	4.4		mg/Kg		09/10/21 08:41	09/12/21 15:18	1
Cadmium	<0.18		0.18		mg/Kg		09/10/21 08:41	09/12/21 15:18	1
Calcium	**100000**		89		mg/Kg		09/10/21 08:41	09/13/21 21:10	5
Chromium	**12**	**F1**	0.89		mg/Kg		09/10/21 08:41	09/12/21 15:18	1
Cobalt	**15**		11		mg/Kg		09/10/21 08:41	09/14/21 10:57	25
Lead	**5.6**		0.44		mg/Kg		09/10/21 08:41	09/12/21 15:18	1
Lithium	**20**	**V**	0.89		mg/Kg		09/10/21 08:41	09/12/21 15:18	1
Molybdenum	**1.1**	**F1**	0.89		mg/Kg		09/10/21 08:41	09/12/21 15:18	1
Selenium	<0.89	F1	0.89		mg/Kg		09/10/21 08:41	09/12/21 15:18	1
Thallium	**2.9**		0.89		mg/Kg		09/10/21 08:41	09/12/21 15:18	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.016		0.016		mg/Kg		09/09/21 13:15	09/10/21 09:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**560**		19		mg/Kg		09/14/21 11:45	09/14/21 17:58	10
Chloride	<20		20		mg/Kg		09/15/21 09:49	09/15/21 15:04	1
Fluoride	<1.0		1.0		mg/Kg		09/15/21 09:49	09/15/21 12:47	1

Definitions/Glossary

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD recovery exceeds control limits.
F3	Duplicate RPD exceeds the control limit
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL, and the absolute difference between results is < the upper reporting limits for both.
V	Serial Dilution exceeds the control limits

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

QC Association Summary

Metals

Prep Batch: 617888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	7471A	
MB 500-617888/12-A	Method Blank	Total/NA	Solid	7471A	
LCS 500-617888/13-A	Lab Control Sample	Total/NA	Solid	7471A	

Prep Batch: 618052

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	3050B	
MB 500-618052/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 500-618052/2-A	Lab Control Sample	Total/NA	Solid	3050B	
500-204544-1 MS	Jolet #29 Ash	Total/NA	Solid	3050B	
500-204544-1 MSD	Jolet #29 Ash	Total/NA	Solid	3050B	
500-204544-1 DU	Jolet #29 Ash	Total/NA	Solid	3050B	

Analysis Batch: 618070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	7471A	617888
MB 500-617888/12-A	Method Blank	Total/NA	Solid	7471A	617888
LCS 500-617888/13-A	Lab Control Sample	Total/NA	Solid	7471A	617888

Analysis Batch: 618247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	6010B	618052
MB 500-618052/1-A	Method Blank	Total/NA	Solid	6010B	618052
LCS 500-618052/2-A	Lab Control Sample	Total/NA	Solid	6010B	618052
500-204544-1 MS	Jolet #29 Ash	Total/NA	Solid	6010B	618052
500-204544-1 MSD	Jolet #29 Ash	Total/NA	Solid	6010B	618052
500-204544-1 DU	Jolet #29 Ash	Total/NA	Solid	6010B	618052

Analysis Batch: 618479

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	6010B	618052
500-204544-1 MS	Jolet #29 Ash	Total/NA	Solid	6010B	618052
500-204544-1 MSD	Jolet #29 Ash	Total/NA	Solid	6010B	618052
500-204544-1 DU	Jolet #29 Ash	Total/NA	Solid	6010B	618052

Analysis Batch: 618576

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	6010B	618052
500-204544-1 MS	Jolet #29 Ash	Total/NA	Solid	6010B	618052
500-204544-1 MSD	Jolet #29 Ash	Total/NA	Solid	6010B	618052
500-204544-1 DU	Jolet #29 Ash	Total/NA	Solid	6010B	618052

General Chemistry

Analysis Batch: 617356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	Moisture	

Prep Batch: 618524

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	300_Prep	

General Chemistry (Continued)

Prep Batch: 618524 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 500-618524/1-A	Method Blank	Total/NA	Solid	300_Prep	
LCS 500-618524/2-A	Lab Control Sample	Total/NA	Solid	300_Prep	

Analysis Batch: 618534

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	9056A	618524
MB 500-618524/1-A	Method Blank	Total/NA	Solid	9056A	618524
LCS 500-618524/2-A	Lab Control Sample	Total/NA	Solid	9056A	618524

Prep Batch: 618692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	300_Prep	
MB 500-618692/1-A	Method Blank	Total/NA	Solid	300_Prep	
LCS 500-618692/2-A	Lab Control Sample	Total/NA	Solid	300_Prep	

Analysis Batch: 618739

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	SM 4500 F C	618692
MB 500-618692/1-A	Method Blank	Total/NA	Solid	SM 4500 F C	618692
LCS 500-618692/2-A	Lab Control Sample	Total/NA	Solid	SM 4500 F C	618692

Analysis Batch: 618775

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	SM 4500 Cl- E	618692
MB 500-618692/1-A	Method Blank	Total/NA	Solid	SM 4500 Cl- E	618692
LCS 500-618692/2-A	Lab Control Sample	Total/NA	Solid	SM 4500 Cl- E	618692

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Ash

Job ID: 500-204544-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 500-618052/1-A
Matrix: Solid
Analysis Batch: 618247

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 618052

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<2.0		2.0		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Arsenic	<1.0		1.0		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Barium	<1.0		1.0		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Beryllium	<0.40		0.40		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Boron	<5.0		5.0		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Cadmium	<0.20		0.20		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Calcium	<20		20		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Chromium	<1.0		1.0		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Cobalt	<0.50		0.50		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Lead	<0.50		0.50		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Lithium	<1.0		1.0		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Molybdenum	<1.0		1.0		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Selenium	<1.0		1.0		mg/Kg		09/10/21 08:41	09/12/21 15:12	1
Thallium	<1.0		1.0		mg/Kg		09/10/21 08:41	09/12/21 15:12	1

Lab Sample ID: LCS 500-618052/2-A
Matrix: Solid
Analysis Batch: 618247

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	50.0	49.5		mg/Kg		99	80 - 120
Arsenic	10.0	9.09		mg/Kg		91	80 - 120
Barium	200	196		mg/Kg		98	80 - 120
Beryllium	5.00	4.54		mg/Kg		91	80 - 120
Boron	100	83.6		mg/Kg		84	80 - 120
Cadmium	5.00	4.69		mg/Kg		94	80 - 120
Calcium	1000	912		mg/Kg		91	80 - 120
Chromium	20.0	18.3		mg/Kg		91	80 - 120
Cobalt	50.0	46.6		mg/Kg		93	80 - 120
Lead	10.0	9.03		mg/Kg		90	80 - 120
Lithium	50.0	53.2		mg/Kg		106	80 - 120
Molybdenum	100	99.6		mg/Kg		100	80 - 120
Selenium	10.0	8.61		mg/Kg		86	80 - 120
Thallium	10.0	8.77		mg/Kg		88	80 - 120

Lab Sample ID: 500-204544-1 MS
Matrix: Solid
Analysis Batch: 618247

Client Sample ID: Jolet #29 Ash
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	<1.8	F1	49.6	6.04	F1	mg/Kg		12	75 - 125
Arsenic	1.5	F1	9.92	9.59		mg/Kg		81	75 - 125
Beryllium	1.5	F1	4.96	5.09	F1	mg/Kg		72	75 - 125
Boron	130	F1 V	99.2	178	F1	mg/Kg		50	75 - 125
Cadmium	<0.18		4.96	3.82		mg/Kg		75	75 - 125
Chromium	12	F1	19.8	24.8	F1	mg/Kg		67	75 - 125
Lead	5.6		9.92	16.2		mg/Kg		107	75 - 125
Lithium	20	V	49.6	62.1		mg/Kg		85	75 - 125
Molybdenum	1.1	F1	99.2	68.4	F1	mg/Kg		68	75 - 125

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Ash

Job ID: 500-204544-1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 500-204544-1 MS
Matrix: Solid
Analysis Batch: 618247

Client Sample ID: Jolet #29 Ash
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	<0.89	F1	9.92	6.39	F1	mg/Kg		64	75 - 125
Thallium	2.9		9.92	10.9		mg/Kg		80	75 - 125

Lab Sample ID: 500-204544-1 MS
Matrix: Solid
Analysis Batch: 618479

Client Sample ID: Jolet #29 Ash
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	3000		198	2980	4	mg/Kg		11	75 - 125
Calcium	100000		992	97600	4	mg/Kg		-533	75 - 125

Lab Sample ID: 500-204544-1 MS
Matrix: Solid
Analysis Batch: 618576

Client Sample ID: Jolet #29 Ash
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	15		49.6	67.5		mg/Kg		105	75 - 125

Lab Sample ID: 500-204544-1 MSD
Matrix: Solid
Analysis Batch: 618247

Client Sample ID: Jolet #29 Ash
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	<1.8	F1	45.0	4.97	F1	mg/Kg		11	75 - 125	19	20
Arsenic	1.5	F1	9.01	8.21	F1	mg/Kg		74	75 - 125	16	20
Beryllium	1.5	F1	4.50	4.74	F1	mg/Kg		72	75 - 125	7	20
Boron	130	F1 V	90.1	183	F1	mg/Kg		61	75 - 125	3	20
Cadmium	<0.18		4.50	3.56		mg/Kg		77	75 - 125	7	20
Chromium	12	F1	18.0	23.7	F1	mg/Kg		67	75 - 125	4	20
Lead	5.6		9.01	14.4		mg/Kg		98	75 - 125	12	20
Lithium	20	V	45.0	57.0		mg/Kg		82	75 - 125	9	20
Molybdenum	1.1	F1	90.1	59.6	F1	mg/Kg		65	75 - 125	14	20
Selenium	<0.89	F1	9.01	5.78	F1	mg/Kg		64	75 - 125	10	20
Thallium	2.9		9.01	10.6		mg/Kg		85	75 - 125	3	20

Lab Sample ID: 500-204544-1 MSD
Matrix: Solid
Analysis Batch: 618479

Client Sample ID: Jolet #29 Ash
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	3000		180	3090	4	mg/Kg		74	75 - 125	4	20
Calcium	100000		901	104000	4	mg/Kg		99	75 - 125	6	20

Lab Sample ID: 500-204544-1 MSD
Matrix: Solid
Analysis Batch: 618576

Client Sample ID: Jolet #29 Ash
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cobalt	15		45.0	58.0		mg/Kg		95	75 - 125	15	20

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 500-204544-1 DU
Matrix: Solid
Analysis Batch: 618247

Client Sample ID: Jolet #29 Ash
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<1.8	F1	<1.8		mg/Kg		NC	20
Arsenic	1.5	F1	2.20	F5	mg/Kg		36	20
Beryllium	1.5	F1	1.48		mg/Kg		2	20
Boron	130	F1 V	118		mg/Kg		9	20
Cadmium	<0.18		0.195		mg/Kg		NC	20
Chromium	12	F1	11.3		mg/Kg		2	20
Lead	5.6		5.71		mg/Kg		2	20
Lithium	20	V	19.9		mg/Kg		0	20
Molybdenum	1.1	F1	1.20		mg/Kg		8	20
Selenium	<0.89	F1	<0.90		mg/Kg		NC	20
Thallium	2.9		1.94	F3	mg/Kg		41	20

Lab Sample ID: 500-204544-1 DU
Matrix: Solid
Analysis Batch: 618479

Client Sample ID: Jolet #29 Ash
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Barium	3000		2840		mg/Kg		4	20
Calcium	100000		104000		mg/Kg		1	20

Lab Sample ID: 500-204544-1 DU
Matrix: Solid
Analysis Batch: 618576

Client Sample ID: Jolet #29 Ash
Prep Type: Total/NA
Prep Batch: 618052

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Cobalt	15		13.9		mg/Kg		10	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 500-617888/12-A
Matrix: Solid
Analysis Batch: 618070

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 617888

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.017		0.017		mg/Kg		09/09/21 13:15	09/10/21 08:27	1

Lab Sample ID: LCS 500-617888/13-A
Matrix: Solid
Analysis Batch: 618070

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 617888

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.167	0.179		mg/Kg		107	80 - 120

QC Sample Results

Client: KPRG and Associates, Inc. Job ID: 500-204544-1
Project/Site: Joliet #29 Ash

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 500-618524/1-A **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 618534 **Prep Batch: 618524**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<2.0		2.0		mg/Kg		09/14/21 11:45	09/14/21 12:53	1

Lab Sample ID: LCS 500-618524/2-A **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 618534 **Prep Batch: 618524**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	50.0	53.9		mg/Kg		108	80 - 120

Method: SM 4500 Cl- E - Chloride, Total

Lab Sample ID: MB 500-618692/1-A **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 618775 **Prep Batch: 618692**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<20		20		mg/Kg		09/15/21 09:49	09/15/21 15:03	1

Lab Sample ID: LCS 500-618692/2-A **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 618775 **Prep Batch: 618692**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	200	202		mg/Kg		101	85 - 115

Method: SM 4500 F C - Fluoride

Lab Sample ID: MB 500-618692/1-A **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 618739 **Prep Batch: 618692**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<1.0		1.0		mg/Kg		09/15/21 09:49	09/15/21 12:27	1

Lab Sample ID: LCS 500-618692/2-A **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 618739 **Prep Batch: 618692**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	100	103		mg/Kg		103	80 - 120

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park IL 60484
Phone 708 534-5200 Fax 708 534-5211

Chain of Custody Record

eurofins 244-ATLANTA

Client Information	Sampler Michael Ross	Lab PM Mockler Diana J	Carrier Tracking No(s)	COC No 500-94568-41920 1
Client Contact Richard Gnat	Phone 630-203-7240	E-Mail Diana Mockler@Eurofinset com	State of Origin	Page Page 1 of 1
Company KPRG and Associates Inc	PWSID	**Analysis Requested**		Job # 500-204544

Address
14665 West Lisbon Road Suite 1A

City
Brookfield

State Zip
WI 53005

Phone

Email
richardg@kprginc com

Project Name
Joliet #9 Ash

Site
Illinois

Due Date Requested

TAT Requested (days)

Compliance Project Δ Yes Δ No

PO #
4502042860

WO #

Project #
50011504

SSOW#

500-204544 COC

Preservation Codes

A HCL	M Hexane
B NaOH	N None
C Zn Acetate	O AsNaO2
D Nitric Acid	P Na2O4S
E NaHSO4	Q Na2SO3
F MeOH	R Na2S2O3
G Amchlor	S H2SO4
H Ascorbic Acid	T TSP Dodecahydrate
I Ice	U Acetone
J DI Water	V MCAA
K EDTA	W pH 4-5
L EDA	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		X	X	N	N	N	X	
Joliet #9 Ash	8/31	9:30	C	Solid			X	X	X		
1 Joliet #29 Ash	8/31	10:00	C	Solid			X	X	X		
				Solid							

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 Michael Ross	Date/Time 8/31 13:00	Company KPRG	Received by Stephanie Hernandez	Date/Time 8/31/21 1300	Company ETA-CHI
Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Relinquished by	Date/Time	Company	Received by	Date/Time	Company

Custody Seals Intact Δ Yes Δ No | Custody Seal No | Cooler Temperature(s) °C and Other Remarks 22 4

Ver 06/08/2021

Login Sample Receipt Checklist

Client: KPRG and Associates, Inc.

Job Number: 500-204544-1

Login Number: 204544
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	Received same day of collection; chilling process has begun.
Cooler Temperature is recorded.	True	22.4
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	

Accreditation/Certification Summary

Laboratory: Eurofins TestAmerica, Chicago

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Illinois	NELAP	IL00035	04-29-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
7471A	7471A	Solid	Mercury
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

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1 2 3 4 5 6 7 8 9 10 11 12 13

ANALYTICAL REPORT

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park, IL 60484
Tel: (708)534-5200

Laboratory Job ID: 500-204544-2
Client Project/Site: Joliet #29 Ash

For:
KPRG and Associates, Inc.
14665 West Lisbon Road,
Suite 1A
Brookfield, Wisconsin 53005

Attn: Richard Gnat

Diana Mockler

Authorized for release by:
10/26/2021 8:28:20 AM

Diana Mockler, Project Manager I
(219)252-7570
Diana.Mockler@Eurofinset.com

LINKS

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www.eurofinsus.com/Env

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.

Table of Contents

Case Narrative

Job ID: 500-204544-2

Laboratory: Eurofins TestAmerica, Chicago

Narrative

Job Narrative
500-204544-2

Comments
No additional comments.

Receipt
The sample was received on 8/31/2021 1:00 PM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 22.4º C.

RAD
Methods 903.0, 9315: Radium 226 prep batch 160-527617
Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

Jolet #29 Ash (500-204544-1), (LCS 160-527617/2-A), (MB 160-527617/1-A), (500-204327-A-20-D) and (500-204327-A-20-E DU)

Method 904.0: Radium-228 prep batch 160-528400:

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. Jolet #29 Ash (500-204544-1), (LCS 160-528400/2-A), (MB 160-528400/1-A), (500-204543-A-1-C) and (500-204543-A-1-D DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
Methods 6010B, NONE: The following sample was diluted to bring the concentration of target analytes within the calibration range: Jolet #29 Ash (500-204544-1). 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.

Method Summary

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
DPS-21	Preparation, Digestion/Precipitate Separation (21-Day In-Growth)	None	TAL SL

Protocol References:

EPA = US Environmental Protection Agency
None = None
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Ash

Job ID: 500-204544-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
500-204544-1	Jolet #29 Ash	Solid	08/31/21 10:00	08/31/21 13:00

Client Sample ID: Jolet #29 Ash

Date Collected: 08/31/21 10:00
Date Received: 08/31/21 13:00

Lab Sample ID: 500-204544-1

Matrix: Solid

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**1.54**		0.311	0.341	1.00	0.252	pCi/g	09/19/21 19:06	10/15/21 17:11	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*104*		*40 - 110*	*09/19/21 19:06*	*10/15/21 17:11*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	**1.63**		0.377	0.406	1.00	0.443	pCi/g	09/22/21 16:04	10/06/21 12:36	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*91.3*		*40 - 110*	*09/22/21 16:04*	*10/06/21 12:36*	*1*
Y Carrier	*78.1*		*40 - 110*	*09/22/21 16:04*	*10/06/21 12:36*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	**3.17**		0.489	0.530	5.00	0.443	pCi/g		10/25/21 17:38	1

Definitions/Glossary

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

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

QC Association Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Ash

Job ID: 500-204544-2

Rad

Prep Batch: 527617

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	DPS-21	
MB 160-527617/1-A	Method Blank	Total/NA	Solid	DPS-21	
LCS 160-527617/2-A	Lab Control Sample	Total/NA	Solid	DPS-21	

Prep Batch: 528400

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204544-1	Jolet #29 Ash	Total/NA	Solid	DPS-0	
MB 160-528400/1-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-528400/2-A	Lab Control Sample	Total/NA	Solid	DPS-0	

QC Sample Results

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Ash

Job ID: 500-204544-2

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-527617/1-A
Matrix: Solid
Analysis Batch: 531966

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 527617

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.1252	U	0.144	0.144	1.00	0.234	pCi/g	09/19/21 19:06	10/15/21 17:14	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*80.9*		*40 - 110*	*09/19/21 19:06*	*10/15/21 17:14*	*1*

Lab Sample ID: LCS 160-527617/2-A
Matrix: Solid
Analysis Batch: 531966

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 527617

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-226			11.3	12.04		1.37	1.00	0.272	pCi/g	106	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*82.8*		*40 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-528400/1-A
Matrix: Solid
Analysis Batch: 530453

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 528400

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.1697	U	0.277	0.278	1.00	0.467	pCi/g	09/22/21 16:04	10/06/21 12:35	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.5*		*40 - 110*	*09/22/21 16:04*	*10/06/21 12:35*	*1*
Y Carrier	*80.0*		*40 - 110*	*09/22/21 16:04*	*10/06/21 12:35*	*1*

Lab Sample ID: LCS 160-528400/2-A
Matrix: Solid
Analysis Batch: 530453

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 528400

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228			9.27	10.17		1.24	1.00	0.492	pCi/g	110	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*78.9*		*40 - 110*
Y Carrier	*77.4*		*40 - 110*

Eurofins TestAmerica, Chicago
2417 Bond Street
University Park IL 60484
Phone 708 534-5200 Fax 708 534-5211

Chain of Custody Record

eurofins
244-ATLANTA

Client Information

Sampler: Michael Ross
Phone: 630-203-7240
Lab PM: Mockler Diana J
E-Mail: Diana Mockler@Eurofinset com
Carrier Tracking No(s):
State of Origin:
COC No: 500-94568-41920 1
Page: Page 1 of 1
Job #: 500-204544

Client Contact: Richard Gnat
Company: KPRG and Associates Inc
PWSID:
Address: 14665 West Lisbon Road Suite 1A
Due Date Requested:
City: Brookfield
TAT Requested (days):
State Zip: WI 53005
Compliance Project ∆ Yes ∆ No
Phone:
PO #: 4502042860
Email: richardg@kprginc com
WO #:
Project Name: Joliet #9 Ash
Project #: 50011504
Site: Illinois
SSOW#:

Analysis Requested

500-204544 COC

Preservation Codes

A	HCL	M	Hexane
B	NaOH	N	None
C	Zn Acetate	O	AsNaO2
D	Nitric Acid	P	Na2O4S
E	NaHSO4	Q	Na2SO3
F	MeOH	R	Na2S2O3
G	Amchlor	S	H2SO4
H	Ascorbic Acid	T	TSP Dodecahydrate
I	Ice	U	Acetone
J	DI Water	V	MCAA
K	EDTA	W	pH 4-5
L	EDA	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		
Joliet #9 Ash	8/31	9:30	C	Solid			X	X	X		
Joliet #29 Ash	8/31	10:00	C	Solid			X	X	X		
				Solid							

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
Michael Ross	8/31 13:00	KPRG	Stephanie Hernandez	8/31/21 1300	ETA-CHI

Custody Seals Intact ∆ Yes ∆ No
Custody Seal No:
Cooler Temperature(s) °C and Other Remarks: 22 4

Ver 06/08/2021

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 (Sub Contract Lab)

Client Contact: Shipping/Receiving
Sampler:
Lab PM: Mockler, Diana J
Carrier Tracking No(s):
COC No: 500-152056.1
Phone:
E-Mail: Diana.Mockler@Eurofinset.com
State of Origin: Illinois
Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.
Accreditations Required (See note): NELAP - Illinois
Job #: 500-204544-2
Address: 13715 Rider Trail North,
Due Date Requested: 10/3/2021
City: Earth City
TAT Requested (days):
State, Zip: MO, 63045
Phone: 314-298-8566(Tel) 314-298-8757(Fax)
PO #:
Email:
WO #:
Project Name: Joliet #29 Ash
Project #: 50005078
Site:
SSOW#:

Analysis Requested

Sample Identification - Client ID (Lab ID)	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/DPS_21 Radium 226	904.0/DPS_0 Radium 228	Ra226Ra228_GFPC/ Combined Rad 226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:		☒	☒				☒	
Jolet #29 Ash (500-204544-1)	8/31/21	10:00 Central		Solid			X	X	X	2	

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification

Unconfirmed

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)
Primary Deliverable Rank: 2
Special Instructions/QC Requirements:

Empty Kit Relinquished by:
Date:
Time:
Method of Shipment:

Relinquished by: Shri Scott	Date/Time: 8/31/21 1445	Company ETACFL	Received by: Micha [illegible]	Date/Time 9/1/21 08:37	Company ETA SL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: KPRG and Associates, Inc.

Job Number: 500-204544-2

Login Number: 204544

List Source: Eurofins TestAmerica, Chicago

List Number: 1

Creator: Hernandez, Stephanie

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	Received same day of collection; chilling process has begun.
Cooler Temperature is recorded.	True	22.4
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	

Login Sample Receipt Checklist

Client: KPRG and Associates, Inc.

Job Number: 500-204544-2

Login Number: 204544
List Number: 2
Creator: Korrinhizer, Micha L

List Source: Eurofins TestAmerica, St. Louis
List Creation: 09/01/21 05:40 PM

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.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Ash

Job ID: 500-204544-2

Laboratory: Eurofins TestAmerica, St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-22
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-21
California	Los Angeles County Sanitation Districts	10259	06-30-22
California	State	2886	06-30-21 *
Connecticut	State	PH-0241	03-31-23
Florida	NELAP	E87689	06-30-22
HI - RadChem Recognition	State	n/a	06-30-22
Illinois	NELAP	004553	11-30-21
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21
Kentucky (DW)	State	KY90125	01-01-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-21
Louisiana	NELAP	04080	06-30-22
Louisiana (DW)	State	LA011	12-31-21
Maryland	State	310	09-30-22
MI - RadChem Recognition	State	9005	06-30-22
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-22
New Jersey	NELAP	MO002	06-30-22
New York	NELAP	11616	04-01-22
North Dakota	State	R-207	06-30-22
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-22
Oregon	NELAP	4157	09-01-22
Pennsylvania	NELAP	68-00540	03-01-22
South Carolina	State	85002001	06-30-22
Texas	NELAP	T104704193	07-31-22
US Fish & Wildlife	US Federal Programs	058448	07-31-22
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542021-14	08-01-22
Virginia	NELAP	10310	06-14-22
Washington	State	C592	08-30-22
West Virginia DEP	State	381	10-31-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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Tracer/Carrier Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #29 Ash

Job ID: 500-204544-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Solid

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)
500-204544-1	Jolet #29 Ash	104
LCS 160-527617/2-A	Lab Control Sample	82.8
MB 160-527617/1-A	Method Blank	80.9

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Solid

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

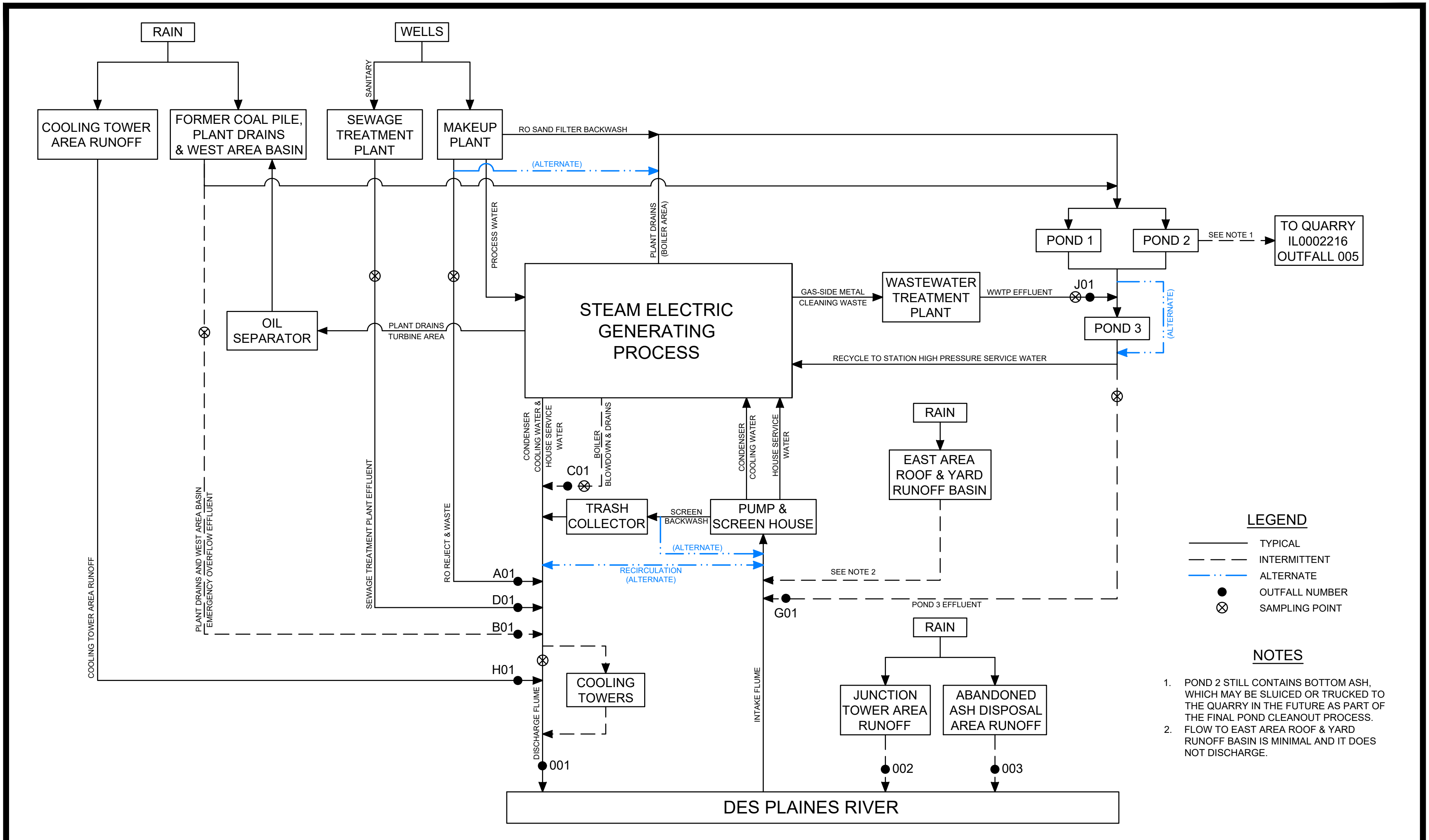
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
500-204544-1	Jolet #29 Ash	91.3	78.1
LCS 160-528400/2-A	Lab Control Sample	78.9	77.4
MB 160-528400/1-A	Method Blank	87.5	80.0

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

ATTACHMENT 3 CHEMICAL CONSTITUENTS ANALYSIS OF OTHER WASTE STREAMS



LEGEND

———	TYPICAL
— — —	INTERMITTENT
—·· —	ALTERNATE
●	OUTFALL NUMBER
⊗	SAMPLING POINT

NOTES

1. POND 2 STILL CONTAINS BOTTOM ASH, WHICH MAY BE SLUICED OR TRUCKED TO THE QUARRY IN THE FUTURE AS PART OF THE FINAL POND CLEANOUT PROCESS.
2. FLOW TO EAST AREA ROOF & YARD RUNOFF BASIN IS MINIMAL AND IT DOES NOT DISCHARGE.

APTIM

APTIM Environmental
& Infrastructure, Inc.

MIDWEST GENERATION, LLC
JOLIET 29 GENERATING STATION

GENERAL FLOW DIAGRAM WITH NPDES OUTFALLS
NPDES PERMIT NO. IL0064254

DRAWN BY:	ORC	APPROVED BY:	SZF	PROJ. NO.:	631237225	DATE:	JANUARY 2019

T:\AutoCAD\Projects\NRG\Joliet NPDES\Joliet 29 Flow Diagram - Revised.dwg, 1/24/2019 12:30:46 PM, _AutoCAD PDF (General Documentation).pc3

ATTACHMENT 4 LOCATION STANDARDS DEMONSTRATION

Geosyntec consultants

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Oak Brook, Illinois 60523
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Fax: 630.203.3341
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PLACEMENT ABOVE THE UPPERMOST AQUIFER LOCATION RESTRICTIONS
ASH POND 2
JOLIET 29 GENERTING 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 Pond 2 (the Ash Pond) at the Joliet 29 Generating Station (Site) in Joliet, 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 base of Ash Pond 2 is separated from the upper limit of the uppermost aquifer by a minimum distance of five (5) feet (1.52 meters). Therefore, the location of the Ash Pond is 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.

JESSE PAUL
VARSHO
062-059069

Jesse Varsho, P.E.
Illinois Professional Engineer No. 062.067766
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WETLANDS LOCATION RESTRICTIONS
ASH POND 2
JOLIET 29 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 Pond 2 at the Joliet 29 Station (Site) in Joliet, 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

Ash Pond 2 is 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 POND 2
JOLIET 29 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 Pond 2 at the Joliet 29 Station (Site) in Joliet, 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

Ash Pond 2 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, 2018]. Therefore, the location of Ash Pond 2 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 POND 2
JOLIET 29 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 Pond 2 at the Joliet 29 Station (Site) in Joliet, 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

Ash Pond 2 is 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 location of Ash Pond 2 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, 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 POND 2
JOLIET 29 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 Pond 2 at the Joliet 29 Station (Site) in Joliet, 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

Ash Pond 2 is not located in an unstable area [Geosyntec, 2016]. Therefore, the location of Ash Pond 2 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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062-059069

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Illinois Professional Engineer No. 062.067766
License Expires: 11/30/19

3. References

Geosyntec, 2016. Structural Stability and Factor of Safety Assessment, Ash Pond 2, Joliet 29 Station, October.

ATTACHMENT 5 PERMANENT MARKERS

Photo documentation – Permanent Marker Installation – Pond 2, Joliet #29 Generating Station, Joliet, IL.

Pond 2 Permanent Marker

ATTACHMENT 6 INCISED/SLOPE PROTECTION DOCUMENTATION


1. East slope looking north.


2. East slope looking west.


3. East side of south slope, looking north.


4. Center of south slope, looking north.


5. Looking north at south slope retaining wall.


6. Looking north at south slope retaining wall.

ATTACHMENT 7 EMERGENCY ACTION PLAN

EMERGENCY ACTION PLAN
ASH POND 2
JOLIET 29 STATION
OCTOBER 2021

This Emergency Action Plan (EAP) has been prepared pursuant to both Title 35 of the Illinois Administrative Code (35 IAC) Part 845, Subpart E, Section 845.520 and Title 40 of the Code of Federal Regulations (40 CFR) Part 257, Subpart D, Section 257.73(a)(3) for Ash Pond 2 at Midwest Generation, LLC (MWG) Joliet 29 Station (Station) in Joliet, Illinois. Previous assessments performed in accordance with §257.73(a)(2) identified Ash Pond 2 as significant hazard potential coal combustion residual (CCR) surface impoundments, and as a result, this written EAP has been prepared to address potential failures of Ash Pond 2. The EAP is presented as follows:

> **Section 1.0:** Definition of the events or circumstances involving the CCR surface impoundment(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:** Definition of the responsible persons, their respective responsibilities, and notification procedures in the event of a safety emergency involving the CCR surface impoundment(s); and contact information of emergency responders;
>
> **Section 3.0:** Site maps which delineate the downstream areas that would be affected in the event of an Ash Pond 2 failure and a physical description of the CCR surface impoundments;
>
> **Section 4.0:** Provisions for an annual face-to-face meeting or exercise between representatives of the Joliet 29 Station and local emergency responders; and

Section 5.0: Certification from a qualified professional engineer stating that the written EAP, and any subsequent amendment of the EAP, meets the requirements of 35 IAC 845.520 and Part 257 Section 257.73(a)(3).

1.0 DEFINITION OF THE EVENTS THAT REPRESENT A SAFETY EMERGENCY

The following tables define the events and/or circumstances involving Ash Pond 2 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 list of potential problems that may occur at Ash Pond 2, how to make a rapid evaluation of the problem, and what action should be taken in response to the problem. These tables present 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 Ash Pond 2. The problems discussed herein include:

- Table 1: Seepage;
- Table 2: Sliding;
- Table 3: Cracking; and
- 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.

Table 1: Ash Pond 2 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 rainwater, 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.	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 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 Pond 2 Event Definition, Evaluation, and Action: <u>Sliding</u>

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 feet, 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 feet 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 Pond 2 Event Definition, Evaluation, and Action: Cracking

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: Ash Pond 2 Event Definition, Evaluation, and Action: Animal Burrows and Holes

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. The following sections define responsible persons, their respective responsibilities, and notification procedures in the event of a safety emergency involving Ash Pond 2. 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, chemical specialist, or designated alternate. 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 plant manager, 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 Ash Pond 2:

(1) Notify the shift supervisor and environmental specialist or chemical specialist.
(2) If unsafe conditions exist, the employee should evacuate the area.
(3) Only the environmental specialist or chemical specialist shall have any official communication with non-employees or regulatory agencies, and only the communications director shall have any contact, and/or the media.

The environmental specialist, chemical specialist, or designated alternate should follow these procedures in the event of a safety emergency involving Ash Pond 2:

(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 potential inundation areas at any time during the safety emergency response.
(4) If the emergency is beyond the Station'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

Table 5, attached, provides contact information of emergency responders. The Station environmental specialist, chemical specialist, or alternate will determine whom 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 Ash Pond 2. A site vicinity map is provided as Figure 1, and a site plan is provided as Figure 2, attached. Drawings depicting the locations of, and the downstream areas affected by, a potential failure of Ash Pond 2 were prepared by Geosyntec in October 16, 2016 and are provided in Appendix A.

3.1 Pond Location and Description

The physical address for Joliet Station 29 is Illinois & Michigan Canal State Trail, 1800 Channahon Road (U.S. Route 6) in Joliet, Illinois. As shown in Figure 1, the Station is bound by Channahon Road on the north and the Des Plaines River on the south. Ash Pond 2 is situated east of the Station Entrance/Guard House and Pond 1, and west of the Wastewater Treatment Plant immediately adjacent to U.S. Route 6 (see Figure 2). Ash Pond 2 is situated northeast of the Main Power Block Building.

From our observations and review of construction and engineering documentation provided by MWG, the pond was constructed with elevated earthen embankment on one side. The south side of the pond is an earthen berm. Run-on is limited to precipitation contained within the earthen berm. Physical characteristics of the Ash Pond 2 are provided in Table 6, below.

Table 6: Pond Characteristics

	Ash Pond 2
Estimated Storage Capacity (acre-feet)	45.0
Estimated Maximum Basin Depth (ft)	19
Elevation - Maximum Crest (ft msl)	535

3.2 Delineation of Downstream Areas

The potential impacts from failure of Ash Pond 2 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/coal-combustion-residuals).

Results of the HPCA indicate that Ash Pond 2 is classified as significant hazard potential CCR surface impoundments. The evaluation reports no loss of life resulting from failure of Ash Pond 2 is probable because no occupied buildings are located within the anticipated inundation areas. However, potential failure during flood conditions could results in offsite economic or environmental impacts. Inundation Maps are provided in Appendix A.

4.0 ANNUAL FACE-TO-FACE MEETING

A face-to-face meeting or an exercise between representatives of the Station and the local emergency responders shall be offered and, if acceptable, be 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 offered 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 an 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.

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 Station's operating record. The written EAP must be evaluated, at a minimum, every five years to ensure the information required is accurate.

5.0 LIMITATIONS AND CERTIFICATION

This emergency action plan was prepared to meet the requirements of 35 IAC 845.520 and 40 CFR 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:

MAURICE DEAN JONES, JR.
062-051317

Signature: Dean Jones

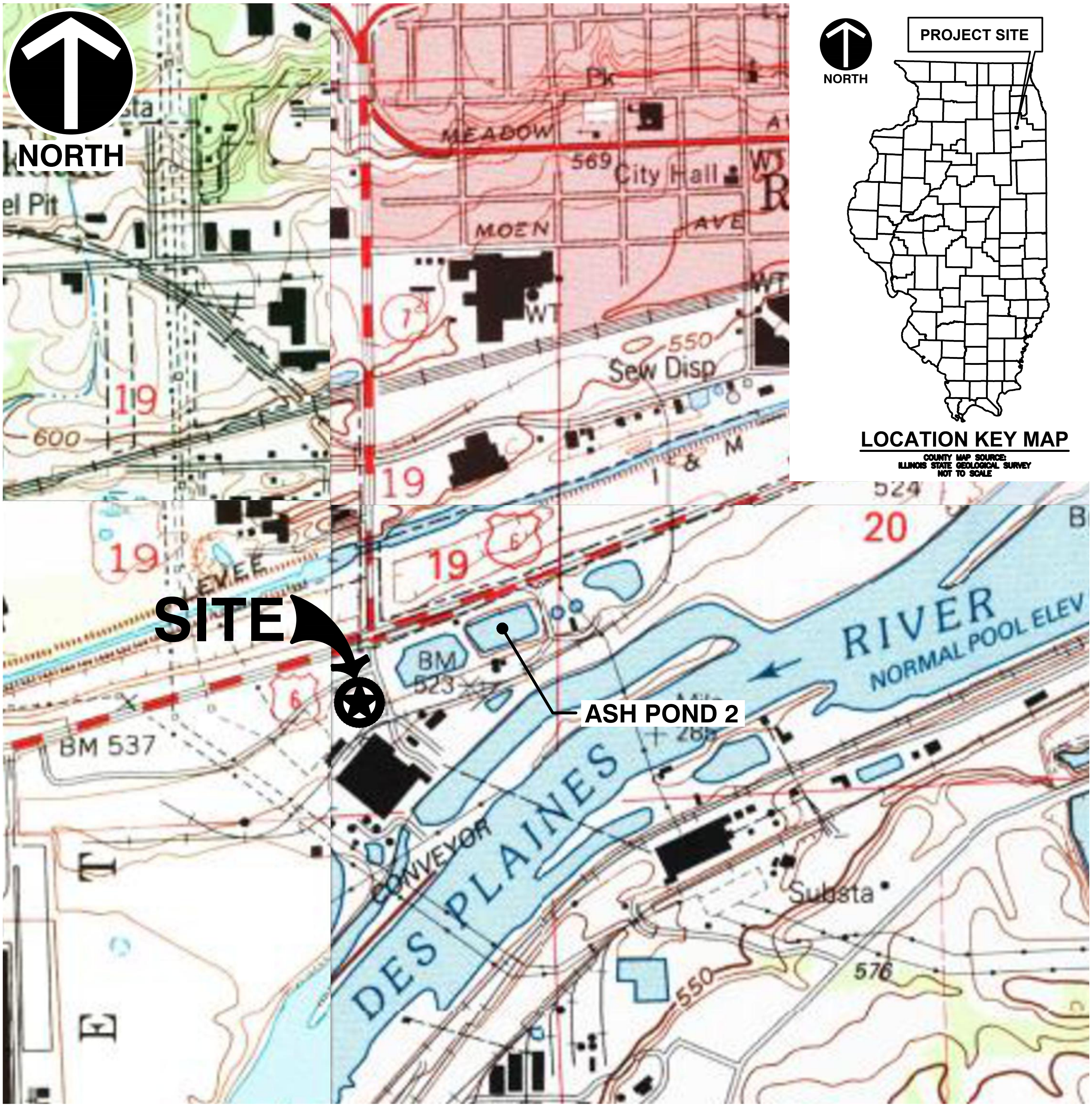
Name: M. Dean Jones, P.E.

Date of Certification: October 26, 2021

Illinois Professional Engineer No.: 062-051317

Expiration Date: November 30, 2021

FIGURES



REFERENCE

1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, ELWOOD QUADRANGLE, ILLINOIS DATED: 1999.

*HAND SIGNATURE ON FILE

SCALE IN FEET

0 1000 2000

CEC

Civil & Environmental Consultants, Inc.

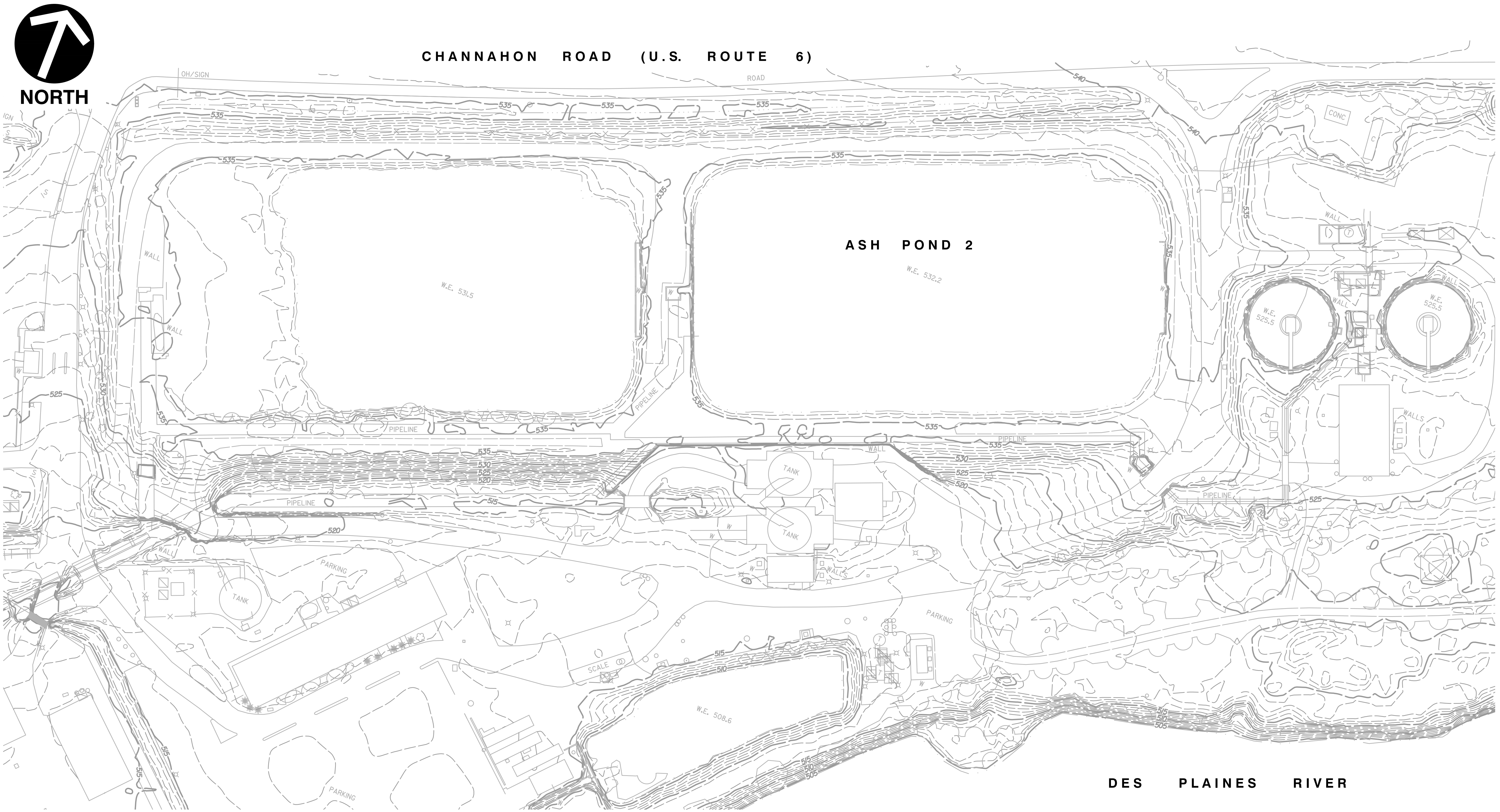
1230 E. Diehl Road, Suite 200 - Naperville, IL 60563
630-963-6026 · 877-963-6026
www.cecinc.com

MIDWEST GENERATION LLC
JOLIET 29 STATION
ASH POND 2
JOLIET, ILLINOIS

SITE VICINITY MAP

DRAWN BY: CAC		CHECKED BY: MDJ		APPROVED BY: MDJ*		FIGURE NO.:
DATE: 10/25/2021		DWG SCALE: 1"=1000'		PROJECT NO: 302-771.0121		1

P:\300-000\302-771\-CADD\Dwg\302771-CV01-J29 EAP\302771-CV01-C101-Site Vicinity Map.dwg{LAYOUT1} LS:(10/26/2021 - ccase) - LP: 10/26/2021 12:08 PM



REFERENCE

1. TOPOGRAPHIC INFORMATION PROVIDED BY AERO-METRIC, INC. DATE OF AERIAL PHOTOGRAPHY: JUNE 19, 2008.

LEGEND

TOPOGRAPHY (1-FOOT INTERVAL)

***HAND SIGNATURE ON FILE**

SCALE IN FEET

0 100 200

Civil & Environmental Consultants, Inc.
1230 E. Diehl Road, Suite 200 - Naperville, IL 60563
630-963-6026 · 877-963-6026
www.cecinc.com

MIDWEST GENERATION LLC
JOLIET 29 STATION
ASH POND 2
JOLIET, ILLINOIS

SITE PLAN

DRAWN BY:	CAC	CHECKED BY:	MDJ	APPROVED BY:	MDJ*	FIGURE NO.:
DATE:	10/25/2021	DWG SCALE:	1"=100'	PROJECT NO:	302-771.0121	2

P:\300-000\302-771\-CADD\Dwg\302771-CV01-J29 EAP\302771-CV01-C102-Site Plan.dwg{LAYOUT1} LS:(10/26/2021 - ccase) - LP: 10/26/2021 12:11 PM

TABLE 5

EAP NOTIFICATION LIST

Table 5: Midwest Generation Joliet 29 Station CCR Surface Impoundment EAP Notification List

Plant Contacts:

Name	Title	Contact Info
Mr. DeAndre Cooley	Environmental Specialist	(O) 815-207-5489 (C) 779-279-2321
Mr. Harrison Estepp	Chemical Specialist Class K WWT Operator	(O) 815-207-5416 (C) 773-617-7515
Mr. William Naglosky	Station Director	(O) 815-207-5412 (C) 312-636-1539
Mr. Michael Korolenko	Operations Manager	(O) 815-207-5415 (C) 815-409-6426
Mr. John Shields	Maintenance Planner	(O) 815-207-4926 (C) 815-713-8697

Corporate Support:

Name	Title	Contact Info
Sharene Shealey	Director, Environmental	(C) 724-255-3220
Jill Buckley	Environmental Manager	(C) 724-448-9732
Tony Shea	Director - Environmental Compliance	(O) 609-524-4923 (C) 609-651-6478
David Schrader	Stations Communications Director (point of public 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	Brandon Road Lock and Dam Joliet, Illinois Illinois River; Des Plaines River 286.0 RDB	Phone: 800-424-8802 Emergency: 815-744-1714
Illinois Department of Natural Resources, Office of Water Resources	One Natural Resources Way, 2nd Floor Springfield, Illinois 62702-1271	8:30 a.m.-5:00 p.m. 217-785-3334
Illinois Emergency Management Agency (IEMA)	110 East Adams Springfield, Illinois 62701	800-782-7860
Illinois Environmental Protection Agency (IEPA)	Bureau of Water 1021 North Grand Avenue East Springfield, Illinois 62794	217-782-3637
Will County Emergency Management Agency Operations Center	302 North Chicago Street Joliet, Illinois 60432	Phone: 815-740-8351 24-hour: 815-740-0911
Will County ETSB: Dispatches to Fire, Police and Emergency Medical services	302 North Chicago Street Joliet, Illinois 60432	Emergency: 9-1-1 Non-Emergency: 815-740-8376
Rockdale Police Department	79 Moen Avenue Rockdale, Illinois 60436	Emergency: 9-1-1 Non-Emergency: 815-725-2171 Front Desk: 815-725-0360
Rockdale Fire Department	603 Otis Avenue Rockdale, Illinois 60436	Emergency: 9-1-1 Non-Emergency: 815-725-6928

Environmental Response Contractors/Consultants:

Contractor/Consultant	Address	Contact Info
Civil & Environmental Consultants, Inc.	1230 East Diehl Road, Suite 200 Naperville, Illinois 60563	630-963-6026
Bluff City Materials (Earthwork Contractor)	2252 Southwind Boulevard Bartlett, Illinois 60103	630-497-8700
SET Environmental (Spill Response)	450 Sumac Road Wheeling, Illinois 60090	847-850-1056 877-437-7455 (24-hour)

APPENDIX A

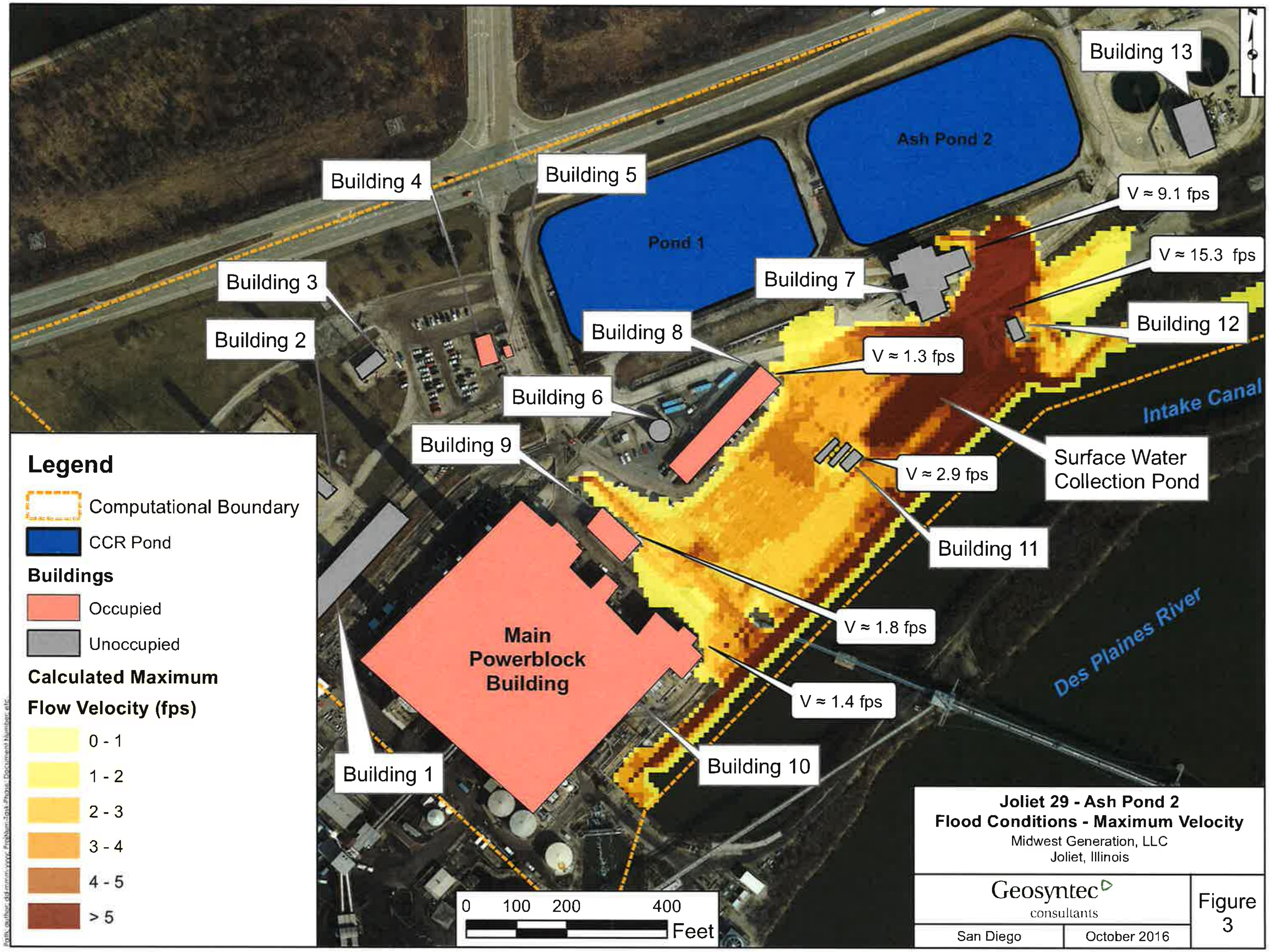
GEOSYNTEC HPCA INUNDATION MAPS

Joliet 29 - Ash Pond 2
Flood Conditions - Maximum Flow Depth
Midwest Generation, LLC
Joliet, Illinois

Geosyntec consultants

San Diego | October 2016

Figure 2



Joliet 29 - Ash Pond 2

Flood Conditions - Maximum Velocity

Midwest Generation, LLC
Joliet, Illinois

Geosyntec consultants

San Diego

October 2016

Figure 3

Path: author: dd-mm-yyyy: ProjNum-Task-Phase: Document Number: etc.

ATTACHMENT 8 FUGITIVE DUST CONTROL PLAN

CCR COMPLIANCE
FUGITIVE DUST CONTROL PLAN

Midwest Generation, LLC
Joliet #29 Generating Station
1800 Channahon Road
Joliet, Illinois

PREPARED BY:

KPRG and Associates, Inc.
14665 W. Lisbon Road, Suite 1A
Brookfield, Wisconsin 53005

August 24, 2021

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

On April 15, 2021, the Illinois Pollution Control Board adopted a new Part 845 of its waste disposal regulations creating state-wide 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 CCR 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.

This Plan has been revised from the Plan dated June 3, 2016 that was created to comply with the federal CCR Rule Part 257. The revisions reflect the change that the CCR in Pond 2 has been removed and the operational change to a natural gas-fired electrical generating power plant from coal-fired.

2.0 SITE INFORMATION

2.1 Owner/Operator and Address:

Midwest Generation, LLC
Joliet #29 Generating Station
1800 Channahon Road
Joliet, Illinois

2.2 Owner Representative/Responsible Person Contact Information:

Mr. William Naglosky
Station Manager
815-207-5412

2.3 Location and Description of Facility Operations

The Midwest Generation Joliet #29 Generating Station is located at 1800 Channahon Road, Joliet, Will County, Illinois. The facility is a natural gas-fired electric power generating station (formerly coal-fired) situated on approximately 297 acres located on the north side of the Des Plaines River. There are currently two operating units, identified as Units 7 and 8, on the property. Electrical power is transmitted from the site to the area grid through overhead transmission power lines.

The general vicinity includes other commercial and industrial facilities, limited residential development and agricultural areas.

3.0 POTENTIAL NON-CCR FUGITIVE DUST SOURCES

As a result of the recent fuel conversion, the correlated fact that all coal combustion ceased at the facility as of March 20, 2016, and Pond 2 was cleaned out during the summer of 2019, the remaining potential CCR fugitive dust sources have been removed from the facility. It is unlikely that CCR Fugitive dust could potentially be generated from the facility as a result of equipment malfunctions, wind erosion, housekeeping issues and/or the nature of the operation. The facility has the potential to generate non-CCR fugitive dust and those sources were further evaluated to determine the probability of non-CCR fugitive dust being generated and to determine the level of emission controls that are warranted to mitigate non-CCR fugitive dust emissions. The findings of the evaluation are individually discussed in the following sections.

3.1 Pond 2

Now that the facility is not burning coal, Pond 2 will no longer be used to store bottom ash and slag and Pond 2 has been cleaned and continued to be used for non-CCR wastewaters. Prior to the conversion, when the facility burned coal, Pond 2 was occasionally used to store bottom ash and slag when certain operational circumstances required it. In 2019, the cleaning of Pond 2 occurred in accordance with Section 257.102 of the Federal CCR Rule. The cleaning of Pond 2 required dredging to remove the prior deposited bottom ash and slag from the pond. When the cleaning occurred, Pond 2 was dewatered and the dredged material allowed to dry within the pond. When the material was suitable for transport, it was loaded into open top trucks, covered and sent off site to Lincoln Stone Quarry for disposal. The potential for CCR fugitive dust emissions were kept to a minimum during the cleaning event. Now that the cleaning of Pond 2 is complete, the potential for CCR fugitive dust will no longer be present.

Gravel roads are present around the perimeter of Pond 2 and have the potential to generate non-CCR fugitive dust during dry weather conditions.

3.2 Facility Roadways

Both gravel covered and asphalt paved roads within the facility are used by trucks hauling equipment and vehicles transporting plant personnel. Non-CCR fugitive dust emissions could occur during transit if accumulated dust is present on the roadways during dry weather conditions.

These potential non-CCR 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 non-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 Pond 2

During the cleaning activities, Pond 2 was dewatered and the sediment removed to Lincoln Stone Quarry. Therefore, the potential for CCR fugitive dust emissions is no longer applicable. Periodically, Pond 2 is inspected by plant personnel to ensure its functional operation. During these inspections, the plant personnel may drive around the pond on the adjacent gravel roads and the potential for non-CCR fugitive dust emissions may occur during excessively dry and windy conditions. If excessive non-CCR fugitive dust emissions are observed, the speed of the vehicle will be minimized and a water truck may be used if needed.

4.3 Ash Transport Roadways

Truck drivers are instructed on the proper procedure for cleaning trucks and a vehicle speed limit is enforced at the facility. To minimize non-CCR fugitive dust emissions, these roads will be assessed during station activities and any observed accumulated non-CCR material will be promptly cleaned up and collected for proper disposal.

5.0 PLAN ASSESSMENTS/AMENDMENTS

To assure that the work practices being implemented during Pond 2 operations adequately control the dust from the identified potential non-CCR fugitive dust emission sources at the facility, routine assessments and record keeping will be performed. These procedures include the following:

5.1 Non-CCR Fugitive Dust Assessments

Pursuant to 35 Ill. Adm. Code 845.500(b)(3), assessments of the potential non-CCR fugitive dust emission sources identified within this Plan will be conducted to assess the effectiveness of this Plan. The assessment will include observation of site activities that involve significant vehicular traffic at the facility to confirm the adequacy of the control measures. The assessments will be conducted during excessive dry weather conditions by an individual designated by the contact identified in Section 2.2 of this Plan. Observations made during each assessment will be recorded on a form similar to the one included in Appendix B.

If the results of the assessment determine that the control measures are not adequate, the necessary response measures will be implemented. If the assessment finds that this Plan does not effectively minimize the non-CCR from becoming airborne, this Plan will be amended to include additional control measures.

5.2 Plan Amendments

This non-CCR 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. 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 non-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. Upon receipt of the complaint, an investigation of the alleged source of the non-CCR fugitive dust emissions will be performed and the results of that investigation recorded on the form. If the non-CCR fugitive dust emission event is confirmed, any necessary repairs or changes in operation required to mitigate the non-CCR 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 and records that must be maintained to meet the requirements specified in Section 845.500(b). 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 as part of the annual consolidated report required by Section 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 the 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.

7.0 PROFESSIONAL ENGINEER CERTIFICATION

The undersigned Registered Professional Engineer is familiar with the requirements of 35 Ill. Adm. Code 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 non-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 Section 845.500, and that this Plan is adequate for the facility. This certification was prepared as required by Section 845.500(b)(7).

Engineer: Joshua D. Davenport

Signature: ______________________

Date: 8/24/21______________

Company: KPRG and Associates, Inc.

Registration State: Illinois

Registration Number: 062.061945

License Expiration Date: November 30, 2021

Professional Engineer Stamp:

JOSHUA D. DAVENPORT
062-061945

APPENDIX A

SITE DIAGRAM
POTENTIAL NON-CCR FUGITIVE DUST SOURCES

0 600'

APPROXIMATE SCALE

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

KPRG

KPRG and Associates, inc.

14665 West Lisbon Road, Suite 1A Brookfield, Wisconsin 53005 Telephone 262-781-0475 Facsimile 262-781-0478

414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630-325-1300 Facsimile 630-325-1593

SITE DIAGRAM/NON-CCR FUGITIVE DUST SOURCES

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

Scale: 1" = 600'

Date: August 24, 2021

KPRG Project No. 15315

APPENDIX A

W:\c\projects\midwest generation\attorney-client privilege\fugitive dust plans\joliet 29 dust map.dwg

APPENDIX B

EXAMPLE ASSESSMENT RECORD

APPENDIX B

JOLIET #29 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 - Pond 2
2 - Roadways

APPENDIX C

EXAMPLE PLAN REVIEW AND AMENDMENT RECORD

APPENDIX C

JOLIET #29 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

JOLIET #29 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 Stratigraphy Information. Midwest Generation, LLC, Joliet #29 Generating Station, Joliet, IL.

ID	Well_Count	Well_ID	From	To	Original Logged Description
1	1	121973265800	0	15	gravel
2		121973265800	15	185	limestone
3		121973265800	185	267	shale
4		121973265800	267	605	limestone
5	2	121973842900	0	8	fill
6		121973842900	8	170	lime
7		121973842900	170	220	shale
8		121973842900	220	575	lime
9	3	121973842800	0	10	black dirt and rocks
10		121973842800	10	135	yellow limestone
11		121973842800	135	150	shale
12		121973842800	150	175	limestone
13	4	121974206700	0	7	clay
14		121974206700	7	8	broken rock
15		121974206700	8	50	lime
16		121974206700	50	200	white & gray lime
17		121974206700	200	215	shale streaks lime
18		121974206700	215	225	shale
19	5	121974045100	0	20	sand & gravel
20		121974045100	20	140	brown limestone
21		121974045100	140	200	gray limestone
22	6	121972880200	0	25	clay
23		121972880200	25	40	clay & boulders
24		121972880200	40	50	lime
25		121972880200	50	85	porous lime
26		121972880200	85	140	white lime
27		121972880200	140	205	grey lime
28		121972880200	205	235	white porous lime
29		121972880200	235	250	grey lime w/sh strks
30		121972880200	250	255	shale
31	7	121972738300	0	60	clay
32		121972738300	60	185	limestone
33	8	121974359800	0	11	Clay Fill
34		121974359800	11	24	sand & gravel
35		121974359800	24	30.5	Fill
36		121974359800	30.5	33	Organic Clay
37		121974359800	33	43	loam
38	9	121972919900	0	8	clay
39		121972919900	8	100	limestone
40	10	121973006000	0	60	clay
41		121973006000	60	69	sand & gravel
42		121973006000	69	91	limestone
43		121973006000	91	135	shale
44		121973006000	135	185	limestone
45	11	121972758800	0	3	top soil
46		121972758800	3	90	rock
47		121972758800	90	108	shale
48		121972758800	108	138	rock
49		121972758800	138	200	rock & shale
50	12	121972760100	0	65	clay
51		121972760100	65	70	sand
52		121972760100	70	90	gravel
53		121972760100	90	205	limestone
54	13	121972773600	0	90	clay & gravel
55		121972773600	90	185	limestone
56	14	121973178000	0	10	brown clay
57		121973178000	10	73	shale
58		121973178000	73	205	limestone
59	15	121973179200	0	1	top soil
60		121973179200	1	75	clay
61		121973179200	75	90	clay/sand/gravel
62		121973179200	90	200	limestone

63	16	121973179400	0	2	top soil
64		121973179400	2	3	clay
65		121973179400	3	18	flagstone
66		121973179400	18	185	limestone
67		121973179400	185	205	shale
68	17	121973179500	0	26	gravel
69		121973179500	26	120	limestone
70		121973179500	120	140	shale
71		121973179500	140	150	limestone
72		121973179500	150	170	shale
73		121973179500	170	205	limestone
74	18	121973179600	0	40	clay & gravel
75		121973179600	40	115	limestone
76	19	121973179700	0	10	clay
77		121973179700	10	84	gravel
78		121973179700	84	205	limestone
79	20	121973624000	0	10	clay
80		121973624000	10	20	gravel
81		121973624000	20	130	limestone
82		121973624000	130	150	black hard shale
83	21	121973628800	0	6	fill
84		121973628800	6	70	dolomite
85	22	121973524600	0	5	gravel
86		121973524600	5	200	limestone
87	23	121973686500	0	8	clay & gravel
88		121973686500	8	20	flagstone
89		121973686500	20	145	gray limestone
90	24	121970126200	0	5	FILL
91		121970126200	5	102	dolomite
92		121970126200	102	210	Maquoketa
93	25	121973388700	0	5	fill and black soil
94		121973388700	5	35	clay, yellow
95		121973388700	35	68	clay, blue
96		121973388700	68	82	sand & clay
97		121973388700	82	112	rock, hard, white
98		121973388700	112	170	red rock
99		121973388700	170	181	lime, dark gray
100	26	121973889900	0	12	Large River Rock
101		121973889900	12	15	Sand and Gravel
102		121973889900	15	20	Clay
103		121973889900	20	35	Sand and Large Gravel
104		121973889900	35	37	broken rock
105		121973889900	37	95	Lime
106		121973889900	95	105	Shallow and Lime
107		121973889900	105	140	Lime and Shale Streaks
108		121973889900	140	218	Shale
109	27	121973265900	0	7	black soil
110		121973265900	7	17	broken limestone
111		121973265900	17	103	limestone
112	28	121970027700	0	10	boulders
113		121970027700	10	20	gravel boulders and sand
114		121970027700	20	23	yellowish lime
115		121970027700	23	33	dark gray lime
116		121970027700	33	73	gray lime
117		121970027700	73	135	white lime
118	29	121970159300	0	1	drift
119		121970159300	1	133	Silurian dolomite
120		121970159300	133	143	dolomite withe shale
121		121970159300	143	145	shale
122	30	121970350100	0	2	top soil
123		121970350100	2	55	clay
124		121970350100	55	83	sand
125		121970350100	83	225	limestone

126	31	121970119800	0	3	Drift
127		121970119800	3	65	Limestone
128		121970119800	65	201	Maquoketa
129	32	121970356800	0	1	topsoil
130		121970356800	1	58	clay & gravel
131		121970356800	58	180	limestone
132	33	121970356900	0	1	top soil
133		121970356900	1	76	clay & gravel
134		121970356900	76	185	limestone
135	34	121970124700	0	12	surface
136		121970124700	12	135	limestone, hard
137		121970124700	135	140	shale
138		121970124700	140	165	limestone, hard
139		121970124700	165	175	streaks of limestone, shale
140		121970124700	175	245	Maquoketa
141	35	121970124800	0	125	Dolomite
142		121970124800	125	240	Maquoketa
143	36	121970125000	10	148	Dolomite
144		121970125000	148	256	Maquoketa
145	37	121970296100	0	42	clay & gravel
146		121970296100	42	160	limestone
147	38	121972646300	0	40	clay & gravel
148		121972646300	40	115	limestone
149	39	121973925800	0	6	drift
150		121973925800	6	33	limestone
151		121973925800	33	37	shale
152		121973925800	37	100	limestone
153	40	121970126100	0	98	Dolomite
154		121970126100	98	210	Maquoketa
155	41	121973265600	0	4	black soil
156		121973265600	4	10	yellow clay and boulders
157		121973265600	10	35	yellow clay
158		121973265600	35	55	blue clay
159		121973265600	55	62	sand and gravel
160		121973265600	62	200	limestone
161	42	121973265700	0	14	boulders
162		121973265700	14	17	rock and gravel
163		121973265700	17	94	lime
164		121973265700	94	103	shale and lime
165		121973265700	103	137	shale
166		121973265700	137	147	lime
167	43	MW-01	0	1	FILL: Topsoil with fine to coarse gravel
168		MW-01	1	6	FILL: 1' to 2' rounded coarse gravel at surface
169		MW-01	6	9	FILL: Fine to coarse sand and gravel, limestone fragments
170		MW-01	9	11	FILL: Limestone fragments
171		MW-01	11	19	Fine to coarse sand and gravel, some black clay, limestone fragments
172		MW-01	19	20	Limestone fragments
173		MW-01	20	27.5	Fine to coarse sand and gravel, with limestone fragments, weathered
174	44	MW-02	0	1	Fine to coarse grave (CA-6)
175		MW-02	1	4	Brown fine to coarse sand and gravel
176		MW-02	4	6	1" limestone fragments
177		MW-02	6	8	Brown fine to coarse sand and gravel
178		MW-02	8	12.5	1" limestone fragments
179		MW-02	12.5	13.5	Little Silty clay
180		MW-02	13.5	16	Coarse gravel with black silty clay, trace roots, trace coarse sand
181		MW-02	18.5	21	Brown silty fine to coarse sand, trace fine gravel
182		MW-02	21	24	Limestone fragments, trace light brown silty clay
183		MW-02	24	28.5	Limestone fragments
184	45	MW-03	0	4	Coarse gravel (CA-6)
185		MW-03	4	18.5	Fine to coarse sand and gravel
186		MW-03	18.5	41	Tan fine to coarse sand, with coarse gravel

Attachment 9-1.
Local Well Stratigraphy Information. Midwest Generation, LLC, Joliet #29 Generating Station, Joliet, IL.

187	46	MW-04	0	1	Coarse gravel (CA-6)
188		MW-04	1	6	Brown silty clay, trace coarse sand, stiff
189		MW-04	6	17	Brown fine to coarse sand and gravel, trace limestone fragments
190		MW-04	17	20	Limestone fragments
191		MW-04	20	23	Brown fien to coarse sand and gravel, trace limestone fragments
192		MW-04	23	33	Fine to coarse sand and gravel
193		MW-04	33	35.5	Fine to coarse sand
194		MW-04	35.5	40	Fine to coarse sand and gravel, with limestone fragments
195	47	MW-05	0	8.5	Fine to coarse gravel, topsoil
196		MW-05	8.5	19	Black silty clay, coarse sand
197		MW-05	19	23.5	Coarse gravel fragments
198		MW-05	23.5	31	Tan to light brown fine to coarse sand, little coarse gravel
199		MW-05	31	41	Fine to coarse sand and gravel
200		MW-05	41	42	Tan to light brown fine to coarse sand, little coarse gravel
201	48	MW-06	0	8.5	Gravel (CA-6) topsoil
202		MW-06	8.5	31	Brown to tan fine to coarse sand and gravel, trace limestone, gravel seams
203		MW-06	31	38.5	Fine to coarse sand and gravel
204		MW-06	38.5	40.5	Limestone Bedrock
205	49	MW-07	0	8.5	Gravel (CA-6) topsoil
206		MW-07	8.5	39.5	Tan to brown fine to coarse sand and gravel
207	50	MW-08	0	1	Fine to coarse gravel fill
208		MW-08	1	3.5	Dark brown silty clay, some fine to coarse sand, stiff
209		MW-08	3.5	6	Black/brown fine to coarse sand and gravel
210		MW-08	6	20	Limestone fragments
211		MW-08	20	35.5	Black/brown fine to coarse sand and gravel
212	51	MW-09	0	1	Coarse sand and gravel (CA-6)
213		MW-09	1	3.5	Coarse gravel, with black silty clay, trace root seams
214		MW-09	3.5	11	Coarse gravel fragments, with fine to coarse sand
215		MW-09	11	18.5	Limestone fragments, with light brown silty fine to coarse sand
216		MW-09	18.5	23.5	Limestone fragments, with light brown to dark orange fine to coarse sand
217		MW-09	23.5	28.5	Light brown/orange fine to coarse sand, with coarse gravel
218		MW-09	28.5	35	Light brown coarse sand, some fine to coarse gravel, little fine sand
219	52	MW-10	0	3	Coarse gravel
220		MW-10	3	7	Brown clay
221		MW-10	7	19	Black/gray sandy silt
222		MW-10	19	41	Gray silty clay, trace coarse sand, soft
223	53	MW-11	0	9	Fine to coarse sand and gravel, fill
224		MW-11	9	14	Grades to dark gray clayey silt
225		MW-11	14	24	Dark gray clayey silt, soft
226		MW-11	24	39.5	Light brown fine to coarse silt and gravel

Attachment 9-2 – Boring Logs

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-1** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **531.5**

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
531.5	0.0		Topsoil with fine to coarse gravel, moist				
			1' to 2' rounded coarse gravel at surface	SS-1 1.0-2.5 8"R	8 10 5		Bentonite seal 2.0'-14.0'. Stickup protective cover installed.
				SS-2 3.5-5.0 10"R	12 32 14		
			Fine to coarse sand and gravel, limestone fragments				
				SS-3 6.0-7.5 10"R	12 12 7		
			Limestone fragments, wet	SS-4 8.5-10.0 0.5"	8 4 4		
520.5	11.0		Fine to coarse sand and gravel, some black clay, limestone fragments, wet	SS-5 11.0-12.5 8"R	5 5 5		
				SS-6 13.5-15.0 6"R	45 6 10		Sand pack 14.0'-26.25'
514.5	17.0		▽ Saturated	SS-7 16.0-17.5 10"R	8 6 8		Set screen (slot 0.010) 16.25'-26.25'
			Limestone fragments, saturated	SS-8 18.5-20.0 6"R	14 10 11		
511.5	20.0						

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **10/27/10** ENDED **10/27/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **17.0**
▼ **15.0'**
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-1** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **531.5**

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
511.5	20.0		Fine to coarse sand and gravel, with limestone fragments, weathered, saturated				
				SS-9 21.0-22.5 8"R	22 25 13		
			Wet to saturated	SS-10 23.5-25.0 8"R	15 11 10		
504.0	27.5		Saturated	SS-11 26.0-27.5 10"R	12 16 18		
			End of Boring at 27.5'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **10/27/10** ENDED **10/27/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
⊻ **17.0**
⊻ **15.0'**
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-2** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **531.2**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □ - - - ○ - - - △ LL Water Content 10 20 30 40 50 Unconfined Compressive Strength (TSF) ✳ 1 2 3 4 5	NOTES & TEST RESULTS
531.2	0.0	○	Fine to coarse gravel (CA-6)				1" - 6" cobbles at surface
530.2	1.0	⁙	Brown fine to coarse sand and gravel, moist	SS-1 1.0-2.5 6"R	5 7 5		Bentonite seal 2.0'-14.0'. Stickup protective cover installed.
			1" limestone fragments	SS-2 3.5-5.0 0.5"R	8 12 6		
525.2	6.0	⁙	Brown fine to coarse sand and gravel, moist	SS-3 6.0-7.5 3"R	5 9 6		
			1" limestone fragments	SS-4 8.5-10.0 9"R	11 8 10		
			Little silty clay, moist to wet	SS-5 11.0-12.5 3"R	6 37 11		
517.7	13.5	○	Coarse gravel with black silty clay, trace roots, trace coarse sand, moist	SS-6 13.5-15.0 4"R	15 4 3		Sand pack 14.0'-26.5'
515.2	16.0	▨	Black silty clay, with fine to coarse sand and gravel, moist	SS-7 16.0-17.5 8"R	12 6 12		Set screen 16.5'-26.5'
512.7	18.5	⁙ ▽	Brown silty fine to coarse sand, trace fine gravel, saturated	SS-8 18.5-20.0 6"R	3 4 3		

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **10/29/10** ENDED **10/29/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **18.5**
▼ **21.5'**
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-2** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **531.2**

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
511.2	20.0						
510.2	21.0						
			Limestone fragments, trace light brown silty clay, moist	SS-9 21.0-22.5 8"R	13 16 13		
			Limestone fragments, saturated	SS-10 23.5-25.0 4"R	14 13 13		
502.7	28.5						
			End of Boring at 28.5'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **10/29/10** ENDED **10/29/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **18.5**
▼ **21.5'**
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-3** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **535.5**

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
535.5	0.0		Coarse gravel (CA-6)				
				SS-1 1.0-2.5			Bentonite seal 2.0'-30.5'. Stickup protective cover installed.
			Fine to coarse sand and gravel, dry	SS-2 3.5-5.0	8 10 12		
				SS-3 6.0-7.5			
				SS-4 8.5-10.0	12 11 10		
				SS-5 11.0-12.5			
				SS-6 13.5-15.0	9 12 13		
				SS-7 16.0-17.5			
517.0	18.5		Tan fine to coarse sand, with coarse gravel, dry	SS-8 18.5-20.0	12 17 23		

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/1/10** ENDED **11/1/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **31.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-3** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **535.5**

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
514.5	21.0		Tan fine to coarse sand, with coarse gravel, dry	SS-9 21.0-22.5			
				SS-10 23.5-25.0	14 32 36		
				SS-11 26.0-27.5			
				SS-12 28.5-30.0	21 16 15		Sand pack 28.0'-40.5'
504.5	31.0		∇ Saturated	SS-13 31.0-32.5	15 11 12		Set screen (slat 0.010) 30.5'-40.5'
				SS-14 33.5-35.0			
				S-15 36.0-37.5			
				SS-16 38.5-40.0	50/0.5"		
494.5	41.0		End of Boring at 41.0'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/1/10** ENDED **11/1/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ **31.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-4** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **535.8**

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
535.8	0.0		Coarse gravel (CA-6), dry				
534.8	1.0		Brown silty clay, trace coarse sand, stiff, dry	SS-1 1.0-2.5 6"R	6 6 7		Bentonite seal 2.0'-27.5'. Stickup protective cover installed.
				SS-2 3.5-5.0 10"R	4 7 9		
529.8	6.0		Brown fine to coarse sand and gravel, trace limestone fragments	SS-3 6.0-7.5 6"R	20 22 12		
				SS-4 8.5-10.0 6"R	10 12 16		
				SS-5 11.0-12.5 8"R	11 20 23		
				SS-6 13.5-15.0 4"R	9 8 9		
			Limestone fragments, dry	SS-7 16.0-17.5 2"R	31 31		
				SS-8 18.5-20.0 4"R	24 40		

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/1/10** ENDED **11/1/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **31.5**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-4** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **535.8**

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
515.8	20.0		Brown fine to coarse sand and gravel, trace limestone fragments				
			Fine to coarse sand and gravel, dry	SS-9 21.0-22.5 4"R	60/6"		
				SS-10 23.5-25.0 6"R	35 36		
				SS-11 26.0-27.5 10"R	28 21 10		Sand pack 27.5'-39.5'
				SS-12 28.5-30.0 6"R	12 8 8		Set screen (slot 0.010) 29.5'-39.5'
504.3	31.5		▽ Saturated	SS-13 31.0-32.5 8"R	13 17 13		
502.8	33.0		Fine to coarse sand, saturated	SS-14 33.5-35.0 18"R	13 24 24		
			Fine to coarse sand and gravel, with limestone fragments	SS-15 36.0-37.5			
				SS-16 38.5-40.0 10"R	21 50/3"		
495.8	40.0		End of Boring at 40.0'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/1/10** ENDED **11/1/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **31.5**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-5** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **536.4**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □- - -○- - -△ LL Water Content 10 20 30 40 50 / Unconfined Compressive Strength (TSF) ✳ 1 2 3 4 5	NOTES & TEST RESULTS
536.4	0.0		Fine to coarse gravel, topsoil, dry				
				SS-1 1.0-2.5			Bentonite seal 2.0'-32.0'. Stickup protective cover installed.
				SS-2 3.5-5.0			
				SS-3 6.0-7.5			
527.9	8.5		Black silty clay, coarse sand, moist to wet	SS-4 8.5-10.0 1"R	2 4 2		
				SS-5 13.5-15.0 8"R	2 4 3		
				SS-6 16.0-17.5			
			Coarse gravel fragments	SS-7 18.5-20.0 0.5"R	4 3 3		
				SS-8 21.0-22.5			

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/2/10** ENDED **11/2/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **31.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-5** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**
LOGGED BY **AFG**
GROUND ELEVATION **536.4**

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
513.9 513.4	22.5 23.0						
			Tan to light brown fine to coarse sand, little coarse gravel, dry	SS-9 23.5-25.0 12"R	27 35 38		
				SS-10 26.0-27.5	42 49		
				SS-11 28.5-30.0 8"R	7 8 9		Sand pack 30.0'-42.0'
505.4	31.0		∇ Fine to coarse sand and gravel, saturated	SS-12 31.0-32.5 4"R	7 10 27		Set screen (slot 0.010") 32.0'-42.0'
				SS-13 33.5-35.0			
				SS-14 36.0-37.5			
				SS-15 38.5-40.0	29 18		
			Tan to light brown fine to coarse sand, little coarse gravel, dry				
494.4	42.0						
			End of Boring at 42.0'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/2/10** ENDED **11/2/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ **31.0**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-6** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **535.9**

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
535.9	0.0		Gravel (CA-6), topsoil, dry				
				SS-1 1.0-2.5			Bentonite seal 2.0'-30.5'. Stickup protective cover installed.
				SS-2 3.5-5.0			
				SS-3 6.0-7.5			
527.4	8.5		Brown to tan fine to coarse sand and gravel, trace limestone, gravel seams, dry	SS-4 8.5-10.0 12"R	12 12 12		
				SS-5 11.0-12.5			
				SS-6 13.5-15.0 14"R	23 30 27		
				SS-7 16.0-17.5			
				SS-8 18.5-20.0 12"R	18 28 24		

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/3/10** ENDED **11/3/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ **31.0**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-6** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **535.9**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □- - -○- - -△ LL (Water Content) 10 20 30 40 50 Unconfined Compressive Strength (TSF) ✳ 1 2 3 4 5	NOTES & TEST RESULTS
514.9	21.0		Brown to tan fine to coarse sand and gravel, trace limestone, gravel seams, dry	SS-9 21.0-22.5			
				SS-10 23.5-25.0 14"R	23 34 18/3"		
				SS-11 26.0-27.5			
				SS-12 28.5-30.0 12"R	33 21 27		Sand pack 28.0'-40.5'
504.9	31.0		▽ Fine to coarse sand and gravel, saturated	SS-13 31.0-32.5 12"R			Set screen (slot 0.010) 30.5'-40.5'
				SS-14 33.5-35.0			
				SS-15 36.0-37.5			
497.4	38.5		Limestone bedrock	SS-16 38.5-40.0 0.5"R	50/0.5"		
495.4	40.5		End of Boring at 40.5'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/3/10** ENDED **11/3/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **31.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-7** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **535.9**

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
535.9	0.0		Gravel (CA-6), topsoil, dry				
				SS-1 1.0-2.5			Bentonite seal 2.0'-28.75'. Stickup protective cover installed.
				SS-2 3.5-5.0			
				SS-3 6.0-7.5			
527.4	8.5		Tan to brown fine to coarse sand and gravel, dry	SS-4 8.5-10.0 8"R	32 16 17		
				SS-5 11.0-12.5			
				SS-6 13.5-15.0	13 21		
				SS-7 16.0-17.5			
				SS-8 18.5-20.0	28 17		

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/3/10** ENDED **11/3/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ **31.0**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-7** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **535.9**

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
515.9	20.0		Tan to brown fine to coarse sand and gravel, dry				
				SS-9 21.0-22.5			
				SS-10 23.5-25.0 8"R	21 28 1		
				SS-11 26.0-27.5			Sand pack 26.5'-38.75'
				SS-12 28.5-30.0 12"R	22 31 37		Set screen (slot 0.010) 28.75'-38.75'
504.9	31.0		▽ Saturated	SS-13 31.0-32.5 10"R	12 8 5		
496.4	39.5						
			End of Boring at 39.5'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/3/10** ENDED **11/3/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **31.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-8** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **533.7**

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
533.7	0.0		Fine to coarse gravel fill, dry				
532.7	1.0		Dark brown silty clay, some fine to coarse sand, stiff, moist	SS-1 1.0-2.5 6"R	2 5 9		Bentonite seal 2.0'-25.5'. Stickup protective cover installed.
530.2	3.5		Black/brown fine to coarse sand and gravel, moist	SS-2 3.5-5.0 6"R	5 5 10		
			Limestone fragments, dry	SS-3 6.0-7.5 8"R	13 16 14		
				SS-4 8.5-10.0 8"R	7 15 22		
				SS-5 11.0-12.5 8"R	15 13 13		
				SS-6 13.5-15.0 8"R	17 14 12		
				SS-7 16.0-17.5 8"R	5 12 8		
				SS-8 18.5-20.0 3"R	12 9 9		

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **10/27/10** ENDED **10/27/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **27.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-8** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**
LOGGED BY **AFG**
GROUND ELEVATION **533.7**

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
513.7	20.0		Black/brown fine to coarse sand and gravel, moist				
				SS-9 21.0-22.5 4"R	5 4 5		
			Moist to wet	SS-10 23.5-25.0 6"R	6 9 18		Sand pack 23.0'-35.5'
				SS-11 26.0-27.5 8"R	6 9 8		Screen set (slot 0.010) 25.5'-35.5'
506.7	27.0		∇ Saturated				
				SS-12 28.5-30.0 6"R	4 8 8		
				SS-13 33.5-35.0 2"R	50/1"		
498.2	35.5		End of Boring at 35.5'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **10/27/10** ENDED **10/27/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ **27.0**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-9** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **531.1**

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
531.1	0.0		Coarse sand and gravel (CA-6), dry				
530.1	1.0		Coarse gravel, with black silty clay, trace root seams, moist	SS-1 1.0-2.5 6"R	15 14 13		Bentonite seal 2.0'-34.75'. Stickup protective cover installed.
527.6	3.5		Coarse gravel fragments, with fine to coarse sand, dry	SS-2 3.5-5.0 2"R	4 5 6		
				SS-3 6.0-7.5			
				SS-4 8.5-10.0			
520.1	11.0		Limestone fragments, with light brown silty fine to coarse sand, dry	SS-5 11.0-12.5 8"R	34 37		
				SS-6 13.5-15.0 10"R	20 16 16		
				SS-7 16.0-17.5 6"R	10 15 23		
512.6	18.5		Limestone fragments, with light brown to dark orange fine to coarse sand, moist	SS-8 18.5-20.0 10"R	15 24 28		

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **10/29/10** ENDED **10/29/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **26.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-9** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **531.1**

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
511.1	20.0		Limestone fragments, with light brown to dark orange fine to coarse sand, moist	SS-9 21.0-22.5			Sand pack 22.5'-34.75'
507.6	23.5		Light brown/orange fine to coarse sand, with coarse gravel, moist	SS-10 23.5-25.0 12"R	15 29 36		Screen set (slot 0.010) 24.75'-34.75'
505.1	26.0	∇		SS-11 26.0-27.5 1"R	16 10 8		
502.6	28.5		Light brown coarse sand, some fine to coarse gravel, little fine sand, saturated	SS-12 28.5-30.0 10"R	6 10 13		
				SS-13 31.0-32.5			
				SS-14 33.5-35.0 6"R	18 50/4"		
496.1	35.0		End of Boring at 35.0'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **10/29/10** ENDED **10/29/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ **26.0**
▼
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-10** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **536.9**

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
536.9	0.0		Coarse gravel, dry				
				SS-1 1.0-2.5 10"R	5 4 5		Bentonite seal 2.0'-28.0'. Stickup protective cover installed.
			Brown clay	SS-2 3.5-5.0 10"R	3 2 2		
				SS-3 6.0-7.5 16"R	2 1 1		
529.9	7.0		Black/gray sandy silt, moist				
				SS-4 8.5-10.0 12"R	1 3 1		
				SS-5 11.0-12.5 18"R	1 1 1		
				SS-6 13.5-15.0 18"R	1 2 2		
				SS-7 16.0-17.5 18"R	1 3 2		
517.9	19.0		Gray silty clay, trace coarse sand, soft, wet	SS-8 18.5-20.0 18"R	2 3 4		

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/2/10** ENDED **11/2/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
∇ **31.0**
∇
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-10** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **536.9**

ELEVATION	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	PL □– – –○– – –△ LL Water Content 10 20 30 40 50 Unconfined Compressive Strength (TSF) ✳ 1 2 3 4 5	NOTES & TEST RESULTS
515.9	21.0	▨	Gray silty clay, trace coarse sand, soft, wet	SS-9 21.0-22.5 8"R	12 28 31		
		▨		SS-10 23.5-25.0 10"R	11 24 21		
		▨		SS-11 26.0-27.5 12"R	6 13 17		
		▨		SS-12 28.5-30.0 18"R	13 19 24		Sand pack 28.0'-40.5'
505.9	31.0	▨	▽	SS-13 31.0-32.5 10"R	28 24 14		Screen set (slot 0.010) 30.5'-40.5'
		▨		SS-14 33.5-35.0 18"R	16 63 12		
		▨		SS-15 36.0-37.5			
		▨		SS-16 38.5-40.0 18"R	9 14		
495.9	41.0		End of Boring at 41.0'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/2/10** ENDED **11/2/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **31.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-11** SHEET **1** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **536.5**

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
536.5	0.0		Fine to coarse sand and gravel, fill, dry				
				SS-1 1.0-2.5			Bentonite seal 2.0'-27.0'. Stickup protective cover installed.
				SS-2 3.5-5.0	3 2 2		
				SS-3 6.0-7.5			
			Grades to dark gray clayey silt	SS-4 8.5-10.0	3 2 2		
				SS-5 11.0-12.5			
522.5	14.0		Dark gray clayey silt, soft, moist	SS-6 13.5-15.0	1 2 2		
				SS-7 16.0-17.5			
				SS-8 18.5-20.0	1 3 5		

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/4/10** ENDED **11/4/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **31.0**
▽
▼

PATRICK ENGINEERING INC.

BORING NUMBER **B-MW-11** SHEET **2** OF **2**
CLIENT **Midwest Generation**
PROJECT & NO. **21053.070**
LOCATION **Joliet No. 29**

LOGGED BY **AFG**
GROUND ELEVATION **536.5**

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
516.5	20.0		Dark gray clayey silt, soft, moist				
				SS-9 21.0-22.5			
			Light brown fine to coarse silt and gravel, moist	SS-10 23.5-25.0	9 11 12		
				SS-11 26.0-27.5			Sand pack 27.0'-39.5'
				SS-12 28.5-30.0	1 3 13		Screen set (slot 0.010) 29.5'-39.5'
505.5	31.0		▽				
				SS-13 31.0-32.5	8 7 8		
				SS-14 33.5-35.0			
				SS-15 36.0-37.5			
				SS-16 38.5-40.0	36 50/2"		
497.0	39.5						
			End of Boring at 39.5'				

DRILLING CONTRACTOR **Groff Testing**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME**
DRILLING STARTED **11/4/10** ENDED **11/4/10**

REMARKS
Installed 2" diameter PVC monitoring well.

WATER LEVEL (ft.)
▽ **31.0**
▼
▼

Attachment 9-3 – Historical CCA Groundwater Data

Attachment 9-3. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-01	Date	12/6/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012		9/19/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	0.0043	NS	NS	0.0030	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0030	ND
Arsenic	0.010	0.0010	0.0011	NS	NS	0.0010	0.0014	NS	NS	NS	NS	NS	NS	NS	NS	0.0010	0.0012
Barium	2.0	0.0025	0.13	NS	NS	0.0025	0.14	NS	NS	NS	NS	NS	NS	NS	NS	0.0025	0.16
Beryllium	0.004	0.0010	ND	NS	NS	0.0010	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0010	ND
Boron	2.0	0.050	0.31	NS	NS	0.050	0.29	NS	NS	NS	NS	NS	NS	NS	NS	0.050	0.38^
Cadmium	0.005	0.00050	ND	NS	NS	0.00050	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.00050	ND
Chloride	200.0	10	140	NS	NS	10	170	NS	NS	NS	NS	NS	NS	NS	NS	10	120
Chromium	0.1	0.0050	ND	NS	NS	0.0050	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0050	ND
Cobalt	1.0	0.0010	ND	NS	NS	0.0010	0.0010	NS	NS	NS	NS	NS	NS	NS	NS	0.0010	ND
Copper	0.65	0.0020	0.0032	NS	NS	0.0020	0.0025	NS	NS	NS	NS	NS	NS	NS	NS	0.0020	0.0021
Cyanide	0.2	0.010	ND	NS	NS	0.010	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.010	ND
Fluoride	4.0	0.10	0.45	NS	NS	0.10	0.43	NS	NS	NS	NS	NS	NS	NS	NS	0.10	0.59
Iron	5.0	0.10	ND	NS	NS	0.10	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.10	ND
Lead	0.0075	0.00050	ND	NS	NS	0.00050	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.00050	ND
Manganese	0.15	0.0025	ND	NS	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0025	ND
Mercury	0.002	0.00020	ND	NS	NS	0.00020	ND^	NS	NS	NS	NS	NS	NS	NS	NS	0.00020	ND
Nickel	0.1	0.0020	0.0034	NS	NS	0.0020	0.0029	NS	NS	NS	NS	NS	NS	NS	NS	0.0020	0.0029
Nitrogen/Nitrate	10.0	0.10	1.9	NS	NS	0.10	2.9	NS	NS	NS	NS	NS	NS	NS	NS	0.10	4.2
Nitrogen/Nitrate, Nitri	NA	0.20	1.9	NS	NS	0.20	2.9	NS	NS	NS	NS	NS	NS	NS	NS	0.50	4.2
Nitrogen/Nitrite	NA	0.020	ND	NS	NS	0.020	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.020	ND
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS	NR	NR
Selenium	0.05	0.0025	ND	NS	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0025	ND
Silver	0.05	0.00050	ND	NS	NS	0.00050	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.00050	ND
Sulfate	400.0	50	180	NS	NS	25	81	NS	NS	NS	NS	NS	NS	NS	NS	50	240
Thallium	0.002	0.0020	ND	NS	NS	0.0020	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0020	ND
Total Dissolved Solids	1,200	10	590	NS	NS	10	670	NS	NS	NS	NS	NS	NS	NS	NS	10	630
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS	NR	NR
Zinc	5.0	0.020	ND	NS	NS	0.020	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.020	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS	NR	NR
BETX	11.705	NR	NR	NR	NR	NR	NR	NS	NS	NS	NS	NS	NS	NS	NS	NR	NR
pH	6.5 - 9.0	NA	7.82	NS	NS	NA	7.25	NS	NS	NS	NS	NS	NS	NS	NS	NA	7.46
Temperature	NA	NA	7.52	NA	NS	NA	13.92	NS	NS	NS	NS	NS	NS	NS	NS	NA	22.01
Conductivity	NA	NA	1.04	NA	NS	NA	1.28	NS	NS	NS	NS	NS	NS	NS	NS	NA	0.97
Dissolved Oxygen	NA	NA	NM	NA	NS	NA	4.19	NS	NS	NS	NS	NS	NS	NS	NS	NA	7.68
ORP	NA	NA	NM	NA	NS	NA	210.6	NS	NS	NS	NS	NS	NS	NS	NS	NA	155.0

Sample: MW-01	12/20/2012		3/5/2013		5/23/2013		7/22/2013		10/15/2013		2/21/2014		5/1/2014		8/18/2014	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	NS	NS	NS	NS	0.0030	0.0052	NS	NS	NS	NS	NS	NS	NS	NS	0.0030	ND
Arsenic	NS	NS	NS	NS	0.0010	0.0011	NS	NS	NS	NS	NS	NS	NS	NS	0.0010	ND
Barium	NS	NS	NS	NS	0.0025	0.15	NS	NS	NS	NS	NS	NS	NS	NS	0.0025	0.15
Beryllium	NS	NS	NS	NS	0.0010	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0010	ND
Boron	NS	NS	NS	NS	0.050	0.33	NS	NS	NS	NS	NS	NS	NS	NS	0.050	0.22
Cadmium	NS	NS	NS	NS	0.00050	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.00050	ND
Chloride	NS	NS	NS	NS	10	210	NS	NS	NS	NS	NS	NS	NS	NS	10	120
Chromium	NS	NS	NS	NS	0.0050	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0050	ND
Cobalt	NS	NS	NS	NS	0.0010	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0010	ND
Copper	NS	NS	NS	NS	0.0020	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0020	ND
Cyanide	NS	NS	NS	NS	0.010	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.010	ND
Fluoride	NS	NS	NS	NS	0.10	0.42	NS	NS	NS	NS	NS	NS	NS	NS	0.10	0.47
Iron	NS	NS	NS	NS	0.10	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.10	ND
Lead	NS	NS	NS	NS	0.00050	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.00050	ND
Manganese	NS	NS	NS	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0025	0.012
Mercury	NS	NS	NS	NS	0.00020	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.00020	ND
Nickel	NS	NS	NS	NS	0.0020	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0020	0.0024
Nitrogen/Nitrate	NS	NS	NS	NS	0.10	3.7	NS	NS	NS	NS	NS	NS	NS	NS	0.10	0.44
Nitrogen/Nitrate, Nitri	NS	NS	NS	NS	0.50	3.7	NS	NS	NS	NS	NS	NS	NS	NS	0.10	0.44
Nitrogen/Nitrite	NS	NS	NS	NS	0.020	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.020	ND
Perchlorate	NS	NS	NS	NS	0.0040	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0040	ND
Selenium	NS	NS	NS	NS	0.0025	0.0040	NS	NS	NS	NS	NS	NS	NS	NS	0.0025	ND
Silver	NS	NS	NS	NS	0.00050	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.00050	ND
Sulfate	NS	NS	NS	NS	25	140	NS	NS	NS	NS	NS	NS	NS	NS	20	59
Thallium	NS	NS	NS	NS	0.0020	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0020	ND
Total Dissolved Solids	NS	NS	NS	NS	10	700	NS	NS	NS	NS	NS	NS	NS	NS	10	550
Vanadium	NS	NS	NS	NS	0.0050	0.0081	NS	NS	NS	NS	NS	NS	NS	NS	0.0050	0.0066
Zinc	NS	NS	NS	NS	0.020	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.020	ND
Benzene	NS	NS	NS	NS	0.00050	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0005	ND
BETX	NS	NS	NS	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.002	ND
pH	NS	NS	NS	NS	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NA	6.54
Temperature	NS	NS	NS	NS	NA	NM	NS	NS	NS	NS	NS	NS	NS	NS	NA	14.06
Conductivity	NS	NS	NS	NS	NA	NM	NS	NS	NS	NS	NS	NS	NS	NS	NA	0.857
Dissolved Oxygen	NS	NS	NS	NS	NA	NM	NS	NS	NS	NS	NS	NS	NS	NS	NA	3.38
ORP	NS	NS	NS	NS	NA	NM	NS	NS	NS	NS	NS	NS	NS	NS	NA	150.8

Sample: MW-01	10/23/2014		2/10/2015		5/27/2015		8/4/2015		10/28/2015		2/9/2016		5/11/2016		8/30/2016	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0030	ND	0.0030	ND
Arsenic	0.0010	ND^	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0010	ND ^	0.0010	ND
Barium	0.0025	0.17	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0025	0.15	0.0025	0.071
Beryllium	0.0010	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0010	ND	0.0010	ND ^
Boron	0.050	0.21	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.050	0.18	0.050	0.24
Cadmium	0.00050	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00050	ND	0.00050	ND
Chloride	10	79	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	50	400	10	93
Chromium	0.0050	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0050	ND	0.0050	ND
Cobalt	0.0010	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0010	ND	0.0010	ND
Copper	0.0020	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0020	ND	0.0020	ND
Cyanide	0.010	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.010	ND	0.010	ND
Fluoride	0.10	0.39	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.10	0.42	0.10	0.37
Iron	0.10	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.10	ND ^	0.10	ND
Lead	0.00050	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00050	ND	0.00050	ND
Manganese	0.0025	0.015	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0025	0.0065	0.0025	ND
Mercury	0.00020	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00020	ND	0.00020	ND
Nickel	0.0020	0.0020	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0020	0.0041	0.0020	0.0022
Nitrogen/Nitrate	0.10	0.71	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.10	1.2	0.10	1.9
Nitrogen/Nitrate, Nitri	0.10	0.71	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.10	1.2	0.10	1.9
Nitrogen/Nitrite	0.020	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.020	ND	0.020	ND
Perchlorate	0.0040	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0040	ND	0.0040	ND
Selenium	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.013	0.021 ^	0.0025	0.0072
Silver	0.00050	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00050	ND	0.00050	ND
Sulfate	20	65	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	50	170	25	74
Thallium	0.0020	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0020	ND	0.0020	ND
Total Dissolved Solids	10	570	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	10	1100	10	670
Vanadium	0.0050	0.0068	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0050	ND	0.0050	ND
Zinc	0.020	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.020	ND	0.020	ND
Benzene	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.0005	ND	0.0005	ND
BETX	0.002	0.00056	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.002	0.0024	0.002	ND
pH	NA	7.08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	7.02	NA	6.50
Temperature	NA	12.25	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	14.78	NA	17.29
Conductivity	NA	0.90	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	1.83	NA	1.05
Dissolved Oxygen	NA	1.36	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	2.64	NA	5.40
ORP	NA	66.2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	26.4	NA	-62.3

Sample: MW-01	11/3/2016		2/6/2017		4/25/2017		2/21/2018		8/1/2018		10/17/2018		2/4/2019		5/7/2019	
Parameter	DL	Result	DL	Result	DL	Result			DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.0030	ND	NS	NS	NS	NS	0.0030	ND	NS	NS	0.003	ND	0.003	NS	0.003	ND
Arsenic	0.0010	ND	NS	NS	NS	NS	0.0010	ND	NS	NS	0.001	ND	0.001	NS	0.001	ND
Barium	0.0025	0.12	NS	NS	NS	NS	0.0025	0.079	NS	NS	0.0025	0.12	0.0025	NS	0.0025	0.054
Beryllium	0.0010	ND	NS	NS	NS	NS	0.0010	ND	NS	NS	0.001	ND^	0.001	NS	0.001	ND ^
Boron	0.050	0.25	NS	NS	NS	NS	0.050	0.19	NS	NS	0.05	0.23	0.05	NS	0.05	0.22
Cadmium	0.00050	ND	NS	NS	NS	NS	0.00050	ND	NS	NS	0.0005	ND	0.0005	NS	0.0005	ND
Chloride	10	73	NS	NS	NS	NS	10	280	NS	NS	10	130	10	NS	10	280
Chromium	0.0050	ND	NS	NS	NS	NS	0.0050	ND	NS	NS	0.005	ND	0.005	NS	0.005	ND
Cobalt	0.0010	ND	NS	NS	NS	NS	0.0010	ND	NS	NS	0.001	ND	0.001	NS	0.001	ND
Copper	0.0020	ND	NS	NS	NS	NS	0.0020	ND	NS	NS	0.002	ND	0.002	NS	0.002	ND
Cyanide	0.010	ND	NS	NS	NS	NS	0.010	ND	NS	NS	0.01	ND	0.01	NS	0.01	ND
Fluoride	0.10	0.35	NS	NS	NS	NS	0.10	0.43	NS	NS	0.1	0.36	0.1	NS	0.1	0.42
Iron	0.10	ND	NS	NS	NS	NS	0.10	0.17	NS	NS	0.1	ND	0.1	NS	0.1	0.1
Lead	0.00050	ND	NS	NS	NS	NS	0.00050	ND	NS	NS	0.0005	ND	0.0005	NS	0.0005	ND
Manganese	0.0025	0.0032	NS	NS	NS	NS	0.0025	ND	NS	NS	0.0025	ND	0.0025	NS	0.0025	ND
Mercury	0.00020	ND	NS	NS	NS	NS	0.00020	ND	NS	NS	0.0002	ND	0.0002	NS	0.0002	ND
Nickel	0.0020	0.0022	NS	NS	NS	NS	0.0020	ND	NS	NS	0.002	ND	0.002	NS	0.002	ND
Nitrogen/Nitrate	0.10	1.0	NS	NS	NS	NS	0.10	2.6	NS	NS	0.1	1.8	0.1	NS	0.1	2.9
Nitrogen/Nitrate, Nitri	0.10	1.0	NS	NS	NS	NS	0.20	2.6	NS	NS	0.1	1.8	0.1	NS	0.1	2.9
Nitrogen/Nitrite	0.020	ND	NS	NS	NS	NS	0.020	0.029	NS	NS	0.02	ND	0.02	NS	0.02	ND
Perchlorate	0.0040	ND	NS	NS	NS	NS	0.0040	ND	NS	NS	0.004	ND	0.004	NS	0.004	ND
Selenium	0.0025	0.0037	NS	NS	NS	NS	0.0025	0.0071	NS	NS	0.0025	0.0071	0.0025	NS	0.0025	0.016
Silver	0.00050	ND	NS	NS	NS	NS	0.00050	ND	NS	NS	0.0005	ND	0.0005	NS	0.0005	ND
Sulfate	20	62	NS	NS	NS	NS	50	230 F1	NS	NS	20	56	20	NS	20	84
Thallium	0.0020	ND	NS	NS	NS	NS	0.0020	ND	NS	NS	0.002	ND	0.002	NS	0.002	ND
Total Dissolved Solids	10	600	NS	NS	NS	NS	10	990	NS	NS	10	720	10	NS	10	940
Vanadium	0.0050	0.0071	NS	NS	NS	NS	0.0050	ND	NS	NS	0.005	ND^	0.005	NS	0.005	ND
Zinc	0.020	ND	NS	NS	NS	NS	0.020	ND	NS	NS	0.02	ND	0.02	NS	0.02	ND ^
Benzene	0.0005	ND	NS	NS	NS	NS	0.0005	ND	NS	NS	0.0005	ND	0.0005	NS	0.0005	ND
BETX	0.002	0.00743	NS	NS	NS	NS	0.0025	ND	NS	NS	0.0025	ND	0.0025	NS	0.0025	ND
pH	NA	7.08	NS	NS	NS	NS	NA	7.00	NS	NS	NA	7.20	NA	NS	NA	7.42
Temperature	NA	14.78	NS	NS	NS	NS	NA	9.08	NS	NS	NA	13.12	NA	NS	NA	14.8
Conductivity	NA	0.91	NS	NS	NS	NS	NA	0.91	NS	NS	NA	0.91	NA	NS	NA	2.25
Dissolved Oxygen	NA	3.90	NS	NS	NS	NS	NA	8.08	NS	NS	NA	9.88	NA	NS	NA	8.62
ORP	NA	-25.4	NS	NS	NS	NS	NA	-13.2	NS	NS	NA	30.4	NA	NS	NA	-246.5

Sample: MW-01	8/6/2019		11/7/2019		2/13/2020		5/21/2020		7/30/2020		10/22/2020		3/2/2021		5/18/2021	
Parameter	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.003	NS	0.003	ND	NS	NS	0.003	0.0066	NS	NS	NS	NS	NS	NS	NS	NS
Arsenic	0.001	NS	0.001	ND	NS	NS	0.001	0.0012	NS	NS	NS	NS	NS	NS	NS	NS
Barium	0.0025	NS	0.0025	0.051	NS	NS	0.0025	0.076	NS	NS	NS	NS	NS	NS	NS	NS
Beryllium	0.001	NS	0.001	ND	NS	NS	0.001	ND ^	NS	NS	NS	NS	NS	NS	NS	NS
Boron	0.05	NS	0.05	0.22	NS	NS	0.05	0.35	NS	NS	NS	NS	NS	NS	NS	NS
Cadmium	0.0005	NS	0.0005	ND	NS	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS
Chloride	10	NS	10	60	NS	NS	10	140	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	0.005	NS	0.005	ND	NS	NS	0.005	ND	NS	NS	NS	NS	NS	NS	NS	NS
Cobalt	0.001	NS	0.001	ND	NS	NS	0.001	0.0011	NS	NS	NS	NS	NS	NS	NS	NS
Copper	0.002	NS	0.002	ND	NS	NS	0.002	ND	NS	NS	NS	NS	NS	NS	NS	NS
Cyanide	0.01	NS	0.01	ND	NS	NS	0.01	ND	NS	NS	NS	NS	NS	NS	NS	NS
Fluoride	0.1	NS	0.1	0.34	NS	NS	0.1	0.4	NS	NS	NS	NS	NS	NS	NS	NS
Iron	0.1	NS	0.1	ND	NS	NS	0.1	ND	NS	NS	NS	NS	NS	NS	NS	NS
Lead	0.0005	NS	0.0005	ND	NS	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS
Manganese	0.0025	NS	0.0025	ND	NS	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS
Mercury	0.0002	NS	0.0002	ND	NS	NS	0.0002	ND	NS	NS	NS	NS	NS	NS	NS	NS
Nickel	0.002	NS	0.002	ND	NS	NS	0.002	0.0023	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrate	0.1	NS	0.1	1.6	NS	NS	0.1	2.1	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrate, Nitri	0.1	NS	0.1	1.6	NS	NS	0.1	2.1	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrite	0.02	NS	0.02	ND	NS	NS	0.02	ND	NS	NS	NS	NS	NS	NS	NS	NS
Perchlorate	0.004	NS	0.004	ND	NS	NS	0.004	ND	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	0.0025	NS	0.0025	ND	NS	NS	0.0025	0.0075	NS	NS	NS	NS	NS	NS	NS	NS
Silver	0.0005	NS	0.0005	ND	NS	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS
Sulfate	20	NS	20	42	NS	NS	20	120	NS	NS	NS	NS	NS	NS	NS	NS
Thallium	0.002	NS	0.002	ND	NS	NS	0.002	ND	NS	NS	NS	NS	NS	NS	NS	NS
Total Dissolved Solids	10	NS	10	510	NS	NS	10	730	NS	NS	NS	NS	NS	NS	NS	NS
Vanadium	0.005	NS	0.005	ND	NS	NS	0.005	0.005	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	0.02	NS	0.02	ND	NS	NS	0.02	ND	NS	NS	NS	NS	NS	NS	NS	NS
Benzene	0.0005	NS	0.0005	ND	NS	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS
BETX	0.0025	NS	0.0025	ND	NS	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS
pH	NA	NS	NA	7.9	NS	NS	NA	7.01	NS	NS	NS	NS	NS	NS	NS	NS
Temperature	NA	NS	NA	11.25	NS	NS	NA	12.7	NS	NS	NS	NS	NS	NS	NS	NS
Conductivity	NA	NS	NA	90.6	NS	NS	NA	1.226	NS	NS	NS	NS	NS	NS	NS	NS
Dissolved Oxygen	NA	NS	NA	12.51	NS	NS	NA	8.61	NS	NS	NS	NS	NS	NS	NS	NS
ORP	NA	NS	NA	-29.4	NS	NS	NA	87.6	NS	NS	NS	NS	NS	NS	NS	NS

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
^ - Denotes instrument related QC exceeds the control 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. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-02	Date	12/6/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012		9/19/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	0.012	NS	NS	0.0030	0.0042	0.0030	0.0032	0.0030	ND	0.0030	ND	NS	NS	0.0030	ND
Arsenic	0.010	0.0010	ND	NS	NS	0.0050	ND	0.0010	ND	0.0010	ND	0.0010	ND	NS	NS	0.0010	0.0015
Barium	2.0	0.0025	0.082	NS	NS	0.0025	0.081	0.0025	0.10	0.0025	0.12	0.0025	0.12	NS	NS	0.0025	0.12
Beryllium	0.004	0.0010	ND	NS	NS	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	NS	NS	0.0010	ND
Boron	2.0	0.050	0.31	NS	NS	0.050	0.35	0.050	0.44	0.050	0.74	0.050	0.22	NS	NS	0.050	0.35^
Cadmium	0.005	0.00050	ND	NS	NS	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	NS	NS	0.00050	ND
Chloride	200.0	10	140	NS	NS	10	230	10	140	10	140	2.0	280	NS	NS	10	120
Chromium	0.1	0.0050	ND	NS	NS	0.025	ND	0.0050	ND	0.0050	ND	0.0050	ND	NS	NS	0.0050	ND
Cobalt	1.0	0.0010	ND	NS	NS	0.0050	ND	0.0010	ND	0.0010	ND	0.0010	ND	NS	NS	0.0010	ND
Copper	0.65	0.0020	0.0032	NS	NS	0.010	ND	0.0020	ND	0.0020	ND	0.0020	ND	NS	NS	0.0020	ND
Cyanide	0.2	0.010	ND	NS	NS	0.010	ND	0.010	ND	0.010	ND	0.010	ND	NS	NS	0.010	ND
Fluoride	4.0	0.10	0.62	NS	NS	0.10	0.58	0.10	0.54	0.10	0.51	0.10	0.53	NS	NS	0.10	0.64
Iron	5.0	0.10	ND	NS	NS	0.50	ND	0.10	ND	0.10	ND	0.10	ND	NS	NS	0.10	ND
Lead	0.0075	0.00050	ND	NS	NS	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	NS	NS	0.00050	ND
Manganese	0.15	0.0025	ND	NS	NS	0.013	ND	0.0025	0.0025	0.0025	ND	0.0025	ND^	NS	NS	0.0025	ND
Mercury	0.002	0.00020	ND	NS	NS	0.00020	ND^	0.00020	ND	0.00020	ND	0.00020	ND	NS	NS	0.00020	ND
Nickel	0.1	0.0020	0.0033	NS	NS	0.010	ND	0.0020	0.0027	0.0020	0.0023	0.0020	ND	NS	NS	0.0020	0.0024
Nitrogen/Nitrate	10.0	0.10	3.1	NS	NS	0.10	1.8	0.10	2.2	0.10	2.9	0.10	6.4	NS	NS	0.10	4.7
Nitrogen/Nitrate, Nitri	NA	0.20	3.1	NS	NS	0.10	1.8	0.20	2.2	0.10	2.9	0.50	6.4	NS	NS	0.50	4.7
Nitrogen/Nitrite	NA	0.020	ND	NS	NS	0.020	ND	0.020	ND	0.020	ND	0.020	ND	NS	NS	0.020	ND
Perchlorate	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NS	NR	NR
Selenium	0.05	0.0025	ND	NS	NS	0.013	ND	0.0025	0.0038	0.0025	0.0055	0.0025	0.0048	NS	NS	0.0025	ND
Silver	0.05	0.00050	ND	NS	NS	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	NS	NS	0.00050	ND
Sulfate	400.0	50	190	NS	NS	25	67	25	110	50	150	50	110	NS	NS	50	190
Thallium	0.002	0.0020	ND	NS	NS	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	NS	NS	0.0020	ND
Total Dissolved Solids	1,200	10	600	NS	NS	10	720	10	690	10	750	10	800	NS	NS	10	580
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NS	NR	NR
Zinc	5.0	0.020	ND	NS	NS	0.10	ND	0.020	ND	0.020	ND	0.020	ND	NS	NS	0.020	ND
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NS	NR	NR
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NS	NR	NR
pH	6.5 - 9.0	NA	7.85	NS	NS	NA	7.30	NA	7.37	NA	7.37	NA	NM	NS	NS	NA	7.39
Temperature	NA	NA	9.3	NA	NS	NA	15.57	NA	18.72	NA	13.04	NA	NM	NS	NS	NA	22.02
Conductivity	NA	NA	1.1	NA	NS	NA	1.30	NA	0.98	NA	0.90	NA	NM	NS	NS	NA	0.90
Dissolved Oxygen	NA	NA	NM	NA	NS	NA	6.45	NA	5.21	NA	5.91	NA	NM	NS	NS	NA	6.02
ORP	NA	NA	NM	NA	NS	NA	227.3	NA	-36.0	NA	81.0	NA	NM	NS	NS	NA	158.0

Sample: MW-02	Date	12/20/2012		3/5/2013		5/23/2013		7/22/2013		10/15/2013		2/21/2014		5/2/2014		8/18/2014	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	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	0.010	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	2.0	0.0025	0.13	0.0025	0.12	0.0025	0.11	0.0025	0.12	0.0025	0.093	0.0025	0.13	0.0025	0.11	0.0025	0.087
Beryllium	0.004	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	2.0	0.050	0.42	0.050	0.41	0.050	0.35	0.050	0.29	0.050	0.41	0.050	0.34	0.050	0.25	0.050	0.22
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00057	0.00050	ND
Chloride	200.0	10	150	10	260	10	250	10	310	10	180	10	240	50	350	10	280
Chromium	0.1	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	1.0	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	0.65	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	0.2	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	4.0	0.10	0.59	0.10	0.59^	0.10	0.54	0.10	0.51	0.10	0.56	0.10	0.46	0.10	0.40	0.10	0.49
Iron	5.0	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	0.0075	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	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0036	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	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	0.1	0.0020	0.0029	0.0020	0.0027	0.0020	0.0022	0.0020	0.0061	0.0020	0.0039	0.0020	ND	0.0020	0.0023	0.0020	0.0049
Nitrogen/Nitrate	10.0	0.10	7.5	0.10	4.4	0.10	3.7	0.10	1.8	0.10	1.6	0.10	3.4	0.10	2.9	0.10	1.1
Nitrogen/Nitrate, Nitri	NA	0.50	7.5	0.50	4.4	0.50	3.7	0.10	1.8	0.10	1.6	0.50	3.4	0.50	2.9	0.10	1.1
Nitrogen/Nitrite	NA	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	0.0049	0.004	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.05	0.0025	ND	0.0025	0.0034	0.0025	0.0027	0.0025	ND	0.0025	ND	0.0025	0.0077	0.0025	ND	0.0025	ND
Silver	0.05	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	400.0	50	140	50	130	25	150	50	140	25	130	25	61	25	68	25	85
Thallium	0.002	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	1,200	10	720	10	840	10	860	10	980	10	660	10	830	10	1100	10	850
Vanadium	0.049	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	5.0	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	0.005	0.0005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.002	ND	0.002	ND
pH	6.5 - 9.0	NA	7.39	NA	7.52	NA	7.44	NA	7.08	NA	7.20	NA	9.24	NA	7.22	NA	7.07
Temperature	NA	NA	14.4	NA	9.5	NA	12.82	NA	16.25	NA	15.37	NA	11.97	NA	11.55	NA	16.92
Conductivity	NA	NA	0.91	NA	1.02	NA	1.008	NA	1.785	NA	1.02	NA	1.00	NA	1.35	NA	1.299
Dissolved Oxygen	NA	NA	9.91	NA	7.79	NA	7.65	NA	14.83	NA	5.81	NA	6.17	NA	8.48	NA	5.14
ORP	NA	NA	41.0	NA	58.1	NA	178.0	NA	138.5	NA	-40.3	NA	-66.1	NA	152.4	NA	115.8

Sample: MW-02	Date	10/23/2014		2/10/2015		5/27/2015		8/4/2015		10/28/2015		2/9/2016		5/11/2016		8/31/2016	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	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	0.010	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	2.0	0.0025	0.089	0.0025	0.088	0.0025	0.092	0.0025	0.090	0.0025	0.084	0.0025	0.098	0.0025	0.11	0.0025	0.087
Beryllium	0.004	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	2.0	0.050	0.22	0.050	0.23	0.050	0.35	0.050	0.25	0.050	0.21	0.050	0.20	0.050	0.18	0.050	0.18
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	0.00069	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	240	10	190	50	410	10	290	10	130	10	180	10	340	10	170
Chromium	0.1	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	1.0	0.0010	ND	0.0010	0.0017	0.0010	0.010	0.0010	0.0027	0.0010	0.0017	0.0010	0.0011	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	0.0059	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	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	4.0	0.10	0.45	0.10	0.40	0.10	0.40	0.10	0.41	0.10	0.39	0.10	0.38	0.10	0.40	0.10	0.44
Iron	5.0	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	0.0075	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	0.15	0.0025	ND	0.0025	ND	0.0025	0.0031	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	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	0.1	0.0020	0.0069	0.0020	0.0053	0.0020	0.013	0.0020	0.0073	0.0020	0.0031	0.0020	0.0039	0.0020	0.0071	0.0020	0.0062
Nitrogen/Nitrate	10.0	0.10	1.3	0.10	1.3	0.10	0.43	0.10	1.2	0.10	1.0	0.10	1.5	0.10	1.4	0.10	1.5
Nitrogen/Nitrate, Nitri	NA	0.10	1.3	0.10	1.3	0.10	0.43	0.10	1.2	0.10	1.0	0.10	1.5	0.10	1.4	0.10	1.5
Nitrogen/Nitrite	NA	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	0.0049	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	0.05	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
Silver	0.05	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	400.0	25	92	20	67	25	100	25	85	20	60	20	88	25	100	25	62
Thallium	0.002	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	1,200	10	810	10	730	10	1200	10	890	10	610	10	750	10	960	10	700
Vanadium	0.049	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	5.0	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	0.005	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	11.705	0.002	0.00076	0.002	0.00076	0.002	0.00076	0.002	ND	0.002	ND	0.002	ND	0.002	0.002	0.002	ND
pH	6.5 - 9.0	NA	7.31	NA	7.46	NA	6.83	NA	7.61	NA	7.05	NA	7.12	NA	7.13	NA	6.70
Temperature	NA	NA	14.3	NA	9.28	NA	14.63	NA	16.75	NA	15.07	NA	11.10	NA	13.52	NA	18.75
Conductivity	NA	NA	1.30	NA	0.94	NA	1.75	NA	1.38	NA	1.10	NA	0.92	NA	1.38	NA	1.11
Dissolved Oxygen	NA	NA	4.07	NA	5.58	NA	1.96	NA	3.66	NA	4.47	NA	5.38	NA	4.25	NA	4.84
ORP	NA	NA	57.1	NA	73.2	NA	33.9	NA	-51.3	NA	110.4	NA	80.7	NA	38.4	NA	47.8

Sample: MW-02	Date	11/1/2016		2/8/2017		4/25/2017		2/21/2018		8/1/2018		10/16/2018		2/4/2019		5/7/2019	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND ^	0.0030	ND	0.0030	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	2.0	0.0025	0.071	0.0025	0.085	0.0025	0.10	0.0025	0.12	0.0025	0.071	0.0025	0.063	0.0025	0.071	0.0025	0.11
Beryllium	0.004	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND^	0.001	ND	0.001	ND
Boron	2.0	0.050	0.18	0.050	0.17	0.050	0.15	0.050	0.19	0.05	0.14	0.05	0.15	0.05	0.14	0.05	0.15
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200.0	10	97	10	140	10	330	10	240	10	200	10	120	10	150	10	500
Chromium	0.1	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.0020	ND	0.0020	ND ^	0.0020	ND ^	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.010	ND	0.010	ND F1,2	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	4.0	0.10	0.40	0.10	0.35	0.10	0.32	0.10	0.35	0.1	0.4	0.1	0.43	0.1	0.39	0.1	0.41
Iron	5.0	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	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	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.0020	0.0044	0.0020	0.0030	0.0020	0.0050	0.0020	0.0054	0.002	0.003	0.002	ND	0.002	0.0027	0.002	0.0034
Nitrogen/Nitrate	10.0	0.10	0.79	0.10	1.0	0.10	1.8	0.10	1.6	0.1	0.81	0.1	0.68	0.1	1.0	0.1	1.8
Nitrogen/Nitrate, Nitri	NA	0.10	0.79	0.10	1.0	0.10	1.8	0.10	1.6	0.1	0.81	0.1	0.68	0.1	1.0	0.1	1.8
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	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	0.05	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400.0	10	41	20	50	25	140	50	160	20	76	20	45	20	71	20	73
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	570	10	630	10	890	10	970	10	760	10	520	10	690	10	1,100
Vanadium	0.049	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND^	0.005	ND	0.005	ND
Zinc	5.0	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.001	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.002	0.0068	0.002	ND	0.002	ND	0.0025	0.00052	0.0025	0.0142	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.26	NA	6.97	NA	7.15	NA	7.28	NA	7.36	NA	7.70	NA	7.32	NA	7.3
Temperature	NA	NA	17.85	NA	11.92	NA	14.74	NA	7.75	NA	17.40	NA	14.68	NA	13.4	NA	19.3
Conductivity	NA	NA	0.84	NA	0.78	NA	1.22	NA	0.916	NA	0.961	NA	0.735	NA	1.1	NA	3.0
Dissolved Oxygen	NA	NA	3.87	NA	4.90	NA	6.60	NA	5.82	NA	5.36	NA	6.25	NA	6.20	NA	6.98
ORP	NA	NA	91.2	NA	15.3	NA	10.1	NA	13.1	NA	85.9	NA	36.6	NA	125.6	NA	NA

Sample: MW-02	Date	8/6/2019		11/7/2019		2/13/2020		5/21/2020		7/30/2020		10/22/2020		3/2/2021		5/18/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	NS	0.003	ND	0.003	NS	0.003	ND	NS	NS	NS	NS	NS	NS	NS	NS
Arsenic	0.010	0.001	NS	0.001	ND	0.001	NS	0.001	ND	NS	NS	NS	NS	NS	NS	NS	NS
Barium	2.0	0.0025	NS	0.0025	0.065	0.0025	NS	0.0025	0.089	NS	NS	NS	NS	NS	NS	NS	NS
Beryllium	0.004	0.001	NS	0.001	ND	0.001	NS	0.001	ND ^	NS	NS	NS	NS	NS	NS	NS	NS
Boron	2.0	0.05	NS	0.05	0.18	0.05	NS	0.05	0.24	NS	NS	NS	NS	NS	NS	NS	NS
Cadmium	0.005	0.0005	NS	0.0005	ND	0.0005	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS
Chloride	200.0	10	NS	10	100	10	NS	10	260	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	0.1	0.005	NS	0.005	ND	0.005	NS	0.005	ND	NS	NS	NS	NS	NS	NS	NS	NS
Cobalt	1.0	0.001	NS	0.001	ND	0.001	NS	0.001	ND	NS	NS	NS	NS	NS	NS	NS	NS
Copper	0.65	0.002	NS	0.002	ND	0.002	NS	0.002	ND	NS	NS	NS	NS	NS	NS	NS	NS
Cyanide	0.2	0.01	NS	0.01	ND	0.01	NS	0.01	ND	NS	NS	NS	NS	NS	NS	NS	NS
Fluoride	4.0	0.1	NS	0.1	0.38	0.1	NS	0.1	0.41	NS	NS	NS	NS	NS	NS	NS	NS
Iron	5.0	0.1	NS	0.1	ND	0.1	NS	0.1	ND	NS	NS	NS	NS	NS	NS	NS	NS
Lead	0.0075	0.0005	NS	0.0005	ND	0.0005	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS
Manganese	0.15	0.0025	NS	0.0025	ND	0.0025	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS
Mercury	0.002	0.0002	NS	0.0002	ND	0.0002	NS	0.0002	ND	NS	NS	NS	NS	NS	NS	NS	NS
Nickel	0.1	0.002	NS	0.002	0.0021	0.002	NS	0.002	0.0046	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrate	10.0	0.1	NS	0.1	1.2	0.1	NS	0.1	2.9	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrate, Nitri	NA	0.1	NS	0.1	1.2	0.1	NS	0.1	2.9	NS	NS	NS	NS	NS	NS	NS	NS
Nitrogen/Nitrite	NA	0.02	NS	0.02	ND	0.02	NS	0.02	ND	NS	NS	NS	NS	NS	NS	NS	NS
Perchlorate	0.0049	0.004	NS	0.004	ND	0.004	NS	0.004	ND	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	0.05	0.0025	NS	0.0025	ND	0.0025	NS	0.0025	0.0045	NS	NS	NS	NS	NS	NS	NS	NS
Silver	0.05	0.0005	NS	0.0005	ND	0.0005	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS
Sulfate	400.0	20	NS	20	34	20	NS	20	160	NS	NS	NS	NS	NS	NS	NS	NS
Thallium	0.002	0.002	NS	0.002	ND	0.002	NS	0.002	ND	NS	NS	NS	NS	NS	NS	NS	NS
Total Dissolved Solids	1,200	10	NS	10	580	10	NS	10	910	NS	NS	NS	NS	NS	NS	NS	NS
Vanadium	0.049	0.005	NS	0.005	ND	0.005	NS	0.005	ND	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	5.0	0.02	NS	0.02	ND	0.02	NS	0.02	ND	NS	NS	NS	NS	NS	NS	NS	NS
Benzene	0.005	0.0005	NS	0.0005	ND	0.0005	NS	0.0005	ND	NS	NS	NS	NS	NS	NS	NS	NS
BETX	11.705	0.0025	NS	0.0025	ND	0.0025	NS	0.0025	ND	NS	NS	NS	NS	NS	NS	NS	NS
pH	6.5 - 9.0	NA	NS	NA	7.16	NA	NS	NA	6.99	NS	NS	NS	NS	NS	NS	NS	NS
Temperature	NA	NA	NS	NA	12.61	NA	NS	NA	14.5	NS	NS	NS	NS	NS	NS	NS	NS
Conductivity	NA	NA	NS	NA	9.67	NA	NS	NA	1.577	NS	NS	NS	NS	NS	NS	NS	NS
Dissolved Oxygen	NA	NA	NS	NA	9.1	NA	NS	NA	7.77	NS	NS	NS	NS	NS	NS	NS	NS
ORP	NA	NA	NS	NA	-10.5	NA	NS	NA	82.1	NS	NS	NS	NS	NS	NS	NS	NS

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
^ - Denotes instrument related QC exceeds the control 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. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-03	Date	12/7/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012		9/19/2012		12/20/2012		3/5/2013	
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	0.0030	0.0040	0.0030	ND	0.0030	ND	0.0030	0.0065	0.0030	0.016	0.0030	0.013	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	ND	0.0010	0.0011	0.0050	ND	0.0010	0.0012	0.0010	0.0016	0.0010	0.0014	0.0010	0.0011	0.0010	0.0012	0.0010	0.0012	0.0010	0.0014
Barium	2.0	0.0025	0.089	0.0025	0.085	0.0025	0.092	0.0025	0.081	0.0025	0.084	0.0025	0.081	0.0025	0.088	0.0025	0.097	0.0025	0.09	0.0025	0.089
Beryllium	0.004	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	2.0	0.050	0.24	0.050	0.36	0.050	0.46	0.050	0.24	0.050	0.23	0.050	0.26	0.050	0.31	0.050	0.22^	0.050	0.28	0.050	0.29
Cadmium	0.005	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	0.00074	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	260	10	240	10	300	50	160	10	260	2.0	250	10	260	10	330	10	290	10	260
Chromium	0.1	0.0050	ND	0.0050	ND	0.025	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	0.0013	0.0010	0.0013	0.0050	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.010	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	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	4.0	0.10	0.43	0.10	0.40	0.10	0.41	0.10	0.31	0.10	0.40	0.10	0.39	0.10	0.43	0.10	0.43	0.10	0.38	0.10	0.42^
Iron	5.0	0.10	ND	0.10	ND	0.50	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0075	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	0.15	0.0025	0.10	0.0025	0.048	0.013	ND	0.0025	0.0076	0.0025	0.0080	0.0025	0.0095^	0.0025	0.014	0.0025	0.011	0.0025	0.0076	0.0025	0.0068
Mercury	0.002	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	0.1	0.0020	0.011	0.0020	0.0065	0.010	ND	0.0020	0.0041	0.0020	0.0060	0.0020	0.0046	0.0020	0.0044	0.0020	0.0059	0.0020	0.0063	0.0020	0.0051
Nitrogen/Nitrate	10.0	0.10	ND	0.10	1.0	0.10	2.1	0.10	1.1	0.10	0.79	0.10	ND	0.10	1.3	0.10	0.88	0.10	0.77	0.10	0.86
Nitrogen/Nitrate, Nitri	NA	0.10	ND	0.10	1.0	0.20	2.1	0.10	1.1	0.10	0.79	0.10	ND	0.10	1.3	0.10	0.88	0.10	0.77	0.10	0.86
Nitrogen/Nitrite	NA	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	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.004	ND	0.0040	ND
Selenium	0.05	0.0025	ND	0.0025	0.0050	0.013	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0043	0.0025	ND	0.0025	ND	0.0025	0.0031
Silver	0.05	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	0.00091	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	50	120	50	160	50	120	25	120	50	160	50	190	25	160	50	150	50	110	50	140
Thallium	0.002	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	1,200	10	930	10	1100	10	1000	10	930	10	1100	10	1000	10	1100	10	1000	10	1100	10	950
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0050	ND	0.0050	ND
Zinc	5.0	0.020	ND	0.020	ND	0.10	ND	0.020	ND	0.020	ND	0.020	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	0.0005	ND	0.00050	ND
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0025	NS	0.0025	ND
pH	6.5 - 9.0	NA	7.84	NA	7.26	NA	7.41	NA	7.37	NA	7.48	NA	7.34	NA	7.21	NA	7.40	NA	7.42	NA	7.66
Temperature	NA	NA	10.91	NA	12.73	NA	13.04	NA	11.90	NA	10.94	NA	13.73	NA	14.01	NA	13.35	NA	12.40	NA	11.20
Conductivity	NA	NA	1.83	NA	1.76	NA	1.74	NA	1.15	NA	1.19	NA	1.21	NA	1.33	NA	1.41	NA	1.28	NA	1.18
Dissolved Oxygen	NA	NA	NM	NA	4.73	NA	7.78	NA	6.03	NA	6.07	NA	6.07	NA	6.47	NA	6.35	NA	6.30	NA	7.03
ORP	NA	NA	NM	NA	179.1	NA	223.5	NA	-51.0	NA	145.0	NA	193.0	NA	114.0	NA	134.0	NA	130.0	NA	196.6

Sample: MW-03	Date	5/22/2013		7/22/2013		10/15/2013		2/17/2014		5/2/2014		8/18/2014		10/23/2014		2/10/2015		5/27/2015		8/4/2015	
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	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	0.010	0.0010	0.0013	0.0010	0.0012	0.0010	0.0014	0.0010	0.0014	0.0010	0.0015	0.0010	ND	0.0010	ND^	0.0010	0.0015	0.0010	0.0015	0.0010	0.0015
Barium	2.0	0.0025	0.13	0.0025	0.10	0.0025	0.099	0.0025	0.098	0.0025	0.10	0.0025	0.075	0.0025	0.089	0.0025	0.093	0.0025	0.094	0.0025	0.092
Beryllium	0.004	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	2.0	0.050	0.74 V	0.050	0.67	0.050	0.27	0.050	0.45	0.050	0.27	0.050	0.37	0.050	0.45	0.050	0.52	0.050	0.54	0.050	0.48
Cadmium	0.005	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	200.0	50	380	10	210	10	250	10	200	10	300	10	220	10	180	10	160	10	220	10	230
Chromium	0.1	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	1.0	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	0.65	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
Cyanide	0.2	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	4.0	0.10	0.44	0.10	0.45	0.10	0.47	0.10	0.51	0.10	0.40	0.10	0.52	0.10	0.49	0.10	0.46	0.10	0.43	0.10	0.47
Iron	5.0	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
Lead	0.0075	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	0.15	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
Mercury	0.002	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	0.1	0.0020	0.0042	0.0020	0.0043	0.0020	0.0046	0.0020	0.0033	0.0020	0.0040	0.0020	0.0021	0.0020	0.0023	0.0020	ND	0.0020	0.0026	0.0020	ND
Nitrogen/Nitrate	10.0	0.10	3.6	0.10	3.1	0.10	1.9	0.10	1.5	0.10	2.3	0.10	1.9	0.10	1.8	0.10	2.5	0.10	2.1	0.10	1.9
Nitrogen/Nitrate, Nitri	NA	0.50	3.6	0.50	3.1	0.10	1.9	0.10	1.5	0.50	2.3	0.10	1.9	0.10	1.8	0.20	2.5	0.20	2.1	0.10	1.9
Nitrogen/Nitrite	NA	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	0.0049	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	0.05	0.0025	0.022	0.0025	0.012	0.0025	ND	0.0025	0.0051	0.0025	ND	0.0025	0.0029	0.0025	0.0036	0.0025	0.0054	0.0025	0.0063	0.0025	0.0066
Silver	0.05	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	400.0	50	250	50	260	50	210	25	89	25	110	40	84	50	130	25	58	25	84	25	91
Thallium	0.002	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	1,200	10	1300	10	1000	10	910	10	890	10	1100	10	810	10	760	10	700	10	830	10	860
Vanadium	0.049	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	5.0	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	0.005	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	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0015	0.002	ND
pH	6.5 - 9.0	NA	7.00	NA	7.26	NA	7.22	NA	8.57	NA	7.09	NA	6.70	NA	7.16	NA	7.55	NA	7.37	NA	7.29
Temperature	NA	NA	13.45	NA	17.29	NA	13.91	NA	9.27	NA	11.38	NA	18.40	NA	13.97	NA	9.02	NA	16.14	NA	17.45
Conductivity	NA	NA	1.55	NA	1.33	NA	0.99	NA	0.75	NA	1.31	NA	1.22	NA	1.22	NA	0.90	NA	1.23	NA	1.26
Dissolved Oxygen	NA	NA	5.31	NA	3.47	NA	2.78	NA	3.32	NA	5.23	NA	6.68	NA	5.41	NA	4.84	NA	5.49	NA	6.03
ORP	NA	NA	-20.4	NA	32.2	NA	-79.8	NA	-7.3	NA	141.8	NA	94.8	NA	69.5	NA	71.9	NA	64.1	NA	7.6

Sample: MW-03	Date	10/28/2015		2/10/2016		5/10/2016		8/31/2016		11/2/2016		2/6/2017		4/26/2017		2/20/2018		7/31/2018		10/17/2018	
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	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.0010	ND	0.0010	0.0015	0.0010	ND ^	0.0010	0.0011	0.0010	0.0013	0.0010	0.0013	0.0010	0.0011	0.0010	0.0012	0.001	0.0012	0.001	0.001
Barium	2.0	0.0025	0.10	0.0025	0.098	0.0025	0.093	0.0025	0.093	0.0025	0.089	0.0025	0.096	0.0025	0.096	0.0025	0.094	0.0025	0.099	0.0025	0.1
Beryllium	0.004	0.0010	ND	0.0010	ND ^	0.0010	ND ^	0.0010	ND ^	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND^
Boron	2.0	0.050	0.29	0.050	0.49	0.050	0.44	0.050	0.37	0.050	0.38	0.050	0.39	0.050	0.45	0.050	0.51	0.05	0.33	0.05	0.22
Cadmium	0.005	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
Chloride	200.0	10	230	10	200	10	240	10	240	10	170	10	140	10	210	10	170 F1	10	260	10	250
Chromium	0.1	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
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND	0.002	ND	0.002	ND
Cyanide	0.2	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
Fluoride	4.0	0.10	0.41	0.10	0.48	0.10	0.49	0.10	0.45	0.10	0.57	0.10	0.39	0.10	0.35	0.10	0.42	0.1	0.42	0.1	0.4
Iron	5.0	0.10	ND	0.10	0.22	0.10	ND ^	0.10	ND	0.10	ND	0.10	ND	0.10	0.10	0.10	0.10	0.1	ND	0.1	ND
Lead	0.0075	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
Manganese	0.15	0.0025	ND	0.0025	0.0040	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0028	0.0025	ND	0.0025	ND
Mercury	0.002	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	ND	0.0002	ND
Nickel	0.1	0.0020	0.0023	0.0020	0.0025	0.0020	ND	0.0020	0.0020	0.0020	ND	0.0020	0.0025	0.0020	ND	0.0020	0.0024	0.002	0.0025	0.002	0.0049
Nitrogen/Nitrate	10.0	0.10	1.6	0.10	1.9	0.10	1.5	0.10	3.4	0.10	1.9	0.10	1.4	0.10	2.6	0.10	1.7	0.1	1.4	0.1	0.94
Nitrogen/Nitrate, Nitri	NA	0.10	1.6	0.10	1.9	0.20	1.5	0.50	3.4	0.10	1.9	0.10	1.4	0.20	2.6	0.10	1.7	0.1	1.4	0.1	0.94
Nitrogen/Nitrite	NA	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
Perchlorate	0.0049	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	0.0048	0.013	ND ^	0.0025	0.0032	0.0025	0.0031	0.0025	0.0033	0.0025	0.0050	0.0025	ND	0.0025	0.0038	0.0025	ND
Silver	0.05	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
Sulfate	400.0	40	180	50	150	25	130	25	96	20	87	25	75	25	110	50	110	25	110	25	84
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	820	10	780	10	850	10	920	10	800	10	740	10	890	10	840	10	920	10	860
Vanadium	0.049	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^
Zinc	5.0	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
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.00094	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.002	0.0065	0.002	ND	0.002	0.0027	0.002	ND	0.002	0.02984	0.002	ND	0.002	ND	0.0025	0.0015	0.0025	0.001	0.0025	ND
pH	6.5 - 9.0	NA	7.11	NA	7.31	NA	7.07	NA	7.18	NA	7.45	NA	7.35	NA	7.03	NA	7.11	NA	7.22	NA	7.04
Temperature	NA	NA	13.85	NA	6.78	NA	13.77	NA	18.94	NA	16.53	NA	12.81	NA	15.34	NA	13.37	NA	20.13	NA	11.69
Conductivity	NA	NA	1.50	NA	0.86	NA	1.18	NA	1.35	NA	1.14	NA	0.95	NA	1.05	NA	0.925	NA	1.206	NA	1.070
Dissolved Oxygen	NA	NA	5.48	NA	5.93	NA	5.65	NA	6.91	NA	5.30	NA	5.69	NA	7.22	NA	5.84	NA	6.75	NA	9.38
ORP	NA	NA	106.6	NA	94.8	NA	93.8	NA	66.4	NA	66.0	NA	5.1	NA	59.8	NA	111.7	NA	142.0	NA	101.7

Sample: MW-03	Date	2/4/2019		5/7/2019		8/7/2019		11/7/2019		2/17/2020		5/20/2020		7/30/2020		10/22/2020		3/2/2021		5/18/2021	
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	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	0.010	0.001	0.0011	0.001	0.001	0.001	ND	0.001	0.0012	0.001	0.0015	0.001	0.0015	0.001	0.001	0.001	ND	0.001	0.001	0.001	ND
Barium	2.0	0.0025	0.089	0.0025	0.11	0.0025	0.088	0.0025	0.081	0.0025	0.09	0.0025	0.11	0.0025	0.093	0.0025	0.1	0.0025	0.11	0.0025	0.14
Beryllium	0.004	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
Boron	2.0	0.05	0.36	0.05	0.41	0.05	0.36	0.05	0.32	0.05	0.33	0.05	0.36	0.05	0.28	0.05	0.29	0.05	0.35	0.05	0.25
Cadmium	0.005	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	200.0	10	160	10	270 F1	10	220	10	150	10	130	10	230	10	170	10	180	10	200	40	290
Chromium	0.1	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	1.0	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	0.001
Copper	0.65	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	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	0.0062	0.01	ND	0.005	ND	0.005	ND
Fluoride	4.0	0.1	0.43	0.1	0.41	0.1	0.39	0.1	0.41	0.1	0.46	0.1	0.42	0.1	0.45	0.1	0.44	0.1	0.44	0.1	0.4
Iron	5.0	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	0.0075	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	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0035	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	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	0.1	0.002	0.0033	0.002	0.0035	0.002	ND	0.002	0.0028	0.002	ND	0.002	ND	0.002	ND	0.002	0.0031	0.002	0.0048	0.002	0.0072
Nitrogen/Nitrate	10.0	0.1	1.0	0.1	2.1	0.1	2.7	0.1	1.8	0.1	1.7	0.1	2.1	0.1	3	0.1	2.8	0.1	2.8	0.1	1.9
Nitrogen/Nitrate, Nitri	NA	0.1	1.0	0.1	2.1	0.1	2.7	0.1	1.8	0.1	1.7	0.1	2.1	0.5	3	0.5	2.8	0.5	2.8	0.5	1.9
Nitrogen/Nitrite	NA	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	0.0049	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	0.05	0.0025	0.0032	0.0025	0.0056	0.0025	0.0037	0.0025	0.0025	0.0025	0.0025	0.0025	0.0039	0.0025	0.0028	0.0025	ND	0.0025	0.0047	0.0025	ND
Silver	0.05	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	400.0	25	100	25	160	25	71	25	73	25	65	25	100	25	77	15	91	25	140	25	190
Thallium	0.002	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	1,200	10	770	10	900	10	760	10	740	10	610	10	910	30	680	30	760	10	900	10	1100
Vanadium	0.049	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	5.0	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	0.005	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	11.705	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	6.5 - 9.0	NA	7.44	NA	7.27	NA	7.34	NA	7.32	NA	7.31	NA	7.56	NA	7.1	NA	7.23	NA	7.27	NA	7.13
Temperature	NA	NA	11.00	NA	12.00	NA	13.00	NA	11.86	NA	12.00	NA	11.50	NA	12.50	NA	12.60	NA	12.40	NA	12.80
Conductivity	NA	NA	123.700	NA	2.35	NA	1.37	NA	11.87	NA	9.37	NA	9.92	NA	1.36	NA	1.35	NA	1.561	NA	1.802
Dissolved Oxygen	NA	NA	7.10	NA	6.48	NA	6.09	NA	8.23	NA	5.7	NA	3.98	NA	7.65	NA	4.22	NA	4.96	NA	5.34
ORP	NA	NA	194.7	NA	-237.9	NA	157.7	NA	-9.8	NA	154.4	NA	160.7	NA	157.4	NA	180.0	NA	20.0	NA	88.3

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
^ - Denotes instrument related QC exceeds the control 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. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-04	Date	12/7/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012		9/19/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	0.0067	0.0030	0.0057	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	ND	0.0010	0.0011	0.0010	ND	0.0010	ND	0.0010	ND
Barium	2.0	0.0025	0.065	0.0025	0.067	0.0025	0.059	0.0025	0.060	0.0025	0.069	0.0025	0.070	0.0025	0.068	0.0025	0.092
Beryllium	0.004	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	2.0	0.050	0.46	0.050	0.37	0.050	0.38	0.050	0.25	0.050	0.34	0.050	0.29	0.050	0.48	0.050	0.34^
Cadmium	0.005	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	270	10	270	10	250	10	150	10	200	2.0	210	10	270	10	260
Chromium	0.1	0.0050	ND	0.0050	ND	0.025	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	0.0018	0.0010	0.0028	0.0010	0.0026	0.0010	0.0042	0.0010	0.0059
Copper	0.65	0.0020	ND	0.0020	ND	0.010	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	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	4.0	0.10	0.49	0.10	0.38	0.10	0.44	0.10	0.37	0.10	0.44	0.10	0.41	0.10	0.46	0.10	0.47
Iron	5.0	0.10	ND	0.10	ND	0.50	ND	0.10	0.22	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0075	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	0.15	0.0025	0.33	0.0025	0.048	0.013	0.018	0.0025	0.066	0.0025	0.029	0.0025	0.038^	0.0025	0.082	0.0025	0.043
Mercury	0.002	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	0.1	0.0020	0.0067	0.0020	0.0037	0.010	ND	0.0020	0.0029	0.0020	0.0038	0.0020	0.0037	0.0020	0.0036	0.0020	0.0043
Nitrogen/Nitrate	10.0	0.10	0.81	0.10	1.6	0.10	2.7	0.10	1.6	0.10	1.4	0.10	0.62	0.10	1.4	0.10	1.3
Nitrogen/Nitrate, Nitri	NA	0.10	0.81	0.10	1.6	0.20	2.7	0.10	1.6	0.10	1.4	0.10	0.62	0.10	1.4	0.10	1.3
Nitrogen/Nitrite	NA	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	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	0.0025	0.0025	0.0025	ND	0.013	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0047
Silver	0.05	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	50	300	25	140	25	84	25	74	50	170	50	210	25	110	50	180
Thallium	0.002	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	1,200	10	1100	10	1000	10	890	10	770	10	970	10	930	10	1100	10	980
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	0.020	ND	0.020	ND	0.10	ND	0.020	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
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	7.71	NA	7.15	NA	7.48	NA	7.42	NA	7.56	NA	7.40	NA	7.31	NA	7.37
Temperature	NA	NA	10.69	NA	12.13	NA	12.59	NA	11.78	NA	9.67	NA	12.52	NA	13.59	NA	14.52
Conductivity	NA	NA	1.84	NA	1.76	NA	1.50	NA	0.94	NA	1.04	NA	1.06	NA	1.28	NA	1.33
Dissolved Oxygen	NA	NA	NM	NA	6.80	NA	8.20	NA	7.17	NA	6.95	NA	6.95	NA	6.51	NA	6.26
ORP	NA	NA	NM	NA	196.1	NA	217.5	NA	-43.0	NA	135.0	NA	177.0	NA	86.0	NA	155.0

Sample: MW-04	Date	12/20/2012		3/5/2013		5/22/2013		7/22/2013		10/16/2013		2/21/2014		5/1/2014		8/18/2014	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	0.012	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	ND	0.0010	0.0013	0.0010	0.0014	0.0010	0.0013	0.0010	0.0012	0.0010	0.0013	0.0010	ND	0.0010	0.0012
Barium	2.0	0.0025	0.87	0.0025	0.080	0.0025	0.084	0.0025	0.078	0.0025	0.089	0.0025	0.088	0.0025	0.072	0.0025	0.071
Beryllium	0.004	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	2.0	0.050	0.38	0.050	0.40	0.050	0.40	0.050	0.50	0.050	0.45	0.050	0.35	0.050	0.32	0.050	0.35
Cadmium	0.005	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	200.0	10	250	10	230	10	270	10	200	10	210	10	220	10	270	10	210
Chromium	0.1	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	1.0	0.0010	0.0049	0.0010	0.0057	0.0010	0.0012	0.0010	0.014	0.0010	0.0048	0.0010	0.0022	0.0010	ND	0.0010	0.0060
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0041	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	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	4.0	0.10	0.41	0.10	0.47^	0.10	0.49	0.10	0.50	0.10	0.53	0.10	0.45	0.10	0.44	0.10	0.51
Iron	5.0	0.10	ND	0.10	0.46	0.10	0.17	0.10	ND	0.10	ND	0.10	ND	0.10	0.18	0.10	ND
Lead	0.0075	0.00050	ND	0.00050	0.00077	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	0.029	0.0025	0.067	0.0025	0.0081	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	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	0.1	0.0020	0.0042	0.0020	0.0051	0.0020	0.0034	0.0020	0.0037	0.0020	0.0033	0.0020	0.0022	0.0020	0.0022	0.0020	ND
Nitrogen/Nitrate	10.0	0.10	0.91	0.10	1.3	0.10	2.9	0.10	2.4	0.10	2.5	0.10	2.0	0.10	2.0	0.10	1.9
Nitrogen/Nitrate, Nitri	NA	0.10	0.91	0.10	1.3	0.20	2.9	0.50	2.4	0.20	2.5	0.10	2.0	0.50	2.0	0.10	1.9
Nitrogen/Nitrite	NA	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	0.0049	0.004	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.05	0.0025	0.0033	0.0025	ND	0.0025	0.0025	0.0025	ND	0.0025	0.0037	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	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	400.0	50	130	50	110	25	120	50	170	50	230	25	110	20	140	25	89
Thallium	0.002	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	1,200	10	1000	10	880	10	900	10	840	10	860	10	870	10	860	10	760
Vanadium	0.049	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	5.0	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	0.005	0.0005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	NS	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.002	ND	0.002	ND
pH	6.5 - 9.0	NA	7.38	NA	7.44	NA	7.18	NA	7.25	NA	7.24	NA	9.11	NA	7.15	NA	6.89
Temperature	NA	NA	12.98	NA	9.90	NA	14.25	NA	14.76	NA	13.91	NA	9.25	NA	10.92	NA	18.13
Conductivity	NA	NA	1.24	NA	1.05	NA	1.106	NA	1.07	NA	1.19	NA	0.93	NA	1.13	NA	1.18
Dissolved Oxygen	NA	NA	8.19	NA	7.6	NA	6.47	NA	4.4	NA	3.13	NA	5.94	NA	4.23	NA	5.82
ORP	NA	NA	132.0	NA	140.9	NA	-6.4	NA	27.6	NA	-80.9	NA	-34.2	NA	101.1	NA	77.4

Sample: MW-04	Date	10/23/2014		2/10/2015		5/27/2015		8/4/2015		10/28/2015		2/10/2016		5/10/2016		8/31/2016	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	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	0.010	0.0010	ND	0.0010	ND	0.0010	0.0013	0.0010	0.0015	0.0010	ND	0.0010	0.0013	0.0010	ND ^	0.0010	0.0013
Barium	2.0	0.0025	0.078	0.0025	0.079	0.0025	0.090	0.0025	0.067	0.0025	0.083	0.0025	0.085	0.0025	0.10	0.0025	0.089
Beryllium	0.004	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	2.0	0.050	0.41	0.050	0.44	0.050	0.36	0.050	0.33	0.050	0.30	0.050	0.35	0.050	0.51	0.050	0.43
Cadmium	0.005	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	200.0	10	160	10	180	10	290	10	200	10	200	10	200	10	260	10	200
Chromium	0.1	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	1.0	0.0010	0.011	0.0010	0.0076	0.0010	0.0062	0.0010	0.0047	0.0010	0.0041	0.0010	0.0075	0.0010	0.0046	0.0010	0.0072
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0072	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	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	4.0	0.10	0.49	0.10	0.44	0.10	0.43	0.10	0.49	0.10	0.45	0.10	0.51	0.10	0.50	0.10	0.44
Iron	5.0	0.10	ND	0.10	0.14	0.10	ND	0.10	ND	0.10	ND	0.10	0.31	0.10	ND ^	0.10	ND
Lead	0.0075	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	0.15	0.0025	ND	0.0025	0.0044	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0054	0.0025	ND	0.0025	ND
Mercury	0.002	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	0.1	0.0020	ND	0.0020	ND	0.0020	0.0023	0.0020	ND	0.0020	ND	0.0020	0.0021	0.0020	0.0021	0.0020	0.0020
Nitrogen/Nitrate	10.0	0.10	1.6	0.10	2.2	0.10	2.5	0.10	1.3	0.10	1.7	0.10	1.8	0.10	2.1	0.10	1.8
Nitrogen/Nitrate, Nitri	NA	0.10	1.6	0.20	2.2	0.20	2.5	0.10	1.3	0.10	1.7	0.10	1.8	0.20	2.1	0.10	1.8
Nitrogen/Nitrite	NA	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	0.0049	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	0.05	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	0.05	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	400.0	50	160	25	65	20	88	25	92	20	100	25	100	50	130	50	100
Thallium	0.002	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	1,200	10	720	10	730	10	980	10	770	10	780	10	760	10	860	10	800
Vanadium	0.049	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	5.0	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	0.005	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	11.705	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0017	0.002	ND
pH	6.5 - 9.0	NA	7.11	NA	7.53	NA	7.31	NA	6.80	NA	7.07	NA	7.22	NA	6.71	NA	7.07
Temperature	NA	NA	14.52	NA	8.49	NA	15.49	NA	18.49	NA	13.44	NA	4.24	NA	12.83	NA	19.61
Conductivity	NA	NA	1.18	NA	0.90	NA	1.34	NA	1.20	NA	1.34	NA	0.80	NA	1.21	NA	1.33
Dissolved Oxygen	NA	NA	5.54	NA	4.57	NA	6.54	NA	5.60	NA	5.76	NA	6.44	NA	7.00	NA	7.06
ORP	NA	NA	57.6	NA	41.7	NA	36.7	NA	25.8	NA	104.2	NA	99.2	NA	150.9	NA	72.1

Sample: MW-04	Date	11/2/2016		2/6/2017		4/26/2017		2/20/2018		7/31/2018		10/17/2018		2/4/2019		5/7/2019	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.0010	0.0012	0.0010	0.0013	0.0010	0.0011	0.0010	0.0015	0.001	0.0011	0.001	0.001	0.001	0.0012	0.001	0.001
Barium	2.0	0.0025	0.079	0.0025	0.10	0.0025	0.084	0.0025	0.083	0.0025	0.089	0.0025	0.093	0.0025	0.085	0.0025	0.091
Beryllium	0.004	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND^	0.001	ND	0.001	ND
Boron	2.0	0.050	0.32	0.050	0.38	0.050	0.29	0.050	0.46	0.05	0.35	0.05	0.29	0.05	0.44	0.05	0.77
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200.0	10	140	10	200	10	220	10	150	10	250	10	210	10	190	10	310
Chromium	0.1	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1.0	0.0010	0.0029	0.0010	0.0082	0.0010	0.0052	0.0010	0.0083	0.001	0.008	0.001	ND	0.001	0.0046	0.001	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	4.0	0.10	0.46	0.10	0.38	0.10	0.37	0.10	0.46	0.1	0.43	0.1	0.46	0.1	0.46	0.1	0.43
Iron	5.0	0.10	ND	0.10	ND	0.10	ND	0.10	0.16	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0026	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0020	0.002	ND	0.002	0.0021	0.002	0.0022	0.002	ND
Nitrogen/Nitrate	10.0	0.10	1.9	0.10	1.8	0.10	2.4	0.10	1.5	0.1	1.7	0.1	1.4	0.1	1.4	0.1	2.5
Nitrogen/Nitrate, Nitri	NA	0.10	1.9	0.10	1.8	0.20	2.4	0.10	1.5	0.1	1.7	0.1	1.4	0.1	1.4	0.1	2.5
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0076
Silver	0.05	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400.0	25	67	25	76	25	80	50	110	50	110	25	91	25	130	25	150
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	700	10	870	10	750	10	800	10	1000	10	790	10	840	10	980
Vanadium	0.049	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND^	0.005	ND	0.005	ND
Zinc	5.0	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	0.0010	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.0024	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.002	0.01675	0.002	ND	0.002	ND	0.0025	ND	0.0025	0.0082	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.25	NA	7.19	NA	7.46	NA	7.46	NA	7.58	NA	7.20	NA	7.41	NA	7.27
Temperature	NA	NA	15.48	NA	11.95	NA	15.52	NA	12.63	NA	16.54	NA	12.53	NA	11.30	NA	11.60
Conductivity	NA	NA	1.10	NA	1.01	NA	1.08	NA	0.858	NA	1.125	NA	1.086	NA	1.336	NA	2.520
Dissolved Oxygen	NA	NA	3.56	NA	5.06	NA	8.90	NA	7.19	NA	7.54	NA	8.36	NA	6.32	NA	7.10
ORP	NA	NA	71.2	NA	-14.7	NA	-15.3	NA	70.7	NA	96.5	NA	58.0	NA	163.9	NA	-233.6

Sample: MW-04	Date	8/6/2019		11/6/2019		2/17/2020		5/20/2020		7/31/2020		10/22/2020		3/2/2021		5/18/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	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	0.010	0.001	ND	0.001	0.001	0.001	0.0014	0.001	0.0014	0.001	ND	0.001	ND	0.001	0.0012	0.001	ND
Barium	2.0	0.0025	0.08	0.0025	0.082	0.0025	0.085	0.0025	0.085	0.0025	0.082	0.0025	0.09	0.0025	0.099	0.0025	0.12
Beryllium	0.004	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	2.0	0.05	0.26	0.05	0.28	0.05	0.25	0.05	0.25	0.05	0.23	0.05	0.29	0.05	0.33	0.05	0.2
Cadmium	0.005	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	200.0	10	220	10	140	10	160	10	160	10	170	10	190	10	230	40	290
Chromium	0.1	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	1.0	0.001	0.0057	0.001	0.0016	0.001	0.0071	0.001	0.0071	0.001	0.0031	0.001	0.0041	0.001	0.0059	0.001	0.0025
Copper	0.65	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	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	0.0057	0.01	ND	0.005	ND	0.005	ND
Fluoride	4.0	0.1	0.39	0.1	0.42	0.1	0.46	0.1	0.46	0.1	0.47	0.1	0.49	0.1	0.46	0.1	0.42
Iron	5.0	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.14	0.1	ND
Lead	0.0075	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	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0033	0.0025	ND
Mercury	0.002	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	0.1	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.003
Nitrogen/Nitrate	10.0	0.1	2.5	0.1	1.8	0.1	1.6	0.1	1.6	0.1	2.7	0.1	3.4	0.1	1.5	0.1	2.4
Nitrogen/Nitrate, Nitri	NA	0.1	2.5	0.1	1.8	0.1	1.6	0.1	1.6	0.5	2.7	0.5	3.4	0.1	1.5	0.5	ND F1
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	0.02
Perchlorate	0.0049	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	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.003	0.0025	ND
Silver	0.05	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	400.0	25	74	25	53	25	94	25	94	25	75	15	82	25	150	25	190
Thallium	0.002	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	1,200	10	770	10	690	10	710	10	710	30	700	30	760	10	920	10	950
Vanadium	0.049	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	5.0	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	0.005	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	11.705	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	6.5 - 9.0	NA	7.31	NA	7.33	NA	7.26	NA	7.26	NA	7.23	NA	7.15	NA	7.36	NA	7.30
Temperature	NA	NA	12.70	NA	11.72	NA	11.20	NA	11.20	NA	14.20	NA	14.40	NA	11.30	NA	17.50
Conductivity	NA	NA	1.440	NA	1.080	NA	1.016	NA	1.016	NA	1.428	NA	0.292	NA	1.605	NA	1.739
Dissolved Oxygen	NA	NA	52.40	NA	6.65	NA	6.23	NA	6.23	NA	7.32	NA	5.33	NA	6.65	NA	7.47
ORP	NA	NA	182.3	NA	192.0	NA	167.2	NA	167.2	NA	128.4	NA	178.4	NA	-5.8	NA	121.7

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
^ - Denotes instrument related QC exceeds the control 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. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-05	Date	12/7/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012		9/19/2012		12/20/2012		3/5/2013	
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	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	0.0040	0.0030	0.0035	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	0.0011	0.0010	0.0011	0.0010	ND	0.0010	ND	0.0010	0.0011	0.0010	ND	0.0010	ND
Barium	2.0	0.0025	0.061	0.0025	0.092	0.0025	0.053	0.0025	0.053	0.0025	0.062	0.0025	0.069	0.0025	0.056	0.0025	0.071	0.0025	0.078	0.0025	0.076
Beryllium	0.004	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	2.0	0.050	0.42	0.050	0.52	0.050	0.47	0.050	0.57	0.050	0.49	0.050	0.54	0.050	0.44	0.050	0.55^	0.050	0.65	0.050	0.59
Cadmium	0.005	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	0.0016	0.00050	ND	0.00050	0.00091	0.00050	0.00076	0.00050	ND
Chloride	200.0	10	150	10	240	10	220	10	120	10	190	2.0	210	10	220	10	240	10	210	10	230
Chromium	0.1	0.0050	ND	0.0050	ND	0.025	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	0.0040	0.0010	0.006	0.0010	0.0019
Copper	0.65	0.0020	ND	0.0020	ND	0.010	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.019	0.0020	0.017	0.0020	0.0065
Cyanide	0.2	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	4.0	0.10	0.40	0.10	0.34	0.10	0.39	0.10	0.28	0.10	0.34	0.10	0.32	0.10	0.38	0.10	0.39	0.10	0.35	0.10	0.35^
Iron	5.0	0.10	ND	0.10	ND	0.50	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00062	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	0.0065	0.0025	ND	0.013	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0040	0.0025	0.081	0.0025	ND	0.0025	0.0037
Mercury	0.002	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	0.1	0.0020	ND	0.0020	ND	0.010	ND	0.0020	0.0021	0.0020	ND	0.0020	ND	0.0020	0.0025	0.0020	0.0080	0.0020	0.02	0.0020	0.0072
Nitrogen/Nitrate	10.0	0.10	ND	0.10	1.2	0.10	1.3	0.10	1.1	0.10	1.5	0.10	0.33	0.10	1.0	0.10	ND	0.10	0.21	0.10	0.16
Nitrogen/Nitrate, Nitri	NA	0.10	ND	0.10	1.2	0.10	1.3	0.10	1.1	0.10	1.5	0.10	0.33	0.10	1.0	0.10	ND	0.10	0.21	0.10	0.16
Nitrogen/Nitrite	NA	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	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.004	ND	0.0040	ND
Selenium	0.05	0.0025	ND	0.0025	0.0072	0.013	ND	0.0025	ND	0.0025	0.0050	0.0025	ND	0.0025	0.0057	0.0025	ND	0.0025	0.0034	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	25	110	50	160	25	100	50	140	50	140	50	190	25	130	50	210	50	210	50	150
Thallium	0.002	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	1,200	10	750	10	990	10	850	10	800	10	900	10	930	10	1000	10	990	10	1000	10	960
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0050	ND	0.0050	ND
Zinc	5.0	0.020	ND	0.020	ND	0.10	ND	0.020	ND	0.020	ND	0.020	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	0.0005	ND	0.00050	ND
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0025	NS	0.0025	ND
pH	6.5 - 9.0	NA	7.82	NA	7.19	NA	7.44	NA	7.25	NA	7.44	NA	7.30	NA	7.18	NA	7.32	NA	7.36	NA	7.34
Temperature	NA	NA	8.86	NA	13.41	NA	13.37	NA	12.15	NA	11.23	NA	13.52	NA	16.19	NA	14.23	NA	13.64	NA	10.90
Conductivity	NA	NA	1.36	NA	1.65	NA	1.38	NA	0.92	NA	1.02	NA	1.19	NA	1.56	NA	1.29	NA	1.25	NA	1.08
Dissolved Oxygen	NA	NA	NM	NA	6.96	NA	7.16	NA	6.43	NA	6.07	NA	6.24	NA	6.56	NA	3.68	NA	4.27	NA	4.49
ORP	NA	NA	NM	NA	197.8	NA	210.0	NA	-26.0	NA	125.0	NA	228.0	NA	176.0	NA	155.0	NA	112.0	NA	160.5

Sample: MW-05	Date	6/5/2013		7/23/2013		10/15/2013		2/21/2014		5/1/2014		8/19/2014		10/23/2014		2/11/2015		5/27/2015		8/4/2015	
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	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	0.010	0.0010	ND	0.0010	ND	0.0010	0.0010	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND^	0.0010	ND	0.0010	ND	0.0010	ND
Barium	2.0	0.0025	0.060	0.0025	0.050	0.0025	0.056	0.0025	0.091	0.0025	0.078	0.0025	0.054	0.0025	0.057	0.0025	0.078	0.0025	0.053	0.0025	0.060
Beryllium	0.004	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	2.0	0.050	0.69	0.050	0.81	0.050	0.55	0.050	0.34	0.050	0.36	0.050	0.95	0.050	0.57	0.050	0.69	0.050	1.0	0.050	1.1
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.00060	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0014
Chloride	200.0	10	180	10	110	10	140	10	240	10	370	10	120	10	120	10	220	10	250	10	180
Chromium	0.1	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	1.0	0.0010	ND	0.0010	ND	0.0010	0.0014	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	0.0035	0.0010	ND	0.0010	0.0052
Copper	0.65	0.0020	ND	0.0020	0.0020	0.0020	ND	0.0020	ND	0.0020	0.0057	0.0020	ND	0.0020	ND	0.0020	0.013	0.0020	0.0026	0.0020	0.015
Cyanide	0.2	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	4.0	0.10	0.39	0.10	0.38	0.10	0.41	0.10	0.34	0.10	0.32	0.10	0.42	0.10	0.44	0.10	0.42	0.10	0.54	0.10	0.52
Iron	5.0	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
Lead	0.0075	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	0.00074
Manganese	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.035	0.0025	0.0062	0.0025	ND	0.0025	0.0076	0.0025	ND	0.0025	0.012
Mercury	0.002	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	0.1	0.0020	0.0029	0.0020	0.0058	0.0020	0.0030	0.0020	ND	0.0020	0.0033	0.0020	0.0078	0.0020	0.0035	0.0020	0.0092	0.0020	0.0055	0.0020	0.011
Nitrogen/Nitrate	10.0	0.10	1.7	0.10	1.0	0.10	1.0	0.10	1.2	0.10	1.6	0.10	0.53	0.10	1.2	0.10	1.7	0.10	1.5	0.10	0.18
Nitrogen/Nitrate, Nitri	NA	0.10	1.7	0.10	1.0	0.10	1.0	0.10	1.2	0.10	1.7	0.10	0.53	0.10	1.2	0.10	1.7	0.10	1.5	0.10	0.18
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	0.056	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0049	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	0.05	0.0025	0.025	0.0025	0.016	0.0025	0.0026	0.0025	0.0030	0.0025	ND	0.0025	0.017	0.0025	0.0097	0.0025	0.014	0.0025	0.025	0.0025	0.013
Silver	0.05	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	400.0	50	200	50	290	50	180	25	130	25	160	100	360	50	240	50	230	50	290	50	260
Thallium	0.002	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	1,200	10	1,100	10	910	10	680	10	840	10	1100	10	1000	10	730	10	1000	10	1000	10	930
Vanadium	0.049	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	5.0	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	0.005	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	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
pH	6.5 - 9.0	NA	6.92	NA	6.71	NA	7.21	NA	9.09	NA	7.06	NA	6.40	NA	6.94	NA	7.49	NA	7.25	NA	7.31
Temperature	NA	NA	14.95	NA	14.65	NA	14.16	NA	11.17	NA	11.87	NA	16.11	NA	16.69	NA	8.18	NA	18.15	NA	21.19
Conductivity	NA	NA	1.067	NA	1.01	NA	0.93	NA	0.96	NA	1.46	NA	1.18	NA	1.17	NA	1.15	NA	1.49	NA	1.47
Dissolved Oxygen	NA	NA	4.01	NA	3.5	NA	1.17	NA	4.61	NA	1.10	NA	1.65	NA	4.70	NA	4.99	NA	6.73	NA	2.77
ORP	NA	NA	-1.7	NA	82.5	NA	-98.4	NA	-54.7	NA	91.1	NA	88.6	NA	62.0	NA	85.8	NA	92.2	NA	-27.6

Sample: MW-05	Date	10/28/2015		2/10/2016		5/10/2016		8/31/2016		11/2/2016		2/6/2017		4/26/2017		2/20/2018		7/31/2018		10/17/2018	
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	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.0010	ND	0.0010	0.0011	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	0.0012	0.001	ND	0.001	ND
Barium	2.0	0.0025	0.057	0.0025	0.063	0.0025	0.065	0.0025	0.066	0.0025	0.054	0.0025	0.077	0.0025	0.059	0.0025	0.098	0.0025	0.061	0.0025	0.067
Beryllium	0.004	0.0010	ND	0.0010	ND ^	0.0010	ND ^	0.0010	ND ^	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND^
Boron	2.0	0.050	0.57	0.050	0.45	0.050	0.69	0.050	0.98	0.050	0.40	0.050	0.47	0.050	0.62	0.050	0.25	0.05	0.58	0.05	0.31
Cadmium	0.005	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
Chloride	200.0	10	170	10	210	10	230	10	92	10	120	10	180	10	190	10	180	10	120	10	200
Chromium	0.1	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
Cobalt	1.0	0.0010	0.0014	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND
Copper	0.65	0.0020	0.0032	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND	0.002	ND	0.002	ND
Cyanide	0.2	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
Fluoride	4.0	0.10	0.38	0.10	0.42	0.10	0.51	0.10	0.56	0.10	0.36	0.10	0.29	0.10	0.38	0.10	0.33	0.1	0.38	0.1	0.33
Iron	5.0	0.10	ND	0.10	0.28	0.10	ND ^	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.15	0.1	ND	0.1	ND
Lead	0.0075	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
Manganese	0.15	0.0025	0.0046	0.0025	0.0050	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0062	0.0025	ND	0.0025	ND
Mercury	0.002	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	ND	0.0002	ND
Nickel	0.1	0.0020	0.0037	0.0020	0.0027	0.0020	0.0033	0.0020	0.0044	0.0020	ND	0.0020	0.0022	0.0020	0.0025	0.0020	0.0024	0.002	0.0034	0.002	ND
Nitrogen/Nitrate	10.0	0.10	1.0	0.10	1.1	0.10	1.7	0.10	0.86	0.10	1.1	0.10	1.3	0.10	1.6	0.10	2.7	0.1	1.7	0.1	1.3
Nitrogen/Nitrate, Nitri	NA	0.10	1.0	0.10	1.1	0.10	1.7	0.10	0.86	0.10	1.1	0.10	1.3	0.10	1.6	0.20	2.7	0.1	1.7	0.1	1.3
Nitrogen/Nitrite	NA	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
Perchlorate	0.0049	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	0.0030	0.0025	ND	0.013	0.018 ^	0.0025	0.019	0.0025	ND	0.0025	ND	0.0025	0.014	0.0025	ND	0.0025	0.023	0.0025	0.0028
Silver	0.05	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
Sulfate	400.0	50	140	25	110	50	270	50	270	25	95	50	130	50	170	50	150	50	190	25	110
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	760	10	770	10	910	10	850	10	630	10	840	10	760	10	860	10	1000	10	800
Vanadium	0.049	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	0.011	0.0050	ND	0.0050	ND	0.0050	0.0087	0.0050	ND	0.005	0.0077	0.005	ND^
Zinc	5.0	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
Benzene	0.005	0.0005	0.0008	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.00096	0.0005	ND
BETX	11.705	0.002	0.0031	0.002	ND	0.002	0.0009	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.0025	0.0012	0.0025	0.00396	0.0025	ND
pH	6.5 - 9.0	NA	7.12	NA	7.25	NA	6.88	NA	6.81	NA	7.26	NA	7.22	NA	7.28	NA	7.51	NA	7.61	NA	7.29
Temperature	NA	NA	14.30	NA	8.60	NA	14.22	NA	21.67	NA	17.16	NA	12.75	NA	17.02	NA	13.35	NA	18.49	NA	14.72
Conductivity	NA	NA	1.31	NA	0.84	NA	1.24	NA	1.27	NA	0.99	NA	0.93	NA	1.06	NA	0.835	NA	1.122	NA	1.050
Dissolved Oxygen	NA	NA	2.29	NA	4.11	NA	5.76	NA	4.62	NA	4.45	NA	6.15	NA	6.18	NA	6.74	NA	5.67	NA	7.68
ORP	NA	NA	107.2	NA	123.3	NA	78.3	NA	61.6	NA	73.3	NA	11.9	NA	34.0	NA	59.1	NA	77.8	NA	42.1

Sample: MW-05	Date	2/5/2019		5/6/2019		8/6/2019		11/7/2019		2/13/2020		5/20/2020		7/31/2020		10/22/2020		2/25/2021		5/17/2021	
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	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	0.010	0.001	ND	0.001	ND	0.001	ND	0.001	0.0033	0.001	ND	0.001	0.0011	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	2.0	0.0025	0.076	0.0025	0.094	0.0025	0.062	0.0025	0.062	0.0025	0.072	0.0025	0.074	0.0025	0.054	0.0025	0.07	0.0025	0.091	0.0025	0.098
Beryllium	0.004	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
Boron	2.0	0.05	0.28	0.05	0.34	0.05	0.5	0.05	0.32	0.05	0.43	0.05	0.29	0.05	0.47	0.05	0.47	0.05	0.29	0.05	0.32
Cadmium	0.005	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	200.0	10	180	10	470	10	120	10	130	10	170	10	280	10	180	10	180	10	220	40	410
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	0.0053	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1.0	0.001	ND	0.001	ND	0.001	ND	0.001	0.0015	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	0.0063	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	ND	0.01	ND	0.005	ND	0.005	ND
Fluoride	4.0	0.1	0.33	0.1	0.31	0.1	0.31	0.1	0.31	0.1	0.36	0.1	0.37	0.1	0.38	0.1	0.38	0.1	0.34	0.1	0.31
Iron	5.0	0.1	ND	0.1	ND	0.1	ND	0.1	4.1	0.1	ND	0.1	0.11	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.0033	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.14	0.0025	ND	0.0025	0.0025	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	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	0.1	0.002	ND	0.002	ND	0.002	0.0024	0.002	0.0072	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	10.0	0.1	0.92	0.1	1.8	0.1	1.3	0.1	1.2	0.1	1.2	0.1	1.4	0.1	1.3	0.1	0.99	0.1	0.99	0.1	1.7
Nitrogen/Nitrate, Nitri	NA	0.1	0.92	0.1	1.8	0.1	1.3	0.1	1.2	0.1	1.2	0.1	1.4	0.1	1.3	0.1	0.99	0.1	0.99	0.1	1.7
Nitrogen/Nitrite	NA	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	0.0049	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	0.05	0.0025	ND	0.0025	ND	0.0025	0.011	0.0025	ND	0.0025	0.0025	0.0025	0.0048	0.0025	0.0029	0.0025	0.0032	0.0025	ND	0.0025	ND
Silver	0.05	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	400.0	25	110	25	90	25	180	25	68	25	ND	25	190	25	79	15	84	25	140	25	160
Thallium	0.002	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	1,200	10	720	10	1,400	10	770	10	630	10	700	10	920	30	680	30	690	10	880	10	1200
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	0.012	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5.0	0.02	ND	0.02	ND	0.02	ND	0.02	0.027	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	0.0007	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	11.705	0.0025	ND	0.0025	0.0007	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	6.5 - 9.0	NA	7.40	NA	7.11	NA	7.03	NA	7.44	NA	7.02	NA	7.03	NA	7.28	NA	7.16	NA	7.31	NA	7
Temperature	NA	NA	10.70	NA	13	NA	14.2	NA	10.34	NA	13.2	NA	12.8	NA	13.7	NA	14.5	NA	12.1	NA	13.2
Conductivity	NA	NA	1.116	NA	2.95	NA	1.28	NA	10.56	NA	1.058	NA	1.534	NA	1.381	NA	0.278	NA	1.505	NA	2.084
Dissolved Oxygen	NA	NA	5.97	NA	4.48	NA	3.53	NA	7.84	NA	6.2	NA	6.85	NA	5.7	NA	4.34	NA	4.63	NA	3.93
ORP	NA	NA	150.3	NA	-281.1	NA	170.6	NA	-11.9	NA	136.4	NA	142.8	NA	119.9	NA	161.3	NA	11.4	NA	161.6

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
^ - Denotes instrument related QC exceeds the control 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. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-06	Date	12/7/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012		9/19/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	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	0.010	0.0010	ND	0.0010	0.0015	0.0050	ND	0.0010	ND	0.0010	0.0018	0.0010	0.0016	0.0010	0.0014	0.0010	0.0015
Barium	2.0	0.0025	0.075	0.0025	0.12	0.0025	0.082	0.0025	0.094	0.0025	0.11	0.0025	0.13	0.0025	0.11	0.0025	0.14
Beryllium	0.004	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	2.0	0.050	0.32	0.050	0.44	0.050	0.32	0.050	0.27	0.050	0.30	0.050	0.25	0.050	0.26	0.050	0.25^
Cadmium	0.005	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	200.0	10	130	10	270	10	140	10	140	10	130	2.0	240	10	210	10	190
Chromium	0.1	0.0050	ND	0.0050	ND	0.025	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	0.0019	0.0050	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.010	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	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	4.0	0.10	0.40	0.10	0.36	0.10	0.44	0.10	0.29	0.10	0.44	0.10	0.36	0.10	0.36	0.10	0.36
Iron	5.0	0.10	ND	0.10	ND	0.50	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0075	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	0.15	0.0025	0.14	0.0025	0.033	0.013	ND	0.0025	0.036	0.0025	0.024	0.0025	0.015	0.0025	0.0080	0.0025	0.0087
Mercury	0.002	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	0.1	0.0020	0.0056	0.0020	0.0025	0.010	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	10.0	0.10	ND	0.10	1.3	0.10	0.91	0.10	0.31	0.10	0.36	0.10	ND	0.10	0.65	0.10	0.55
Nitrogen/Nitrate, Nitri	NA	0.10	ND^	0.10	1.3	0.10	0.91	0.10	0.31	0.10	0.36	0.10	ND	0.10	0.65	0.10	0.55
Nitrogen/Nitrite	NA	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	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.05	0.0025	0.0029	0.0025	0.0034	0.013	ND	0.0025	ND	0.0025	0.0054	0.0025	0.0051	0.0025	0.0069	0.0025	0.0073
Silver	0.05	0.00050	ND	0.00050	0.00077	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	50	140	50	140	25	87	25	100	50	130	50	110	25	91	25	85
Thallium	0.002	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	1,200	10	650	10	1000	10	650	10	620	10	710	10	800	10	860	10	760
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	0.020	ND	0.020	ND	0.10	ND	0.020	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
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	8.04	NA	7.51	NA	7.71	NA	7.53	NA	7.71	NA	7.57	NA	7.42	NA	7.46
Temperature	NA	NA	8.53	NA	12.90	NA	14.26	NA	12.73	NA	13.70	NA	14.45	NA	19.31	NA	14.51
Conductivity	NA	NA	1.20	NA	1.65	NA	1.05	NA	0.77	NA	0.87	NA	1.06	NA	1.23	NA	1.02
Dissolved Oxygen	NA	NA	NM	NA	7.44	NA	6.82	NA	6.74	NA	7.05	NA	7.47	NA	7.21	NA	6.27
ORP	NA	NA	NM	NA	183.7	NA	203.8	NA	-65.0	NA	113.0	NA	210.0	NA	153.0	NA	162.0

Sample: MW-06	Date	12/20/2012		3/5/2013		5/22/2013		7/23/2013		10/16/2013		2/21/2014		5/2/2014		8/19/2014	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	0.0045	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	0.0014	0.0010	0.0018	0.0010	0.0018	0.0010	0.0017	0.0010	0.0016	0.0010	0.0015	0.0010	0.0019	0.0010	0.0013
Barium	2.0	0.0025	0.12	0.0025	0.12	0.0025	0.097	0.0025	0.096	0.0025	0.11	0.0025	0.17	0.0025	0.15	0.0025	0.098
Beryllium	0.004	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	2.0	0.050	0.31	0.050	0.33	0.050	0.23	0.050	0.23	0.050	0.22	0.050	0.26	0.050	0.17	0.050	0.26
Cadmium	0.005	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	200.0	10	150	10	160	10	170	10	120	10	120	10	370	50	340	10	120
Chromium	0.1	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	1.0	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	0.0017
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0025	0.0020	ND	0.0020	ND	0.0020	0.0056
Cyanide	0.2	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	4.0	0.10	0.38	0.10	0.40^	0.10	0.43	0.10	0.37	0.10	0.35	0.10	0.34	0.10	0.33	0.10	0.38
Iron	5.0	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	0.0075	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	0.15	0.0025	0.0076	0.0025	0.0047	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	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	0.1	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0021	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0021
Nitrogen/Nitrate	10.0	0.10	0.47	0.10	1.0	0.10	1.7	0.10	0.46	0.10	0.49	0.10	1.7	0.10	1.3	0.10	0.51
Nitrogen/Nitrate, Nitri	NA	0.10	0.47	0.10	1.0	0.10	1.7	0.10	0.46	0.10	0.49	0.10	1.7	0.10	1.3	0.10	0.51
Nitrogen/Nitrite	NA	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	0.0049	0.004	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.05	0.0025	0.0059	0.0025	0.013	0.0025	0.0032	0.0025	0.0027	0.0025	0.0035	0.0025	0.0034	0.0025	0.0034	0.0025	0.0031
Silver	0.05	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	400.0	25	120	25	120	25	96	25	110	25	150	25	100	20	120	25	91
Thallium	0.002	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	1,200	10	710	10	690	10	690	10	350	10	570	10	930	10	990	10	600
Vanadium	0.049	0.0050	0.0052	0.0050	0.0050	0.0050	0.0056	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	0.0059	0.0050	ND
Zinc	5.0	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	0.005	0.0005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	NS	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.002	ND	0.002	ND
pH	6.5 - 9.0	NA	7.66	NA	8.05	NA	7.35	NA	7.42	NA	7.31	NA	9.52	NA	7.42	NA	7.29
Temperature	NA	NA	13.45	NA	12.20	NA	14.48	NA	15.22	NA	13.50	NA	7.33	NA	11.12	NA	18.67
Conductivity	NA	NA	0.93	NA	0.94	NA	0.855	NA	0.76	NA	0.80	NA	0.96	NA	1.37	NA	0.94
Dissolved Oxygen	NA	NA	7.20	NA	8.70	NA	4.77	NA	2.44	NA	3.73	NA	4.78	NA	6.82	NA	3.99
ORP	NA	NA	125.0	NA	186.4	NA	18.1	NA	22.7	NA	-86.3	NA	-81.0	NA	137.8	NA	60.1

Sample: MW-06	Date	10/23/2014		2/10/2015		5/28/2015		8/5/2015		10/27/2015		2/11/2016		5/12/2016		9/1/2016	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	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	0.010	0.0010	0.0010	0.0010	0.0016	0.0010	0.0017	0.0010	0.0016	0.0010	ND	0.0010	0.0016	0.0050	ND ^	0.0010	0.0012
Barium	2.0	0.0025	0.12	0.0025	0.14	0.0025	0.14	0.0025	0.11	0.0025	0.12	0.0025	0.14	0.0025	0.14	0.0025	0.096
Beryllium	0.004	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	2.0	0.050	0.19	0.050	0.22	0.050	0.19	0.050	0.21	0.050	0.22	0.050	0.17	0.050	0.19	0.050	0.28
Cadmium	0.005	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	200.0	10	100	10	150	10	270	10	140	10	130	10	230	10	250	10	79
Chromium	0.1	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	1.0	0.0010	ND	0.0010	0.0010	0.0010	0.0015	0.0010	0.0011	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	0.0021	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	0.054	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	4.0	0.10	0.34	0.10	0.36	0.10	0.35	0.10	0.39	0.10	0.32	0.10	0.34	0.10	0.38	0.10	0.34
Iron	5.0	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.50	ND	0.10	ND
Lead	0.0075	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	0.15	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	0.002	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	0.1	0.0020	0.0022	0.0020	0.0027	0.0020	0.0034	0.0020	0.0023	0.0020	0.0026	0.0020	ND	0.0020	0.0032	0.0020	0.0027
Nitrogen/Nitrate	10.0	0.10	0.64	0.10	1.3	0.10	1.2	0.10	0.35	0.10	0.47	0.10	1.6	0.10	1.5	0.10	0.43
Nitrogen/Nitrate, Nitri	NA	0.10	0.64	0.10	1.3	0.10	1.2	0.10	0.35	0.10	0.47	0.10	1.6	0.10	1.5	0.10	0.43
Nitrogen/Nitrite	NA	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	0.0049	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	0.05	0.0025	0.0039	0.0025	0.0045	0.0025	0.0036	0.0025	ND	0.0025	0.0035	0.0025	0.0027	0.0025	0.0030 ^	0.0025	0.0037
Silver	0.05	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND F1	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	25	140	50	140	25	94	50	110	25	120	50	140	50	160	50	97
Thallium	0.002	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	1,200	10	530	10	710	10	870	10	680	10	650	10	820	10	880	10	530
Vanadium	0.049	0.0050	0.0057	0.0050	0.0063	0.0050	0.0060	0.0050	0.0063	0.0050	ND	0.0050	0.0065	0.0050	ND	0.0050	0.0054
Zinc	5.0	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	0.005	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	11.705	0.002	ND	0.002	ND	0.002	0.00073	0.002	ND	0.002	ND	0.002	ND	0.002	0.0029	0.002	ND
pH	6.5 - 9.0	NA	7.29	NA	7.78	NA	7.60	NA	7.79	NA	7.02	NA	7.30	NA	7.31	NA	7.36
Temperature	NA	NA	13.92	NA	9.51	NA	16.30	NA	18.55	NA	14.11	NA	9.02	NA	13.65	NA	18.41
Conductivity	NA	NA	0.88	NA	0.86	NA	1.19	NA	1.11	NA	1.12	NA	0.89	NA	1.16	NA	0.94
Dissolved Oxygen	NA	NA	4.44	NA	7.08	NA	6.80	NA	5.23	NA	5.42	NA	6.28	NA	5.88	NA	5.35
ORP	NA	NA	60.8	NA	88.5	NA	120.7	NA	-16.5	NA	164.8	NA	114.3	NA	50.1	NA	53.4

Sample: MW-06	Date	11/3/2016		2/7/2017		4/27/2017		2/21/2018		7/31/2018		10/18/2018		2/5/2019		5/6/2019	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.0010	0.0012	0.0010	0.0014	0.0010	0.0012	0.0010	0.0012	0.001	0.0012	0.001	0.001	0.001	0.0011	0.001	0.0014
Barium	2.0	0.0025	0.12	0.0025	0.16	0.0025	0.10	0.0025	0.16	0.0025	0.1	0.0025	0.13	0.0025	0.12	0.0025	0.15
Beryllium	0.004	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND^	0.001	ND	0.001	ND
Boron	2.0	0.050	0.25	0.050	0.22	0.050	0.15	0.050	0.20	0.05	0.21	0.05	0.22	0.05	0.24	0.05	0.3
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200.0	10	85	10	200	10	150	50	500	10	140	10	150	10	170 F1	10	420
Chromium	0.1	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	4.0	0.10	0.32	0.10	0.27	0.10	0.28	0.10	0.32	0.1	0.31	0.1	0.34	0.1	0.33	0.1	0.34
Iron	5.0	0.10	ND	0.10	0.15	0.10	ND	0.10	0.27	0.1	ND	0.1	ND	0.1	ND	0.1	0.26
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	0.0068	0.0025	ND	0.0025	0.0048	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.017
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0020	0.002	ND	0.002	ND	0.002	ND	0.002	0.0024
Nitrogen/Nitrate	10.0	0.10	0.31	0.10	0.99	0.10	1.1	0.10	7.2	0.1	0.43	0.1	0.34	0.1	2.2	0.1	1.7
Nitrogen/Nitrate, Nitri	NA	0.10	0.31	0.10	0.99	0.10	1.1	0.50	7.2	0.1	0.43	0.1	0.34	0.1	2.2	0.1	1.7
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	0.0042	0.0025	0.0026	0.0025	ND	0.0025	ND	0.0025	0.0034	0.0025	0.0026	0.0025	0.026
Silver	0.05	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400.0	25	97	50	130	25	83	50	160	25	76	20	89	20	130	20	110
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	590	10	840	10	590	10	1400	10	620	10	640	10	720	10	1,200
Vanadium	0.049	0.0050	0.0066	0.0050	0.0060	0.0050	0.0054	0.0050	ND	0.005	ND	0.005	ND^	0.005	ND	0.005	ND
Zinc	5.0	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	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	11.705	0.002	0.0027	0.002	ND	0.002	ND	0.0025	0.0015	0.0025	0.0023	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.36	NA	6.84	NA	7.65	NA	7.65	NA	7.54	NA	7.63	NA	7.62	NA	7.42
Temperature	NA	NA	15.80	NA	11.16	NA	11.48	NA	7.63	NA	19.68	NA	12.51	NA	13.1	NA	11.7
Conductivity	NA	NA	0.78	NA	0.92	NA	0.83	NA	0.891	NA	1.265	NA	0.825	NA	1159	NA	2.83
Dissolved Oxygen	NA	NA	4.09	NA	6.71	NA	8.59	NA	8.85	NA	7.19	NA	10.56	NA	5.93	NA	5.82
ORP	NA	NA	22.7	NA	201.6	NA	-16.1	NA	38.6	NA	71.6	NA	2.2	NA	112.0	NA	-265.1

Sample: MW-06	Date	8/7/2019		11/7/2019		2/13/2020		5/21/2020		7/31/2020		10/22/2020		2/25/2021		5/17/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	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	0.010	0.001	ND	0.001	0.0011	0.001	0.0014	0.001	0.0017	0.001	0.001	0.001	ND	0.001	0.001	0.001	ND
Barium	2.0	0.0025	0.11	0.0025	0.13	0.0025	0.14	0.0025	0.14	0.0025	0.13	0.0025	0.13	0.0025	0.16	0.0025	0.2
Beryllium	0.004	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	2.0	0.05	0.21	0.05	0.24	0.05	0.2	0.05	0.49	0.05	0.18	0.05	0.23	0.05	0.26	0.05	0.17
Cadmium	0.005	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	200.0	10	130	10	99	10	150	10	180	10	160	10	160	10	240	40	410
Chromium	0.1	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	1.0	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	0.65	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	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	0.0051	0.01	ND	0.005	ND	0.005	ND
Fluoride	4.0	0.1	0.26	0.1	0.3	0.1	0.37	0.1	0.37	0.1	0.32	0.1	0.31	0.1	0.36	0.1	0.3
Iron	5.0	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	0.0075	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	0.15	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	0.002	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	0.1	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	10.0	0.1	0.47	0.1	0.61	0.1	0.75	0.1	1.9	0.1	0.66	0.1	0.56	0.1	1.5	0.1	1.7
Nitrogen/Nitrate, Nitri	NA	0.1	0.47	0.1	0.61	0.1	0.75	0.1	1.9	0.1	0.66	0.1	0.56	0.1	1.5	0.1	1.7
Nitrogen/Nitrite	NA	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	0.0049	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	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.053	0.0025	ND	0.0025	ND	0.0025	0.0025	0.0025	0.0036
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND F1	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400.0	20	7.8	20	78	20	130	20	160	25	110	15	83	25	160	25	130
Thallium	0.002	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	1,200	10	620	10	620	10	710	10	830	30	650	30	640	10	930	10	1200
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	0.0056	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5.0	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	0.005	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	11.705	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	6.5 - 9.0	NA	7.39	NA	7.27	NA	7.42	NA	7.06	NA	7.44	NA	6.95	NA	7.52	NA	7.35
Temperature	NA	NA	12.8	NA	13.84	NA	13.2	NA	12.5	NA	13.2	NA	17.1	NA	12.7	NA	12.2
Conductivity	NA	NA	1.06	NA	9.34	NA	0.983	NA	1.141	NA	1.306	NA	1.2	NA	1.539	NA	2.003
Dissolved Oxygen	NA	NA	51.00	NA	9.01	NA	7.71	NA	7.98	NA	7.06	NA	3.67	NA	6.47	NA	6.93
ORP	NA	NA	187.4	NA	-11.6	NA	157.2	NA	224.6	NA	152.0	NA	157.4	NA	3.0	NA	161.0

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
^ - Denotes instrument related QC exceeds the control 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. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-07	Date	12/7/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	0.0010	0.0010	ND	0.0050	ND	0.0010	ND	0.0010	0.0014	0.0010	0.0010	0.0010	ND
Barium	2.0	0.0025	0.13	0.0025	0.11	0.0025	0.072	0.0025	0.092	0.0025	0.11	0.0025	0.13	0.0025	0.092
Beryllium	0.004	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	2.0	0.050	0.51	0.050	0.39	0.050	0.25	0.050	0.29	0.050	0.35	0.050	0.30	0.050	0.25
Cadmium	0.005	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	50	430	10	320	10	140	10	99	10	140	2.0	300	10	170
Chromium	0.1	0.0050	ND	0.0050	ND	0.025	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	0.011	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.010	ND	0.0020	0.0025	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	4.0	0.10	0.36	0.10	0.31	0.10	0.35	0.10	0.27	0.10	0.35	0.10	0.31	0.10	0.37
Iron	5.0	0.10	ND	0.10	ND	0.50	ND	0.10	3.8	0.10	ND	0.10	ND	0.10	0.13
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	0.29	0.0025	0.014	0.013	ND	0.0025	0.080	0.0025	0.0073	0.0025	0.015	0.0025	0.069
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.1	0.0020	0.0045	0.0020	ND	0.010	ND	0.0020	0.014	0.0020	ND	0.0020	ND	0.0020	0.0032
Nitrogen/Nitrate	10.0	0.10	ND	0.10	1.2	0.10	0.76	0.10	0.27	0.10	0.60	0.10	ND	0.10	0.65
Nitrogen/Nitrate, Nitri	NA	0.10	ND^	0.10	1.2	0.10	0.76	0.10	0.27	0.10	0.60	0.10	ND	0.10	0.65
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	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
Selenium	0.05	0.0025	ND	0.0025	ND	0.013	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	50	250	50	120	25	85	25	110	50	160	50	140	50	190
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	1,200	10	1200	10	970	10	580	10	650	10	780	10	870	10	760
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	0.020	ND	0.020	ND	0.10	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
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	8.08	NA	7.50	NA	7.61	NA	7.65	NA	7.63	NA	7.53	NA	7.59
Temperature	NA	NA	9.72	NA	13.58	NA	12.92	NA	12.50	NA	13.07	NA	15.40	NA	16.33
Conductivity	NA	NA	2.12	NA	1.78	NA	1.02	NA	0.78	NA	0.89	NA	1.18	NA	0.99
Dissolved Oxygen	NA	NA	NM	NA	7.02	NA	8.10	NA	7.70	NA	6.74	NA	7.23	NA	7.29
ORP	NA	NA	NM	NA	183.2	NA	202.8	NA	-82.0	NA	113.0	NA	175.0	NA	148.0

Sample: MW-07	Date	9/19/2012		12/20/2012		3/5/2013		5/22/2013		7/23/2013		10/16/2013		2/21/2014	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	0.0013	0.0010	ND	0.0010	0.0011	0.0010	0.0015	0.0010	0.0011	0.0010	0.0013	0.0010	ND
Barium	2.0	0.0025	0.12	0.0025	0.11	0.0025	0.12	0.0025	0.11	0.0025	0.082	0.0025	0.13	0.0025	0.15
Beryllium	0.004	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^
Boron	2.0	0.050	0.31^	0.050	0.41	0.050	0.39	0.050	0.21	0.050	0.21	0.050	0.24	0.050	0.30
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	170	10	140	10	190	10	170	10	95	10	130	50	470
Chromium	0.1	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	4.0	0.10	0.32	0.10	0.31	0.10	0.30^	0.10	0.38	0.10	0.37	0.10	0.32	0.10	0.31
Iron	5.0	0.10	ND	0.10	ND	0.10	ND	0.10	0.41	0.10	ND	0.10	ND	0.10	ND
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	0.0041	0.0025	0.0063	0.0025	0.0044	0.0025	0.012	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.1	0.0020	ND	0.0020	0.0024	0.0020	0.0024	0.0020	0.0020	0.0020	ND	0.0020	0.0021	0.0020	ND
Nitrogen/Nitrate	10.0	0.10	0.61	0.10	0.73	0.10	1.4	0.10	1.7	0.10	0.34	0.10	0.65	0.10	ND
Nitrogen/Nitrate, Nitri	NA	0.10	0.61	0.10	0.73	0.10	1.4	0.10	1.7	0.10	0.34	0.10	0.65	0.50	ND
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0049	NR	NR	0.004	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.05	0.0025	ND	0.0025	0.0031	0.0025	0.0041	0.0025	0.0026	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	50	130	25	90	25	150	50	150	25	74	50	190	25	170
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	1,200	10	760	10	760	10	720	10	740	10	540	10	650	10	1200
Vanadium	0.049	NR	NR	0.0050	0.0051	0.0050	ND	0.0050	0.0053	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	5.0	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.005	NR	NR	0.0005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	11.705	NR	NR	0.0025	NS	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.45	NA	7.52	NA	7.99	NA	7.34	NA	7.42	NA	7.33	NA	9.34
Temperature	NA	NA	13.97	NA	12.88	NA	12.30	NA	14.15	NA	15.44	NA	13.06	NA	8.38
Conductivity	NA	NA	1.00	NA	0.91	NA	0.99	NA	0.818	NA	0.72	NA	0.89	NA	1.21
Dissolved Oxygen	NA	NA	7.16	NA	8.51	NA	8.38	NA	4.29	NA	3.52	NA	2.52	NA	6.39
ORP	NA	NA	199.0	NA	152.0	NA	154.3	NA	17.0	NA	23.7	NA	-81.7	NA	-99.0

Sample: MW-07	Date	5/2/2014		8/19/2014		10/23/2014		2/10/2015		5/28/2015		8/5/2015		10/27/2015	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	0.0014	0.0010	ND	0.0010	ND^	0.0010	ND	0.0010	0.0013	0.0010	0.0013	0.0010	ND
Barium	2.0	0.0025	0.12	0.0025	0.091	0.0025	0.11	0.0025	0.18	0.0025	0.12	0.0025	0.10	0.0025	0.11
Beryllium	0.004	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	2.0	0.050	0.15	0.050	0.22	0.050	0.17	0.050	0.21	0.050	0.16	0.050	0.20	0.050	0.19
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0041	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	350	10	110	10	98	10	210	10	260	10	130	10	110
Chromium	0.1	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	0.0090	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	0.0047	0.0020	0.0020	0.0020	0.096	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	4.0	0.10	0.32	0.10	0.35	0.10	0.36	0.10	0.30	0.10	0.32	0.10	0.35	0.10	0.32
Iron	5.0	0.10	ND	0.10	ND	0.10	0.13	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0072	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	ND	0.0025	0.0033	0.0025	0.0091	0.0025	0.0048	0.0025	0.0026	0.0025	ND	0.0025	0.0041
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND *	0.00020	ND
Nickel	0.1	0.0020	ND	0.0020	0.0022	0.0020	0.0027	0.0020	0.016	0.0020	0.0034	0.0020	ND	0.0020	0.0020
Nitrogen/Nitrate	10.0	0.10	1.3	0.10	0.46	0.10	0.56	0.10	0.19	0.10	1.1	0.10	0.37	0.10	0.51
Nitrogen/Nitrate, Nitri	NA	0.10	1.3	0.10	0.46	0.10	0.56	0.10	0.33	0.10	1.1	0.10	0.37	0.10	0.51
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	0.020	0.14	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0049	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.05	0.0025	0.0026	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	20	110	25	82	25	120	50	260	25	80	25	99	50	110
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	1,200	10	860	10	570	10	520	10	1000	10	860	10	640	10	620
Vanadium	0.049	0.0050	0.0051	0.0050	ND	0.0050	ND	0.0050	0.0052	0.0050	ND	0.0050	0.0051	0.0050	ND
Zinc	5.0	0.020	ND	0.020	ND	0.020	ND	0.020	0.036	0.020	ND	0.020	ND	0.020	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
pH	6.5 - 9.0	NA	7.35	NA	6.99	NA	7.28	NA	7.52	NA	7.52	NA	7.75	NA	7.21
Temperature	NA	NA	11.45	NA	17.46	NA	16.49	NA	10.95	NA	17.16	NA	21.99	NA	14.87
Conductivity	NA	NA	1.30	NA	0.90	NA	0.91	NA	1.18	NA	1.30	NA	1.06	NA	1.04
Dissolved Oxygen	NA	NA	5.51	NA	3.47	NA	3.32	NA	1.15	NA	4.82	NA	1.80	NA	3.74
ORP	NA	NA	141.5	NA	55.0	NA	61.8	NA	78.4	NA	128.5	NA	-41.0	NA	147.0

Sample: MW-07	Date	2/11/2016		5/12/2016		9/1/2016		11/3/2016		2/7/2017		4/27/2017		2/21/2018	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	0.0017	0.0050	ND ^	0.0010	ND	0.0010	0.0011	0.0010	0.0010	0.0010	ND	0.0010	0.0014
Barium	2.0	0.0025	0.15	0.0025	0.12	0.0025	0.084	0.0025	0.11	0.0025	0.15	0.0025	0.096	0.0025	0.17
Beryllium	0.004	0.0010	ND ^	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND
Boron	2.0	0.050	0.16	0.050	0.20	0.050	0.23	0.050	0.23	0.050	0.19	0.050	0.13	0.050	0.24
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	240	10	240	10	77	10	84	10	240	10	160	10	350
Chromium	0.1	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	4.0	0.10	0.33	0.10	0.35	0.10	0.32	0.10	0.31	0.10	0.25	0.10	0.28	0.10	0.28
Iron	5.0	0.10	0.85	0.50	ND	0.10	ND	0.10	0.25	0.10	0.15	0.10	0.40	0.10	0.63
Lead	0.0075	0.00050	0.00057	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	0.018	0.0025	0.010	0.0025	0.0025	0.0025	0.0093	0.0025	0.0075	0.0025	0.011	0.0025	0.014
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.1	0.0020	0.0030	0.0020	0.0036	0.0020	ND	0.0020	0.0022	0.0020	ND	0.0020	ND	0.0020	0.0033
Nitrogen/Nitrate	10.0	0.10	1.7	0.10	1.4	0.10	0.36	0.10	0.33	0.10	1.2	0.10	1.0	0.10	7.3
Nitrogen/Nitrate, Nitri	NA	0.10	1.7	0.10	1.4	0.10	0.36	0.10	0.33	0.10	1.2	0.10	1.0	0.50	7.3
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0049	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND ^	0.0040	ND
Selenium	0.05	0.0025	ND	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0031
Silver	0.05	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	50	140	50	180	25	75	25	100	25	85	25	74	50	280
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	1,200	10	860	10	860	10	510	10	570	10	840	10	590	10	1300
Vanadium	0.049	0.0050	0.0077	0.0050	ND	0.0050	ND	0.0050	0.0051	0.0050	ND	0.0050	0.0050	0.0050	0.0066
Zinc	5.0	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.0018	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.002	ND	0.002	0.0039	0.002	ND	0.002	0.0575	0.002	ND	0.002	ND	0.0025	0.00097
pH	6.5 - 9.0	NA	7.35	NA	7.27	NA	6.96	NA	7.55	NA	7.31	NA	7.70	NA	7.62
Temperature	NA	NA	5.97	NA	13.22	NA	18.40	NA	17.87	NA	12.53	NA	11.28	NA	7.25
Conductivity	NA	NA	0.86	NA	1.12	NA	0.86	NA	0.78	NA	0.98	NA	0.79	NA	0.929
Dissolved Oxygen	NA	NA	6.33	NA	5.75	NA	4.17	NA	4.97	NA	5.01	NA	6.40	NA	8.16
ORP	NA	NA	129.1	NA	74.0	NA	102.1	NA	24.2	NA	153.9	NA	-10.4	NA	48.5

Sample: MW-07	Date	8/1/2018		10/18/2018		2/5/2019		5/6/2019		8/6/2019		11/7/2019		2/13/2020	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.0011
Barium	2.0	0.0025	0.093	0.0025	0.12	0.0025	0.13	0.0025	0.1	0.0025	0.11	0.0025	0.11	0.0025	0.14
Beryllium	0.004	0.001	ND	0.001	ND^	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	0.05	0.18	0.05	0.25	0.05	0.19	0.05	0.24	0.05	0.23	0.05	0.19	0.05	0.23
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200.0	10	130	10	140	10	180	10	400 F1	10	130	10	87	10	190
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1.0	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	4.0	0.1	0.29	0.1	0.26	0.1	0.26	0.1	0.3	0.1	0.24	0.1	0.26	0.1	0.3
Iron	5.0	0.1	ND	0.1	0.58	0.1	0.45	0.1	0.2	0.1	0.16	0.1	ND	0.1	0.13
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	0.0005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	0.0026	0.0025	0.015	0.0025	0.017	0.0025	0.0068	0.0025	0.0063	0.0025	ND	0.0025	0.004
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	0.0021	0.002	0.0022	0.002	0.0022	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	10.0	0.1	0.29	0.1	0.29	0.1	0.85	0.1	1.6	0.1	0.23	0.1	0.68	0.1	0.88
Nitrogen/Nitrate, Nitri	NA	0.1	0.29	0.1	0.29	0.1	0.85	0.1	1.6	0.1	0.23	0.1	0.68	0.1	0.88
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0048	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400.0	20	64	20	90	20	87	20	97	20	48	20	83	20	96
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	580	10	680	10	670	10	1,300	10	590	10	540	10	710
Vanadium	0.049	0.005	ND	0.005	ND^	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5.0	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	0.0018	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.47	NA	7.51	NA	7.48	NA	7.36	NA	7.31	NA	7.55	NA	7.27
Temperature	NA	NA	21.38	NA	12.69	NA	12.70	NA	12.10	NA	12.40	NA	13.75	NA	12.80
Conductivity	NA	NA	1.143	NA	0.784	NA	1.129	NA	2.720	NA	1.020	NA	8.950	NA	1.052
Dissolved Oxygen	NA	NA	3.97	NA	9.73	NA	2.96	NA	6.71	NA	27.40	NA	5.54	NA	7.22
ORP	NA	NA	92.9	NA	6.0	NA	113.5	NA	-281.3	NA	189.6	NA	-22.6	NA	158.8

Sample: MW-07	Date	5/21/2020		7/31/2020		10/22/2020		2/25/2021		5/17/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	2.0	0.0025	0.095	0.0025	0.11	0.0025	0.13	0.0025	0.17	0.0025	0.17
Beryllium	0.004	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND ^	0.001	ND
Boron	2.0	0.05	0.38	0.05	0.19	0.05	0.34	0.05	0.22	0.05	0.16
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200.0	10	190	10	210	10	150	40	310	40	440
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1.0	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.005	ND	0.01	ND	0.005	ND	0.005	ND
Fluoride	4.0	0.1	0.33	0.1	0.29	0.1	0.28	0.1	0.25	0.1	0.26
Iron	5.0	0.1	ND	0.1	ND	0.1	ND	0.1	0.15	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	0.0041	0.0025	ND	0.0025	0.0061	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	10.0	0.1	1.4	0.1	0.54	0.1	0.93	0.1	1.1	0.1	1.6
Nitrogen/Nitrate, Nitri	NA	0.1	1.4	0.1	0.54	0.1	0.93	0.1	1.1	0.1	1.6
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	0.0038	0.0025	ND	0.0025	0.0025	0.0025	ND	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400.0	20	140	25	85	15	97	25	130	25	120
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	750	30	630	30	680	10	1000	10	1300
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5.0	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.09	NA	7.23	NA	7.06	NA	7.25	NA	7.18
Temperature	NA	NA	12.00	NA	13.10	NA	14.50	NA	12.00	NA	12.30
Conductivity	NA	NA	1.100	NA	1.327	NA	1.230	NA	1.692	NA	2.101
Dissolved Oxygen	NA	NA	6.48	NA	4.62	NA	3.98	NA	3.76	NA	4.93
ORP	NA	NA	282.5	NA	187.6	NA	150.9	NA	8.2	NA	163.9

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
^ - Denotes instrument related QC exceeds the control 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. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-08	Date	12/6/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	2.0	0.0025	0.054	0.0025	0.055	0.0025	0.026	0.0025	0.048	0.0025	0.057	0.0025	0.049	0.0025	0.029
Beryllium	0.004	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	2.0	0.050	0.29	0.050	0.16	0.050	0.12	0.050	0.20	0.050	0.16	0.050	0.13	0.050	0.20
Cadmium	0.005	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	130	10	350	10	150	10	79	10	120	50	410	10	190
Chromium	0.1	0.0050	ND	0.0050	ND	0.025	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.010	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	4.0	0.10	0.51	0.10	0.36	0.10	0.45	0.10	0.25	0.10	0.31	0.10	0.38	0.10	0.41
Iron	5.0	0.10	ND	0.10	ND	0.50	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	0.0051	0.0025	0.0026	0.013	0.017	0.0025	ND	0.0025	ND	0.0025	0.0042	0.0025	0.016
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.1	0.0020	0.0025	0.0020	ND	0.010	ND	0.0020	0.012	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	10.0	0.10	0.33	0.10	2.2	0.10	1.9	0.10	0.95	0.10	0.86	0.10	ND	0.10	0.44
Nitrogen/Nitrate, Nitri	NA	0.10	0.33	0.20	2.2	0.10	1.9	0.10	0.95	0.10	0.86	0.10	ND	0.10	0.44
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	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
Selenium	0.05	0.0025	ND	0.0025	ND	0.013	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	50	210	25	87	10	52	50	120	50	170	25	130	20	110
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	1,200	10	670	10	990	10	580	10	690	10	800	10	1000	10	740
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Zinc	5.0	0.020	ND	0.020	ND	0.10	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
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
pH	6.5 - 9.0	NA	7.75	NA	7.29	NA	7.70	NA	7.32	NA	7.38	NA	7.49	NA	7.64
Temperature	NA	NA	12.70	NA	13.06	NA	13.15	NA	12.20	NA	12.71	NA	14.64	NA	16.68
Conductivity	NA	NA	1.17	NA	1.80	NA	0.99	NA	0.80	NA	0.88	NA	1.40	NA	1.05
Dissolved Oxygen	NA	NA	NM	NA	7.82	NA	8.00	NA	6.06	NA	6.57	NA	7.68	NA	7.22
ORP	NA	NA	NM	NA	192.6	NA	196.0	NA	-47.0	NA	119.0	NA	130.0	NA	132.0

Sample: MW-08	Date	9/19/2012		12/20/2012		3/5/2013		5/23/2013		7/22/2013		10/15/2013		2/21/2014	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	2.0	0.0025	0.059	0.0025	0.058	0.0025	0.069	0.0025	0.057	0.0025	0.046	0.0025	0.045	0.0025	0.066
Beryllium	0.004	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND ^
Boron	2.0	0.050	0.46^	0.050	0.33	0.050	0.25	0.050	0.16	0.050	0.18	0.050	0.19	0.050	0.16
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	130	10	130	10	200	10	300	10	210	10	110	10	270
Chromium	0.1	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	4.0	0.10	0.40	0.10	0.33	0.10	0.29^	0.10	0.34	0.10	0.34	0.10	0.36	0.10	0.29
Iron	5.0	0.10	0.24	0.10	ND	0.10	ND	0.10	0.23	0.10	ND	0.10	ND	0.10	0.11
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	0.023	0.0025	0.0044	0.0025	ND	0.0025	0.0065	0.0025	ND	0.0025	ND	0.0025	0.0039
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.1	0.0020	0.0021	0.0020	ND	0.0020	ND	0.0020	0.0034	0.0020	0.0040	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	10.0	0.10	4.0	0.10	2.0	0.10	2.2	0.10	2.8	0.10	1.2	0.10	1.2	0.10	1.6
Nitrogen/Nitrate, Nitri	NA	0.50	4.0	0.50	2.0	0.20	2.2	0.20	2.8	0.10	1.2	0.10	1.2	0.10	1.6
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0049	NR	NR	0.004	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.05	0.0025	0.0079	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	50	180	50	130	50	150	25	99	25	72	20	74	20	54
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	1,200	10	710	10	730	10	830	10	860	10	740	10	560	10	740
Vanadium	0.049	NR	NR	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	5.0	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.005	NR	NR	0.0005	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
BETX	11.705	NR	NR	0.0025	NS	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	6.80	NA	7.40	NA	7.46	NA	7.17	NA	7.28	NA	7.22	NA	9.17
Temperature	NA	NA	15.09	NA	12.82	NA	11.10	NA	11.95	NA	13.86	NA	13.43	NA	10.89
Conductivity	NA	NA	0.95	NA	0.91	NA	1.05	NA	1.031	NA	0.97	NA	0.83	NA	0.91
Dissolved Oxygen	NA	NA	8.19	NA	9.83	NA	7.73	NA	5.33	NA	4.75	NA	3.69	NA	4.94
ORP	NA	NA	211.0	NA	101.0	NA	136.1	NA	6.2	NA	30.5	NA	-49.3	NA	-64.9

Sample: MW-08	Date	5/1/2014		8/18/2014		10/23/2014		2/10/2015		5/27/2015		8/4/2015		10/27/2015	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	ND	0.0010	ND	0.0010	ND^	0.0010	0.0089	0.0010	ND	0.0010	ND	0.0010	ND
Barium	2.0	0.0025	0.12	0.0025	0.044	0.0025	0.051	0.0025	0.22	0.0025	0.057	0.0025	0.044	0.0025	0.048
Beryllium	0.004	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Boron	2.0	0.050	0.15	0.050	0.19	0.050	0.16	0.050	0.64	0.050	0.11	0.050	0.15	0.050	0.15
Cadmium	0.005	0.00050	0.0019	0.00050	ND	0.00050	ND	0.00050	0.00053	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	50	780	10	170	10	140	50	470	10	270	10	130	2.0	70
Chromium	0.1	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	0.13	0.0010	0.0018	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	0.012	0.0020	ND	0.0020	ND	0.0020	0.0060	0.0020	0.0039	0.0020	ND	0.0020	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	ND	0.010	0.012	0.010	ND	0.010	ND	0.010	ND
Fluoride	4.0	0.10	0.34	0.10	0.36	0.10	0.36	0.10	0.51	0.10	0.44	0.10	0.39	0.10	0.32
Iron	5.0	0.10	ND	0.10	ND	0.10	ND	0.10	10	0.10	ND	0.10	ND	0.10	ND
Lead	0.0075	0.00050	0.0036	0.00050	ND	0.00050	ND	0.00050	0.0034	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	ND	0.0025	0.017	0.0025	0.0069	0.0025	1.1	0.0025	0.0044	0.0025	0.0029	0.0025	ND
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND *	0.00020	ND
Nickel	0.1	0.0020	0.0020	0.0020	0.0029	0.0020	0.0036	0.0020	0.19	0.0020	0.0033	0.0020	0.0020	0.0020	ND
Nitrogen/Nitrate	10.0	0.10	5.9	0.10	0.54	0.10	1.3	0.10	ND	0.10	1.7	0.10	0.72	0.10	1.0
Nitrogen/Nitrate, Nitri	NA	0.50	6.2	0.10	0.54	0.10	1.3	0.10	ND	0.10	1.7	0.10	0.72	0.10	1.0
Nitrogen/Nitrite	NA	0.040	0.33	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0049	0.020	ND	0.0040	ND	0.0040	ND	0.040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0034	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND^	0.00050	ND	0.00050	ND
Sulfate	400.0	100	460	10	59	20	73	100	600	5.0	25	10	31	10	41
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	1,200	13	2100	10	610	10	560	10	2000	10	760	10	540	10	470
Vanadium	0.049	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	5.0	0.020	0.080	0.020	ND	0.020	ND	0.020	0.026	0.020	ND	0.020	ND	0.020	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.002	0.0005	0.002	0.0005	ND	0.0005	ND
BETX	11.705	0.002	ND	0.002	ND	0.002	ND	0.002	0.002	0.002	0.002	0.002	ND	0.002	ND
pH	6.5 - 9.0	NA	7.17	NA	7.28	NA	7.19	NA	7.58	NA	7.26	NA	7.47	NA	6.95
Temperature	NA	NA	11.71	NA	20.49	NA	15.79	NA	9.48	NA	17.90	NA	22.19	NA	14.00
Conductivity	NA	NA	2.71	NA	1.08	NA	1.01	NA	2.80	NA	1.57	NA	0.98	NA	0.86
Dissolved Oxygen	NA	NA	4.72	NA	5.91	NA	3.52	NA	1.00	NA	3.82	NA	3.84	NA	3.86
ORP	NA	NA	85.2	NA	76.5	NA	28.8	NA	-114.1	NA	-9.9	NA	-19.0	NA	146.3

Sample: MW-08	Date	2/9/2016		5/11/2016		8/30/2016		11/1/2016		2/7/2017		4/25/2017		2/20/2018	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Barium	2.0	0.0025	0.055	0.0025	0.059	0.0025	0.044	0.0025	0.042	0.0025	0.069	0.0025	0.056	0.0025	0.063
Beryllium	0.004	0.0010	ND ^	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND
Boron	2.0	0.050	0.11	0.050	0.12	0.050	0.18	0.050	0.13	0.050	0.12	0.050	0.10	0.050	0.15
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	190	10	300	2.0	69	2.0	67	10	270	10	280	10	180
Chromium	0.1	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND
Cyanide	0.2	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Fluoride	4.0	0.10	0.36	0.10	0.42	0.10	0.33	0.10	0.32	0.10	0.30	0.10	0.31	0.10	0.31
Iron	5.0	0.10	ND	0.10	ND ^	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.14
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	0.0034	0.0025	0.023	0.0025	0.0043	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0039
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	ND
Nickel	0.1	0.0020	ND	0.0020	0.0039	0.0020	ND	0.0020	ND	0.0020	0.0027	0.0020	0.0035	0.0020	0.0054
Nitrogen/Nitrate	10.0	0.10	0.82	0.10	1.2	0.10	1.3	0.10	0.46	0.10	1.3	0.10	1.4	0.10	0.74
Nitrogen/Nitrate, Nitri	NA	0.10	0.82	0.10	1.2	0.10	1.3	0.10	0.46	0.10	1.3	0.10	1.4	0.10	0.74
Nitrogen/Nitrite	NA	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Perchlorate	0.0049	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.05	0.0025	ND	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	10	48	20	70	10	23	10	50	10	43	20	57	20	110
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Total Dissolved Solids	1,200	10	740	10	810	10	450	10	450	10	810	10	800	10	780
Vanadium	0.049	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Zinc	5.0	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.00059	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.002	ND	0.002	0.0016	0.002	ND	0.002	0.02269	0.002	ND	0.002	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.08	NA	7.05	NA	6.88	NA	7.04	NA	6.95	NA	7.37	NA	7.56
Temperature	NA	NA	7.88	NA	14.82	NA	21.32	NA	19.47	NA	11.98	NA	17.31	NA	11.55
Conductivity	NA	NA	0.81	NA	1.28	NA	1.16	NA	0.69	NA	0.98	NA	1.14	NA	0.804
Dissolved Oxygen	NA	NA	5.38	NA	5.09	NA	4.83	NA	3.68	NA	5.62	NA	7.88	NA	5.69
ORP	NA	NA	41.1	NA	-15.4	NA	22.7	NA	65.0	NA	100.1	NA	9.2	NA	33.5

Sample: MW-08	Date	8/1/2018		10/16/2018		2/5/2019		5/6/2019		8/6/2019		11/7/2019		2/12/2020	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	2.0	0.0025	0.037	0.0025	0.044	0.0025	0.046	0.0025	0.031	0.0025	0.027	0.0025	0.034	0.0025	0.054
Beryllium	0.004	0.001	ND	0.001	ND^	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	0.05	0.15	0.05	0.15	0.05	0.089	0.05	0.09	0.05	0.12	0.05	0.14	0.05	0.11
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200.0	10	120	10	85	10	200	10	310	10	270	10	70	10	230
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1.0	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	4.0	0.1	0.31	0.1	0.3	0.1	0.34	0.1	0.4	0.1	0.28	0.1	0.26	0.1	0.33
Iron	5.0	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	0.0027	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0055
Nitrogen/Nitrate	10.0	0.1	0.49	0.1	0.63	0.1	0.89	0.1	2.3	0.1	0.76	0.1	0.94	0.1	1
Nitrogen/Nitrate, Nitri	NA	0.1	0.49	0.1	0.63	0.1	0.89	0.1	2.3	0.1	0.76	0.1	0.94	0.1	1
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400.0	20	43	20	31	20	26	20	39	20	16	20	29	20	63
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	520	10	480	10	560	10	930	10	420	10	470	10	750
Vanadium	0.049	0.005	ND	0.005	ND^	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5.0	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	0.0022	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	0.0249	0.0025	0.0016	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.41	NA	7.47	NA	7.45	NA	7.38	NA	7.41	NA	7.01	NA	7.25
Temperature	NA	NA	18.27	NA	14.62	NA	14.20	NA	13.80	NA	12.40	NA	11.31	NA	13.30
Conductivity	NA	NA	0.854	NA	0.691	NA	1.062	NA	2.200	NA	0.850	NA	8.020	NA	1.112
Dissolved Oxygen	NA	NA	5.48	NA	5.97	NA	5.22	NA	6.50	NA	48.30	NA	6.97	NA	7.14
ORP	NA	NA	85.3	NA	83.5	NA	112.6	NA	-291.4	NA	190.0	NA	-24.4	NA	177.6

Sample: MW-08	Date	5/20/2020		7/30/2020		10/22/2020		2/11/2021		5/17/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	2.0	0.0025	0.041	0.0025	0.047	0.0025	0.062	0.0025	0.081	0.0025	0.086
Beryllium	0.004	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	0.05	0.14	0.05	0.11	0.05	0.18	0.05	0.16	0.05	0.091
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200.0	10	370	10	160	10	180	10	230	40	450
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1.0	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.005	0.0062	0.01	ND	0.005	ND	0.005	0.0072
Fluoride	4.0	0.1	0.34	0.1	0.3	0.1	0.27	0.1	0.26	0.1	0.27
Iron	5.0	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.006	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	0.0024	0.002	ND	0.002	0.002	0.002	0.0023	0.002	ND
Nitrogen/Nitrate	10.0	0.1	3.6	0.1	1.4	0.1	1.4	0.1	1.5	0.1	1.3
Nitrogen/Nitrate, Nitri	NA	0.1	3.6	0.1	1.4	0.1	1.4	0.1	1.5	0.1	1.3
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	0.0043	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400.0	20	89	25	83	15	140	100	260	25	190
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	1100	30	650	30	800	10	990	10	1300
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5.0	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.10	NA	6.97	NA	7.14	NA	7.10	NA	7.14
Temperature	NA	NA	12.80	NA	13.20	NA	12.90	NA	11.70	NA	12.90
Conductivity	NA	NA	1.860	NA	1.297	NA	1.880	NA	1.570	NA	2.151
Dissolved Oxygen	NA	NA	9.68	NA	6.97	NA	3.88	NA	5.92	NA	7.60
ORP	NA	NA	139.8	NA	185.2	NA	189.0	NA	70.4	NA	186.3

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
^ - Denotes instrument related QC exceeds the control 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. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-09	Date	12/6/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012		9/19/2012		12/20/2012		3/5/2013	
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	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	0.010	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	0.0010	0.0010	ND	0.0010	ND	0.0010	ND
Barium	2.0	0.0025	0.031	0.0025	0.029	0.0025	0.032	0.0025	0.029	0.0025	0.030	0.0025	0.021	0.0025	0.021	0.0025	0.022	0.0025	0.021	0.0025	0.016
Beryllium	0.004	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	2.0	0.050	0.36	0.050	0.32	0.050	0.29	0.050	0.35	0.050	0.31	0.050	0.38	0.050	0.34	0.050	0.59^	0.050	0.44	0.050	0.36
Cadmium	0.005	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	0.00059	0.00050	ND	0.00050	0.00065	0.00050	ND	0.00050	ND
Chloride	200.0	10	140	10	230	10	290	10	190	10	190	10	170	10	250	10	160	10	150	10	190
Chromium	0.1	0.0050	ND	0.0050	ND	0.025	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	0.0047	0.0010	0.0034	0.0050	0.0062	0.0010	0.011	0.0010	0.0075	0.0010	0.0021	0.0010	0.0021	0.0010	0.0022	0.0010	0.002	0.0010	0.0024
Copper	0.65	0.0020	ND	0.0020	ND	0.010	ND	0.0020	0.0026	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	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	4.0	0.10	0.61	0.10	0.52	0.10	0.47	0.10	0.39	0.10	0.50	0.10	0.45	0.10	0.48	0.10	0.48	0.10	0.45	0.10	0.46^
Iron	5.0	0.10	ND	0.10	0.18	0.50	7.3	0.10	3.8	0.10	1.5	0.10	5.5	0.10	8.0	0.10	4.7	0.10	13	0.10	15
Lead	0.0075	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	0.15	0.0025	1.1	0.0025	1.6	0.013	0.95	0.0025	0.82	0.0025	0.66	0.0025	1.3	0.0025	1.2	0.0025	0.68	0.0025	0.44	0.0025	0.43
Mercury	0.002	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	0.1	0.0020	0.0094	0.0020	0.0072	0.010	0.013	0.0020	0.014	0.0020	0.011	0.0020	0.0054	0.0020	0.0070	0.0020	0.010	0.0020	0.0059	0.0020	0.0065
Nitrogen/Nitrate	10.0	0.10	ND	0.10	ND	0.10	0.97	0.10	0.36	0.10	0.22	0.10	ND	0.10	ND	0.10	0.22	0.10	0.22	0.10	0.75
Nitrogen/Nitrate, Nitri	NA	0.10	ND^	0.10	ND	0.10	0.97	0.10	0.36	0.10	0.22	0.10	ND	0.10	ND	0.10	0.22	0.10	0.22	0.10	0.75
Nitrogen/Nitrite	NA	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	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.004	ND	0.020	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.013	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	250	1600	250	1100	100	580	130	750	50	130	500	1600	500	1500	250	1600	250	1100	250	700
Thallium	0.002	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	1,200	10	2600	10	2400	10	1500	10	1700	10	2400	10	2600	10	2800	10	2900	10	2000	10	1700
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0050	ND	0.0050	ND
Zinc	5.0	0.020	ND	0.020	ND	0.10	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	0.023
Benzene	0.005	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0005	ND	0.00050	ND
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0025	NS	0.0025	ND
pH	6.5 - 9.0	NA	7.03	NA	7.19	NA	7.01	NA	6.90	NA	7.19	NA	6.86	NA	6.85	NA	6.82	NA	6.80	NA	7.05
Temperature	NA	NA	11.94	NA	12.78	NA	15.68	NA	15.90	NA	11.94	NA	14.29	NA	15.10	NA	16.23	NA	15.41	NA	12.20
Conductivity	NA	NA	2.97	NA	3.30	NA	2.25	NA	1.88	NA	1.54	NA	2.31	NA	2.50	NA	2.56	NA	1.93	NA	1.59
Dissolved Oxygen	NA	NA	NM	NA	7.49	NA	0.49	NA	0.33	NA	0.43	NA	2.22	NA	1.71	NA	6.15	NA	4.26	NA	4.86
ORP	NA	NA	NM	NA	102.2	NA	-43.5	NA	-114.0	NA	-40.0	NA	2.0	NA	-32.0	NA	-22.0	NA	-39.0	NA	-30.3

Sample: MW-09	Date	5/23/2013		7/22/2013		10/15/2013		2/17/2014		5/1/2014		8/18/2014		10/23/2014		2/10/2015		5/27/2015		8/4/2015	
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	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	0.010	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
Barium	2.0	0.0025	0.017	0.0025	0.017	0.0025	0.019	0.0025	0.022	0.0025	0.021	0.0025	0.018	0.0025	0.017	0.0025	0.029	0.0025	0.018	0.0025	0.013
Beryllium	0.004	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	2.0	0.050	0.30	0.050	0.29	0.050	0.29	0.050	0.30	0.050	0.27	0.050	0.29	0.050	0.24	0.050	0.30	0.050	0.37	0.050	0.38
Cadmium	0.005	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0019	0.00050	ND	0.00050	ND
Chloride	200.0	10	290	10	280	10	280	10	270	10	340	10	270	10	230	50	390	10	340	10	230
Chromium	0.1	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	1.0	0.0010	0.0076	0.0010	0.0063	0.0010	0.0056	0.0010	0.0044	0.0010	0.0035	0.0010	0.0063	0.0010	0.0045	0.0010	0.047	0.0010	0.017	0.0010	0.011
Copper	0.65	0.0020	ND	0.0020	0.0025	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.011	0.0020	0.0023	0.0020	ND
Cyanide	0.2	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	4.0	0.10	0.40	0.10	0.47	0.10	0.53	0.10	0.56	0.10	0.50	0.10	0.56	0.10	0.55	0.10	0.51	0.10	0.44	0.10	0.27
Iron	5.0	0.10	160	0.10	50	0.10	25	0.10	12	0.10	8.4	0.10	130	0.10	45	0.10	23	0.10	140	0.10	ND
Lead	0.0075	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	0.0010	0.00050	ND	0.00050	ND
Manganese	0.15	0.0025	1.6	0.0025	0.81	0.0025	0.52	0.0025	0.34	0.0025	0.30	0.0025	0.72	0.0025	0.38	0.0025	0.54	0.0025	0.66	0.0025	1.4
Mercury	0.002	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	0.1	0.0020	0.014	0.0020	0.012	0.0020	0.0090	0.0020	0.0057	0.0020	0.0057	0.0020	0.013	0.0020	0.0079	0.0020	0.039	0.0020	0.026	0.0020	0.021
Nitrogen/Nitrate	10.0	0.10	ND	0.10	0.24	0.10	0.11	0.10	0.34	0.10	0.12	0.10	0.11	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrate, Nitri	NA	0.10	ND	0.10	0.24	0.10	0.11	0.10	0.34	0.10	0.12	0.10	0.11	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Nitrogen/Nitrite	NA	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	0.020
Perchlorate	0.0049	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	0.05	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	0.05	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	400.0	500	1300	250	1000	130	680	100	560	130	560	250	880	250	960	250	820	500	1100	500	1900
Thallium	0.002	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	1,200	13	3000	10	2300	10	1700	10	1600	10	1700	10	2100	10	1700	10	2400	17	3100	10	3900
Vanadium	0.049	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	5.0	0.020	0.049	0.020	ND	0.020	ND	0.020	ND	0.020	ND	0.020	0.021	0.020	ND	0.020	0.072	0.020	0.028	0.020	0.17
Benzene	0.005	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	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.002	ND	0.002	ND	0.002	0.0006	0.002	0.0006	0.002	0.0006	0.002	ND
pH	6.5 - 9.0	NA	6.34	NA	6.6	NA	6.69	NA	8.83	NA	6.71	NA	6.62	NA	6.93	NA	6.92	NA	6.59	NA	6.52
Temperature	NA	NA	12.19	NA	14.92	NA	15.21	NA	8.4	NA	9.84	NA	21.87	NA	15.35	NA	10.12	NA	19.34	NA	22.72
Conductivity	NA	NA	2.522	NA	2.17	NA	1.81	NA	1.02	NA	1.89	NA	2.91	NA	2.51	NA	2.50	NA	3.51	NA	4.04
Dissolved Oxygen	NA	NA	0.40	NA	1.22	NA	1.81	NA	1.24	NA	1.49	NA	0.41	NA	0.76	NA	1.26	NA	0.81	NA	1.00
ORP	NA	NA	-85.9	NA	-61.5	NA	-78.4	NA	-125.7	NA	25.7	NA	-108.7	NA	-85.1	NA	-82.0	NA	-96.9	NA	-108.0

Sample: MW-09	Date	10/27/2015		2/9/2016		5/11/2016		8/30/2016		11/1/2016		2/8/2017		4/25/2017		2/20/2018		8/1/2018		10/16/2018	
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	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND ^	0.0030	ND	0.0030	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.0010	ND	0.0010	0.0014	0.0050	ND ^	0.0010	0.0021	0.0010	0.0013	0.0010	0.0011 F1	0.0050	ND	0.0010	0.0025	0.001	0.0013	0.001	0.0013
Barium	2.0	0.0025	0.014	0.0025	0.013	0.0025	0.017	0.0025	0.015	0.0025	0.014	0.0025	0.012	0.013	0.014	0.0025	0.017	0.0025	0.0083	0.0025	0.011
Beryllium	0.004	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND ^	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND^
Boron	2.0	0.050	0.33	0.050	0.36	0.050	0.40	0.050	0.72	0.050	0.47	0.050	0.34	0.050	0.30	0.050	0.65	0.05	0.29	0.05	0.27
Cadmium	0.005	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
Chloride	200.0	10	220	10	170	2.0	23	2.0	19	10	110	10	150	10	180	2.0	16	10	210	10	210
Chromium	0.1	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
Cobalt	1.0	0.0010	0.016	0.0010	0.034	0.0010	0.050	0.0010	0.034	0.0010	0.016	0.0010	0.0089	0.0010	0.023	0.0010	0.057	0.001	0.021	0.001	0.022
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND ^	0.0020	ND	0.002	ND	0.002	ND
Cyanide	0.2	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
Fluoride	4.0	0.10	0.35	0.10	0.45	0.10	0.31	0.10	0.26	0.10	0.30	0.10	0.36	0.10	0.31	0.10	0.54	0.1	0.38	0.1	0.43
Iron	5.0	0.10	170	0.10	ND	2.0	3400	0.10	ND	1.0	900	1.0	250	0.50	1000	2.0	3700	1	750	1	530
Lead	0.0075	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
Manganese	0.15	0.0025	0.79	0.0025	2.3	0.050	6.0	0.0025	3.7	0.0025	1.6	0.0025	0.61	0.0025	1.9	0.050	5.8	0.0025	1.3	0.0025	0.96
Mercury	0.002	0.00020	ND	0.00020	ND	0.00020	0.00032	0.00020	0.00096	0.00020	ND	0.00020	ND	0.00020	ND	0.00020	0.00021	0.0002	ND	0.0002	ND
Nickel	0.1	0.0020	0.025	0.0020	0.071	0.0020	0.17	0.0020	0.14	0.0020	0.045	0.0020	0.015	0.0020	0.060	0.0020	0.22	0.002	0.046	0.002	0.03
Nitrogen/Nitrate	10.0	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND
Nitrogen/Nitrate, Nitri	NA	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.1	ND	0.1	ND
Nitrogen/Nitrite	NA	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
Perchlorate	0.0049	0.0040	ND	0.080	ND	0.040	ND	0.0040	ND F1	0.0040	ND	0.0040	ND	0.0040	ND ^	0.020	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND ^	0.0025	ND	0.0025	ND	0.0025	ND	0.013	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	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
Sulfate	400.0	500	1100	1000	3600	2500	12000	2500	8100	500	3600	500	1200	1000	4700	2500	16000	500	2500	500	1900
Thallium	0.002	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	2600	13	4700	50	19000	100	15000	17	6100	10	2800	25	6500	50	20000	13	4900	10	3700
Vanadium	0.049	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^
Zinc	5.0	0.020	0.050	0.020	0.70	0.020	2.3	0.020	1.8	0.020	0.45	0.020	0.092	0.10	0.73	0.020	3.0	0.02	0.56	0.02	0.3
Benzene	0.005	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	0.0039	0.0005	ND
BETX	11.705	0.002	0.00093	0.002	ND	0.002	0.00062	0.002	ND	0.002	0.00823	0.002	ND	0.002	ND	0.0025	0.00066	0.0025	0.0252	0.0025	0.0011
pH	6.5 - 9.0	NA	6.37	NA	6.03	NA	5.73	NA	3.36	NA	6.19	NA	5.74	NA	6.13	NA	6.19	NA	7.30	NA	6.47
Temperature	NA	NA	13.47	NA	7.31	NA	13.73	NA	22.44	NA	18.36	NA	9.03	NA	15.44	NA	11.22	NA	22.20	NA	14.34
Conductivity	NA	NA	3.53	NA	3.29	NA	9.49	NA	8.79	NA	4.93	NA	2.14	NA	4.95	NA	7.519	NA	3.619	NA	2.920
Dissolved Oxygen	NA	NA	0.95	NA	0.60	NA	1.90	NA	1.55	NA	0.52	NA	3.13	NA	4.22	NA	1.35	NA	1.32	NA	2.45
ORP	NA	NA	-24.9	NA	-19.6	NA	-12.9	NA	332.9	NA	-94.2	NA	34.9	NA	-51.1	NA	50.1	NA	35.8	NA	39.2

Sample: MW-09	Date	2/5/2019		5/7/2019		8/7/2019		11/7/2019		2/12/2020		5/20/2020		8/5/2020		10/22/2020		3/2/2021		5/17/2021	
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	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	0.010	0.001	0.0023	0.001	0.0042	0.001	0.0016	0.001	0.0047	0.001	0.0038	0.001	0.0062	0.001	0.001	0.001	0.034	0.001	0.0043	0.001	0.0025
Barium	2.0	0.0025	0.011	0.0025	0.012	0.0025	0.0084	0.0025	0.012	0.0025	0.01	0.0025	0.013	0.0025	0.01	0.0025	0.086	0.0025	0.015	0.0025	0.012
Beryllium	0.004	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
Boron	2.0	0.05	0.35	0.05	0.45	0.05	0.33	0.05	0.73	0.05	0.33	0.05	0.3	0.05	0.29	0.05	0.37	0.05	0.47	0.05	0.29
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.0021	0.0005	ND	0.0005	ND
Chloride	200.0	10	140	10	57	10	180	10	23	10	75	10	6.1 F1	10	140	10	190	2	7	10	180
Chromium	0.1	0.005	0.005	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	0.028	0.005	ND	0.005	ND
Cobalt	1.0	0.001	0.033	0.001	0.059	0.001	0.031	0.001	0.065	0.001	0.032	0.001	0.04	0.001	0.016	0.001	0.046	0.001	0.044	0.001	0.024
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.041	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.005	0.0053	0.01	ND	0.005	ND	0.005	ND
Fluoride	4.0	0.1	0.46	0.1	0.57	0.1	0.41	0.1	0.63	0.1	0.52	0.1	0.71	0.1	0.66	0.1	0.66	0.1	0.62	0.1	0.46
Iron	5.0	1	1200	1	2,700	1	630	1	1800	1	960	1	1900	10	400	0.5	970	10	2000 ^	10	620
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.036	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	2.1	0.0025	4.2	0.0025	1.4	0.0025	4.4	0.0025	2.2	0.0025	3	0.0025	0.96	0.0025	2.3	0.0025	3.5	0.0025	1.4
Mercury	0.002	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	0.1	0.002	0.077	0.002	0.2	0.002	0.051	0.002	0.22	0.002	0.084	0.002	0.13	0.002	0.036	0.002	0.1	0.002	0.15	0.002	0.051
Nitrogen/Nitrate	10.0	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/Nitrate, Nitri	NA	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND F1	0.1	ND	5	ND	0.1	ND	0.1	ND	0.1	ND
Nitrogen/Nitrite	NA	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	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.02	ND	0.04	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0027	0.0025	ND	0.0025	ND
Silver	0.05	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	400.0	500	3400	500	8900	500	2800	500	7100	500	ND	500	6800	250	2000	250	1500	1000	7400	1000	3300
Thallium	0.002	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	1,200	10	5900	10	15000	10	5000	10	11000	10	6600	10	11000	150	2900	150	3000	50	12000	25	5600 H
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	0.026	0.005	ND	0.005	ND
Zinc	5.0	0.02	0.74	0.02	4.1	0.02	0.6	0.02	2.6	0.02	1	0.02	2.4	0.02	0.42	0.02	1.2	0.02	1.8	0.02	0.47
Benzene	0.005	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	11.705	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	6.5 - 9.0	NA	6.16	NA	5.70	NA	6.07	NA	5.53	NA	5.74	NA	5.41	NA	6.26	NA	5.73	NA	5.92	NA	6.03
Temperature	NA	NA	12.60	NA	12.40	NA	13.10	NA	12.17	NA	12.60	NA	12.10	NA	13.90	NA	17.70	NA	12.50	NA	12.80
Conductivity	NA	NA	4.982	NA	13.650	NA	4.050	NA	7.426	NA	4.789	NA	7.209	NA	3.080	NA	4.030	NA	8.104	NA	4.881
Dissolved Oxygen	NA	NA	1.58	NA	0.48	NA	0.36	NA	1.18	NA	5.13	NA	1.17	NA	NS	NA	0.47	NA	0.12	NA	0.09
ORP	NA	NA	-41.8	NA	-402.4	NA	-25.1	NA	35.2	NA	24.8	NA	25.9	NA	-44.5	NA	-91.4	NA	-28.2	NA	-34.6

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
^ - Denotes instrument related QC exceeds the control 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. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-10	Date	12/6/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012		9/19/2012		12/20/2012		3/5/2013	
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	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	0.010	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	ND	0.0010	0.0012	0.0010	ND	0.0010	ND	0.0010	0.0012	0.0010	0.001	0.0010	0.0012
Barium	2.0	0.0025	0.050	0.0025	0.051	0.0025	0.039	0.0025	0.039	0.0025	0.036	0.0025	0.040	0.0025	0.043	0.0025	0.040	0.0025	0.041	0.0025	0.040
Beryllium	0.004	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	2.0	0.050	0.50	0.050	0.54	0.050	0.54	0.050	0.41	0.050	0.52	0.25	0.52	0.050	0.53	0.050	0.43^	0.050	0.49	0.050	0.49
Cadmium	0.005	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	200	10	300	2.0	7.1	10	170	10	180	10	180	10	290	10	230	10	200	10	210
Chromium	0.1	0.0050	ND	0.0050	ND	0.025	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.010	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	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	4.0	0.10	0.43	0.10	0.39	0.10	0.42	0.10	0.41	0.10	0.45	0.10	0.41	0.10	0.46	0.10	0.50	0.10	0.47	0.10	0.49^
Iron	5.0	0.10	ND	0.10	ND	0.50	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0075	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	0.15	0.0025	0.12	0.0025	0.0076	0.013	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	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	0.1	0.0020	0.0052	0.0020	0.0029	0.010	ND	0.0020	0.0087	0.0020	0.0024	0.0020	ND	0.0020	ND	0.0020	0.0021	0.0020	0.0024	0.0020	0.0022
Nitrogen/Nitrate	10.0	0.10	0.39	0.10	2.3	0.10	2.7	0.10	2.6	0.10	1.4	0.10	ND	0.10	1.8	0.10	1.5	0.10	1.5	0.10	1.6
Nitrogen/Nitrate, Nitri	NA	0.10	0.39	0.20	2.3	0.20	2.7	0.20	2.6	0.10	1.4	0.10	ND	0.10	1.8	0.10	1.5	0.10	1.5	0.10	1.6
Nitrogen/Nitrite	NA	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	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.004	ND	0.0040	ND
Selenium	0.05	0.0025	ND	0.0025	ND	0.013	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	50	130	50	130	25	89	25	100	50	190	50	250	50	170	50	110	25	120	25	84
Thallium	0.002	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	1,200	10	860	10	1100	10	980	10	730	10	890	10	890	10	1100	10	870	10	860	10	830
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0050	ND	0.0050	ND
Zinc	5.0	0.020	ND	0.020	ND	0.10	ND	0.020	ND	0.020	ND	0.020	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	0.0005	ND	0.00050	ND
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0025	NS	0.0025	ND
pH	6.5 - 9.0	NA	7.65	NA	7.20	NA	7.40	NA	7.34	NA	7.51	NA	7.35	NA	7.20	NA	7.38	NA	7.38	NA	7.55
Temperature	NA	NA	9.26	NA	12.40	NA	12.05	NA	11.23	NA	11.26	NA	13.08	NA	14.44	NA	13.53	NA	12.60	NA	10.40
Conductivity	NA	NA	1.51	NA	1.88	NA	1.58	NA	0.98	NA	0.99	NA	1.04	NA	1.35	NA	1.13	NA	1.07	NA	1.04
Dissolved Oxygen	NA	NA	NM	NA	7.18	NA	8.70	NA	7.42	NA	7.12	NA	7.08	NA	7.13	NA	6.93	NA	8.74	NA	9.16
ORP	NA	NA	NM	NA	191.6	NA	210.0	NA	-37.0	NA	143.0	NA	210.0	NA	147.0	NA	146.0	NA	112.0	NA	129.5

Sample: MW-10	5/22/2013		7/23/2013		10/15/2013		2/17/2014		5/1/2014		8/18/2014		10/23/2014		2/11/2015		5/28/2015		8/4/2015	
Parameter	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
Arsenic	0.0010	0.0011	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
Barium	0.0025	0.041	0.0025	0.042	0.0025	0.044	0.0025	0.047	0.0025	0.043	0.0025	0.038	0.0025	0.044	0.0025	0.050	0.0025	0.046	0.0025	0.035
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
Boron	0.050	0.25	0.050	0.30	0.050	0.42	0.050	0.40	0.050	0.39	0.050	0.48	0.050	0.56	0.050	0.52	0.050	0.35	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	0.00050	ND	0.00050	ND
Chloride	10	240	10	210	10	220	10	240	10	300	10	200	10	170	10	210	10	320	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
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
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	0.0027
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
Fluoride	0.10	0.50	0.10	0.48	0.10	0.50	0.10	0.47	0.10	0.43	0.10	0.49	0.10	0.46	0.10	0.41	0.10	0.43	0.10	0.46
Iron	0.10	0.32	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
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
Manganese	0.0025	0.010	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0049	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	0.00020	ND	0.00020	ND *
Nickel	0.0020	ND	0.0020	0.0027	0.0020	0.0024	0.0020	0.0020	0.0020	0.0023	0.0020	ND	0.0020	0.0020	0.0020	0.0037	0.0020	0.0023	0.0020	ND
Nitrogen/Nitrate	0.10	2.8	0.10	3.0	0.10	2.3	0.10	2.2	0.10	2.8	0.10	0.72	0.10	1.7	0.10	2.4	0.10	2.9	0.10	1.5
Nitrogen/Nitrate, Nitri	0.20	2.8	0.50	3.0	0.50	2.3	0.50	2.2	0.50	2.8	0.10	0.72	0.10	1.7	0.20	2.4	0.20	2.9	0.10	1.5
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
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
Selenium	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
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
Sulfate	25	120	50	130	50	140	25	55	20	120	20	73	50	110	25	93	20	50	25	97
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
Total Dissolved Solids	10	850	10	910	10	880	10	870	10	890	10	910	10	740	10	810	10	1100	10	710
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
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
Benzene	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	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
pH	NA	7.11	NA	7.26	NA	7.11	NA	4.39	NA	7.07	NA	6.74	NA	7.12	NA	7.26	NA	7.27	NA	6.92
Temperature	NA	12.70	NA	14.21	NA	13.04	NA	11.47	NA	11.23	NA	16.85	NA	13.74	NA	6.83	NA	15.02	NA	17.42
Conductivity	NA	0.964	NA	1.1	NA	1.09	NA	0.84	NA	1.18	NA	1.14	NA	1.18	NA	0.92	NA	1.37	NA	1.19
Dissolved Oxygen	NA	6.14	NA	4.59	NA	4.27	NA	4.82	NA	6.31	NA	6.99	NA	6.16	NA	6.50	NA	7.41	NA	5.39
ORP	NA	35.6	NA	30.2	NA	-48.9	NA	201.1	NA	109.8	NA	87.8	NA	77.3	NA	135.3	NA	134.8	NA	15.3

Sample: MW-10	10/28/2015		2/10/2016		5/12/2016		8/31/2016		11/2/2016		2/7/2017		4/26/2017		2/21/2018		8/1/2018		10/17/2018	
Parameter	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	0.003	ND	0.003	ND
Arsenic	0.0010	ND	0.0010	ND	0.0050	ND ^	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.001	ND	0.001	ND
Barium	0.0025	0.041	0.0025	0.042	0.0025	0.055	0.0025	0.037	0.0025	0.034	0.0025	0.046	0.0025	0.038	0.0025	0.042	0.0025	0.042	0.0025	0.04
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	0.001	ND	0.001	ND^
Boron	0.050	0.44	0.050	0.43	0.050	0.32	0.050	0.34	0.050	0.49	0.050	0.39	0.050	0.29	0.050	0.31	0.05	0.27	0.05	0.6
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	0.0005	ND	0.0005	ND
Chloride	10	210	10	200	10	290	10	150	10	120	10	200	10	210	10	170	10	240	10	170
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	0.005	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	0.001	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	0.002	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	0.01	ND	0.01	ND
Fluoride	0.10	0.41	0.10	0.45	0.10	0.46	0.10	0.44	0.10	0.43	0.10	0.36	0.10	0.35	0.10	0.38	0.1	0.39	0.1	0.4
Iron	0.10	ND	0.10	0.13	0.10	ND ^	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.24	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	0.00050	ND	0.00050	ND	0.0005	ND	0.0005	ND
Manganese	0.0025	ND	0.0025	0.0037	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0057	0.0025	ND	0.0025	0.0028
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	0.0002	ND	0.0002	ND
Nickel	0.0020	ND	0.0020	ND	0.0020	0.0032	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.002	ND	0.002	0.0021
Nitrogen/Nitrate	0.10	2.4	0.10	2.2	0.10	2.6	0.10	1.4	0.10	2.3	0.10	1.9	0.10	2.3	0.10	1.4	0.1	1.7	0.1	0.96
Nitrogen/Nitrate, Nitri	0.20	2.4	0.20	2.2	0.20	2.6	0.10	1.4	0.50	2.3	0.10	1.9	0.20	2.3	0.10	1.4	0.1	1.7	0.1	0.96
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	0.02	ND	0.02	ND
Perchlorate	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	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
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	0.0005	ND	0.0005	ND
Sulfate	25	86	25	110	25	120	25	80	20	92	25	88	25	89	50	100	25	110	25	120
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	0.002	ND	0.002	ND
Total Dissolved Solids	10	810	10	800	10	920	10	670	10	690	10	810	10	750	10	820	10	1000	10	750
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	0.005	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	0.02	ND	0.02	ND
Benzene	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.00076	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	0.002	0.00075	0.002	ND	0.002	0.00069	0.002	ND	0.002	0.02226	0.002	ND	0.002	ND	0.0025	0.0012	0.0025	0.0024	0.0025	ND
pH	NA	7.04	NA	7.17	NA	7.02	NA	6.95	NA	6.99	NA	6.99	NA	7.27	NA	7.62	NA	7.35	NA	7.30
Temperature	NA	12.90	NA	7.17	NA	13.60	NA	19.33	NA	15.66	NA	11.40	NA	16.65	NA	8.03	NA	17.55	NA	14.62
Conductivity	NA	1.40	NA	0.85	NA	1.29	NA	1.25	NA	0.95	NA	0.98	NA	1.09	NA	0.760	NA	1.147	NA	1.113
Dissolved Oxygen	NA	6.49	NA	7.45	NA	6.76	NA	7.13	NA	5.97	NA	6.48	NA	8.46	NA	8.84	NA	7.00	NA	8.75
ORP	NA	113.8	NA	121.8	NA	54.2	NA	90.4	NA	86.8	NA	127.9	NA	28.7	NA	47.9	NA	89.1	NA	34.6

Sample: MW-10	2/5/2019		5/7/2019		8/6/2019		11/7/2019		2/12/2020		5/20/2020		7/30/2020		10/22/2020		3/2/2021		5/18/2021	
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	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Barium	0.0025	0.044	0.0025	0.05	0.0025	0.037	0.0025	0.033	0.0025	0.044	0.0025	0.045	0.0025	0.036	0.0025	0.04	0.0025	0.053	0.0025	0.064
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
Boron	0.05	0.25	0.05	0.49	0.05	0.35	0.05	0.29	0.05	0.29	0.05	0.7	0.05	0.24	0.05	0.29	0.05	0.36	0.05	0.36
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	10	210	10	410	10	200	10	130	10	180	10	250	2	170	10	230	40	290	40	350
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	0.0029	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	0.005	ND	0.01	ND	0.005	ND	0.005	ND
Fluoride	0.1	0.41	0.1	0.4	0.1	0.35	0.1	0.37	0.1	0.44	0.1	0.42	0.1	0.42	0.1	0.41	0.1	0.41	0.1	0.39
Iron	0.1	ND	0.1	0.44	0.1	ND	0.1	0.25	0.1	ND	0.1	1.8	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	ND	0.0025	ND	0.0025	ND	0.0025	0.0029	0.0025	ND	0.0025	0.0034	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	0.0002	ND	0.0002	ND
Nickel	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0023	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0027
Nitrogen/Nitrate	0.1	1.3	0.1	2.4	0.1	ND	0.1	1.8	0.1	1.7	0.1	1.4	0.1	2.8	0.1	3.8	0.1	2.2	0.1	2.7
Nitrogen/Nitrate, Nitri	0.1	1.3	0.1	2.4	0.1	2.3	0.1	1.8	0.1	1.7	0.1	1.4	0.5	2.8	0.5	3.8	0.5	2.2	0.5	2.7
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
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	0.0041	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0035	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	85	25	100	25	95	25	ND	25	110	25	170	25	88	15	94	25	150	25	210
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 Solids	10	910	10	1000	10	810	10	660	10	810	10	1000	30	720	30	850	10	1100	10	1100
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	7.31	NA	7.17	NA	7.4	NA	7.4	NA	7.28	NA	6.9	NA	6.95	NA	7.11	NA	7.19	NA	7.16
Temperature	NA	12.5	NA	11.8	NA	12.3	NA	11.89	NA	12.9	NA	12.5	NA	12.3	NA	12.7	NA	12.2	NA	14
Conductivity	NA	1.39	NA	2.74	NA	1.45	NA	1.085	NA	1.133	NA	1.61	NA	1.405	NA	1.51	NA	1.747	NA	1.95
Dissolved Oxygen	NA	5.60	NA	7.18	NA	5.45	NA	9.30	NA	7.73	NA	8.65	NA	7.68	NA	4.79	NA	4.70	NA	6.87
ORP	NA	127.7	NA	-231.3	NA	167.5	NA	-12.2	NA	166.3	NA	133.9	NA	138.6	NA	172.5	NA	41.8	NA	147.7

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
^ - Denotes instrument related QC exceeds the control 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. CCA Groundwater Analytical Results - Midwest Generation LLC, Joliet Station #29, Joliet IL

Sample: MW-11	Date	12/6/2010		3/23/2011		6/14/2011		9/14/2011		12/7/2011		3/15/2012		6/19/2012		9/19/2012		12/20/2012	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.0030	ND	0.015	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND	0.0030	ND
Arsenic	0.010	0.0010	0.0013	0.0010	0.0016	0.0050	ND	0.0010	0.0016	0.0010	0.0019	0.0010	0.0017	0.0010	0.0017	0.0010	0.0018	0.0010	0.0018
Barium	2.0	0.0025	0.064	0.0025	0.076	0.013	0.051	0.0025	0.054	0.0025	0.057	0.0025	0.067	0.0025	0.046	0.0025	0.060	0.0025	0.063
Beryllium	0.004	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	2.0	0.050	0.47	0.050	2.6	0.050	2.2	0.050	1.1	0.050	1.2	0.25	1.4	0.050	0.85	0.050	0.68^	0.050	0.57
Cadmium	0.005	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Chloride	200.0	10	160	10	270	10	280	10	86	10	140	10	240	10	150	10	150	10	140
Chromium	0.1	0.0050	ND	0.0050	ND	0.025	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND	0.0050	ND
Cobalt	1.0	0.0010	ND	0.0010	ND	0.0050	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	ND	0.0020	ND	0.010	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND
Cyanide	0.2	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	4.0	0.10	0.34	0.10	0.31	0.10	0.36	0.10	0.32	0.10	0.31	0.10	0.30	0.10	0.37	0.10	0.32	0.10	0.34
Iron	5.0	0.10	ND	0.10	ND	0.50	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.23	0.10	ND	0.10	0.42
Lead	0.0075	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	0.0008
Manganese	0.15	0.0025	0.052	0.0025	0.0047	0.013	ND	0.0025	0.0053	0.0025	0.0047	0.0025	ND	0.0025	0.014	0.0025	ND	0.0025	0.042
Mercury	0.002	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	0.1	0.0020	0.0022	0.0020	ND	0.010	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0025
Nitrogen/Nitrate	10.0	0.10	0.39	0.10	1.1	0.10	0.92	0.10	0.31	0.10	0.60	0.10	0.30	0.10	ND	0.10	0.36	0.10	0.46
Nitrogen/Nitrate, Nitri	NA	0.10	0.39	0.10	1.1	0.10	0.92	0.10	0.31	0.10	0.60	0.10	0.30	0.10	ND	0.10	0.36	0.10	0.46
Nitrogen/Nitrite	NA	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	0.0049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.004	ND
Selenium	0.05	0.0025	ND	0.0025	0.0054	0.013	ND	0.0025	0.0026	0.0025	0.0033	0.0025	0.0043	0.0025	0.0028	0.0025	ND	0.0025	ND
Silver	0.05	0.00050	ND	0.00050	ND	0.0025	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND	0.00050	ND
Sulfate	400.0	50	140	50	150	25	110	25	110	50	160	25	140	50	150	50	100	50	150
Thallium	0.002	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	1,200	10	770	10	1000	10	710	10	590	10	790	10	850	10	760	10	740	10	730
Vanadium	0.049	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0050	0.0050
Zinc	5.0	0.020	ND	0.020	ND	0.10	ND	0.020	ND	0.020	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	0.0005	ND
BETX	11.705	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.0025	NS
pH	6.5 - 9.0	NA	7.72	NA	7.23	NA	7.60	NA	7.38	NA	7.46	NA	7.38	NA	7.37	NA	7.36	NA	7.36
Temperature	NA	NA	11.97	NA	13.49	NA	11.69	NA	12.18	NA	13.15	NA	14.22	NA	15.30	NA	13.23	NA	12.83
Conductivity	NA	NA	1.32	NA	1.69	NA	1.14	NA	0.79	NA	0.92	NA	1.12	NA	0.97	NA	0.97	NA	0.89
Dissolved Oxygen	NA	NA	NM	NA	7.23	NA	8.65	NA	6.28	NA	6.74	NA	7.37	NA	7.09	NA	6.71	NA	8.66
ORP	NA	NA	NM	NA	194.3	NA	200.8	NA	-31.0	NA	136.0	NA	208.0	NA	172.0	NA	172.0	NA	113.0

Sample: MW-11	Date	3/5/2013		5/23/2013		7/23/2013		10/15/2013		2/21/2014		5/1/2014		8/19/2014		10/23/2014		2/11/2015	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	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	0.010	0.0010	0.0018	0.0010	0.0017	0.0010	0.0014	0.0010	0.0015	0.0010	ND	0.0010	0.0017	0.0010	0.0016	0.0010	0.0012	0.0010	ND
Barium	2.0	0.0025	0.060	0.0025	0.045	0.0025	0.040	0.0025	0.060	0.0050	0.090	0.0025	0.053	0.0025	0.048	0.0025	0.059	0.0025	0.10
Beryllium	0.004	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	2.0	0.50	1.1	0.050	0.34	0.050	0.88	0.050	0.49	0.10	1.2	0.050	1.3	0.25	1.6	0.050	2.0	0.050	1.1
Cadmium	0.005	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	0.0077
Chloride	200.0	10	190	10	160	10	91	10	140	50	430	10	340	10	120	10	84	10	270
Chromium	0.1	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	1.0	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	0.033
Copper	0.65	0.0020	ND	0.0020	ND	0.0020	0.017	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.16
Cyanide	0.2	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	4.0	0.10	0.29^	0.10	0.38	0.10	0.37	0.10	0.31	0.10	0.29	0.10	0.32	0.10	0.37	0.10	0.38	0.10	0.33
Iron	5.0	0.10	0.15	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.17
Lead	0.0075	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	0.023
Manganese	0.15	0.0025	0.016	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.27
Mercury	0.002	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	0.1	0.0020	0.0020	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	0.0020	0.0020	0.16
Nitrogen/Nitrate	10.0	0.10	1.1	0.10	1.4	0.10	0.28	0.10	0.79	0.10	1.4	0.10	1.3	0.10	0.25	0.10	0.59	0.10	ND
Nitrogen/Nitrate, Nitri	NA	0.10	1.1	0.10	1.4	0.10	0.28	0.10	0.79	0.10	1.4	0.10	1.3	0.10	0.25	0.10	0.59	0.10	ND
Nitrogen/Nitrite	NA	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	0.0049	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	0.027
Selenium	0.05	0.0025	0.0043	0.0025	0.0034	0.0025	ND	0.0025	ND	0.0025	0.0041	0.0025	0.0043	0.0025	0.0069	0.0025	0.0040	0.0025	ND
Silver	0.05	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	400.0	50	110	25	100	25	100	25	110	25	130	25	100	25	91	50	120	100	290
Thallium	0.002	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	1,200	10	770	10	670	10	570	10	690	10	1100	10	850	10	720	10	580	10	1300
Vanadium	0.049	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	5.0	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	0.056
Benzene	0.005	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	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
pH	6.5 - 9.0	NA	7.60	NA	7.11	NA	7.33	NA	7.16	NA	9.25	NA	7.17	NA	6.78	NA	7.29	NA	7.16
Temperature	NA	NA	10.60	NA	12.10	NA	14.41	NA	15.41	NA	10.38	NA	10.97	NA	16.58	NA	15.17	NA	8.04
Conductivity	NA	NA	0.96	NA	0.774	NA	0.68	NA	0.95	NA	1.20	NA	1.25	NA	0.90	NA	0.95	NA	1.32
Dissolved Oxygen	NA	NA	7.99	NA	5.38	NA	5.69	NA	3.26	NA	4.81	NA	6.31	NA	5.14	NA	3.80	NA	2.98
ORP	NA	NA	167.1	NA	2.4	NA	26.5	NA	-58.4	NA	-51.0	NA	106.7	NA	87.8	NA	69.4	NA	108.2

Sample: MW-11	Date	5/28/2015		8/4/2015		10/29/2015		2/11/2016		5/11/2016		9/1/2016		11/2/2016		2/7/2017		4/26/2017	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	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	0.010	0.0010	0.0015	0.0010	0.0026	0.0010	ND	0.0010	0.0018	0.0010	0.0015	0.0010	0.0017	0.0010	0.0016	0.0010	0.0014	0.0010	0.0014
Barium	2.0	0.0025	0.059	0.0025	0.062	0.0025	0.069	0.0025	0.074	0.0025	0.066	0.0025	0.056	0.0025	0.062	0.0025	0.078	0.0025	0.051
Beryllium	0.004	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	2.0	0.050	1.0	0.050	1.4	0.050	0.78	0.050	1.4	0.050	1.5	0.050	1.6	0.050	1.6	0.050	1.3	0.050	1.1
Cadmium	0.005	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	200.0	10	290	10	150	10	120	10	230	10	240	10	110	10	93	10	240	10	150
Chromium	0.1	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	1.0	0.0010	0.0016	0.0010	0.0015	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND	0.0010	ND
Copper	0.65	0.0020	0.0073	0.0020	0.0022	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND	0.0020	ND ^	0.0020	ND ^
Cyanide	0.2	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	4.0	0.10	0.35	0.10	0.38	0.10	0.30	0.10	0.34	0.10	0.39	0.10	0.34	0.10	0.31	0.10	0.30	0.10	0.28
Iron	5.0	0.10	ND	0.10	ND	0.10	ND	0.10	0.12	0.10	ND	0.10	ND	0.10	ND	0.10	ND	0.10	ND
Lead	0.0075	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	0.15	0.0025	ND	0.0025	0.49	0.0025	0.040	0.0025	0.0034	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	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	0.1	0.0020	0.0097	0.0020	0.0099	0.0020	0.0028	0.0020	0.0028	0.0020	0.0031	0.0020	0.0020	0.0020	ND	0.0020	ND	0.0020	ND
Nitrogen/Nitrate	10.0	0.10	1.1	0.10	0.15	0.10	0.48	0.10	1.8	0.10	1.4	0.10	0.69	0.10	0.58	0.10	1.2	0.10	1.1
Nitrogen/Nitrate, Nitri	NA	0.10	1.1	0.10	0.15	0.10	0.48	0.10	1.8	0.10	1.4	0.10	0.69	0.10	0.58	0.10	1.2	0.10	1.1
Nitrogen/Nitrite	NA	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	0.0049	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.20	ND	0.0040	ND	0.0040	ND	0.0040	ND
Selenium	0.05	0.0025	0.0035	0.0025	0.0050	0.0025	ND	0.0025	0.0040	0.0025	0.0033	0.0025	0.0046	0.0025	ND	0.0025	0.0025	0.0025	0.0034
Silver	0.05	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	400.0	25	84	50	110	50	170	50	140	50	150	50	120	25	130	25	90	25	100
Thallium	0.002	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	1,200	10	860	10	700	10	740	10	880	10	920	10	660	10	640	10	830	10	620
Vanadium	0.049	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	5.0	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	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	0.0016	0.0005	ND	0.0005	ND
BETX	11.705	0.002	ND	0.002	ND	0.002	0.00094	0.002	ND	0.002	0.0023	0.002	ND	0.002	0.0394	0.002	ND	0.002	ND
pH	6.5 - 9.0	NA	7.42	NA	7.40	NA	7.26	NA	7.15	NA	7.24	NA	7.20	NA	7.18	NA	7.21	NA	7.47
Temperature	NA	NA	17.77	NA	17.05	NA	12.34	NA	6.49	NA	14.15	NA	18.10	NA	16.36	NA	12.91	NA	17.52
Conductivity	NA	NA	1.45	NA	1.08	NA	1.13	NA	0.87	NA	1.19	NA	1.03	NA	0.88	NA	1.04	NA	0.98
Dissolved Oxygen	NA	NA	5.44	NA	1.52	NA	8.45	NA	8.32	NA	8.21	NA	6.22	NA	4.89	NA	4.91	NA	6.50
ORP	NA	NA	121.5	NA	-25.7	NA	86.5	NA	139.1	NA	48.6	NA	53.3	NA	73.7	NA	133.0	NA	25.2

Sample: MW-11	Date	2/21/2018		8/1/2018		10/17/2018		2/5/2019		5/7/2019		8/6/2019		11/7/2019	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.0030	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.0010	0.0020	0.001	0.0012	0.001	0.0015	0.001	0.0013	0.001	0.0019	0.001	0.0011	0.001	ND
Barium	2.0	0.0025	0.084	0.0025	0.046	0.0025	0.064	0.0025	0.063	0.0025	0.058	0.0025	0.051	0.0025	0.033
Beryllium	0.004	0.0010	ND	0.001	ND	0.001	ND^	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	0.050	2.4	0.05	1.2 V	0.05	1.2	0.05	2.7	0.05	0.98	0.05	1.1	0.05	0.29
Cadmium	0.005	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200.0	10	260	10	120	10	160	10	170	10	290	10	130	10	130
Chromium	0.1	0.0050	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1.0	0.0010	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	0.0029
Cyanide	0.2	0.010	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND
Fluoride	4.0	0.10	0.29	0.1	0.29	0.1	0.27	0.1	0.27	0.1	0.34	0.1	0.24	0.1	0.37
Iron	5.0	0.10	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	0.25
Lead	0.0075	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	0.0029
Mercury	0.002	0.00020	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	10.0	0.10	1.5	0.1	0.41	0.1	0.66	0.1	0.92	0.1	1.4	0.1	0.34	0.1	1.8
Nitrogen/Nitrate, Nitri	NA	0.10	1.5	0.1	0.41	0.1	0.66	0.1	0.92	0.1	1.4	0.1	0.34	0.1	1.8
Nitrogen/Nitrite	NA	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND F1	0.02	ND
Perchlorate	0.0049	0.0040	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	0.0077	0.0025	0.0032 F1	0.0025	0.0029	0.0025	0.0056	0.0025	0.0056	0.0025	0.003	0.0025	ND
Silver	0.05	0.00050	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400.0	50	190	25	84	50	93	50	91	50	81	50	78	50	ND
Thallium	0.002	0.0020	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	1100	10	720	10	740	10	780	10	810	10	590	10	660
Vanadium	0.049	0.0050	0.0053	0.005	ND	0.005	ND^	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5.0	0.020	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	0.0029	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	0.0018	0.0025	0.0106	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.55	NA	7.39	NA	7.37	NA	7.33	NA	7.45	NA	7.42	NA	7.4
Temperature	NA	NA	9.05	NA	18.04	NA	14.41	NA	13.1	NA	10.9	NA	12.3	NA	11.89
Conductivity	NA	NA	0.953	NA	0.965	NA	0.866	NA	1.212	NA	2.24	NA	1.05	NA	1.085
Dissolved Oxygen	NA	NA	7.72	NA	5.84	NA	8.17	NA	7.00	NA	10.94	NA	7.00	NA	9.30
ORP	NA	NA	47.6	NA	88.9	NA	30.5	NA	122.0	NA	-234.2	NA	163.4	NA	-12.2

Sample: MW-11	Date	2/13/2020		5/20/2020		7/30/2020		10/22/2020		3/2/2021		5/18/2021	
Parameter	Standards	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	Result
Antimony	0.006	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Arsenic	0.010	0.001	0.0014	0.001	0.0023	0.001	0.0011	0.001	ND	0.001	0.0013	0.001	ND
Barium	2.0	0.0025	0.065	0.0025	0.085	0.0025	0.051	0.0025	0.055	0.0025	0.089	0.0025	0.078
Beryllium	0.004	0.001	ND	0.001	ND ^	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Boron	2.0	0.05	1.4	0.05	0.51	0.05	0.86	0.05	0.44	0.05	1.2	0.05	0.67
Cadmium	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Chloride	200.0	10	200	10	520	10	170	10	170	40	320	40	420
Chromium	0.1	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Cobalt	1.0	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND
Copper	0.65	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Cyanide	0.2	0.01	ND	0.01	ND	0.005	ND	0.01	ND	0.005	ND	0.005	0.0051
Fluoride	4.0	0.1	0.3	0.1	0.34	0.1	0.3	0.1	0.28	0.1	0.28	0.1	0.28
Iron	5.0	0.1	ND	0.1	0.23	0.1	ND	0.1	ND	0.1	ND	0.1	ND
Lead	0.0075	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Manganese	0.15	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
Mercury	0.002	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Nickel	0.1	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Nitrogen/Nitrate	10.0	0.1	0.79	0.1	2	0.1	0.85	0.1	0.59	0.1	1.1	0.1	1.4
Nitrogen/Nitrate, Nitri	NA	0.1	0.79	0.1	2	0.1	0.85	0.1	0.59	0.1	1.1	0.1	1.4
Nitrogen/Nitrite	NA	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Perchlorate	0.0049	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND	0.004	ND
Selenium	0.05	0.0025	0.0029	0.0025	0.0039	0.0025	ND	0.0025	ND	0.0025	0.0035	0.0025	0.0025
Silver	0.05	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
Sulfate	400.0	50	110	50	82	25	100	15	89	25	160	25	140
Thallium	0.002	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND
Total Dissolved Solids	1,200	10	710	10	1400	30	670	30	710	10	1000	10	1200
Vanadium	0.049	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Zinc	5.0	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND
Benzene	0.005	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND	0.0005	ND
BETX	11.705	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND	0.0025	ND
pH	6.5 - 9.0	NA	7.3	NA	7.12	NA	7.13	NA	7.11	NA	7.33	NA	7.22
Temperature	NA	NA	13.7	NA	12.2	NA	12.1	NA	12.7	NA	12.5	NA	13.2
Conductivity	NA	NA	1.138	NA	2.323	NA	1.332	NA	1.51	NA	1.702	NA	2.022
Dissolved Oxygen	NA	NA	8.76	NA	11.05	NA	9.19	NA	4.79	NA	9.97	NA	10.34
ORP	NA	NA	156.1	NA	139.8	NA	140.8	NA	172.5	NA	27.7	NA	152.2

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
^ - Denotes instrument related QC exceeds the control 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 Joliet #29 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; 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.

JOSHUA D. DAVENPORT
062-061945
STATE OF ILLINOIS

Attachment 9-5 – CCR Compliance Statistical Approach

K P R G

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

ILLINOIS STATE CCR RULE COMPLIANCE STATISTICAL APPROACH FOR GROUNDWATER DATA EVALUATION

Midwest Generation, LLC
Joliet #29 Generating Station
1800 Channahon Road
Joliet, Illinois

PREPARED BY:

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

August 19, 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 Joliet #29 facility, Ash Pond 2 requires monitoring under the State CCR Rule. The monitoring well network around this pond consists of four monitoring wells (MW-3, MW-4, MW-5 and MW-10 [upgradient]) as 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 Joliet #29 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 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 location (in this case well MW-10) 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^{TM} 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:

$$95\%\ \mathit{Prediction\ Limit}\ = \bar{x} + t_{1-0.05/m,n-1} s\sqrt{1+\frac{1}{n}}$$

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 19, 2021, the statistical procedures developed and selected for evaluation of groundwater data associated with the Midwest Generation Joliet #29 Station CCR Unit are adequate and appropriate for evaluating the groundwater data.

Certified by: ______________________________

Date: 8/19/21

Joshua Davenport, P.E.

Professional Engineer Registration No. 062.061945

KPRG and Associates, Inc.

JOSHUA D. DAVENPORT
062-061945

FIGURE

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

KPRG

KPRG and Associates, inc.

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CCR MONITORING WELLS SITE MAP

JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS

Scale: 1" = 100'

Date: December 27, 2017

KPRG Project No. 12313.0

FIGURE 1

W:\projects\midwest generation\attorney-client privilege gw evaluations\joliet #29 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
JOLIET #29 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.

The proposed site-specific GWPSs for the Joliet #29 Generating Station are summarized in Table 9-7 in Section 9 of this Operating Permit. The background Prediction Limit values presented in that table were developed, where possible, by combining or “pooling” as many background data points as possible. This includes evaluating whether the initial eight rounds of data generated as part of Federal CCR Rule compliance that was completed between 2015 and 2017 can be combined with subsequent available data from ongoing groundwater monitoring since that time at the upgradient monitoring well location (MW-10). 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 significant 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. Ten rounds of turbidity measurements were collected this calendar year (2021) since this was a new state requirement that was not part of the Federal CCR Rule.

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. Well MW-10 is the upgradient well. Wells MW-03 through MW-05 are the downgradient monitoring wells. The following statistically significant outliers (dates in parentheses) were noted:

- Barium – MW-03 (5/18/21) and MW-04 (5/18/21)
- Combined Radium – MW-04 (10/28/2015 and 2/10/16)
- Lead – MW-04 (11/2/16)
- Lithium – MW-03 (11/2/16) and MW-10 (4/26/17)

- Molybdenum – MW-04 (5/18/21)
- pH – MW-04 (5/10/16)

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. No statistically significant seasonal/temporal variations were noted in any of the wells for any of the parameters. 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 the upgradient monitoring well location (MW-10), trend analysis for each constituent at each upgradient well location was performed. The results are summarized as flows:

- MW-10 – Statistically significant trends were noted for calcium, chloride and total dissolved solids (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.

Spatial Variability Testing

Since only one upgradient monitoring well is being used for establishing a statistical background, spatial variability testing for the purposes of background calculations is not applicable at this time.

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 full background dataset for each constituent, which includes all available data through the second quarter 2021, at upgradient well location MW-10. 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. For all constituents the data distribution or underlying transformed data distribution, were found to be normal with the exception of antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, mercury, selenium and thallium. The various distributions or underlying transformed distributions for these parameters were found not to be normal due to the large number of non-detect values and will need to be handled through non-parametric analysis methods. The statistical run summary is 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:

- Upgradient well MW-10 all parameter values pooled for all constituents through the second quarter 2021 except calcium, chloride and TDS. These datasets did not show any statistically significant trends or temporal variation in the expanded datasets.
- Upgradient well MW-10 original eight background values were used for calcium, chloride and TDS since there were noted statistically significant trends in the expanded datasets.
- Upgradient well MW-10 all ten turbidity measurements were used since no statistically significant trend was noted in the data.

The calculated prediction limits (PLs) under the above background dataset selection scenarios are summarized in Table 9-7 in Section 9 of this permit application. A prediction limit statistical run summary which includes the specific statistical method used for each parameter is provided at the end of this discussion.

Outlier Analysis - Joliet #29 - All CCR Wells

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29 Printed 8/8/2021, 9:59 AM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	12	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	12	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	12	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.003	0	unknown	ShapiroWilk
Arsenic (mg/L)	MW-03	No	n/a	n/a	EPA 1989	0.05	12	0.0016	0.0003015	normal	ShapiroWilk
Arsenic (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	12	0.001658	0.0003825	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	12	0.001608	0.0005869	normal	ShapiroWilk
Arsenic (mg/L)	MW-10 (bg)	No	n/a	n/a	NP (nrm)	NaN	12	0.001175	0.0002598	unknown	ShapiroWilk
Barium (mg/L)	**MW-03**	**Yes**	**0.14**	**5/18/2021**	**Dixon`s**	**0.05**	**12**	**0.09942**	**0.01466**	**normal**	**ShapiroWilk**
Barium (mg/L)	**MW-04**	**Yes**	**0.12**	**5/18/2021**	**Dixon`s**	**0.05**	**12**	**0.08867**	**0.01203**	**normal**	**ShapiroWilk**
Barium (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	12	0.06733	0.01459	normal	ShapiroWilk
Barium (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	12	0.04258	0.00709	normal	ShapiroWilk
Beryllium (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	12	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	12	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	12	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.001	0	unknown	ShapiroWilk
Boron (mg/L)	MW-03	No	n/a	n/a	EPA 1989	0.05	17	0.4006	0.08555	normal	ShapiroWilk
Boron (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	19	0.3926	0.1551	ln(x)	ShapiroWilk
Boron (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	17	0.4776	0.197	ln(x)	ShapiroWilk
Boron (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	19	0.4374	0.1443	ln(x)	ShapiroWilk
Cadmium (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0005	0	unknown	ShapiroWilk
Calcium (mg/L)	MW-03	No	n/a	n/a	NP (nrm)	NaN	17	101.7	10.75	unknown	ShapiroWilk
Calcium (mg/L)	MW-04	No	n/a	n/a	NP (nrm)	NaN	17	101.1	10.55	unknown	ShapiroWilk
Calcium (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	18	114.8	27.05	normal	ShapiroWilk
Calcium (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	18	112.1	18.78	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-03	No	n/a	n/a	EPA 1989	0.05	17	213.5	42.56	normal	ShapiroWilk
Chloride (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	18	216.1	49.96	normal	ShapiroWilk
Chloride (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	19	221.5	113.2	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	19	227.9	86.77	ln(x)	ShapiroWilk
Chromium (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	12	0.005008	0.0000...	unknown	ShapiroWilk
Chromium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	12	0.007917	0.0101	unknown	ShapiroWilk
Chromium (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	12	0.005108	0.000345	unknown	ShapiroWilk
Chromium (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.005	0	unknown	ShapiroWilk
Cobalt (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	12	0.001008	0.0000...	unknown	ShapiroWilk
Cobalt (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	12	0.0076	0.003815	normal	ShapiroWilk
Cobalt (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	12	0.00105	0.0001168	unknown	ShapiroWilk
Cobalt (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.001	0	unknown	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-03	No	n/a	n/a	NP (nrm)	NaN	11	0.6191	0.4393	unknown	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	**MW-04**	**Yes**	**0.741,1.52**	**10/28/201...**	**Dixon`s**	**0.05**	**11**	**0.5169**	**0.3544**	**normal**	**ShapiroWilk**
Combined Radium 226 + 228 (pCi/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	11	0.5354	0.2161	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	11	0.4169	0.08566	normal	ShapiroWilk
Fluoride (mg/L)	MW-03	No	n/a	n/a	EPA 1989	0.05	17	0.4153	0.02348	normal	ShapiroWilk
Fluoride (mg/L)	MW-04	No	n/a	n/a	NP (nrm)	NaN	17	0.4359	0.03144	unknown	ShapiroWilk
Fluoride (mg/L)	MW-05	No	n/a	n/a	NP (nrm)	NaN	17	0.3759	0.06727	unknown	ShapiroWilk
Fluoride (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	17	0.4047	0.03145	normal	ShapiroWilk
Lead (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0005	0	unknown	ShapiroWilk
Lead (mg/L)	**MW-04**	**Yes**	**0.0012**	**11/2/2016**	**NP (nrm)**	**NaN**	**12**	**0.000595**	**0.000207**	**unknown**	**ShapiroWilk**

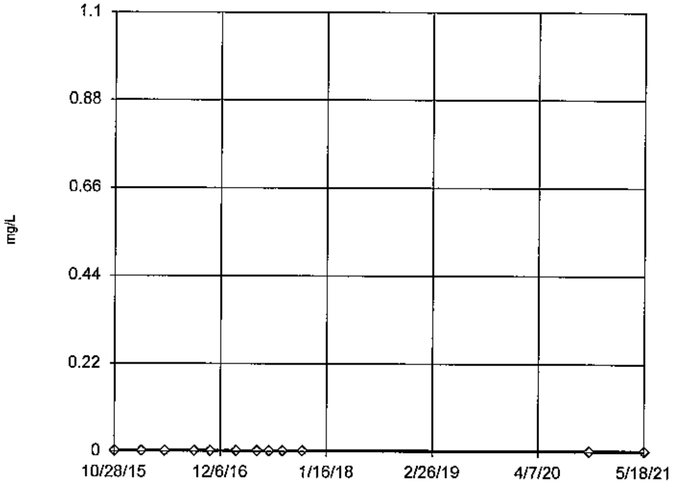
Outlier Analysis - Joliet #29 - All CCR Wells

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29 Printed 8/8/2021, 9:59 AM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Lead (mg/L)	MW-05	No	n/a	n/a	NP (nrm)	NaN	12	0.00115	0.0007799	unknown	ShapiroWilk
Lead (mg/L)	MW-10 (bg)	No	n/a	n/a	NP (nrm)	NaN	12	0.000...	0.0003144	unknown	ShapiroWilk
Lithium (mg/L)	**MW-03**	**Yes**	**0.005**	**11/2/2016**	**Dixon`s**	**0.05**	**12**	**0.01117**	**0.00225**	**normal**	**ShapiroWilk**
Lithium (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	12	0.01258	0.001165	normal	ShapiroWilk
Lithium (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	12	0.01408	0.005583	normal	ShapiroWilk
Lithium (mg/L)	**MW-10 (bg)**	**Yes**	**0.005**	**4/26/2017**	**Dixon`s**	**0.05**	**12**	**0.0115**	**0.002505**	**normal**	**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	12	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-03	No	n/a	n/a	NP (nrm)	NaN	12	0.005733	0.002192	unknown	ShapiroWilk
Molybdenum (mg/L)	**MW-04**	**Yes**	**0.0025**	**5/18/2021**	**Dixon`s**	**0.05**	**12**	**0.007017**	**0.001743**	**normal**	**ShapiroWilk**
Molybdenum (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	12	0.00605	0.002842	normal	ShapiroWilk
Molybdenum (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	12	0.006342	0.0008898	normal	ShapiroWilk
pH (n/a)	MW-03	No	n/a	n/a	EPA 1989	0.05	17	7.243	0.1543	normal	ShapiroWilk
pH (n/a)	**MW-04**	**Yes**	**6.71**	**5/10/2016**	**Dixon`s**	**0.05**	**17**	**7.223**	**0.1744**	**normal**	**ShapiroWilk**
pH (n/a)	MW-05	No	n/a	n/a	EPA 1989	0.05	17	7.183	0.1793	normal	ShapiroWilk
pH (n/a)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	17	7.151	0.1617	normal	ShapiroWilk
Selenium (mg/L)	MW-03	No	n/a	n/a	NP (nrm)	NaN	12	0.00355	0.001102	unknown	ShapiroWilk
Selenium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	12	0.002575	0.0001765	unknown	ShapiroWilk
Selenium (mg/L)	MW-05	No	n/a	n/a	NP (nrm)	NaN	12	0.0064	0.006791	unknown	ShapiroWilk
Selenium (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0025	0	unknown	ShapiroWilk
Sulfate (mg/L)	MW-03	No	n/a	n/a	EPA 1989	0.05	20	113.7	38.23	ln(x)	ShapiroWilk
Sulfate (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	19	116.8	37.08	normal	ShapiroWilk
Sulfate (mg/L)	MW-05	No	n/a	n/a	EPA 1989	0.05	18	128.7	60.87	ln(x)	ShapiroWilk
Sulfate (mg/L)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	18	109.8	37.14	ln(x)	ShapiroWilk
Thallium (mg/L)	MW-03	n/a	n/a	n/a	NP (nrm)	NaN	12	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-04	n/a	n/a	n/a	NP (nrm)	NaN	12	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-05	n/a	n/a	n/a	NP (nrm)	NaN	12	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	MW-10 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.002	0	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-03	No	n/a	n/a	EPA 1989	0.05	19	879.5	153.5	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-04	No	n/a	n/a	EPA 1989	0.05	20	866	138.9	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-05	No	n/a	n/a	NP (nrm)	NaN	20	875.5	207.8	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-10 (bg)	No	n/a	n/a	NP (nrm)	NaN	20	856.5	160.7	unknown	ShapiroWilk

Tukey's Outlier Screening

MW-03



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

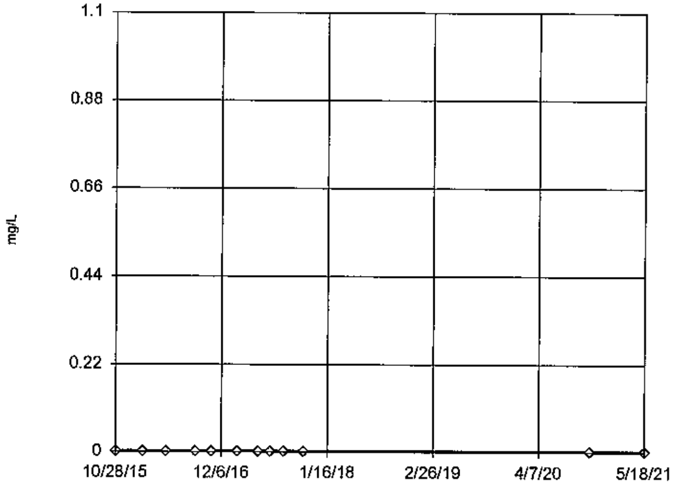
Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

MW-04



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

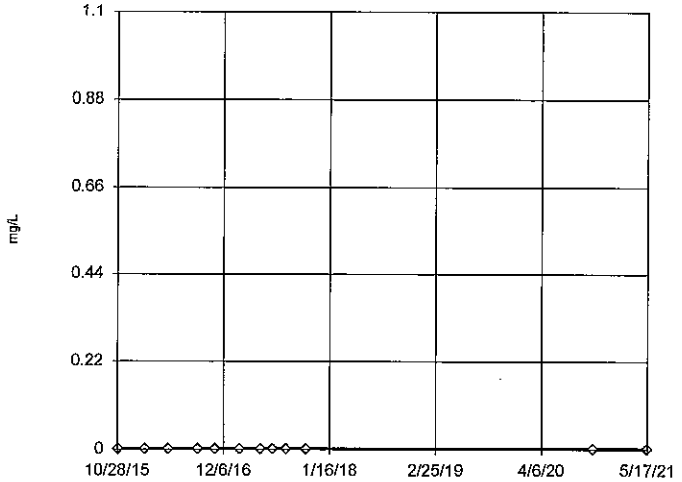
Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

MW-05



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

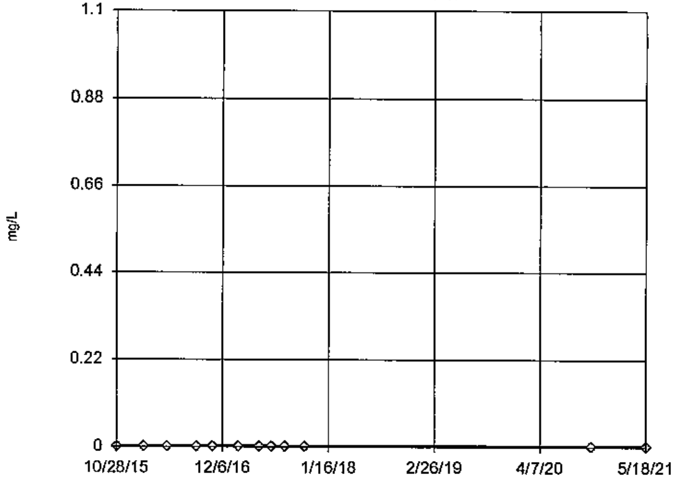
Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

MW-10 (bg)



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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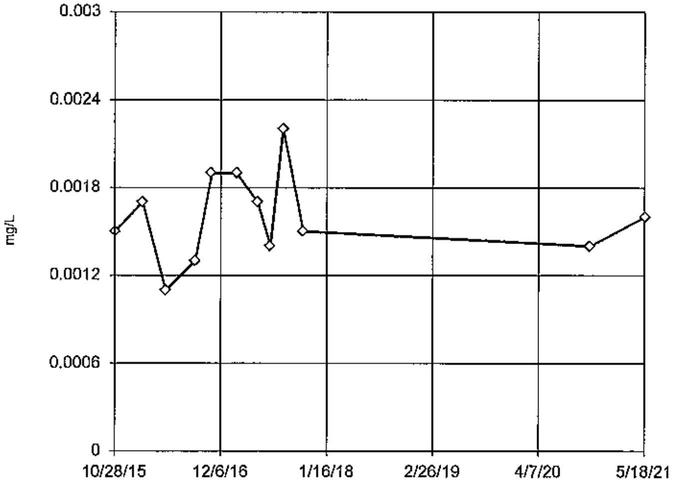
EPA Screening (suspected outliers for Dixon's Test)

MW-03



n = 12

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.0016, std. dev.
0.0003015, critical Tn
2.285

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9764
Critical = 0.883
The distribution was found
to be normally distributed.

Constituent: Arsenic Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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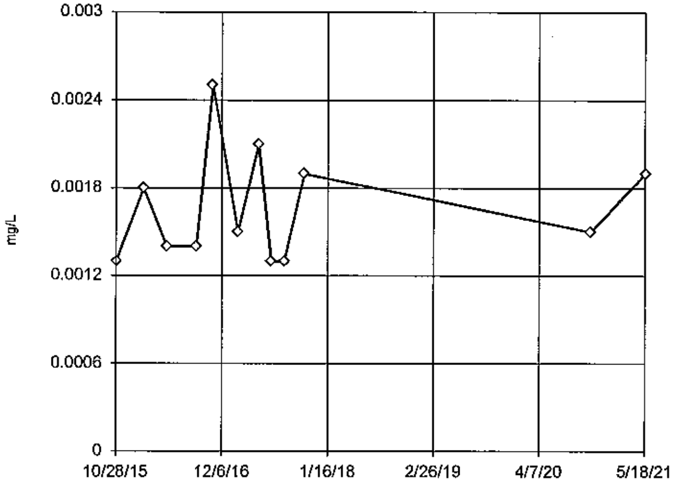
EPA Screening (suspected outliers for Dixon's Test)

MW-04



n = 12

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.001658, std. dev.
0.0003825, critical Tn
2.285

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8891
Critical = 0.883 (after
natural log transformation)
The distribution was found
to be log-normal.

Constituent: Arsenic Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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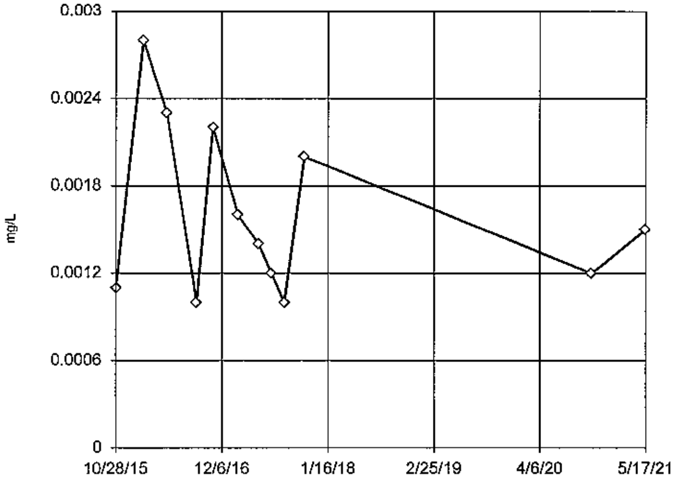
EPA Screening (suspected outliers for Dixon's Test)

MW-05



n = 12

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.001608, std. dev.
0.0005869, critical Tn
2.285

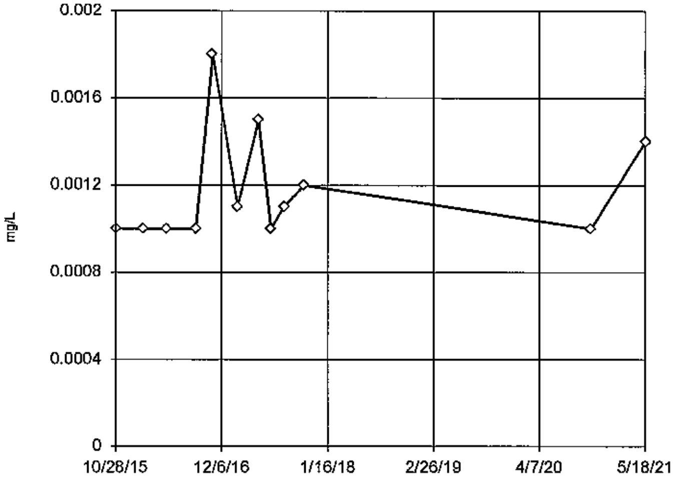
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8961
Critical = 0.883
The distribution was found
to be normally distributed.

Constituent: Arsenic Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG

Tukey's Outlier Screening

MW-10 (bg)



n = 12

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

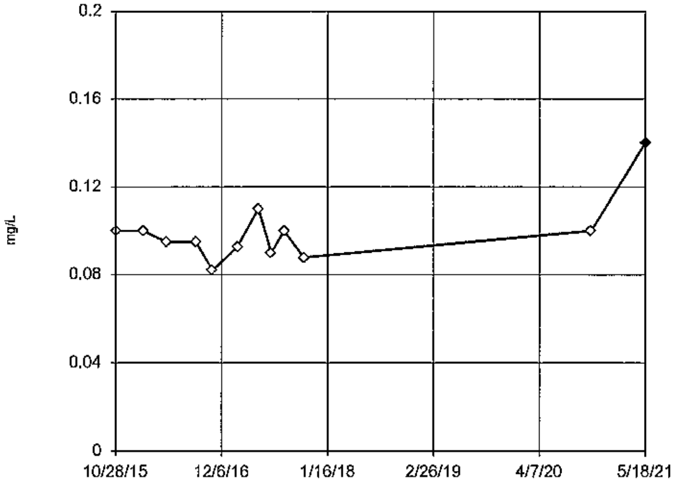
Data were natural log
transformed to achieve
best W statistic (graph
shown in original units).

High cutoff = 0.002822,
low cutoff = 0.0004592,
based on IQR multiplier
of 3.

Constituent: Arsenic Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Dixon's Outlier Test

MW-03



n = 12

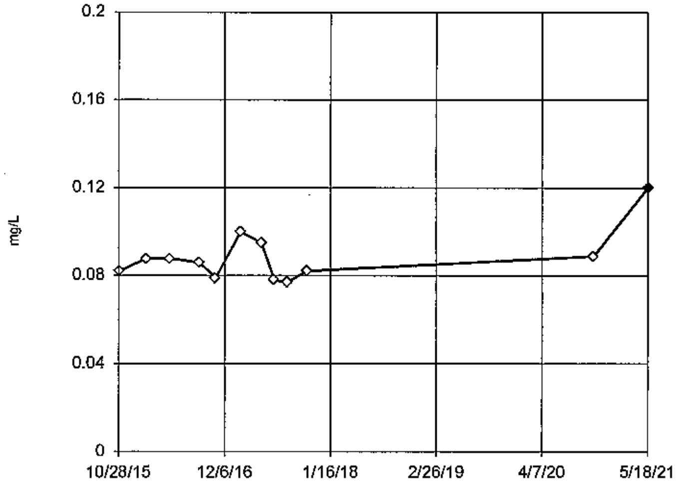
Statistical outlier is
drawn as solid.
Testing for 1 high outlier.
Mean = 0.09942.
Std. Dev. = 0.01466.
0.14: c = 0.7692
tabl = 0.546.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9563
Critical = 0.876
The distribution, after
removal of suspect value, was found to be normally distributed.

Constituent: Barium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Dixon's Outlier Test

MW-04



n = 12

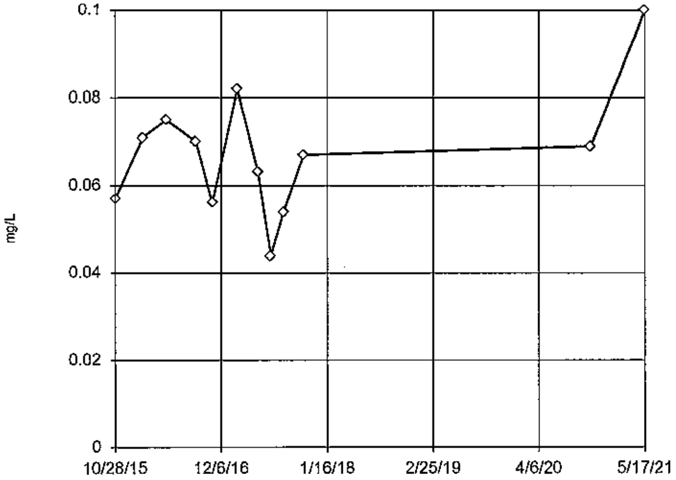
Statistical outlier is
drawn as solid.
Testing for 1 high outlier.
Mean = 0.08867.
Std. Dev. = 0.01203.
0.12: c = 0.5952
tabl = 0.546.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9358
Critical = 0.876
The distribution, after
removal of suspect value, was found to be normally distributed.

Constituent: Barium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

MW-05



n = 12

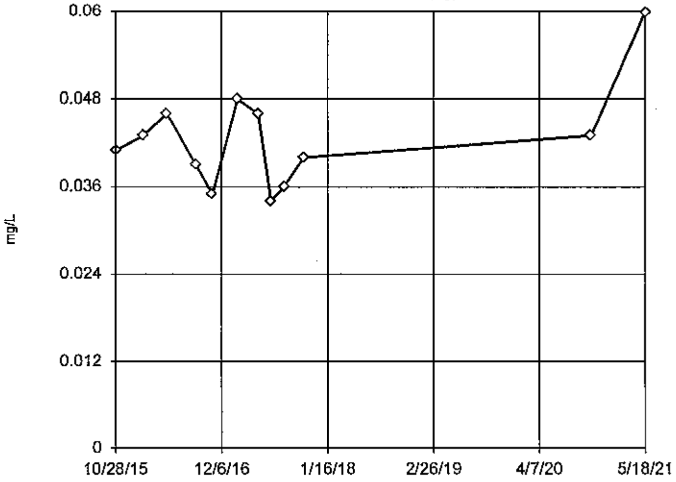
Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.06733, std. dev.
0.01459, critical Tn 2.285

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9581
Critical = 0.883
The distribution was found
to be normally distributed.

Constituent: Barium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

MW-10 (bg)



n = 12

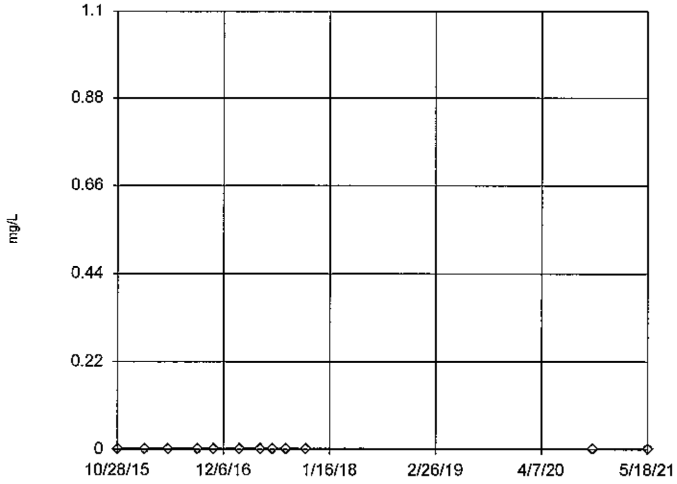
Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.04258, std. dev.
0.00709, critical Tn 2.285

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9036
Critical = 0.883
The distribution was found
to be normally distributed.

Constituent: Barium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

MW-03



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

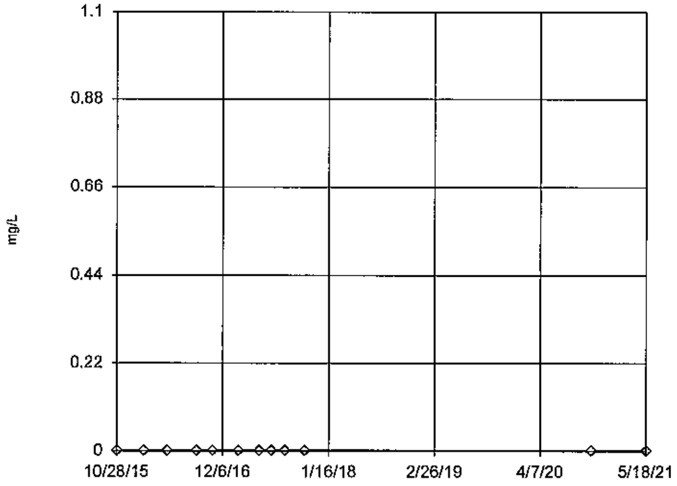
Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Beryllium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

MW-04



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

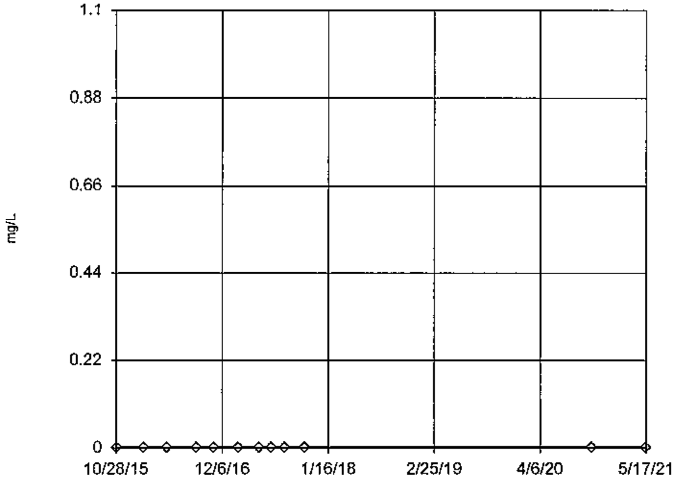
Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Beryllium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

MW-05



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

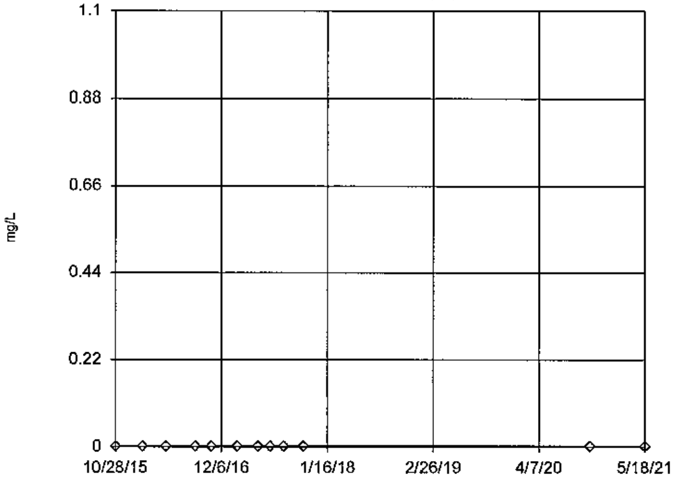
Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Beryllium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

MW-10 (bg)



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Beryllium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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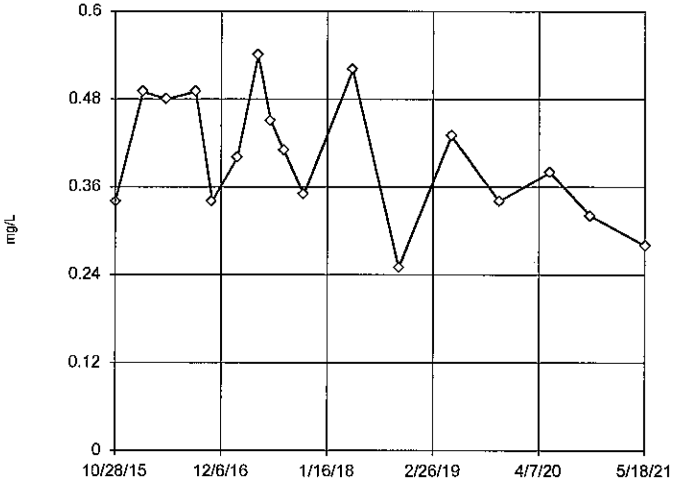
EPA Screening (suspected outliers for Dixon's Test)

MW-03



n = 17

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.4006, std. dev.
0.08555, critical Tn 2.475

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9644
Critical = 0.91
The distribution was found
to be normally distributed.

Constituent: Boron Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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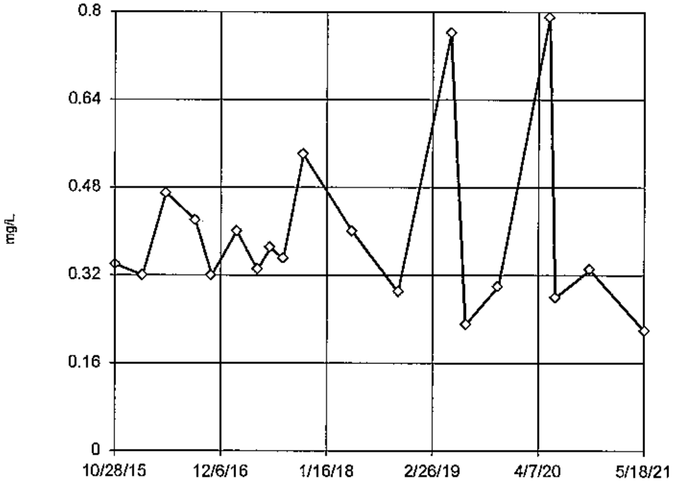
EPA Screening (suspected outliers for Dixon's Test)

MW-04



n = 19

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.3926, std. dev.
0.1551, critical Tn 2.532

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9189
Critical = 0.917 (after
natural log transformation)
The distribution was found
to be log-normal.

Constituent: Boron Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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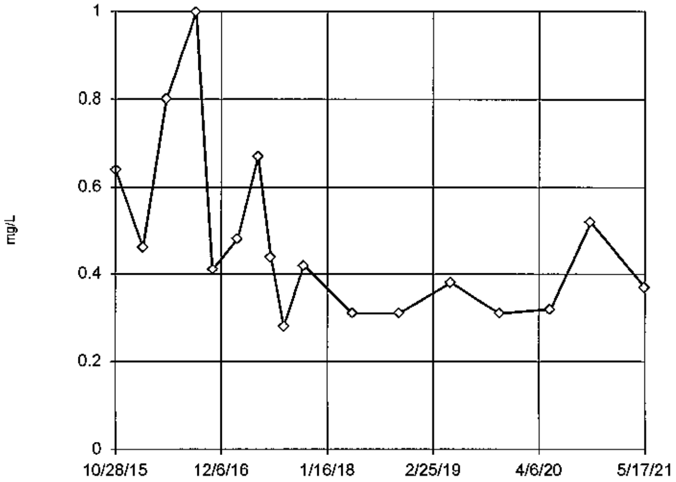
EPA Screening (suspected outliers for Dixon's Test)

MW-05



n = 17

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.4776, std. dev.
0.197, critical Tn 2.475

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9293
Critical = 0.91 (after
natural log transformation)
The distribution was found
to be log-normal.

Constituent: Boron Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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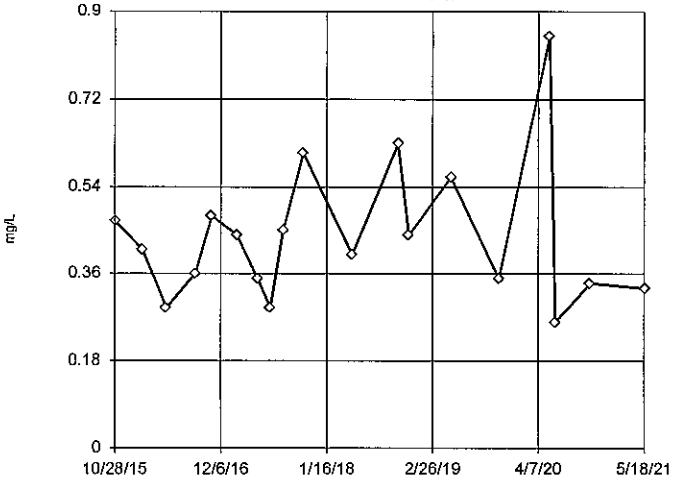
EPA Screening (suspected outliers for Dixon's Test)

MW-10 (bg)



n = 19

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.4374, std. dev.
0.1443, critical Tn 2.532

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9662
Critical = 0.917 (after
natural log transformation)
The distribution was found
to be log-normal.

Constituent: Boron Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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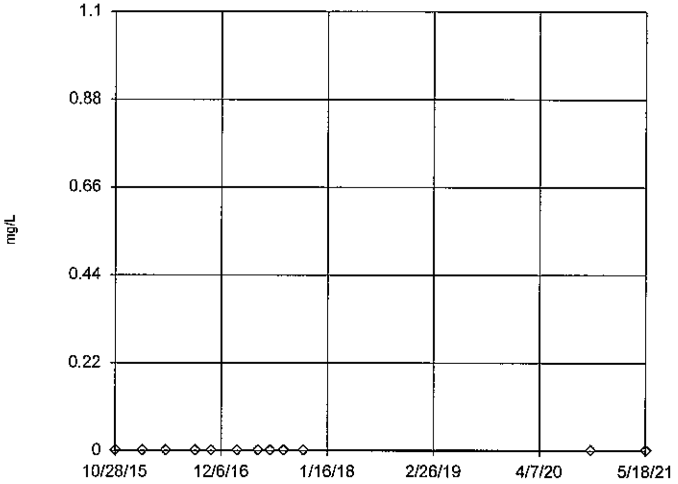
Tukey's Outlier Screening

MW-03



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cadmium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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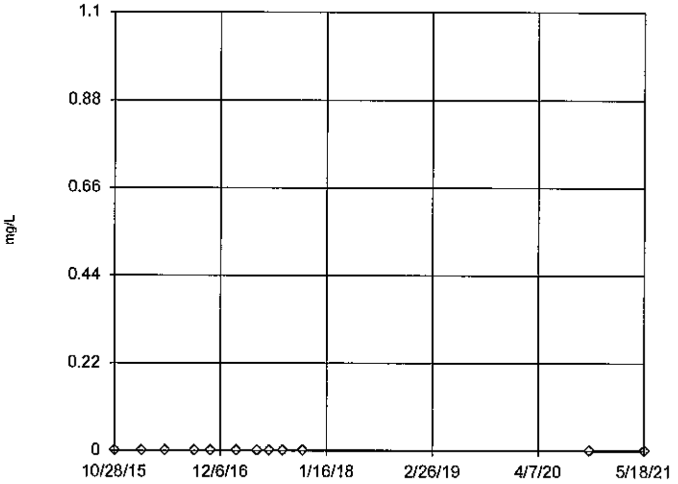
Tukey's Outlier Screening

MW-04



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cadmium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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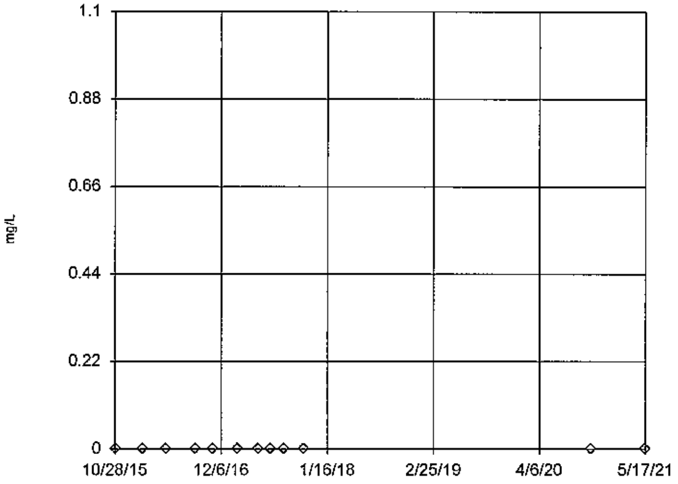
Tukey's Outlier Screening

MW-05



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cadmium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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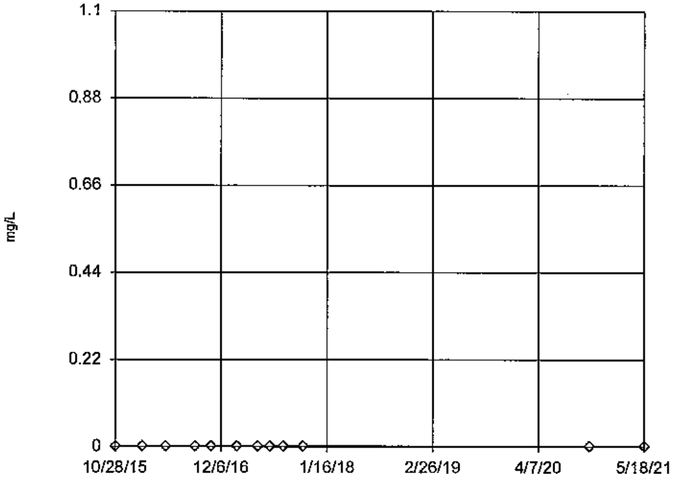
Tukey's Outlier Screening

MW-10 (bg)



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cadmium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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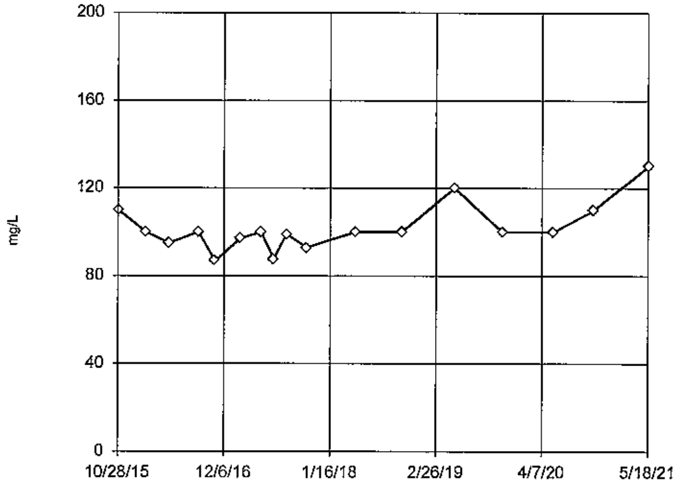
Tukey's Outlier Screening

MW-03



n = 17

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Data were natural log
transformed to achieve
best W statistic (graph
shown in original units).

High cutoff = 136.8, low
cutoff = 73.6, based on
IQR multiplier of 3.

Constituent: Calcium   Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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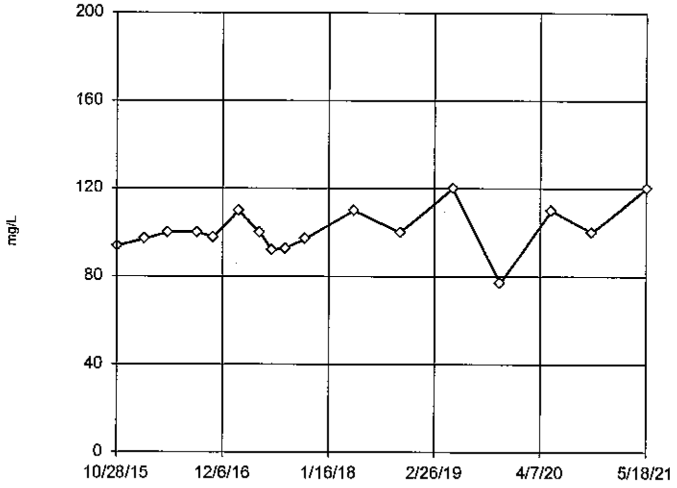
Tukey's Outlier Screening

MW-04



n = 17

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 153.5, low
cutoff = 52, based on
IQR multiplier of 3.

Constituent: Calcium   Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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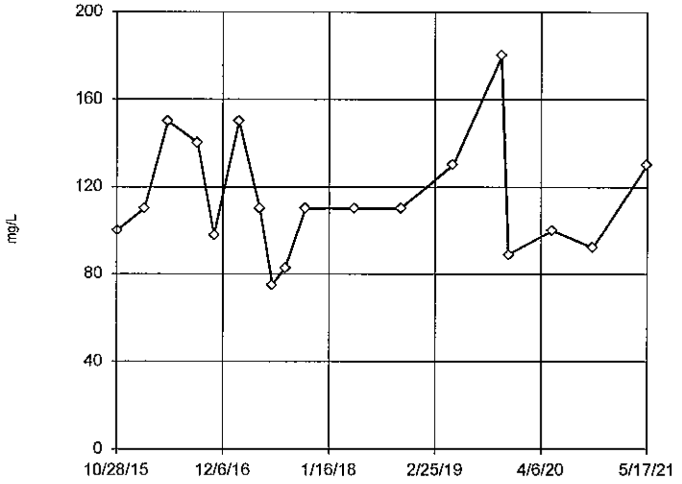
EPA Screening (suspected outliers for Dixon's Test)

MW-05



n = 18

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 114.8, std. dev.
27.05, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9358
Critical = 0.914
The distribution was found
to be normally distributed.

Constituent: Calcium   Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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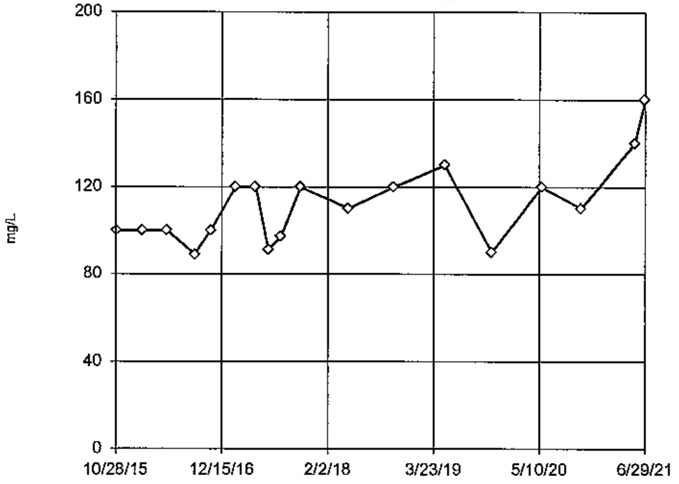
EPA Screening (suspected outliers for Dixon's Test)

MW-10 (bg)



n = 18

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 112.1, std. dev.
18.78, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9362
Critical = 0.914 (after
natural log transformation)
The distribution was found
to be log-normal.

Constituent: Calcium   Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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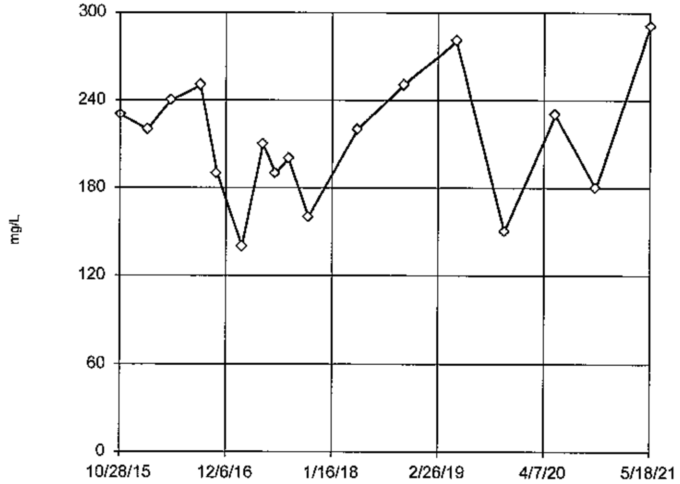
EPA Screening (suspected outliers for Dixon's Test)

MW-03



n = 17

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 213.5, std. dev.
42.56, critical Tn 2.475

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9787
Critical = 0.91
The distribution was found
to be normally distributed.

Constituent: Chloride Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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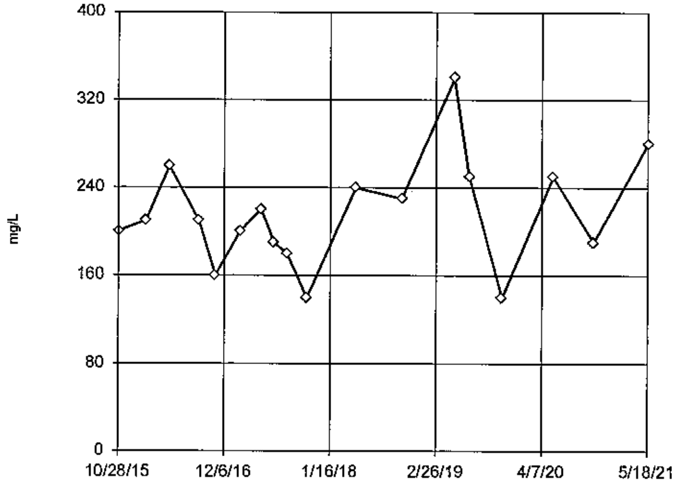
EPA Screening (suspected outliers for Dixon's Test)

MW-04



n = 18

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 216.1, std. dev.
49.96, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9616
Critical = 0.914
The distribution was found
to be normally distributed.

Constituent: Chloride Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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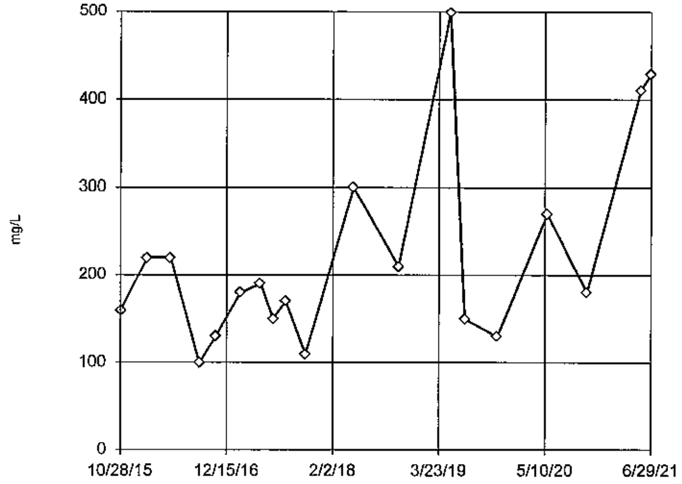
EPA Screening (suspected outliers for Dixon's Test)

MW-05



n = 19

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 221.5, std. dev.
113.2, critical Tn 2.532

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9488
Critical = 0.917 (after
natural log transformation)
The distribution was found
to be log-normal.

Constituent: Chloride Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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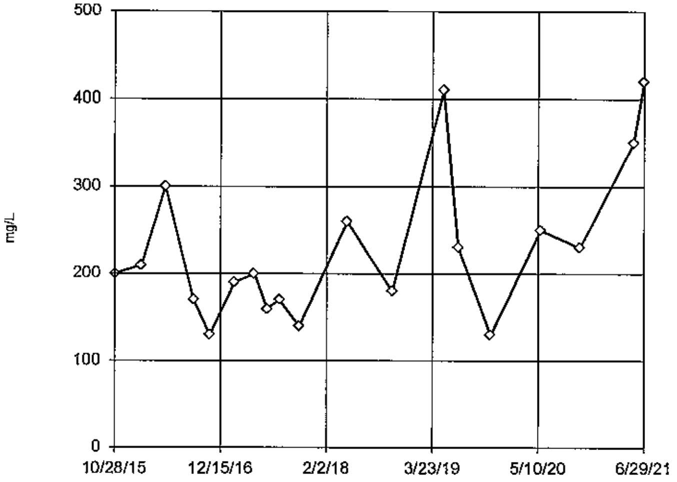
EPA Screening (suspected outliers for Dixon's Test)

MW-10 (bg)



n = 19

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 227.9, std. dev.
86.77, critical Tn 2.532

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9492
Critical = 0.917 (after
natural log transformation)
The distribution was found
to be log-normal.

Constituent: Chloride Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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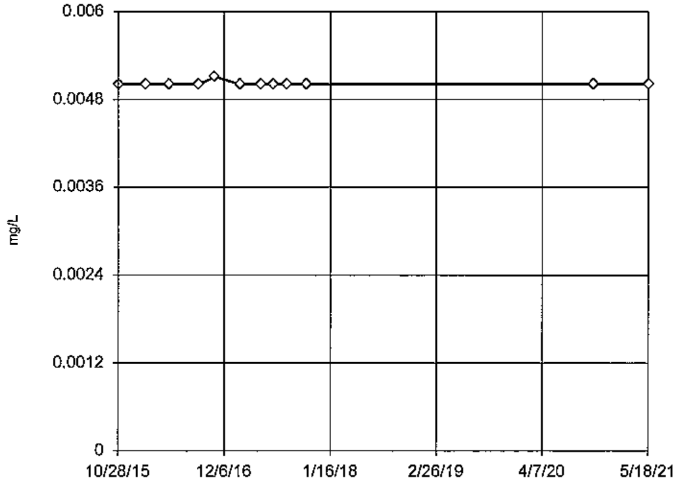
Tukey's Outlier Screening

MW-03



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Chromium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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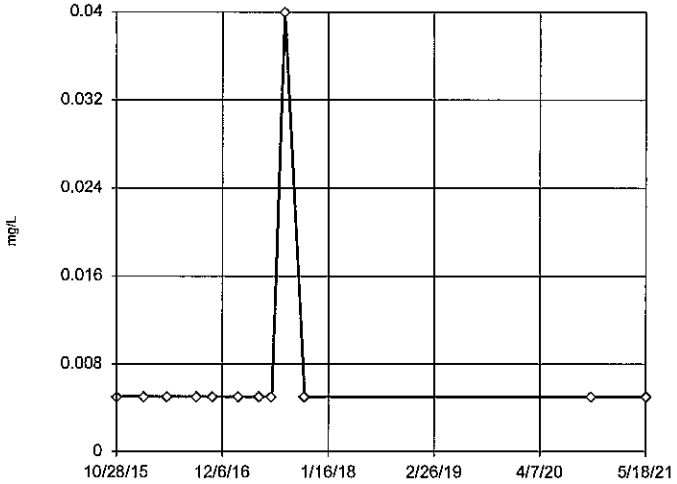
Tukey's Outlier Screening

MW-04



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were cube transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Chromium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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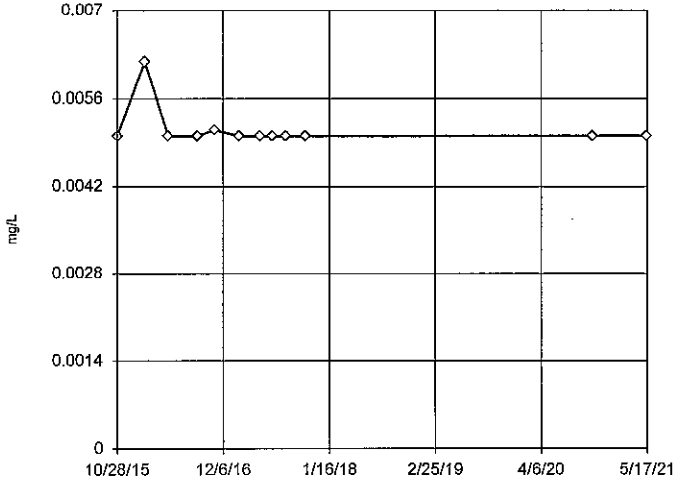
Tukey's Outlier Screening

MW-05



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Chromium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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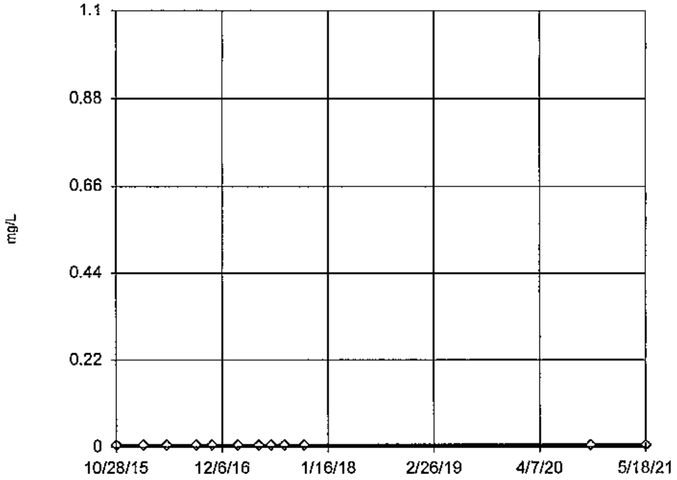
Tukey's Outlier Screening

MW-10 (bg)



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Chromium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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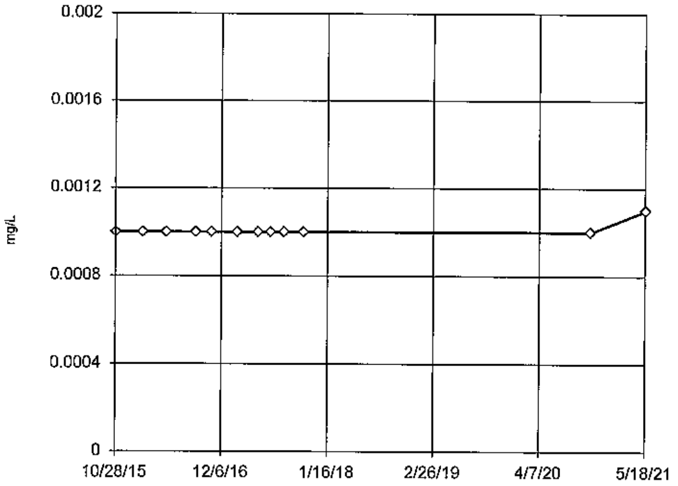
Tukey's Outlier Screening

MW-03



n = 12

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Data were square trans-
formed to achieve best
W statistic (graph shown
in original units).

The results were invalid-
ated, because the lower
and upper quartiles are
equal.

Constituent: Cobalt Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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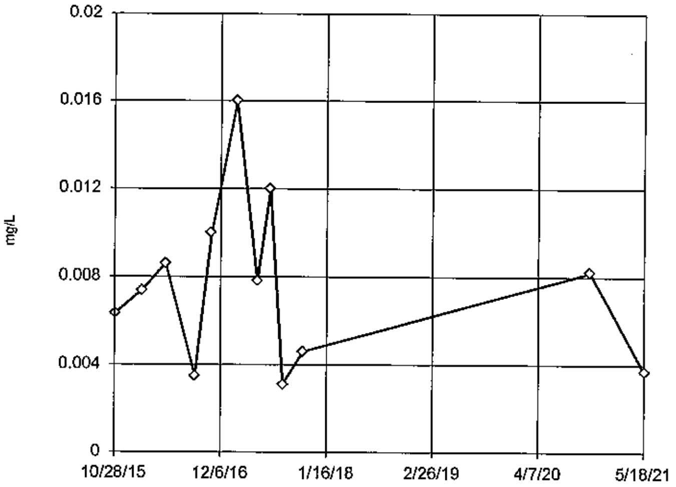
EPA Screening (suspected outliers for Dixon's Test)

MW-04



n = 12

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.0076, std. dev.
0.003815, critical Tn
2.285

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9282
Critical = 0.883
The distribution was found
to be normally distrib-
uted.

Constituent: Cobalt Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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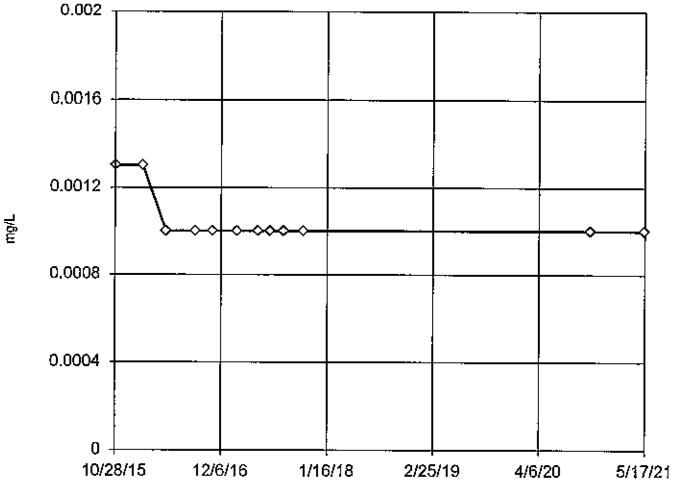
Tukey's Outlier Screening

MW-05



n = 12

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Data were square root
transformed to achieve
best W statistic (graph
shown in original units).

The results were invalid-
ated, because the lower
and upper quartiles are
equal.

Constituent: Cobalt Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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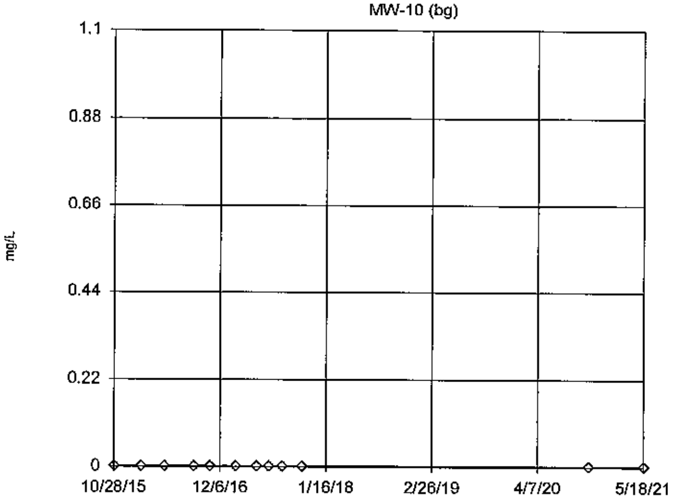
Tukey's Outlier Screening

MW-10 (bg)



n = 12

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Data were cube root trans-
formed to achieve best
W statistic (graph shown
in original units).

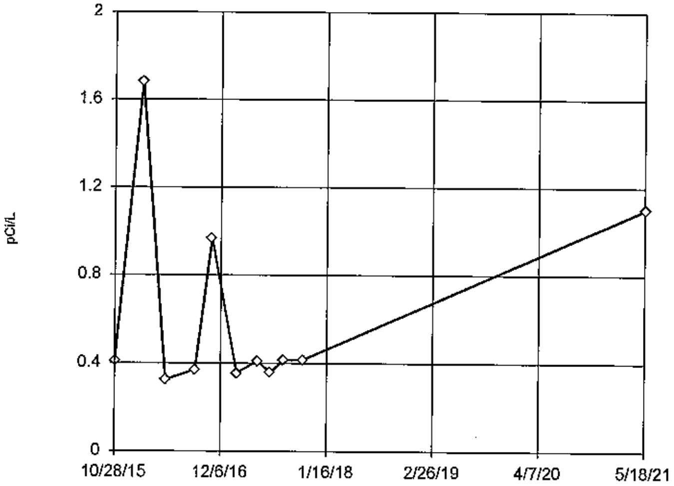
The results were invalid-
ated, because the lower
and upper quartiles are
equal.

Constituent: Cobalt Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

MW-03



n = 11

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

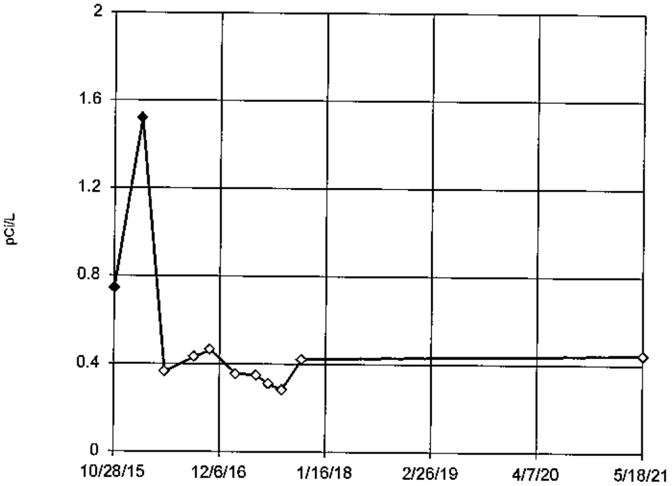
Data were natural log
transformed to achieve
best W statistic (graph
shown in original units).

High cutoff = 18.9, low
cutoff = 0.01828, based
on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Dixon's Outlier Test

MW-04



n = 11

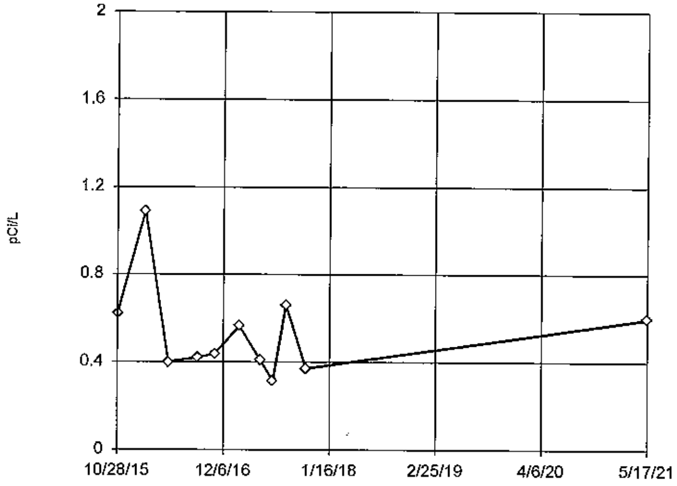
Statistical outliers are
drawn as solid.
Testing for 2 high outliers.
Mean = 0.5169.
Std. Dev. = 0.3544.
0.741: c = 0.6852
tabl = 0.576.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9376
Critical = 0.859
The distribution, after
removal of suspect values, was found to be normally distributed.

Constituent: Combined Radium 226 + 228 Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

MW-05



n = 11

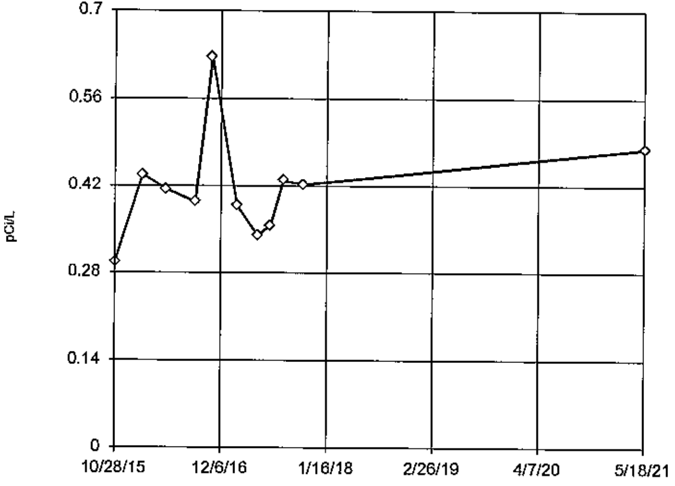
Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.5354, std. dev.
0.2161, critical Tn 2.234

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9228
Critical = 0.876 (after
natural log transformation)
The distribution was found
to be log-normal.

Constituent: Combined Radium 226 + 228 Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

MW-10 (bg)



n = 11

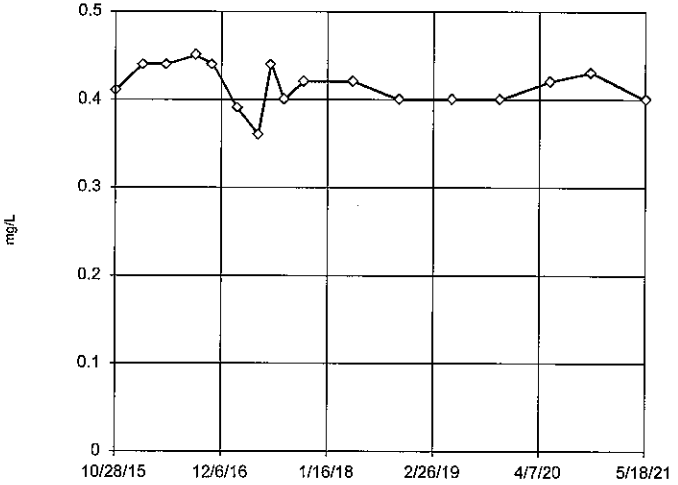
Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.4169, std. dev.
0.08566, critical Tn 2.234

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8951
Critical = 0.876
The distribution was found
to be normally distributed.

Constituent: Combined Radium 226 + 228 Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

MW-03



n = 17

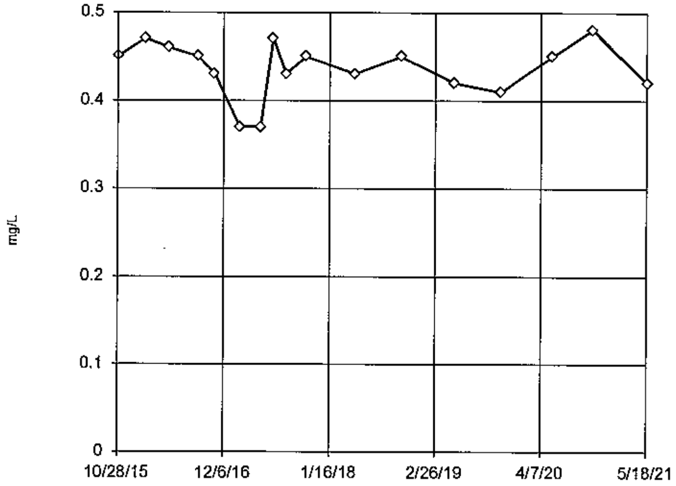
Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.4153, std. dev.
0.02348, critical Tn 2.475

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9266
Critical = 0.91
The distribution was found
to be normally distributed.

Constituent: Fluoride Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

MW-04



n = 17

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

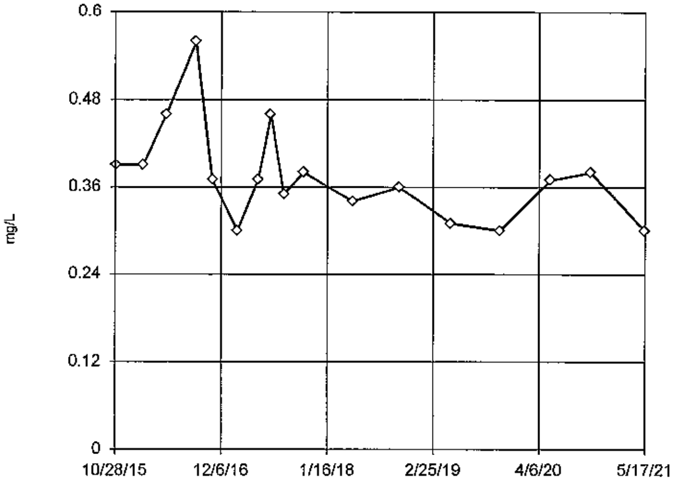
Data were x^6 transformed to achieve best W statistic (graph shown in
original units).

High cutoff = 0.517, low
cutoff = -0.4094, based
on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

MW-05



n = 17

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

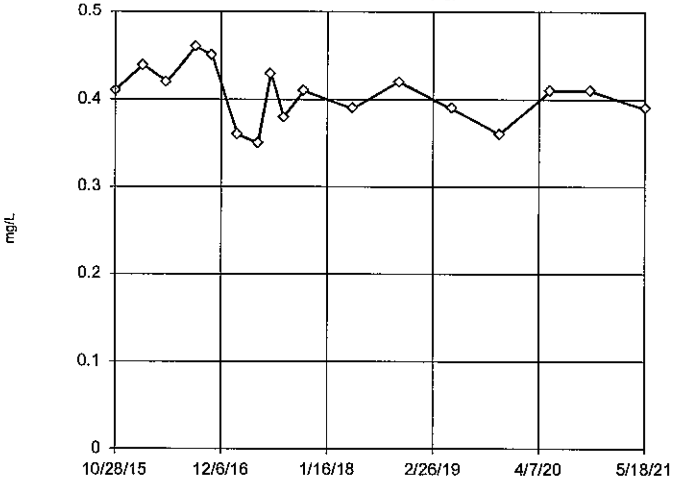
Data were natural log
transformed to achieve
best W statistic (graph
shown in original units).

High cutoff = 0.6761,
low cutoff = 0.1873, based
on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

MW-10 (bg)



n = 17

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.4047, std. dev.
0.03145, critical Tn 2.475

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9672
Critical = 0.91
The distribution was found
to be normally distributed.

Constituent: Fluoride Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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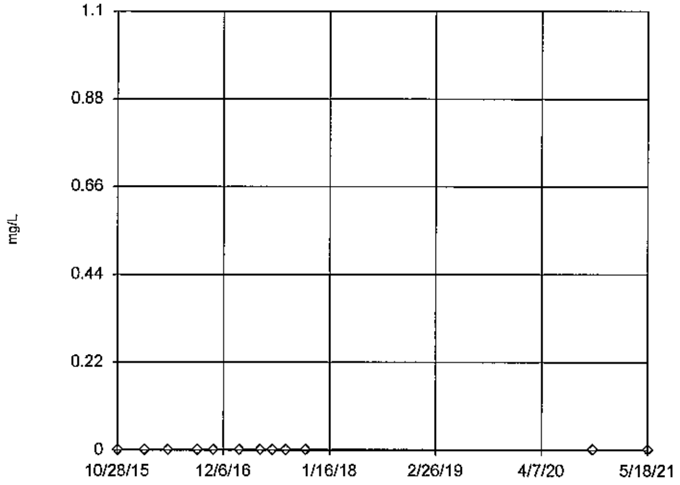
Tukey's Outlier Screening

MW-03



n = 12

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Data were square root
transformed to achieve
best W statistic (graph
shown in original units).

The results were invalidated, because the lower
and upper quartiles are
equal.

Constituent: Lead Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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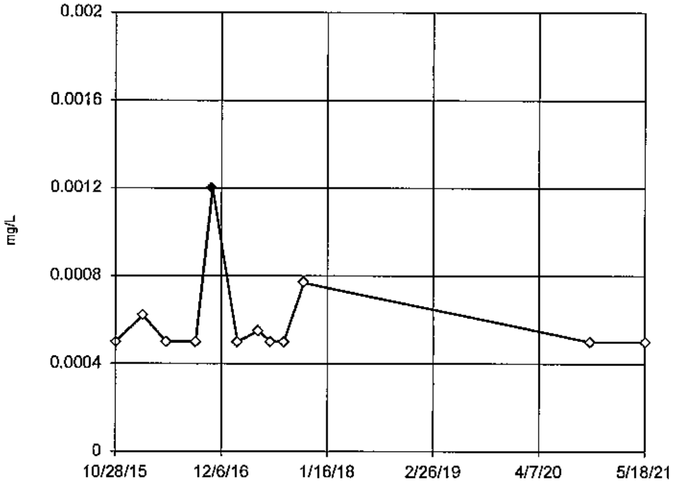
Tukey's Outlier Screening

MW-04



n = 12

Outlier is drawn as solid.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Data were natural log
transformed to achieve
best W statistic (graph
shown in original units).

High cutoff = 0.0009302,
low cutoff = 0.0003139,
based on IQR multiplier
of 3.

Constituent: Lead Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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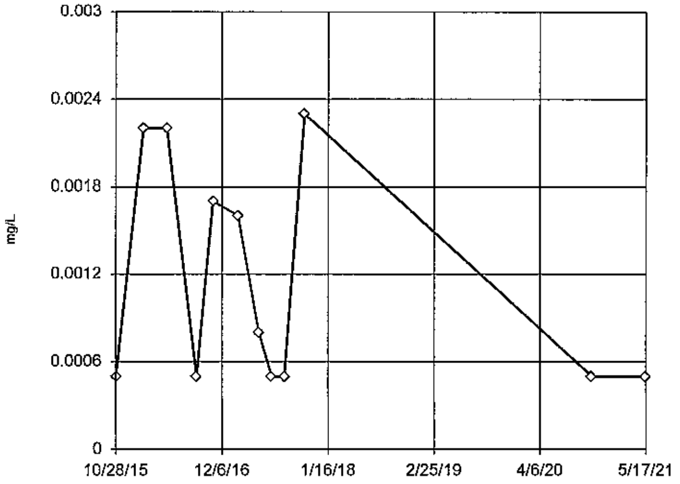
Tukey's Outlier Screening

MW-05



n = 12

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 0.0063,
low cutoff = -0.00385,
based on IQR multiplier
of 3.

Constituent: Lead Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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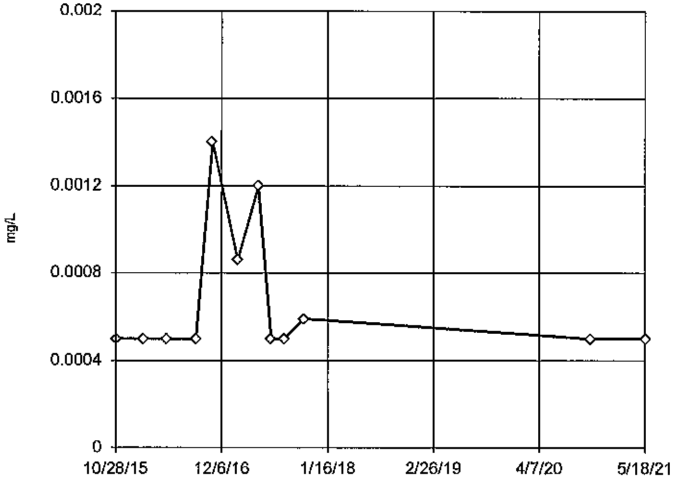
Tukey's Outlier Screening

MW-10 (bg)



n = 12

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Data were natural log
transformed to achieve
best W statistic (graph
shown in original units).

High cutoff = 0.00206,
low cutoff = 0.0001729,
based on IQR multiplier
of 3.

Constituent: Lead Analysis Run 8/8/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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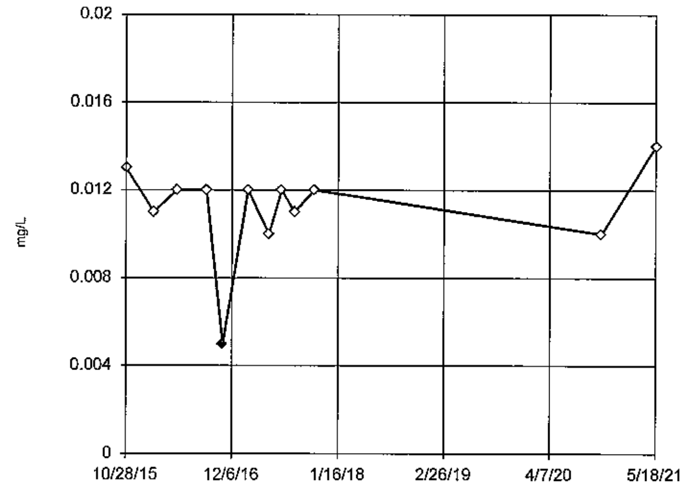
Dixon's Outlier Test

MW-03



n = 12

Statistical outlier is
drawn as solid.
Testing for 1 low outlier.
Mean = 0.01117.
Std. Dev. = 0.00225.
<0.01: c = 0.625
tabl = 0.546.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9158
Critical = 0.876
The distribution, after removal of suspect value, was found to be normally distributed.

Constituent: Lithium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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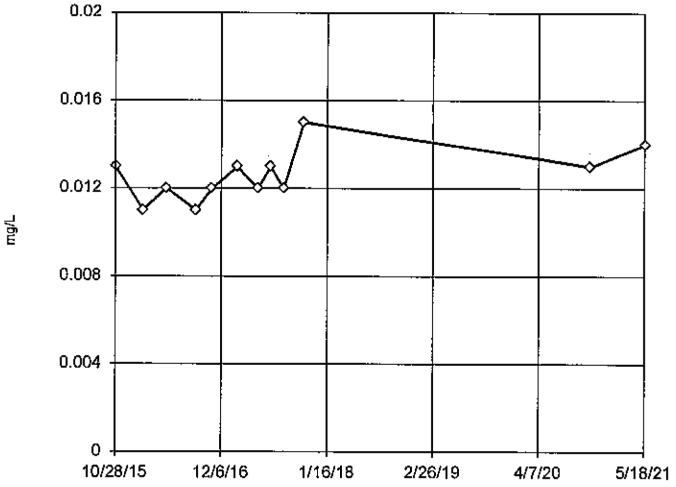
EPA Screening (suspected outliers for Dixon's Test)

MW-04



n = 12

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.01258, std. dev.
0.001165, critical Tn
2.285

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9194
Critical = 0.883
The distribution was found to be normally distributed.

Constituent: Lithium Analysis Run 8/8/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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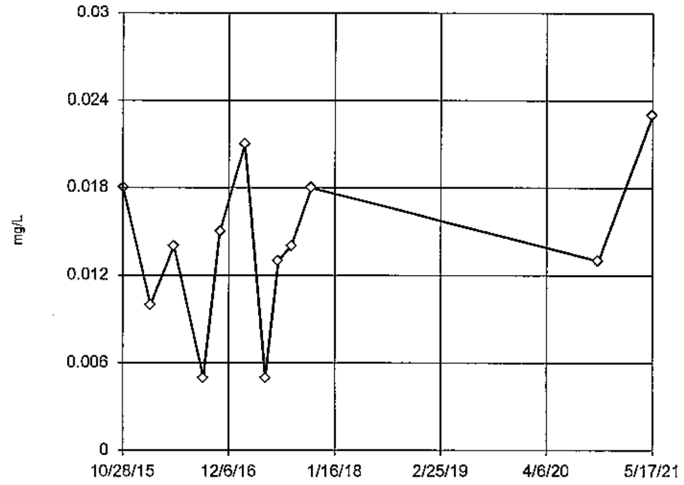
EPA Screening (suspected outliers for Dixon's Test)

MW-05



n = 12

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.01408, std. dev.
0.005583, critical Tn
2.285

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.948
Critical = 0.883
The distribution was found to be normally distributed.

Constituent: Lithium Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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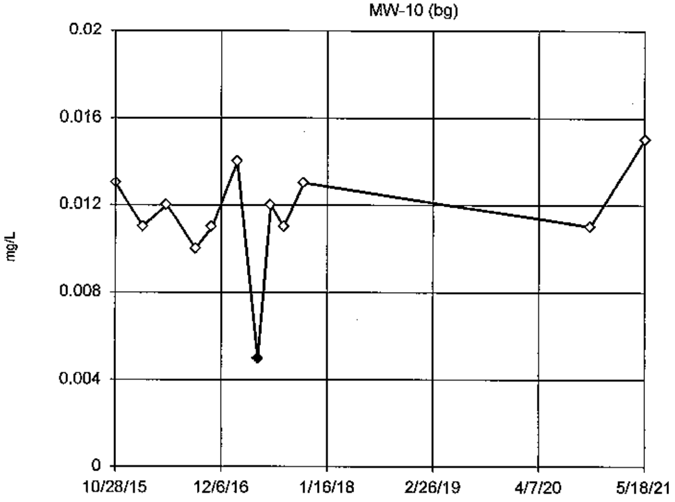
Dixon's Outlier Test

MW-10 (bg)



n = 12

Statistical outlier is
drawn as solid.
Testing for 1 low outlier.
Mean = 0.0115.
Std. Dev. = 0.002505.
<0.01: c = 0.6667
tabl = 0.546.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9246
Critical = 0.876
The distribution, after removal of suspect value, was found to be normally distributed.

Constituent: Lithium Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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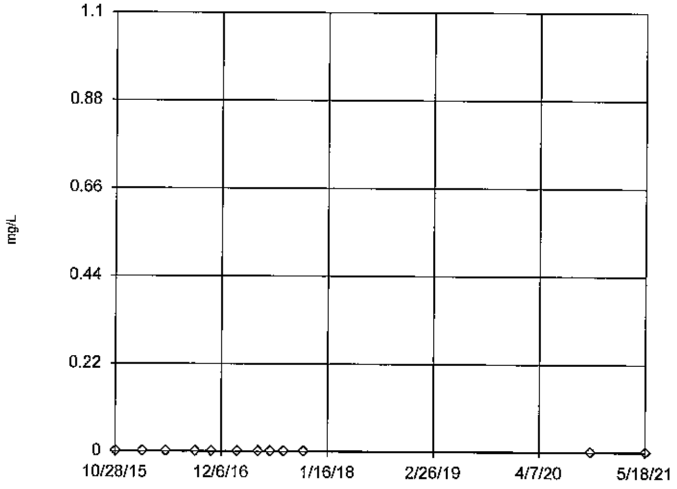
Tukey's Outlier Screening

MW-03



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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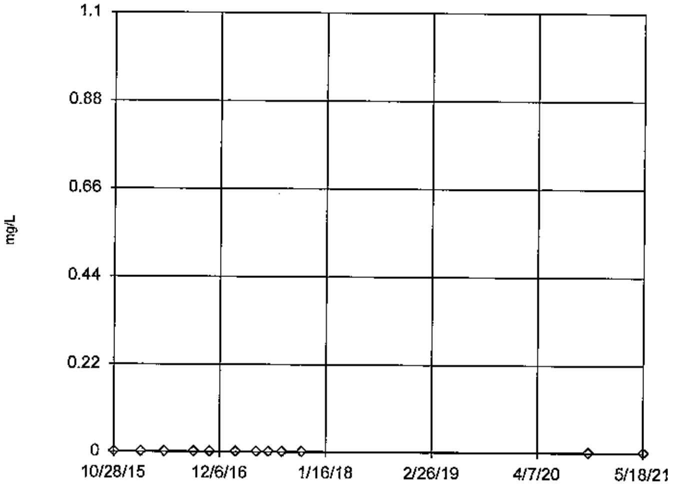
Tukey's Outlier Screening

MW-04



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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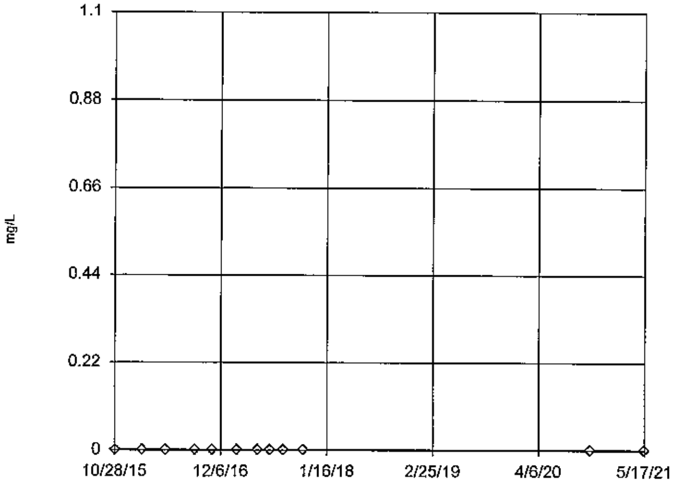
Tukey's Outlier Screening

MW-05



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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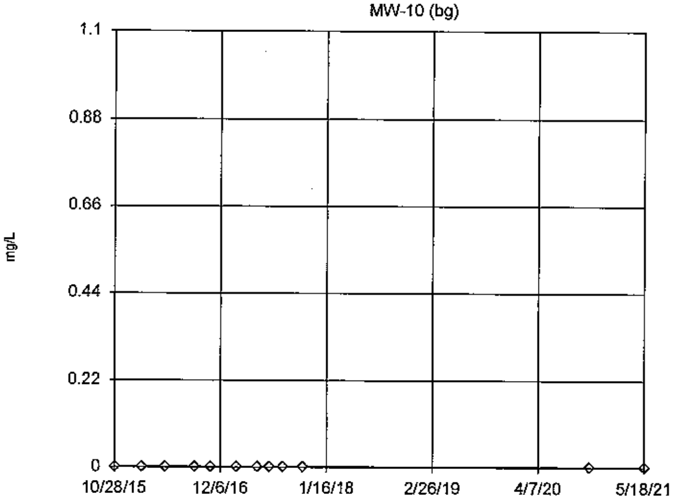
Tukey's Outlier Screening

MW-10 (bg)



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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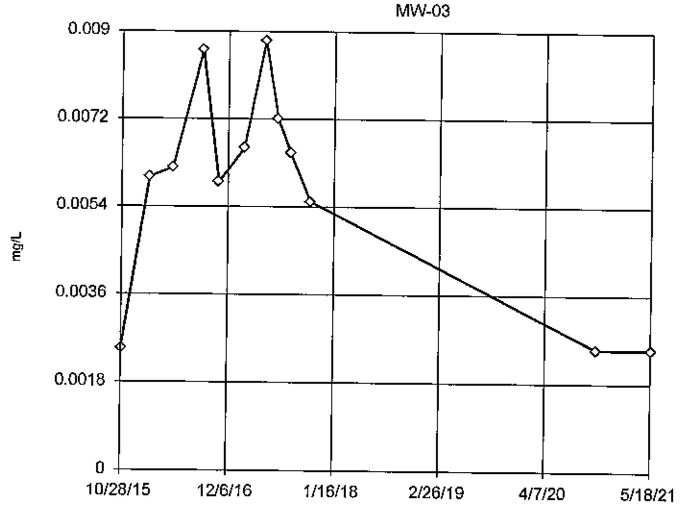
Tukey's Outlier Screening

MW-03



n = 12

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Data were square trans-
formed to achieve best
W statistic (graph shown
in original units).

High cutoff = 0.01166,
low cutoff = -0.008373,
based on IQR multiplier
of 3.

Constituent: Molybdenum Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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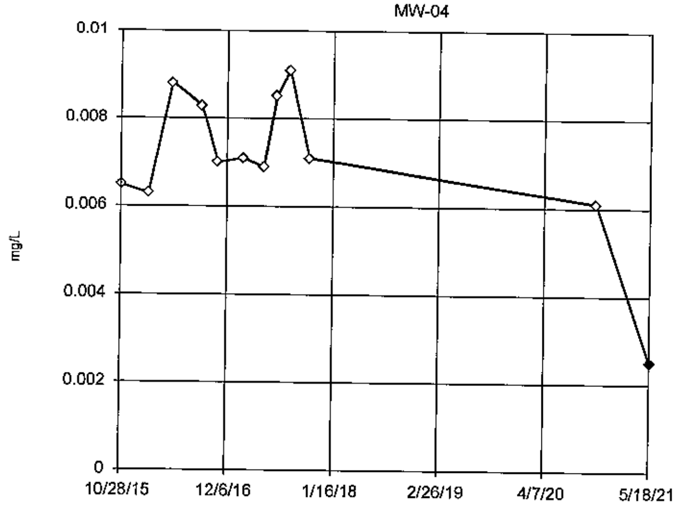
Dixon's Outlier Test

MW-04



n = 12

Statistical outlier is
drawn as solid.
Testing for 1 low outlier.
Mean = 0.007017.
Std. Dev. = 0.001743.
<0.005: c = 0.6032
tabl = 0.546.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8992
Critical = 0.876
The distribution, after
removal of suspect val-
ue, was found to be nor-
mally distributed.

Constituent: Molybdenum Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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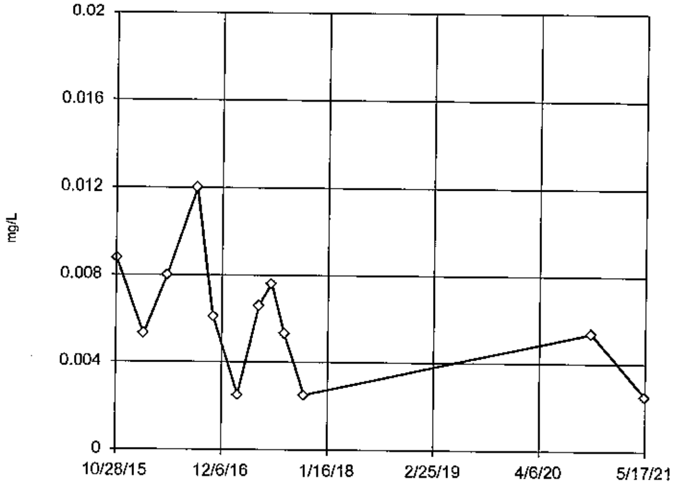
EPA Screening (suspected outliers for Dixon's Test)

MW-05



n = 12

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.00605, std. dev.
0.002842, critical Tn
2.285

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9307
Critical = 0.883
The distribution was found
to be normally distrib-
uted.

Constituent: Molybdenum Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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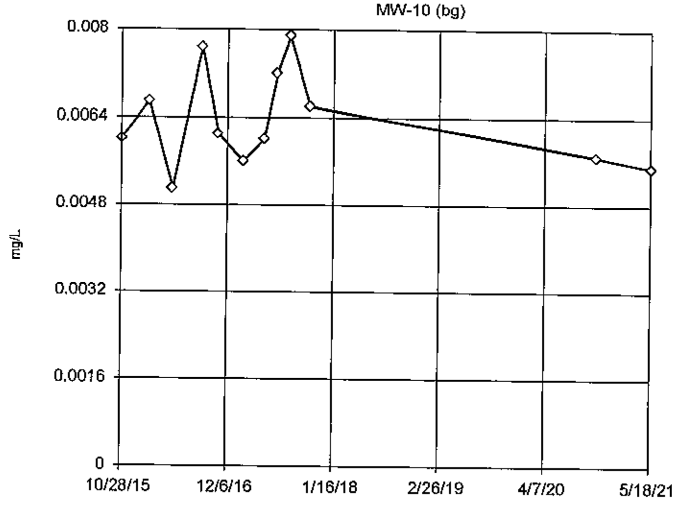
EPA Screening (suspected outliers for Dixon's Test)

MW-10 (bg)



n = 12

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.006342, std. dev.
0.0008898, critical Tn
2.285

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9372
Critical = 0.883
The distribution was found
to be normally distrib-
uted.

Constituent: Molybdenum Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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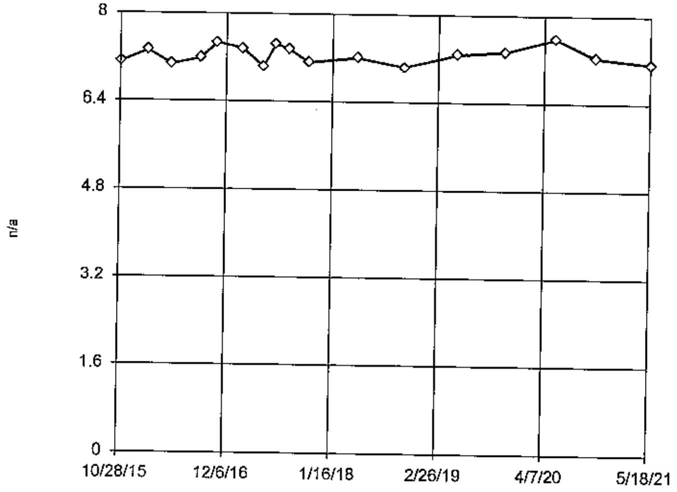
EPA Screening (suspected outliers for Dixon's Test)

MW-03



n = 17

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 7.243, std. dev.
0.1543, critical Tn 2.475

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9599
Critical = 0.91
The distribution was found
to be normally distributed.

Constituent: pH Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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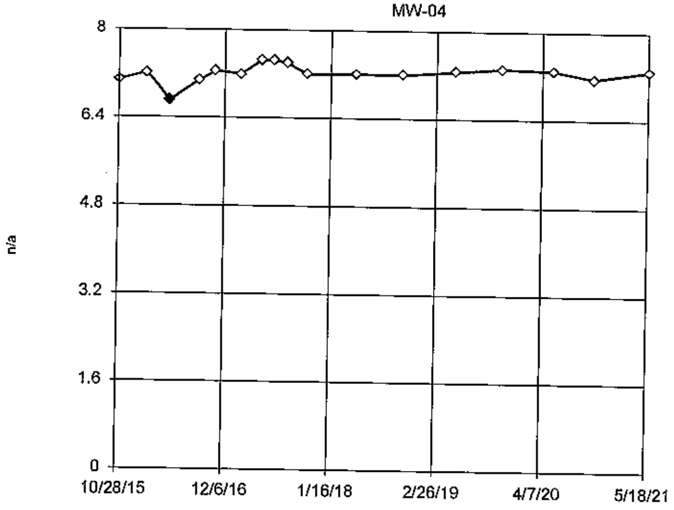
Dixon's Outlier Test

MW-04



n = 17

Statistical outlier is
drawn as solid.
Testing for 1 low outlier.
Mean = 7.223.
Std. Dev. = 0.1744.
6.71: c = 0.5143
tabl = 0.49.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9505
Critical = 0.906
The distribution, after
removal of suspect value, was found to be normally distributed.

Constituent: pH Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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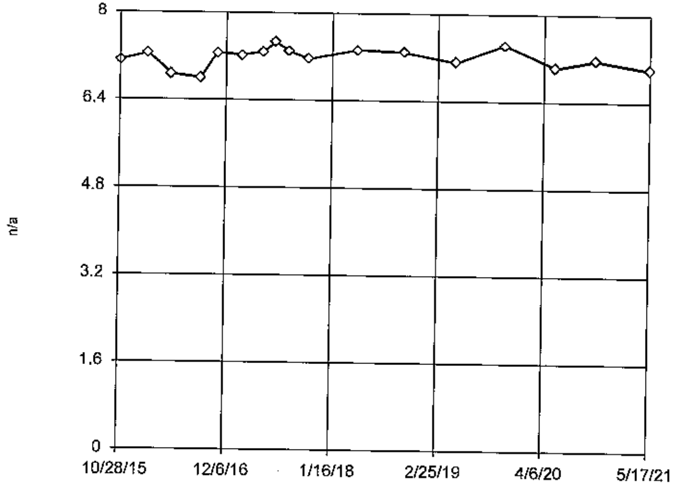
EPA Screening (suspected outliers for Dixon's Test)

MW-05



n = 17

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 7.183, std. dev.
0.1793, critical Tn 2.475

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9641
Critical = 0.91
The distribution was found
to be normally distributed.

Constituent: pH Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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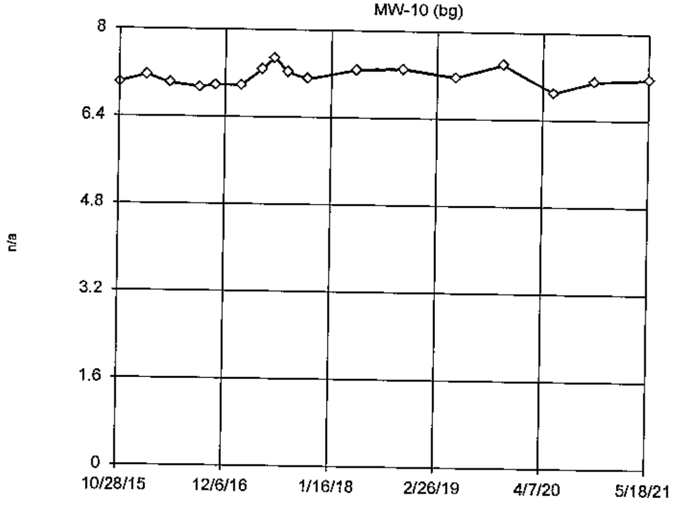
EPA Screening (suspected outliers for Dixon's Test)

MW-10 (bg)



n = 17

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 7.151, std. dev.
0.1617, critical Tn 2.475

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9714
Critical = 0.91
The distribution was found
to be normally distributed.

Constituent: pH Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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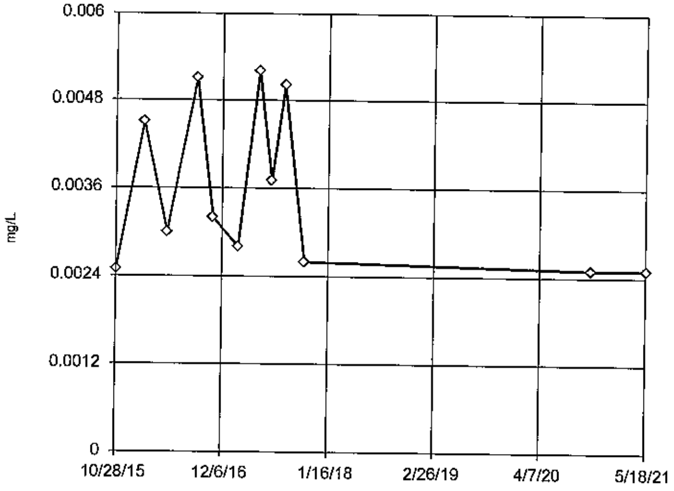
Tukey's Outlier Screening

MW-03



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.03055, low cutoff = 0.0003959, based on IQR multiplier of 3.

Constituent: Selenium Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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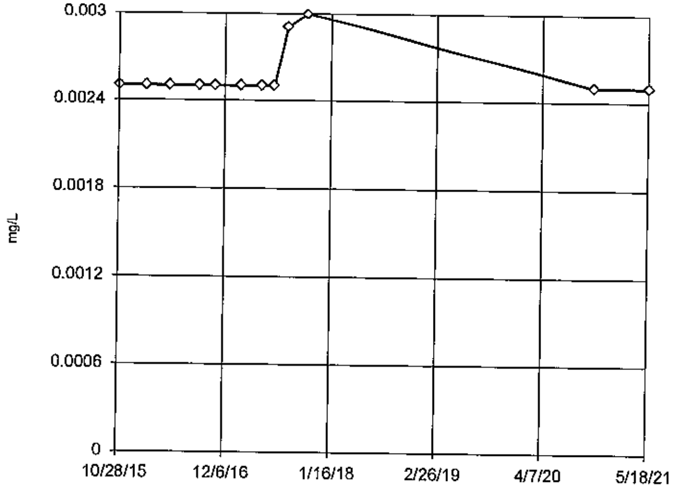
Tukey's Outlier Screening

MW-04



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Selenium Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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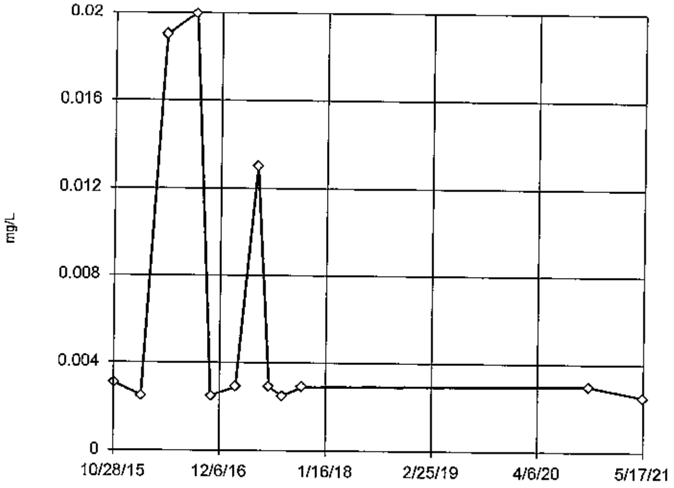
Tukey's Outlier Screening

MW-05



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.1039, low cutoff = 0.0001527, based on IQR multiplier of 3.

Constituent: Selenium Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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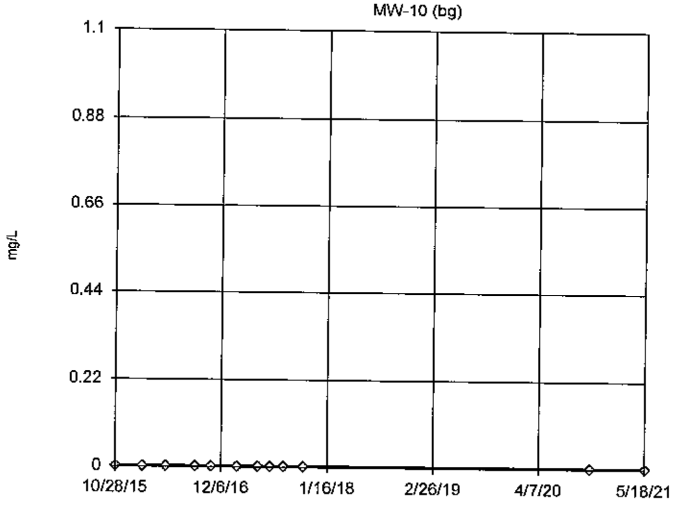
Tukey's Outlier Screening

MW-10 (bg)



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Selenium Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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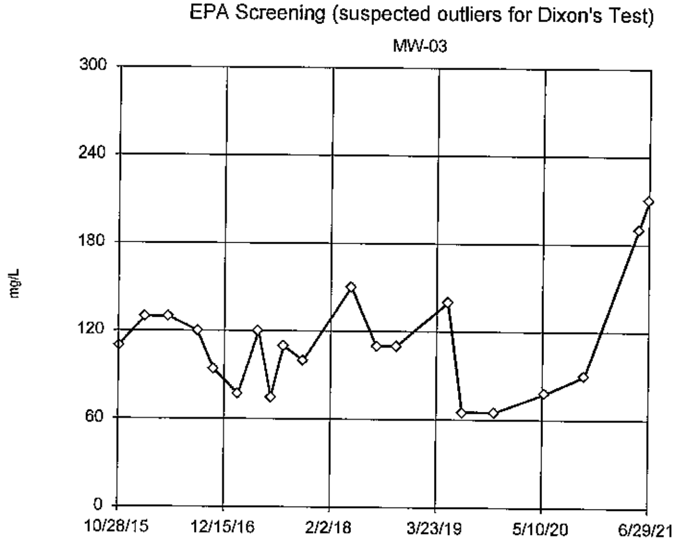

EPA Screening (suspected outliers for Dixon's Test)

MW-03

n = 20

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 113.7, std. dev. 38.23, critical Tn 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9664
Critical = 0.92 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Sulfate Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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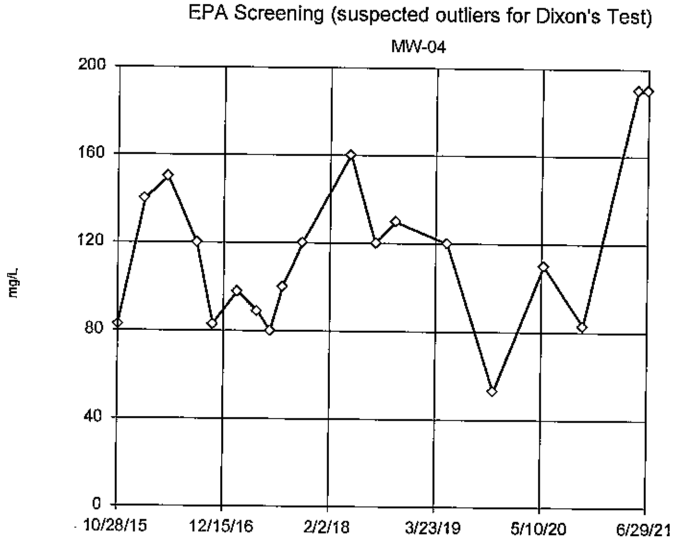

EPA Screening (suspected outliers for Dixon's Test)

MW-04

n = 19

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 116.8, std. dev. 37.08, critical Tn 2.532

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.947
Critical = 0.917
The distribution was found to be normally distributed.

Constituent: Sulfate Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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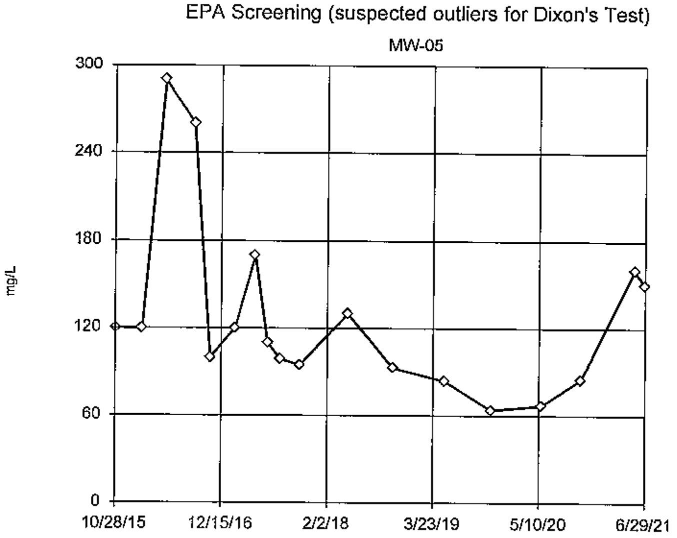

EPA Screening (suspected outliers for Dixon's Test)

MW-05

n = 18

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 128.7, std. dev. 60.87, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9423
Critical = 0.914 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Sulfate Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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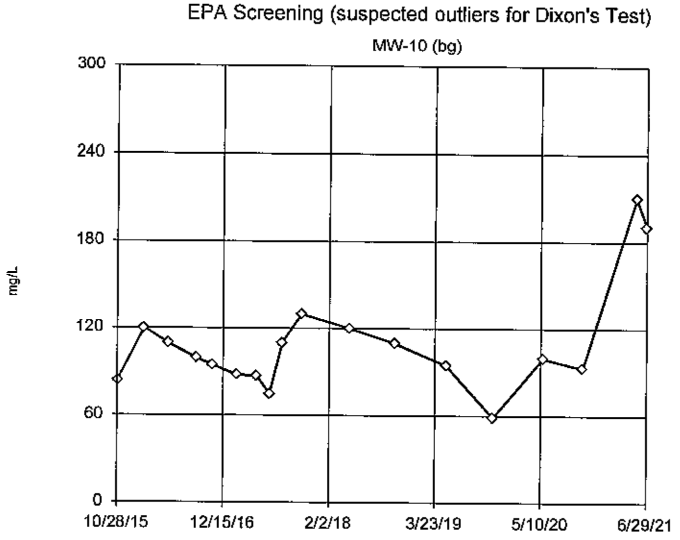

EPA Screening (suspected outliers for Dixon's Test)

MW-10 (bg)

n = 18

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 109.8, std. dev. 37.14, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9281
Critical = 0.914 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Sulfate Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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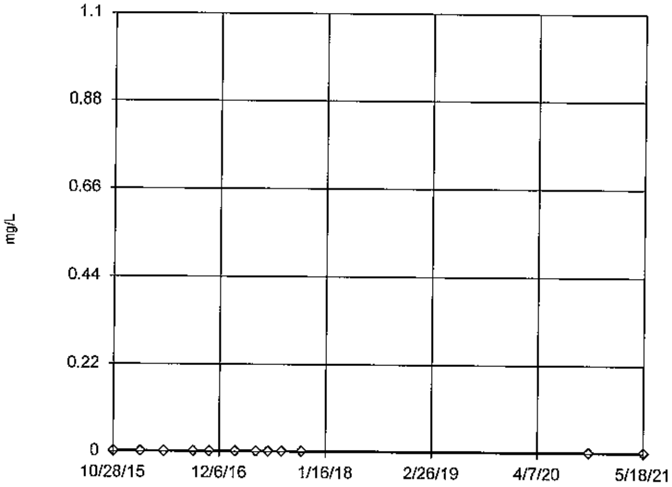
Tukey's Outlier Screening

MW-03



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Thallium Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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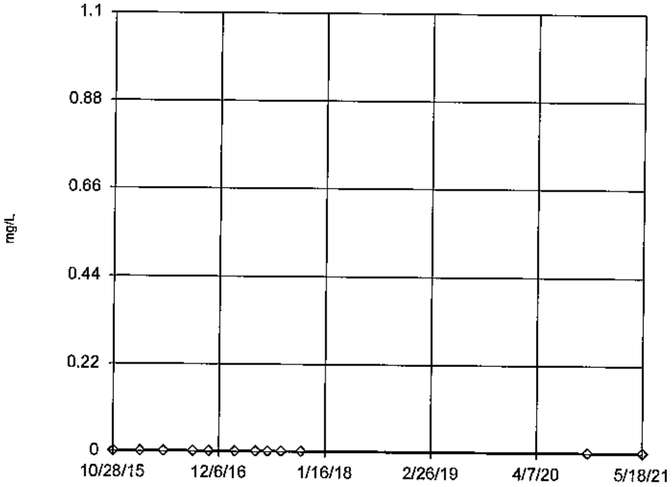
Tukey's Outlier Screening

MW-04



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Thallium Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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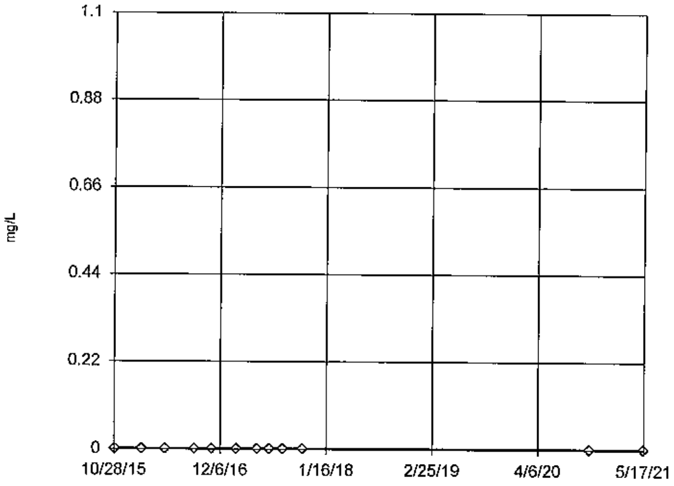
Tukey's Outlier Screening

MW-05



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Thallium Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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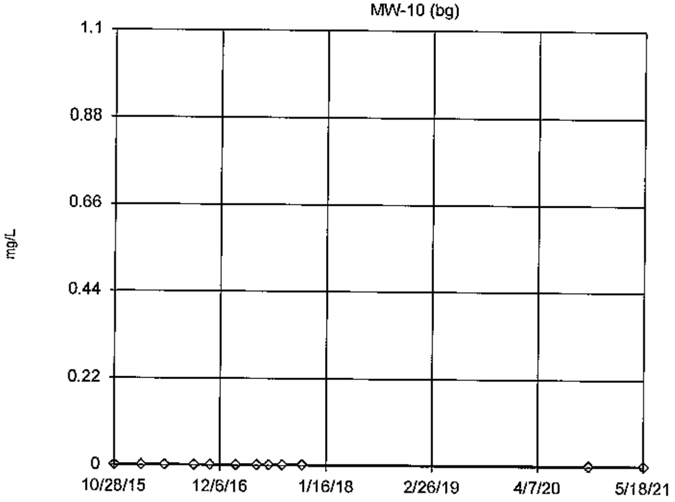
Tukey's Outlier Screening

MW-10 (bg)



n = 12

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were square root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Thallium Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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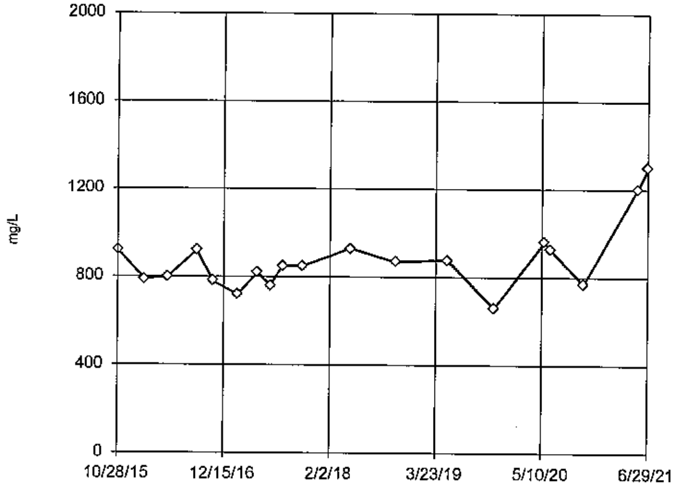
EPA Screening (suspected outliers for Dixon's Test)

MW-03



n = 19

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 879.5, std. dev.
153.5, critical Tn 2.532

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.92
Critical = 0.917 (after
natural log transformation)
The distribution was found
to be log-normal.

Constituent: Total Dissolved Solids Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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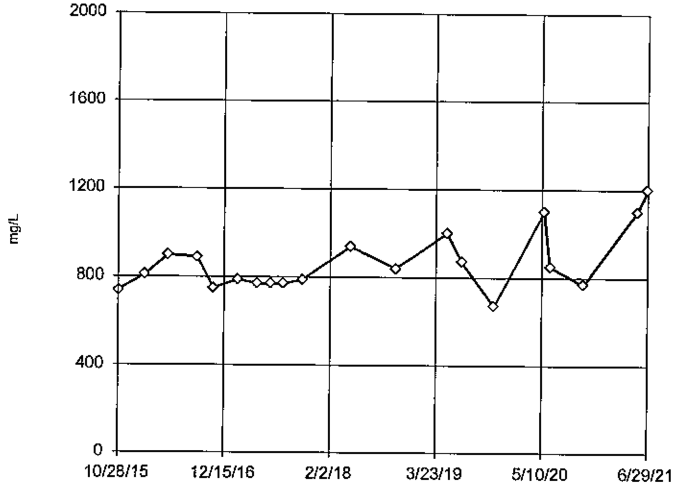
EPA Screening (suspected outliers for Dixon's Test)

MW-04



n = 20

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 866, std. dev. 138.9,
critical Tn 2.557

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9241
Critical = 0.92 (after
natural log transformation)
The distribution was found
to be log-normal.

Constituent: Total Dissolved Solids Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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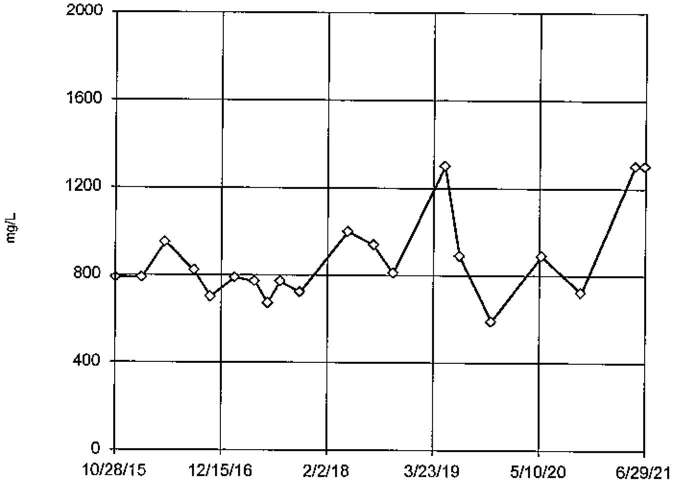
Tukey's Outlier Screening

MW-05



n = 20

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Data were natural log
transformed to achieve
best W statistic (graph
shown in original units).

High cutoff = 1932, low
cutoff = 364.2, based
on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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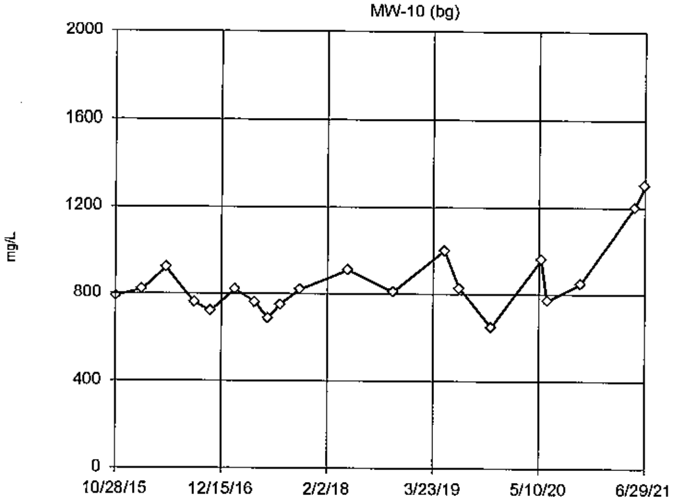
Tukey's Outlier Screening

MW-10 (bg)



n = 20

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

Data were natural log
transformed to achieve
best W statistic (graph
shown in original units).

High cutoff = 1597, low
cutoff = 435.5, based
on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 8/8/2021 9:58 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Outlier Analysis - Joliet 29 - All Wells All Values

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29   Printed 10/7/2021, 2:37 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Turbidity (NTU)	MW-03	No	n/a	n/a	EPA 1989	0.05	10	8.956	11.98	ln(x)	ShapiroWilk
Turbidity (NTU)	MW-04	No	n/a	n/a	NP (nrm)	NaN	10	17.11	26.77	unknown	ShapiroWilk
Turbidity (NTU)	MW-05	No	n/a	n/a	EPA 1989	0.05	10	9.131	7.729	ln(x)	ShapiroWilk
Turbidity (NTU)	MW-10 (bg)	No	n/a	n/a	EPA 1989	0.05	10	10.86	6.601	normal	ShapiroWilk

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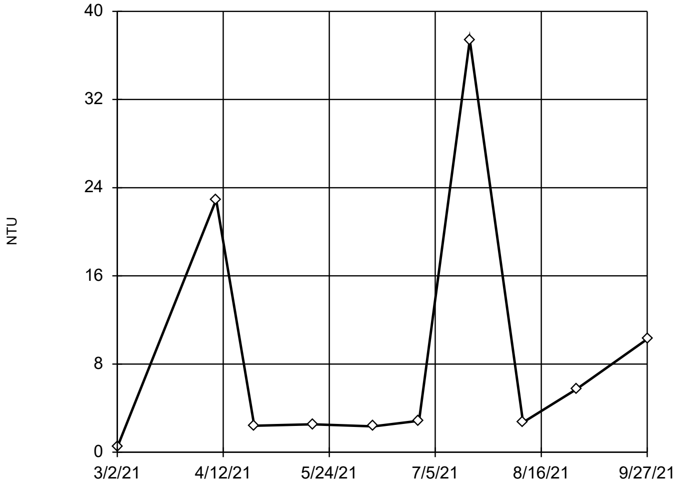
EPA Screening (suspected outliers for Dixon's Test)

MW-03



n = 10

Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 8.956, std. dev. 11.98, critical Tn 2.176

Normality test used: Shapiro Wilk@alpha = 0.1 Calculated = 0.9265 Critical = 0.869 (after natural log transformation) The distribution was found to be log-normal.

Constituent: Turbidity   Analysis Run 10/7/2021 2:36 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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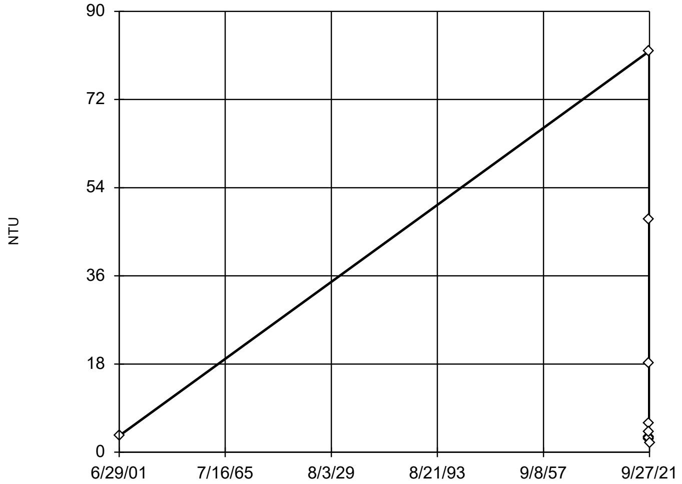
Tukey's Outlier Screening

MW-04



n = 10

No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 40144, low cutoff = 0.001949, based on IQR multiplier of 3.

Constituent: Turbidity   Analysis Run 10/7/2021 2:36 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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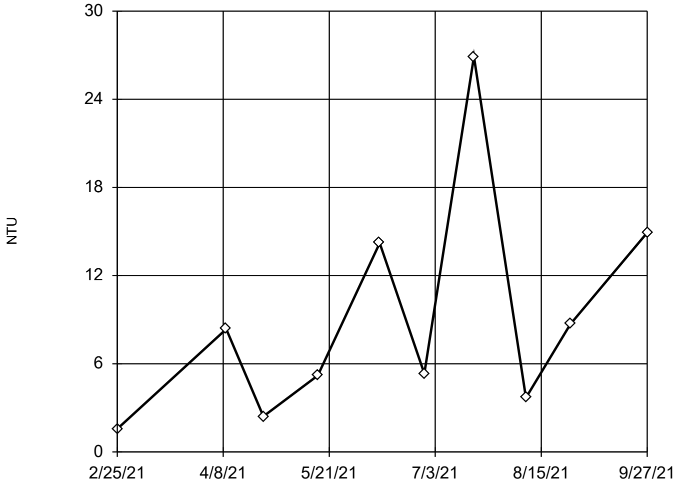
EPA Screening (suspected outliers for Dixon's Test)

MW-05



n = 10

Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 9.131, std. dev. 7.729, critical Tn 2.176

Normality test used: Shapiro Wilk@alpha = 0.1 Calculated = 0.9831 Critical = 0.869 (after natural log transformation) The distribution was found to be log-normal.

Constituent: Turbidity   Analysis Run 10/7/2021 2:36 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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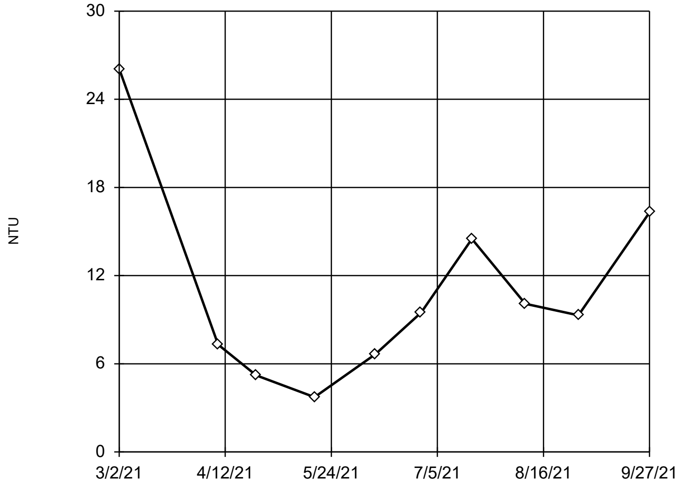
EPA Screening (suspected outliers for Dixon's Test)

MW-10 (bg)



n = 10

Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 10.86, std. dev. 6.601, critical Tn 2.176

Normality test used: Shapiro Wilk@alpha = 0.1 Calculated = 0.8725 Critical = 0.869 The distribution was found to be normally distributed.

Constituent: Turbidity   Analysis Run 10/7/2021 2:36 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Seasonality - Joliet #29 - All CCR Wells

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29 Printed 8/8/2021, 10:19 AM

Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Boron (mg/L)	MW-03	No	0	0	0	17	0.05
Boron (mg/L)	MW-04	No	0	0	0	19	0.05
Boron (mg/L)	MW-05	No	0	0	0	17	0.05
Boron (mg/L)	MW-10 (bg)	No	2.541	7.815	3	19	0.05
Calcium (mg/L)	MW-03	No	2.541	7.815	3	17	0.05
Calcium (mg/L)	MW-04	No	2.541	7.815	3	17	0.05
Calcium (mg/L)	MW-05	No	1.353	7.815	3	18	0.05
Calcium (mg/L)	MW-10 (bg)	No	1.353	7.815	3	18	0.05
Chloride (mg/L)	MW-03	No	1.353	7.815	3	17	0.05
Chloride (mg/L)	MW-04	No	1.353	7.815	3	18	0.05
Chloride (mg/L)	MW-05	No	1.353	7.815	3	19	0.05
Chloride (mg/L)	MW-10 (bg)	No	1.353	7.815	3	19	0.05
Fluoride (mg/L)	MW-03	No	1.353	7.815	3	17	0.05
Fluoride (mg/L)	MW-04	No	1.353	7.815	3	17	0.05
Fluoride (mg/L)	MW-05	No	1.353	7.815	3	17	0.05
Fluoride (mg/L)	MW-10 (bg)	No	1.353	7.815	3	17	0.05
pH (n/a)	MW-03	No	1.353	7.815	3	17	0.05
pH (n/a)	MW-04	No	1.353	7.815	3	17	0.05
pH (n/a)	MW-05	No	1.353	7.815	3	17	0.05
pH (n/a)	MW-10 (bg)	No	1.353	7.815	3	17	0.05
Sulfate (mg/L)	MW-03	No	1.353	7.815	3	20	0.05
Sulfate (mg/L)	MW-04	No	1.353	7.815	3	19	0.05
Sulfate (mg/L)	MW-05	No	1.353	7.815	3	18	0.05
Sulfate (mg/L)	MW-10 (bg)	No	1.353	7.815	3	18	0.05
Total Dissolved Solids (mg/L)	MW-03	No	1.353	7.815	3	19	0.05
Total Dissolved Solids (mg/L)	MW-04	No	1.353	7.815	3	20	0.05
Total Dissolved Solids (mg/L)	MW-05	No	1.353	7.815	3	20	0.05
Total Dissolved Solids (mg/L)	MW-10 (bg)	No	1.353	7.815	3	20	0.05

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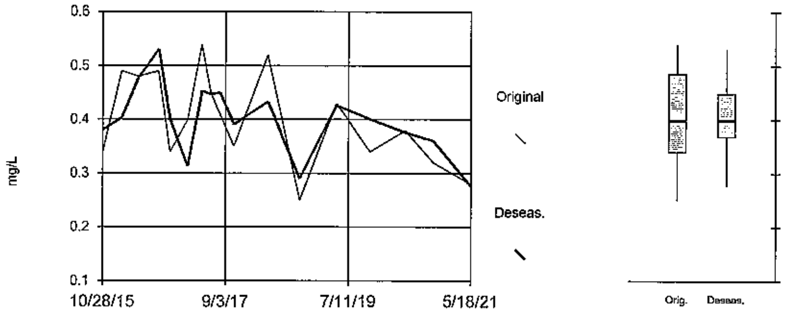
Seasonality: MW-03

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Boron Analysis Run 8/8/2021 10:17 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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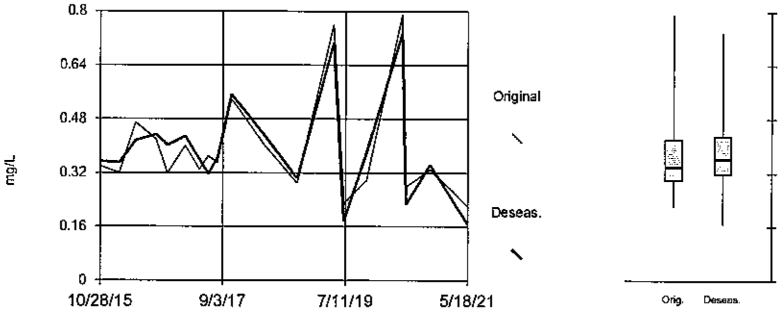
Seasonality: MW-04

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Boron Analysis Run 8/8/2021 10:17 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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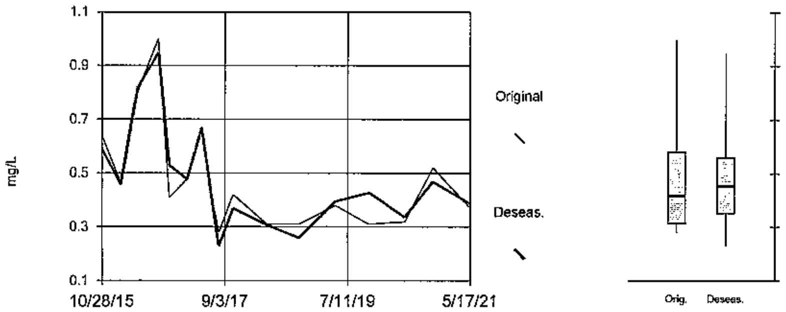
Seasonality: MW-05

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Boron Analysis Run 8/8/2021 10:17 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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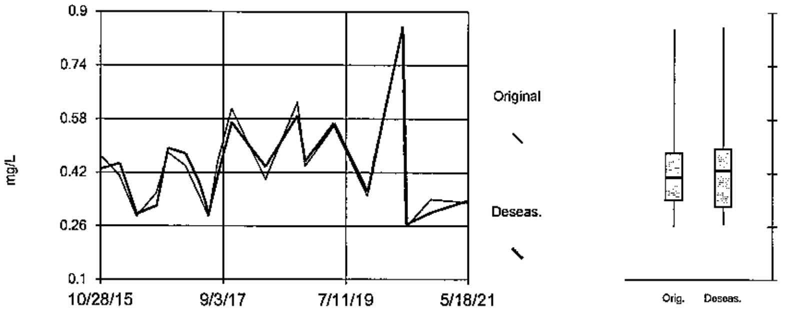
Seasonality: MW-10 (bg)

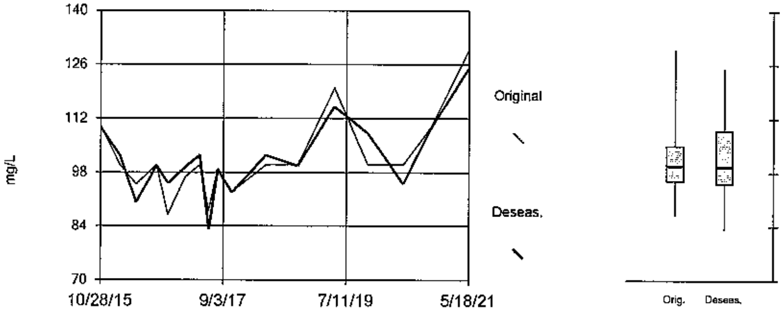
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 2.541
Tabulated Chi-Squared value = 7.815 with 3 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) = 2.534
Adjusted Kruskal-Wallis statistic (H') = 2.541



Constituent: Boron Analysis Run 8/8/2021 10:17 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: MW-03

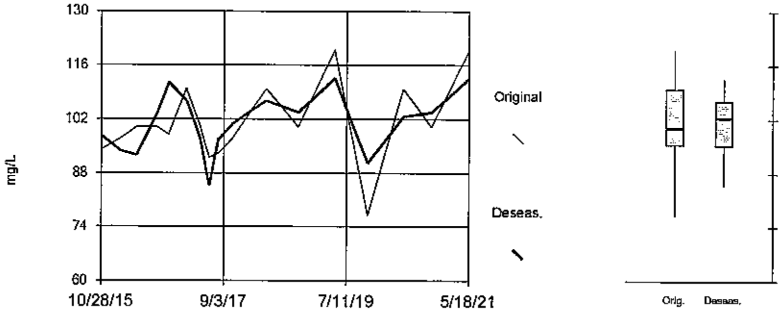
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Calcium Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: MW-04

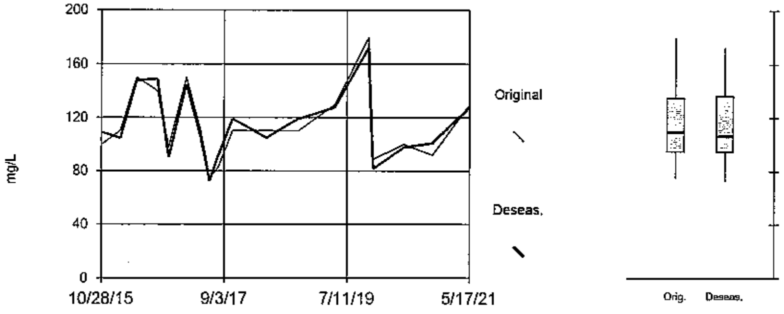
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Calcium Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: MW-05

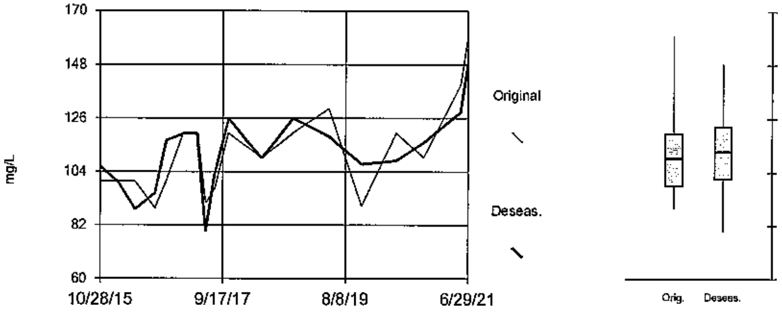
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 1.353
Tabulated Chi-Squared value = 7.815 with 3 degrees 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) = 1.321
Adjusted Kruskal-Wallis statistic (H') = 1.353



Constituent: Calcium Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: MW-10 (bg)

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Calcium Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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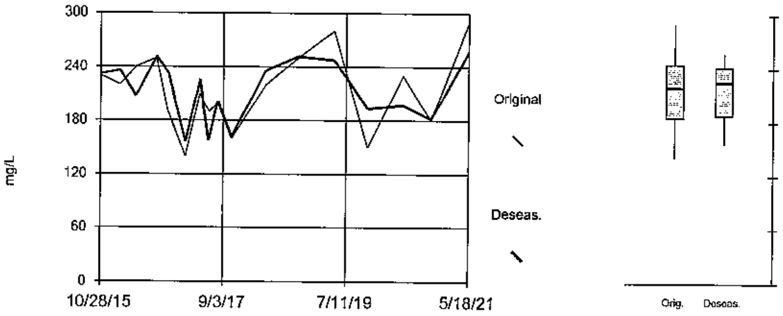
Seasonality: MW-03

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Chloride Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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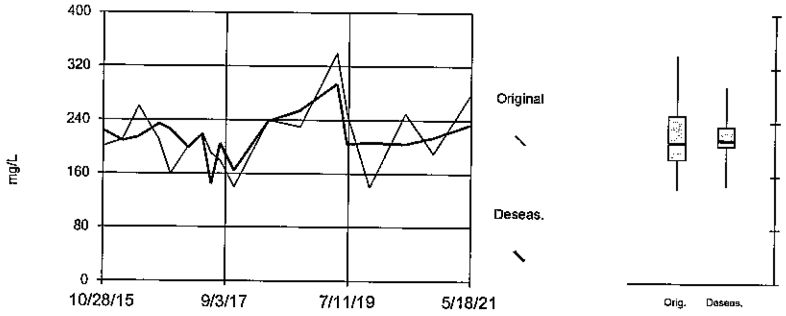
Seasonality: MW-04

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Chloride Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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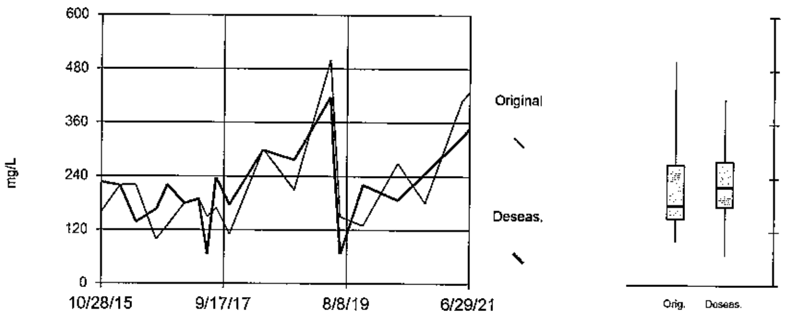
Seasonality: MW-05

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Chloride Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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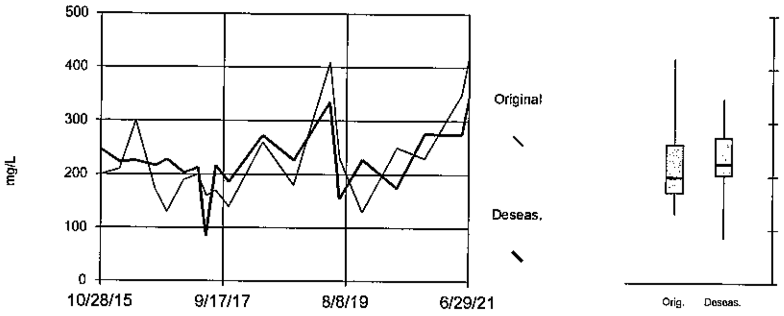
Seasonality: MW-10 (bg)

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Chloride Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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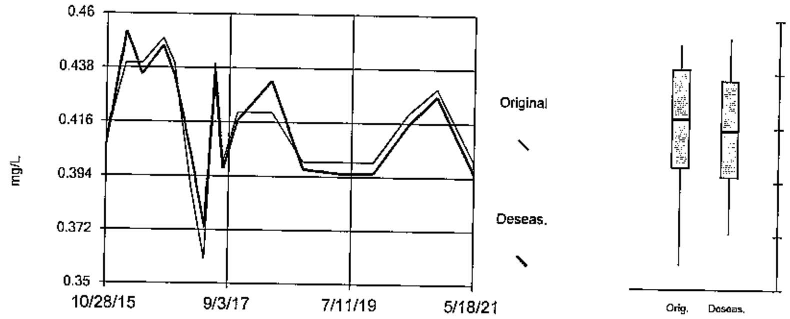
Seasonality: MW-03

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Fluoride Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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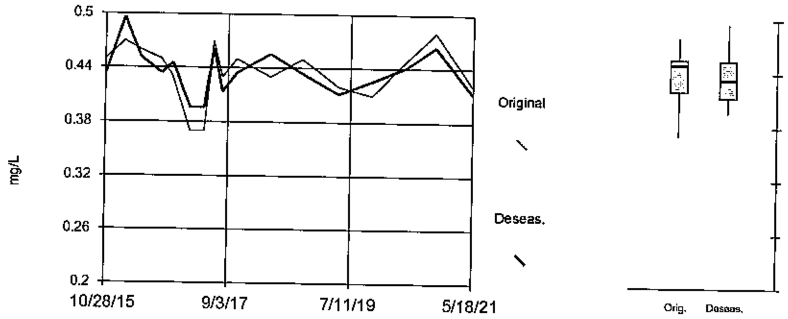
Seasonality: MW-04

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Fluoride Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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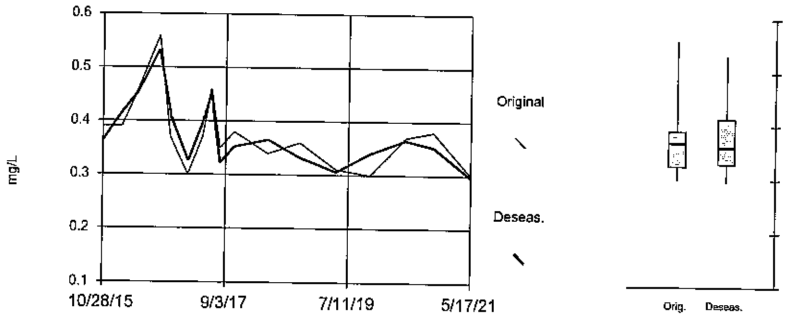
Seasonality: MW-05

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Fluoride Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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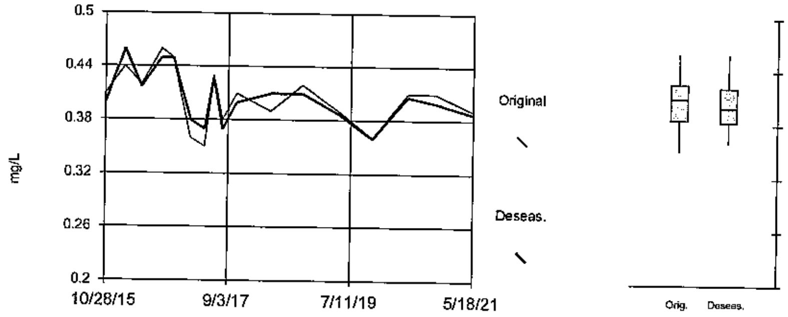
Seasonality: MW-10 (bg)

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Fluoride Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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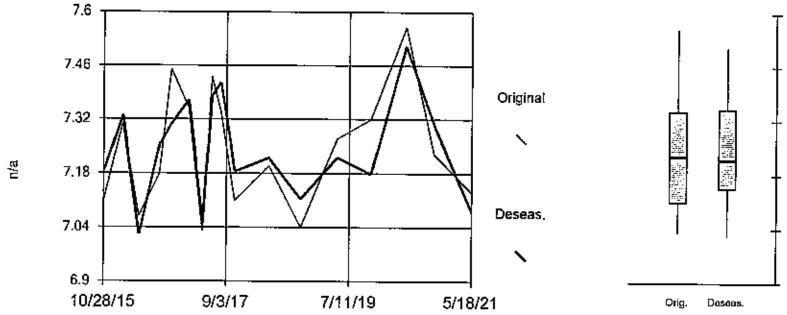
Seasonality: MW-03

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: pH Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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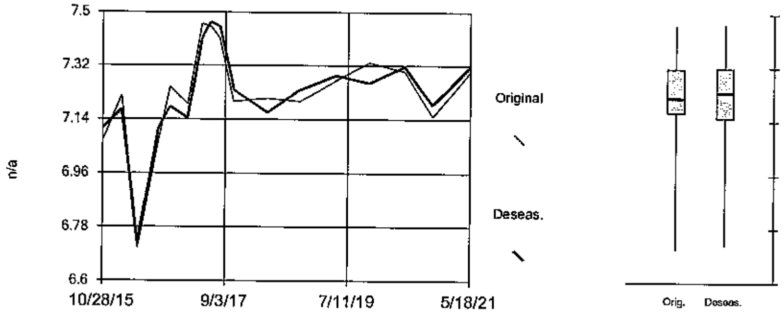
Seasonality: MW-04

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: pH Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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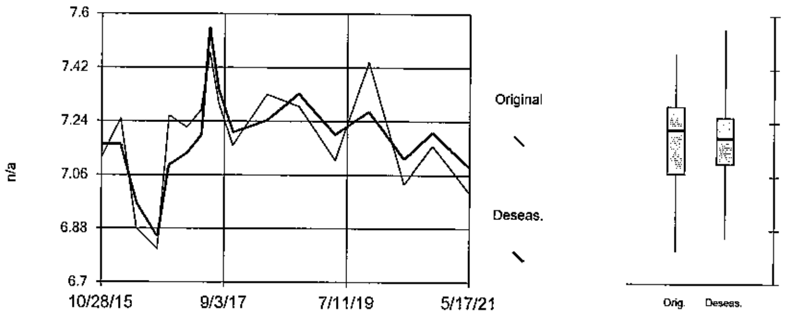
Seasonality: MW-05

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: pH Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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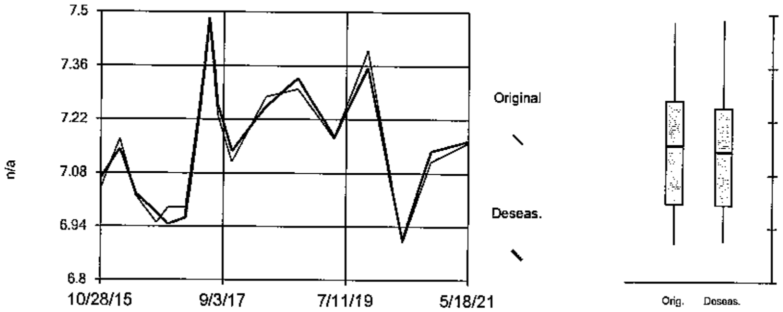
Seasonality: MW-10 (bg)

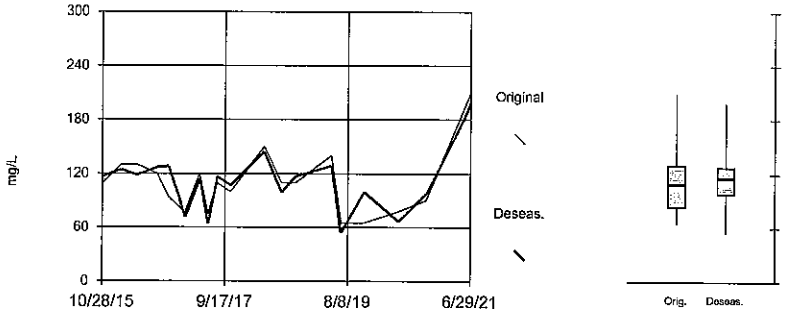
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: pH Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: MW-03

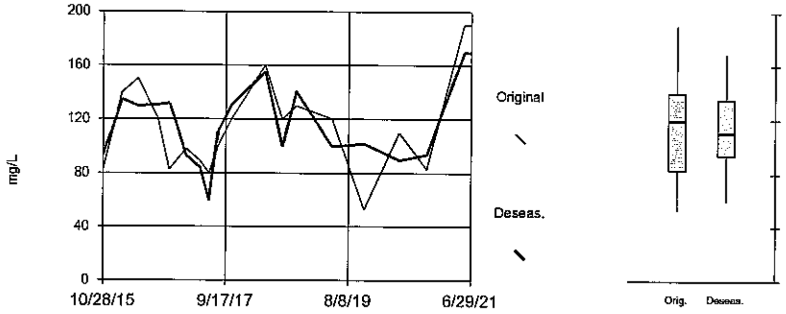
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Sulfate Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: MW-04

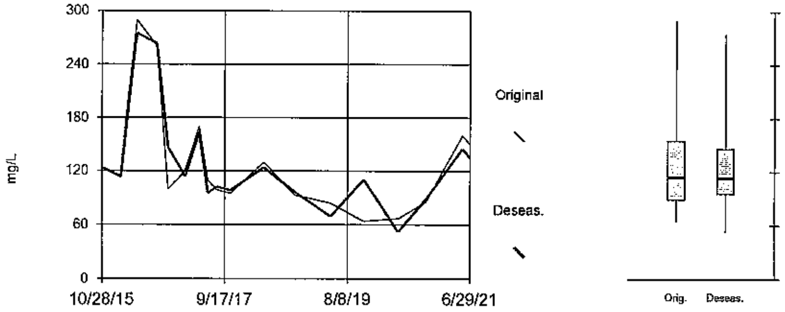
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Sulfate Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: MW-05

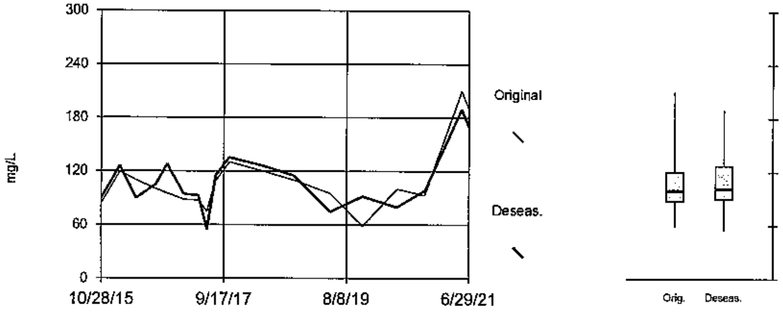
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Sulfate Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: MW-10 (bg)

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Sulfate Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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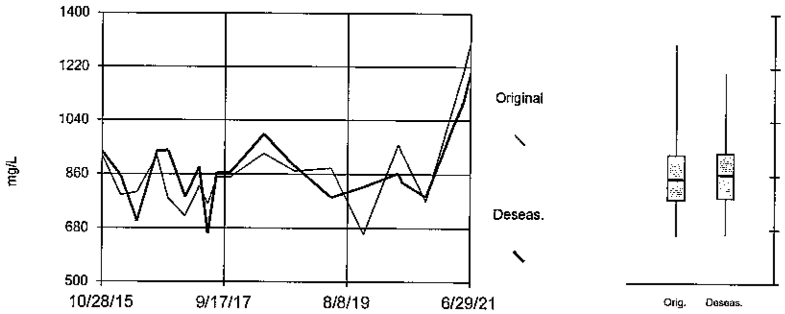
Seasonality: MW-03

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Total Dissolved Solids Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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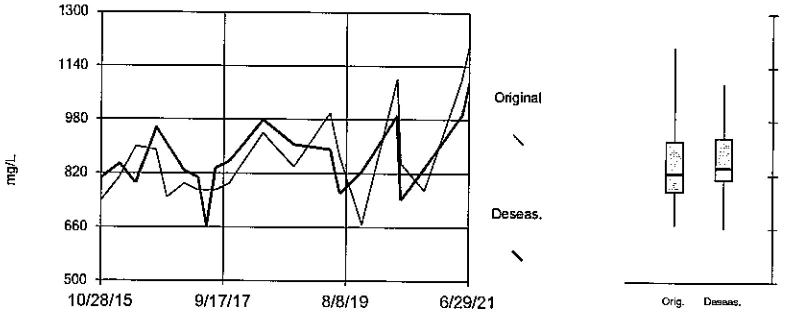
Seasonality: MW-04

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Total Dissolved Solids Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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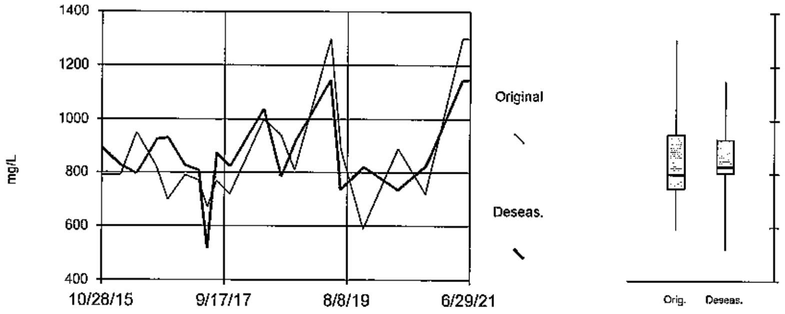
Seasonality: MW-05

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Total Dissolved Solids Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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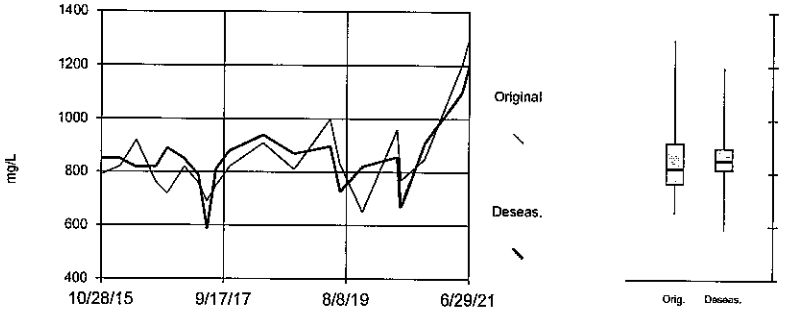
Seasonality: MW-10 (bg)

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Total Dissolved Solids Analysis Run 8/8/2021 10:18 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Trend Test Joliet #29 MW-10 UG

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29 Printed 8/8/2021, 10:15 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Antimony (mg/L)	MW-10 (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Arsenic (mg/L)	MW-10 (bg)	0.02072	0.5843	2.359	No	12	41.67	Yes	natura...	0.02	Param.
Barium (mg/L)	MW-10 (bg)	0.002143	1.955	2.359	No	12	0	Yes	no	0.02	Param.
Beryllium (mg/L)	MW-10 (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Boron (mg/L)	MW-10 (bg)	0.008327	0.4069	2.224	No	19	0	Yes	no	0.02	Param.
Cadmium (mg/L)	MW-10 (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Calcium (mg/L)	**MW-10 (bg)**	**6.638**	**3.416**	**2.235**	**Yes**	**18**	**0**	**Yes**	**no**	**0.02**	**Param.**
Chloride (mg/L)	**MW-10 (bg)**	**25.19**	**2.539**	**2.224**	**Yes**	**19**	**0**	**Yes**	**no**	**0.02**	**Param.**
Chromium (mg/L)	MW-10 (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Cobalt (mg/L)	MW-10 (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-10 (bg)	0.0149	0.8027	2.398	No	11	72.73	Yes	no	0.02	Param.
Fluoride (mg/L)	MW-10 (bg)	-0.00...	-1.303	2.249	No	17	0	Yes	no	0.02	Param.
Lead (mg/L)	MW-10 (bg)	0	0	35	No	12	66.67	n/a	n/a	0.02	NP (Nor...
Lithium (mg/L)	MW-10 (bg)	0.000...	0.7936	2.359	No	12	8.333	Yes	no	0.02	Param.
Mercury (mg/L)	MW-10 (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Molybdenum (mg/L)	MW-10 (bg)	-0.00...	-0.8336	2.359	No	12	0	Yes	no	0.02	Param.
pH (n/a)	MW-10 (bg)	0.01492	0.6175	2.249	No	17	0	Yes	no	0.02	Param.
Selenium (mg/L)	MW-10 (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Sulfate (mg/L)	MW-10 (bg)	9.656	2.174	2.235	No	18	0	Yes	no	0.02	Param.
Thallium (mg/L)	MW-10 (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Total Dissolved Solids (mg/L)	**MW-10 (bg)**	**49.54**	**2.873**	**2.214**	**Yes**	**20**	**0**	**Yes**	**no**	**0.02**	**Param.**

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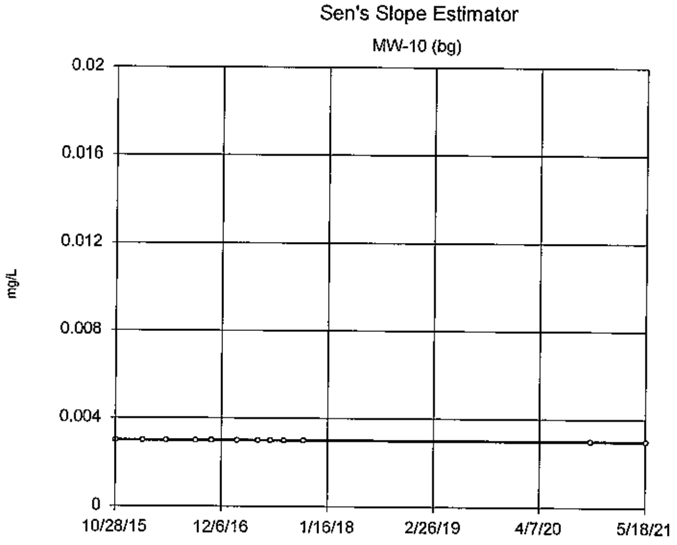
Hollow symbols indicate censored values.



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: Antimony Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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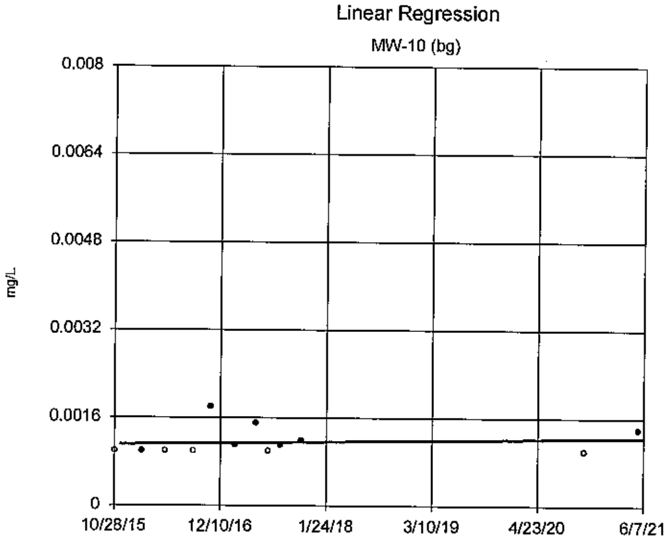
Hollow symbols indicate censored values.



n = 12
41.67% NDs

Slope = 0.02072
natural log units/year.

alpha = 0.02
t = 0.5843
critical = 2.359

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.8359 after natural
log transformation,
critical = 0.805.

Constituent: Arsenic Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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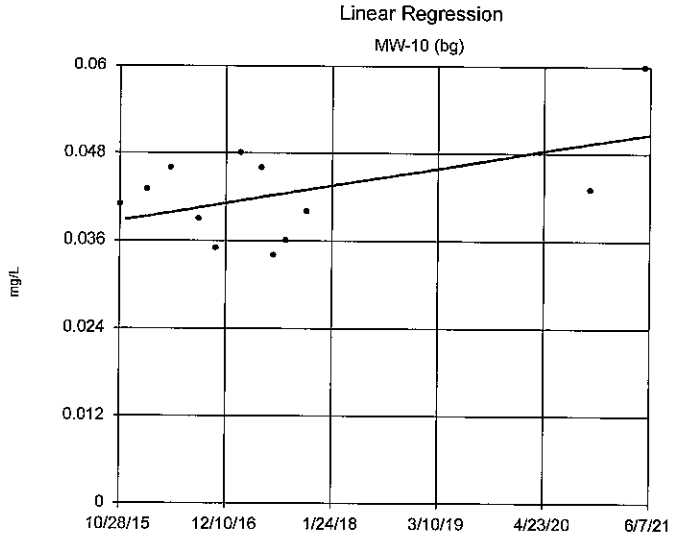

n = 12

Slope = 0.002143
units/year.

alpha = 0.02
t = 1.955
critical = 2.359

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.923, critical =
0.805.

Constituent: Barium Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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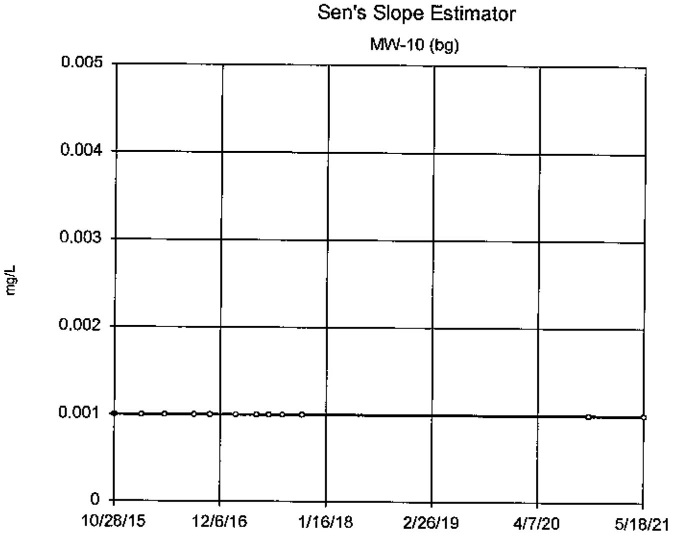
Hollow symbols indicate censored values.



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: Beryllium Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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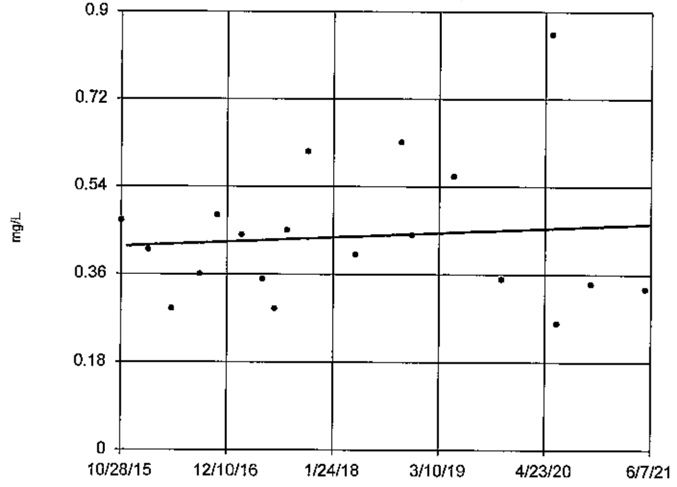
Linear Regression

MW-10 (bg)



n = 19

Slope = 0.008327
units/year.

alpha = 0.02
t = 0.4069
critical = 2.224

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.9156, critical
= 0.863.

Constituent: Boron Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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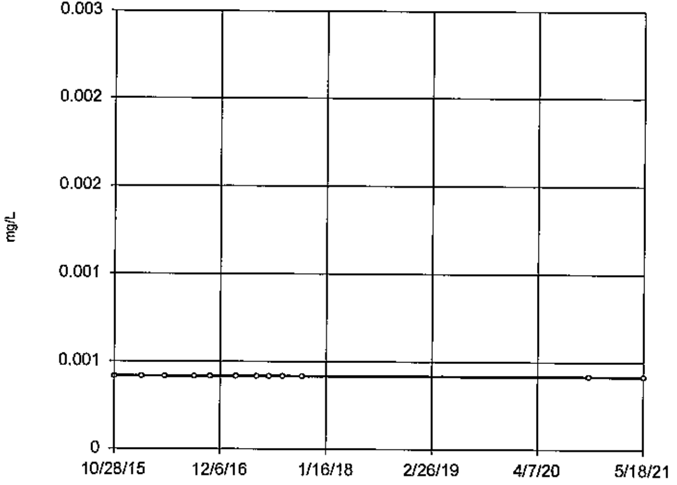
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10 (bg)



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: Cadmium Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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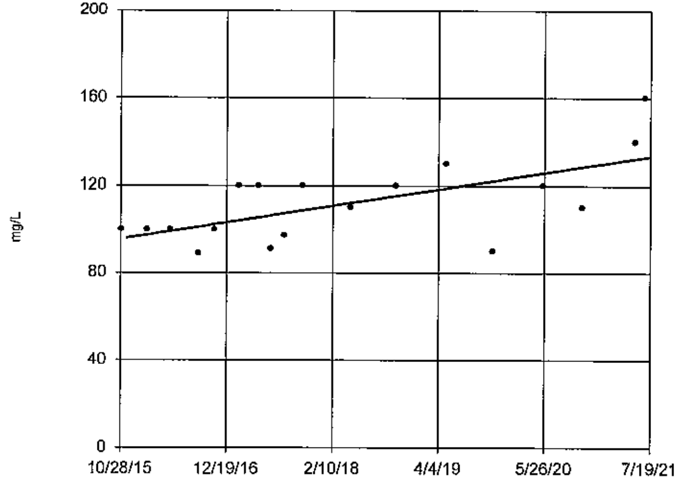
Linear Regression

MW-10 (bg)



n = 18

Slope = 6.638
units/year.

alpha = 0.02
t = 3.416
critical = 2.235

Significant increasing trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.9861, critical
= 0.858.

Constituent: Calcium Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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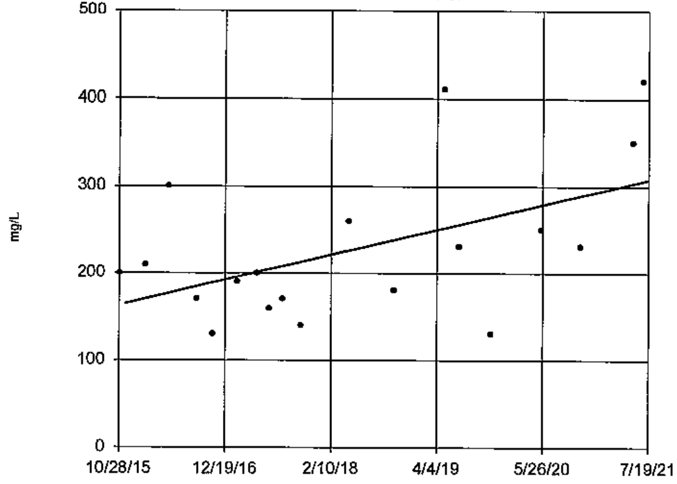
Linear Regression

MW-10 (bg)



n = 19

Slope = 25.19
units/year.

alpha = 0.02
t = 2.539
critical = 2.224

Significant increasing trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.9496, critical
= 0.863.

Constituent: Chloride Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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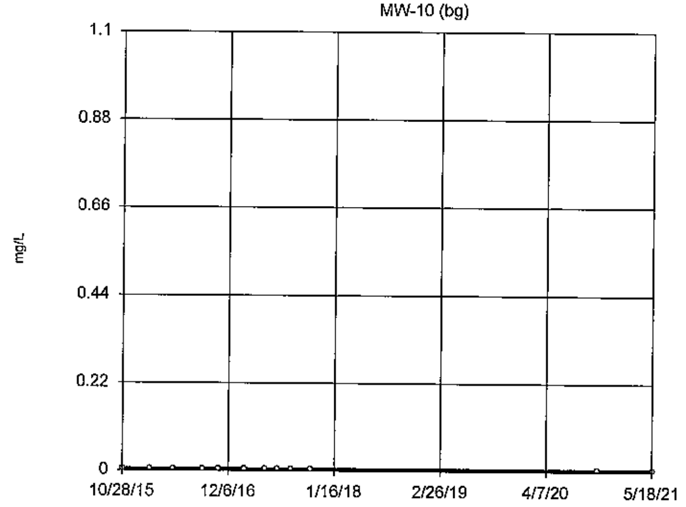
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10 (bg)



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: Chromium Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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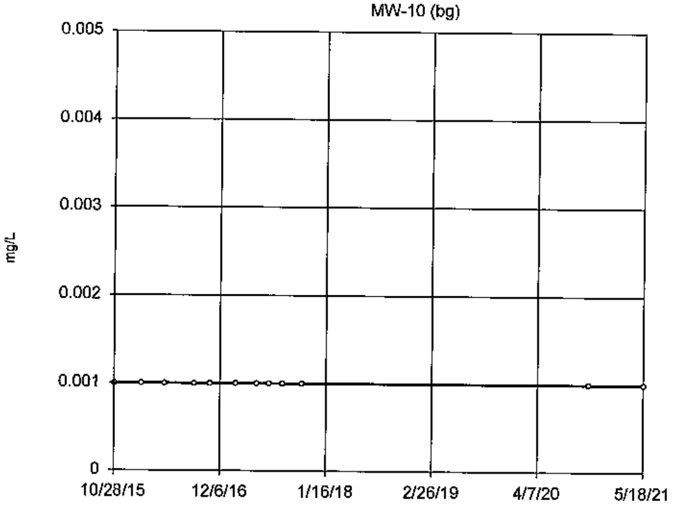
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10 (bg)



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: Cobalt Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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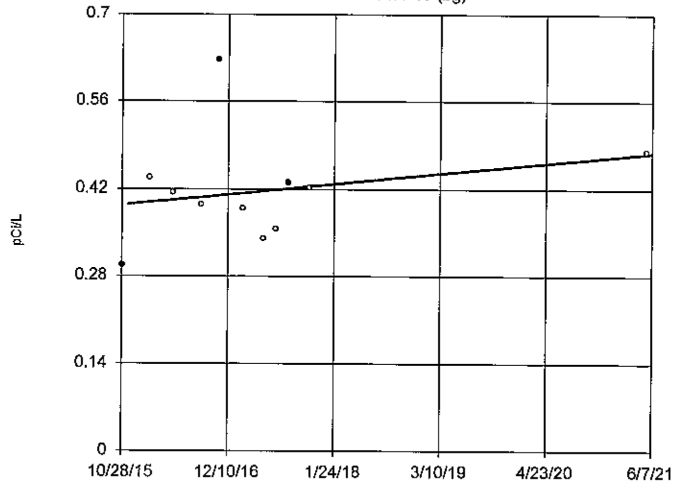
Hollow symbols indicate censored values.

Linear Regression

MW-10 (bg)



n = 11
72.73% NDs

Slope = 0.0149
units/year.

alpha = 0.02
t = 0.8027
critical = 2.398

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha = 0.01, calculated = 0.8148, critical = 0.792.

Constituent: Combined Radium 226 + 228 Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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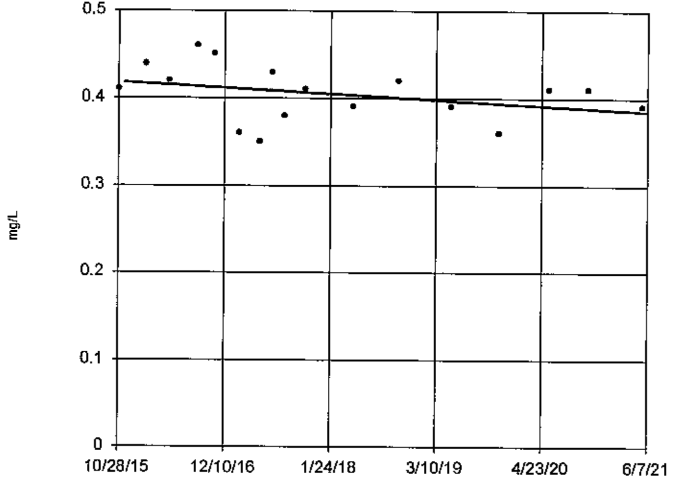
Linear Regression

MW-10 (bg)



n = 17

Slope = -0.005875
units/year.

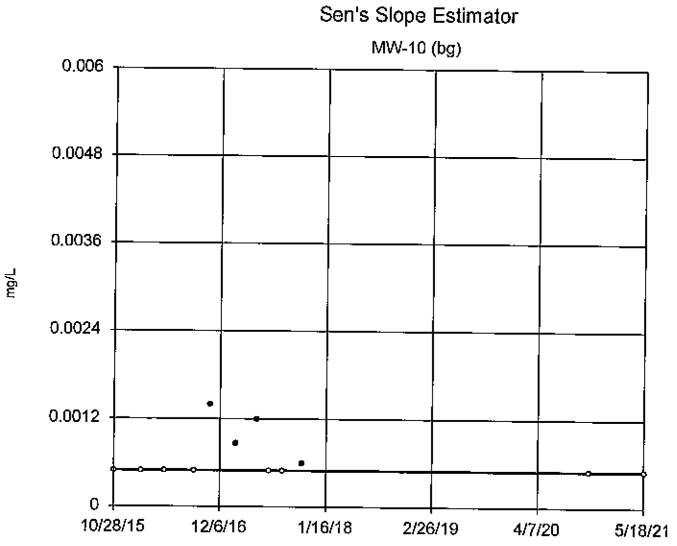
alpha = 0.02
t = -1.303
critical = 2.249

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha = 0.01, calculated = 0.9548, critical = 0.851.

Constituent: Fluoride Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.


Sen's Slope Estimator

MW-10 (bg)

n = 12

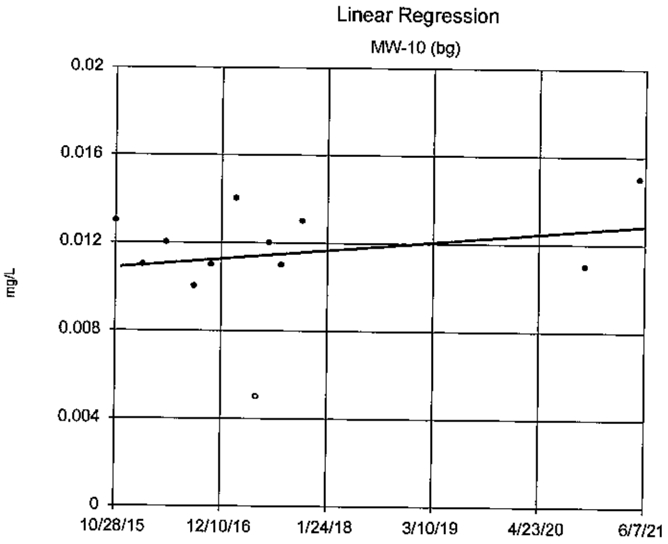
Slope = 0
units per year.

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 the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.01 alpha level, calculated = 0.757, critical = 0.805.

Constituent: Lead Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.


Linear Regression

MW-10 (bg)

n = 12
8.333% NDs

Slope = 0.0003505
units/year.

alpha = 0.02
t = 0.7936
critical = 2.359

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.8517, critical
= 0.805.

Constituent: Lithium Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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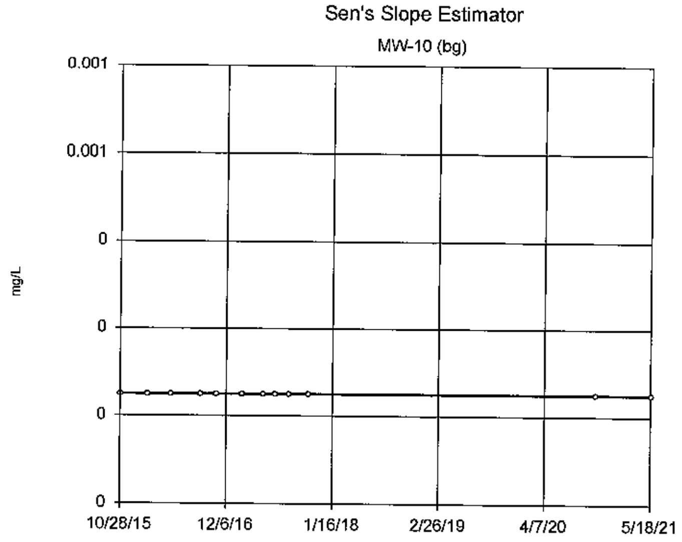
Hollow symbols indicate censored values.


Sen's Slope Estimator

MW-10 (bg)

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 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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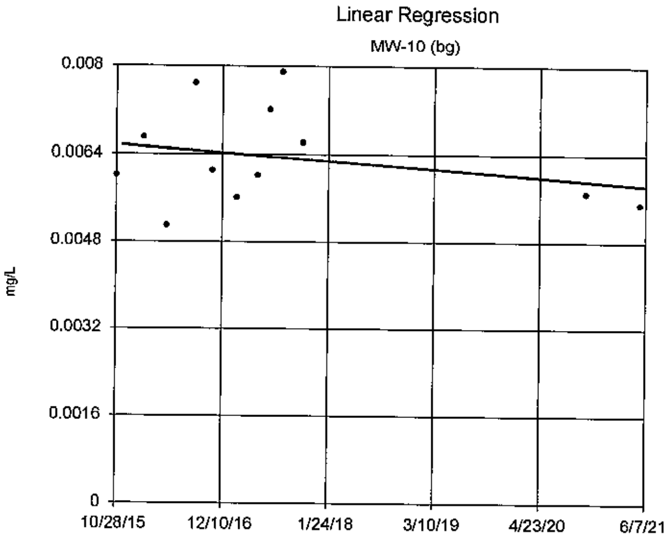
Linear Regression

MW-10 (bg)

n = 12

Slope = -0.0001304
units/year.

alpha = 0.02
t = -0.8336
critical = 2.359

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.954, critical =
0.805.

Constituent: Molybdenum Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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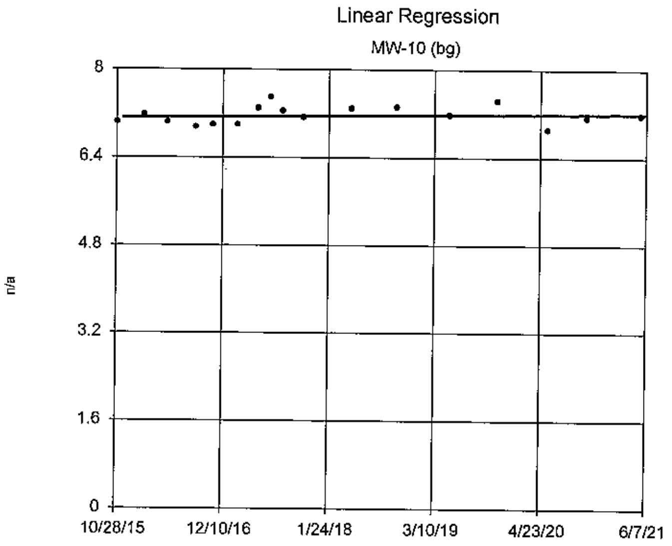

n = 17

Slope = 0.01492 units/year.

alpha = 0.02
t = 0.6175
critical = 2.249

No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.01, calculated = 0.9808, critical = 0.851.

Constituent: pH Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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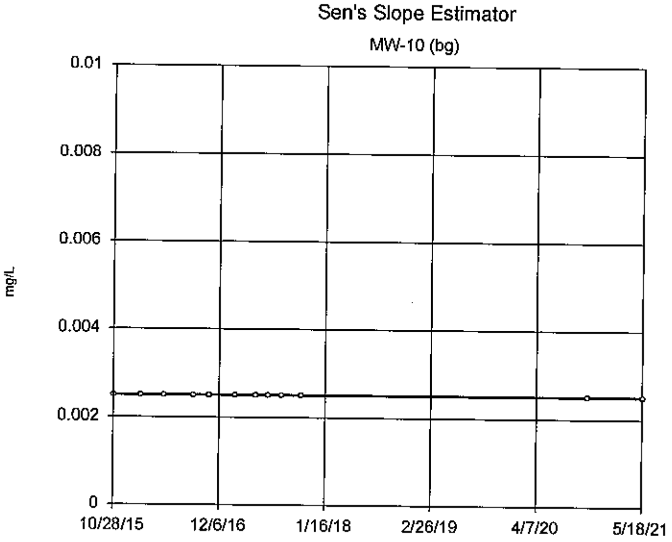
Hollow symbols indicate censored values.



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: Selenium Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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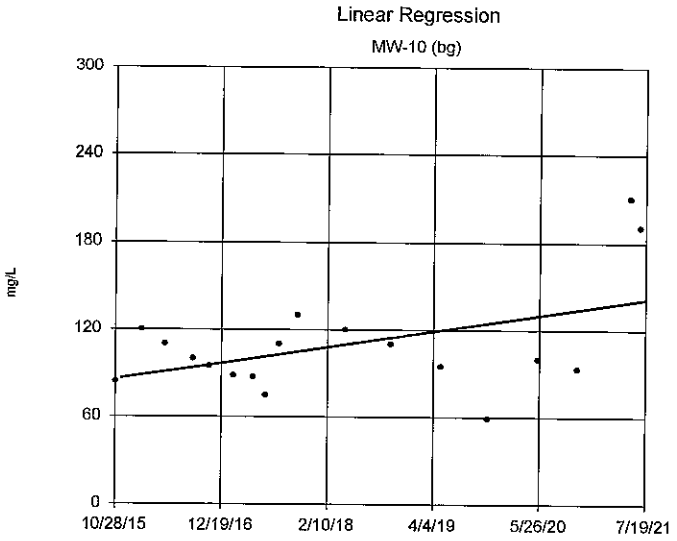


n = 18

Slope = 9.656 units/year.

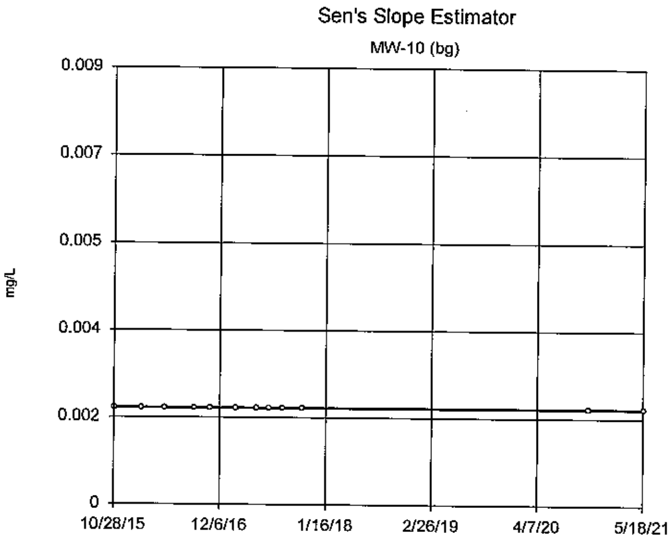
alpha = 0.02
t = 2.174
critical = 2.235

No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.01, calculated = 0.9897, critical = 0.858.

Constituent: Sulfate Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



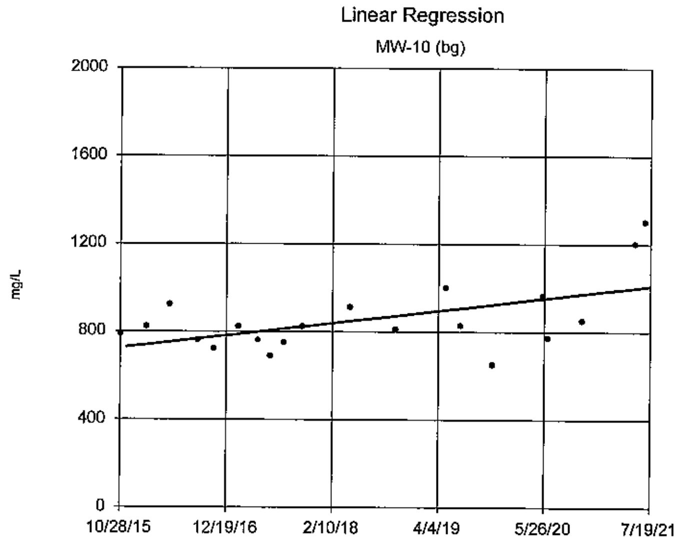
n = 12

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: Thallium Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29



Linear Regression

MW-10 (bg)

n = 20

Slope = 49.54
units/year.

alpha = 0.02
t = 2.873
critical = 2.214

Significant increasing trend.

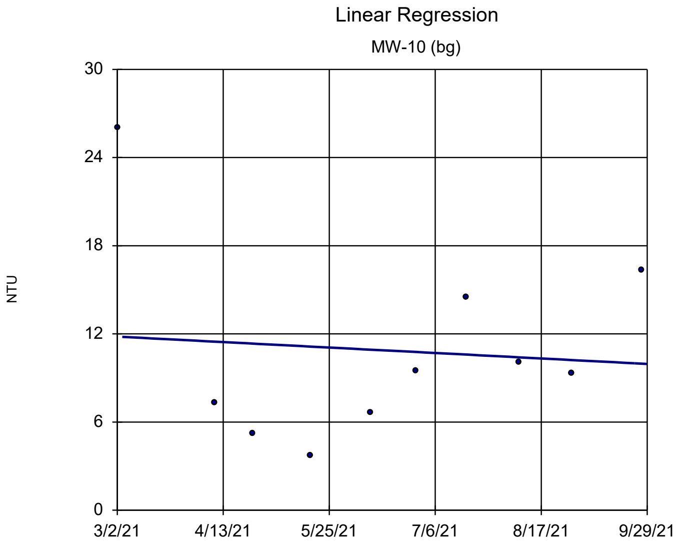
Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.9879, critical
= 0.868.

Constituent: Total Dissolved Solids   Analysis Run 8/8/2021 10:14 AM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Trend Test Joliet #29 MW-10 Turbidity

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29   Printed 10/7/2021, 2:47 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Turbidity (NTU)	MW-10 (bg)	-3.217	-0.2499	2.449	No	10	0	Yes	no	0.02	Param.



n = 10

Slope = -3.217
units/year.

alpha = 0.02
t = -0.2499
critical = 2.449

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.9051, critical
= 0.781.

Constituent: Turbidity   Analysis Run 10/7/2021 2:45 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Shapiro-Wilk Normality Test

Constituent: Antimony Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	-1	0.859	No
	square root	0	0.859	No
	square	-1	0.859	No
	cube root	0	0.859	No
	cube	-1	0.859	No
	natural log	-1	0.859	No
	x^4	-1	0.859	No
	x^5	-1	0.859	No
	x^6	-1	0.859	No

Shapiro-Wilk Normality Test

Constituent: Arsenic Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	0.7417	0.859	No
	square root	0.7553	0.859	No
	square	0.709	0.859	No
	cube root	0.7594	0.859	No
	cube	0.6705	0.859	No
	natural log	0.7669	0.859	No
	x^4	0.6288	0.859	No
	x^5	0.5868	0.859	No
	x^6	0.5469	0.859	No

Shapiro-Wilk Normality Test

Constituent: Barium Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	0.9036	0.859	Yes
	square root	0.9268	0.859	Yes
	square	0.8453	0.859	No
	cube root	0.9336	0.859	Yes
	cube	0.7769	0.859	No
	natural log	0.9454	0.859	Yes
	x^4	0.7058	0.859	No
	x^5	0.6383	0.859	No
	x^6	0.5782	0.859	No

Shapiro-Wilk Normality Test

Constituent: Beryllium Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

```
Well                     Transformation           Calculated               Critical                 Normal
MW-10 (bg) (n = 12, alpha = 0.05)
                         no                       -1                       0.859                    No
                         square root              -1                       0.859                    No
                         square                   -1                       0.859                    No
                         cube root                0                        0.859                    No
                         cube                     -1                       0.859                    No
                         natural log              0                        0.859                    No
                         x^4                      -1                       0.859                    No
                         x^5                      -1                       0.859                    No
                         x^6                      -1                       0.859                    No
```

Shapiro-Wilk Normality Test

Constituent: Boron   Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 19, alpha = 0.05)				
	no	0.8874	0.901	No
	square root	0.9339	0.901	Yes
	square	0.7655	0.901	No
	cube root	0.9464	0.901	Yes
	cube	0.6355	0.901	No
	natural log	0.9662	0.901	Yes
	x^4	0.5242	0.901	No
	x^5	0.4401	0.901	No
	x^6	0.3805	0.901	No

Shapiro-Wilk Normality Test

Constituent: Cadmium   Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	-1	0.859	No
	square root	0	0.859	No
	square	-1	0.859	No
	cube root	0	0.859	No
	cube	-1	0.859	No
	natural log	-1	0.859	No
	x^4	-1	0.859	No
	x^5	-1	0.859	No
	x^6	-1	0.859	No

Shapiro-Wilk Normality Test

Constituent: Calcium   Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 18, alpha = 0.05)				
	no	0.9087	0.897	Yes
	square root	0.9244	0.897	Yes
	square	0.866	0.897	No
	cube root	0.9288	0.897	Yes
	cube	0.8107	0.897	No
	natural log	0.9362	0.897	Yes
	x^4	0.7474	0.897	No
	x^5	0.6816	0.897	No
	x^6	0.6183	0.897	No

Shapiro-Wilk Normality Test

Constituent: Chloride   Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 19, alpha = 0.05)				
	no	0.8777	0.901	No
	square root	0.9191	0.901	Yes
	square	0.7794	0.901	No
	cube root	0.9306	0.901	Yes
	cube	0.6854	0.901	No
	natural log	0.9492	0.901	Yes
	x^4	0.6097	0.901	No
	x^5	0.5532	0.901	No
	x^6	0.5122	0.901	No

Shapiro-Wilk Normality Test

Constituent: Chromium   Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	-1	0.859	No
	square root	0	0.859	No
	square	-1	0.859	No
	cube root	0	0.859	No
	cube	-1	0.859	No
	natural log	0	0.859	No
	x^4	-1	0.859	No
	x^5	-1	0.859	No
	x^6	-1	0.859	No

Shapiro-Wilk Normality Test

Constituent: Cobalt Analysis Run 8/12/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	-1	0.859	No
	square root	-1	0.859	No
	square	-1	0.859	No
	cube root	0	0.859	No
	cube	-1	0.859	No
	natural log	0	0.859	No
	x^4	-1	0.859	No
	x^5	-1	0.859	No
	x^6	-1	0.859	No

Shapiro-Wilk Normality Test

Constituent: Combined Radium 226 + 228 Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 11, alpha = 0.05)				
	no	0.8951	0.85	Yes
	square root	0.928	0.85	Yes
	square	0.8127	0.85	No
	cube root	0.9372	0.85	Yes
	cube	0.7228	0.85	No
	natural log	0.9527	0.85	Yes
	x^4	0.6393	0.85	No
	x^5	0.5689	0.85	No
	x^6	0.513	0.85	No

Shapiro-Wilk Normality Test

Constituent: Fluoride Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 17, alpha = 0.05)				
	no	0.9672	0.892	Yes
	square root	0.9655	0.892	Yes
	square	0.9683	0.892	Yes
	cube root	0.9648	0.892	Yes
	cube	0.9663	0.892	Yes
	natural log	0.963	0.892	Yes
	x^4	0.9612	0.892	Yes
	x^5	0.9531	0.892	Yes
	x^6	0.9424	0.892	Yes

Shapiro-Wilk Normality Test

Constituent: Lead   Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	0.6248	0.859	No
	square root	0.6354	0.859	No
	square	0.598	0.859	No
	cube root	0.6385	0.859	No
	cube	0.5677	0.859	No
	natural log	0.6439	0.859	No
	x^4	0.5377	0.859	No
	x^5	0.5103	0.859	No
	x^6	0.4864	0.859	No

Shapiro-Wilk Normality Test

Constituent: Lithium Analysis Run 8/12/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	0.8624	0.859	Yes
	square root	0.8009	0.859	No
	square	0.9403	0.859	Yes
	cube root	0.7781	0.859	No
	cube	0.9555	0.859	Yes
	natural log	0.7307	0.859	No
	x^4	0.9304	0.859	Yes
	x^5	0.8884	0.859	Yes
	x^6	0.8422	0.859	No

Shapiro-Wilk Normality Test

Constituent: Mercury   Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	-1	0.859	No
	square root	0	0.859	No
	square	-1	0.859	No
	cube root	0	0.859	No
	cube	-1	0.859	No
	natural log	-1	0.859	No
	x^4	-1	0.859	No
	x^5	-1	0.859	No
	x^6	-1	0.859	No

Shapiro-Wilk Normality Test

Constituent: Molybdenum Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	0.9372	0.859	Yes
	square root	0.9461	0.859	Yes
	square	0.916	0.859	Yes
	cube root	0.9488	0.859	Yes
	cube	0.8913	0.859	Yes
	natural log	0.9537	0.859	Yes
	x^4	0.8644	0.859	Yes
	x^5	0.8366	0.859	No
	x^6	0.8087	0.859	No

Shapiro-Wilk Normality Test

Constituent: pH Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 17, alpha = 0.05)				
	no	0.9714	0.892	Yes
	square root	0.9723	0.892	Yes
	square	0.9693	0.892	Yes
	cube root	0.9726	0.892	Yes
	cube	0.9671	0.892	Yes
	natural log	0.9732	0.892	Yes
	x^4	0.9645	0.892	Yes
	x^5	0.9617	0.892	Yes
	x^6	0.9587	0.892	Yes

Shapiro-Wilk Normality Test

Constituent: Selenium   Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	-1	0.859	No
	square root	0	0.859	No
	square	-1	0.859	No
	cube root	-1	0.859	No
	cube	-1	0.859	No
	natural log	0	0.859	No
	x^4	-1	0.859	No
	x^5	-1	0.859	No
	x^6	-1	0.859	No

Shapiro-Wilk Normality Test

Constituent: Sulfate Analysis Run 8/12/2021 9:57 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 18, alpha = 0.05)				
	no	0.8207	0.897	No
	square root	0.8813	0.897	No
	square	0.6916	0.897	No
	cube root	0.8989	0.897	Yes
	cube	0.5848	0.897	No
	natural log	0.9281	0.897	Yes
	x^4	0.5095	0.897	No
	x^5	0.4593	0.897	No
	x^6	0.4261	0.897	No

Shapiro-Wilk Normality Test

Constituent: Thallium Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 12, alpha = 0.05)				
	no	-1	0.859	No
	square root	0	0.859	No
	square	-1	0.859	No
	cube root	-1	0.859	No
	cube	-1	0.859	No
	natural log	0	0.859	No
	x^4	-1	0.859	No
	x^5	-1	0.859	No
	x^6	-1	0.859	No

Shapiro-Wilk Normality Test

Constituent: Total Dissolved Solids Analysis Run 8/12/2021 9:57 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
MW-10 (bg) (n = 20, alpha = 0.05)				
	no	0.849	0.905	No
	square root	0.8818	0.905	No
	square	0.7774	0.905	No
	cube root	0.892	0.905	No
	cube	0.7043	0.905	No
	natural log	0.9111	0.905	Yes
	x^4	0.6359	0.905	No
	x^5	0.5759	0.905	No
	x^6	0.5252	0.905	No

Shapiro-Wilk Normality Test

Constituent: Turbidity   Analysis Run 10/7/2021 2:42 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

```
Well                  Transformation        Calculated            Critical              Normal
MW-03 (n = 10, alpha = 0.05)
                      no                    0.6987                0.842                 No
                      square root           0.8252                0.842                 No
                      square                0.5517                0.842                 No
                      cube root             0.8704                0.842                 Yes
                      cube                  0.4778                0.842                 No
                      natural log           0.9265                0.842                 Yes
                      x^4                   0.4348                0.842                 No
                      x^5                   0.4084                0.842                 No
                      x^6                   0.3921                0.842                 No
MW-04 (n = 10, alpha = 0.05)
                      no                    0.6444                0.842                 No
                      square root           0.7365                0.842                 No
                      square                0.5248                0.842                 No
                      cube root             0.7711                0.842                 No
                      cube                  0.4592                0.842                 No
                      natural log           0.8401                0.842                 No
                      x^4                   0.4208                0.842                 No
                      x^5                   0.398                 0.842                 No
                      x^6                   0.3846                0.842                 No
MW-05 (n = 10, alpha = 0.05)
                      no                    0.8561                0.842                 Yes
                      square root           0.9502                0.842                 Yes
                      square                0.6485                0.842                 No
                      cube root             0.97                  0.842                 Yes
                      cube                  0.5159                0.842                 No
                      natural log           0.9831                0.842                 Yes
                      x^4                   0.4452                0.842                 No
                      x^5                   0.4082                0.842                 No
                      x^6                   0.3887                0.842                 No
MW-10 (bg) (n = 10, alpha = 0.05)
                      no                    0.8725                0.842                 Yes
                      square root           0.9473                0.842                 Yes
                      square                0.6983                0.842                 No
                      cube root             0.9654                0.842                 Yes
                      cube                  0.5657                0.842                 No
                      natural log           0.9871                0.842                 Yes
                      x^4                   0.4837                0.842                 No
                      x^5                   0.4356                0.842                 No
                      x^6                   0.4075                0.842                 No
```

Joliet #29 Interwell PL MW-10 All Values

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29 Printed 8/8/2021, 11:41 AM

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	3 future	n/a	12	100	n/a	0.009156	NP (NDs) 1 of 2
Arsenic (mg/L)	n/a	0.0018	n/a	n/a	3 future	n/a	12	41.67	n/a	0.009156	NP (normality) 1 of 2
Barium (mg/L)	n/a	0.0628	n/a	n/a	3 future	n/a	12	0	No	0.000399	Param 1 of 2
Beryllium (mg/L)	n/a	0.001	n/a	n/a	3 future	n/a	12	100	n/a	0.009156	NP (NDs) 1 of 2
Boron (mg/L)	n/a	0.8306	n/a	n/a	3 future	n/a	19	0	sqrt(x)	0.000399	Param 1 of 2
Cadmium (mg/L)	n/a	0.0005	n/a	n/a	3 future	n/a	12	100	n/a	0.009156	NP (NDs) 1 of 2
Chromium (mg/L)	n/a	0.005	n/a	n/a	3 future	n/a	12	100	n/a	0.009156	NP (NDs) 1 of 2
Cobalt (mg/L)	n/a	0.001	n/a	n/a	3 future	n/a	12	100	n/a	0.009156	NP (NDs) 1 of 2
Combined Radium 226 + 228 (pCi/L)	n/a	0.626	n/a	n/a	3 future	n/a	11	72.73	n/a	0.01058	NP (NDs) 1 of 2
Fluoride (mg/L)	n/a	0.486	n/a	n/a	3 future	n/a	17	0	No	0.000399	Param 1 of 2
Lead (mg/L)	n/a	0.0014	n/a	n/a	3 future	n/a	12	66.67	n/a	0.009156	NP (NDs) 1 of 2
Lithium (mg/L)	n/a	0.01864	n/a	n/a	3 future	n/a	12	8.333	No	0.000399	Param 1 of 2
Mercury (mg/L)	n/a	0.0002	n/a	n/a	3 future	n/a	12	100	n/a	0.009156	NP (NDs) 1 of 2
Molybdenum (mg/L)	n/a	0.008878	n/a	n/a	3 future	n/a	12	0	No	0.000399	Param 1 of 2
pH (n/a)	n/a	7.569	6.733	n/a	3 future	n/a	17	0	No	0.000...	Param 1 of 2
Selenium (mg/L)	n/a	0.0025	n/a	n/a	3 future	n/a	12	100	n/a	0.009156	NP (NDs) 1 of 2
Sulfate (mg/L)	n/a	214.7	n/a	n/a	3 future	n/a	18	0	x^(1/3)	0.000399	Param 1 of 2
Thallium (mg/L)	n/a	0.002	n/a	n/a	3 future	n/a	12	100	n/a	0.009156	NP (NDs) 1 of 2

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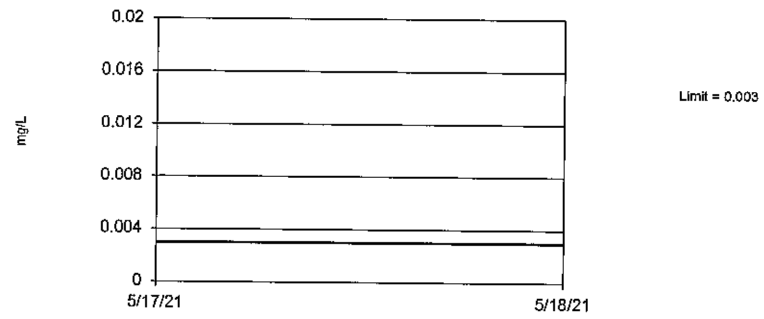
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 12) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.1045. Individual comparison alpha = 0.009156 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Antimony Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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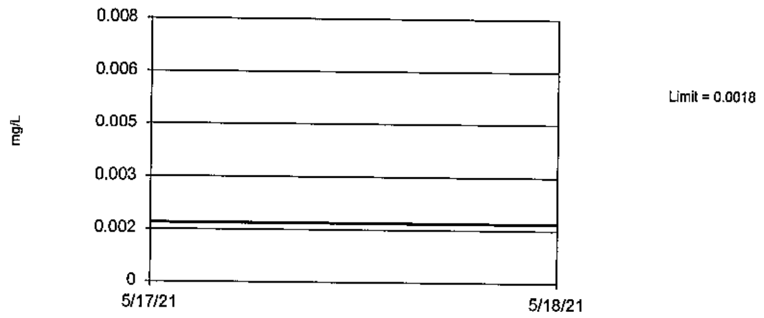
Prediction Limit

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 12 background values. 41.67% NDs. Annual per-constituent alpha = 0.1045. Individual comparison alpha = 0.009156 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Arsenic Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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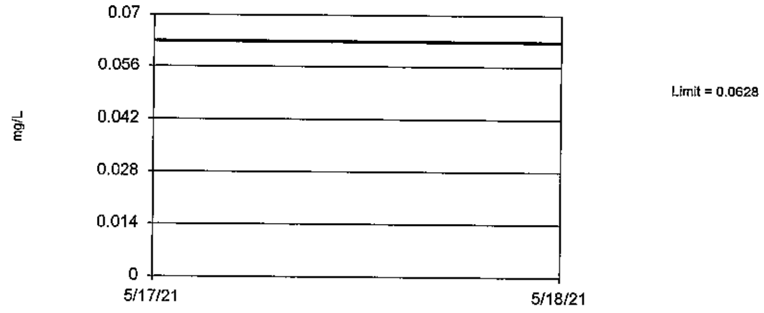
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.04258, Std. Dev.=0.00709, n=12. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9036, critical = 0.859. Kappa = 2.851 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.000399. Assumes 3 future values.

Constituent: Barium Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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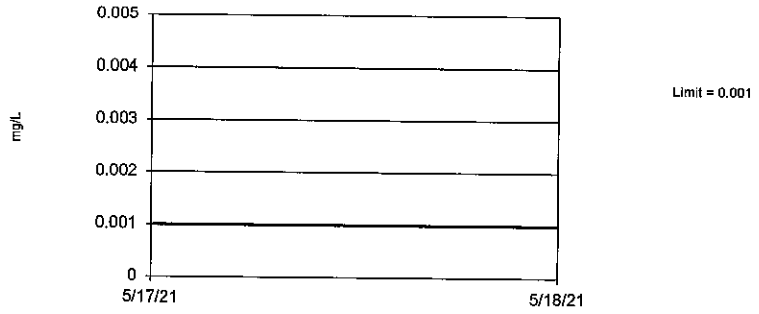
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 12) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.1045. Individual comparison alpha = 0.009156 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Beryllium Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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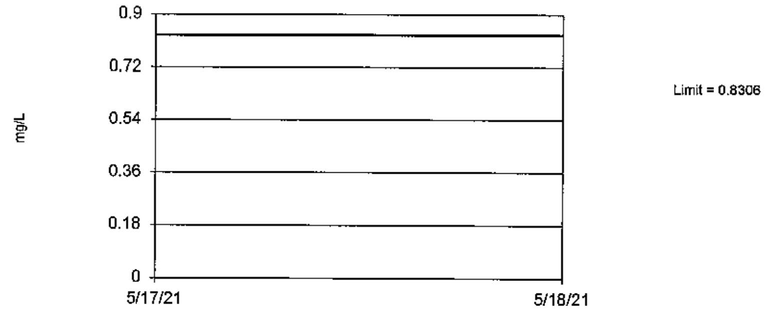
Prediction Limit

Interwell Parametric



Background Data Summary (based on square root transformation): Mean=0.6538, Std. Dev.=0.1026, n=19. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9339, critical = 0.901. Kappa = 2.511 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.000399. Assumes 3 future values.

Constituent: Boron Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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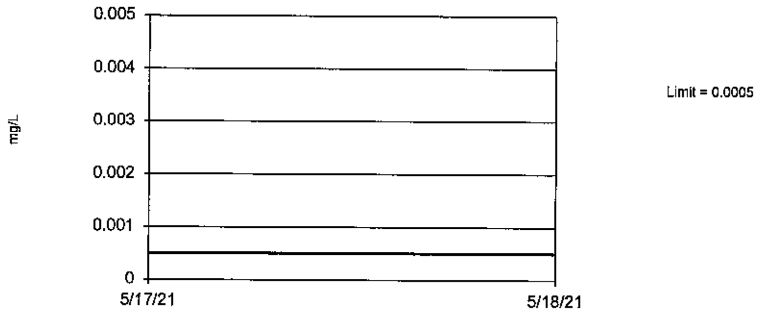
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 12) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.1045. Individual comparison alpha = 0.009156 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Cadmium Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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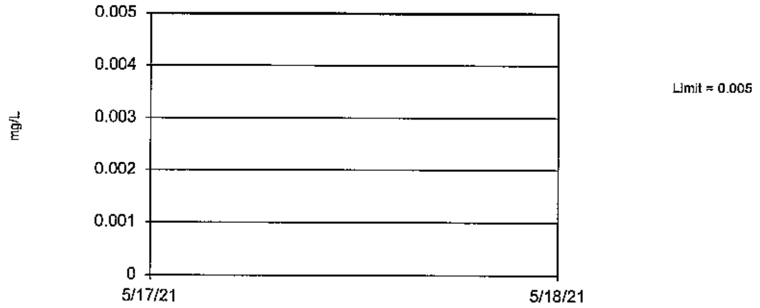
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 12) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.1045. Individual comparison alpha = 0.009156 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Chromium Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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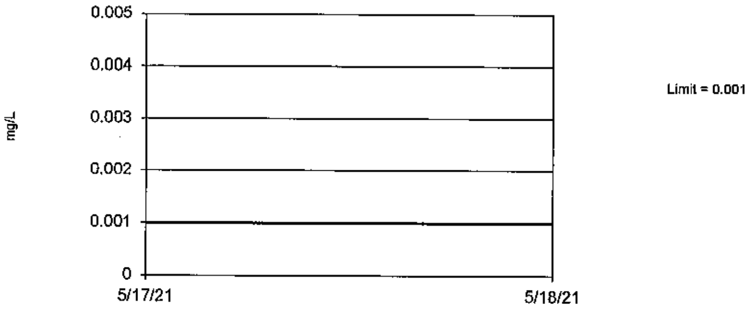
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 12) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.1045. Individual comparison alpha = 0.009156 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Cobalt Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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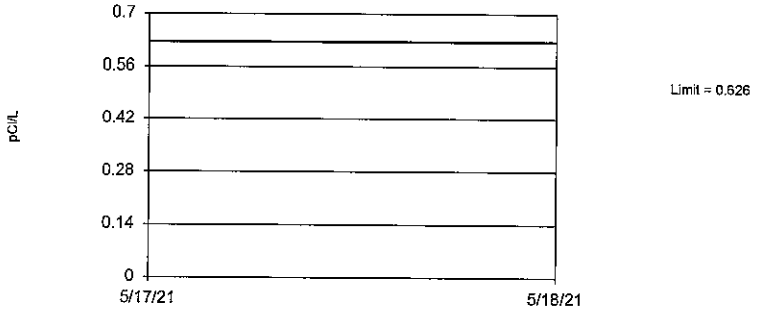
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 11 background values. 72.73% NDs. Annual per-constituent alpha = 0.1199. Individual comparison alpha = 0.01058 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Combined Radium 226 + 228 Analysis Run 8/8/2021 11:39 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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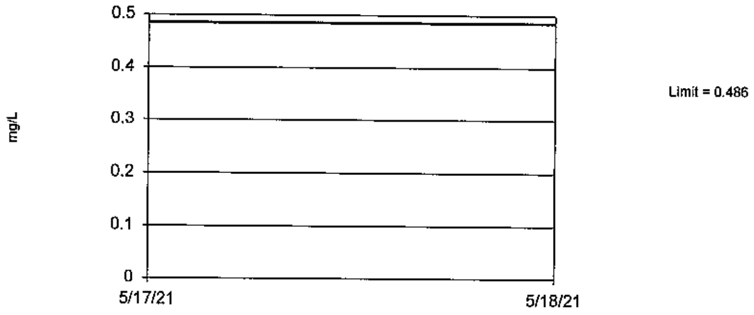
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.4047, Std. Dev.=0.03145, n=17. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9672, critical = 0.892. Kappa = 2.586 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.000399. Assumes 3 future values.

Constituent: Fluoride Analysis Run 8/8/2021 11:39 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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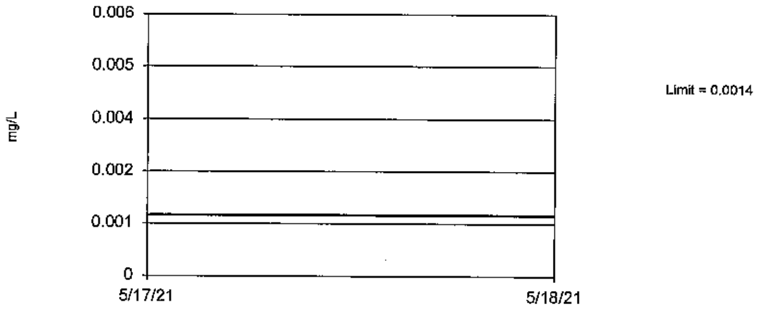
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 12 background values. 66.67% NDs. Annual per-constituent alpha = 0.1045. Individual comparison alpha = 0.009156 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Lead Analysis Run 8/8/2021 11:39 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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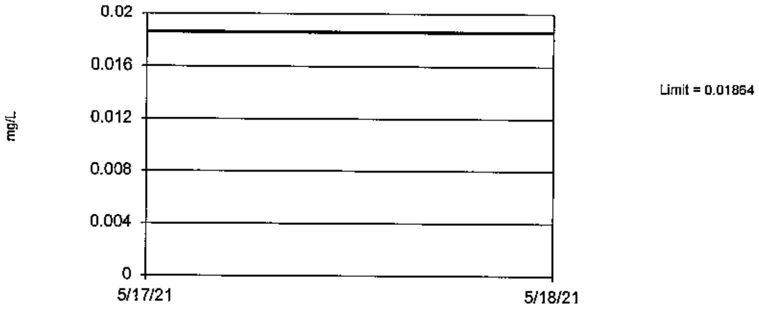
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.0115, Std. Dev.=0.002505, n=12, 8.333% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8624, critical = 0.859. Kappa = 2.851 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.000399. Assumes 3 future values.

Constituent: Lithium Analysis Run 8/8/2021 11:39 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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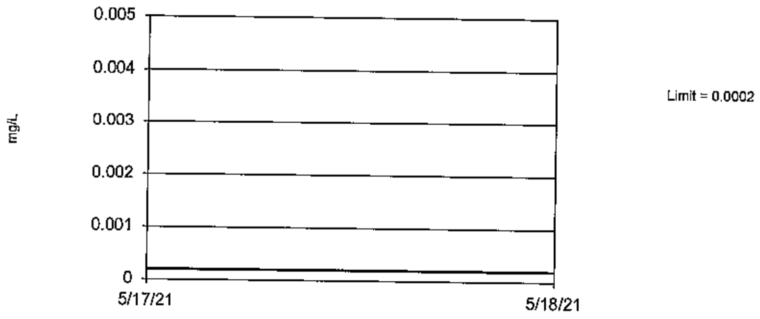
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 12) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.1045. Individual comparison alpha = 0.009156 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Mercury Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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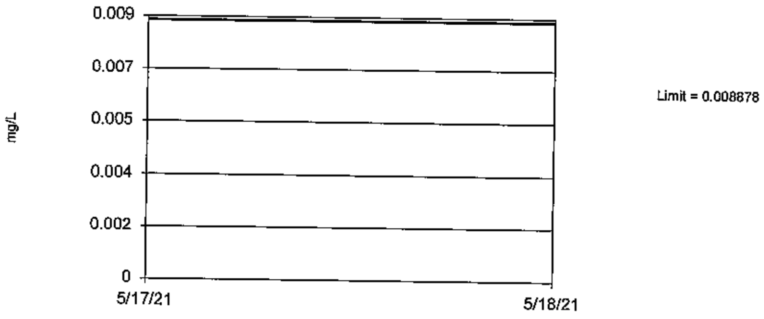
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.006342, Std. Dev.=0.0008898, n=12. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9372, critical = 0.859. Kappa = 2.851 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.000399. Assumes 3 future values.

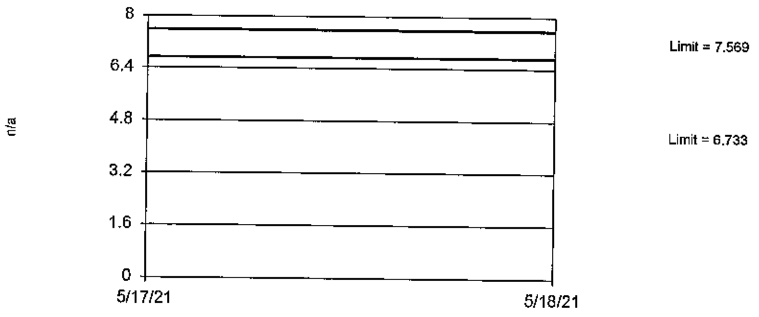
Constituent: Molybdenum Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=7.151, Std. Dev.=0.1617, n=17. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9714, critical = 0.892. Kappa = 2.586 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001995. Assumes 3 future values.

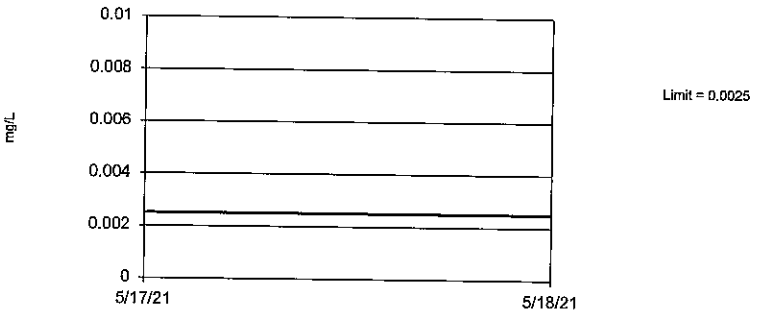
Constituent: pH Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 12) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.1045. Individual comparison alpha = 0.009156 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

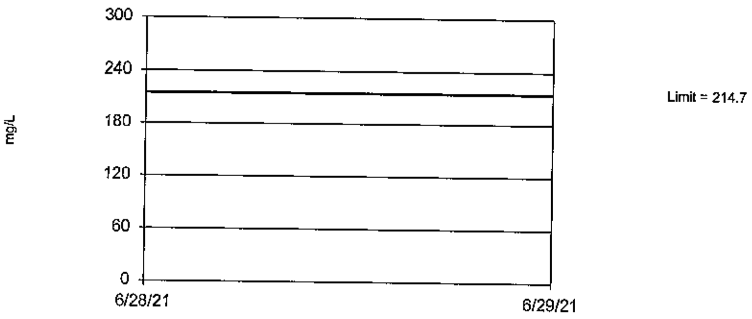
Constituent: Selenium Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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=4.739, Std. Dev.=0.4901, n=18. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8989, critical = 0.897. Kappa = 2.549 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.000399. Assumes 3 future values.

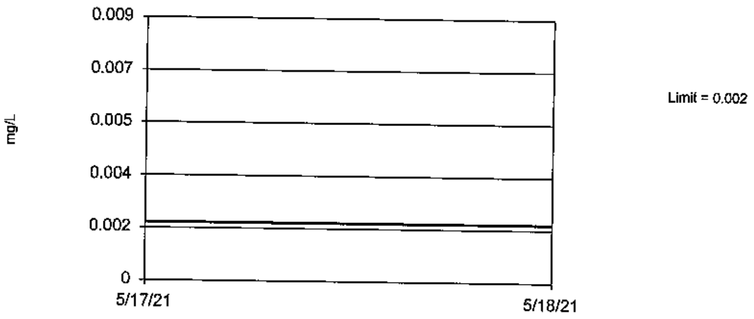
Constituent: Sulfate Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 12) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.1045. Individual comparison alpha = 0.009156 (1 of 2). Assumes 3 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Thallium Analysis Run 8/8/2021 11:39 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Joliet #29 Interwell PL MW-10 Original 8

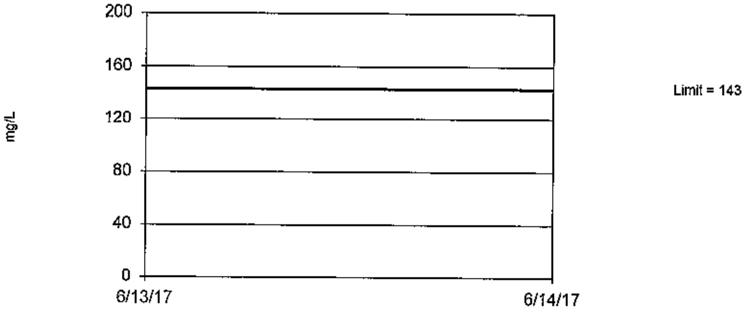
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29 Printed 8/8/2021, 11:34 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Calcium (mg/L)	n/a	143	n/a	n/a	3 future	n/a	8	0	No	0.000399	Param 1 of 2
Chloride (mg/L)	n/a	368	n/a	n/a	3 future	n/a	8	0	No	0.000399	Param 1 of 2
Total Dissolved Solids (mg/L)	n/a	1031	n/a	n/a	3 future	n/a	8	0	No	0.000399	Param 1 of 2

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=102.5, Std. Dev.=11.66, n=8. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8198, critical = 0.818. Kappa = 3.469 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.000399. Assumes 3 future values.

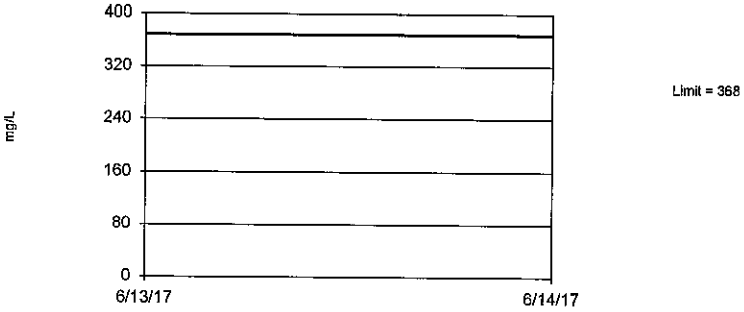
Constituent: Calcium Analysis Run 8/8/2021 11:32 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=195, Std. Dev.=49.86, n=8. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8907, critical = 0.818. Kappa = 3.469 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.000399. Assumes 3 future values.

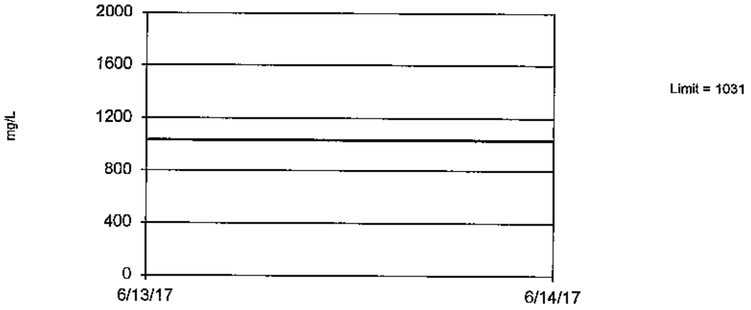
Constituent: Chloride Analysis Run 8/8/2021 11:32 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=785, Std. Dev.=70.91, n=8. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9512, critical = 0.818. Kappa = 3.469 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.000399. Assumes 3 future values.

Constituent: Total Dissolved Solids Analysis Run 8/8/2021 11:32 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Interwell Prediction Limit Joliet #29 MW-10 Turbidity

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29   Printed 10/7/2021, 2:48 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Turbidity (NTU)	n/a	31.22	n/a	n/a	3 future	n/a	10	0	No	0.000399	Param 1 of 2

Prediction Limit

Interwell Parametric

Background Data Summary: Mean=10.86, Std. Dev.=6.601, n=10. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8725, critical = 0.842. Kappa = 3.084 (c=22, w=3, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.000399. Assumes 3 future values.

Constituent: Turbidity Analysis Run 10/7/2021 2:47 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

ATTACHMENT 10 WRITTEN CLOSURE PLAN

CLOSURE PLAN
ASH POND 2
JOLIET #29 STATION
OCTOBER 2016

This closure plan has been prepared in accordance with Ill. Adm. Code Title 35 Part 845.720(a) for Ash Pond 2 at the Joliet #29 Station, operated by Midwest Generation, LLC (Midwest Generation) in Joliet, IL. This closure plan describes the schedule and steps necessary for closure and methods for compliance with closure requirements for final closure of Ash Pond 2.

1.0 Closure Narrative [845.720(a)(1)(A)]

The closure of Ash Pond 2 will be by removal of the CCR in accordance with Ill. Adm. Code Title 35 Part 845.740(a). Midwest Generation plans to keep the structure of the pond intact for use for non-CCR material.

2.0 CCR Removal and Decontamination [845.720(a)(1)(B)]

Closure of Ash Pond 2 will be through removal of CCR. The pond will be dewatered to allow for the excavation of the CCR. First, the pond will be allowed to naturally dewater to a water level equal with the elevation of the existing outlet structure. At this point, the water will be pumped into the existing outlet structure.

The CCR will be removed through mechanical excavation once the pond has been sufficiently dewatered. A mechanical excavator will excavate the CCR from the pond and load it into dump trucks. Once the CCR has been mechanically loaded it will be hauled to Lincoln Stone Quarry or other regulated facility for disposal. Any CCR remnants will be removed through washing/rinsing and/or vacuuming.

In addition, all CCR will be removed from the pond inlet and outlet structures through mechanical means and also by washing/rinsing any remaining CCR remnants. The CCR that is removed from the inlet and outlet structures will be taken to Lincoln Stone Quarry or other regulated facility for disposal.

CCR removal and decontamination will be considered complete when CCR has been removed from the pond and from any areas that may have been affected by releases from the pond and groundwater monitoring concentrations do not exceed the groundwater protection standards established in Ill. Adm. Code Title 35 Part 845.650(a) for two consecutive sampling events using the statistical procedures in §845.640(g).

3.0 Closure with CCR Left in Place [845.720(a)(1)(C)]

Closure of Ash Pond 2 will be through removal of CCR and decontamination of areas affected by CCR. Therefore this requirement is not applicable.

4.0 Maximum Inventory of CCR [845.720(a)(1)(D)]

The estimated maximum inventory of CCR on-site contained in Ash Pond 2 is approximately 15,000 cubic yards based upon the 2015 annual inspection, conducted on September 30, 2015.

5.0 Largest Area of CCR Requiring a Final Cover [845.720(a)(1)(E)]

Ash Pond 2 will be closed by removing the CCR in accordance with 845.740; therefore, this section is not applicable to this closure plan.

6.0 Closure Schedule [845.720(a)(1)(F)]

Implementation of closure through removal of CCR is estimated to require 7 months. Closure is anticipated to begin in 2017 or 2018 and estimated to be completed by the end of 2018. Prior to initiation of closure, a notice of intent to close will be prepared in accordance with §845.730(d). 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 for closure, technical specifications, and adequate CCR removal confirmation procedures. The permits required for closure construction will be evaluated at the time of closure, and may include permits from the Illinois Environmental Protection Agency (IEPA), Illinois Department of Natural Resources (IDNR), and Will County. A preliminary schedule of anticipated closure activities is included below.

Closure Schedule

Activity No.	Closure Activity	Schedule
1	Dewater	1 month
2a	Excavate CCR	5 months
2b	Decontaminate Pond Liner	5 months
2c	Decontaminate Pond Inlet & Outlet Structures	5 months
3	Closure Certification	1 month

7.0 Closure Activities Initiation [845.730]

Closure activities will commence when one or more of the following conditions have occurred:

- No later than 30 days after the date on which the CCR unit received the known final receipt of CCR or non-CCR waste;
- No later than 30 days after the removal of the known final volume of CCR for the purpose of beneficial use;
- Within two years of the last receipt of waste for a unit that has not received CCR or non-CCR waste; or
- Within two years of the last removal of CCR material for the purposes of beneficial use.

In accordance with §845.760(f), 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 §845.760(e)(2).

8.0 Closure Plan Amendments [845.720(a)(3)]

This Closure Plan will be amended in accordance with §845.720(a)(3). If a change in the operation of Ash Pond 2 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 §845.720(a)(4).

9.0 Professional Engineer's Certification [845.720(a)(4)]

This Closure Plan has been prepared to meet the requirements of Ill. Adm. Code Title 35 845.720(a).

10/14/16

Joshua D. Davenport, P.E.
Illinois Professional Engineer

SEAL

JOSHUA D. DAVENPORT
062-061945

ATTACHMENT 11 POST-CLOSURE PLAN

POST-CLOSURE PLAN
POND 2
JOLIET 29 STATION
SEPTEMBER 2021

This post-closure plan has been prepared in accordance with Ill. Adm. Code 845.780(d) for Pond 2 at the Joliet 29 Generating Station, operated by Midwest Generation, LLC (Midwest Generation), in Joliet, IL. This post-closure plan describes the steps necessary for post-closure and methods for compliance with post-closure requirements for Pond 2. The post-closure care period will begin once the construction completion report documenting the closure of Pond 2 has been approved by the Illinois Environmental Protection Agency (IEPA) and Midwest Generation has placed the certified notification of closure as required by 845.780(f) in Joliet 29's operating record.

1.0 POST-CLOSURE MONITORING AND MAINTENANCE DESCRIPTION [845.780(d)(1)(A)]

The 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 geomembrane liner, including making repairs as necessary; and

- Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with 845.600 through 845.680.

In accordance with 845.780(b)(1), the geomembrane liner will be inspected annually for settlement/subsidence that could damage the geomembrane liner. The liner will be repaired in accordance with the manufacturer's recommendations if any of the above conditions are observed. If settlement or subsidence is observed, the potential for leaking through the liner should be evaluated. If it is determined that the potential for leaking through the liner will be detrimental to the proper function of the liner, then it will be repaired as necessary. This should be done based upon guidance from the manufacturer. If the settlement or subsidence does not detrimentally affect the functionality of the liner, then the engineered turf and geomembrane will be inspected for rips/tears. If rips/tears to the geomembrane are noted, then they will be repaired by an approved geomembrane installer.

Groundwater monitoring will be performed in accordance with 845.600 through 845.680 for the duration of the post-closure period. The groundwater monitoring plan for Pond 2 in the Joliet 29 Operating Permit's Section 9 details how the groundwater monitoring will comply with 845.600 through 845.680.

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 are still conducting "assessment monitoring" in accordance with Ill. Adm Code 845.640, the post-closure care monitoring and maintenance will continue until the groundwater monitoring can return to detection monitoring in accordance with Ill. Adm. Code 845.640.

2.0 POST-CLOSURE CARE CONTACT INFORMATION [845.780(d)(1)(b)]

Mr. William Naglosky
Station Director
Joliet 29 Generating Station
1800 Channahon Road, Joliet, IL 60436
815-207-5412
william.naglosky@nrg.com

3.0 PLANNED USES OF THE PROPERTY [845.780(d)(1)(c)]

Pond 2 will be used to manage low-volume wastewater that does not contain CCR material. Pond 2 will be accessed to perform groundwater monitoring or inspections, as noted above. The groundwater monitoring will not involve access onto the liner. Access onto the liner 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 Section 845.780(d)(3) if a change in the operation of Pond 2 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 within 60 days before the change in operation being implemented. If an unexpected event occurs that requires amendment of the Post-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 post-closure activities have commenced. Amendments to this Post-Closure Plan will be certified by a professional engineer registered in the State of Illinois in accordance with Ill. Adm. Code 845.780(d)(4).

5.0 PROFESSIONAL ENGINEER'S CERTIFICATION [845.780(d)(4)]

This Post-Closure Plan has been prepared to meet the requirements of 35 Ill. Adm. Code 845.780(d)(1).

9/21/21

Joshua D. Davenport, P.E.
Illinois Professional Engineer

SEAL

JOSHUA D. DAVENPORT
062-061945

ATTACHMENT 12 LINER CERTIFICAITON

Attachment 12: Liquid Flow Rate through Alternative Composite Liner
Joliet 29 Pond 2

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 = 85245.5917 ft^2 = 79195746.16 cm^2 Based on surface area at toe of embankment
q = calculated
k = 1.00E-07 cm/s
h = 15.85 ft = 483.108 cm
t = 2 ft = 60.96 cm

$$Q = 1.00E-07 \quad \frac{483.108}{60.96} +1 \quad * \quad 79,195,746.16$$

Q = 70.68 cm^3/s Compare to Surface Impoundment Flow Rate

Pond Profile

Layers	Depth (ft)	Elevation (ft msl)		Layer Description	Permeability (cm/s)	Layer Thickness (inch)	Layer Thickness (cm)	Product of Permeability & Layer Thickness
		From	To					
Pond	0	535	517	Pond embankment crest	--	--	--	--
	18'	517	517	Pond bottom	--	--	--	--
Upper Liner Component	18'-17.94'	517	516.94	60-mil HDPE geomembrane	1E-11	0.06	0.1524	1.524E-12
Lower Liner Component	18'-19'	516.94	515.94	Poz-O-Pac	3.12E-05	12	30.48	9.51E-04
	19'-24'	515.94	510.94	Gravelly sand, some fine grained sand, trace clay and gravel, some gray lean clay	2.74E-02	60	152.4	4.16814

Totals	182.88	4.17E+00

Permeability (weighted) = 2.28E-02

Pond 2 Flow Rate Calculation

Q/A = q = k((h/t)+1)
Q= calculated
A = 85245.5917 ft^2 = 79,195,746.16 cm^2 Based on surface area at toe of embankment
q = calculated
k = 2.28E-02 cm/s
h = 15.85 ft = 483.108 cm
t = 5 ft = 152.4 cm

$$Q = 2.28E-02 \quad \frac{483.108}{152.4} +1 \quad * \quad 79,195,746.16$$

Q = 7,528,579.99 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 7,528,579.99 less than the Section 845.400(c) Comparison Flow Rate of 70.68 **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 Joliet 29 Generating Station. The performance bond is attached, note the bond covers both the Joliet 9 and Joliet 29 Generating Stations.

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 Joliet

Name	Joliet Generating Station

Address	1800 Channahon Road

City Joliet, IL 60436

Amount guaranteed by this bond: $26,417,781.96

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: $ 26,417,781.96

Surety's bond number: SU1174125

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		Name: Arch Insurance Company
Typed Name Edward Christopher Krupa		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
		Typed Name: Mark W. Edwards, II
		Title-Attorney-in-Fact
Corporate seal		Corporate seal

		Bond premium:	$	184,924.00

(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

Stephen C. Ruschak, Executive Vice President

CORPORATE SEAL 1971

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
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

CORPORATE SEAL 1971

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
Joliet 29 Generating Station

2021 Hazard Potential Classification Assessment for Ash Pond 2

Revision 0
October 14, 2021
Issue Purpose: Use
Project No.: 12661-121

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Sargent & Lundy

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

Ash Pond 2 at Midwest Generation, LLC's (MWG) Joliet 29 Generating Station ("Joliet 29" 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." Pursuant to 35 Ill. Adm. Code 845.440(a)(1), MWG must conduct and complete a hazard potential classification assessment that assigns a hazard potential classification to Ash Pond 2 in accordance with the hazard potential classifications defined in 35 Ill. Adm. Code 845.120.

Ash Pond 2 is 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." 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 Ash Pond 2 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 Ash Pond 2 at Joliet 29. 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 assessment completed for Ash Pond 2 that was conducted in accordance with the Federal CCR Rule,
- Evaluates potential changes to the factors used as the bases for the initial federal hazard potential classification assigned to Ash Pond 2 to determine whether a revised federal hazard potential classification is warranted, and
- Provides the 2021 hazard potential classifications for Ash Pond 2 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, Ash Pond 2 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 Ash Pond 2 and the surrounding areas was obtained from an aerial survey performed by Aero-Metric, Inc. in 2008 (Ref. 4).

Impacted Areas

Areas impacted by a hypothetical failure at Ash Pond 2 were obtained from the pond's initial hazard potential classification assessment (Ref. 3), the dike breach analysis conducted in 2016 for the pond's southern dike (Ref. 5), and the dike breach inundation map prepared for Ash Pond 2's Emergency Action Plan (Ref. 6). The inputs, assumptions, and methodology utilized to identify areas impacted by failures at each of the pond's 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 Ash Pond 2.

Aerial Images

Historical and recent aerial images of the Station and surrounding areas were obtained from Google Earth Pro (Ref. 7).

Property Boundaries

Boundaries for the Station's property and adjacent properties were obtained from the geographic information system (GIS) for Will County, Illinois (Ref. 8).

100-Year Floodway & Floodplain

Delineations for the floodway and floodplain for the 1% annual chance flood ("100-year flood") at and downstream from the Joliet 29 site were obtained from the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) for the subject area (Ref. 9).

Ash Pond Conditions

The operating and physical conditions for Ash Pond 2 were based on discussions with MWG personnel and on the annual inspection reports prepared for the CCR surface impoundment in accordance with 40 CFR 257.83(b) (Refs. 10 through 14).

3.0 ASSUMPTIONS

There are no assumptions in this document that require verification.

4.0 METHODOLOGY

The bases for Ash Pond 2's initial hazard potential classification as documented within the pond's initial hazard potential classification assessment were reviewed to determine if any changes have occurred since the initial assessment was completed. Identified changes were then evaluated to determine if the pond's previous hazard potential classification warrants 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 classification were identified (*e.g.*, downstream development that was not present in 2016), hypothetical dike breaches were considered at the CCR surface impoundment 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 Ash Pond 2, the solid waste materials in the 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 Ash Pond 2, 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 Ash Pond 2 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 Ash Pond 2 was considered to be a federal low hazard potential. If the environmental and/or economic losses extend beyond MWG's property, then Ash Pond 2 was considered to be a federal significant hazard potential.

After assigning a federal hazard potential classification to Ash Pond 2, 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 Ash Pond 2 if the pond was classified as a federal high hazard potential. Alternatively, Ash Pond 2 was classified as an Illinois Class 2 hazard potential if the pond was classified as either a federal significant or low hazard potential.

5.0 ASSESSMENT

5.1 SUMMARY OF INITIAL HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

The initial hazard potential classification assessment for Ash Pond 2 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 the pond. A quantitative dike breach analysis was also conducted for the pond's southern dike which was determined to pose the most risk to human life due to its height, its proximity to occupied buildings, and the adjacent topography sloping towards occupied buildings and the Des Plaines River. The 2016 dike breach analysis also assumed Ash Pond 2 was at capacity at the time of the hypothetical failure.

Per Figures 2 and 3 in Appendix A, the 2016 dike breach analysis concluded that the flood released through a hypothetical breach in Ash Pond 2's southern dike could impact six Station buildings, of which three are considered to be occupied buildings and the remaining three are considered to be unoccupied buildings. The 2016 dike breach analysis also concluded that the combination of the estimated flood velocity and depth at each occupied building is within the U.S. Department of the Interior, Bureau of Reclamation's (USBR) "Low Danger Zone" (see Figure 4 in Appendix A). In its "Downstream Hazard Classification Guidelines" (Ref. 15), the USBR states that if the depth-velocity combination of a hazard (*e.g.*, flood) for a given area plots within the "Low Danger Zone," "the number of lives-in-jeopardy associated with possible downstream hazards is assumed to be zero." In other words, floods plotting within the USBR's "Low Danger Zone" are unlikely to cause a probable loss of human life. Therefore, the initial hazard potential classification assessment concluded that a failure of Ash Pond 2's southern dike would not result in a probable loss of human life.

Although a hypothetical failure Ash Pond 2 was determined to not cause a probable loss of human life, it was also determined that wastewater released from such a breach would flow into the Station's Intake Canal, thereby impacting the Des Plaines River. Therefore, Ash Pond 2 was classified as a significant hazard potential CCR surface impoundment.

5.2 CHANGES IN BASES FOR INITIAL HAZARD POTENTIAL CLASSIFICATION

5.2.1 CHANGES IN ASH POND OPERATIONS & EMBANKMENT GEOMETRY

Ash Pond 2 was originally designed to manage CCR and miscellaneous non-CCR wastestreams from the Station. Following the conversion of Joliet 29's coal-fired units to natural gas, the pond was no longer used to manage CCR wastestreams and was eventually taken out of service. In accordance with the Station's ash pond maintenance practices, the Station then began dewatering and removing CCR from the pond. As documented in the pond's annual inspection reports since 2019 (Refs. 13 and 14), minimal CCR remains in Ash Pond 2. During a site visit in September 2021, no CCR and only a few feet of stormwater were visually observed in Ash Pond 2. In April 2021, MWG filed a notice of intent to close Ash Pond 2 in accordance with the Federal CCR Rule's closure criteria (Ref. 2, § 257.102). Closure construction activities will commence at the pond upon receipt of a closure construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule.

As previously mentioned in Section 5.1, Ash Pond 2's 2016 hazard potential classification assessment examined hypothetical breach scenarios assuming the pond was at capacity; therefore, the assumed operating condition used for the initial assessment is conservative for the pond's current operating condition. Therefore, there is no basis to reevaluate the surface water elevation used to conduct the initial hazard potential classification assessment for Ash Pond 2.

Based on reviews of the annual inspection reports (Refs. 10 through 14) and Google Earth aerial images (Ref. 7), there have been no significant modifications to Ash Pond 2 (mass excavations, major embankment modifications, *etc*.) since the initial hazard potential classification assessment was 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. 10 through 14) and Google Earth aerial images (Ref. 7), there have been no significant modifications to the ground surfaces (mass excavations, mass fill placement, *etc*.) adjacent to Ash Pond 2 or within the dike breach impact areas since the initial hazard potential classification assessment was completed. Therefore, the topographic data collected for the site in 2008 (Ref. 4) 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. 7) and the Will County, Illinois GIS (Ref. 8), no new buildings or transport corridors (roads, rail lines, *etc*.) have been constructed in the past five years within the dike breach impact areas identified in the initial hazard potential classification assessment. Thus, there is no basis to reevaluate the potential impacts to the areas downstream of Ash Pond 2 for this 2021 assessment.

5.2.4 CHANGES IN USBR DEPTH-VELOCITY FLOOD DANGER LEVELS

The USBR has not updated the depth-velocity flood danger level relationships presented in its "Downstream Hazard Classification Guidelines" (Ref. 15) since the initial hazard potential classification assessment for Ash Pond 2 was completed in 2016. Therefore, there is no basis to reevaluate the danger levels assigned to the occupied buildings identified within the inundation area downstream of Ash Pond 2's southern dike following a hypothetical breach.

5.3 2021 HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

Other than the change in the operational status of Ash Pond 2, there have been no significant modifications to Ash Pond 2; no significant modifications to the topography adjacent to and downstream of the CCR surface impoundment; and no significant buildings or transport corridors that have been constructed in the areas downstream of the CCR surface impoundment that would be impacted by a hypothetical dike breach. There have also been no changes to the USBR's depth-velocity flood danger level relationships, which were used in the 2016 hazard potential classification assessment. Moreover, the Federal Energy Regulatory Commission's *Engineering Guidelines for the Evaluation of Hydropower Projects*, which references FEMA's *Federal Guidelines for Dam Safety* (Ref. 17), states that "the consequences of failure are not expected to cause a probable loss of human life when incremental effects on downstream structures are approximately two feet or less." FEMA's *Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures* (Ref. 18) also states that an incremental rise in flood depth of two feet or less caused by a dike breach is not considered to be a concern to human life. These two federal guidelines further support the conclusion that the loss of human life at the three occupied buildings is not probable given the initial breach analysis results show the estimated flood depths at these buildings are less than two feet. Therefore, the initial hazard potential classification assessment completed in 2016 for this CCR surface impoundment remains valid. In addition, the 2016 dike breach analysis for Ash Pond 2's southern dike still represents the worst-case failure scenario amongst the pond's three dikes.

Based on the preceding observations, the initial federal significant hazard potential classification assigned to Ash Pond 2 in accordance with 40 CFR 257.73(a)(2) and the bases for this assignment remain valid for 2021. A loss of human life is unlikely to result from a hypothetical failure at this CCR surface impoundment, but potential offsite environmental damage could occur to the Des Plaines 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, Ash Pond 2 was classified as a Class 2 CCR surface impoundment 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 assessment completed in accordance with the Federal CCR Rule for Joliet 29's Ash Pond 2. It was determined that no significant operational or physical changes to the CCR surface impoundment and no new downstream developments have occurred within the last five years that would necessitate changing the pond's initial hazard potential classification. Therefore, the initial federal hazard potential classification assigned to Ash Pond 2 and the bases for this assignment remain valid for this 2021 assessment. This federal hazard potential classification was then used to determine the hazard potential classification 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 Ash Pond 2 at Joliet 29 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 Ash Pond 2 at the Joliet 29 Generating Station

CCR Surface Impoundment	Illinois Hazard Potential Classification	Federal Hazard Potential Classification
Ash Pond 2	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:

THOMAS J DEHLIN
062-069314

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 Pond 2, Joliet 29 Station.” October 2016.
4. Aero-Metric, Inc. Aerial Survey of Joliet 29 Generating Station Dated June 17, 2008.
5. Geosyntec Consultants. “Joliet 29 Station, Ash Pond 2, Hazard Potential Classification Assessment Embankment Breach Analysis.” October 17, 2016.
6. Civil & Environmental Consultants, Inc. “Emergency Action Plan, Ash Pond 2, Joliet 29 Station.” April 2017.
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12. Civil & Environmental Consultants, Inc. “Annual Inspection Report, Ash Pond 2, Joliet Station.” October 16, 2018.
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16. Federal Energy Regulatory Commission. *Engineering Guidelines for the Evaluation of Hydropower Projects*. “Chapter II – Selecting and Accommodating Inflow Design Floods for Dams.” August 2015.
17. Federal Emergency Management Agency. *Federal Guidelines for Dam Safety*. April 2004.
18. Federal Emergency Management Agency. *Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures*. FEMA P-946. First Edition. July 2013.

APPENDIX A: 2016 ASH POND 2 HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

ATTACHMENT 16 STRUCTURAL STABILITY ASSESSMENT

MWG

Midwest Generation, LLC
Joliet 29 Generating Station

2021 Structural Stability Assessment for Ash Pond 2

Revision 0

October 14, 2021

Issue Purpose: Use

Project No.: 12661-121

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

Ash Pond 2 at Midwest Generation, LLC's (MWG) Joliet 29 Generating Station ("Joliet 29" 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." 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 Ash Pond 2 are consistent with recognized and generally accepted engineering practices for the CCR surface impoundment's storage capacity.

Ash Pond 2 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 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 Ash Pond 2 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 Ash Pond 2 at Joliet 29.

1.2 SCOPE

Per the 2016 Water Infrastructure Improvements for the Nation (WIIN) Act, Ash Pond 2 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 Ash Pond 2 are based on visual observations made during a site visit by S&L on September 14, 2021; discussions with MWG personnel; historical and recent aerial images obtained from Google Earth Pro (Ref. 3); and Ash Pond 2's initial structural stability assessment (Ref. 4), annual inspection reports (Refs. 5 through 9), and history of construction (Ref. 10). The initial structural stability assessment for Ash Pond 2, which was completed in October 2016, is included in its entirety in Appendix A.

Ash Pond 2 was originally designed to manage CCR and miscellaneous non-CCR wastestreams from the Station. Following the conversion of Joliet 29's coal-fired units to natural gas, the pond was no longer used to manage CCR wastestreams and was eventually taken out of service. In accordance with the Station's ash pond maintenance practices, the Station then began dewatering and removing CCR from the pond. As documented in the pond's annual inspection reports since 2019 (Refs. 8 and 9), minimal CCR remains in Ash Pond 2. During the September 2021 site visit, no CCR and only a few feet of stormwater were visually observed in Ash Pond 2. In April 2021, MWG filed a notice of intent to close Ash Pond 2 in accordance with the Federal CCR Rule's closure criteria (Ref. 2, § 257.102). Closure construction activities will commence at the pond upon receipt of a closure construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule. After closing Ash Pond 2, MWG currently plans on subsequently repurposing the area as a new service water basin for the Station.

2.2 STABLE FOUNDATIONS & ABUTMENTS

(35 Ill. Adm. Code 845.450(a)(1); 40 CFR 257.73(d)(1)(i))

Ash Pond 2 is comprised of three earthen dikes and does not have any abutments. Detailed information on the soils supporting Ash Pond 2's dikes is provided in the pond's initial structural stability assessment in Appendix A. Based on reviews of the pond's annual inspection reports (Refs. 5 through 9) and Google Earth aerial images (Ref. 3), there have been no significant modifications to Ash Pond 2's geometry since its initial structural stability assessment was completed. Therefore, the details of the soils supporting Ash Pond 2's dikes and corresponding conclusions documented in the pond's initial structural stability assessment remain valid for this 2021 assessment (see Appendix A). Thus, the soils supporting Ash Pond 2's dikes are considered to be stable for the maximum volume of CCR and CCR wastewater which can be impounded therein.

2.3 SLOPE PROTECTION

(35 Ill. Adm. Code 845.450(a)(2) & (4); 40 CFR 257.73(d)(1)(ii) & (iv))

The upstream slopes of Ash Pond 2 are lined with high-density polyethylene (HDPE) geomembrane. This form of cover protects the upstream slopes of the pond's dikes against surface erosion, wave action, and adverse effects of sudden (rapid) drawdown.

Slope protection for the downstream slopes of Ash Pond 2 consists of either the HDPE geomembrane liner of Pond 1 (western dike) or vegetative cover (eastern and southern dikes). The gravel, sand, and cobble surfacing noted in the pond's initial structural stability assessment was also observed along the downstream slopes of the pond's eastern and southern dikes during the September 2021 site visit. These forms of cover protect the downstream slopes of the pond's dikes against surface erosion, wave action, and adverse effects of sudden (rapid) drawdown.

During the September 2021 site visit, vegetation greater than 12 inches was observed along portions of the pond's downstream slopes and dike crests. Some woody vegetation was also observed. Pursuant to 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.

2.4 DIKE COMPACTION

(35 Ill. Adm. Code 845.450(a)(3); 40 CFR 257.73(d)(1)(iii))

As documented in Ash Pond 2's initial and 2021 safety factor assessments (Refs. 4 and 11), the pond's dikes are sufficiently compacted to withstand the range of loading conditions in the CCR surface impoundment.

2.5 SPILLWAYS

(35 Ill. Adm. Code 845.450(a)(5); 40 CFR 257.73(d)(1)(v))

Ash Pond 2 does not have spillways. As documented in the pond's 2021 inflow design flood control system plan, the pond is capable of managing the design flood event (1000-year, 24-hour storm) without a spillway.

2.6 EMBEDDED HYDRAULIC STRUCTURES

(35 Ill. Adm. Code 845.450(a)(6); 40 CFR 257.73(d)(1)(vi))

Portions of the discharge pipes from Pond 1 and from Ash Pond 2 underlie the latter's southern dike. The locations of these two pipes are shown on Figure 2 of the pond's initial structural stability assessment in Appendix A. As documented in the initial assessment, visual surveillance of these pipes was performed in May 2016 by a third party that specializes in video camera pipe inspections. No significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, or debris that may negatively affect Ash Pond 2 were identified during this surveillance program. It is noted that a portion of Pond 1's discharge pipe passes under Ash Pond 2's northern crest, but this portion of Ash Pond 2 is effectively incised and, thus, is not considered to be at risk if the discharge pipe's integrity was to become compromised.

No similar pipe surveillance programs have been performed since the initial video camera inspection in May 2016. However, no visual signs of distress at the dike surfaces that could be indicative of pipe deterioration, failure, deformation, *etc*. were observed (*e.g.*, soft spots caused by leaking water, distortions in dike alignment) during the September 2021 site visit. Moreover, since Ash Pond 2 has been taken out of service and had minimal surface water remaining in it as of the September 2021 site visit, the pond's discharge pipe is not expected to convey water again until the pond is closed and subsequently repurposed as a new low volume waste pond. Therefore, it is recommended that the Station conduct a visual surveillance program to confirm the discharge pipes for Pond 1 and (the current) Ash Pond 2 are in good, working condition and are free of significant material defects that could impact the pipes' integrities prior to repurposing Ash Pond 2 as a new service water basin.

2.7 LOW POOL & RAPID DRAWDOWN STABILITY

(35 Ill. Adm. Code 845.450(a)(7); 40 CFR 257.73(d)(1)(vii))

As documented in Ash Pond 2's initial safety factor assessment (Ref. 4), the results of which were revalidated in its 2021 safety factor assessment (Ref. 11), the structural stability of the pond's downstream slopes is maintained during a low pool condition in Pond 1. Because Pond 1 is lined with an HDPE geomembrane, a sudden (rapid) drawdown condition was determined to not be an applicable loading condition for Ash Pond 2 since Pond 1's liner precludes the infiltration of water into Ash Pond 2's western dike.

Based on reviews of Ash Pond 2's annual inspection reports (Refs. 5 through 9) and Google Earth aerial images (Ref. 3), there have been no significant modifications to Pond 1 since Ash Pond 2's initial structural stability assessment was completed. Therefore, the conclusions documented therein regarding the stability of Ash Pond 2's western dike during low pool and sudden (rapid) drawdown conditions at Pond 1 remain valid for this 2021 assessment (see Appendix A).

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:

- Mow vegetation that is greater than 12-inches tall along Ash Pond 2's downstream slopes and dike crests,
- Remove woody vegetation in accordance with 35 Ill. Adm. Code 845.430(b)(4), and
- Conduct a visual surveillance program to verify that the discharge pipes for Pond 1 and Ash Pond 2 are in good, working condition and are free of significant material defects that could compromise the pipes' integrities prior to repurposing Ash Pond 2 as a new service water basin.

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:

THOMAS J DEHLIN
062-069314

Th. Dehlin
10/14/2021
Exp. 11/30/2021

5.0 REFERENCES

1. Illinois Pollution Control Board. “Standards for Disposal of Coal Combustion Residuals in CCR Surface Impoundments.” 35 Ill. Adm. Code 845. Accessed October 12, 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 12, 2021.
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APPENDIX A: 2016 ASH POND 2 STRUCTURAL STABILITY ASSESSMENT

ATTACHMENT 17 SAFETY FACTOR ASSESSMENT

MWG

Midwest Generation, LLC
Joliet 29 Generating Station

2021 Safety Factor Assessment for Ash Pond 2

Revision 0

October 15, 2021

Issue Purpose: Use

Project No.: 12661-121

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

Ash Pond 2 at Midwest Generation, LLC's (MWG) Joliet 29 Station ("Joliet" 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." 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 Ash Pond 2 achieves the minimum safety factors specified in 35 Ill. Adm. Code 845.460(a).

Ash Pond 2 at Joliet is 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." 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 Ash Pond 2 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 Ash Pond 2 at the Joliet 29 Station. 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 assessment completed for Ash Pond 2 that was conducted in accordance with the Federal CCR Rule,
- Evaluates potential changes to the inputs used in the initial safety factor assessment to determine whether new or updated liquefaction and/or structural stability analyses are warranted, and
- Provides the 2021 factors of safety for Ash Pond 2 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, Ash Pond 2 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 all existing CCR surface impoundments 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 Assessment

Appendix A provides the initial safety factor assessment conducted by Geosyntec Consultants in 2016 for Ash Pond 2 (Ref. 3). The inputs, assumptions, and methodology utilized in this initial safety factor assessment were evaluated to determine whether any updates to this analysis are warranted.

Site Topography & Aerial Images

Topographic data for Ash Pond 2 and the adjacent areas was obtained from an aerial survey flown at the site in June 2008 (Ref. 4). Historical and recent aerial images of Ash Pond 2 and adjacent areas were obtained from Google Earth Pro (Ref. 5).

Groundwater

Groundwater data for Ash Pond 2 and the surrounding areas was obtained from annual groundwater monitoring reports prepared by KPRG and Associates, Inc. for the CCR surface impoundment in accordance with 40 CFR 257.90(e) (Refs. 11 through 14).

Ash Pond Conditions

The operating and physical conditions for Ash Pond 2 were based on discussions with MWG personnel and on the annual inspection reports prepared for the CCR surface impoundment in accordance with 40 CFR 257.83(b) (Refs. 6 through 10).

Horizontal Seismic Coefficient

Pursuant to 35 Ill. Adm. Code 845.460(a)(4) and 40 CFR 257.73(e)(1)(iii), Ash Pond 2 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. 15) on which Ash Pond 2's seismic loading condition was based.

Table 2-2 – Horizontal Seismic Coefficient Inputs

Parameter	Symbol	Value
Peak Ground Acceleration	PGA	0.113
Mapped Spectral Response, 1-Second Period	S_1	0.069
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 Ash Pond 2's 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 pond's 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 on 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 ASSESSMENT

The initial safety factor assessment for Ash Pond 2 was completed in October 2016 and is included in its entirety in Appendix A. The results of this assessment indicated that the pond's critical cross-section is stable and meets 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).

In addition to evaluating the pond's earthen dikes, the initial safety factor assessment also evaluated a reinforced concrete cantilever retaining wall located along the southwest portion of Ash Pond 2's southern dike. This wall section was analyzed to confirm it meets or exceeds the minimum factors of safety for bearing capacity, overturning, and sliding that are generally accepted industry standards.

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 Ash Pond 2's 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. 6 through 10) and Google Earth aerial images (Ref. 5), there have been no significant 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 POND 2

Based on reviews of the annual inspection reports (Refs. 6 through 10) and Google Earth aerial images (Ref. 5), there have been no significant modifications to the ground surfaces adjacent to Ash Pond 2 (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. 4) 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 Ash Pond 2 (Refs. 11 through 14), no significant variations in the groundwater were noted. Because Ash Pond 2 is lined with a geomembrane, the embankments are not hydraulically connected to the water levels within the pond, 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. 6 through 10), Google Earth aerial images (Ref. 5), and visual observations made in September 2021, there have been no significant modifications to the embankments for the pond since the initial safety factor assessment was completed. Therefore, there is no basis to reevaluate Ash Pond 2's embankment geometry 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) was based on published data in ASCE 7-10 (Ref. 16). Since the existing technical analysis was developed, an updated publication of the reference material has been produced (ASCE 7-16 (Ref. 15)), 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 Ash Pond 2's 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 Ash Pond 2.

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	0.132	0.113
Mapped Spectral Response, 1-Second Period	S_1	0.069	0.069
Site Correction Factor for 1-Second Period	F_v	2.4	2.4

5.2.6 CHANGES IN ASH POND OPERATIONS

Ash Pond 2 was originally designed to manage CCR and miscellaneous non-CCR wastestreams from the Station. Following the conversion of Joliet 29's coal-fired units to natural gas, the pond was no longer used to manage CCR wastestreams and was eventually taken out of service. In accordance with the Station's ash pond maintenance practices, the Station then began dewatering and removing CCR from the pond. As documented in the pond's annual inspection reports since 2019 (Refs. 9 and 10), minimal CCR remains in Ash Pond 2. During a site visit in September 2021, it was noted that no CCR and only a few feet of stormwater were visually observed in Ash Pond 2. In April 2021, MWG filed a notice of intent to close Ash Pond 2 in accordance with the Federal CCR Rule's closure criteria (Ref. 2, § 257.102). Closure construction activities will commence upon receipt of a closure construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule.

The decrease in surface water elevation in Ash Pond 2 decreases the driving forces in the embankment; therefore, the surface water elevation used for the 2016 analysis is conservative for the pond's current operating condition. Therefore, there is no basis to reevaluate the surface water elevations used to conduct the initial safety factor assessment for Ash Pond 2.

6.0 2021 SAFETY FACTOR ASSESSMENT CONCLUSIONS

The initial safety factor analysis for Ash Pond 2 (Ref. 3) was reviewed and validated for compliance with the 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 were identified in reviews of available information and reports completed for the CCR surface impoundment since the initial assessment was completed in 2016. Therefore, the results reported in the initial safety factor assessment for Ash Pond 2's earthen dikes and retaining wall remain valid for this 2021 assessment.

Table 6-1 presents the 2021 factors of safety for Ash Pond 2's earthen dikes 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 Ash Pond 2 at the Joliet 29 Station

Loading Condition	Ash Pond 2	Min. Allowable Factor of Safety
Long-Term, Maximum Storage Pool	≥ 1.50	**1.50**
Maximum Surcharge Pool	≥ 1.40	**1.40**
Seismic	≥ 1.00	**1.00**
Liquefaction	Note 1	**1.20**

Notes: 1) The embankment soils for Ash Pond 2 are not considered susceptible to liquefaction because saturation of the embankment soils is unlikely based on the installed geomembrane liner system and depth to groundwater. Thus, liquefaction safety factors are not reported.

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

Seal:

THOMAS J DEHLIN
062-069314

Th. Dehlin
10/15/2021
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 15, 2021.
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APPENDIX A: 2016 ASH POND 2 SAFETY FACTOR ASSESSMENT

ATTACHMENT 18 INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

MWG

Midwest Generation, LLC
Joliet 29 Generating Station

2021 Inflow Design Flood Control System Plan for Ash Pond 2

Revision 0

October 15, 2021

Issue Purpose: Use

Project No.: 12661-121

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1.0 PURPOSE & SCOPE

1.1 PURPOSE

Ash Pond 2 at Midwest Generation, LLC's (MWG) Joliet 29 Generating Station ("Joliet 29" 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." 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 system for Ash Pond 2 has been designed and constructed to meet the hydrologic and hydraulic capacity requirements for CCR surface impoundments promulgated by 35 Ill. Adm. Code 845.510.

Ash Pond 2 is 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." 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 Ash Pond 2 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 Ash Pond 2 at Joliet 29. This report:

- Lists the inputs and assumptions used to determine whether Ash Pond 2 can manage the inflow design flood,
- Discusses the methodology used to determine whether Ash Pond 2 can manage the inflow design flood,
- Evaluates potential changes to the design inputs used in the initial hydrologic and hydraulic assessment completed for Ash Pond 2 that was conducted in accordance with the Federal CCR Rule, and
- Summarizes the results of the hydrologic and hydraulic calculations performed to support the conclusion of whether Ash Pond 2 meets 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, Ash Pond 2 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 System

The inflow design flood control system for Ash Pond 2 is documented in the pond's 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.

Inflow Design Flood Event

Per its 2021 hazard potential classification assessment (Ref. 4), Ash Pond 2 is classified as a Class 2 CCR surface impoundment pursuant to 35 Ill. Adm. Code 845.440(a)(1) and as a significant hazard potential CCR surface impoundment pursuant to 40 CFR 257.73(a)(2). Therefore, the inflow design flood event used in this hydrologic and hydraulic assessment of Ash Pond 2 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 (NOAA) Atlas 14 (Ref. 5), the precipitation depth for the 1,000-year, 24-hour storm event at the Joliet 29 site is 14.2 inches.

Site Topography

Topographic data for Ash Pond 2 and the surrounding areas was obtained from an aerial survey performed by Aero-Metric, Inc. in 2008 (Ref. 6).

Aerial Images

Historical and recent aerial images of the Station and surrounding areas were obtained from Google Earth Pro (Ref. 7).

Ash Pond Conditions

The operating and physical conditions for Ash Pond 2 were based on discussions with MWG personnel, the history of construction prepared for the CCR surface impoundment in accordance with 40 CFR 257.73(c) (Ref. 8), and the annual inspection reports prepared for the CCR surface impoundment in accordance with 40 CFR 257.83(b) (Refs. 9 through 13).

Mean Annual Precipitation Depth

The mean annual precipitation depth for the site was obtained from NOAA's "Summary of Monthly Normals" (Ref. 14) for a monitoring station at the Brandon Road Lock and Dam in Joliet, Illinois, which is approximately 1.5 miles northeast of the Station. Per this NOAA dataset, the mean annual precipitation depth at the site is 36.8 inches.

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

Ash Pond 2 was originally designed to manage CCR and miscellaneous non-CCR wastestreams from the Station. Following the conversion of Joliet 29's coal-fired units to natural gas, the pond was no longer used to manage CCR wastestreams and was eventually taken out of service. In accordance with the Station's ash pond maintenance practices, the Station then began dewatering and removing CCR from the pond. Moreover, the Station isolated the pond by capping the inlet pipe from Pond 1. As documented in the pond's annual inspection reports since 2019 (Refs. 12 and 13), minimal CCR remains in Ash Pond 2. During a site visit in September 2021, no CCR and approximately 2 feet of stormwater were visually observed in Ash Pond 2. In April 2021, MWG filed a notice of intent to close Ash Pond 2 in accordance with the Federal CCR Rule's closure criteria (Ref. 2, § 257.102). Closure construction activities will commence at the pond upon receipt of a closure construction permit from the Illinois EPA in accordance with Subpart B of the Illinois CCR Rule.

Based on reviews of the annual inspection reports (Refs. 9 through 13) and Google Earth aerial images (Ref. 7), there have been no significant modifications to Ash Pond 2 (mass excavations, major embankment modifications, *etc.*) since the initial inflow design flood control system plan was completed. Therefore, there is no basis to reevaluate the embankment geometry for this 2021 assessment.

4.1.2 CHANGES IN ASH POND TOPOGRAPHY

Based on reviews of the annual inspection reports (Refs. 9 through 13) and Google Earth aerial images (Ref. 7), there have been no significant modifications to Ash Pond 2's embankments (mass excavations, mass fill placement, *etc.*) since the initial inflow design flood control system plan was completed. Therefore, the topographic data collected for the site in 2008 (Ref. 4) and the area-capacity curves documented in Ash Pond 2's history of construction (Ref. 8) remain valid for use in this 2021 assessment.

4.2 METHODOLOGY

As previously mentioned, approximately 2 feet of water was observed in Ash Pond 2 during a September 2021. Since the pond was taken out of service, the water level in the pond has fluctuated with the net precipitation rate into the pond (*i.e.*, inflow from direct precipitation and stormwater run-on less outflow from evaporation). For the purposes of this assessment, the design operating water level in Ash Pond 2 was based on the 2 feet of water observed in September 2021 plus 1.5 years' worth of direct precipitation and stormwater run-on to account for a period of time until closure construction activities commence. Evaporation out of the pond was conservatively omitted. No rainfall abstraction was considered, which is also a conservative assumption (*i.e.*, the full design precipitation depth over Ash Pond 2's catchment area was assumed to enter the pond). Because Ash Pond 2 is perched, stormwater entering the pond during storm events is limited to direct precipitation and stormwater run-on from the access roads on the pond's dikes.

After determining the design operating surface water elevation in Ash Pond 2 for this assessment, the inflow flood volume into Ash Pond 2 from the 1000-year, 24-hour storm event was then calculated to determine the rise in the pond's water level. The new surface water elevation was then compared to the pond's outlet weir elevation (EL. 532.85 feet) and berm elevation (EL. 535.00 feet) to verify that Ash Pond 2 could manage direct precipitation and stormwater run-on from the 1000-year, 24-hour storm event without water discharging through the pond's outlet weir or overtopping the pond's dikes.

4.3 RESULTS

Table 4-1 summarizes the results from the hydrologic and hydraulic calculations performed for Ash Pond 2 (Ref. 15). Based on these results, water entering Ash Pond 2 during the inflow design flood event will not discharge through the pond's outlet weir or overtop the pond's dikes. The surface water elevation in the pond during the design event was estimated to be 2.30 feet below the pond's outlet weir and 4.45 feet below the pond's dike.

Table 4-1 – Summary of Hydrologic & Hydraulic Assessment Results for Ash Pond 2

CCR Surface Impoundment	Illinois Hazard Potential Classification	Federal Hazard Potential Classification	Inflow Design Flood	Maximum Surface Water Elevation	Outlet Weir Elevation	Pond Crest Elevation
Ash Pond 2	Class 2	Significant	1,000 Year	530.55 feet	532.85 feet	535.00 feet

5.0 CONCLUSIONS

Based on the hydrologic and hydraulic calculations performed for Ash Pond 2 (Ref. 15), the pond has adequate hydraulic capacity to retain the 1000-year flood event without water discharging from the pond or overtopping the pond's dikes. Therefore, Ash Pond 2 is 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 15, 2021

Seal:

THOMAS J DEHLIN
062-069314

Th. Dehlin
10/15/2021
Exp. 11/30/2021

7.0 REFERENCES

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APPENDIX A: 2016 ASH POND 2 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), 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. 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 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 **4** feet or more exits.

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 2 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 <u>conditional warning</u> 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 <u>Unconditional warning</u> 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 <u>**CONTRACTOR’S FACILITIES**</u>

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