Form CCR 1

Illinois Environmental Protection Agency

CCR Residual Surface Impoundment Permit Application

CCR Form 1 – General Provisions

Bureau of Water ID Number: **CCR Permit Number:** **Facility Name:**	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 #9 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 1601 Patterson 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)	Title	Phone Number
William Naglosky	Plant Manager	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	State	Zip Code
Princeton	New Jersey	08540

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

Legal Description

2.1 Legal Description of the facility boundary

That part of the Southeast Quarter of Section 20, and the Northeast Quarter of Section 29, Lying south of Patterson Road, West of Brandon Road, and lying north of the north line of the South 233' of the North half of the Northeast quarter of Section 29, all in Township 35 North, Range 10 East of the third Principal meridian, in Will County, IL

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.

Impoundment ID	Checked	
W1970450046-01	☑	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	Official Title
William Naglosky	Plant Manager.
Signature	**Date Signed**
William Naglosky	10/28/21

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

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

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

Construction History

1.1	CCR surface impoundment name.
	Lincoln Stone Quarry
1.2	Identification number of the CCR surface impoundment (if one has been assigned by the Agency).
	W1970450046-01
1.3	Description of the boundaries of the CCR surface impoundment (35 Ill. Adm. Code 845.210(c)).
	That part of the Southeast Quarter of Section 20, and the Northeast Quarter of Section 29, Lying south of Patterson Road, West of Brandon Road, and lying north of the north line of the South 233' of the North half of the Northeast quarter of Section 29, all in Township 35 North, Range 10 East of the third Principal meridian, in Will County, IL
1.4	State the purpose for which the CCR surface impoundment is being used.
	Used as a disposal facility for bottom ash/boiler slag from Joliet #9 and Joliet #29 generating stations.
1.5	How long has the CCR surface impoundment been in operation?
	Exact construction date is unknown. The Lincoln Stone Quarry has been operating as a surface impoundment since 1962
1.6	List the types of CCR that have been placed in the CCR surface impoundment.
	Bottom ash and boiler slag

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 Ill. Adm. Code 845.220(a)(1)(F).
		☑	Description of the type, purpose, and location of existing instrumentation.
		☑	Area capacity curves for the CCR Impoundment.
		☑	Description of each spillway and diversion design features and capacities and provide the calculations used in their determination.
		☑	Construction specifications and provisions for surveillance, maintenance, and repair of the CCR surface impoundment.
	1.10.1	Is there any record or knowledge of structural instability of the CCR surface impoundment?	
		☐ Yes ☑ No	
	1.10.2	If you answered yes to Item 1.10.1, provide detailed explanation of the structural instability.	

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

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

SECTION 3: DEMONSTRATIONS AND CERTIFICATIONS (35 Ill. Adm. Code 845.230(d)(2)(D))

Demonstrations

3.1 Indicate whether you have attached a demonstration that the CCR surface impoundment, as built, meets, or an explanation of how the CCR surface impoundments fails to meet, the location standards in the following sections:

35 Ill. Adm. Code 845.300 (Placement Above the Uppermost Aquifer)	☐	Demonstration	☑	Explanation
35 Ill. Adm. Code 845.310 (Wetlands)	☑	Demonstration	☐	Explanation
35 Ill. Adm. Code 845.320 (Fault Areas)	☑	Demonstration	☐	Explanation
35 Ill. Adm. Code 845.330 (Seismic Impact Zones)	☑	Demonstration	☐	Explanation
35 Ill. Adm. Code 845.340 (Unstable Areas and Floodplains)	☑	Demonstration	☐	Explanation

SECTION 4: ATTACHMENTS

Attachments

4.1 Check the corresponding boxes to indicate that you have attached the following:

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

SECTION 5: GROUNDWATER MONITORING

Groundwater

5.1 Check the corresponding boxes to indicate you have attached the following groundwater monitoring information:

☑	A hydrogeologic site characterization meeting the requirements of 35 Ill. Adm. Code 845.620.
☑	Design and construction plans of a groundwater monitoring system meeting the requirements of 35 Ill. Adm. Code 845.630.

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

KPRG

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

APPLICATION FOR INITIAL OPERATING PERMIT

JOLIET #9 GENERATING STATION
MIDWEST GENERATION, LLC
JOLIET, ILLINOIS

Illinois EPA Site No. 1970450046

October 29, 2021

Submitted To:

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

Prepared For:

Midwest Generation, LLC
Patterson Rd.
Joliet, IL 60436

Prepared By:

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

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Introduction

Midwest Generation, LLC (Midwest Generation) currently operates the natural gas-fired generating station, referred to as Joliet #9 Station, located in Joliet, Illinois ("Site" or "generating station"). Midwest Generation converted the generating station from coal to natural gas in 2016. As part of the previous coal-fired operations, the station operated Lincoln Stone Quarry (LSQ) to manage/store the coal combustion residuals (CCR) created at the generating station as part of the electricity generating process. LSQ consists of an inactive West Filled Area (WFA), the formerly active Main Quarry, and the North Quarry. Decant water from the Main Quarry is gravity drained to the North Quarry. The North Quarry is not used to manage/store CCR but rather as a settling pond that is used to treat the water discharged from the Main Quarry.

The CCR from the generating station was sluiced into LSQ, where it was temporarily contained, the CCR settled from the sluice water, and the sluice water was ultimately discharged via the North Quarry settling pond to the Des Plaines River through an existing NPDES permit. After the sluice water and wastewater was discharged, the CCR remained within LSQ. LSQ was also used to manage low volume wastewater from the generating station at the same time it was used to manage CCR. LSQ stopped receiving CCR and low volume wastewater in 2019 and neither CCR or low volume wastewater is currently being sent to LSQ.

The LSQ is operated and permitted as a landfill regulated by Illinois Environmental Protection Agency (EPA) Bureau of Land under 35 Ill. Adm. Code, Subtitle G, Part 811. It has been permitted as a landfill since approximately 1976. The operations are still subject to the conditions and requirements of its landfill Operating Permit No. 1994-241-LFM Modification No. 24. In 2015, the LSQ was also determined to be regulated under the newly passed Federal Register, Environmental Protection Agency, 40 CFR Parts 257.94 and 257.95 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule dated April 17, 2015 (Federal CCR Rule) and subsequent amendments. The LSQ operations also fall 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).

The objective of this submittal is to apply for the initial operating permit for Lincoln Stone Quarry at the Joliet #9 Generating Station to continue operating LSQ in compliance with Ill. Adm. Code Title 35, Part 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments. 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 support documentation in this permit application.

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

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

1.1 CCR Surface Impoundment Identifying Information

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

Name	Owner/Operator	Impoundment ID Number
Lincoln Stone Quarry	Midwest Generation 804 Carnegie Center Princeton, NJ 08540	W1970450046-01

1.2 Purpose of CCR Surface Impoundment

The Lincoln Stone Quarry has been used as a disposal facility for bottom ash/boiler slag from Joliet #9 and Joliet #29 Generating Stations. The disposal facility consists of an inactive portion, the West Filled Area (WFA), and the active CCR disposal area referred to as the Main Quarry. The North Quarry contains a settling pond that is used to treat the water discharged from the Main Quarry. LSQ is no longer in service with the last ash being placed in 2019 and will not be used in the future for CCR disposal.

1.3 CCR Surface Impoundment Length of Operation

The exact date of construction for the LSQ in unknown. The LSQ has been operating as a surface impoundment since 1962 when the WFA was being used for ash placement. As of 1975, the WFA had been closed and the Main Quarry was used for the disposal of CCR until 2019. The CCR sluicing system was decommissioned in 2016. Based on an operations start date of 1962, the overall quarry operated for CCR disposal for approximately 57 years. The North Quarry was never used to manage or store CCR. A Notice of Intent to Initiate Closure of the LSQ was submitted on March 24, 2021 by Midwest Generation.

1.4 Type of CCR in Surface Impoundment

The types of CCR present in the LSQ are bottom ash and boiler slag. Some fly ash may also have been placed into the WFA during early operations. The chemical constituents that make up the CCR is explained in further detail in Section 2.0.

1.5 Name and Size of the Watershed

LSQ is present within the Des Plaines River watershed, which is approximately 28,808 acres in size.

1.6 Description of CCR Surface Impoundment Foundation

This section focuses on the WFA and the Main Quarry because they were used to manage and store CCR. LSQ is a former dolomite quarry and site observations and topographic documents show LSQ is incised on all sides. The surrounding ground elevation of the WFA and the Main Quarry is at approximately 590-600 ft above mean sea level (ft amsl) with the base of the Main Quarry ranging from 510 ft amsl to a low point of 477 ft amsl, and the base of the WFA at approximately 480 ft amsl. The surrounding walls of LSQ are Silurian Dolomite bedrock, which is topped with overburden soil. The overburden ranges from approximately 5 feet in thickness to 20 feet in thickness as the ground elevations increase to the south, west, and east. The overburden to the north, remains at a relatively constant elevation because Patterson Road is constructed adjacent to LSQ. The Silurian Dolomite extends from below the overburden soil to the base of the LSQ and at least 50 feet below the base of LSQ.

1.6.1 Physical Properties of Foundation Materials

The physical properties of the foundation materials in which LSQ exists is Silurian Dolomite, which is underlain by the Maquoketa group bedrock. The Silurian dolomite is divided into four units; 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 Brainard Shale, Fort Atkinson dolomite and the Scales Shale. The Scales Shale is a well-documented regional aquitard, which separates shallow groundwater within the Silurian Dolomite from the deeper aquifers.

The dolomite beneath the facility is divided into a "shallow" Silurian zone and a "deep" Ordovician zone. A "lower permeability" zone identified, as the Brainard Shale (approximately 10-feet thick) separates these two more permeable zones. The lower permeability zone is mappable across the site and has been used by the Illinois State Geological Survey (ISGS) as a tracer bed.

The shallow zone dolomite is about 140 to 150 feet thick. This places the bottom of the shallow zone and top of the lower permeability zone (Brainard Shale) at an elevation of approximately 430 to 440 feet msl. The thickness between the top and the bottom of the Brainard Shale is approximately 10 feet, with its base at an elevation between about 420 to 430 feet msl. The deep zone is 30 to 40 feet thick, so the boundary between the deep zone and the underlying Scales Shale member of the Maquoketa group is at an elevation of approximately 380 to 400 feet msl. As previously noted, the deepest portions of the bottom of LSQ lie at an elevation of approximately 477 feet msl, which is within the shallow Silurian dolomite zone and above the Brainard Shale low permeability zone.

1.6.2 Engineering Properties of Foundation Materials

The engineering properties for the foundation materials were obtained from regional and site-specific data (Harza Engineering (1976), MACTEC (2004)) that document fractures in the Silurian dolomite. Site-specific and regional data are consistent in 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 $1/16^{th}$-inch. Bedding plane fractures are also described. Descriptions from the quarry walls and from cores obtained during drilling show significant clay infilling of the vertical joints and bedding plane fractures.

Borings completed in 2005/2006 by KPRG and Associates, Inc. (KPRG) for monitoring wells G46S/D, G47S/D and G48S/D were cored using HQ-series core barrels. Estimates of the Rock Quality Designation (RQD) were made for the dolomite based on visual inspection and measurements of the cores. The RQD is a measure that determines the quality of rock and is used as part of the early site evaluation process when determining locations for engineered structures such as power facilities, underground tunnels, and dams. During the early site evaluation process, the RQD is used to determine any potential problems of bearing capacity, settlement, or sliding. The higher the RQD percentage, the more competent the rock and its ability to support structures, resist settlement and prevent sliding. The upper approximate 10 to 15 feet of Silurian dolomite was weathered and highly fractured with RQDs ranging from 16.5% to 34%. Once competent bedrock was reached, the RQDs within the Silurian dolomite ranged from a low of 15.4 % in an isolated, highly fractured zone to 100% with an overall average of 76.6% and median of 84.8%. An RQD greater than 75% is considered good and an RQD greater than 90% is considered excellent.

1.7 Description of the Construction Materials, Methods, and Dates

The descriptions of the construction materials, methods, and dates are based on site investigations, available site drawings, and site observations.

1.7.1 Physical and Engineering Properties of Construction Materials

LSQ is an incised surface impoundment with Silurian dolomite bedrock walls, so the physical and engineering properties of the construction materials for this section are the same as the physical and engineering properties of the foundation materials. As described in Section 1.6.1, the physical properties for the foundation materials were described as Silurian dolomite underlain by the Maquoketa group formation. The engineering properties are the same as those listed in Section 1.6.2. As discussed in Section 1.6.2, the RQD for the Silurian dolomite is identified as good with an overall average of 76.6% and a median of 84.8%.

1.7.2 Construction Methods

LSQ was created by the quarrying and removal of the dolomite from the area used regionally for construction purposes, with the resulting void now filled with CCR. The disposal boundary of the CCR is created by the vertical dolomite walls and the quarry floor that remained after the quarrying operations were completed. A wall of bedrock exists between the North Quarry and the Main Quarry on which Patterson Road is built upon. Approximately 115 feet of the bedrock wall between the Main Quarry and the North Quarry contains a dike constructed of compacted soil. The overall length of the bedrock wall between the North Quarry and the Main Quarry is approximately 1,800 feet long. This dike contains the discharge pipes that allows water to gravity drain from the Main Quarry into the North Quarry settling pond. The Main Quarry discharge pipes are flow controlled using manually activated valves to either increase or decrease the water level in the Main Quarry as needed. The discharged water enters the North Quarry settling pond from where it is pumped to the Des Plaines River through a NPDES regulated discharge.

The CCR was sluiced into the WFA and the Main Quarry through steel pipes that run along the surface. The sluiced CCR was initially sent to the WFA and then into the Main Quarry once the WFA was filled and covered with a clayey soil layer. Three CCR sluice pipes entered the LSQ property at the northwest corner where they separated and the CCR sluice pipe from the Joliet #9 generating station ran east along the ground to the northwest corner of the Main Quarry. The remaining two pipes from the Joliet #29 generating station ran south through the WFA and then turned east towards the southwest corner of the Main Quarry where they most recently discharged.

1.7.3 Construction Dates

The actual dates of the quarrying operation are unknown, but LSQ has been used as a surface impoundment for ash from 1962 until 2019. Therefore, the creation of the LSQ surface impoundment through mining is some time prior to 1962.

1.8 Detailed Dimensional Drawings

Detailed dimensional drawings are not available for LSQ. The drawing in Attachment 1 is an aerial survey of LSQ in 1975 that shows the closed WFA, the active sluicing area of the Main Quarry (south portion of Main Quarry), an east-west trending clay berm separating the north and south halves of the Main Quarry to facilitate ongoing mining operations on the north side from the sluicing operations on the south side, and the access through to the North Quarry.

1.9 Instrumentation

Water level monitoring instrumentation was installed in the northeast corner of the Main Quarry to monitor the water level within the Main Quarry. Included in the instrumentation is a pressure transducer, data logger, and radio antenna to transmit data to a website accessible by MWG. This same style of water level monitoring instrumentation was installed in Boyd's Quarry to monitor the water level differential between the two quarries. Boyd's Quarry is located immediately east of LSQ.

A groundwater extraction system was installed beginning in 2010 with the construction of four (4) extraction wells and expanded in 2012 with the construction of eight (8) additional extraction wells. The system was constructed along the southern perimeter of LSQ to address an observed reversal in groundwater flow to the southeast instead of towards the north, which is its natural flow direction and that required to be maintained by the landfill operating permit (i.e., inward gradient). As discussed in Section 9 below, the noted change in groundwater flow direction within the dolomite is the result of ongoing, unrelated quarrying operations at the Vulcan Laraway Quarry located approximately 1,000 feet to the southeast of the LSQ. The system was constructed in accordance with IEPA approved Permit Modification No. 12 (dated December 1, 2009), No. 16 (dated August 8, 2011), and No. 17 (dated July 2, 2012).

The objective of the groundwater extraction system is to establish a hydraulic trough between the Main Quarry/WFA and the south property boundary to sufficiently capture water moving from the facility to the south and to re-establish an inward hydraulic gradient from the south property boundary to the north. The groundwater extraction system discharges the groundwater into the Main Quarry where it is discharged through the NPDES regulated outfall.

1.10 Area-Capacity Curve

An area-capacity curve for LSQ is included as Figure 1.

1.11 Spillway and Diversion Capacities and Calculations

CCR is no longer sluiced into the Main Quarry at LSQ. Therefore, the discharge pipes from the Main Quarry to the North Quarry settling pond only have to manage the discharge from stormwater runoff that enters the Main Quarry. Stormwater runoff from the Main Quarry discharges through two (2) 20-inch diameter steel pipes into the North Quarry settling pond. From the settling pond, the water is discharged to the Des Plaines River using up to three discharge pumps capable of pumping at about 4,200 gallons per minute (gpm) each for a total pump rate of 12,600 gpm. The stormwater runoff volume from the 1,000-year, 24-hour flood is approximately 69.1 acre-feet (3,009,800 cubic feet) and a flow rate of about 15,600 gpm over 24 hours. The Main Quarry has a capacity of up to 1,400 acre-feet, indicating the Main Quarry has the capacity to contain the 1,000-year, 24-hour flood without exceeding the capacity of the settling pond and the settling pond pumps.

1.12 Surveillance, Maintenance, and Repair Construction Specifications

Specifications for the surveillance, maintenance, and repair associated with LSQ were not available for this application. Repairs did occur as needed on the sluice pipes, but this consisted of removing the unsatisfactory section of pipe and replacing with the same size pipe. Specifications for this work were not available. The WFA soil cover is routinely inspected for any potential erosion and repairs are completed as necessary. The vegetation on the soil cover is also inspected to remove any deep-rooted growth and mowed as necessary.

1.13 Record of Structural Instability

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

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

The bottom ash CCR that was sluiced to the Main Quarry was sampled and analyzed for the parameters listed in Section 845.600(a) except for total dissolved solids. One representative composite sample was collected from ash sluiced from the Joliet #9 generating station and one from the ash sluiced from the Joliet #29 generating station. The results of those analyses are presented in Table 2. The laboratory data package is included in Attachment 2-1.

A piezometer located within the WFA (P105) was sampled quarterly in 2012 for chemical analysis of landfill permit parameters. This data was used to provide leachate chemistry data for subsequent numerical groundwater modeling in support of the Groundwater Impact Assessment (GIA) and landfill operating permit renewal. The summary table of that quarterly sampling data is included in Attachment 2-2.

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

The other waste streams that entered LSQ when it was in service were discharges from the Joliet #29 sand filter backwash, the Joliet #29 west area basin, the Joliet #29 former coal pile runoff, Joliet #9 sand filter backwash, Joliet #9 coal pile and switch yard runoff, and the discharge from the LSQ groundwater extraction system (see Section 1.9). The Joliet #9 Flow Diagram from 2015 is included in Attachment 3-1 to show the discharges to LSQ prior to the Joliet #9 generating station's conversion to natural gas. The Joliet #29 Flow Diagram is included in Attachment 3-2. All of the water flow processes and stormwater flow contain total suspended solids (TSS) which can include sand sized and smaller sized particles. Once the Joliet #29 and Joliet #9 generating stations were converted to natural gas, the active placement of non-CCR waste streams into LSQ ceased, except for the discharge from the groundwater extraction system. The groundwater extraction system will continue to operate in accordance with an Interim Corrective Action approved as part of LSQ's landfill operating permit 1994-241-LFM. Attachment 3-3 contains the Joliet #9 Flow Diagram from 2019 when it was revised after the Joliet #9 generating station's conversion to natural gas.

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 KPRG and Associates, Inc (KPRG) in October of 2018, "the base of the Quarry is elevation 501 ft amsl and the upper limit groundwater elevation is 555.35 ft amsl. The Quarry is not separated from the upper limit of the uppermost aquifer by a minimum of five (5) feet". Therefore, the location of the Lincoln Stone Quarry does not comply with Section 845.300. This determination is still valid and is included in Attachment 4.

4.2 Wetlands

According to the Location Restrictions Compliance Demonstration performed by KPRG in October of 2018, site visits to the Quarry did not identify any wetlands around the perimeter of the Quarry that would indicate if wetlands were present prior to the mining of the Quarry. The national wetlands inventory (NWI) and the Will County Geographical Information System (GIS) Data Viewer were viewed to identify the presence of wetlands around the Quarry. Neither the NWI nor the Will County GIS Data Viewer identified wetlands around the Quarry, but the NWI did identify wetlands located inside the Quarry. The noted NWI observation of a wetland within the quarry was based on aerial photograph interpretations of standing, ponded water within the quarry. Since the presence of that water is an operational issue, the potential identification of a wetland within the quarry is not valid. Based on this evaluation, the Quarry is not located in a wetland and the demonstration included in Attachment 4 is valid.

4.3 Fault Areas

According to the Location Restrictions Compliance Demonstration performed by KPRG in October of 2018, "the Quarry 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 the Lincoln Stone Quarry complies with Section 845.320. This determination is still valid and is included in Attachment 4.

4.4 Seismic Impact Zones

According to the Location Restrictions Compliance Demonstration performed by KPRG in October of 2018, "the Quarry complies with the location requirement" of Section 845.330 "and is not located in a seismic impact zone". This determination is still valid and is included in Attachment 4.

4.5 Unstable Areas

According to the Location Restrictions Compliance Demonstration performed by KPRG in October of 2018, "the Quarry is not located in unstable areas". Therefore, the location of the Lincoln Stone Quarry complies with Section 845.340. This determination is still valid and is included in Attachment 4.

4.6 Floodplains

LSQ is not located in a floodplain according to the FIRM Flood Insurance Rate Map, Will County, Illinois and Incorporated Areas Panel 280 of 585, Map No. 1719C0280 E, effective date September 6, 1995 as mapped by the Federal Emergency Management Agency. Therefore, the location of LSQ complies with Section 845.340. The relevant FIRM 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)(E)

LSQ is an incised surface impoundment, thus this requirement is not applicable. The surrounding elevation is at a greater elevation, approximately 600 ft above mean sea level (ft amsl), compared to the bottom of LSQ, elevation approximately 477-510 ft amsl.

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

The Emergency Action Plan is included in Attachment 7. The plan was developed in June 2015 by KPRG and was reviewed and updated for compliance with Section 845.520. In accordance with 845.520(e), a certification of compliance is included in Attachment 7.

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

The Fugitive Dust Plan is included in Attachment 8. This plan was updated in June 2016 to reflect the operational change to a natural gas fired electrical generating plant from coal-fired. This plan was reviewed and updated by KPRG for compliance with this section and is compliant.

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

9.1 Hydrogeologic Site Characterization (845.230(d)(2)(I)(i)

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

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 include a variety of silt and silty clay loams. These soils are well to poorly drained. Organic content ranges from 0.02 to 7 percent (generally decreasing with depth) and have a negligible to slight accelerated erosion rate, a generally moderate to high corrosivity rate and a pH range from slightly acidic to slightly basic (4.5 to 8.4). Surface runoff class is low to medium (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. Substantial hydrogeologic characterization was completed as part of groundwater quality assessment and landfill operating permit renewal submittals (the LSQ is currently operating as an Illinois EPA licensed landfill Permit No. 1994-241-LFM, Modification No. 24). Boring logs from monitoring wells around the Lincoln Stone Quarry are provided in Attachment 9-1 and a site map showing the locations is provided on Figure 9-1. Based on an evaluation of this data, the following general site specific stratigraphy is defined and geologic cross-sections are provided as Figures 9-2 through 9-4.

Surface sediments in the area around the LSQ facility are comprised of approximately 20 to 30 feet of unconsolidated glacial overburden (this thickness may vary substantially across the site) that is underlain by Silurian-aged dolomite. The Silurian dolomite is divided into four units; 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 Brainard Shale, Fort Atkinson dolomite and the Scales Shale. The Scales Shale is a recognized regional aquitard that hydraulically isolates the deeper bedrock aquifers from the shallower units.

Regional and site-specific data (Harza Engineering (1976), MACTEC (2004)) document fractures in the Silurian dolomite. Site-specific and regional data are consistent in 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 the quarry walls and from cores obtained during drilling 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).

There is additional fracturing at the quarry wall and the fractures/joints tend to be more open at the wall. This is interpreted to be a localized phenomenon that is the result of the blasting and unloading from quarry operations. This effect does not appear to extend greater than about 10 or 15 feet away from the quarry wall.

The dolomite beneath the facility is divided into a "shallow" Silurian dolomite zone and a "deep" Ordovician dolomite zone. A "lower permeability" zone identified, as the Brainard Shale (approximately 10-feet thick) separates these two more permeable zones. The lower permeability zone is mappable across the site and has been used by the Illinois State Geological Survey (ISGS) as a tracer bed.

The shallow zone dolomite is about 140 to 150 feet thick. This places the bottom of the shallow zone and top of the lower permeability zone (Brainard Shale) at an elevation of approximately 430 to 440 feet msl. The thickness between the top and the bottom of the Brainard Shale is approximately 10 feet, with its base at an elevation between about 420 to 430 feet msl. The deep zone is 30 to 40 feet thick, so the boundary between the deep zone and the underlying Scales Shale member of the Maquoketa group is at an elevation of approximately 380 to 400 feet msl. The deepest portions of bottom of the Main Quarry lie at an elevation of approximately 477 feet msl, which is within the shallow Silurian dolomite zone and above the Brainard Shale low permeability zone.

Hydrogeologic evaluations have interpreted a horizon of higher permeability within the shallow Silurian dolomite. The higher permeability zone extends from approximately 500 feet msl down to approximately 430 feet msl, and is partially penetrated by LSQ. This interpretation is based on evidence of increased vuggy horizons logged from core samples, down-hole geophysical data obtained from boreholes on both the north and south sides of LSQ and an integration of all aquifer testing data from various studies which include packer tests and single well slug tests. This increased permeability feature assists in the understanding and interpretation of existing groundwater flow conditions beneath the site.

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 regional 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 local precipitation data is provided in Table 9-1.

Outside of remnant quarry ponds in the vicinity (e.g., Boyd's Quarry), the nearest natural surface water body is the Des Plaines River located to the north 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).

The water table beneath the site is encountered within the unconsolidated overburden and/or the upper portion of the shallow dolomite. There is sufficient potentiometric and chemical data from clustered piezometers around LSQ to indicate that the "shallow" dolomite zone and "deep" dolomite zone can be viewed as separate water bearing units. The intervening Brainard Shale is of sufficiently lower permeability that it impedes downward migration and mixing of the groundwater. The different groundwater flow patterns within the shallow and deep zones are discussed further below. The Scales Shale member of the Maquoketa Group, which defines the base of the deep zone of Ordovician dolomite, is widely accepted as a regional aquitard that hydraulically separates the groundwater of the overlying dolomite from deeper groundwater in the older Cambro-Ordovician sandstone and carbonate units beneath it.

Monitoring wells surrounding the LSQ include "WT-series" wells (water table), "S-series" wells (shallow dolomite) and "D-series" wells (deep dolomite). Natural groundwater flow in the area is from the south and east to the north and west. This flow pattern largely parallels surface drainage from topographically high areas to the Des Plaines River and likely represents a topographically driven groundwater flow system. However, ongoing dewatering activities at the Laraway Quarry located approximately 1,000 feet to the southeast of the LSQ have resulted in a component of groundwater flow to the southeast within the "shallow" dolomite. Groundwater flow within each zone is discussed below. Water level measurements from monitoring wells which the subsequent flow map discussions are based are provided in Table 9-2.

Water Table (WT-Series Wells)

Water table maps for the 3rd and 4th Quarters 2020 and the 1st and 2nd Quarters 2021 are provided on Figures 9-5 through 9-8. These are based on water levels obtained from groundwater assessment monitoring wells installed as part of landfill permit studies which include screens that straddle the phreatic surface. The maps indicate that groundwater flow within the upper portion of the saturated zone is generally in a northerly and westerly direction. The near surface groundwater from the south and east of the site flows through the Main Quarry and WFA. This is consistent with the natural groundwater flow patterns defined as part of the initial landfill permit application. All four quarters show consistent patterns, which are also consistent with historical water table data.

Shallow Zone (S-Series Wells)

The potentiometric surface maps of the shallow zone dolomite for the 3rd and 4th Quarters 2020 and the 1st and 2nd Quarters 2021 are provided on Figures 9-9 through 9-12. The maps show generally lower heads than were mapped in 1993 when elevation data were first collected in support of landfill permit development. This is in part the natural result of wet conditions that existed during 1993 baseline data collection and in part the result of dewatering associated with the operations of Laraway Quarry, beginning circa 1997. In spite of the general decline in heads, the groundwater flow patterns north and west of the facility remain consistent with the 1993 flow patterns.

The south-southeasterly component of groundwater flow was defined along the south perimeter of the Joliet/Lincoln Stone Quarry facility that was not evident in 1993 data. This component of flow has been determined to be the result of unrelated, off-site dewatering activities associated with surface mining operations at Laraway Quarry, approximately 1,000 feet to the southeast of the Joliet/Lincoln Stone Quarry facility that began circa 1997. This change of natural flow conditions along the south side of the Joliet/Lincoln Stone Quarry facility was not observed in the water table conditions which were described above (i.e., groundwater flow at the water table elevations continued to flow from south to north, into the quarry). The noted change of natural flow within the shallow dolomite unit has been determined by hydrogeologic investigation work to be the result of a higher permeability horizon that exists at, and just beneath, the base of Joliet/Lincoln Stone Quarry (approximate lowest quarry base elevation of 477 feet msl) within the shallow dolomite. This zone is undergoing additional depressurization as a result of dewatering operations at Laraway Quarry located approximately 1,000 feet southeast of the site. This depressurization is allowing for a component of groundwater flow to move from Joliet/Lincoln Stone Quarry to the south-southeast.

To address the south-southeasterly groundwater flow component within the shallow zone, a total of twelve extraction wells (X101 through X112) were installed. The first four extraction wells (X101 through X104) were installed during the February to April 2010 timeframe and this portion of the system was put into full operation on April 30, 2010. The remaining eight extraction wells (X105 through X112) were installed during the October 2011 through January 2012 timeframe and this portion of the system was put into full operation on February 16, 2012.

The hydraulic effects of the pumping system are clearly seen on the shallow zone potentiometric surface maps. A cone of depression has been established between south perimeter wells G48S, G47S, G46S, G38S and G39S and the Main Quarry/WFA. Groundwater from the south perimeter of the site is generally being drawn back to the north to the extraction well system. Water from the Main Quarry/WFA is also being intercepted by the extraction system. The extracted water is being discharged back into the Main Quarry.

In addition, Midwest Generation voluntarily implemented a program to replace any potable water wells to the southeast between the LSQ and Laraway Quarry which were screened within the Silurian dolomite with deeper water wells screened within the Cambro-Ordovician aquifers beneath the Scales Shale. The shallow dolomite wells were subsequently abandoned. This effectively removed any potential groundwater use receptors to the southeast that may have been effected by this artificially modified flow pattern.

Deep Zone (D-Series Wells)

The potentiometric surface maps for the deep zone dolomite for the 3rd and 4th Quarters 2020 and the 1st and 2nd Quarters 2021 are provided on Figures 9-13 through 9-16.

Groundwater flow within this zone is in a westerly direction. The overall flow patterns are generally consistent with historic conditions within the deep zone. Variations from earlier annual submittals during initial landfill permit development appear to be interpretive artifacts that are the result of variations in the number and distribution of control points for the maps, rather than changes in flow direction in the deep zone. For example, in 1993, there were only four monitoring points controlling the interpretation of the deep zone. There are now 13 wells within this zone providing a more detailed assessment.

Based on the above discussed geology/hydrogeology and as discussed further below, the groundwater monitoring network for the purposes of CCR unit monitoring is necessarily focused on the shallow dolomite zone (S-series wells). Table 9-3 provides a summary of the flow direction, gradient and an estimated rate of groundwater flow for each quarterly sampling event from the 3rd quarter 2020 through the 2nd quarter 2021. The flow rate was calculated using the following equation:

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

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

n_e is effective porosity (unitless)

The average hydraulic conductivity of 1.38 x 10^{-5} ft/sec used in Table 9-3 was obtained from the Revised Groundwater Impact Assessment Lincoln Stone Quarry Landfill – Addendum to IEPA Application Logs 2004-052 and 2009-213 dated March 13, 2013. The estimated effective porosity of the aquifer materials (0.05) was also obtained from the above noted document.

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 Zone of Attenuation (ZOA) was established to the north of the LSQ as part of the initial landfill operating permit and a Groundwater Management Zone (GMZ) has been established to the south-southeast of the LSQ as part of the landfill permit renewal process and associated with the corrective action implemented in response to the component of groundwater flow moving to the southeast due to Laraway Quarry dewatering activities. The extent of the established ZOA and approved GMZ is provided on Figure 9-17.

A survey of all potable water sources within a 2,500 feet radius of the LSQ was completed. 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;
- ILWATER

The survey results are provided on Figure 9-18. There are no wells within the impacted aquifer downgradient of the LSQ. There are two water wells to the west of LSQ on Joliet #9 Generation Station property (owned by Midwest Generation) both of which are screened within the deeper aquifers beneath the Scales Shale and have had a successful compliance record during sampling in accordance with the drinking water regulations. There are 19 water wells located to the east of LSQ and/or Boyd's Quarry. All of these wells are sidegradient of the LSQ and are screened within the Silurian Dolomite. There are eight existing water wells to the south of LSQ and/or Boyd's Quarry. All of these wells were voluntarily replaced by Midwest Generation circa 2006 into the deeper Cambro-Ordovician aquifers beneath the Scales Shale due to the noted migration of groundwater to the southeast of LSQ associated with the dewatering activities at the Vulcan Quarry located to the southeast. There were an additional six wells located in that direction which are no longer present due to the expansion of Vulcan Quarry mining (circled in dashed red line). Also circled with a red dashed line and identified as well locations A through F on Figure 9-18 are six wells that are incorrectly located within the ILWATER database or no they longer exist. Field inspections of these locations indicate no water wells present in those areas. Review of available well log information for wells A, B and C indicate actual well addresses outside of the noted search radius (i.e., well A is located at 513 Woodruf Rd. which is approximately 3,900 feet to the east of mapped location; well B is located at 2317 W. Jefferson Street in Joliet which is over 1 mile to the north-northwest; and well C which has an address of 100 Peru Street in Troy Grove, Illinois which is in the LaSalle-Ottawa, Illinois vicinity). Well D is a 1943 vintage well log with LSQ ownership but this well is no longer present. Wells E and F have an owner name but no address and there are no wells present in those areas.

A search of the Illinois Department of Natural Resources dedicated nature preserve database (https://www2.illinois.gov/dnr/INPC/Pages/NaturePreserveDirectory.aspx) was performed to determine whether there may be a nearby dedicated nature preserve. 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 through the lower portion of the Silurian dolomite (shallow zone) with movement towards the extraction well line along the southern periphery of the site and to the north towards the Des Plaines River. There are no potable water wells downgradient of the subject CCR surface impoundment screened within the aquifer of concern. There are two deep water wells as noted above associated with former operations at the Joliet #9 power plant. 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 extensive quarterly groundwater quality data dating back to 1993 associated with the ongoing groundwater monitoring performed under the existing landfill operating permit for the LSQ. This data through the 4th quarter 2020 is provided in Attachment 9-2 in the form of time versus concentration curves. The (LSQ), however, was also identified as being subject to the new 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). To meet the Federal CCR Rule requirements, a detection monitoring network focused on the "shallow zone" dolomite was developed based on the hydrogeology discussion in Section 9.1.2, and consists of wells R08S, G20S, G30S, R32S, G44S, G45S, G46S, G47S, G48S and T03S). Wells T03S (side-gradient) and G45S are considered background monitoring wells and the remaining wells are considered downgradient wells. The locations of these wells are shown on Figure 9-1.

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. This included the full list of Appendix III (detection monitoring) and IV (assessment monitoring) parameters. All currently available CCR groundwater monitoring data available through 2nd quarter 2021 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. This data is provided in Table 9-5.

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

A comprehensive monitoring well network has been established as part of ongoing landfill permit requirements and work completed in support of that landfill operating permit. The well depths were determined based on depth to groundwater and the base elevation of the LSQ being monitored. The well locations and depths were agreed upon by Illinois EPA Bureau of Land (BOL) as part of operating permit review/approval. Based on review of the Federal and State CCR Rule, LSQ is also being regulated as an existing, incised CCR surface impoundment. As discussed above, a separate CCR groundwater monitoring network has been established for this unit. The detection monitoring network focuses on the "shallow zone" dolomite based on the hydrogeology discussion in Section 9.1.2 and consists of wells R08S, G20S, G30S, R32S, G44S, G45S, G46S, G47S, G48S and T03S). Wells T03S (side-gradient) and G45S are considered for background monitoring purposes and the remaining wells are considered downgradient wells. The locations of these wells are shown on Figure 9-1. This proposed monitoring well network will be utilized for determining whether potential leakage from the regulated unit may be causing or contributing to groundwater impacts in the vicinity of the units.

The monitoring wells were installed by either Harza Engineering, Andrews Engineering or KPRG and Associates, Inc. (KPRG) at varying times. The wells were drilled using air drilling techniques (rotary or hammer). Some of the wells borings were cored using either "NX" or "HQ" series core barrels. The wells were completed with standard 2-inch inner-diameter, schedule 80 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 grout. Surface completions include stick-up (above grade two to three feet) locking protector casings set in concrete aprons. The wells may be further protected by traffic bollards, as necessary. Boring logs and/or well construction summaries for these wells are provided in Attachment 9-1. Top-of-casing elevations were surveyed by an Illinois licensed surveyor and are included in the previously referenced Table 9-2.

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

In accordance with requirements under Section 845.630(g), Attachment 9-3 includes an Illinois licensed Professional Engineer certification of the above defined monitoring system.

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

9.3.1 Sample Frequency

The LSQ is regulated under the Federal CCR Rule. As such, all of the above defined CCR monitoring wells (upgradient and downgradient) 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. Additional sampling has also been completed as part of assessment monitoring requirements. This dataset will facilitate the development of proper statistical evaluation procedures for the site and use in development of applicable GWPSs for each constituent pursuant to Section 845.600(b). 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. Water levels are also obtained concurrently from the Main Quarry through an electronic pressure transducer used to monitor ongoing water levels within that unit.

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

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

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

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

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

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

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

9.3.4 Equipment Decontamination

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

9.3.5 Sample Preservation, Chain-of-Custody and Shipment

Since measurement of total recoverable metals is required by the State CCR Rule, the samples will not be filtered prior to collection. This will facilitate the analysis to capture both the particulate fraction and dissolved fraction of metals in natural groundwater. Groundwater samples will be collected directly into Illinois certified laboratory provided containers. Those containers will be prepared by the laboratory to contain any necessary chemical preservation. The samples shall be stored at temperatures required by the lab following sample collection. Table 9-6 includes a summary of sample bottle requirements, preservatives and holding times

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

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

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

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

9.3.6 Analytical Methods

A list of the analytical methods to be used by the laboratory for each specified parameter is included in the above referenced Table 9-6. 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 Illinois Class I Drinking Water 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 field work 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 9-4 along with a certification of the plan by an Illinois licensed Professional Engineer.

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

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

As previously noted, the monitoring well system for the subject unit consists of wells R08S, G20S, G30S, R32S, G44S, G45S, G46S, G47S, G48S and T03S). Wells T03S (side-gradient) and G45S are considered background monitoring wells and the remaining wells are considered downgradient wells.

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 and since this unit is currently within assessment monitoring under the Federal CCR Rule, additional Appendix IV sampling data is also available. All available CCR monitoring data through the end of the second quarter 2021 is summarized in Table 9-4 and the eight rounds of turbidity data collected since the enactment of the State CCR Rule in April 2021 in Table 9-5.

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 9-4. A presentation of the statistical evaluations which resulted in the background concentration calculations is provided in Attachment 9-5.

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. 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 the Quarry will be accomplished by leaving the CCR in place and covering with a final cover system as defined in Section 845.750. The Closure Plan is written in accordance with Section 845.720(a). The Plan is included as part of this application in Attachment 10.

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

The Post-Closure Plan was created by KPRG in October 2016. The Plan outlines the maintenance and inspection requirements for the final cover system. The Post-Closure Plan is written in accordance with Section 845.780. This Plan is included as part of this application in Attachment 11.

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

LSQ does not comply with the liner requirements of Section 845.400. The base of LSQ consists of Silurian Dolomite and does not have a distinct upper liner component or lower liner component. The Silurian Dolomite present in the base of LSQ was evaluated against the liner design criteria using the process outlined in Section 845.400(c) to determine if LSQ is considered lined or unlined. The calculations showing the flow rate calculations and comparison are provided in Attachment 12. The calculations indicate that the base of LSQ does not comply with the requirements of Section 845.400 and the surface impoundment is considered unlined.

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

As previously noted in the introduction, there is no Attachment with supporting documentation for this Section since the referenced data is provided in Attachment 9 documentation. The Lincoln Stone Quarry has been, and still currently is operating as a landfill since 1993 under the oversight of the Illinois EPA Bureau of Land (Landfill Permit No. 1994-241-LFM). The facility is currently operating under Modification No. 24 of that permit. Under that permit, Applicable Groundwater Quality Standards (AGQSs) were developed based on statistical evaluations, performed as part of the permit application by the operator of the facility at that time, of existing groundwater quality at that time. The groundwater monitoring parameters specified in the landfill operating permit include primarily dissolved constituents as opposed to total analyses as required under the Federal and State CCR Rules, and that list of parameters is slightly different than the list required under the State CCR Rule. However, there are three parameters within the landfill permit, which are collected and analyzed as “total” constituents that also are part of the Section 845.600 list or constituents. These are barium, lead and mercury. A review of the landfill operating permit data for these three parameters indicates no confirmed detections above the Section 845.600 standards for barium or mercury and two confirmed detections of lead; one at well G31S in the second quarter of 2002 and one at well G39S in the second quarter 2018. It is noted that these were only one-time confirmed detections above the noted standards with all prior and subsequent sampling data being below the standards.

The existing CCR data for the LSQ groundwater monitoring network was also presented and discussed in Section 9 of this operating permit application (see Table 9-4). Relative to the most recent round of CCR groundwater monitoring data referenced in that Section, the following are noted above the standards provided in Section 845.600(a):

- R08S (downgradient): Boron and sulfate.

- G30S (downgradient): Boron and sulfate.
- R32S (downgradient): Boron, sulfate lithium and molybdenum.
- G44S (downgradient): Molybdenum.
- G46S (downgradient): Boron sulfate, arsenic, lithium and molybdenum.
- G47S (downgradient): Boron, sulfate, arsenic, lithium and molybdenum.
- G48S (downgradient): Boron, sulfate and molybdenum.
- G31S (downgradient assessment): Boron, lithium and molybdenum.
- G33S (downgradient assessment): Lithium.
- T01S (downgradient assessment): Boron, arsenic and molybdenum.
- T02S (downgradient assessment): Boron, molybdenum.
- T05S (downgradient assessment): Boron, pH, sulfate, TDS, arsenic and molybdenum.
- T08S (downgradient assessment): Boron, sulfate, arsenic and molybdenum.
- T09S (downgradient assessment): Boron, sulfate and lithium.

All of the above wells except G44S, G31S, G33S and T09S are within the existing GMZ or Zone of Attenuation established as part of the landfill operating permit. Proposed GWPSs which were 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.

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

LSQ is an incised surface impoundment; therefore, in accordance with Section 845.440(b), a hazard potential classification assessment is not required. This section does not have an attachment because a hazard potential classification assessment was not required and, therefore, not included with this operating permit application.

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

LSQ is an incised surface impoundment; therefore, in accordance with Section 845.450(e), a structural stability assessment is not required. This section does not have an attachment because a structural stability assessment was not required and, therefore, not included with this operating permit application.

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

LSQ is an incised surface impoundment; therefore, in accordance with Section 845.460(e), a safety factor assessment is not required. This section does not have an attachment because a safety factor assessment was not required and, therefore, not included with this operating permit application.

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 LSQ in October of 2016 and has been reviewed and updated by Geosyntec in accordance with 845.510 and is included in Attachment 18.

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

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

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

In accordance with the requirements of Section 845.700(c), the category designation for LSQ is Category 3. The Category 3 designation for LSQ is based on the following:

- LSQ is an inactive CCR surface impoundment.
- There are no potable water supply wells or setbacks of existing potable water supply wells downgradient of LSQ. As such, Midwest Generation is not aware of any imminent threat to human health or the environment.
- Midwest Generation used the Illinois EPA EJ Start tool found at https://illinois-epa.maps.arcgis.com/apps/webappviewer/index.html?id=f154845da68a4a3f837cd3b880b0233c to determine that the Joliet #9 Generating Station (1601 S. Patterson Rd, Joliet 60436) LSQ is within one mile of an area of environmental justice concern.

OPERATING PERMIT TABLES

Table 2. Lincoln Stone Quarry/Joliet 9 Generating Station
Lincoln Stone Quarry CCR Chemical Constituents Analytical Results

Parameter Name	Slag Sample 8/31/2021	Bottom Ash Sample 8/31/2021
Antimony	<1.8	<1.8 F1
Arsenic	<0.88	1.5 F1
Barium	4,400	3,000
Beryllium	3.3	1.5 F1
Boron	110	130 F1 V
Cadmium	<0.18	<0.18
Calcium	110,000	100,000
Chloride	<20	<20
Chromium	37	12 F1
Cobalt	20	15
Fluoride	<1.0	<1.0
Lead	0.67	5.6
Lithium	32	20 V
Mercury	<0.015	<0.016
Molybdenum	<0.88	1.1 F1
Selenium	<0.88	<0.89 F1
Sulfate	<2.0	560
Thallium	3.6	2.9
Radium 226	2.41	1.54
Radium 228	1.97	1.63
Radium 226 & 228	4.38	3.17

Notes:

All results are in milligrams per kilogram (mg/kg), except for radium, which is 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 #9 Lincoln Stone Quarry

Joliet #9 Lincoln Stone Quarry	
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 #9.

Well ID	Date[1]	Top of Casing Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Groundwater Elevation (ft above MSL)
R08S	Nov-2015	578.65	66.74	511.91
	May-2016	578.65	67.02	511.63
	Jun-2016	578.65	67.50	511.15
	Aug-2016	578.65	67.47	511.18
	Nov-2016	578.65	67.84	510.81
	Feb-2017	578.65	69.28	509.37
	May-2017	578.65	67.56	511.09
	Jul-2017	578.65	67.54	511.11
	Sep-2017	578.65	65.72	512.93
	Nov-2017	578.65	64.83	513.82
	Mar-2018	578.65	65.12	513.53
	May-2018	578.65	65.31	513.34
	Oct-2018	578.62	65.48	513.14
	May-2019	578.62	67.24	511.38
	Nov-2019	578.62	66.78	511.84
	Apr-2020	578.62	65.63	512.99
	Oct-2020	578.62	68.14	510.48
	Apr-2021	578.62	69.20	509.42
G20S	Nov-2015	580.33	55.33	525.00
	May-2016	580.33	51.32	529.01
	Jun-2016	580.33	53.14	527.19
	Aug-2016	580.33	61.32	519.01
	Nov-2016	580.33	54.69	525.64
	Feb-2017	580.33	52.41	527.92
	May-2017	580.33	46.06	534.27
	Jul-2017	580.33	47.85	532.48
	Sep-2017	580.33	49.02	531.31
	Nov-2017	580.33	52.57	527.76
	Mar-2018	580.33	46.65	533.68
	May-2018	580.33	48.83	531.50
	Oct-2018	580.91	49.46	531.45
	May-2019	580.91	39.03	541.88
	Nov-2019	580.91	41.82	539.09
	Apr-2020	580.91	41.69	539.22
	Oct-2020	580.91	46.74	534.17
	Apr-2021	580.91	45.69	535.22
G30S	Nov-2015	524.40	2.74	521.66
	May-2016	524.40	2.53	521.87
	Jun-2016	524.40	3.54	520.86
	Aug-2016	524.40	2.45	521.95
	Nov-2016	524.40	2.57	521.83
	Feb-2017	524.40	2.13	522.27
	May-2017	524.40	1.69	522.71
	Jul-2017	524.40	1.96	522.44
	Sep-2017	524.40	1.84	522.56
	Nov-2017	524.40	1.48	522.92
	Mar-2018	524.40	1.48	522.92
	May-2018	524.40	1.62	522.78
	Oct-2018	524.70	2.51	522.19
	May-2019	524.70	1.57	523.13
	Nov-2019	524.70	1.53	523.17
	Apr-2020	524.70	1.03	523.67
	Oct-2020	524.70	2.19	522.51
	Apr-2021	524.70	2.55	522.15
R32S	Nov-2015	536.81	19.99	516.82
	May-2016	536.81	19.72	517.09
	Jun-2016	536.81	20.51	516.30
	Aug-2016	536.81	20.51	516.30
	Nov-2016	536.81	20.24	516.57
	Feb-2017	536.81	21.12	515.69
	May-2017	536.81	19.33	517.48
	Jul-2017	536.81	19.38	517.43
	Sep-2017	536.81	17.91	518.90
	Nov-2017	536.81	16.32	520.49
	Mar-2018	536.81	16.98	519.83
	May-2018	536.81	20.26	516.55
	Oct-2018	536.99	18.32	518.67
	May-2019	536.99	19.28	517.71
	Nov-2019	536.99	19.09	517.90
	Apr-2020	536.99	17.74	519.25
	Oct-2020	536.99	20.76	516.23
	Apr-2021	536.99	22.06	514.93

MSL - Mean Sea Level
TOC - Top of Casing
[1] - Date of water levels collected at beginning of quarter, actual sample date may vary.

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

Well ID	Date[1]	Top of Casing Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Groundwater Elevation (ft above MSL)
G44S	Nov-2015	586.69	80.54	506.15
	May-2016	586.69	80.42	506.27
	Jun-2016	586.69	80.68	506.01
	Aug-2016	586.69	80.65	506.04
	Nov-2016	586.69	80.69	506.00
	Feb-2017	586.69	84.34	502.35
	May-2017	586.69	82.14	504.55
	Jul-2017	586.69	81.13	505.56
	Sep-2017	586.69	80.15	506.54
	Nov-2017	586.69	77.10	509.59
	Mar-2018	586.69	78.74	507.95
	May-2018	586.69	80.17	506.52
	Oct-2018	586.53	78.21	508.32
	May-2019	586.53	80.05	506.48
	Nov-2019	586.53	79.96	506.57
	Apr-2020	586.53	79.25	507.28
	Oct-2020	586.53	81.51	505.02
	Apr-2021	586.53	82.51	504.02
G45S	Nov-2015	603.31	68.90	534.41
	May-2016	603.31	67.28	536.03
	Jun-2016	603.31	68.88	534.43
	Aug-2016	603.31	68.39	534.92
	Nov-2016	603.31	66.69	536.62
	Feb-2017	603.31	65.34	537.97
	May-2017	603.31	63.07	540.24
	Jul-2017	603.31	63.44	539.87
	Sep-2017	603.31	63.10	540.21
	Nov-2017	603.31	62.28	541.03
	Mar-2018	603.31	61.82	541.49
	May-2018	603.31	68.50	534.81
	Oct-2018	603.90	66.74	537.16
	May-2019	603.90	62.72	541.18
	Nov-2019	603.90	62.38	541.52
	Apr-2020	603.90	60.10	543.80
	Oct-2020	603.90	65.51	538.39
	Apr-2021	603.90	67.71	536.19
G46S	Nov-2015	601.32	95.78	505.54
	May-2016	601.32	96.74	504.58
	Jun-2016	601.32	97.31	504.01
	Aug-2016	601.32	97.32	504.00
	Nov-2016	601.32	97.50	503.82
	Feb-2017	601.32	98.14	503.18
	May-2017	601.32	98.43	502.89
	Jul-2017	601.32	98.96	502.36
	Sep-2017	601.32	96.61	504.71
	Nov-2017	601.32	95.65	505.67
	Mar-2018	601.32	96.80	504.52
	May-2018	601.32	95.59	505.73
	Oct-2018	601.43	91.34	510.09
	May-2019	601.43	101.40	500.03
	Nov-2019	601.43	100.01	503.83
	Apr-2020	601.43	100.19	501.24
	Oct-2020	601.43	101.44	499.99
	Apr-2021	601.43	103.09	498.34
G47S	Nov-2015	612.32	99.44	512.88
	May-2016	612.32	95.48	516.84
	Jun-2016	612.32	96.58	515.74
	Aug-2016	612.32	96.79	515.53
	Nov-2016	612.32	88.96	523.36
	Feb-2017	612.32	96.41	515.91
	May-2017	612.32	92.61	519.71
	Jul-2017	612.32	93.53	518.79
	Sep-2017	612.32	93.50	518.82
	Nov-2017	612.32	92.57	519.75
	Mar-2018	612.32	93.63	518.69
	May-2018	612.32	93.51	518.81
	Oct-2018	612.10	96.29	515.81
	May-2019	612.10	91.78	520.32
	Nov-2019	612.10	91.98	520.12
	Apr-2020	612.10	89.34	522.76
	Oct-2020	612.10	86.78	525.32
	Apr-2021	612.10	96.78	515.32

MSL - Mean Sea Level
TOC - Top of Casing
[1] - Date of water levels collected at beginning of quarter, actual sample date may vary.

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

Well ID	Date[1]	Top of Casing Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Groundwater Elevation (ft above MSL)
G48S	Nov-2015	620.77	106.83	513.94
	May-2016	620.77	105.20	515.57
	Jun-2016	620.77	104.95	515.82
	Aug-2016	620.77	104.77	516.00
	Nov-2016	620.77	102.41	518.36
	Feb-2017	620.77	103.05	517.72
	May-2017	620.77	100.06	520.71
	Jul-2017	620.77	102.31	518.46
	Sep-2017	620.77	102.88	517.89
	Nov-2017	620.77	100.83	519.94
	Mar-2018	620.77	99.77	521.00
	May-2018	620.77	100.74	520.03
	Oct-2018	620.78	105.79	514.99
	May-2019	620.78	98.18	522.60
	Nov-2019	620.78	98.30	522.48
	Apr-2020	620.78	95.54	525.24
	Oct-2020	620.78	100.63	520.15
	Apr-2021	620.78	104.98	515.80
T03S	Nov-2015	629.65	136.30	493.35
	May-2016	629.65	135.24	494.41
	Jun-2016	629.65	134.26	495.39
	Aug-2016	629.65	134.13	495.52
	Nov-2016	629.65	135.03	494.62
	Feb-2017	629.65	134.92	494.73
	May-2017	629.65	131.87	497.78
	Jul-2017	629.65	135.99	493.66
	Sep-2017	629.65	136.40	493.25
	Nov-2017	629.65	133.61	496.04
	Mar-2018	629.65	131.05	498.60
	May-2018	629.65	134.42	495.23
	Oct-2018	629.89	140.03	489.86
	May-2019	629.89	125.79	504.10
	Oct-2019	629.89	132.92	496.97
	Apr-2020	629.89	133.84	496.05
	Oct-2020	629.89	135.88	494.01
	Apr-2021	629.89	138.78	491.11
G31S	Dec-2018	535.78	25.70	510.08
	Jun-2019	535.78	23.46	512.32
	Oct-2019	535.78	26.89	508.89
	Apr-2020	535.78	25.75	510.03
	Oct-2020	535.78	28.09	507.69
	Apr-2021	535.78	28.65	507.13
G33S	Dec-2018	535.66	27.06	508.60
	Jun-2019	535.66	23.41	512.25
	Oct-2019	535.66	25.64	510.02
	Apr-2020	535.66	27.00	508.66
	Oct-2020	535.66	32.27	503.39
	Apr-2021	535.66	33.03	502.63
T01S	Dec-2018	621.78	115.39	506.39
	Jun-2019	621.78	112.91	508.87
	Oct-2019	621.78	113.37	508.41
	Apr-2020	621.78	111.50	510.28
	Oct-2020	621.78	118.64	503.14
	Apr-2021	621.78	122.36	499.42
T02S	Dec-2018	626.16	133.88	492.28
	Jun-2019	626.16	128.33	497.83
	Oct-2019	626.16	129.36	496.80
	Apr-2020	626.16	128.41	497.75
	Oct-2020	626.16	131.54	494.62
	Apr-2021	626.16	131.50	494.66
T04S	Dec-2018	631.35	158.00	473.35
	Jun-2019	631.35	152.54	478.81
	Oct-2019	631.35	152.07	479.28
	Apr-2020	631.35	152.24	479.11
	Oct-2020	ABD	ABD	ABD
	Apr-2021	ABD	ABD	ABD
T05S	Dec-2018	623.45	123.78	499.67
	Jun-2019	623.45	116.70	506.75
	Oct-2019	623.45	117.14	506.31
	Apr-2020	623.45	115.73	507.72
	Oct-2020	623.45	120.68	502.77
	Apr-2021	623.45	123.71	499.74
T06S	Dec-2018	621.02	112.72	508.30
	Jun-2019	621.02	111.86	509.16
	Oct-2019	621.02	112.43	508.59
	Apr-2020	621.02	109.45	511.57
	Oct-2020	621.02	112.20	508.82
	Apr-2021	621.02	117.22	503.80

MSL - Mean Sea Level
TOC - Top of Casing
1 - Date of water levels collected at beginning of quarter, actual sample date may vary.
ABD - Abandoned. Vulcan property well removed by Vulcan as part of mine expansion.

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

Well ID	Date[1]	Top of Casing Elevation (ft above MSL)	Depth to Groundwater (ft below TOC)	Groundwater Elevation (ft above MSL)
T08S	Dec-2018	627.39	128.97	498.42
	Jun-2019	627.39	124.37	503.02
	Oct-2019	627.39	125.15	502.24
	Apr-2020	627.39	123.91	503.48
	Oct-2020	627.39	126.50	500.89
	Apr-2021	627.39	130.24	497.15
T09S	Dec-2018	603.74	94.75	508.99
	Jun-2019	603.74	102.30	501.44
	Oct-2019	603.74	101.91	501.83
	Apr-2020	603.74	100.63	503.11
	Oct-2020	603.74	103.07	500.67
	Apr-2021	603.74	104.28	499.46

MSL - Mean Sea Level
TOC - Top of Casing
[1] - Date of water levels collected at beginning of quarter, actual sample date may vary.

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

DATE	Natural Groundwater Flow Direction	K_{avg} (ft/sec)*	Average Hydraulic Gradient (ft/ft)	Porosity (unitless)**	Estimated Seepage Velocity (ft/day)
11/2015	Northerly and Westerly	1.38E-05	0.0293	0.05	0.70
5/2016	Northerly and Westerly	1.38E-05	0.0289	0.05	0.69
6/2016	Northerly and Westerly	1.38E-05	0.0287	0.05	0.68
8/2016	Northerly and Westerly	1.38E-05	0.0293	0.05	0.70
11/2016	Northerly and Westerly	1.38E-05	0.0301	0.05	0.72
2/2017	Northerly and Westerly	1.38E-05	0.0431	0.05	1.03
5/2017	Northerly and Westerly	1.38E-05	0.0364	0.05	0.87
7/2017	Northerly and Westerly	1.38E-05	0.0378	0.05	0.90
8/2017	Northerly and Westerly	1.38E-05	0.0364	0.05	0.87
11/2017	Northerly and Westerly	1.38E-05	0.0319	0.05	0.76
3/2018	Northerly and Westerly	1.38E-05	0.0384	0.05	0.92
5/2018	Northerly and Westerly	1.38E-05	0.0222	0.05	0.53
12/2018	Northerly and Westerly	1.38E-05	0.0321	0.05	0.77
6/2019	Northerly and Westerly	1.38E-05	0.0282	0.05	0.67
11/2019	Northerly and Westerly	1.38E-05	0.0269	0.05	0.64
5/2020	Northerly and Westerly	1.38E-05	0.0376	0.05	0.90
10/2020	Northerly and Westerly	1.38E-05	0.0311	0.05	0.74
4/2021	Northerly and Westerly	1.38E-05	0.0221	0.05	0.53

* K_{avg} - Average hydraulic conductivity (feet/second) from Revised Groundwater Impacts assessment Lincoln Stone Quarry, 3/13/2013.

** - Porosity estimate from Revised Groundwater Impacts assessment Lincoln Stone Quarry, 3/13/2013.

Table 9-4. Groundwater Analytical Results - Midwest Generation, LLC, Joliet #9 Generating Station, 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 Combined	Selenium	Thallium
	11/20/2015	0.81	120	180	0.35	7.20	360	810	< 0.003	0.0081	0.044	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.35	< 0.0005	0.036	< 0.0002	0.0120	1.76	< 0.0025	< 0.002
	5/12/2016	0.68	110	140	0.34	7.37	230	860	< 0.003	0.0076	0.041	< 0.001	< 0.0005	< 0.005	< 0.001	0.34	< 0.0005	0.036	< 0.0002	0.0100	3.01	< 0.0025	< 0.002
	6/30/2016	0.48	87	110	0.34	7.50	170	670	< 0.003	0.0075	0.031	< 0.001	< 0.0005	< 0.005	< 0.001	0.34	< 0.0005	0.034	< 0.0002	0.008	2.05	< 0.0025	< 0.002
	8/25/2016	0.47	94	100	0.35	7.28	170	790	< 0.003	0.0076	0.036	< 0.001	< 0.0005	< 0.005	< 0.001	0.35	< 0.0005	0.031	< 0.0002	0.0086	1.91	< 0.0025	< 0.002
	11/16/2016	0.41	91	90	0.33	7.34	170	620	< 0.003	0.0079	0.033	< 0.001	< 0.0005	< 0.005	< 0.001	0.33	< 0.0005	0.028	< 0.0002	0.0094	2.04	< 0.0025	< 0.002
	2/14/2017	0.43	97	97	0.32	7.36	160	620	< 0.003	0.0093	0.037	< 0.001	< 0.0005	< 0.005	< 0.001	0.32	< 0.0005	0.029	< 0.0002	0.0083	1.85	< 0.0025	< 0.002
	5/23/2017	0.36	85	110	0.35	7.30	150	660	< 0.003	0.0082	0.033	< 0.001	< 0.0005	< 0.005	< 0.001	0.35	< 0.0005	0.027	< 0.0002	0.0093	1.40	< 0.0025	< 0.002
	7/7/2017	0.42	94	120	< 0.1	7.21	150	600	< 0.003	0.0086	0.035	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.1	< 0.0005	0.030	< 0.0002	0.007	1.88	< 0.0025	< 0.002
G45S up-gradient	9/26/2017	0.43	110	130	0.3	7.21	160	790	< 0.003	0.0096	0.04	< 0.001	< 0.0005	< 0.005	< 0.001	0.3	< 0.0005	0.029	< 0.0002	0.0079	2.14	< 0.0025	< 0.002
	11/21/2017	0.34	96	130	0.33	7.29	180	700	< 0.003	0.0094	0.038	< 0.001	< 0.0005	< 0.005	< 0.001	0.33	< 0.0005	0.028	< 0.0002	0.0072	8.45	< 0.0025	< 0.002
	3/9/2018	0.38	97	110	0.32	7.18	180	710	< 0.003	0.0093	0.036	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.32	< 0.0005	0.028	^ < 0.0002	0.008	1.89	< 0.0025	< 0.002
	5/21/2018	0.76	110	150	0.33	7.00	230	970	NA	0.0072	0.047	NA	NA	NA	< 0.001	0.33	< 0.0005	0.033	NA	0.013	2.37	< 0.0025	NA
	12/7/2018	0.46	91	120	0.33	7.02	100	740	NA	0.0090	0.034	NA	NA	NA	< 0.001	0.330	< 0.0005	0.031	NA	0.0100	1.910	< 0.0025	NA
	6/28/2019	0.39	96	130	0.33	7.51	120	720	NA	0.0100	0.039	NA	NA	NA	< 0.001	0.33	< 0.0005	0.032	NA	0.0087	1.99	< 0.0025	NA
	11/14/2019	0.48	110	170	0.33	7.33	170	830	NA	< 0.0100	0.042	NA	NA	NA	< 0.001	0.33	< 0.0005	0.034	NA	0.0100	2.89	< 0.010	NA
	6/26/2020	0.62	130	220	0.33	7.21	240	970	NA	0.011	0.049	NA	NA	NA	< 0.001	0.33	< 0.0005	0.039	NA	0.0088	3.1	< 0.0025	NA
	12/11/2020	0.70	120	180	0.38	7.16	220	760	NA	0.011	0.042	NA	NA	NA	< 0.001	0.38	^+< 0.0005	0.038	NA	0.012	1.88	< 0.0025	NA
	6/28/2021	0.44	91	110	0.35	7.20	150	680	< 3	0.01	0.034	< 1.00	< 0.50	< 5.00	< 0.001	0.35	< 0.0005	0.031	< 0.00020	0.0083	DNYA	< 0.0025	< 2.00
	11/19/2015	0.5	110	75	0.22	7.07	250	710	< 0.003	0.0019	0.063	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.22	< 0.0005	0.019	< 0.0002	0.0260	1.101	< 0.0025	< 0.002
	5/5/2016	0.84	100	100	0.21	7.16	190	820	< 0.003	0.0013	0.081	< 0.001	< 0.0005	< 0.005	< 0.001	0.21	< 0.0005	0.018	< 0.0002	0.03	1.43	< 0.0025	< 0.002
	6/28/2016	0.98	100	94	0.19	7.30	180	910	< 0.003	0.0011	0.086	< 0.001	< 0.0005	< 0.005	0.0011	0.19	< 0.0005	0.017	< 0.0002	0.037	1.18	< 0.0025	< 0.002
	8/25/2016	1.1	110	99	0.20	7.32	180	880	< 0.003	< 0.001	0.086	< 0.001	< 0.0005	< 0.005	< 0.001	0.2	< 0.0005	0.016	< 0.0002	0.043	1.54	< 0.0025	< 0.002
	11/17/2016	1.3	120	100	0.19	7.14	150	860	< 0.003	0.0012	0.096	< 0.001	< 0.0005	< 0.005	0.0012	0.19	< 0.0005	0.022	< 0.0002	0.14	1.61	< 0.0025	< 0.002
	2/15/2017	1.0	98	110	0.19	7.36	230	810	< 0.003	0.0011	0.086	< 0.001	< 0.0005	< 0.005	0.0013	0.19	< 0.0005	< 0.05	< 0.0002	0.12	0.938	< 0.0025	< 0.002
	5/22/2017	1.4	110	78	0.23	7.25	160	740	< 0.003	0.0017	B 0.088	^ < 0.001	< 0.0005	< 0.005	0.0015	0.23	0.0023	0.019	< 0.0002	0.13	1.21	< 0.0025	< 0.002
	7/7/2017	1.1	100	F1 71	< 0.1	7.32	180	710	< 0.003	< 0.001	0.078	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.1	< 0.0005	0.019	< 0.0002	0.099	1.11	< 0.0025	< 0.002
T03S up-gradient	9/26/2017	1.3	110	80	0.21	7.19	240	790	< 0.003	0.0011	0.086	< 0.001	< 0.0005	< 0.005	0.0013	0.21	< 0.0005	0.018	< 0.0002	0.14	1.33	< 0.0025	< 0.002
	11/20/2017	1.7	98	90	0.24	7.13	230	770	< 0.003	0.0014	0.087	< 0.001	< 0.0005	< 0.005	< 0.001	0.24	< 0.0005	0.02	< 0.0002	0.2	1.59	< 0.0025	< 0.002
	3/7/2018	1.5	110	110	0.23	7.34	250	900	< 0.003	0.0023	0.093	< 0.001	< 0.0005	< 0.005	0.0013	0.23	< 0.0005	0.022	< 0.0002	0.26	1.30	< 0.0025	< 0.002
	5/17/2018	1.8	100	82	0.24	7.07	210	890	NA	0.001	0.087	NA	NA	NA	0.0013	0.24	< 0.0005	0.021	NA	0.240	1.25	< 0.0025	NA
	12/11/2018	1.8	100	140	0.23	6.96	160	890	NA	0.0014	0.095	NA	NA	NA	0.0012	0.230	< 0.0005	0.021	NA	0.270	1.31	< 0.0025	NA
	6/24/2019	2.7	100	89	0.27	7.17	260	830	NA	0.0020	0.090	NA	NA	NA	0.0010	0.270	< 0.0005	0.027	NA	0.370	1.33	< 0.0025	NA
	10/28/2019	1.5	100	73	0.25	7.19	< 500	780	NA	< 0.0100	0.088	NA	NA	NA	0.0011	0.25	< 0.0050	0.026	NA	0.210	1.38	< 0.0100	NA
	6/23/2020	2.3	97	74	0.33	7.29	240	770	NA	0.0024	0.093	NA	NA	NA	< 0.001	0.33	< 0.0005	0.025	NA	0.23	1.65	< 0.0025	NA
	12/15/2020	1.4	140	F1 170	0.27	7.01	280	960	NA	0.0013	0.11	NA	NA	NA	0.0015	0.27	< 0.0005	0.031	NA	0.14	1.74	< 0.0025	NA
	6/22/2021	0.92	120	130	0.23	6.94	220	980	< 0.0030	0.0016	0.085	< 0.001	< 0.0005	< 0.005	< 0.001	0.23	< 0.0005	0.029	H< 0.00020	0.071	DNYA	< 0.0025	< 0.0020
	11/23/2015	6.9	130	77	0.19	7.80	520	740	< 0.003	0.0019	0.052	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.19	< 0.0005	0.14	< 0.0002	0.410	1.608	0.0061	< 0.002
	5/6/2016	6.1	120	80	0.19	7.70	380	820	< 0.003	0.0013	0.052	< 0.001	< 0.0005	< 0.005	< 0.001	0.19	< 0.0005	0.14	< 0.0002	0.390	1.08	0.0079	< 0.002
	6/28/2016	6.8	130	89	0.18	7.49	320	960	< 0.003	0.0019	0.056	< 0.001	< 0.0005	< 0.005	< 0.001	0.18	< 0.0005	0.14	< 0.0002	0.37	1.87	F1 0.0074	< 0.002
	8/25/2016	6.3	120	84	0.19	7.54	350	890	< 0.003	0.0015	0.053	< 0.001	< 0.0005	< 0.005	< 0.001	0.19	< 0.0005	0.13	< 0.0002	0.33	1.50	0.0032	< 0.002
	11/21/2016	6.4	120	86	0.17	7.53	280	790	< 0.003	0.0016	0.052	< 0.001	< 0.0005	< 0.005	< 0.001	0.17	< 0.0005	0.140	< 0.0002	0.36	2.13	0.0037	< 0.002
	2/14/2017	5.4	150	220	0.17	7.60	280	1,000	< 0.003	0.002	0.081	< 0.001	< 0.0005	< 0.005	< 0.001	0.17	< 0.0005	0.120	< 0.0002	0.3	2.71	0.0029	< 0.002
	5/25/2017	12	250	90	0.17	7.56	340	830	< 0.006	0.0028	0.092	^ < 0.002	< 0.001	< 0.01	< 0.002	0.17	< 0.001	0.250	< 0.0002	0.64	0.821	0.021	< 0.004
	7/6/2017	6.3	140	87	0.17	7.62	350	830	< 0.003	0.002	0.052	< 0.001	< 0.0005	< 0.005	< 0.001	0.17	^ < 0.0005	0.140	< 0.0002	0.35	1.15	0.0054	^ < 0.002
R08S down-gradient	9/25/2017	7.3	140	81	0.15	7.57	390	840	< 0.003	0.002	0.048	< 0.001	< 0.0005	< 0.005	< 0.001	0.15	0.00067	0.130	< 0.0002	0.38	1.27	0.0079	< 0.002
	11/21/2017	7.3	130	89	0.15	8.05	380	800	< 0.003	0.0017	0.046	< 0.001	< 0.0005	< 0.005	< 0.001	0.15	< 0.0005	0.140	< 0.0002	0.34	1.09	0.015	< 0.002
	3/8/2018	7.4	150	83	0.14	8.62	420	850	< 0.003	0.0016	0.05	< 0.001	< 0.0005	< 0.005	< 0.001	0.14	< 0.0005	0.150	< 0.0002	0.37	1.55	0.012	< 0.002
	5/18/2018	7.7	140	82	0.14	8.25	320	920	NA	0.0013	0.046	NA	NA	NA	< 0.001	0.14	< 0.0005	0.150	NA	0.35	1.22	0.017	NA
	12/13/2018	7.7	140	79	0.15	8.11	240	800	NA	0.0012	0.046	NA	NA	NA	< 0.001	0.150	< 0.0005	0.150	NA	0.370	1.450	0.0170	NA
	6/19/2019	8.5	140	83	0.14	8.10	360	820	NA	0.0013	0.044	NA	NA	NA	< 0.001	0.140	< 0.0005	0.160	NA	0.370	1.5	0.0150	NA
	11/11/2019	6.4	140	84	0.15	7.91	360	730	NA	< 0.010	0.044	NA	NA	NA	< 0.001	0.150	< 0.0005	0.15	NA	0.340	1.31	0.0130	NA
	6/26/2020	7.9	140	83	0.15	8.32	370	750	NA	0.0011	0.043	NA	NA	NA	< 0.001	0.15	< 0.0005	0.14	NA	0.36	1.68	0.017	NA
	12/14/2020	8.0	130	88	0.18	8.15	400	700	NA	0.0015	0.04	NA	NA	NA	< 0.001	0.18	< 0.0005	0.14	NA	0.38	1.53	0.0081	NA
	6/23/2021	7.6	140	79	0.16	8.07	430	810	< 0.003	0.0011	0.042	< 0.001	< 0.0005	< 0.005	< 0.001	0.16	< 0.0005	0.15	H< 0.00020	0.37	DNYA	0.011	< 0.002
	11/19/2015	1.2	59	12	0.82	7.73	110	410	< 0.003	< 0.001	0.049	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.82	< 0.0005	0.036	< 0.0002	0.0068	2.078	< 0.0025	< 0.002
	5/11/2016	1.2	53	12	0.81	7.52	77	410	< 0.003	< 0.001	0.049	< 0.001	< 0.0005	< 0.005	< 0.001	0.81	< 0.0005	0.037	0.00027	0.011	2.52	< 0.0025	< 0.002
	6/29/2016	1.2	`	12	0.82	7.38	69	460	< 0.003	< 0.001	0.051	< 0.001	< 0.0005	< 0.005	0.0011	0.82	< 0.0005	0.04	< 0.0002	0.014	2.79	< 0.0025	< 0.002
	8/23/2016	1.3	56	13	0.81	7.41	67	420	< 0.003	< 0.001	0.047	< 0.001	< 0.0005	< 0.005	< 0.001	0.81	< 0.0005	0.039	< 0.0002	0.017	3.67	< 0.0025	< 0.002
	11/17/2016	1.3	59	11	0.74	7.44	55	420	< 0.003	< 0.001	0.056	< 0.001	< 0.0005	< 0.005	0.0018	0.74	< 0.0005	0.042	< 0.0002	0.019	1.98	< 0.0025	< 0.002
	2/13/2017	1.2	54	13	0.69	7.30	93	400	< 0.003	< 0.001	0.046	< 0.001	< 0.0005	< 0.005	< 0.0010	0.69	< 0.0005	0.04	< 0.0002	0.018	2.44	< 0.0025	< 0.002
	5/24/2017	1.3	55	12	0.81	7.45	66	430	< 0.003	< 0.001	0.046	^ < 0.001	< 0.0005	< 0.005	< 0.0010	0.81	< 0.0005	0.038	< 0.0002	0.017	2.15	< 0.0025	< 0.002
	7/5/2017	1.3	61	12	0.76	7.37	70	400	< 0.003	< 0.001	0.054	< 0.001	< 0.0005	< 0.005	0.0021	0.76	^ < 0.0005	0.04	< 0.0002	0.019	1.83	< 0.0025	^ < 0.002
G20S down-gradient	9/25/2017	1.3	60	12	0.78	7.30	76	440	< 0.003	< 0.001	0.051	< 0.001	< 0.0005	< 0.005	0.0015	0.78	< 0.0005	0.036	< 0.0002	0.022	2.19	< 0.0025	< 0.002
	11/20/2017	1.3	59	13	0.78	7.06	85	390	< 0.003	< 0.001	0.051	< 0.001	< 0.0005	< 0.005	0.0022	0.78	< 0.0005	0.041	< 0.0002	0.021	2.50	< 0.0025	< 0.002
	3/6/2018	1.4	63	12	0.76	7.32	88	460	< 0.003	< 0.001	0.049	^ < 0.001	< 0.0005	< 0.005	< 0.0010	0.76	< 0.0005	0.042	< 0.0002	0.021	2.83	< 0.0025	< 0.002
	5/16/2018	1.2	61	12	0.75	7.06	87	410	NA	< 0.001	0.049	NA	NA	NA	0.0024	0.75	^ < 0.0005	0.04	NA	0.019	2.12	< 0.0025	NA
	12/07/18	1.2	58	12	0.76	7.41	65	480	NA	< 0.001	0.048	NA	NA	NA	0.0010	0.760	0.0048	0.042	NA	0.0230	2.26	< 0.0025	NA
	6/18/2019	1.3	62	13	0.75	7.18	65	440	NA	< 0.001	0.051	NA	NA	NA	0.0018	0.750	< 0.0005	0.041	NA	0.017	2.11	< 0.0025	NA
	11/5/2019	1.2	58	13	0.74	7.88	71	410	NA	< 0.010	0.050	NA	NA	NA	0.0023	0.740	< 0.0005	0.044	NA	0.021	1.74	< 0.0100	NA
	6/24/2020	1.3	58	13	0.79	7.81	63	360	NA	< 0.010	0.045	NA	NA	NA	< 0.001	0.79	< 0.0005	0.038	NA	0.019	2.07	< 0.0025	NA
	12/11/2020	1.4	61	14	0.89	7.41	69	390	NA	< 0.001	0.043	NA	NA	NA	< 0.001	0.89	^+< 0.0005	0.042	NA	0.022	2.160	< 0.0025	NA
	6/23/2021	1.3	60	14	0.77	7.46	70	390	< 0.003	< 0.001	0.047	< 0.001	< 0.0005	< 0.005	< 0.001	0.77	< 0.0005	0.047	H< 0.00020	0.022	DNYA	< 0.0025	< 0.002
	11/20/2015	5.80	63	190	1.3	7.46	580	1,000	< 0.003	0.014	0.041	^ < 0.001	< 0.0005	< 0.005	< 0.001	1.3	< 0.0005	0.022	< 0.0002	0.33	1.484	< 0.0025	< 0.002
	5/10/2016	5.4	53	190	1.30	7.68	390	1,100	< 0.003	0.017	0.039	< 0.001	< 0.0005	< 0.005	< 0.001	1.3	< 0.0005	0.021	< 0.0002	0.3	1.41	< 0.0025	< 0.002
	6/30/2016	5.2	60	F1 180	1.30	7.73	410	990	< 0.003	0.013	0.04	< 0.001	< 0.0005	< 0.005	< 0.001	1.3	< 0.0005	0.023	< 0.0002	0.3	1.17	< 0.0025	< 0.002
	8/25/2016	5.7	59	F1 180	1.30	7.70	390	1,100	< 0.003	0.015	0.039	< 0.001	< 0.0005	< 0.005	< 0.001	1.3	< 0.0005	0.02	< 0.0002	0.31	1.87	< 0.0025	< 0.002
	11/18/2016	6.4	57	170	1.2	8.04	320	1,100	< 0.003	0.016	0.043	< 0.001	< 0.0005	< 0.005	< 0.001	1.2	< 0.0005	0.023	< 0.0002	0.33	2.36	< 0.0025	< 0.002
	2/14/2017	5.4	62	190	1.2	7.70	450	1,000	< 0.003	0.011	0.042	< 0.001	< 0.0005	< 0.005	< 0.001	1.2	< 0.0005	0.021	< 0.0002	0.24	1.84	< 0.0025	< 0.002
	5/25/2017	11	110	180	1.4	7.67	430	1,100	< 0.006	0.019	0.078	^ < 0.002	< 0.001	< 0.01	< 0.002	1.4	< 0.001	0.04	< 0.0002	0.45	1.76	< 0.005	< 0.004
	7/7/2017	6.6	54	190	1.3	7.48	410	1,100	< 0.003	0.011	0.039	< 0.001	< 0.0005	< 0.005	< 0.001	1.3	< 0.0005	0.021	< 0.0002	0.26	1.59	< 0.0025	< 0.002
G30S down-gradient	9/26/2017	6.7	62	190	1.3	8.07	460	1,100	< 0.003	0.011	0.041	< 0.001	< 0.0005	< 0.005	< 0.001	1.3	< 0.0005	0.021	< 0.0002	0.2	1.41	< 0.0025	< 0.002
	11/20/2017	6.1	52	210	1.3	7.77	440	1,100	< 0.003	0.01	0.04	< 0.001	< 0.0005	< 0.005	< 0.001	1.3	< 0.0005	0.019	< 0.0002	0.19	1.73	< 0.0025	< 0.002
	3/7/2018	5.1	56	200	1.3	7.97	470	1,100	< 0.003	0.011	0.043	< 0.001	< 0.0005	< 0.005	< 0.001	1.3	< 0.0005	0.019	< 0.0002	0.14	1.94	< 0.0025	< 0.002
	5/17/2018	5.7	55	210	1.2	7.77	540	1,100	NA	0.011	0.043	NA	NA	NA	< 0.001	1.2	< 0.0005	0.021	NA	0.13	1.57	F1 < 0.0025	NA
	12/15/2018	5.8	57	200	1.2	7.99	200	1,100	NA	0.0069	0.041	NA	NA	NA	< 0.001	1.2	< 0.0005	0.022	NA	0.065	2.04	< 0.0025	NA
	6/26/2019	5.4	57	220	1.1	7.98	350	1,100	NA	0.0074	0.041	NA	NA	NA	< 0.001	1.1	< 0.0005	0.018	NA	0.065	1.18	F1 < 0.0025	NA
	11/6/2019	4.5	58	210	1.1	7.99	350	1,100	NA	0.01	0.041	NA	NA	NA	< 0.001	1.1	< 0.0005	0.019	NA	0.013	1.620	0.01	NA
	6/25/2020	4.9	57	220	1.1	8.33	410	1,100	NA	0.0053	0.042	NA	NA	NA	< 0.001	1.1	< 0.0005	0.019	NA	0.02	2.19	< 0.0025	NA
	12/7/2020	5.3	57	220	1.2	7.83	450	1,100	NA	0.0044	0.043	NA	NA	NA	< 0.001	1.2	< 0.0005	0.024	NA	0.018	2.16	< 0.0025	NA
	6/30/2021	5.9 B	61	200	1.1	7.88	470	1,100	3	< 0.017	0.048	U ^1+ 1	< 0.5	< 5	< 0.001	1.1	< 0.0005	0.024	< 0.00020	0.017	DNYA	< 0.0025	< 2

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

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

B - Compound was found in the blank and sample.

Table 1. Groundwater Analytical Results - Midwest Generation, LLC, Joliet #9 Generating Station, 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 Combined	Selenium	Thallium
R32S down-gradient	11/19/2015	1.3	99	88	0.28	7.32	210	640	< 0.003	0.0018	0.033	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.28	< 0.0005	0.04	< 0.0002	0.16	1.928	< 0.0025	< 0.002
	5/5/2016	1.9	100	140	0.32	7.38	210	810	< 0.003	0.0034	0.039	< 0.001	< 0.0005	< 0.005	< 0.001	0.32	0.0005	0.069	< 0.0002	0.29	2.26	< 0.0025	< 0.002
	6/29/2016	2.5	110	110	0.35	7.53	280	860	< 0.003	0.0021	0.042	< 0.001	< 0.0005	< 0.005	< 0.001	0.35	< 0.0005	0.065	< 0.0002	0.43	2.12	< 0.0025	< 0.002
	8/26/2016	3.0	120	100	0.4	7.30	330	850	< 0.003	0.0014	0.043	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.4	< 0.0005	0.056	< 0.0002	0.48	2.39	< 0.0025	< 0.002
	11/18/2016	3.3	120	99	0.34	7.38	270	830	< 0.003	0.0016	0.042	< 0.001	< 0.0005	< 0.005	< 0.001	0.34	< 0.0005	0.063	< 0.0002	0.55	3.17	< 0.0025	< 0.002
	2/16/2017	F1 4.0	120	99	0.34	7.39	340	830	< 0.003	0.002	0.039	< 0.001	< 0.0005	< 0.005	< 0.001	0.34	< 0.0005	0.064	< 0.0002	0.57	1.76	F1 < 0.0025	< 0.002
	5/25/2017	8.3	240	88	0.42	7.54	320	850	< 0.006	0.0042	0.075	^ < 0.002	< 0.001	< 0.01	< 0.002	0.42	< 0.001	0.14	< 0.0002	1.4	1.82	< 0.005	< 0.004
	7/7/2017	6.2	120	96	0.42	7.61	360	830	< 0.003	0.0043	0.04	< 0.001	< 0.0005	< 0.005	< 0.001	0.42	< 0.0005	0.1	< 0.0002	0.87	2.08	< 0.0025	< 0.002
	9/28/2017	4.8	140	78	0.36	7.29	290	870	< 0.003	0.003	0.044	< 0.001	< 0.0005	< 0.005	< 0.001	0.36	< 0.0005	0.086	< 0.0002	0.57	1.79	< 0.0025	< 0.002
	11/21/2017	5.7	120	97	0.38	7.50	390	900	< 0.003	0.0037	0.041	< 0.001	< 0.0005	< 0.005	< 0.001	0.38	< 0.0005	0.11	< 0.0002	0.74	1.82	< 0.0025	< 0.002
	3/7/2018	5.8	130	86	0.32	7.57	350	880	< 0.003	0.0029	0.042	< 0.001	< 0.0005	< 0.005	< 0.001	0.32	< 0.0005	0.11	< 0.0002	0.67	2.56	< 0.0025	< 0.002
	5/21/2018	4.4	120	77	0.29	7.13	310	1,000	NA	0.0024	0.04	NA	NA	NA	< 0.001	0.29	< 0.0005	0.1	NA	0.64	2.22	< 0.0025	NA
	12/13/2018	3.5	120	F1 72	0.26	7.43	280	880	NA	0.0019	0.043	NA	NA	NA	< 0.001	0.260	0.0017	0.080	NA	0.560	2.23	< 0.0025	NA
	6/27/2019	6.3	140	74	0.27	7.33	380	880	NA	0.0027	0.041	NA	NA	NA	< 0.001	0.270	< 0.0005	0.090	NA	0.810	2.67	< 0.0025	NA
	11/6/2019	4.8	150	69	0.27	7.45	360	820	NA	< 0.01	0.039	NA	NA	NA	< 0.001	0.270	< 0.0005	0.13	NA	0.580	2.370	< 0.0100	NA
	6/29/2020	6.0	130	71	0.28	7.47	400	790	NA	0.0021	0.038	NA	NA	NA	< 0.001	0.28	< 0.0005	0.11	NA	0.64	3.92	< 0.0025	NA
	12/16/2020	6.1	150	F1 66	0.34	7.43	430	840	NA	0.0025	0.038	NA	NA	NA	< 0.001	0.34	^+< 0.0005	0.11	NA	0.75	3.22	F1 < 0.0025	NA
	6/28/2021	4.0 B	130	56	0.3	7.16	430	790	< 3	< 0.001	0.036	< 1	< 0.5	< 5	< 0.001	0.3	< 0.0005	0.071	< 0.00020	0.53	DNYA	< 0.0025	< 2
G44S down-gradient	11/20/2015	1.0	120	43	0.21	7.11	220	640	< 0.003	0.0012	0.053	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.21	< 0.0005	0.017	< 0.0002	0.1000	1.161	< 0.0025	< 0.002
	5/9/2016	0.91	110	37	0.18	7.39	120	690	< 0.003	< 0.001	0.049	< 0.001	< 0.0005	< 0.005	< 0.001	0.18	< 0.0005	0.015	< 0.0002	0.046	< 0.415	< 0.0025	< 0.002
	6/30/2016	0.69	100	32	0.18	7.59	99	620	< 0.003	< 0.001	0.044	< 0.001	< 0.0005	< 0.005	< 0.001	0.18	< 0.0005	0.014	< 0.0002	0.025	0.879	< 0.0025	< 0.002
	8/26/2016	0.9	120	36	0.19	7.12	110	710	< 0.003	< 0.001	0.053	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.19	< 0.0005	0.014	< 0.0002	0.047	0.816	< 0.0025	< 0.002
	11/16/2016	0.82	120	26	0.17	7.15	88	530	< 0.003	< 0.001	0.048	< 0.001	< 0.0005	< 0.005	< 0.001	0.17	< 0.0005	0.011	< 0.0002	0.041	0.475	< 0.0025	< 0.002
	2/16/2017	0.86	120	30	0.15	7.38	120	620	< 0.003	< 0.001	0.051	< 0.001	< 0.0005	< 0.005	< 0.001	0.15	< 0.0005	0.014	< 0.0002	0.044	0.729	< 0.0025	< 0.002
	5/24/2017	0.83	120	31	0.19	7.08	95	600	< 0.003	< 0.001	0.048	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.19	< 0.0005	0.011	< 0.0002	0.031	1.02	< 0.0025	< 0.002
	7/10/2017	0.83	110	30	< 0.1	7.00	110	700	< 0.003	< 0.001	0.049	< 0.001	< 0.0005	< 0.005	< 0.001	< 0.1	< 0.0005	0.012	< 0.0002	0.061	0.667	< 0.0025	< 0.002
	9/28/2017	0.99	130	30	0.19	7.13	100	730	< 0.003	< 0.001	0.048	< 0.001	< 0.0005	< 0.005	< 0.001	0.19	< 0.0005	0.014	< 0.0002	0.081	0.614	< 0.0025	< 0.002
	11/21/2017	0.79	110	35	0.18	7.06	120	640	< 0.003	< 0.001	0.051	< 0.001	< 0.0005	< 0.005	< 0.001	0.18	< 0.0005	0.016	< 0.0002	0.055	0.913	< 0.0025	< 0.002
	3/7/2018	0.91	120	36	0.18	7.19	110	670	< 0.003	0.0014	0.053	< 0.001	< 0.0005	< 0.005	< 0.001	0.18	< 0.0005	0.017	< 0.0002	0.049	1.31	< 0.0025	< 0.002
	5/17/2018	0.98	120	35	0.18	7.02	96	780	NA	< 0.001	0.054	NA	NA	NA	< 0.001	0.18	< 0.0005	0.016	NA	0.071	0.714	< 0.0025	NA
	12/10/2018	1.1	120	43	0.19	7.41	78	630	NA	< 0.001	0.057	NA	NA	NA	< 0.001	0.19	< 0.0005	0.019	NA	0.14	0.454	< 0.0025	NA
	6/19/2019	1.3	130	59	0.19	7.02	140	720	NA	< 0.001	0.062	NA	NA	NA	< 0.001	0.19	< 0.0005	0.023	NA	0.13	0.841	< 0.0025	NA
	11/12/2019	1.3	140	53	0.21	7.22	160	670	NA	< 0.01	0.065	NA	NA	NA	< 0.001	0.21	< 0.0005	0.026	NA	0.20	1.01	< 0.01	NA
	6/29/2020	1.4	130	52	0.21	7.30	160	670	NA	< 0.001	0.06	NA	NA	NA	< 0.001	0.21	< 0.0005	0.024	NA	0.15	1.860	< 0.0025	NA
	12/15/2020	1.7	140	52	0.25	7.17	180	650	NA	< 0.001	0.062	NA	NA	NA	< 0.001	0.25	< 0.0005	0.03	NA	0.28	1.18	< 0.0025	NA
	6/302021	1.9 B	120	65	0.21	7	170	730	< 3	< 0.001	0.058	U ^1+ 1	< 0.5	< 5	< 0.001	0.21	< 0.0005	0.026	< 0.00020	0.22	DNYA	< 0.0025	< 2.0
G46S down-gradient	11/23/2015	6.0	110	80	0.27	7.32	430	780	< 0.003	0.0033	0.064	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.27	< 0.0005	0.073	< 0.0002	0.5	1.468	< 0.0025	< 0.002
	5/9/2016	7.7	100	100	0.28	7.77	360	940	< 0.003	0.0018	0.099	< 0.001	< 0.0005	< 0.005	< 0.001	0.28	0.0005	0.11	< 0.0002	0.7	1.85	< 0.0025	< 0.002
	6/30/2016	7.9	100	99	0.29	8.26	290	880	< 0.003	0.0014	0.098	< 0.001	< 0.0005	< 0.005	< 0.001	0.29	< 0.0005	0.13	< 0.0002	0.71	1.94	< 0.0025	< 0.002
	8/26/2016	7.2	100	120	0.35	7.48	350	1,000	< 0.003	0.0027	0.054	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.35	< 0.0005	0.12	< 0.0002	1.2	1.17	< 0.0025	< 0.002
	11/18/2016	6.5	110	120	0.39	7.56	330	1,000	< 0.003	0.0025	0.051	< 0.001	< 0.0005	< 0.005	< 0.0010	0.39	< 0.0005	0.13	< 0.0002	1.8	< 0.601	< 0.0025	< 0.002
	2/16/2017	6.1	100	150	0.41	7.94	410	1,000	< 0.003	0.0024	0.053	< 0.001	< 0.0005	< 0.005	< 0.0010	0.41	< 0.0005	0.091	< 0.0002	1.4	1.07	< 0.0025	< 0.002
	5/22/2017	6.8	100	130	0.44	7.37	350	970	< 0.003	0.0033	B 0.046	^ < 0.001	< 0.0005	< 0.005	< 0.0010	0.44	< 0.0005	0.11	< 0.0002	1.4	0.683	< 0.0025	< 0.002
	7/6/2017	4.9	100	150	0.41	7.33	290	880	< 0.003	0.0034	0.044	< 0.001	< 0.0005	< 0.005	0.0010	0.41	^ < 0.0005	0.076	< 0.0002	0.92	0.709	< 0.0025	^ < 0.002
	9/27/2017	4.9	88	160	0.4	7.28	270	890	< 0.003	0.0043	0.031	< 0.001	< 0.0005	< 0.005	< 0.0010	0.4	< 0.0005	0.091	< 0.0002	0.63	0.754	< 0.0025	< 0.002
	11/21/2017	5.3	78	170	0.43	7.73	270	800	< 0.003	0.0055	0.032	< 0.001	< 0.0005	< 0.005	< 0.0010	0.43	< 0.0005	0.11	< 0.0002	0.68	0.776	< 0.0025	< 0.002
	3/8/2018	5.9	110	140	0.41	7.75	350	940	< 0.003	0.0039	0.049	< 0.001	< 0.0005	< 0.005	< 0.0010	0.41	0.00053	0.093	< 0.0002	0.82	1.29	< 0.0025	< 0.002
	5/18/2018	5.9	110	120	0.4	7.66	260	1,100	NA	0.0028	0.048	NA	NA	NA	< 0.0010	0.4	< 0.0005	0.073	NA	0.84	1.07	< 0.0025	NA
	12/11/2018	7.60	120	110	0.38	7.66	270	1,100	NA	0.0023	0.055	NA	NA	NA	< 0.001	0.380	< 0.0005	0.096	NA	1.20	1.22	< 0.0025	NA
	6/19/2019	13	89	69	0.33	7.64	440	1,000	NA	0.014	0.040	NA	NA	NA	< 0.001	0.330	< 0.0005	0.22	NA	1.80	1.37	< 0.0025	NA
	11/13/2019	10	120	68	0.37	7.68	470	1,000	NA	< 0.050	0.041	NA	NA	NA	< 0.001	0.310	< 0.0050	0.11	NA	1.60	1.3	< 0.0100	NA
	6/29/2020	13	96	74	0.34	8.06	510	980	NA	0.075	0.05	NA	NA	NA	< 0.001	0.34	< 0.0050	0.23	NA	1.7	2.780	< 0.0025	NA
	12/15/2020	10	120	73	0.35	7.74	540	1,000	NA	0.27	0.075	NA	NA	NA	< 0.001	0.35	< 0.00085	0.21	NA	1.5	2.16	< 0.0025	NA
	6/30/2021	15 B	120	67	0.3	7.4	590	1,000	< 3	0.044	0.05	U ^1+ 1	< 0.5	< 5	< 0.001	0.3	< 0.0005	0.21	< 0.00020	1.6	DNYA	< 0.0025	< 2
G47S down-gradient	11/23/2015	4.6	11	160	0.45	9.22	480	700	< 0.003	0.018	0.018	^ < 0.001	< 0.0005	< 0.005	< 0.001	0.45	< 0.0005	0.036	< 0.0002	0.32	0.898	0.003	< 0.002
	5/6/2016	5.0	7.8	140	0.72	9.86	410	910	< 0.003	0.034	0.017	< 0.001	< 0.0005	< 0.005	< 0.001	0.72	< 0.0005	0.033	< 0.0002	0.41	0.736	0.0033	< 0.002
	7/1/2016	6.4	8.4	150	0.68	9.32	340	860	< 0.003	0.022	0.019	< 0.001	^ < 0.0005	< 0.005	< 0.001	0.68	< 0.0005	0.038	< 0.0002	0.53	1.01	< 0.0025	< 0.002
	8/24/2016	9.3	9.2	140	0.67	9.19	300	830	< 0.003	0.017	0.023	< 0.001	< 0.0005	< 0.005	< 0.001	0.67	< 0.0005	0.028	< 0.0002	0.41	1.06	< 0.0025	< 0.002
	11/16/2016	15	1.3	F1 150	1.8	10.08	620	1,700	< 0.003	0.14	0.0091	< 0.001	< 0.0005	< 0.005	< 0.001	1.8	< 0.0005	0.015	< 0.0002	1.4	< 1.38	0.0038	< 0.002
	2/15/2017	7.6	4.4	160	1.1	9.26	540	1,200	< 0.003	0.059	0.016	< 0.001	< 0.0005	< 0.005	< 0.001	1.1	< 0.0005	< 0.05	< 0.0002	0.57	0.716	0.0035	< 0.002
	5/23/2017	18	0.93	160	2.2	10.03	720	1,800	< 0.003	0.18	0.0081	^ < 0.001	< 0.0005	< 0.005	< 0.001	2.2	< 0.0005	0.013	< 0.0002	1.3	< 0.361	0.0025	< 0.002
	7/10/2017	18	1.2	150	2.1	10.06	780	1,800	< 0.003	0.17	0.0085	< 0.001	< 0.0005	< 0.005	< 0.001	2.1	< 0.0005	0.013	< 0.0002	1.2	0.733	< 0.0025	< 0.002
	9/27/2017	18	1.1	150	2.0	10.15	750	1,900	< 0.003	0.21	0.0085	< 0.001	< 0.0005	< 0.005	< 0.001	2	< 0.0005	0.014	< 0.0002	1.3	0.836	0.0027	< 0.002
	11/22/2017	21	1.1	150	2.1	10.56	710	1,800	< 0.003	0.23	0.009	< 0.001	< 0.0005	< 0.005	< 0.001	2.1	< 0.0005	0.012	< 0.0002	1.5	0.692	0.0044	< 0.002
	3/8/2018	18	1.1	170	2.1	10.67	780	1,900	< 0.003	0.25	0.009	< 0.001	< 0.0005	< 0.005	< 0.001	2.1	< 0.0005	0.014	< 0.0002	1.4	0.790	0.0042	< 0.002
	5/18/2018	3.7	1.1	160	1.7	7.79	570	1,800	NA	0.23	0.0087	NA	NA	NA	< 0.001	1.7	< 0.0005	0.015	NA	1.5	1.01	0.0039	NA
	12/11/2018	13	2.8	140	1.1	10.14	440	1,300	NA	0.140	0.0110	NA	NA	NA	< 0.001	1.10	< 0.0005	0.023	NA	1.10	0.597	0.0031	NA
	6/28/2019	13	2.9	130	1.3	9.95	450	1,400	NA	0.13	0.0120	NA	NA	NA	< 0.001	1.30	< 0.0005	0.028	NA	1.00	0.566	< 0.0025	NA
	11/7/2019	4.3	15	140	0.55	8.39	410	1,100	NA	0.029	0.0170	NA	NA	NA	< 0.001	0.55	< 0.0050	0.053	NA	0.38	1.02	< 0.0100	NA
	6/30/2020	5.2	16	120	0.59	9.04	F1 440	1,000	NA	0.037	0.015	NA	NA	NA	< 0.001	0.59	< 0.0050	0.052	NA	0.46	1.240	0.004	NA
	12/7/2020	7.6	11	120	1.1	9.13	500	1,100	NA	0.066	0.012	NA	NA	NA	< 0.001	1.1	< 0.0005	0.047	NA	0.62	< 0.466	< 0.003	NA
	6/24/2021	6.1 B	12	110	0.66	8.68	470	1,000	< 0.003	0.04	0.013	< 0.001	< 0.0005	< 0.005	< 0.001	0.66	< 0.0005	0.05	U H 0.00020	0.48	DNYA	0.0027	< 0.002
G48S down-gradient	11/20/2015	11.00	6.9	120	1.5	9.08	760	1,100	< 0.003	0.03	0.015	^ < 0.001	< 0.0005	< 0.005	< 0.001	1.5	< 0.0005	0.015	< 0.0002	1.4	0.8512	< 0.0025	< 0.002
	5/5/2016	9.30	5.9	120	1.5	9.53	560	1,200	< 0.003	0.046	0.014	< 0.001	< 0.0005	< 0.005	< 0.001	1.5	< 0.0005	0.016	< 0.0002	1.2	0.800	< 0.0025	< 0.002
	7/1/2016	9.50	4.2	120	1.4	9.60	480	1,100	< 0.003	0.038	0.011	< 0.001	^ < 0.0005	< 0.005	< 0.001	1.4	< 0.0005	0.013	< 0.0002	1.2	1.01	< 0.0025	< 0.002
	8/24/2016	10.00	5.5	120	1.4	9.31	420	1,100	< 0.003	0.032	0.014	< 0.001	< 0.0005	< 0.005	< 0.001	1.4	< 0.0005	0.012	< 0.0002	1.1	1.16	< 0.0025	< 0.002
	11/16/2016	9.80	10	110	1.4	9.61	340	1,100	< 0.003	0.03	0.018	< 0.001	< 0.0005	< 0.005	< 0.001	1.4	< 0.0005	0.016	< 0.0002	1.1	1.65	< 0.0025	< 0.002
	9/27/2017	7.60	18	100	1.1	8.94	480	1,100	< 0.003	0.024	0.019	< 0.001	< 0.0005	< 0.005	< 0.001	1.1	< 0.0005	0.019	< 0.0002	0.72	1.32	< 0.0025	< 0.002
	11/22/2017	8.60	12	120	1.2	9.42	450	1,000	< 0.003	0.027	0.015	< 0.001	< 0.0005	< 0.005	< 0.001	1.2	< 0.0005	0.016	< 0.0002	0.77	1.27	< 0.0025	< 0.002
	3/8/2018	5.30	62	100	0.85	8.13	450	1,000	< 0.003	0.017	0.031	< 0.001	< 0.0005	< 0.005	< 0.001	0.85	< 0.0005	0.023	< 0.0002	0.51	2.30	< 0.0025	< 0.002
	5/18/2018	5.90	53	100	0.92	7.79	370	1,100	NA	0.022	0.023	NA	NA	NA	< 0.001	0.92	< 0.0005	0.023	NA	0.49	0.962	< 0.0025	NA
	12/11/2018	7.30	23	110	1.1	8.42	310	1,000	NA	0.023	0.016	NA	NA	NA	< 0.001	1.1	0.0049	0.019	NA	0.79	0.921	< 0.0025	NA
	6/25/2019	7.10	28	110	1.0	8.07	390	1,000	NA	0.022	0.018	NA	NA	NA	< 0.001	0.95	< 0.0005	0.022	NA	0.73	1.33	< 0.0025	NA
	11/7/2019	5.80	18	100	0.89	7.83	380	1,000	NA	0.012	0.027	NA	NA	NA	< 0.001	0.89	< 0.005	0.019	NA	0.59	1.24	< 0.01	NA
	6/26/2020	7.10	16	110	1.0	9.20	400	940	NA	0.022	0.017	NA	NA	NA	< 0.001	1.0	< 0.005	0.021	NA	0.54	0.971	< 0.0025	NA
	12/7/2020	6.00	29	110	1.1	8.4	410	890	NA	0.016	0.02	NA	NA	NA	< 0.001	1.1	< 0.0005	0.026	NA	0.41	2.00	< 0.0025	NA
	6/24/2021	4.3 B	96	96	0.71	7.27	480	1,100	< 0.003	0.0026	0.035	< 0.001	< 0.0005	< 0.005	< 0.001	0.71	< 0.0005	0.032	U H 0.00020	0.26	DNYA	< 0.0025	< 0.002

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

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

B - Compound was found in the blank and sample.

Table 9-5. Groundwater Turbidity - Midwest Generation, LLC, Joliet #9 Generating Station

Well ID	Date	Turbidity (NTU)
G45S	3/12/2021	0.87
	4/5/2021	0.33
	4/23/2021	0.54
	5/18/2021	0.36
	6/8/2021	0.64
	7/2/2021	1.4
	8/12/2021	0.36
	9/2/2021	0.46
T03S	3/15/2021	2.42
	4/1/2021	0.44
	4/22/2021	94
	5/17/2021	0.47
	6/7/2021	0.47
	7/1/2021	0.3
	8/12/2021	0.34
	9/1/2021	0.67
R08S	3/12/2021	0.19
	4/1/2021	0.46
	4/23/2021	0.34
	5/18/2021	0.24
	6/8/2021	0.2
	7/1/2021	0.17
	8/12/2021	0.58
	9/2/2021	0.42
G20S	3/12/2021	0.32
	4/1/2021	0.29
	4/22/2021	0.14
	5/18/2021	0.63
	6/8/2021	0.2
	7/1/2021	0.29
	8/12/2021	0.32
	9/2/2021	0.48
G30S	3/12/2021	0.05
	4/2/2021	0.14
	4/23/2021	0.25
	5/18/2021	0.43
	6/8/2021	0.61
	7/2/2021	0.48
	8/13/2021	0.31
	9/2/2021	0.48
R32S	3/12/2021	0.42
	4/5/2021	0.81
	4/23/2021	1.23
	5/18/2021	1.78
	6/8/2021	1.14
	7/2/2021	0.42
	8/13/2021	0.57
	9/30/2021	0.39
G44S	3/15/2021	3.66
	4/5/2021	3.89
	4/23/2021	3.31
	5/18/2021	1.41
	6/8/2021	1.42
	7/2/2021	1.37
	8/12/2021	1.56
	9/2/2021	1.38
G46S	3/15/2021	18.4
	4/5/2021	106.5
	4/23/2021	59.2
	5/18/2021	181
	6/8/2021	3140
	7/1/2021	11.6
	8/12/2021	112
	9/2/2021	43.3
G47S	3/15/2021	0.12
	4/5/2021	0.1
	4/22/2021	0.16
	5/18/2021	0.14
	6/8/2021	0.53
	8/13/2021	0.18
	9/2/2021	0.68
G48S	3/15/2021	0.47
	4/5/2021	0.14
	4/22/2021	0.22
	5/18/2021	0.44
	6/8/2021	0.24
	7/1/2021	0.91
	8/13/2021	0.23
	9/2/2021	0.63

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

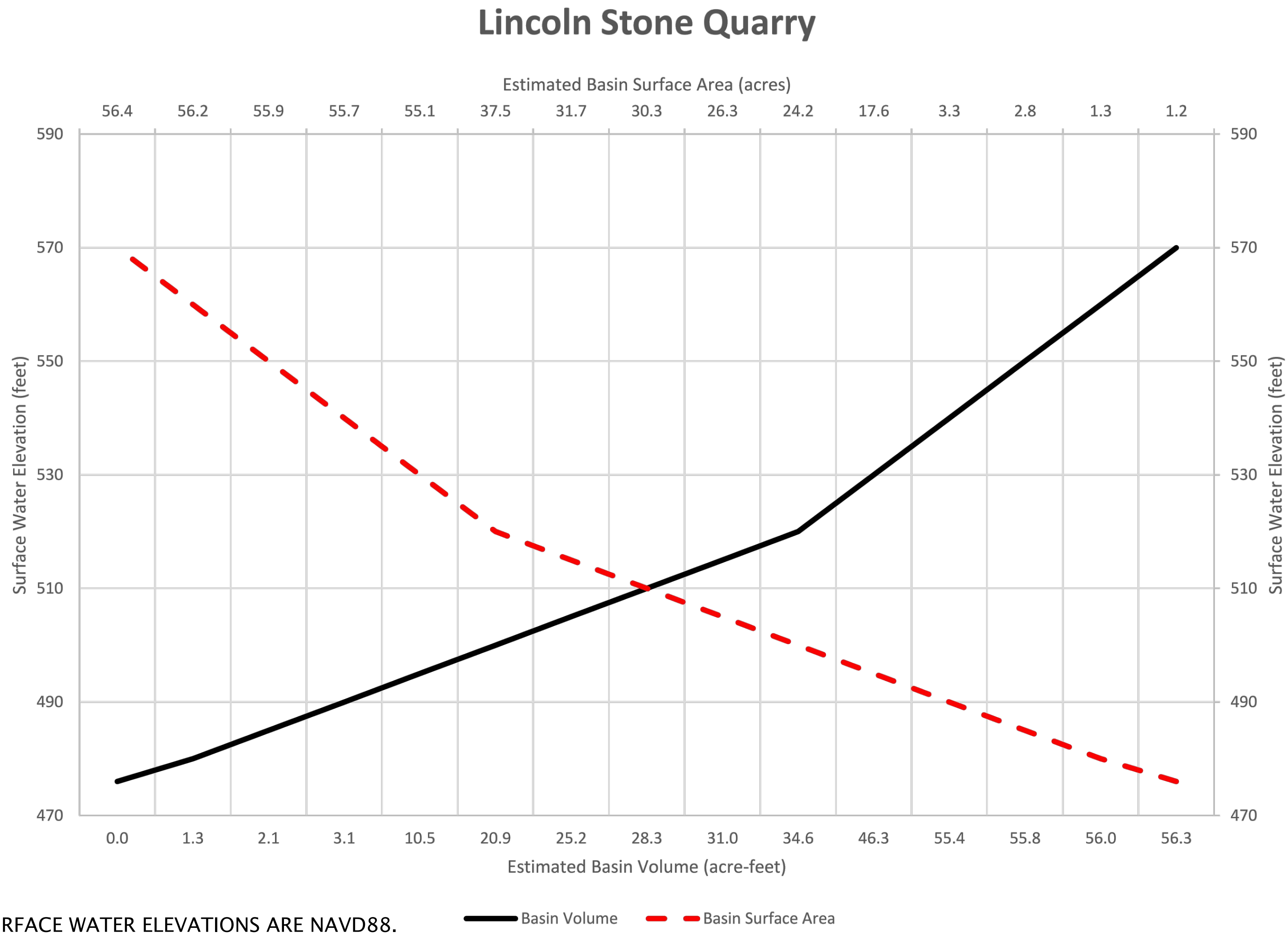
Notes: It is noted that some parameters may be combined with others within the same container.
* - The result for pH is obtained in the field and is not submitted to the laboratory.
** - Combined Radium 226/228
mL - milliliters
L - liters
°C - degrees Celsius
HNO_3 - Nitric Acid
NS- No Standard

Table 9-7. Proposed Site-Specific Groundwater Protection Standards - Joliet #9 Lincoln Stone Quarry

Upgradient Well(s)	Parameter	Section 845.600 Standards	Interwell Background Prediction Limit	**Proposed GWPS**
G45S and T03S Pooled	Antimony	0.006	0.003	**0.006**
T03S	Arsenic	0.01	0.003	**0.01**
G45S	Barium	2	0.05	**2**
G45S and T03S Pooled	Beryllium	0.004	0.001	**0.004**
G45S	Boron	2.0	1.039	**2**
G45S and T03S Pooled	Cadmium	0.005	0.001	**0.005**
G45S	Chloride	200	232.4	**232.4**
G45S and T03S Pooled	Chromium	0.1	0.005	**0.1**
G45S	Cobalt	0.006	0.001	**0.006**
T03S	Combined Radium 226 + 228 (pCi/L)	5.0	1.922	**5.0**
G45S	Fluoride	4.0	0.389	**4.0**
G45S and T03S Pooled	Lead	0.0075	0.0023	**0.0075**
G45S	Lithium	0.04	0.042	**0.042**
G45S and T03S Pooled	Mercury	0.002	0.0002	**0.002**
G45S	Molybdenum	0.10	0.014	**0.10**
G45S and T03S Pooled	pH (standard units)	6.5-9.0	6.85-7.62	**6.5-9.0**
G45S and T03S Pooled	Selenium	0.05	0.003	**0.05**
G45S	Sulfate	400	369.6	**400**
G45S and T03S Pooled	Thallium	0.002	0.002	**0.002**
G45S	Total Dissolved Solids	1200	1053	**1200**
G45S	Calcium	NE	138.4	**138.4**
G45S and T03S Pooled	Turbidity	NE	94	**94**

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

<u>OPERATING PERMIT FIGURES</u>



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 KPRG AND ASSOCIATES, INC. AS PART OF COMPLETING THE OPERATING PERMIT N ACCORDANCE WITH TITLE 35 PART 845.

ENVIRONMENTAL CONSULTATION & REMEDIATION

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

LINCOLN STONE QUARRY AREA-CAPACITY CURVE	
JOLIET 9 STATION JOLIET, ILLINOIS	
Scale: NTS	Date: October 15, 2021
KPRG Project No. 19520.3	FIGURE 1

W:\projects\midwest generation\operating-constructing permits\joliet 9\area-capacity curve.dwg

W:\c.projects\midwest generation\lincoln quarry gw monitoring\permit well map 4-4-14.dwg

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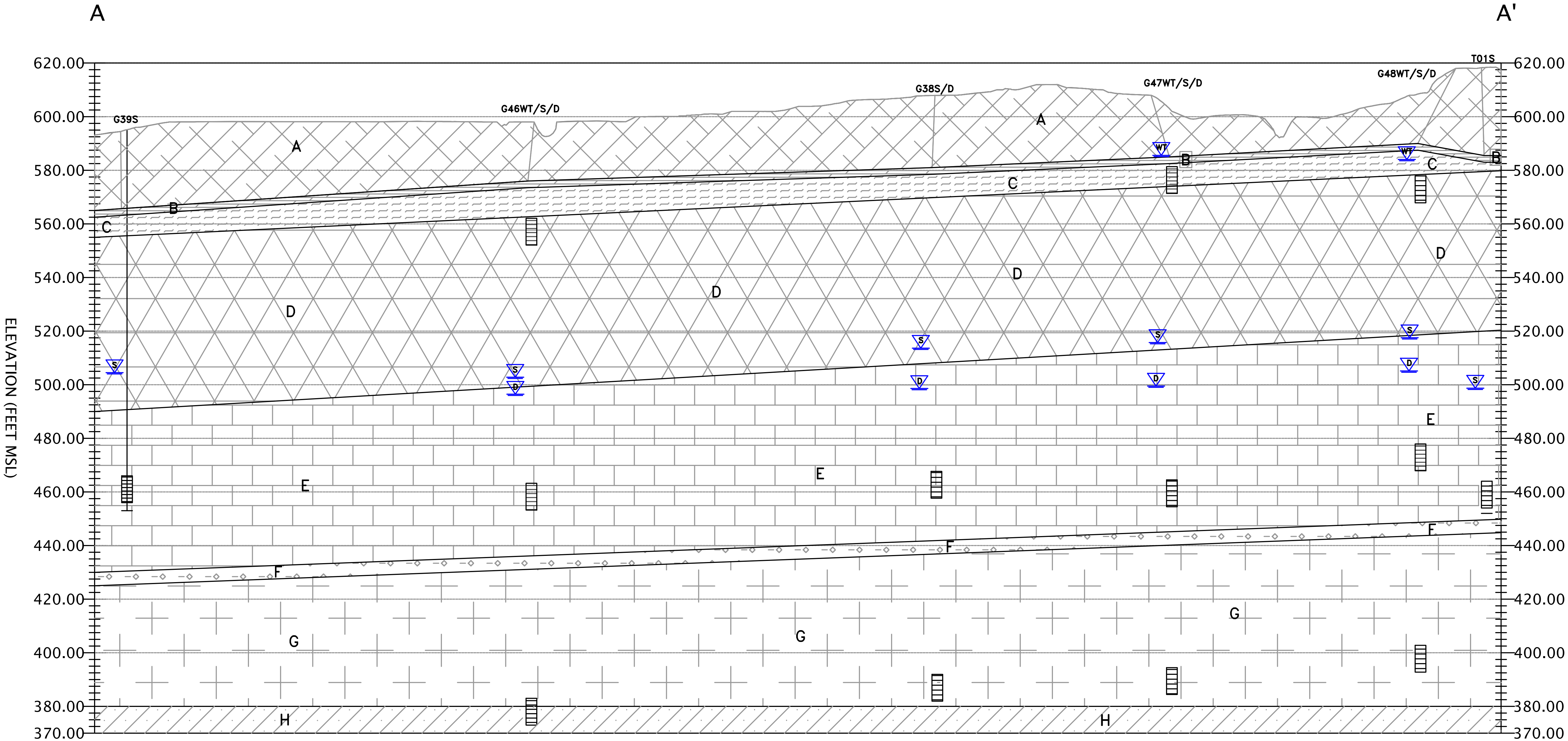
CCR MONITORING WELL SITE MAP

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450'	Date: January 2, 2018
KPRG Project No. 21406.12	FIGURE 9-1



LEGEND

A	UNCONSOLIDATED OVERBURDEN
B	WEATHERED DOLOMITE
C	JOLIET FORMATION DOLOMITE
D	KANKAKEE FORMATION DOLOMITE
E	ELWOOD/WILHELMI DOLOMITE
F	BRAINARD SHALE
G	FORT ATKINSON DOLOMITE
H	SCALES SHALE
WT	WT–WELLS WATER LEVEL (5/21)
D	D–WELLS WATER LEVEL (5/21)
S	S–WELLS WATER LEVEL (5/21)
— — —	PROJECTED POND OUTLINE

40'
0
200'
APPROXIMATE SCALE

ENVIRONMENTAL CONSULTATION & REMEDIATION

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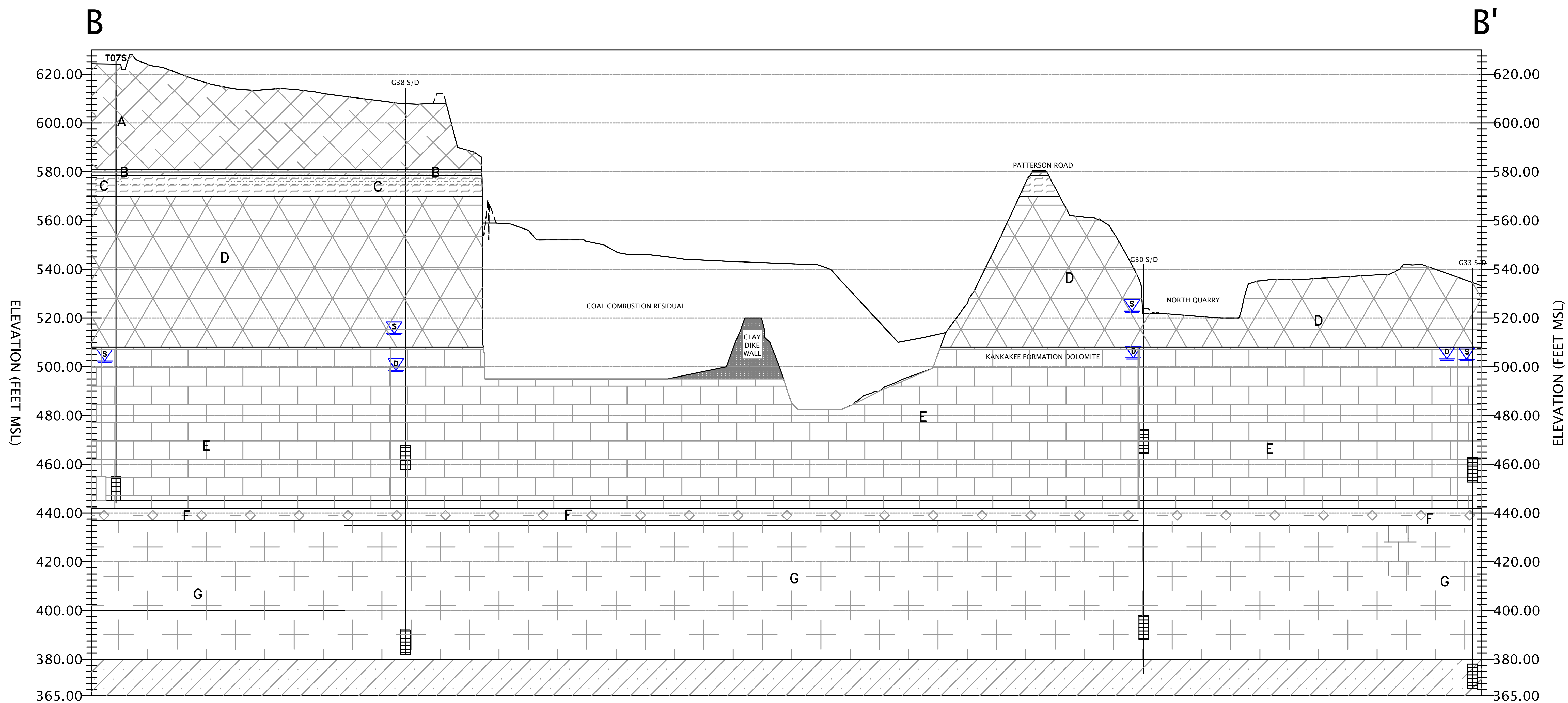
CROSS SECTION A–A'

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

SEE SCALE	Date: October 14, 2021
KPRG Project No. 19520.4	FIGURE 9–2



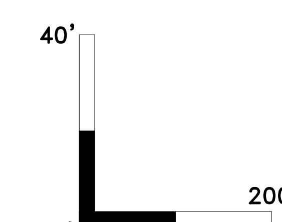
LEGEND

A	UNCONSOLIDATED OVERBURDEN	F	BRAINARD SHALE
B	WEATHERED DOLOMITE	G	FORT ATKINSON DOLOMITE
C	JOLIET FORMATION DOLOMITE	H	SCALES SHALE
D	KANKAKEE FORMATION DOLOMITE		
E	ELWOOD/WILHELMI DOLOMITE		

WT — WT-WELLS WATER LEVEL (5/21)

D — D-WELLS WATER LEVEL (5/21)

S — S-WELLS WATER LEVEL (5/21)



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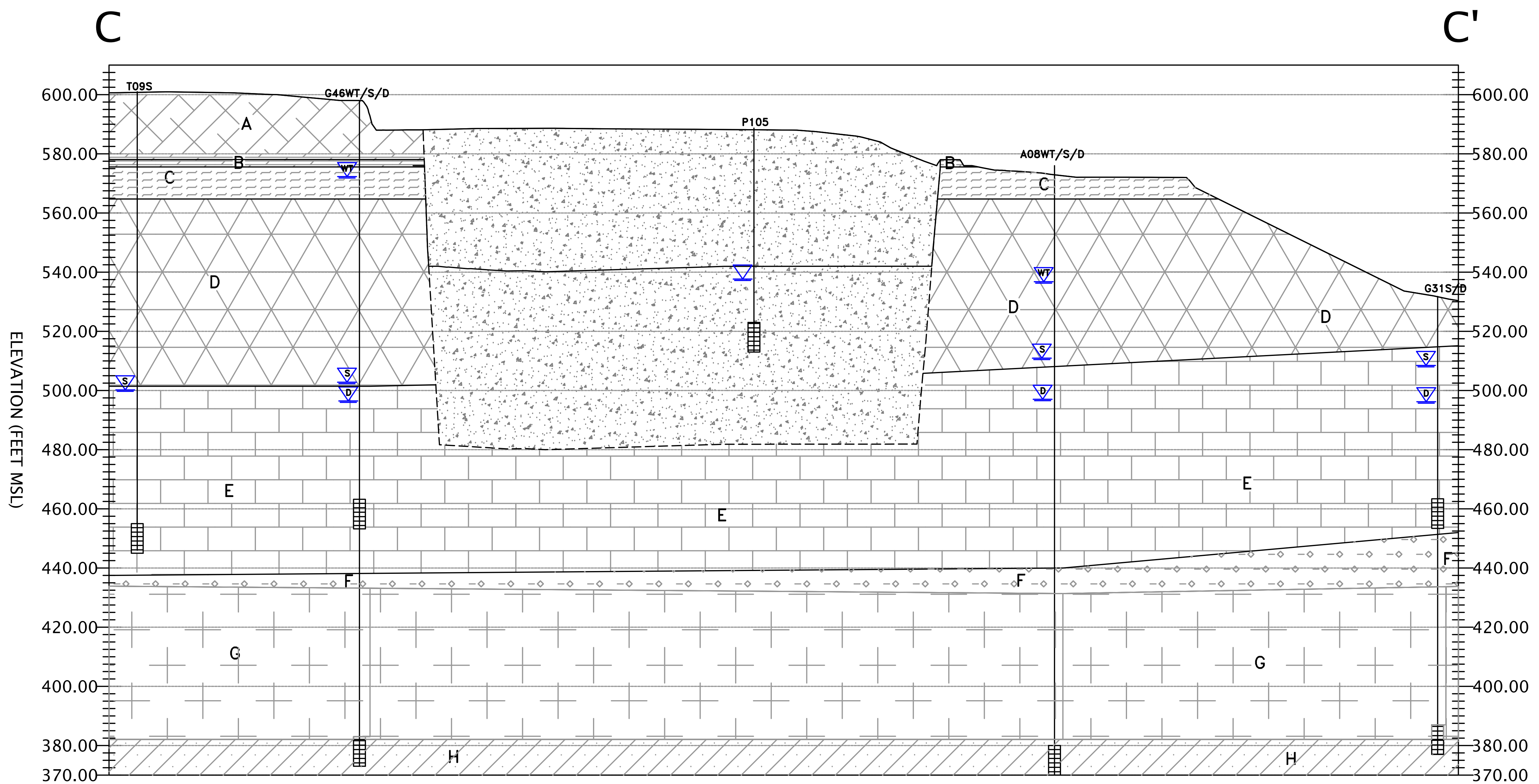
CROSS SECTION B–B'

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

SEE SCALE	Date: October 14, 2021
KPRG Project No. 19520.4	FIGURE 9–3



LEGEND

A	UNCONSOLIDATED OVERBURDEN
B	WEATHERED DOLOMITE
C	JOLIET FORMATION DOLOMITE
D	KANKAKEE FORMATION DOLOMITE
E	ELWOOD/WILHELMI DOLOMITE
F	BRAINARD SHALE
G	FORT ATKINSON DOLOMITE
H	SCALES SHALE
WT	WT–WELLS WATER LEVEL (5/21)
D	D–WELLS WATER LEVEL (5/21)
S	S–WELLS WATER LEVEL (5/21)
- - - - - - - -	PROJECTED POND OUTLINE

40'
200'
0
APPROXIMATE SCALE

ENVIRONMENTAL CONSULTATION & REMEDIATION

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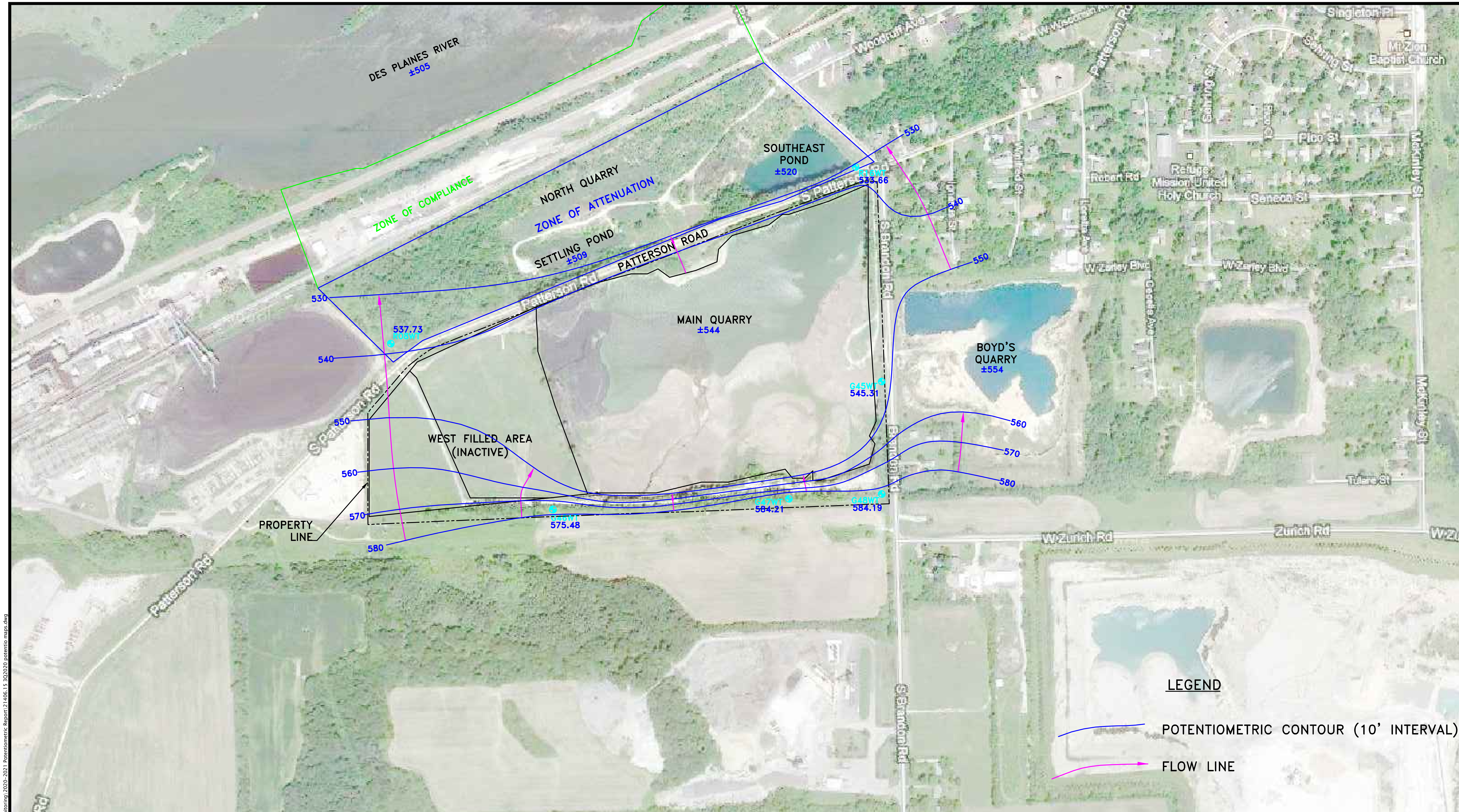
CROSS SECTION C–C'

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

SEE SCALE	Date: October 14, 2021
KPRG Project No. 19520.4	FIGURE 9–4



Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'
APPROXIMATE SCALE

N

ENVIRONMENTAL CONSULTATION & REMEDIATION

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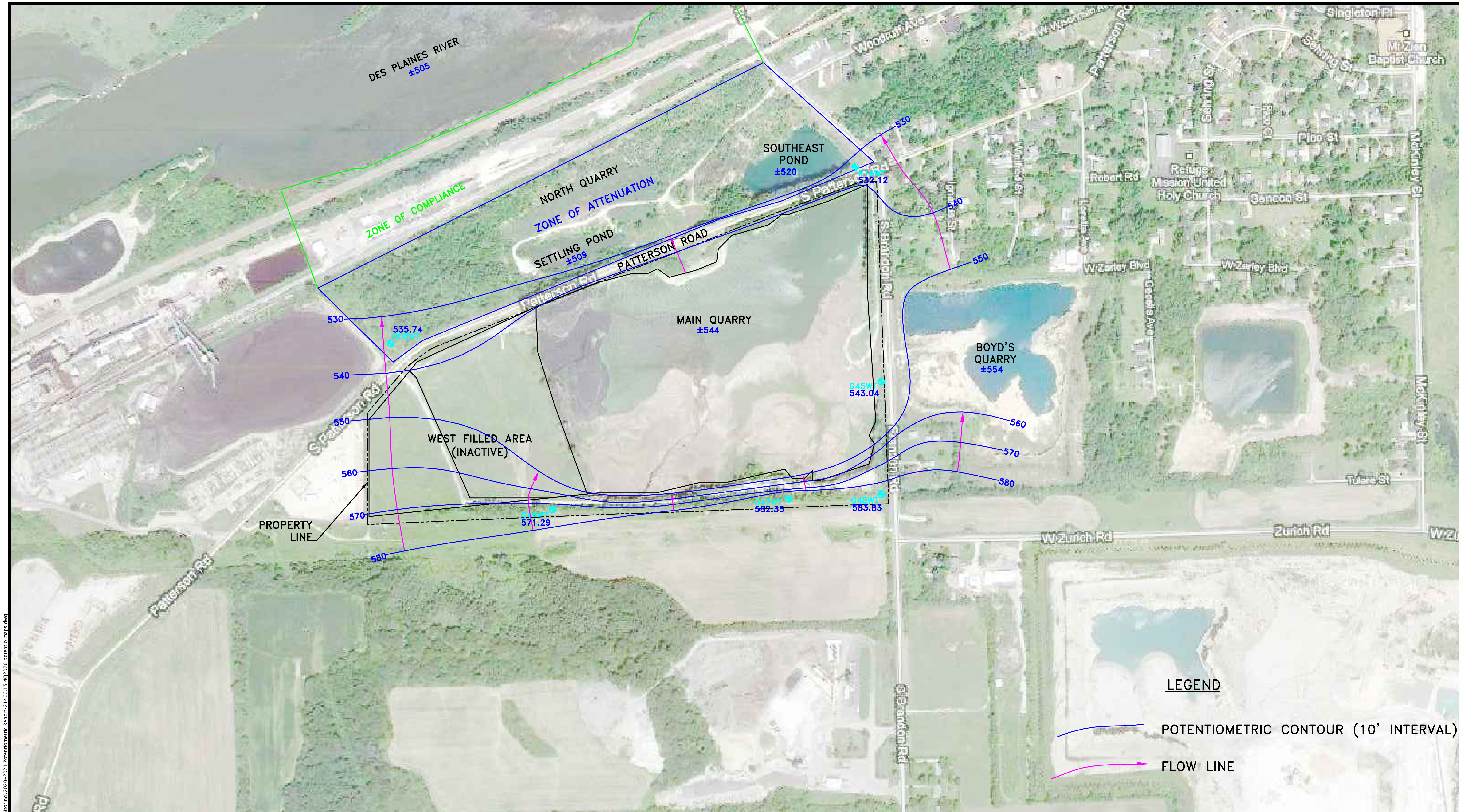
WATER TABLE POTENTIOMETRIC SURFACE MAP
JULY/AUGUST 2020

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450'	Date: June 16, 2021
KPRG Project No. 21406.15	FIGURE 9-5

w:\Projects\Midwest Generation\Lincoln Quarry GW Monitoring\2020-2021 Potentiometric Report 21406.15 3Q2020 potentio maps.dwg



Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'
APPROXIMATE SCALE

N

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG

KPRG and Associates, inc.

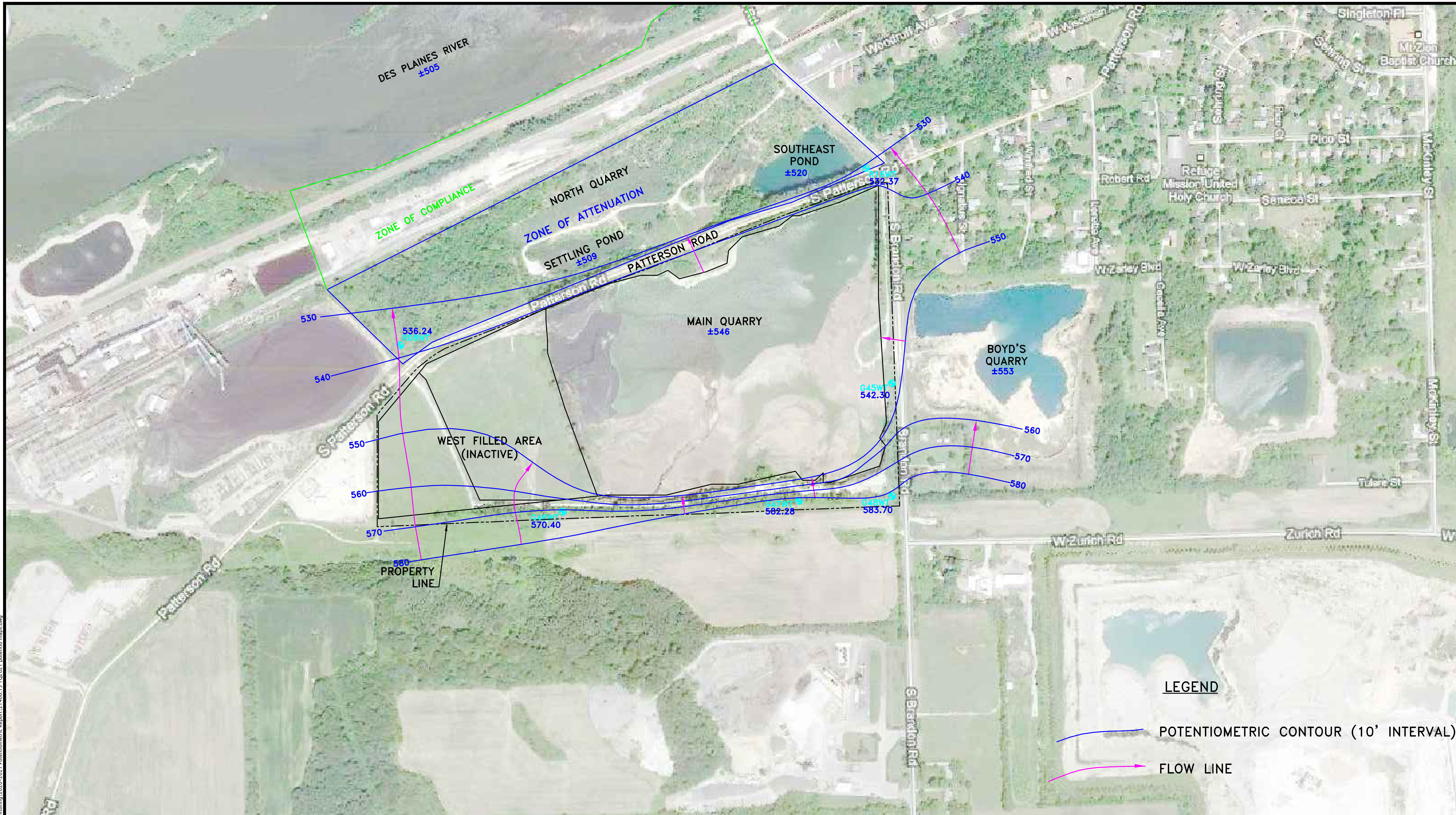
414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630-325-1300 Facsimile 630-325-1593

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

WATER TABLE POTENTIOMETRIC SURFACE MAP
OCTOBER/NOVEMBER 2020

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450'	Date: June 17, 2021
KPRG Project No. 21406.15	FIGURE 9-6



Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'

APPROXIMATE SCALE

N

ENVIRONMENTAL CONSULTATION & REMEDIATION

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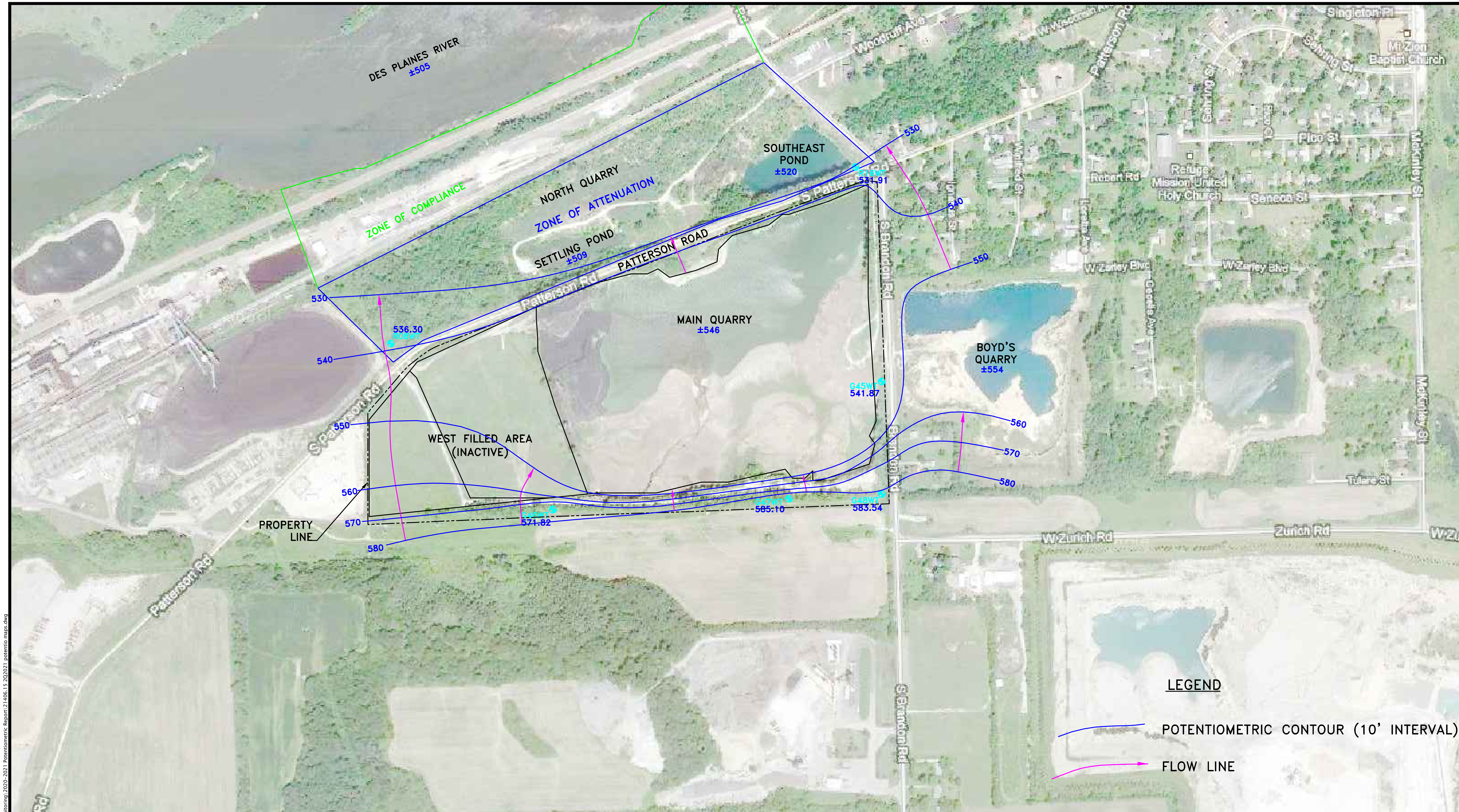
WATER TABLE POTENTIOMETRIC SURFACE MAP
JANUARY/FEBRUARY 2021

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450'	Date: June 17, 2021
KPRG Project No. 21406.15	FIGURE 9-7



Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'
APPROXIMATE SCALE

N

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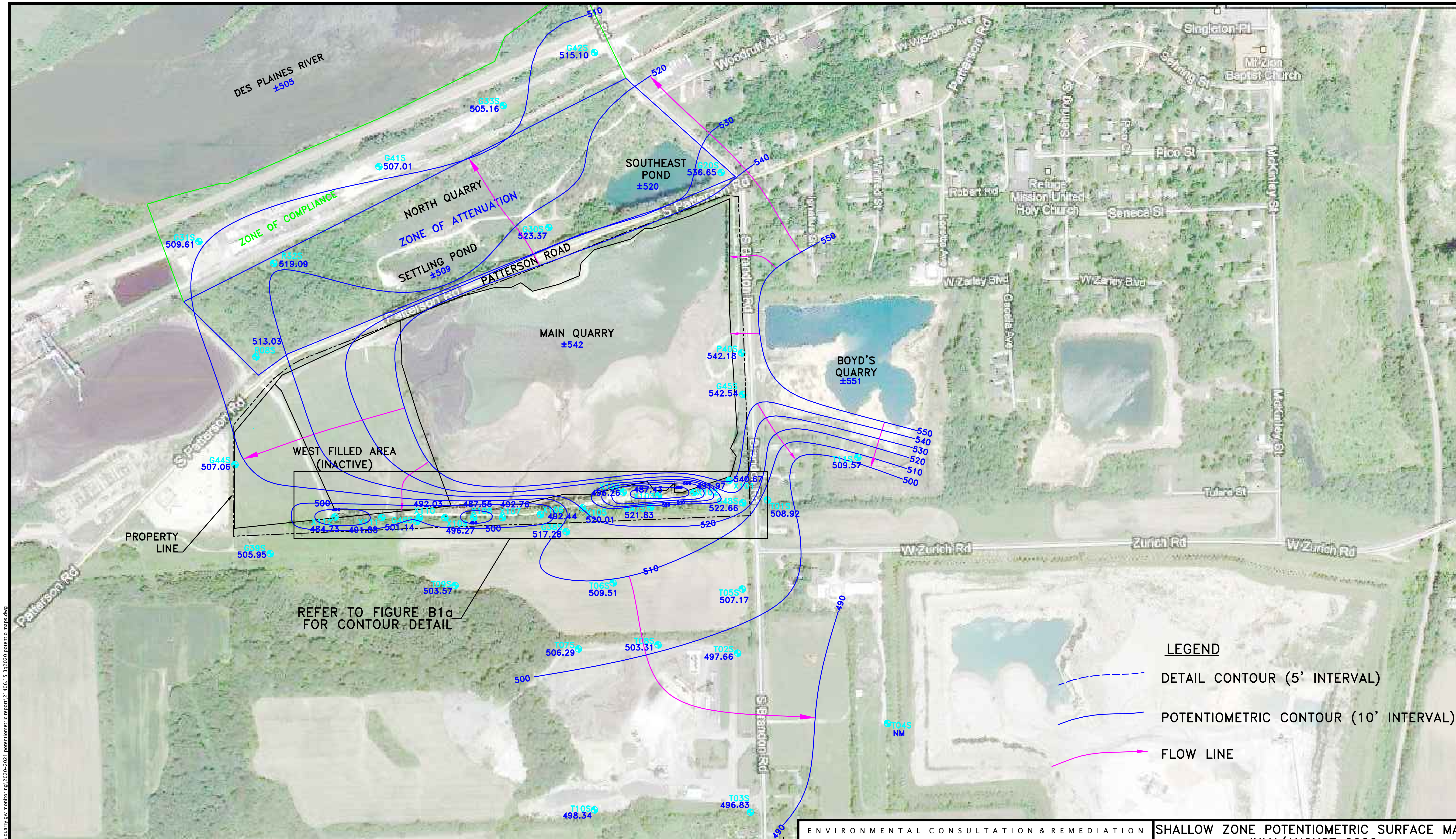
WATER TABLE POTENTIOMETRIC SURFACE MAP
APRIL/MAY 2021

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450'	Date: June 17, 2021
KPRG Project No. 21406.14	FIGURE 9-8

w:\Projects\Midwest Generation\Lincoln Quarry GW Monitoring\2020-2021 Potentiometric Report 21406.15 2Q2021 potentio maps.dwg



Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'
APPROXIMATE SCALE

N

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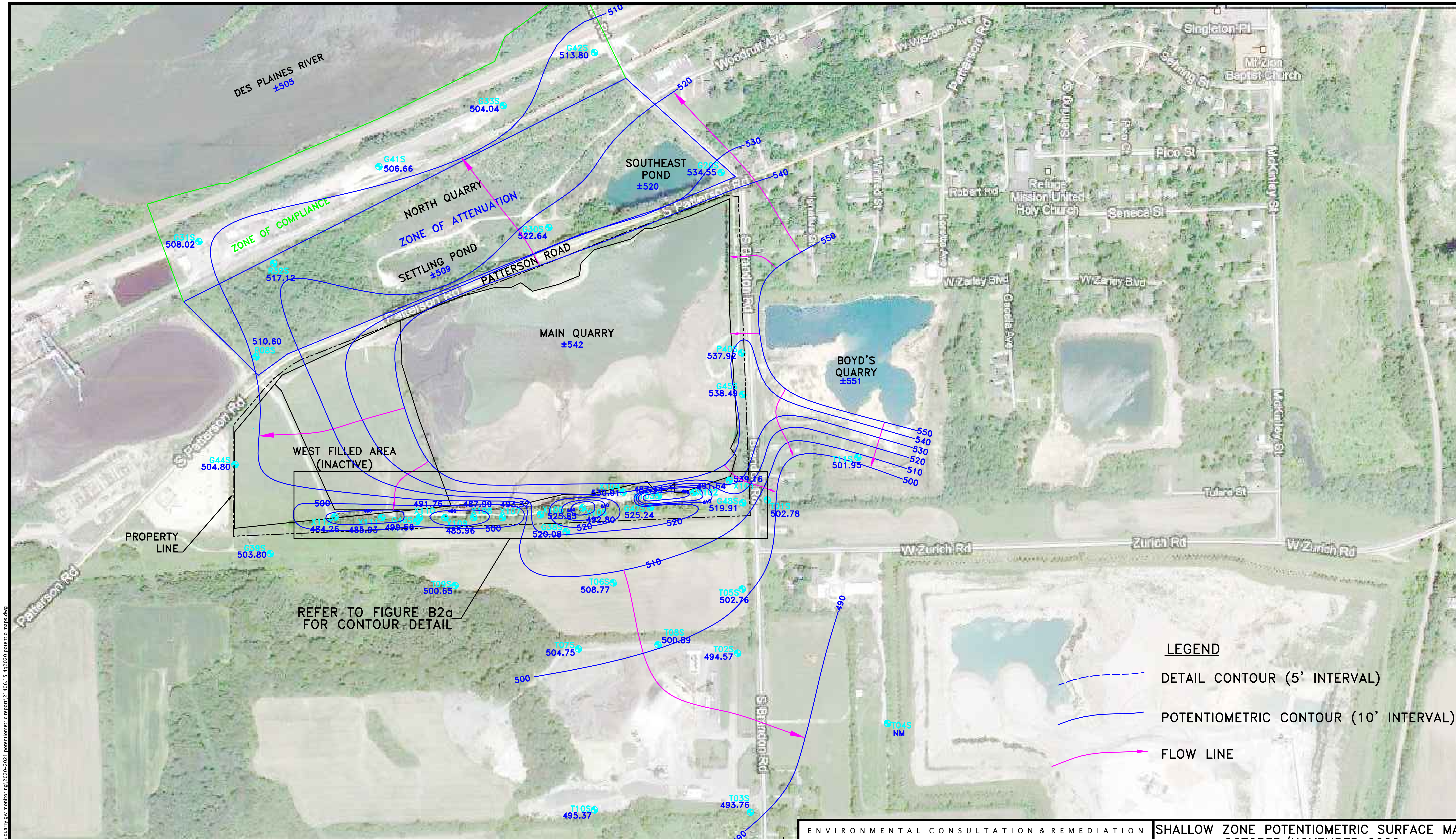
SHALLOW ZONE POTENTIOMETRIC SURFACE MAP JULY/AUGUST 2020	
LINCOLN STONE QUARRY JOLIET, ILLINOIS	
Scale: 1" = 450'	Date: June 23, 2021
KPRG Project No. 21406.15	FIGURE 9-9



Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

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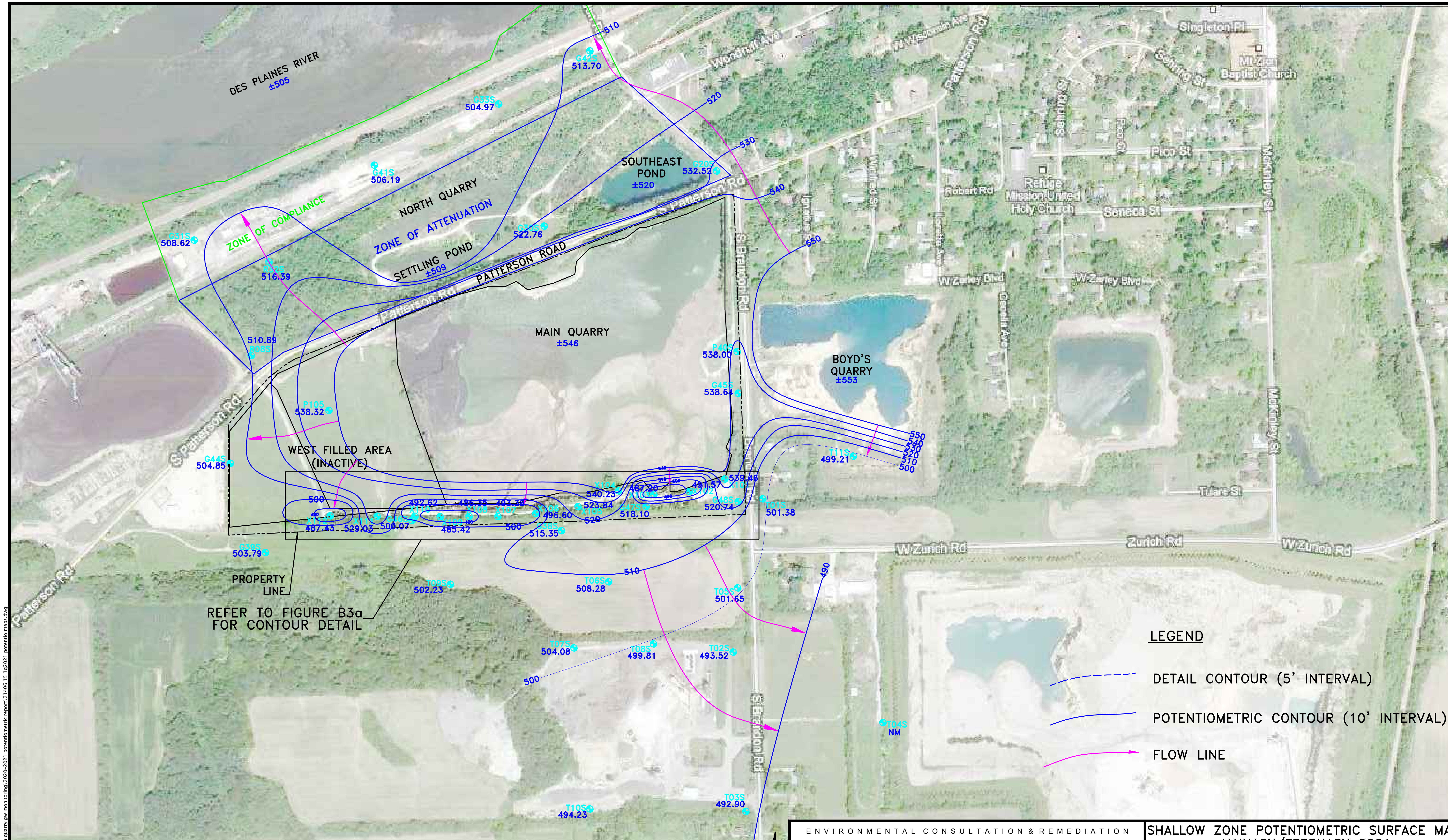
SHALLOW ZONE POTENTIOMETRIC SURFACE MAP OCTOBER/NOVEMBER 2020	
LINCOLN STONE QUARRY JOLIET, ILLINOIS	
Scale: 1" = 450'	Date: June 23, 2021
KPRG Project No. 21406.15	FIGURE 9-10

W:\projects\midwest generation\lincoln quarry gw monitoring\2020-2021 potentiometric report\21406.15 4q2020 potentio maps.dwg



W:\projects\midwest generation\lincoln quarry gw monitoring\2020-2021 potentiometric report\21406.15 1q2021 potentio maps.dwg

Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'
APPROXIMATE SCALE

N

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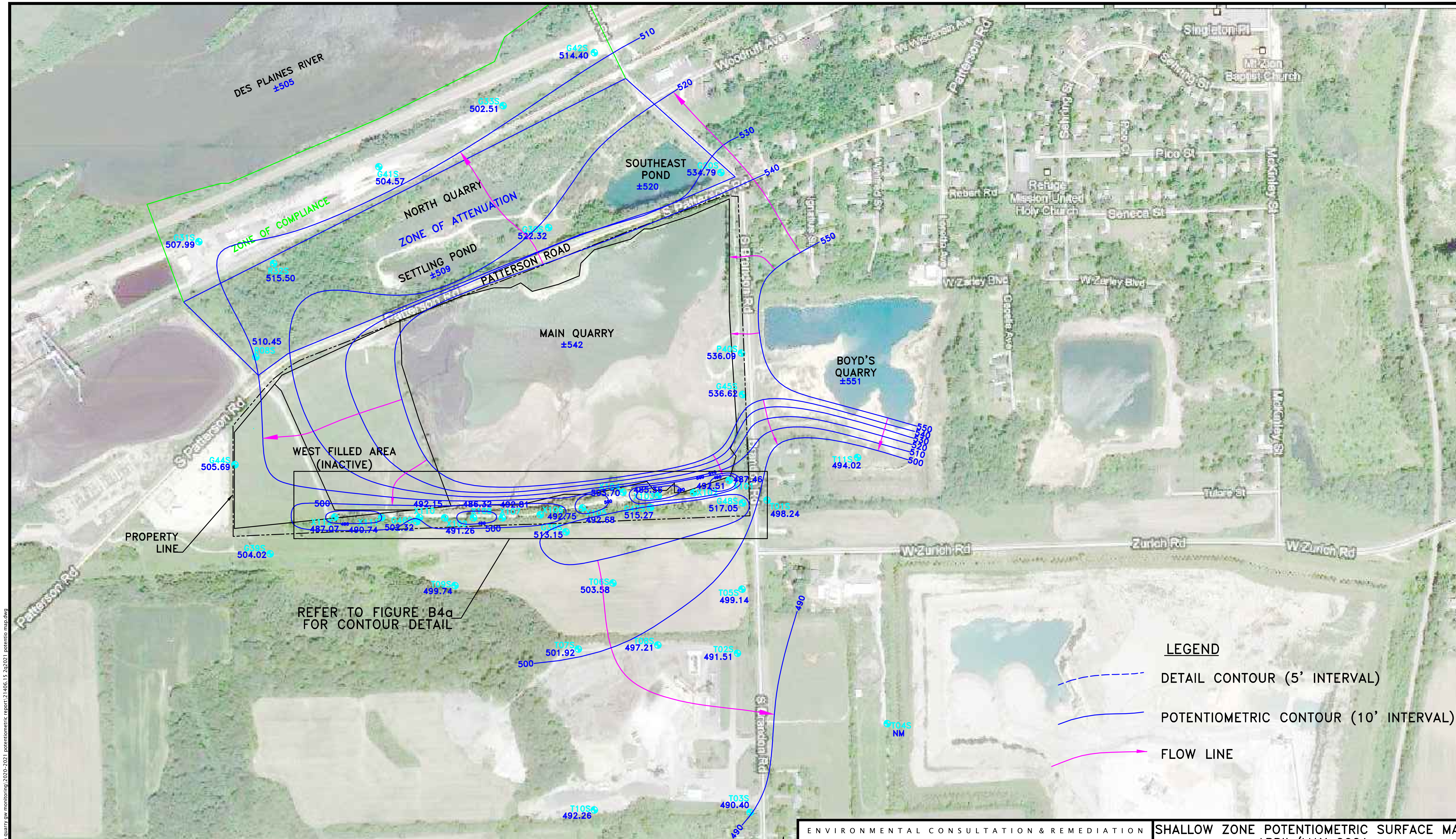
414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630-325-1300 Facsimile 630-325-1593

SHALLOW ZONE POTENTIOMETRIC SURFACE MAP
JANUARY/FEBRUARY 2021

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450'	Date: June 23, 2021
KPRG Project No. 21406.15	FIGURE 9-11



0 450'
APPROXIMATE SCALE

N

Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

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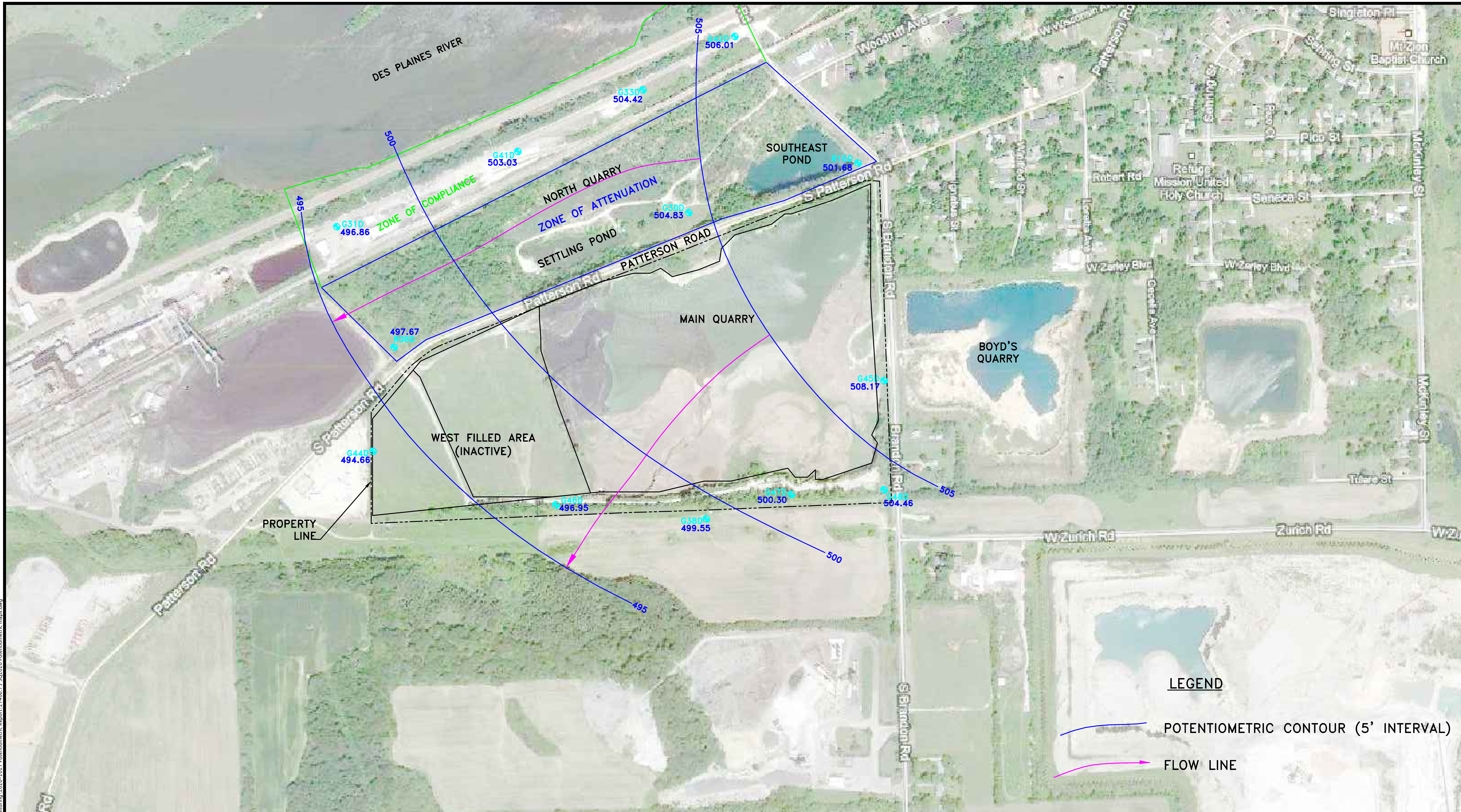
SHALLOW ZONE POTENTIOMETRIC SURFACE MAP
APRIL/MAY 2021

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450'	Date: June 22, 2021
KPRG Project No. 21406.15	FIGURE 9-12



Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'

APPROXIMATE SCALE

N

ENVIRONMENTAL CONSULTATION & REMEDIATION

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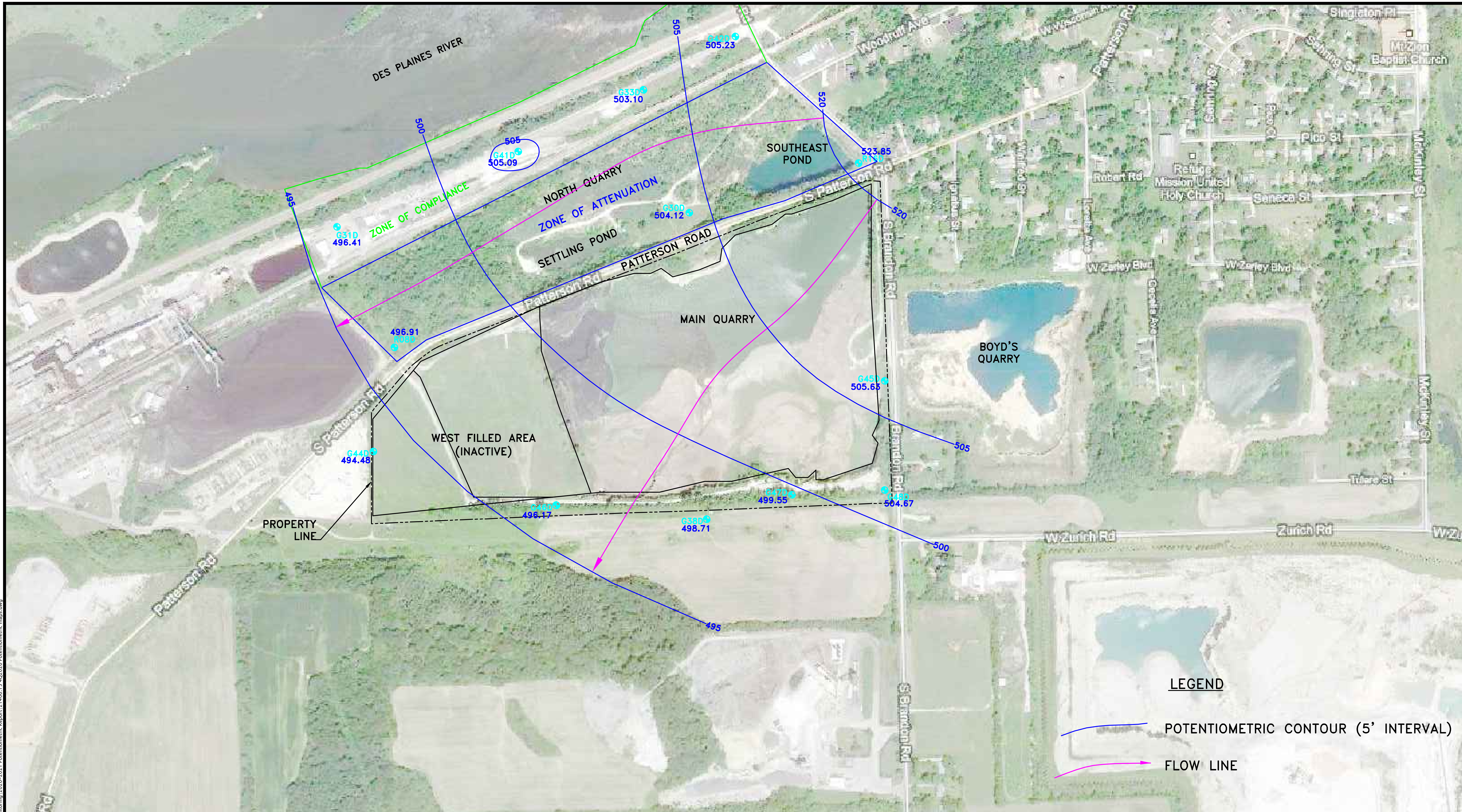
14665 West Lisbon Road, Suite 1A Brookfield, Wisconsin 53005 Telephone 262-781-0475 Facsimile 262-781-0478

DEEP ZONE POTENTIOMETRIC SURFACE MAP
JULY/AUGUST 2020

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450'	Date: June 16, 2021
KPRG Project No. 21406.15	FIGURE 9-13



Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'
APPROXIMATE SCALE

N

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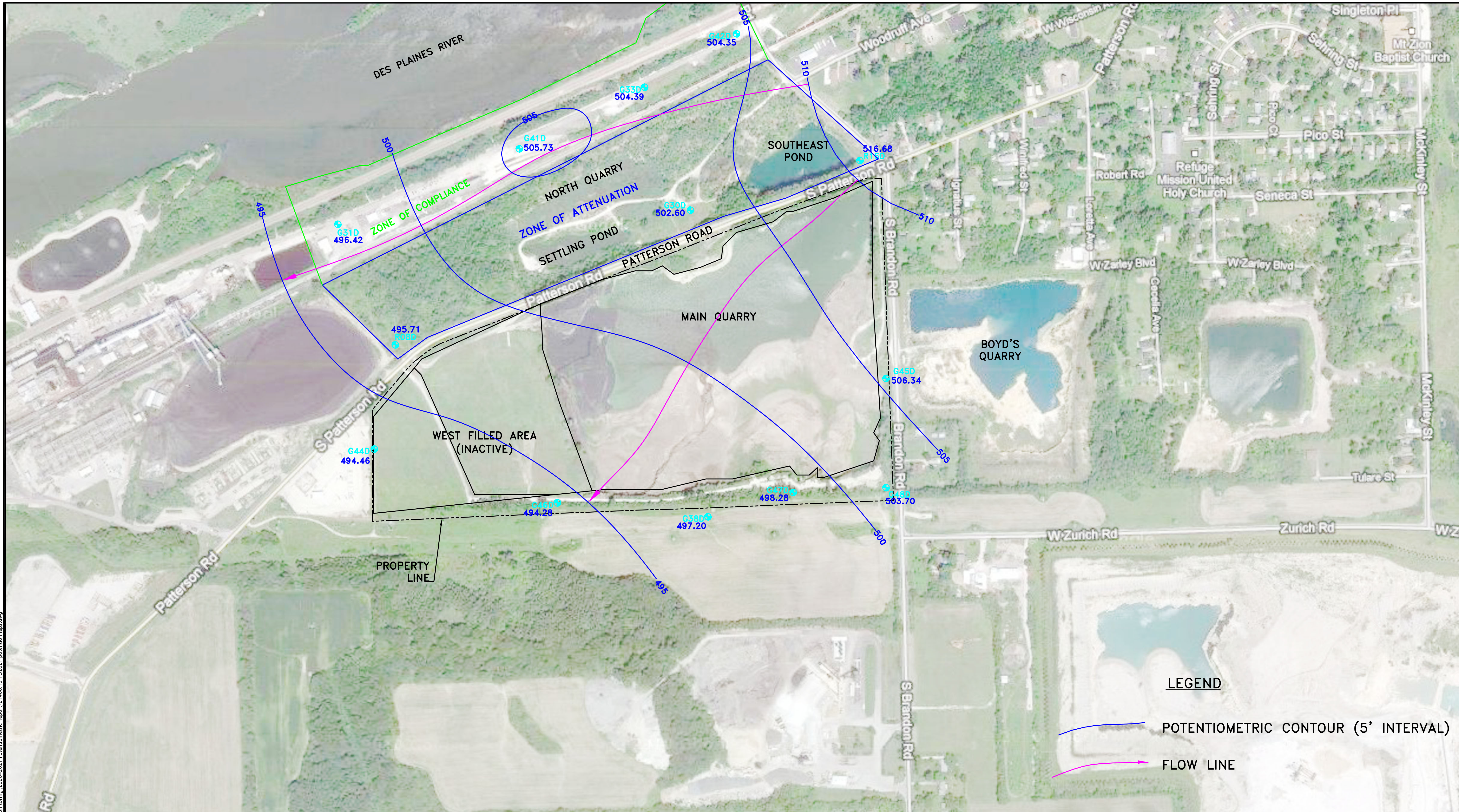
DEEP ZONE POTENTIOMETRIC SURFACE MAP
OCTOBER/NOVEMBER 2020

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450' | Date: June 23, 2021

KPRG Project No. 21406.15 | FIGURE 9-14



Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'
APPROXIMATE SCALE

N

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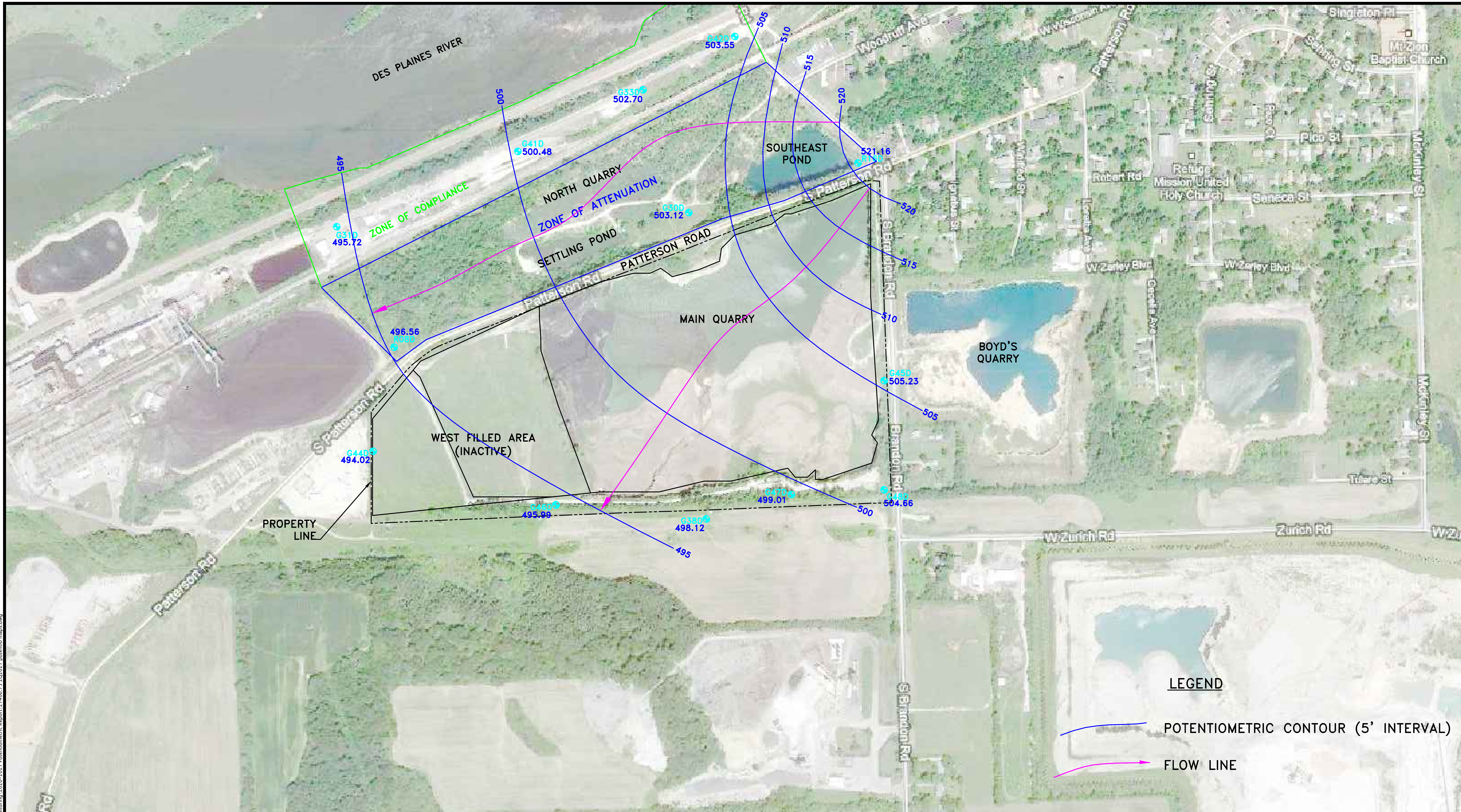
DEEP ZONE POTENTIOMETRIC SURFACE MAP
JANUARY/FEBRUARY 2021

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450'	Date: June 23, 2021
KPRG Project No. 21406.15	FIGURE 9-15

W:\Projects\Midwest Generation\Lincoln Quarry GW Monitoring\2020-2021 Potentiometric Report\21406.15 1Q2021 potentio maps.dwg



Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'
APPROXIMATE SCALE

N

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DEEP ZONE POTENTIOMETRIC SURFACE MAP
APRIL/MAY 2021

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450' | Date: June 17, 2021

KPRG Project No. 21406.15 | FIGURE 9-16

W:\Projects\Midwest Generation\Lincoln Quarry GW Monitoring\2020-2021 Potentiometric Report\21406.15 202021 potentio maps.dwg

Note: WT – Water Table Well; S – Shallow Zone Well; D – Deep Zone Well

0 450'
APPROXIMATE SCALE
N

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

GROUNDWATER MANAGEMENT ZONE	
LINCOLN STONE QUARRY JOLIET, ILLINOIS	
Scale: 1" = 450'	Date: February 22, 2021
KPRG Project No. 21406.14	FIGURE 9-17

W:\projects\midwest generation\extract system assess report\2020 4q2020 chem data contours.dwg

Note: * – NO TOTAL DEPTH GIVEN

LEGEND

- WATER WELL
- 42053 SHORT API WELL ID
- 900 TOTAL DEPTH
- (A) WELL EITHER MISLOCATED OR NO LONGER EXISTS (SEE TEXT DISCUSSION)

0 600'

APPROXIMATE SCALE

N

ENVIRONMENTAL CONSULTATION & REMEDIATION

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KPRG and Associates, inc.

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2500' RADIUS POTABLE WELL MAP

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 600'	Date: September 13, 2021
KPRG Project No. 19520.4	FIGURE 9-18

w:\Projects\Midwest Generation\Lincoln Quarry GW Monitoring\2020-2021 Potentiometric Report 21406.15 4Q2020 potentio maps.dwg

ATTACHMENT 1
HISTORY OF CONSTRUCTION

GENERAL NOTES

THE SITE BENCHMARK IS LOCATED AT NORTHING 1758972.424 AND EASTING 1048071.277 WITH ELEVATION 584.19.

THE TOPOGRAPHIC MAP WAS GENERATED USING AERIAL PHOTOGRAPHY BY THE SIDWELL COMPANY IN MAY 2014.

ATTORNEY-CLIENT PRIVILEGE

EXISTING CONDITIONS LEGEND

- EXISTING CCR CONTOURS
- EXISTING TOPOGRAPHIC CONTOURS
- EXISTING FENCE
- EXTENT OF SURFACE WATER
- EXISTING TREE
- EXISTING CLUSTER OF TREES/VEGETATION
- EXISTING SLUICE PIPES

NO.	REVISION	DATE

PROJECT FIRM AND ADDRESS

KPRG
ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.
14665 West Lisbon Road, Suite 2B
Brookfield, Wisconsin 53005
Telephone 262-781-0475
www.KPRGinc.com

PROJECT NAME AND ADDRESS

LINCOLN QUARRY CLOSURE

1601 S. PATTERSON ROAD
JOLIET, IL 60436

KPRG PROJECT NO.
19115

SHEET TITLE
1975 BOTTOM SITE CONDITIONS

DRAWING DATE
10/29/21

DRAWING SCALE
1" = 200'

SHEET NO.
1

ATTACHMENT 2
CCR CHEMICAL CONSTITUENTS ANALYSIS

Attachment 2-1 – Joliet #9 & Joliet #29 CCR Laboratory Data Package

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

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

Job ID: 500-204544-1

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: 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

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

Job ID: 500-204544-1

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

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

Job ID: 500-204544-1

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

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 500-618052/1-A **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 618247 **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 **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 618247 **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 **Client Sample ID: Jolet #29 Ash**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 618247 **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

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 500-618524/1-A
Matrix: Solid
Analysis Batch: 618534
Client Sample ID: Method Blank
Prep Type: Total/NA
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
Matrix: Solid
Analysis Batch: 618534
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
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
Matrix: Solid
Analysis Batch: 618775
Client Sample ID: Method Blank
Prep Type: Total/NA
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
Matrix: Solid
Analysis Batch: 618775
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
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
Matrix: Solid
Analysis Batch: 618739
Client Sample ID: Method Blank
Prep Type: Total/NA
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
Matrix: Solid
Analysis Batch: 618739
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
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

244-ATLANTA eurofins

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	Due Date Requested			Preservation Codes
City: Brookfield	TAT Requested (days)			
State Zip: WI 53005	Compliance Project Δ Yes Δ No			
Phone	PO #: 4502042860			
Email: richardg@kprginc com	WO #			
Project Name: Joliet #9 Ash	Project #: 50011504			
Site: Illinois	SSOW#			

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

500-204544 COC

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		
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	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 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 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	

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

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

eurofins | Environment Testing America

ANALYTICAL REPORT

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

Laboratory Job ID: 500-204543-1
Client Project/Site: Joliet #9 Ash

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

Attn: Richard Gnat

Diana Mockler

Authorized for release by:
9/21/2021 10:47:01 AM

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.

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

Table of Contents

Case Narrative

Client: KPRG and Associates, Inc.
Project/Site: Joliet #9 Ash

Job ID: 500-204543-1

Job ID: 500-204543-1

Laboratory: Eurofins TestAmerica, Chicago

Narrative

Job Narrative
500-204543-1

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 additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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

Method Summary

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL CHI
7471A	Mercury (CVAA)	SW846	TAL CHI
9056A	Anions, Ion Chromatography	SW846	TAL CHI
Moisture	Percent Moisture	EPA	TAL CHI
SM 4500 Cl- E	Chloride, Total	SM	TAL CHI
SM 4500 F C	Fluoride	SM	TAL CHI
300_Prep	Anions, Ion Chromatography, 10% Wt/Vol	MCAWW	TAL CHI
3050B	Preparation, Metals	SW846	TAL CHI
7471A	Preparation, Mercury	SW846	TAL CHI

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CHI = Eurofins TestAmerica, Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Sample Summary

Client: KPRG and Associates, Inc.
Project/Site: Joliet #9 Ash

Job ID: 500-204543-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
500-204543-1	Joliet #9 Ash	Solid	08/31/21 09:30	08/31/21 13:00

Client Sample ID: Joliet #9 Ash

Lab Sample ID: 500-204543-1

Date Collected: 08/31/21 09:30

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		1.8		mg/Kg		09/15/21 15:57	09/17/21 20:42	1
Arsenic	<0.88		0.88		mg/Kg		09/15/21 15:57	09/17/21 20:42	1
Barium	**4400**		22		mg/Kg		09/15/21 15:57	09/20/21 14:39	25
Beryllium	**3.3**		0.35		mg/Kg		09/15/21 15:57	09/17/21 20:42	1
Boron	**110**		4.4		mg/Kg		09/15/21 15:57	09/17/21 20:42	1
Cadmium	<0.18		0.18		mg/Kg		09/15/21 15:57	09/17/21 20:42	1
Calcium	**110000**		88		mg/Kg		09/15/21 15:57	09/20/21 12:37	5
Chromium	**37**		0.88		mg/Kg		09/15/21 15:57	09/17/21 20:42	1
Cobalt	**20**		11		mg/Kg		09/15/21 15:57	09/20/21 14:39	25
Lead	**0.67**		0.44		mg/Kg		09/15/21 15:57	09/17/21 20:42	1
Lithium	**32**		0.88		mg/Kg		09/15/21 15:57	09/20/21 12:33	1
Molybdenum	<0.88		0.88		mg/Kg		09/15/21 15:57	09/17/21 20:42	1
Selenium	<0.88		0.88		mg/Kg		09/15/21 15:57	09/17/21 20:42	1
Thallium	**3.6**		0.88		mg/Kg		09/15/21 15:57	09/17/21 20:42	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.015		0.015		mg/Kg		09/09/21 13:15	09/10/21 08:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<2.0		2.0		mg/Kg		09/14/21 11:45	09/14/21 13:19	1
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 12:35	1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Metals

Prep Batch: 617888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 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	

Analysis Batch: 618070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 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

Prep Batch: 618772

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 Ash	Total/NA	Solid	3050B	
MB 500-618772/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 500-618772/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Analysis Batch: 619274

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 Ash	Total/NA	Solid	6010B	618772
MB 500-618772/1-A	Method Blank	Total/NA	Solid	6010B	618772
LCS 500-618772/2-A	Lab Control Sample	Total/NA	Solid	6010B	618772

Analysis Batch: 619359

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 Ash	Total/NA	Solid	6010B	618772
500-204543-1	Joliet #9 Ash	Total/NA	Solid	6010B	618772
MB 500-618772/1-A	Method Blank	Total/NA	Solid	6010B	618772
LCS 500-618772/2-A	Lab Control Sample	Total/NA	Solid	6010B	618772

Analysis Batch: 619496

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 Ash	Total/NA	Solid	6010B	618772

General Chemistry

Analysis Batch: 617356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 Ash	Total/NA	Solid	Moisture	

Prep Batch: 618524

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 Ash	Total/NA	Solid	300_Prep	
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
500-204543-1	Joliet #9 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

General Chemistry

Prep Batch: 618692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 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	
500-204543-1 MS	Joliet #9 Ash	Total/NA	Solid	300_Prep	
500-204543-1 MSD	Joliet #9 Ash	Total/NA	Solid	300_Prep	

Analysis Batch: 618739

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 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
500-204543-1 MS	Joliet #9 Ash	Total/NA	Solid	SM 4500 F C	618692
500-204543-1 MSD	Joliet #9 Ash	Total/NA	Solid	SM 4500 F C	618692

Analysis Batch: 618775

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 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
500-204543-1 MS	Joliet #9 Ash	Total/NA	Solid	SM 4500 Cl- E	618692
500-204543-1 MSD	Joliet #9 Ash	Total/NA	Solid	SM 4500 Cl- E	618692

Client: KPRG and Associates, Inc.
Project/Site: Joliet #9 Ash

Job ID: 500-204543-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 500-618772/1-A
Matrix: Solid
Analysis Batch: 619274

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 618772

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<2.0		2.0		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Arsenic	<1.0		1.0		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Barium	<1.0		1.0		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Beryllium	<0.40		0.40		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Boron	<5.0		5.0		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Cadmium	<0.20		0.20		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Calcium	<20		20		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Chromium	<1.0		1.0		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Cobalt	<0.50		0.50		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Lead	<0.50		0.50		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Molybdenum	<1.0		1.0		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Selenium	<1.0		1.0		mg/Kg		09/15/21 15:57	09/17/21 19:34	1
Thallium	<1.0		1.0		mg/Kg		09/15/21 15:57	09/17/21 19:34	1

Lab Sample ID: MB 500-618772/1-A
Matrix: Solid
Analysis Batch: 619359

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 618772

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	<1.0		1.0		mg/Kg		09/15/21 15:57	09/20/21 12:27	1

Lab Sample ID: LCS 500-618772/2-A
Matrix: Solid
Analysis Batch: 619274

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618772

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	50.0	46.8		mg/Kg		94	80 - 120
Arsenic	10.0	9.29		mg/Kg		93	80 - 120
Barium	200	197		mg/Kg		98	80 - 120
Beryllium	5.00	4.68		mg/Kg		94	80 - 120
Boron	100	83.5		mg/Kg		83	80 - 120
Cadmium	5.00	4.54		mg/Kg		91	80 - 120
Calcium	1000	936		mg/Kg		94	80 - 120
Chromium	20.0	18.4		mg/Kg		92	80 - 120
Cobalt	50.0	46.1		mg/Kg		92	80 - 120
Lead	10.0	8.86		mg/Kg		89	80 - 120
Molybdenum	100	98.7		mg/Kg		99	80 - 120
Selenium	10.0	8.49		mg/Kg		85	80 - 120
Thallium	10.0	8.45		mg/Kg		85	80 - 120

Lab Sample ID: LCS 500-618772/2-A
Matrix: Solid
Analysis Batch: 619359

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618772

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	50.0	47.9		mg/Kg		96	80 - 120

Client: KPRG and Associates, Inc.	Job ID: 500-204543-1
Project/Site: Joliet #9 Ash

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 500-617888/12-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 618070 — **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 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 618070 — **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

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

Lab Sample ID: 500-204543-1 MS — **Client Sample ID: Joliet #9 Ash**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 618775 — **Prep Batch: 618692**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	<20		197	189		mg/Kg		96	75 - 125

Method: SM 4500 Cl- E - Chloride, Total (Continued)

Lab Sample ID: 500-204543-1 MSD — **Client Sample ID: Joliet #9 Ash**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 618775 — **Prep Batch: 618692**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	<20		197	189		mg/Kg		96	75 - 125	0	20

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

Lab Sample ID: 500-204543-1 MS — **Client Sample ID: Joliet #9 Ash**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 618739 — **Prep Batch: 618692**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	<1.0		49.2	50.1		mg/Kg		102	75 - 125

Lab Sample ID: 500-204543-1 MSD — **Client Sample ID: Joliet #9 Ash**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 618739 — **Prep Batch: 618692**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	<1.0		49.2	50.1		mg/Kg		102	75 - 125	0	20

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

Chain of Custody Record

ATLANTA 244-

eurofins

Client Information	Sampler: Michael Ress	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 #: 500-204543

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#	

500-204543 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	
1 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 Ress	8/31 13:00	KPRG	Stephanie Hernandez	8/31/21 1300	ETA-CH

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

Ver 06/08/2021

9/21/2021

Login Sample Receipt Checklist

Client: KPRG and Associates, Inc. | Job Number: 500-204543-1

Login Number: 204543 | **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	

Lab Chronicle

Client: KPRG and Associates, Inc.
Project/Site: Joliet #9 Ash

Job ID: 500-204543-1

Client Sample ID: Joliet #9 Ash
Date Collected: 08/31/21 09:30
Date Received: 08/31/21 13:00

Lab Sample ID: 500-204543-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			618772	09/15/21 15:57	LK	TAL CHI
Total/NA	Analysis	6010B		1	619274	09/17/21 20:42	JJB	TAL CHI
Total/NA	Prep	3050B			618772	09/15/21 15:57	LK	TAL CHI
Total/NA	Analysis	6010B		1	619359	09/20/21 12:33	JJB	TAL CHI
Total/NA	Prep	3050B			618772	09/15/21 15:57	LK	TAL CHI
Total/NA	Analysis	6010B		5	619359	09/20/21 12:37	JJB	TAL CHI
Total/NA	Prep	3050B			618772	09/15/21 15:57	LK	TAL CHI
Total/NA	Analysis	6010B		25	619496	09/20/21 14:39	JJB	TAL CHI
Total/NA	Prep	7471A			617888	09/09/21 13:15	MJG	TAL CHI
Total/NA	Analysis	7471A		1	618070	09/10/21 08:30	MJG	TAL CHI
Total/NA	Prep	300_Prep			618524	09/14/21 11:45	EAT	TAL CHI
Total/NA	Analysis	9056A		1	618534	09/14/21 13:19	PSP	TAL CHI
Total/NA	Analysis	Moisture		1	617356	09/04/21 11:46	PFK	TAL CHI
Total/NA	Prep	300_Prep			618692	09/15/21 09:49	MS	TAL CHI
Total/NA	Analysis	SM 4500 Cl- E		1	618775	09/15/21 15:04	MS	TAL CHI
Total/NA	Prep	300_Prep			618692	09/15/21 09:49	MS	TAL CHI
Total/NA	Analysis	SM 4500 F C		1	618739	09/15/21 12:35	MS	TAL CHI

Laboratory References:

TAL CHI = Eurofins TestAmerica, Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

eurofins

Environment Testing
America

ANALYTICAL REPORT

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

Laboratory Job ID: 500-204543-2
Client Project/Site: Joliet #9 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 8:26:21 AM

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.

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

Table of Contents

Job ID: 500-204543-2

Laboratory: Eurofins TestAmerica, Chicago

Narrative

Job Narrative
500-204543-2

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.

Joliet #9 Ash (500-204543-1), (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. Joliet #9 Ash (500-204543-1), (LCS 160-528400/2-A), (MB 160-528400/1-A) 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: Joliet #9 Ash (500-204543-1). 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 #9 Ash

Job ID: 500-204543-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
500-204543-1	Joliet #9 Ash	Solid	08/31/21 09:30	08/31/21 13:00

Client: KPRG and Associates, Inc. Job ID: 500-204543-2
Project/Site: Joliet #9 Ash

Client Sample ID: Joliet #9 Ash

Lab Sample ID: 500-204543-1
Date Collected: 08/31/21 09:30
Matrix: Solid
Date Received: 08/31/21 13:00

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	2.41		0.352	0.414	1.00	0.180	pCi/g	09/19/21 19:06	10/15/21 17:10	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*100*		*40 - 110*	*09/19/21 19:06*	*10/15/21 17:10*	*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	1.97		0.409	0.448	1.00	0.482	pCi/g	09/22/21 16:04	10/06/21 12:35	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*95.3*		*40 - 110*	*09/22/21 16:04*	*10/06/21 12:35*	*1*
Y Carrier	*78.9*		*40 - 110*	*09/22/21 16:04*	*10/06/21 12:35*	*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	4.38		0.540	0.610	5.00	0.482	pCi/g		10/25/21 17:38	1

Client: KPRG and Associates, Inc. Job ID: 500-204543-2
Project/Site: Joliet #9 Ash

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 #9 Ash

Job ID: 500-204543-2

Rad

Prep Batch: 527617

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-204543-1	Joliet #9 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
500-204543-1	Joliet #9 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	
500-204543-1 DU	Joliet #9 Ash	Total/NA	Solid	DPS-0	

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*

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

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: 500-204543-1 DU
Matrix: Solid
Analysis Batch: 530453

Client Sample ID: Joliet #9 Ash
Prep Type: Total/NA
Prep Batch: 528400

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-228	1.97			2.501		0.485	1.00	0.427	pCi/g			0.57	1

Carrier	*DU %Yield*	*DU Qualifier*	*Limits*
Ba Carrier	*88.7*		*40 - 110*
Y Carrier	*79.6*		*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
ATLANTA -244

Client Information	Sampler: Michael Ress	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			Job #: 500-204543

Client fields		Project fields	
Address	14665 West Lisbon Road Suite 1A	Due Date Requested	
City	Brookfield	TAT Requested (days)	
State Zip	WI 53005	Compliance Project	Δ Yes Δ No
Phone		PO #	4502042860
Email	richardg@kprginc com	WO #	
Project Name	Joliet #9 Ash	Project #	50011504
Site	Illinois	SSOW#	

Analysis Requested

500-204543 COC

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							

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

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 Ress	8/31 13:00	KPRG	Stephanie Hernandez	8/31/21 1300	ETA-CH

Custody Seals Intact: Δ Yes Δ 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)	Sampler:	Lab PM: Mockler, Diana J	Carrier Tracking No(s):	COC No: 500-152055.1
Client Contact: Shipping/Receiving	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 #: 500-204543-2
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 #9 Ash	Project #: 50011504			
Site: NRG Midwest Generation LSQ Joliet #9 CCR	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:								
Joliet #9 Ash (500-204543-1)	8/31/21	09:30 Central		Solid			X	X	X	2	

Preservation Codes:

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

Other:

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

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ____ *Months*

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:		Method of Shipment:	
Relinquished by: Shari Scott	Date/Time: 8/31/21 1445	Company: ETA-CHI	Received by: Michael Ouintling	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: 500-204543-2

Login Number: 204543 | **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: 500-204543-2

Login Number: 204543
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	

Lab Chronicle

Client: KPRG and Associates, Inc. Job ID: 500-204543-2
Project/Site: Joliet #9 Ash

Client Sample ID: Joliet #9 Ash

Lab Sample ID: 500-204543-1

Date Collected: 08/31/21 09:30

Matrix: Solid

Date Received: 08/31/21 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	DPS-21			527617	09/19/21 19:06	HA	TAL SL
Total/NA	Analysis	903.0		1	531971	10/15/21 17:10	ANW	TAL SL
Total/NA	Prep	DPS-0			528400	09/22/21 16:04	ASG	TAL SL
Total/NA	Analysis	904.0		1	530453	10/06/21 12:35	EMH	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	533568	10/25/21 17:38	CAH	TAL SL

Laboratory References:

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

Client: KPRG and Associates, Inc.
Job ID: 500-204543-2
Project/Site: Joliet #9 Ash

Method: 903.0 - Radium-226 (GFPC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(40-110)
500-204543-1	Joliet #9 Ash	100
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)	
		Ba	Y
Lab Sample ID	Client Sample ID	(40-110)	(40-110)
500-204543-1	Joliet #9 Ash	95.3	78.9
500-204543-1 DU	Joliet #9 Ash	88.7	79.6
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

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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

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

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	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. Job ID: 500-204544-2

Project/Site: Joliet #29 Ash

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

Client: KPRG and Associates, Inc. Job ID: 500-204544-2
Project/Site: Joliet #29 Ash

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

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	

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

244-ATLANTA

eurofins

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	**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#:			

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_CI_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)	Sampler:	Lab PM: Mockler, Diana J	Carrier Tracking No(s):	COC No: 500-152056.1
Client Contact: Shipping/Receiving	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
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)
Other:

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

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ________ *Months*

Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:	Time:		Method of Shipment:	
Relinquished by: Shir Scott	Date/Time: 8/31/21 1445	Company: ETACHI	Received by: Michael Kountzing	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 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	

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

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.

Tracer/Carrier Summary

Client: KPRG and Associates, Inc. Job ID: 500-204544-2
Project/Site: Joliet #29 Ash

Method: 903.0 - Radium-226 (GFPC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(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)	
		Ba	Y
Lab Sample ID	Client Sample ID	(40-110)	(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 2-2 – P105 Leachate Assessment Data

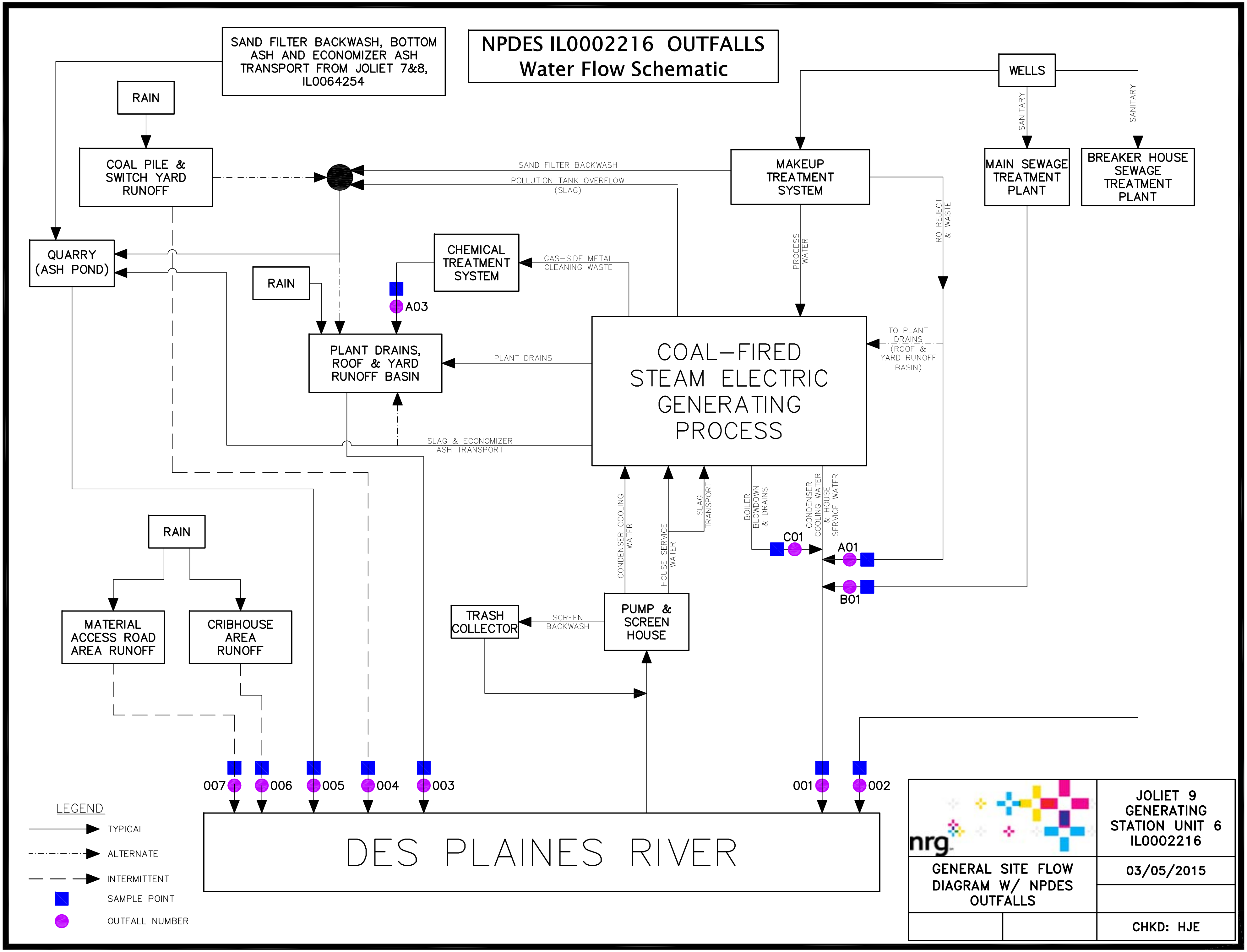
Midwest Generation, LLC - Joliet/Lincoln Stone Quarry--1978090001 - 2012 Assessment Well P105 Data

	Well	P105			
Parameter	Units	1stQtr12	2ndQtr12	3rdQtr12	4thQtr12
Ammonia, Dissolved	mg/L	8.3	8.7	8.8	8.3
Arsenic, Dissolved	ug/L	20	11	13	<10
Barium	ug/L	240	70	53	29
Barium, Dissolved	ug/L	31	27	30	26
Boron, Dissolved	ug/L	10000	11000	12000	10000
Cadmium, Dissolved	ug/L	<2.0	<2.0	<2.0	<2.0
Chloride, Dissolved	mg/L	170	200	190	190
Copper	ug/L	26	<10	11	<10
Depth to Water (ft from MP)	ft	49.75	50.49	50.50	53.35
Depth to Water (ft bls)	ft	47.00	47.74	47.75	50.60
Elevation of GW Surface	ft	541.72	540.98	540.97	538.12
Elevation of Well (MP)	ft	591.47	591.47	591.47	591.47
Elevation Well Bottom	ft	513.71	513.71	513.71	513.71
Field pH	SU	7.38	11.56	7.85	10.55
Field Temperature	Degrees F	35.8	46.0	67.5	60.8
Fluoride, Dissolved	mg/L	0.15	0.15	<0.10	0.16
Iron	ug/L	NA	2000	NA	NA
Lead	ug/L	NA	<5.0	NA	NA
Manganese, Dissolved	ug/L	<10	<10	<10	<10
Mercury	ug/L	NA	<0.20	NA	NA
Molybdenum, Dissolved	ug/L	13000	12000	14000	12000^
Nitrogen, Nitrate	mg/L	<0.10	<0.10	<0.10	<0.10
Nitrogen, Nitrate, Dissolved	mg/L	<0.10	<0.10	<0.10	<0.10
Potassium, Dissolved	mg/L	83	79	81	77
Selenium, Dissolved	ug/L	13	<10	<10	<10
Sodium, Dissolved	mg/L	220	220	220	210
Specific Conductance	umhos/cm	1153	1530	1396	1403
Sulfate, Dissolved	mg/L	410	360	460	460
Total Dissolved Solids	mg/L	1100	1100	1100	1000
Total Organic Carbon	mg/L	5.2	4.7	6.7	7.0
Zinc, Dissolved	ug/L	<20	<20	<20	<20

Notes: 1. A '<' sign means that the analyte was not detected at or above the reporting limit
2. A 'B' sign indicates that the result is less than the reporting limit, but greater than or equal to the method detection limit
3. A '^' sign indicates that an instrument related QC exceeds the control limits
4. NA = Not Analyzed

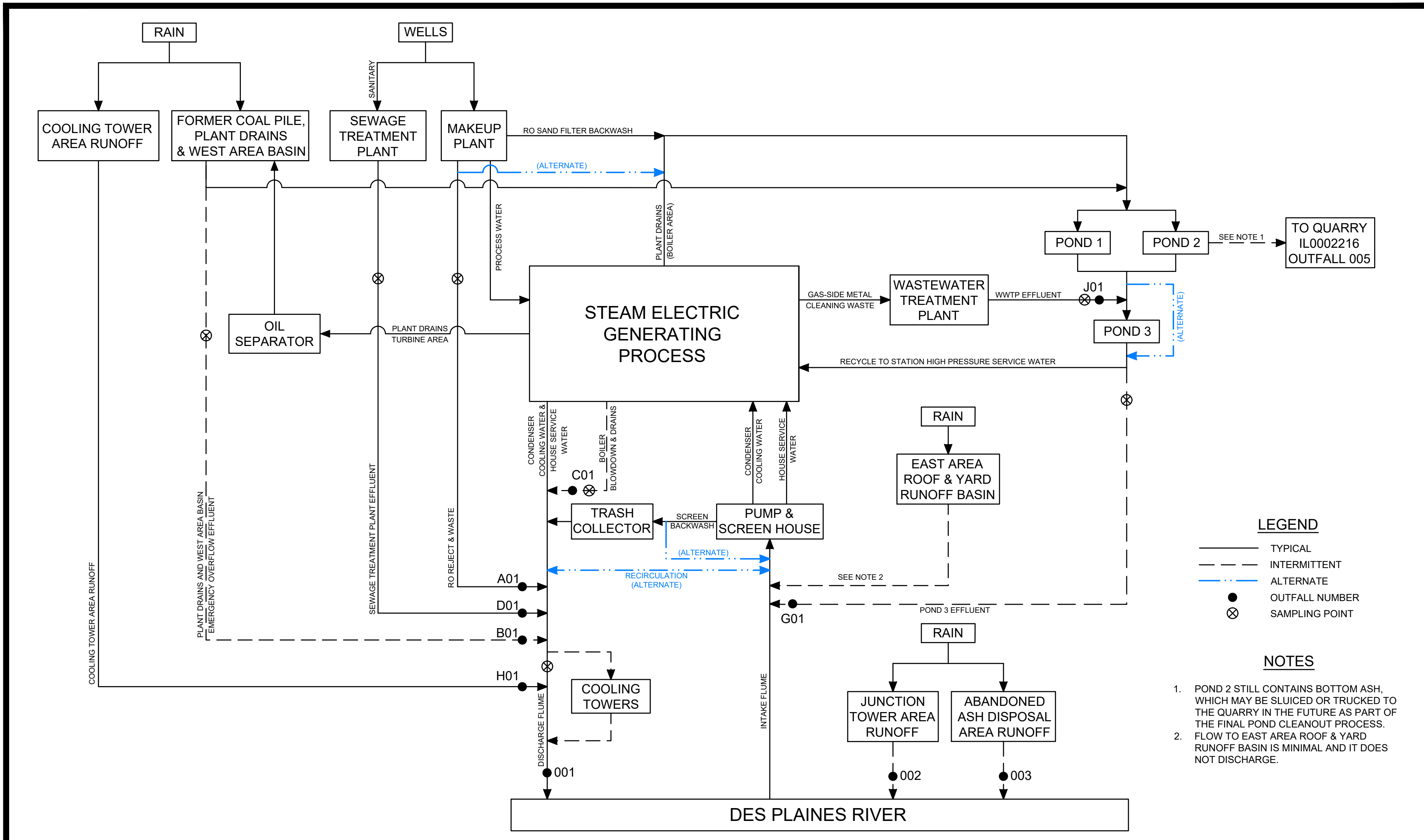
ATTACHMENT 3
CHEMICAL CONSTITUENTS ANALYSIS OF OTHER WASTE STREAMS

Attachment 3-1 – 2015 Flow Diagram



NPDES IL0002216 OUTFALLS
Water Flow Schematic
SAND FILTER BACKWASH, BOTTOM ASH AND ECONOMIZER ASH TRANSPORT FROM JOLIET 7&8, IL0064254
RAIN
COAL PILE & SWITCH YARD RUNOFF
QUARRY (ASH POND)
RAIN
PLANT DRAINS, ROOF & YARD RUNOFF BASIN
CHEMICAL TREATMENT SYSTEM
A03
GAS-SIDE METAL CLEANING WASTE
SAND FILTER BACKWASH
POLLUTION TANK OVERFLOW (SLAG)
WELLS
SANITARY
MAKEUP TREATMENT SYSTEM
MAIN SEWAGE TREATMENT PLANT
BREAKER HOUSE SEWAGE TREATMENT PLANT
PROCESS WATER
RO REJECT & WASTE
TO PLANT DRAINS (ROOF & YARD RUNOFF BASIN)
PLANT DRAINS
COAL-FIRED STEAM ELECTRIC GENERATING PROCESS
SLAG & ECONOMIZER ASH TRANSPORT
CONDENSER COOLING WATER
HOUSE SERVICE WATER
SLAG TRANSPORT
BOILER BLOWDOWN & DRAINS
CONDENSER COOLING WATER & HOUSE SERVICE WATER
C01
A01
B01
RAIN
MATERIAL ACCESS ROAD AREA RUNOFF
CRIBHOUSE AREA RUNOFF
TRASH COLLECTOR
SCREEN BACKWASH
PUMP & SCREEN HOUSE
007
006
005
004
003
001
002
DES PLAINES RIVER
LEGEND
TYPICAL
ALTERNATE
INTERMITTENT
SAMPLE POINT
OUTFALL NUMBER
nrg
JOLIET 9 GENERATING STATION UNIT 6 IL0002216
GENERAL SITE FLOW DIAGRAM W/ NPDES OUTFALLS
03/05/2015
CHKD: HJE

Attachment 3-2 – Joliet #29 Flow Diagram



APTIM Environmental & Infrastructure, Inc.

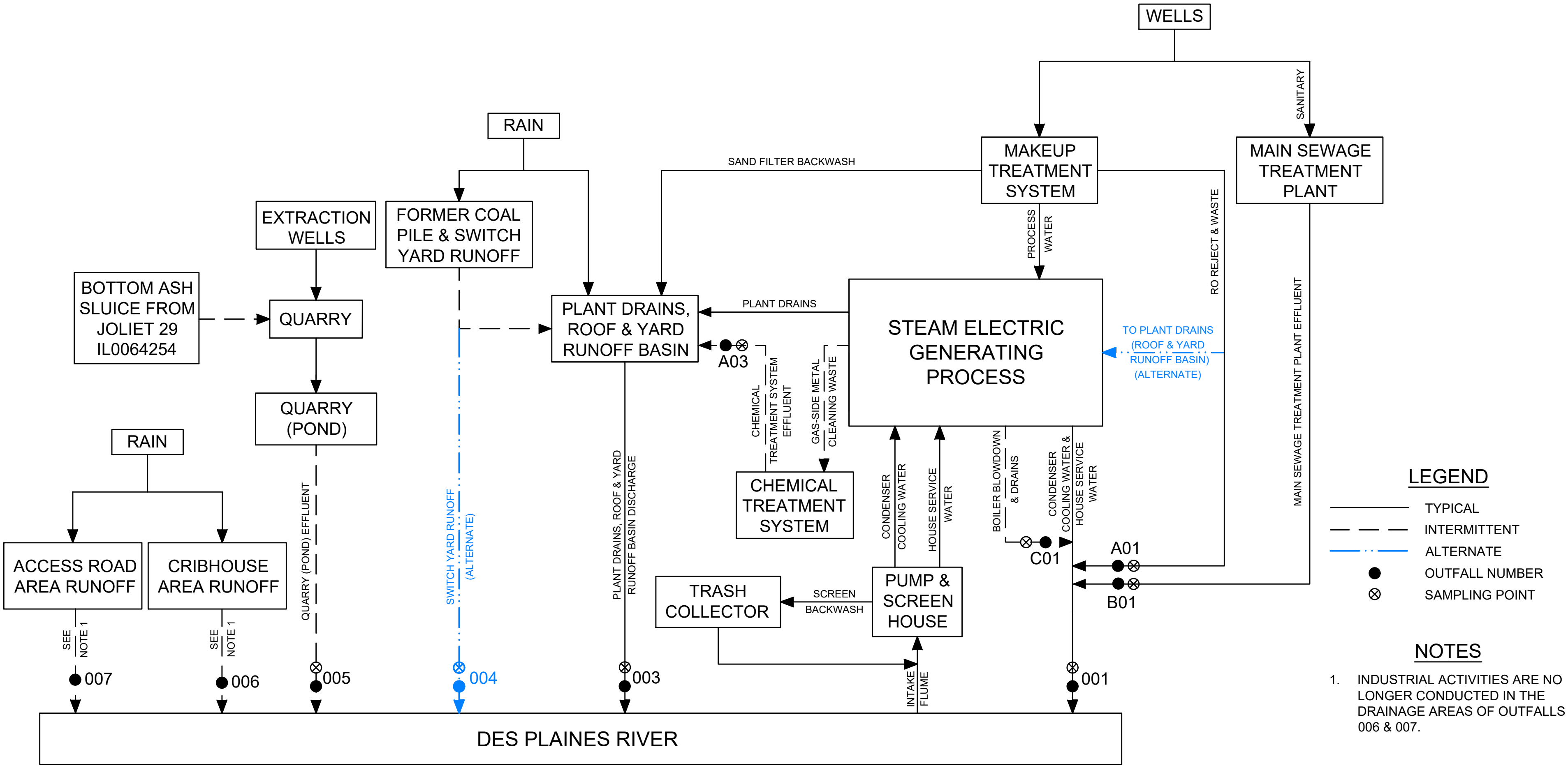
APTIM

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

Attachment 3-3 – 2019 Flow Diagram



APTIM Environmental & Infrastructure, Inc.

APTIM

MIDWEST GENERATION, LLC
JOLIET 9 GENERATING STATION

GENERAL FLOW DIAGRAM WITH NPDES OUTFALLS
NPDES PERMIT NO. IL0002216

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

T:\AutoCAD\Projects\NRG\Joliet NPDES\Joliet 9 Flow Diagram - Revised.dwg, 1/24/2019 12:30:51 PM, _AutoCAD PDF (General Documentation).pc3

ATTACHMENT 4
LOCATION STANDARDS DEMONSTRATION

PLACEMENT ABOVE THE UPPERMOST AQUIFER LOCATION RESTRICTIONS
LINCOLN STONE QUARRY
JOLIET #9 STATION
OCTOBER 2018

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.60, KPRG and Associates, Inc (KPRG) prepared this report to document compliance with location restrictions related to placement above the uppermost aquifer for the existing Lincoln Stone Quarry (the Quarry) at the Joliet #9 Station (Site) in Joliet, Illinois.

The work presented in this report was performed under the direction of Joshua Davenport in accordance with §257.60. Richard Gnat reviewed this report in accordance with KPRG's quality assurance/quality control procedures.

1. Placement Location Restriction Determination

The base of the Quarry is elevation 501 ft amsl and the upper limit groundwater elevation is 555.35 ft amsl. The Quarry is not separated from the upper limit of the uppermost aquifer by a minimum of five (5) feet.

2. Limitations and Certification

This report was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by KPRG personnel and information provided to KPRG by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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WETLANDS LOCATION RESTRICTIONS
LINCOLN STONE QUARRY
JOLIET #9 STATION
OCTOBER 2018

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.61, KPRG and Associates, Inc (KPRG) prepared this report to document compliance with location restrictions related to wetlands for the existing Lincoln Stone Quarry (the Quarry) at the Joliet #9 Station (Site) in Joliet, Illinois.

The work presented in this report was performed under the direction of Joshua Davenport in accordance with §257.61. Richard Gnat reviewed this report in accordance with KPRG's quality assurance/quality control procedures.

1. Wetlands Location Restriction Determination

In order to determine if the Quarry was located in wetlands, it was necessary to determine if wetlands are present in the area of the Quarry. Site visits to the Quarry did not identify any wetlands around the perimeter of the Quarry that would indicate if wetlands were present prior to the mining of the Quarry. The national wetlands inventory (NWI) and the Will County Geographical Information System (GIS) Data Viewer were viewed to identify the presence of wetlands around the Quarry. Neither the NWI nor the Will County GIS Data Viewer identified wetlands around the Quarry, but the NWI did identify wetlands located inside the Quarry. The wetlands identified inside the Quarry were classified as a lake habitat with a classification code of L1UBHx. The definition of each component of this classification code is as follows:

- L = System: Lacustrine. The Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, and emergent mosses or lichens with 30 percent or greater areal coverage; and (3) total area of at least 20 acres. Similar wetlands and deepwater habitats totaling less than 8 ha are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin equals or exceeds 8.2 ft at low water.

- 1 = Subsystem: Limnetic. This Subsystem includes all deepwater habitats (i.e., areas > 8.2 ft deep below low water) in the Lacustrine System. Many small Lacustrine Systems have no Limnetic Subsystem.

- UB = Class: Unconsolidated Bottom. Includes all wetlands and deepwater habitats with at least 25% cover of particles smaller than stones (less than 6-7 cm), and a vegetative cover less than 30%.
- H = Water Regime: Permanently Flooded. Water covers the substrate throughout the year

in all years.

- x = Water Chemistry: Excavated. This Modifier is used to identify wetland basins or channels that were excavated by humans.

The active mining of the limestone and the use of this open Quarry to store CCR from the burning of coal at Joliet generating stations 9 and 29 created the necessary conditions for the wetland that has been classified inside the Quarry. The removal of the limestone created the manmade topographical depression that fulfills the first requirement for a Lacustrine System and the excavated water chemistry (x) designation as noted above. The exposure of the limestone during the mining activities removed vegetation within the area, which fulfills the second requirement for a Lacustrine System. The sluicing of CCR from the generating stations into the Quarry for storage created the standing water and the manmade depression was large enough to allow the surface of the water to be at least 20 acres in size, which meets the third requirement for a Lacustrine System. In addition, the standing water will minimize the potential for vegetation to establish itself on the CCR. The limestone was removed to a depth that allowed the stored water to achieve a depth greater than 8.2 feet deep, which is why the Limnetic Subsystem (1) designation is applicable. The manmade depression is permanently flooded because it was created in a way that does not allow for the natural drainage of the water, which is why the water regime permanently flooded (H) designation is applicable.

The wetland classification given to the standing water and the area within the Quarry is a result of the mining operation and the CCR material storage activities that took place in this area. Therefore, based on this evaluation, the Quarry is not located in a wetland, but an area classified as a wetland that was artificially created within the Quarry.

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 engineering. The contents of this report are based solely on the observations of the conditions observed by KPRG personnel and information provided to KPRG by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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U.S. Fish and Wildlife Service, 2018. "National Wetlands Inventory," https://www.fws.gov/wetlands/, accessed 7 September 2018.

Will County, 2018. "GIS Data Viewer," http://www.willcogis.org/website2014/gis/applications.html, accessed 7 September 2018.

FAULT AREAS LOCATION RESTRICTIONS
LINCOLN STONE QUARRY
JOLIET #9 STATION
OCTOBER 2018

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.62, KPRG and Associates, Inc (KPRG) prepared this report to document compliance with location restrictions related to fault areas for the existing Lincoln Stone Quarry (the Quarry) at the Joliet #9 Station (Site) in Joliet, Illinois.

The work presented in this report was performed under the direction of Joshua Davenport in accordance with §257.62. Richard Gnat reviewed this report in accordance with KPRG's quality assurance/quality control procedures.

1. Fault Areas Location Restriction Determination

The Quarry 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 the Quarry complies 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 KPRG personnel and information provided to KPRG by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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3. References

USGS, 2018. "Quaternary Fault and Fold Database," https://earthquake.usgs.gov/hazards/qfaults/, accessed 17 September 2018.

SEISMIC IMPACT ZONES LOCATION RESTRICTIONS
LINCOLN STONE QUARRY
JOLIET #9 STATION
OCTOBER 2018

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.63, KPRG and Associates, Inc (KPRG) prepared this report to document compliance with location restrictions related to seismic impact zones for the existing Lincoln Stone Quarry (the Quarry) at the Joliet #9 Station (Site) in Joliet, Illinois.

The work presented in this report was performed under the direction of Joshua Davenport in accordance with §257.63. Richard Gnat reviewed this report in accordance with KPRG's quality assurance/quality control procedures.

1. Seismic Impact Zones Location Restriction Determination

The U.S. Geological Survey (USGS) National Seismic Hazard Tool website was used to provide the peak ground acceleration based on a 2% probability in 50 years, with a land designation of 'a site on rock' with a ground acceleration of 760 m/s in the upper 30 meters. The peak ground acceleration was determined to be 0.070 g in 50 years, which is less than 0.10 g in 50 years. The Quarry complies with the location requirement in 257.63(a) and is not located in a seismic impact zone. The peak ground acceleration where the Quarry is located is 0.070 g in 50 years, which is less than 0.10 g in 50 years, which is the minimum threshold specified in the regulations.

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 engineering. The contents of this report are based solely on the observations of the conditions observed by KPRG personnel and information provided to KPRG by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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3. References

USGS, 2018. "National Seismic Hazard Tool," https://www.earthquake.usgs.gov/hazards/interactive/, accessed 17 September 2018.

UNSTABLE AREAS LOCATION RESTRICTIONS
LINCOLN STONE QUARRY
JOLIET #9 STATION
OCTOBER 2018

Pursuant to Code of Federal Regulations Title 40, Part 257, Subpart D (40 CFR), Section 257.64, KPRG and Associates, Inc (KPRG) prepared this report to document compliance with location restrictions related to unstable areas for the existing Lincoln Stone Quarry (the Quarry) at the Joliet #9 Station (Site) in Joliet, Illinois.

The work presented in this report was performed under the direction of Joshua Davenport in accordance with §257.64. Richard Gnat reviewed this report in accordance with KPRG's quality assurance/quality control procedures.

1. Unstable Areas Location Restriction Determination

The Quarry is not located in unstable areas. Therefore, the location of the Quarry complies 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 engineering. The contents of this report are based solely on the observations of the conditions observed by KPRG personnel and information provided to KPRG by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.

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NOTES TO USERS

This map is for use in administering the National Flood Insurance Program; It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

Coastal base flood elevations apply only landward of 0.0' National Geodetic Vertical Datum of 1929 (NVGD), and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

For community map revision history prior to countywide mapping, see section 6.0 of the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

DIGITAL DATA AVAILABILITY: Digital files containing the thematic floodplain information shown on these maps are published by the Federal Emergency Management Agency in DLG-3 Optional format on CD-ROM. Requests for data should include the full name of the community or county and the Flood Insurance Rate Map panel numbers covered by the request. Contact the Federal Emergency Management Agency, Flood Map Distribution Center, 6930 (A-F) San Tomas Road, Baltimore, Maryland 21227-6227.
Telephone 1-800-358-9616.

NOTE: The coordinate system used for the production of this Flood Insurance Rate Map (FIRM) is Universal Transverse Mercator (UTM), North American Datum of 1927 (NAD27), Clarke 1866 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to the Transverse Mercator projection, NAD27. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of the information shown on the FIRM.

ATTENTION: Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, contact the National Geodetic Survey at the following address:

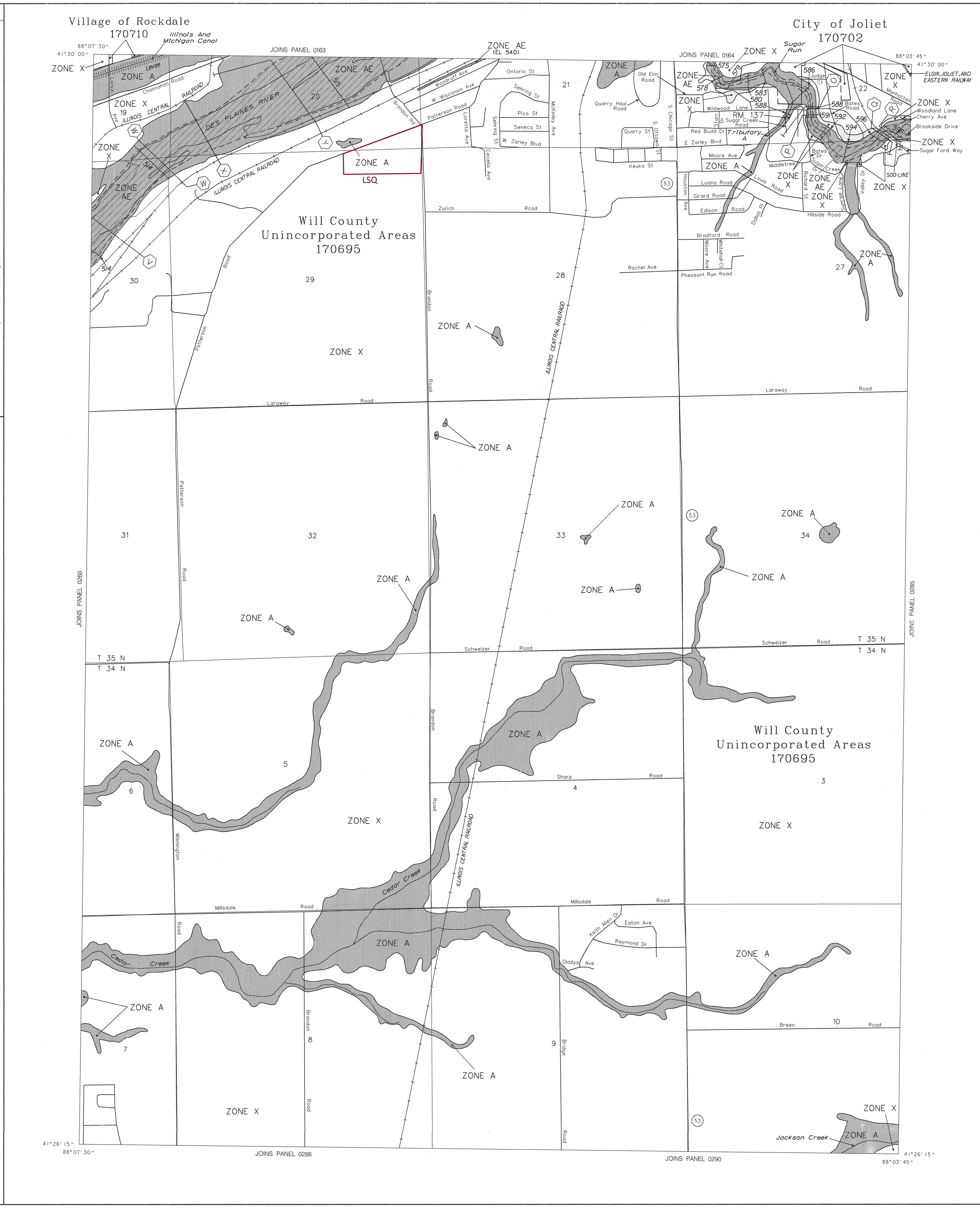
Vertical Network Branch, N/CG13
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

Base Map Source: 1:100,000 USGS Digital Line Graphs. Map users should be aware that this base map source causes road alignment distortions at and near road intersections. These alignment problems have been corrected in the vicinity of identified floodplains.

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 137	591.62	A chiseled square on top of east downstream wing wall located at Sugar Creek Road bridge.

[1]National Geodetic Vertical Datum of 1929.



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE A99	To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.
ZONE V	Coastal flood with velocity hazard (wave action); no base flood elevations determined.
ZONE VE	Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X	Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X	Areas determined to be outside 500-year floodplain.
ZONE D	Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS*

Identified 1983 — Identified 1990 — Otherwise Protected Areas

*Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain Boundary
	Floodway Boundary
	Zone D Boundary
	Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
513	Base Flood Elevation Line; Elevation in Feet**
A — A	Cross Section Line
(EL 987)	Base Flood Elevation in Feet Where Uniform Within Zone**
RM7 x	Elevation Reference Mark
● M1.5	River Mile

**Referenced to the National Geodetic Vertical Datum of 1929

MAP REPOSITORY

Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
SEPTEMBER 6, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

Refer to the FLOOD INSURANCE RATE MAP effective date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE
1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

**WILL COUNTY,
ILLINOIS
AND INCORPORATED AREAS**

PANEL 280 OF 585

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
JOLIET, CITY OF	170702	0280	E
ROCKDALE, VILLAGE OF	170710	0280	E
UNINCORPORATED AREAS	170695	0280	E

Notice to User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

MAP NUMBER
17197C0280 E

EFFECTIVE DATE:
SEPTEMBER 6, 1995

Federal Emergency Management Agency

<u>ATTACHMENT 5</u>
<u>PERMANENT MARKERS</u>

Photo documentation –Lincoln Stone Quarry Signage. Joliet 9 Generating Station, Joliet, IL.

1. Lincoln Stone Quarry Posted IEPA ID Sign

ATTACHMENT 6
INCISED/SLOPE PROTECTION DOCUMENTATION

Attachment 6 – No Attachment

ATTACHMENT 7
EMERGENCY ACTION PLAN

EMERGENCY ACTION PLAN

JOLIET/LINCOLN STONE QUARRY
MIDWEST GENERATION, LLC
JOLIET, ILLINOIS
Permit No. 1994-241-LFM

IEPA Site No. 1978090001

Prepared for:

Midwest Generation, LLC
1800 Channahon Road
Joliet, IL 60436

Prepared by:

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

Project No: 19520.4

October 2021

TABLE OF CONTENTS

FIGURES

1. INTRODUCTION

This Emergency Action Plan (EAP) has been prepared in accordance with 35 Ill. Adm. Code Part 845.520 for Lincoln Stone Quarry (LSQ) associated with Joliet 9 Generating Station in Joliet, Illinois. This EAP describes the measures that will be implemented by Midwest Generation, LLC and any contractors and/or subcontractors working on behalf of Midwest Generation, LLC at Lincoln Stone Quarry (LSQ) to prevent a safety emergency or in the event of a safety emergency, to respond in a safe, effective and timely manner to mitigate the situation.

Safety emergencies can result from natural disasters or malfunctioning equipment while work is being performed. A risk assessment was performed to identify the most likely safety emergencies to occur and opportunities to mitigate or minimize the impacts and occurrence of those emergencies. As always, Midwest Generation, LLC strives for a safety emergency/injury free work experience, but in the event of a safety emergency this EAP will act as a reference.

This EAP is to be used as a reference describing the operation of LSQ, to communicate practices for preventing and responding to safety emergency response situations, and the notification procedures during emergency response situations.

2. FACILITY INFORMATION

Facility Name:	Lincoln Stone Quarry
Mailing Address:	1800 Channahon Road Joliet, Illinois 60436
Site Address:	Southeast Corner of Patterson & Brandon Road Joliet, Illinois 60436
Operator:	Midwest Generation, LLC
Contact Name:	DeAndre Cooley 1800 Channahon Road Joliet, Illinois 60436 Telephone: 779-279-2321
Owner:	Lincoln Stone Quarry, Inc. Attn: Mr. Fred Kaplan 500 North Dearborn Street, Second Floor Chicago, Illinois 60654-3372

The final disposal of the bottom ash/boiler slag is in the Main Quarry. In the Main Quarry, the bottom ash/boiler slag settles out of the water and is contained in the Main Quarry. The water gravity drains from the Main Quarry to the Lower Quarry through two underground discharge pipes that are located under Patterson Road. The flow rate from the Main Quarry to the Lower Quarry can be controlled. The water enters the Lower Quarry into the pond where it is aerated before it is pumped to the Des Plaines River under NPDES discharge permit no. IL0002216, Outfall 005.

As warranted by market demand, some of the CCB material is removed from the Main Quarry and reused. As allowed by the permit, up to 40,000 tons of CCB material can be removed from the Main Quarry and hauled offsite for beneficial reuse. The removal is performed by LaFarge, which will excavate the bottom ash/boiler slag from the disposal area using a mechanical excavator, load the ash/slag material into dump trucks and haul offsite.

A groundwater extraction system was installed along the south edge of LSQ to address the component of groundwater flow away from the Main Quarry to the southeast. The extraction system consists of twelve extraction wells, X101 through X112, that are approximately 145 feet deep and each well contains one pump. The pumps are set 100 feet deep inside each extraction well and their pump rates generally range from 3 to 12 gallons per minute (gpm). The pumps discharge through a series of pipes and valves and exit into the Main Quarry. The flow rate for each pump is manually controlled using ball valves and globe valves. As needed, the valves are manually opened and closed to adjust the flow rate of the pump. The valves for extraction wells X101 through X104 are located in an underground vault that is near extraction well X104. The valves for extraction wells X105 through X107 are located in individual ground level vaults for each extraction well. The valves for extraction wells X108 through X112 are located in an underground vault that is near the sluice pipes discharge, between extraction wells X108 and X109. The set of twelve pumps are controlled by three panels, which turn the pumps on and off, record the water level in each extraction well, and record the flow rates of each pump. The components of the extraction system are identified on Figure 2.

The pumps and controls are supplied by electrical power that comes from Patterson Road and Brandon Road. The pumps and control panel for extraction wells X101 through X104 are supplied power by overhead power lines that come from Brandon Road. The overhead power lines connect to a transformer on the east side of Brandon Road, cross Brandon Road, connect to an electrical meter on the west side of Brandon Road, and then run overhead to the control panel. The pumps and controls for extraction wells X105 through X112 are powered by overhead power lines that first come from Patterson Road and run south adjacent to the access road and then turn east when the access road turns east, from this point the power lines run underground and connect to a transformer. This transformer then drops the power from three-phase, high-voltage power down to single-phase 200-240 volts, which is then connected to the control panel for extraction wells X108 through X112 and the control panel for extraction wells X105 through X107.

The above described groundwater extraction system was necessary due to the influence on the groundwater flow caused by Laraway Quarry. Boyd's Quarry, which is an inactive quarry owned by Midwest Generation, LLC, is used by the owner as a hydraulic control to maintain natural groundwater flow on the east side of LSQ to counteract the unnatural groundwater flow caused by the influence of the Laraway Quarry dewatering. Boyd's Quarry has established a static water level since being inactive and it has an influence on groundwater flow in the area. Field observations identified that Boyd's Quarry is connected to the Main Quarry by the same permeable portion of the Silurian dolomite described above. If the water level in Boyd's Quarry were to drop below the water level in the Main Quarry, the natural groundwater flow would be affected. This would result in groundwater flow going to the east/northeast, which would be opposite of the natural groundwater flow direction. The natural groundwater flow direction is from Boyd's Quarry going west and northwest towards the Main Quarry and the Des Plaines River. In order to maintain compliance with the operations permit for LSQ and to avoid the need for an additional groundwater extraction system, the natural groundwater flow must be maintained and this is accomplished by ensuring the water level in the Main Quarry is lower than the static water level in Boyd's Quarry.

The water levels in Boyd's Quarry and the Main Quarry are monitored continuously using pressure transducers. The water levels are recorded and uploaded to a website so the LSQ operator can monitor the difference in water levels between Boyd's Quarry and the Main Quarry. It is important that the water level in the Main Quarry remain below the water level in Boyd's Quarry and this is accomplished by keeping the Main Quarry water level at least three (3) feet lower than the water level in Boyd's Quarry. If the water level in the Main Quarry is less than three feet lower than the water level in Boyd's Quarry, then the discharge from the Main Quarry into the Lower Quarry must be increased in order to lower the water level in the Main Quarry. The Lower Quarry pond is able to accommodate any additional water from the Main Quarry by increasing the pumping rate from the pond to the Des Plaines River.

3. EVENTS THAT REPRESENT A SAFETY EMERGENCY

In accordance with 35 Ill. Adm. Code 845.520, this section identifies the events or circumstances 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 safety emergencies discussed below are based on LSQ not accepting CCR or any other waste streams and its existence as an incised surface impoundment.

3.1 Main Quarry Discharge Pipes

The scenarios that would affect the Main Quarry discharge pipes are as follows:

3.1.1 Destruction of the Pipes by a Tornado

If a tornado were to touch down at LSQ, damage to the discharge pipes may be possible because they are exposed. Any type of damage from a tornado or other natural disaster is unavoidable. The probably of a tornado touching down at LSQ is low, so the overall hazard rating for this scenario is low probability/low impact because the sluice pipes are no longer in use.

3.1.2 Vehicle Traffic Damages the Pipes

Making contractors aware of the pipes and having spotters when large vehicles are maneuvering near the pipes will prevent any damage and/or collisions to the pipes. Also ensuring proper maintenance of the pipes will maintain the structural integrity of the pipes, which will help to minimize or eliminate any damage to the pipes in the event a collision occurs. The overall hazard rating for this event is low probability/low impact because the vehicle traffic around the pipes is minimal, but if a pipe is damaged that will cause an inconvenience requiring repair.

3.2 Groundwater Extraction System

The groundwater extraction system in general consists of twelve (12) extraction wells, twelve (12) pumps, three control panels, and two underground vaults. Further detail was provided previously in Section 2.2. The scenarios that would affect the groundwater extraction system are as follows:

3.2.1 Natural Disaster

In the event that a natural disaster knocks down the power lines at LSQ, the groundwater extraction system will be without power. The groundwater extraction system going offline is not considered a release; however the operation of the system is important to the operation of LSQ and is required to be in compliance with LSQ’s permit. Power should be restored to the system as soon as possible, but this plan recognizes that the power distribution through the power lines is out of the control of Midwest Generation, LLC. If a prolonged power outage is to occur, other precautions should be made, such as powering the system with a temporary generator.

In addition, a tornado or severe storm could destroy or cause the control panels to malfunction. Destruction or malfunctioning of the control panels causing the pumps to go offline is not considered a release, for the same reasons the power going out is not a release, which is noted above. As noted above it is important to return the pumps to full operation as quickly as possible to ensure compliance with LSQ's landfill permit. This event has occurred in the past as a result of a lightning strike near the control panel for X101 through X104, which caused the pumps to stop operating. The non-operational pumps were discovered as part of the regular maintenance of the system and were returned to operational as quickly as possible.

The overall hazard ratings for these scenarios are medium probability/high impact. This is a result of the fact that lightning has struck nearby one of the cabinets before and caused the system to stop operating and also thunderstorms occur on a regular basis throughout the spring and summer months.

3.2.2 <u>Transformer Malfunction</u>

The power for extraction wells X105-X112 is relayed to the system using a transformer that is adjacent to the sluice pipe discharge into the Main Quarry. In the event this transformer malfunctions, those pumps would be non-operational. Malfunctioning could include a simple failure or an explosion of the transformer as a worst case situation. In the event the transformer fails, notify the appropriate personnel, as outlined in this Plan. If the transformer explodes, notify the appropriate personnel and the electric utility, whose contact information is included in this Plan, see section 6. The overall hazard rating for this scenario is low probability/high impact because the chance it would happen is very unlikely but the impact to the groundwater extraction system is high because this would cause the system to lose power, potentially for a long time.

3.3 <u>Other Scenarios of Concern</u>

Some scenarios for other areas of the site are presented below.

3.3.1 <u>Natural Disaster affecting the West Filled Area Cap</u>

A fire on the cap of the WFA would damage the grass and loosen the soil allowing for the potential for erosion to occur. Erosion of the cap would expose CCR and allow for a potential release to occur. If CCR is released from the WFA, extent of the CCR release could extend north on to Patterson Road, west on to the Commonwealth Edison substation, south on to agricultural land, and east into the Main Quarry. This release would not extend into a waterway even if it enters the Main Quarry. If a CCR release were to enter the Main Quarry, it would be handled as part of the normal disposal process of the other CCR that enters the Main Quarry. The overall hazard rating for this scenario is low probability/medium impact because the chance for a fire is low and the effect to the cap would be detrimental. The CCR release would create a nuisance for the land that is spread to, but the nuisance could be cleaned up and taken care of relatively quickly and easily.

A tornado would cause more damage to the WFA cap than a fire and has the potential to create a greater extent of a release. Any type of damage from a tornado is unavoidable. The tornado would certainly expose the CCR material and potentially transport it to an offsite location. The probably of a tornado touching down at LSQ is low but the potential for damage to the cap and a CCR release is high, so the overall hazard rating for this scenario is low probability/high impact.

3.3.2 Severe Weather Occurs at LSQ

There is the possibility for severe weather to occur at LSQ when workers are present. The presence of workers at LSQ takes place at least twice a month when the groundwater extraction system is serviced. The workers present consist of two people using typical passenger vehicles and tools to change pumps in the extraction wells. On rare occasions, additional personnel and equipment are used to service the groundwater extraction system. The weather is monitored prior to personnel being at LSQ, and if the potential for severe weather does exist, the weather is monitored while personnel are at LSQ.

If severe weather occurs while workers are present and evacuation of the site is required, the workers should notify the guard shack located off of Brandon Road and proceed to that guard shack. The guards will provide the workers with further instructions if additional shelter is needed, say in the event of a tornado or nearby chemical spill.

If severe weather causes a fire while workers are present, they should follow the notification procedures outlined in this Plan and also call the fire department using 911. Workers should not attempt to extinguish a large fire, but they can attempt to extinguish a small fire by smothering or with a fire extinguisher.

The overall hazard rating for severe weather occurring at LSQ is medium probability/high impact. Thunderstorms and large precipitation events occur every year without damaging LSQ, but it is the presence of these events and their ability to turn into something more severe that warrants the medium probability rating. A typical thunderstorm and/or large precipitation event would not cause damage to LSQ, but if the weather turns severe, damage will occur and it will affect some operation and/or portion of the LSQ property.

3.3.3 Releases other than CCR or CCB

Releases that involve material other than CCR and/or CCB have the potential to occur. The releases would mainly consist of oil and or fuel from vehicles that are used by personnel at LSQ during typical maintenance operations. The potential quantity of material released is small, typically less than 20 gallons and the release would have the potential to enter the Main Quarry. If the release enters the Main Quarry notify the appropriate personnel as outlined in this Plan. Another potential for a release would be during the acid treatment of the groundwater extraction system. This treatment consists of mixing an acidic solution which is then pumped through the underground discharge piping associated with the extraction systems to remove build-up of precipitated scale. The release would be from the storage tank used to contain the acid mixture as it is being pumped. This quantity is typically between 200 to 400 gallons. A release of this material does have a chance of entering the Main Quarry, but the small quantity does not pose a risk to the Main Quarry, Des Plaines River or other waterway. If a release occurs notify the appropriate personnel as outlined in this Plan

3.3.4 Beneficial Reuse of Bottom Ash/Boiler Slag

As noted above in Section 2.2, some of the bottom ash/boiler slag from Joliet #9 Generating Station is beneficially reused. Lafarge removes the material as it is needed based upon market demand for their products in which the bottom ash/boiler slag is reused. Lafarge personnel are in charge of removing the material form the Main Quarry and they use their own mechanical excavator at LSQ when needed. Lafarge personnel should be aware of the notification procedures outlined is this Plan and they should have enough personnel onsite to safely perform the material removal. At times, Lafarge equipment and personnel are setup on the bottom ash/boiler slag that is in the Main Quarry to move the material to a point where it can be removed and loaded into dump trucks. At these times, Lafarge should have equipment/tools to be able to safely make their way back to the solid ground of LSQ if the bottom ash/boiler slag where their machine was located began to slough or collapse. It is Lafarge's responsibility to have an appropriate health and safety plan to conduct this work.

4. INCIDENT RESPONSE ACTIONS

4.1 General Response Procedures for Release and/or Spill

This section describes the general response procedures once an incident occurs and/or is discovered at LSQ. The following actions should be taken:

- Stabilize the Incident:
  - Evacuate the area if necessary;
  - If material has been released but is no longer flowing, contain the material to prevent further migration of the material, place a stop-gap measure at the point of release to prevent immediate reoccurrence;
  - If a material has been released that presents an immediate danger to people or the environment, initiate recovery operations of the material. Recovery operations should be completed only by qualified and trained personnel;
  - Initiate cleanup of the spilled product if a threat to human health is not present;
  - Remove equipment from the spill area, if possible;
  - If a structure or site infrastructure is damaged, assess the situation to evaluate if containment or shoring measures need to be put in place to prevent further damage;
  - Establish a security perimeter if needed, and limit personnel from the area.

- Notify appropriate personnel
  - Notify the supervising personnel at LSQ;
  - Notify Operations/shift supervisor;
  - Notify emergency personnel (Fire Dept/EMS/Police), if necessary;
  - Notify the landfill operator, operations manager, the Regional Environmental Manager;
  - Notify cleanup contractors and consultants, who can begin planning the recovery/repair options;

  - Notify Will County Emergency Management Agency, IEPA, and Illinois Emergency Management Agency as necessary.

- Document the discovery, nature, and extent of the incident
  - Date/time and who discovered the incident;
  - Date/time of discovery;
  - Name of responsible party of the incident;
  - Describe the incident, including location and whether a danger or threat exists;
  - Source and cause of the incident;
  - Estimate of the quantity of material if the incident is a release;
  - Number and types of injuries (if any);
  - Media affected or threatened by the incident (i.e., water, land, or air);
  - If material entered any surface water, name the surface water and identify where the material entered the surface water;
  - Describe the weather at time of incident;
  - Describe stabilization actions;
  - Take photographs of the incident including the point of release, extent of release, and stabilization methods.

- Initiate Privileged and Confidential Protocols for CCB and CCR Material
  - Initiate privileged and confidential protocols if CCB and/or CCR material was released, any material left Midwest Generation, LLC owned/operated property, or any material entered surface water;
  - Notify corporate counsel for further instructions, use "Privileged and Confidential" on all communications.

4.2 <u>Fire Response</u>

If a small fire breaks out, attempt to extinguish it using a fire extinguisher or other appropriate measures. If the fire can't be contained using a fire extinguisher or other appropriate measures, call the fire department. The Site location information is as follows:

- Address: 1601 S. Patterson Road, Joliet, IL 60436;
- Location: Southwest corner of Brandon Road and Patterson Road, gate entrance on Patterson Road, after the bend. The gate is approximately 0.5 miles west of the intersection.

If possible, attempts should be made to control the fire with either fire breaks or by wetting the perimeter area around the fire or in its path.

4.3 <u>Emergency Responders Contact Information</u>

Section 5.34 below provides the contact information for the emergency responders. The appropriate Midwest Generation personnel will determine who to notify, including any affected residents, in the case of an imminent or actual site failure. Appropriate contractors will be utilized to assist Midwest Generation personnel 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 below.

5. INFORMATION FOR INCIDENT NOTIFICATION

5.1 Facility Address and Location

- Address: Lincoln Stone Quarry, 1601 Patterson Road, Joliet, IL 60436
- Location: Southwest corner of Brandon Road and Patterson Road, gate entrance on Patterson Road, approximately 0.5 miles west of the corner of Patterson Road and Brandon Road.
- Entrances and Exits (see Figure 2) – There are three gates that provide access to LSQ:
  - Gate 1 – Northeast corner of LSQ, at the intersection of Brandon and Patterson Road;
  - Gate 2 – Approximately 0.5 miles west along Patterson Road from Brandon Road, this gate provides access to the Joliet Generating Station 9 bottom ash/boiler slag disposal area;
  - Gate 3 – Approximately 0.5 miles west along Patterson Road from Brandon Road, this gate provides access to the WFA and the groundwater extraction system.

5.2 Notification Chain within Midwest Generation, LLC

Priority	Midwest Generation, LLC Contacts
1a	Joliet 9 Station Operations/Shift Supervisor 815-207-4911 815-207-4902
1b	Joliet 29 Station Operations/Shift Supervisor 815-207-5410 815-207-5409 815-207-5402
1c	Joliet 9 Guard Shack 815-207-4918 or 815-207-4919
2	Landfill Operator DeAndre Cooley – 779-279-2321
3	Joliet 9 and 29 Stations' Operations Manager 815-207-5415
4	Regional Environmental Manager Sharene Shealey – 724-255-3220
5	LSQ Consultant – KPRG and Associates, Inc., 262-781-0475 Richard Gnat – 262-227-7755
6	Site Cleanup Contractor SET Environmental – 877-437-7455

5.3 Other Contact Information

Agency	Contact
Joliet Fire Department	911 or 815-724-3500
Joliet Police Department	911 or 815-724-3100 Non-emergency 815-726-2491
Will County Emergency Management Agency	EMERGENCY – 815-740-0911 Non-Emergency/Office – 815-740-8351
National Response Center	800-424-8802
Illinois Emergency Management Agency	Office – 217-782-2700 24-hour Response – 800-782-7860
Illinois Environmental Protection Agency	Imran Syed 217-782-7813

6.0 SITE MAP AND A SITE MAP DELINEATING DOWNSTREAM AREA

In accordance with 845.520(b)(), a site map is provided as Figure 1 and a site map close-up is provided as Figure 2. Figure 2 shows the extent of LSQ and the areas downstream of LSQ.

7.0 ANNUAL FACE-TO-FACE MEETING

In accordance with 845.520(b)(5), a face-to-face meeting or an exercise between representatives of Will County Station and the local emergency responders shall be offered and, if accepted, held on an annual basis. The purpose of the annual meeting is to review the EAP to assure that contacts, addresses, telephone numbers, etc. are current. The annual meeting will be held whether or not an incident occurred in the previous year. In the event an incident occurs, the annual meeting date may be moved up in order to discuss the incident closer to the date of occurrence. If no incidents have occurred, the annual meeting will be held to inform local emergency responders on the contents of the EAP and changes from the previous year. Documentation of the annual face to face meeting will be recorded and placed in the operating record for the Station.

Pursuant to §845.520(d), the EAP requires modification whenever there is a change in conditions that would substantially affect the EAP in effect. Changes to the plan shall be made as appropriate, and a copy of the changes will be kept at the station, with the revised EAP placed in the facility's operating record. The written EAP must be evaluated, at a minimum, every five years to ensure the EAP is accurate with §845.520.

8.0 LIMITATIONS AND CERTIFICATION

This Emergency Action Plan was prepared to meet the requirements of 845.520(b). 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.

Signature:

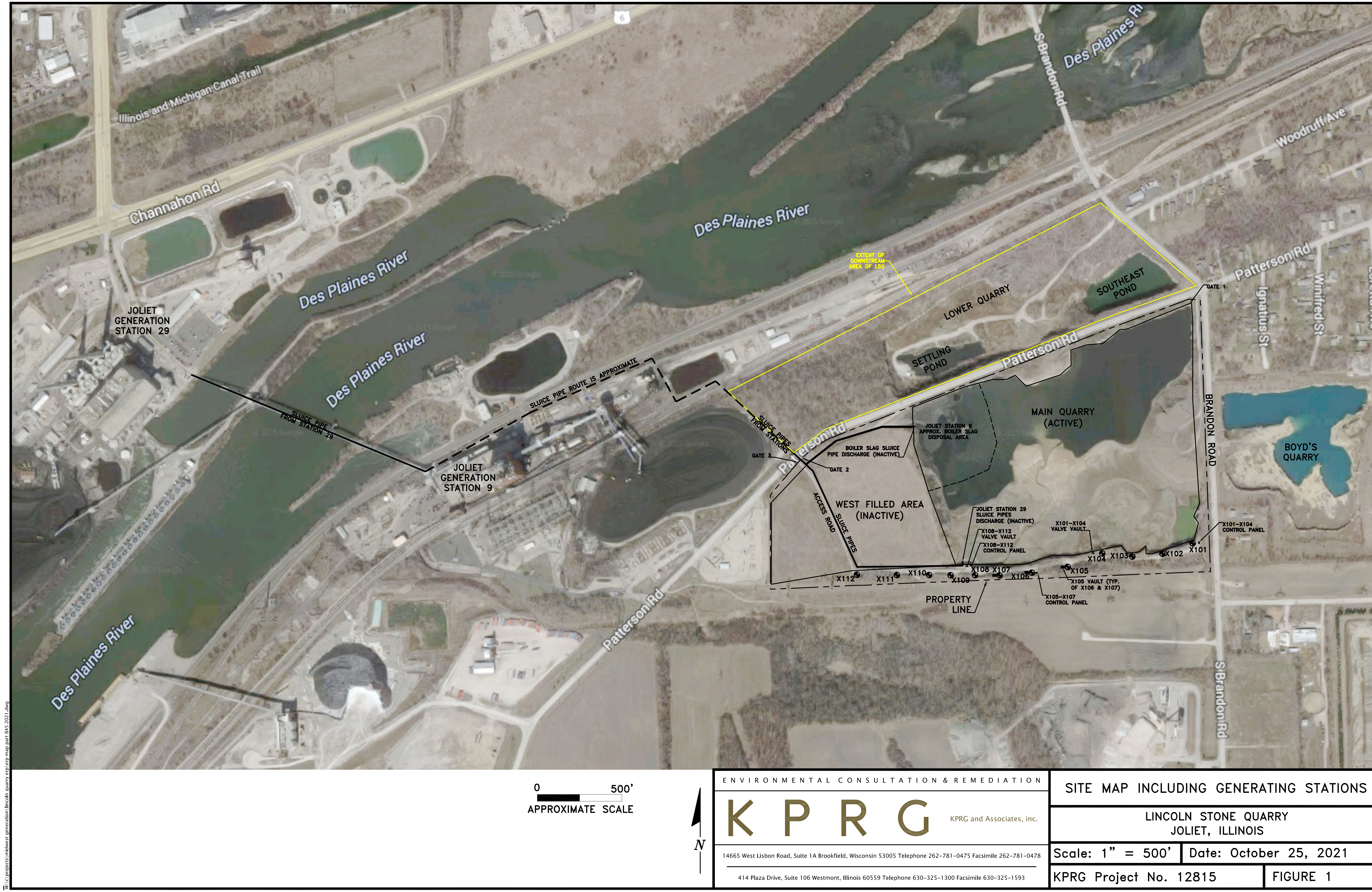
Name: Joshua D. Davenport, P.E.

Date of Certification: 10/29/21

Illinois Professional Engineer No.: 062.061945

License Expires: 11/30/2021

FIGURES



W:\c\projects\midwest generation\lincoln quarry erp\erp map part 845 2021.dwg
Illinois and Michigan Canal Trail
Channahon Rd
Des Plaines River
Des Plaines River
Des Plaines River
Des Plaines River
Des Plaines Ri
JOLIET GENERATION STATION 29
JOLIET GENERATION STATION 9
SLUICE PIPE FROM STATION 29
SLUICE PIPE ROUTE IS APPROXIMATE
SLUICE PIPES FROM STATIONS
EXTENT OF DOWNSTREAM AREA OF LSQ
LOWER QUARRY
SOUTHEAST POND
SETTLING POND
Patterson Rd
Patterson Rd
Patterson Rd
Patterson Rd
S Brandon Rd
S Brandon Rd
Woodruff Ave
Ignatius St
Winifred St
Loretta Ave
GATE 1
GATE 2
GATE 3
BRANDON ROAD
BOYD'S QUARRY
MAIN QUARRY (ACTIVE)
JOLIET STATION 9 APPROX. BOILER SLAG DISPOSAL AREA
BOILER SLAG SLUICE PIPE DISCHARGE (INACTIVE)
WEST FILLED AREA (INACTIVE)
ACCESS ROAD
SLUICE PIPES
JOLIET STATION 29 SLUICE PIPES DISCHARGE (INACTIVE)
X108–X112 VALVE VAULT
X108–X112 CONTROL PANEL
X101–X104 VALVE VAULT
X101–X104 CONTROL PANEL
X105 VAULT (TYP. OF X106 & X107)
X105–X107 CONTROL PANEL
X101
X102
X103
X104
X105
X106
X107
X108
X109
X110
X111
X112
PROPERTY LINE
0
500'
APPROXIMATE SCALE
N
ENVIRONMENTAL CONSULTATION & REMEDIATION
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 MAP INCLUDING GENERATING STATIONS
LINCOLN STONE QUARRY
JOLIET, ILLINOIS
Scale: 1" = 500'
Date: October 25, 2021
KPRG Project No. 12815
FIGURE 1

ENVIRONMENTAL CONSULTATION & REMEDIATION

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

LINCOLN STONE QUARRY SITE MAP	
LINCOLN STONE QUARRY JOLIET, ILLINOIS	
Scale: 1" = 300'	Date: October 25, 2021
KPRG Project No. 12815	FIGURE 2

ATTACHMENT 8
FUGITIVE DUST CONTROL PLAN

CCR COMPLIANCE
CCR FUGITIVE DUST CONTROL PLAN

Midwest Generation, LLC
Joliet #9 Generating Station and Lincoln Stone Quarry
1601 South Patterson Road
Joliet, Illinois

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

October 13, 2021

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SECTION/DESCRIPTION **PAGE**

APPENDICES

1.0 INTRODUCTION

On April 15, 2021, the Illinois Environmental Protection Agency adopted a new Part 845 of its waste disposal regulations creating statewide standards for the disposal of coal combustion residuals (CCR) in surface impoundments. 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.

2.0 SITE INFORMATION

2.1 Owner/Operator and Address:

Midwest Generation, LLC
Joliet #9 Generating Station
1601 South Patterson 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 #9 Generating Station is located at 1601 South Patterson Road, Joliet, Will County, Illinois. The facility consists of a natural gas-fired electric power generating station (formerly coal-fired) situated on approximately 170 acres and the associated Lincoln Stone Quarry occupying approximately 120 acres, each are located on the south side of the Des Plaines River. The Station has one generating unit, identified as Unit 6. Electrical power is transmitted from the site to the area grid through overhead transmission power lines. Lincoln Stone Quarry includes a former ash placement site referred to as the West Filled Area that ceased receiving CCR prior to 1994 and the Main Quarry which was used as a landfill for bottom ash and slag and is anticipated to cease receiving CCR when Ash Pond 2 at Joliet #29 is cleaned or closed. Lincoln Stone Quarry may remain open to allow for the beneficial reuse of slag.

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

3.0 POTENTIAL CCR FUGITIVE DUST SOURCES

As a result of the recent fuel conversion, and the correlated fact that all coal combustion ceased at the facility as of March 20, 2016, the remaining potential CCR fugitive dust sources are now limited to only Ash Pond 2, Ash Pond 2 truck transportation routes (related to cleaning of Ash Pond 2), and the disposal landfill. CCR Fugitive dust could potentially be generated from these sources as a result of equipment malfunctions, wind erosion, housekeeping issues and/or the nature of the operation. Specifically, these identified sources were further evaluated to determine the probability of CCR fugitive dust being generated and to determine the level of emission controls that are warranted to mitigate CCR fugitive dust emissions. The findings of the evaluation are individually discussed in the following paragraphs.

Lincoln Stone Quarry was used for routine disposal of bottom ash and slag from the Joliet #9 and Joliet #29 generating stations. Occasionally Joliet #29 Ash Pond 2 was used for Joliet #29 bottom ash; Joliet #29 Ash Pond 2 is covered by a separate CCR Fugitive Dust Plan. Both Joliet #9 and Joliet #29 facilities no longer generate ash thus eliminating ash disposal in Lincoln Stone Quarry (and disposal to Joliet #29 Ash Pond 2). Ash from the Joliet #29 Ash Pond 2 has been disposed of in Lincoln Stone Quarry from cleaning activities associated with Ash Pond 2. Therefore, Ash Pond 2 is no longer a potential CCR fugitive dust source.

Lincoln Stone Quarry currently consists of a closed portion referred to as the West Filled Area, which has a vegetated soil cover over the historically disposed ash and is not subject to the CCR Rule, and the recently inactive bottom ash and slag disposal area referred to as the Main Quarry. Existing ash in the Main Quarry is predominantly submerged; however, a portion is exposed to allow removal and reuse of the slag as a beneficial fill material. After settling occurs, water from the Main Quarry is discharged through a final settling basin and then ultimately discharged through a regulated NPDES outfall.

This potential CCR fugitive dust source is identified on the Site Diagram included in Appendix A.

4.0 DESCRIPTION OF CONTROL MEASURES

4.1 Purpose

The purpose of developing appropriate control measures is to minimize and reduce the emissions of CCR fugitive dust from the identified potential emission sources. The control measures and work practices implemented at the facility are described in the following sections.

4.2 Lincoln Stone Quarry

Lincoln Stone Quarry used to receive bottom ash and slag from the Joliet #9 and Joliet #29 generating stations. Ash in the Main Quarry is approximately 40 feet below grade and is confined by the quarry walls and, therefore, not readily susceptible to wind erosion and generation of potential CCR fugitive dust emissions. Loading of the moisture-laden slag to be used as a beneficial material is also performed within the Main Quarry at a level well below grade. Therefore, the loading operation is also not susceptible to wind erosion. The ash in the West Filled Area lies beneath a vegetated soil cover, which mitigates any wind erosion impacts and the potential for CCR fugitive dust emissions.

Operation of the Main Quarry and West Filled Area is performed in accordance with the conditions of the issued permit, No. 1994-241-LFM, dated August 14, 2015, Modification No. 21. The issued permit includes the requirement to control dust to prevent wind dispersal of particulate matter off site. Additionally, the permit requires quarterly inspections of the West Filled Area and requires repair of erosion and scoured channels observed during the inspection.

5.0 PLAN ASSESSMENTS/AMENDMENTS

To assure that the work practices being implemented adequately control the dust from the identified potential CCR fugitive dust emission source at the facility, routine assessments and record keeping are performed. These procedures include the following:

5.1 CCR Fugitive Dust Assessments

Pursuant to 485.500(b)(3), assessments of the potential CCR fugitive dust emission source identified within this Plan will be conducted to assess the effectiveness of this Plan. The assessment will include observation of Lincoln Stone Quarry to confirm the adequacy of the control measures. The assessments will be conducted as needed to comply with the issued permit 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, however, the station may create their own form.

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 CCR from becoming airborne, this Plan will be amended to include additional control measures.

5.2 Plan Amendments

This 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, however, the station may create their own form. The amended Plan will be reviewed by a Registered Professional Engineer and, if deemed acceptable, will be recertified.

5.3 Citizen Complaints

Any written or verbal complaints received from a citizen involving alleged CCR fugitive dust emission events at the facility will be recorded by an individual designated by the contact identified in Section 2.2 of this Plan. The complaints will be recorded on a form similar to the one included in Appendix D, however, the station may create their own form. Upon receipt of the complaint, an investigation of the alleged source of the CCR fugitive dust emissions will be performed and the results of that investigation recorded on the form. If the CCR fugitive dust emission event is confirmed, any necessary response measures or changes in operation required to mitigate the CCR fugitive dust emissions will be implemented as soon as practicable.

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 35 Ill. Adm. Code Section 845.500. These requirements include the following:

- Place the Plan in the facility's operating record and publicly accessible internet site. If the Plan is amended, replace the initial Plan with the amended Plan. Only the most recent amended Plan will be maintained in the facility's operating record and internet site.

- Prepare an annual CCR Fugitive Dust Control Report and submit to the IEPA as part of the annual consolidated report required by 845.550. The annual report will include:
  - A description of the actions taken to control CCR fugitive dust,
  - A record of all citizen complaints, and
  - A summary of any corrective measures taken.
  - Placement of this report in the operating record and publicly accessible internet site.

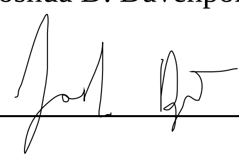
- Provide notification to the IEPA and, if applicable, the Tribal authority when the Plan and reports are placed in the facility's operating record and publicly accessible internet site.

- Submit quarterly reports to IEPA within 14 days from the end of the quarter of all complaints received in that quarter. The quarterly reports will include:
  - The date of the complaint,
  - The date of the incident,
  - The name and contact information of the complainant, and
  - All actions taken to assess and resolve the complaint.

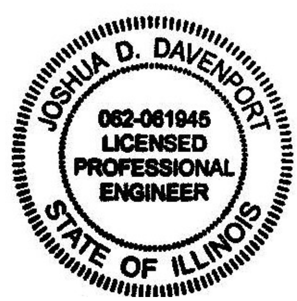
7.0 PROFESSIONAL ENGINEER CERTIFICATION

The undersigned Registered Professional Engineer is familiar with the requirements of 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 CCR Fugitive Dust Control Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and meets the requirements of 845.500, and that this Plan is adequate for the facility. This certification was prepared as required by 845.500(b)(7).

Engineer: Joshua D. Davenport

Signature: 

Date: 10/13/21



Company: KPRG and Associates, Inc.

Registration State: Illinois

Registration Number: 062.061945

License Expiration Date: November 30, 2021

Professional Engineer Stamp:

APPENDIX A

SITE DIAGRAM
POTENTIAL CCR FUGITIVE DUST SOURCES

W:\projects\midwest generation\attorney-client privilege\fugitive dust plans\joliet 9 dust map.dwg

0 550'

APPROXIMATE SCALE

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 2B Brookfield, Wisconsin 53005 Telephone 262-781-0475 Facsimile 262-781-0478

SITE DIAGRAM/CCR FUGITIVE DUST SOURCES

JOLIET 9 GENERATING STATION
JOLIET, ILLINOIS

Scale: 1" = 550' | Date: April 29, 2016

KPRG Project No. 15315 | APPENDIX A

APPENDIX B

EXAMPLE ASSESSMENT RECORD

APPENDIX B

JOLIET #9 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 - Lincoln Stone Quarry

APPENDIX C

EXAMPLE PLAN REVIEW AND AMENDMENT RECORD

APPENDIX C

JOLIET #9 STATION

EXAMPLE CCR PLAN REVIEW/AMENDMENT RECORD

Date of Review	Reason for Review	Section Amended	P.E. Certification (Name/Date)
June 3, 2016	Station fuel change from coal to natural gas.	Sections 1.0 through 5.0 and Section 7.0	Thomas J. Rysiewicz

APPENDIX D

EXAMPLE CITIZEN COMPLAINT LOG

APPENDIX D

JOLIET #9 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 – Boring Logs

ESHARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG Replacement R08S

R08S/D

(R08S) Installed adjacent to this hole.

Sheet No. 1/5

PROJECT JOLIET/LINCOLN QUARRY S44... Date 4/6/93

Hole No. R108 / R08D/S

Feature East of ... No... fill

Coordinates: N

E

Core Sizes —

Angle (from Horizontal) VERTICAL

Bearing —

Date Started 4/6/93

Date Completed 4/7/93

Total Depth 208'

Ground Elevation 5...

Rock Elevation

Overburden Thickness 23'

Ground–Water Elevation

Logged by J E GRIGGS

Depth (Elevation)	Graphic Log: Lithology	Graphic Log: Structure	Graphic Log: Attitude	Classification and Physical Condition	C.R.–Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
0				Logged from cuttings					DRILLING SITE 8.5' SW OF G108
				0-23': FILL					0-208': 6" Air Hammer
									Gardner Denver Rig
10									Completed as a nested well pair. PVC wells installed at 120' and 204'
20		NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	NO SAMPLE		
				23' - 43': DOLOMITE; pinkish gray; fresh angular chips; green sticky shale					
30									
40									

HES HARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG

KO 3/D

Sheet No. 2 of 6
Date 4/7/93

PROJECT JOLIET/LINCOLN QUARRY 54446

Hole No. R108
Feature East of Coal Pile N. of West Fill
Coordinates: N
E
Core Sizes —

Angle (from Horizontal) VERTICAL
Bearing —
Date Started 4/6/93
Date Completed 4/7/93
Total Depth 208'

Ground Elevation
Rock Elevation
Overburden Thickness 23'
Ground–Water Elevation
Logged by JE GRIGGS

Depth (Elevation)	Graphic Log: Lithology	Structure	Attitude	Classification and Physical Condition	C.R.—Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
40									
				43'–87': DOLOMITE; light gray; fresh angular chips; green sticky shale					
50									
60		NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	NO SAMPLE		
70									
80									

HES HARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG

KOE S/D
Sheet No. 3 of 6
Date 4/7/93

PROJECT JOLIET/LINCOLN QUARRY E444G

Hole No. R108
Feature East of Coal Pile N of West Fill
Coordinates: N
E
Core Sizes —

Angle (from Horizontal) VERTICAL
Bearing —
Date Started 4/6/93
Date Completed 4/7/93
Total Depth 208'

Ground Elevation
Rock Elevation
Overburden Thickness 23'
Ground-Water Elevation
Logged by JE GRIGGS

Depth (Elevation)	Graphic Log: Lithology	Graphic Log: Structure	Graphic Log: Attitude	Classification and Physical Condition	C.R.-Graphic	Core Rec. %	RQD %			Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
80										
				87'-125': DOLOMITE; light gray, fresh angular chips; green sticky shale; white chert						
90										
100		NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	NO SAMPLE			
110										
120										

HARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG

Sheet No. 4 of 6
Date 4/7/93

PROJECT JOLIET / LINCOLN QUARRY 5444G

Hole No.	R108	Angle (from Horizontal)	VERTICAL	Ground Elevation	
Feature	East of Coal Pile, N. of West Fill	Bearing	—	Rock Elevation	
Coordinates: N		Date Started	4/6/93	Overburden Thickness	23'
E		Date Completed	4/7/93	Ground–Water Elevation	
Core Sizes	—	Total Depth	208'	Logged by	J E GRIGGS

Depth (Elevation)	Graphic Log: Lithology	Structure	Attitude	Classification and Physical Condition	C.R.–Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
120									
				125'–160': DOLOMITE; mostly dark gray; fresh angular chips; black shale					
130									
140		NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	NO SAMPLE		
150									

HES HARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG

Sheet No. 5 OF 6
Date 4/7/93

PROJECT JOLIET/LINCOLN QUARRY 54446

Hole No. R108	Angle (from Horizontal) VERTICAL	Ground Elevation
Feature Tail of Coal Pile, N. & West Fill	Bearing —	Rock Elevation
Coordinates: N	Date Started 4/6/93	Overburden Thickness 23'
E	Date Completed 4/7/93	Ground–Water Elevation
Core Sizes —	Total Depth 208'	Logged by JE 601665

Depth (Elevation)	Graphic Log: Lithology	Graphic Log: Structure	Graphic Log: Attitude	Classification and Physical Condition	C.R.–Graphic	Core Rec. %	RQD %			Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
160				160' - 168'; SHALE; black; fresh angular chips						
170				168' - 202'; DOLOMITE; light gray; fresh angular chips; green sticky shale						
180		NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	NO SAMPLE			
190										
200										

HARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG

Sheet No. 6 of 6
Date 4/7/93

PROJECT JOLIET/LINCOLN QUARRY 54446

Hole No. R108	Angle (from Horizontal) VERTICAL	Ground Elevation
Feature East of Coal Pile, N. of Wed Fill	Bearing —	Rock Elevation
Coordinates: N	Date Started 4/6/93	Overburden Thickness 23'
E	Date Completed 4/7/93	Ground-Water Elevation
Core Sizes —	Total Depth 208'	Logged by JE GRIGGS

Depth (Elevation)	Graphic Log: Lithology	Graphic Log: Structure	Graphic Log: Attitude	Classification and Physical Condition	C.R.—Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
200				202'-208': SHALE; green and black; green sticky					
210				END OF BORING 208'					

Illinois Environmental Protection Agency — Well Completion Report

Site Number: 1978090001 County: Will (R08S)

Well #: A08S

Site Name: Midwest Generation - Lincoln Quarry, Joliet, IL

State Plane Coordinate: X 1758220 Y 1045679 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Borehole #: A08S

Surveyed by: Jacob & Hefner Associates

IL Registration #: 35-003247

Drilling Contractor: Layne Northwest

Driller: R. Treptow

Consulting Firm: KPRG and Associates, Inc.

Geologist: P. Allenstein

Drilling Method: Core / Air Rotary

Drilling Fluid (Type): none

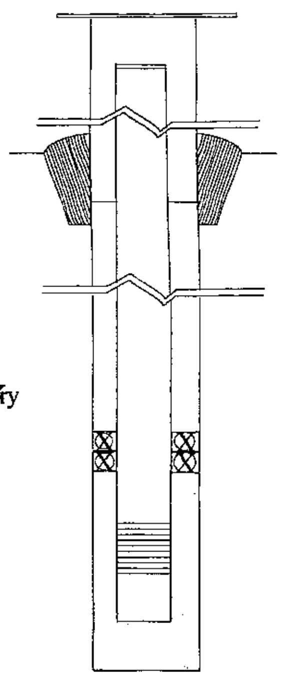
Logged By: P. Allenstein

Date Started: 02/02/06 Date Finished: 02/06/06

Report Form Completed By: P. Allenstein

Date: 03/01/06

ANNULAR SPACE DETAILS



	Elevations (MSL)*	Depths (BGS)	(.01ft.)
		-3.2	Top of Protective Casing
	578.109	-3.0	Top of Riser Pipe
Type of Surface Seal: Concrete	575.606	0.0	Ground Surface
Type of Annular Sealant: Bentonite Grout		2.0	Top of Annular Sealant
Installation Method: tremie pump			Static Water Level (After Completion)
Setting Time:			
Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)			Top of Seal
Installation Method:	469.606	106	Top of Sand Pack
Setting Time:	465.606	110	Top of Screen
Type of Sand Pack: Filter Sand	455.606	120	Bottom of Screen
Grain Size: 5 (Sieve Size)	455.606	120	Bottom of Well
Installation Method: gravity	455.606	120	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Backfill Material: none (if applicable)

Installation Method:

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other ✗
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC ✗, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC ✗, or Other
Screen	SS304, SS316, PTFE, PVC ✗, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	7
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	113
Bottom of Screen to End Cap (feet)	0.5
Screen Length (1st slot to last slot) (feet)	10
Total Length of Casing (feet)	123
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

HARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG

Sheet No. 1 of 5
Date 4/5/93

PROJECT JOLIET/LINCOLN QUARRY 54440

Hole No. R16 — G205 Clustered	Angle (from Horizontal) VERTICAL	Ground Elevation
Feature SE Corner of N. Quarry	Bearing —	Rock Elevation
Coordinates: N	Date Started 4/5/93	Overburden Thickness NONE
E	Date Completed 4/6/93	Ground-Water Elevation
Core Sizes —	Total Depth 190.5'	Logged by JEGRIGGS

Depth (Elevation)	Graphic Log: Lithology	Structure	Attitude	Classification and Physical Condition	C.R.-Graphic	Core Rec. %	RQD %	Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
0		NO SAMPLE	NO SAMPLE	Logged from cuttings 0-20': DOLOMITE; light gray; fresh angular chips; some white chert	NO SAMPLE	NO SAMPLE	NO SAMPLE	DRILLING SITE ≈ 7' SE OF LOCATION G16 0-190.5': 6" Air Hammer Gardner-Denver RIG Completed as a nested well pair. PVC wells installed at 134' and 188'.
10								
20				20'-39': DOLOMITE; pinkish gray; fresh angular chips; green sticky shale				
30								
40								

HARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG

Sheet No. 2 of 5
Date 4/5/93

PROJECT JOLIET/LINCOLN QUARRY 5444G

Hole No.	R16	Angle (from Horizontal)	VERTICAL	Ground Elevation	
Feature	SE Corner of N. Quarry	Bearing	—	Rock Elevation	
Coordinates: N		Date Started	4/5/93	Overburden Thickness	NONE
E		Date Completed	4/6/93	Ground–Water Elevation	
Core Sizes	—	Total Depth	190.5'	Logged by	JEGRIGGS

Depth (Elevation)	Graphic Log: Lithology	Structure	Attitude	Classification and Physical Condition	C.R.–Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
40				39' – 78': DOLOMITE; light gray; fresh angular chips; green sticky shale					
50									
60		NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	NO SAMPLE		
70									
80				78' – 114': DOLOMITE; ~~light gray;~~ fresh angular chips; green sticky shale; white chert					

HARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG

Sheet No. 3 of 5
Date 4/5/93

PROJECT JOLIET/LINCOLN QUARRY 5444G

Hole No. R16
Feature SE Corner of N. Quarry
Coordinates: N
E
Core Sizes —

Angle (from Horizontal) VERTICAL
Bearing —
Date Started 4/5/93
Date Completed 4/6/93
Total Depth 190.5'

Ground Elevation
Rock Elevation
Overburden Thickness NONE
Ground–Water Elevation
Logged by JEGRIGGS

Depth (Elevation)	Graphic Log: Lithology	Graphic Log: Structure	Graphic Log: Attitude	Classification and Physical Condition	C.R.—Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
80									
90									
100		NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	NO SAMPLE		
110									
				114'–146': DOLOMITE; mostly dark gray; fresh angular chips; black shale					
120									

HARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG

Sheet No. 4 of 5
Date 4/6/93

PROJECT JOLIET / LINCOLN QUARRY S.MG

Hole No. R16
Feature SE Corner of N. Quarry
Coordinates: N
E
Core Sizes —

Angle (from Horizontal) VERTICAL
Bearing —
Date Started 4/5/93
Date Completed 4/6/93
Total Depth

Ground Elevation
Rock Elevation
Overburden Thickness NONE
Ground-Water Elevation
Logged by JE GRIGGS

Depth (Elevation)	Lithology	Structure	Attitude	Classification and Physical Condition	C.R.-Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
120									
130									
140		NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	NO SAMPLE		
				146' - 154': SHALE; black; fresh angular chips					
150									
				154' - 187': DOLOMITE; light gray; fresh angular chips; green sticky shale					
160									

HARZA ENVIRONMENTAL SERVICES, INC.

GEOLOGIC LOG

Sheet No. 5 of 5
Date 4/6/93

PROJECT JOLIET/LINCOLN QUARRY

Hole No. R16
Feature SE Corner of N. Quarry
Coordinates: N
E
Core Sizes —

Angle (from Horizontal) VERTICAL
Bearing —
Date Started 4/5/93
Date Completed 4/6/93
Total Depth 190.5'

Ground Elevation
Rock Elevation
Overburden Thickness NONE
Ground-Water Elevation
Logged by J.E. GRIGGS

Depth (Elevation)	Graphic Log: Lithology	Graphic Log: Structure	Graphic Log: Attitude	Classification and Physical Condition	C.R.–Graphic	Core Rec. %	RQD %		Remarks (Sample Data, Water Levels, Drilling Characteristics etc.)
160									
170									
		NO SAMPLE	NO SAMPLE		NO SAMPLE	NO SAMPLE	NO SAMPLE		
180									
				187'–190.5': SHALE, green and black; green sticky					
190									
				END OF BORING 190.5'					
200									

ATTACHMENT 8

Illinois Environmental Protection Agency — **Well Completion Report**

Site #: 1978990001 County: Will Well #: G20S

Site Name: Joliet/Lincoln Quarry Grid Coordinate: Northing 1,759,155.3 Easting 1,048,014.7

Drilling Contractor: TSC Date Drilled Start: 9/8/93

Driller: Greg Donovan Geologist: John Pyrich Date Completed: 9/10/93

Drilling Method: Mud Rotary Drilling Fluids (type): Bentonite

Annular Space Details

Type of Surface Seal: Concrete

Type of Annular Sealant: High Solids Bentonite Grout

Amount of cement: # of bags ______ lbs. per bag ______

Amount of bentonite: # of bags ______ lbs. per bag ______

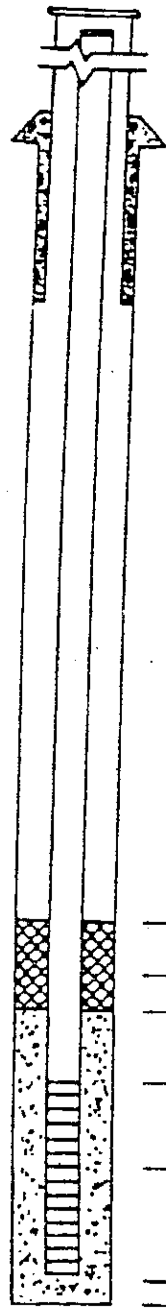
Type of Bentonite Seal (Granular, Pellet): Pellet

Amount of bentonite: # of Bags ______ lbs. per bag ______

Type of Sand Pack: Silica Sand

Source of Sand: Colorado

Amount of Sand: # of bags ______ lbs. per bag ______



Elevations — .01 ft.

580.23 MSL Top of Protective Casing
MSL Top of Riser Pipe
2.73 ft. Casing Stickup
577.5 MSL Ground Surface
3 ft. Top of annular sealant
117 ft. Top of Seal
3 ft. Total Seal Interval
120 ft. Top of Sand
123 ft. Top of Screen
10 ft. Total Screen Interval
133 ft. Bottom of Screen
140 ft. Bottom of Borehole

Well Construction Materials

	Stainless Steel Specify Type	Teflon Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint			40	
Riser pipe above w.t.			40	
Riser pipe below w.t.			40	
Screen			40	
Coupling joint screen to riser			40	
Protective casing				Steel

Measurements

to .01 ft. (where applicable)

Riser pipe length	125.73
Protective casing length	5
Screen length	10
Bottom of screen to end cap	0.5
Top of screen to first joint	10
Total length of casing	-
Screen slot size	10
% of openings in screen	1.6
Diameter of borehole (in)	6-3/4
ID of riser pipe (in)	2

Completed by: ______ Surveyed by ______ Ill. registration # ______

HARZA

GEOLOGIC LOG

BOREHOLE NUMBER 92-5

G305

PROJECT NUMBER 5444 6
CLIENT Commonwealth Edison
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1758877.989
(E) 1047147.728
LOGGED BY John E. Griggs
DATE STARTED 9/23/92 DATE COMPLETED 9/24/92

WEATHER
TOTAL DEPTH 144.0 SOIL THICKNESS 6.0'
GROUND SURFACE ELEVATION 522.1' MSL
SHEET 1 OF 2

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AD=After Drilling
Depth (Ft)		
Time		
Date		

ELEV (FT)	DEPTH (FT)	SAMPLE NUMBER	RECOVERY %
520.0	0.0		
510.0	-10.0	1	100
		2	97
500.0	-20.0		
		3	100
490.0	-30.0		
		4	100
480.0	-40.0		
		5	99
470.0	-50.0		
		6	100
460.0	-60.0		
		7	100
450.0	-70.0		
		8	100
440.0	-80.0		
		9	100
430.0	-90.0		
		10	100
	-100.0		

RQD % 20 40 60 80

LITHOLOGY

DESCRIPTION

FILL 0 - 6 0' NOT SAMPLED gravel fill, debris from quarry operations

DOLOMITE SHALEY 8 8 - 26 4 light gray, shale partings green. thin bedded <0 1' to 0 9', shale partings very thin <1/4" thick, irregularly spaced, shale is sticky. rock breaks along partings with light hammer blow.
10 0'-22 3' broken along shale partings, likely during drilling, max 0 6', min 0 05', several thin vuggy zones lined with calcite and pyrite crystals. most shale partings spaced 0 2'. core segments have ground against each other at breaks during coring (ends show rotation).
22 3'-26 4' broken across shale partings and vuggy zones, max 1 0', min 0 1'. more porous and vuggy than above. vugs lined with calcite crystals. dark green speckles in rock. occasional fossils. vug openings up to 0 1', some clay infilling in vuggy zones

DOLOMITE CHERTY 26 4' - 79 5' shaley. light gray, chert white, shale green. chert nodules spaced 2 5' to 6 0', most <0 7', irregularly spaced, fossiliferous, chalky locally. shale partings spaced <0 1' to 0 3', <1/4" thick, irregularly spaced, sticky, chert scratched with knife, chalky locally
26 4'- 41 5' mostly broken along shale partings and chert nodules, max 0 7', min <0 1'. chert nodules <0 1' to 0 3' in diameter. dolomite vuggy, openings up to 0 5", most <1/4", lined with calcite and pyrite crystals. occasional fossils
41 5'- 79 5 broken along shale partings and chert nodules, max 1 3', min <0 1', chert nodules <0 1' to 0 2' in diameter. shale partings more numerous, thinner and wavey. vugs less common than above, lined with calcite and pyrite crystals. fossils

DOLOMITE SHALEY 79 5' - 93 2' light to dark gray, shale black. shale partings irregularly spaced up to 0 15', very thin, wavey, dense. occasional vugs lined with calcite and pyrite crystals. broken along shale partings max 2 5', min 0 1'. occasional fossils. shale partings predominant toward bottom

SHALE 93 2' - 100 2' dolomitic. black to greenish, black toward bottom. dolomite light gray, very thin bedded, <0 1' to 0 2' thick, spaced 0 4' to 0 9', dense. friable, can break easily with hands. broken along shale partings, max 1 2', min <0 1'. occasional fossils
98 0' color change from black to green across bedding planes

COMMENTS

Drilling site 60' north of quarry wall at east end of bridge in North Quarry

0-6' 4 25" OD SSA
6'-8 8' NW casing with bit
8 8'- 144 0' NX

Mobile B51 rig modified with new driver head equivalent to B80

Coring rate ranged between 20' and 30' per hour

Return fluid initially milky

Completed as a nested pair of PVC wells installed at 60' and 132'

HARZA

GEOLOGIC LOG

BOREHOLE NUMBER 92-5

G305

PROJECT NUMBER 5444 6
CLIENT Commonwealth Edison
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1758877.989
(E) 1047147.728
LOGGED BY John E. Griggs
DATE STARTED 9/23/92 DATE COMPLETED 9/24/92

WEATHER
TOTAL DEPTH 144.0 SOIL THICKNESS 6.0'
GROUND SURFACE ELEVATION 522.1' MSL
SHEET 2 OF 2

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AD=After Drilling
Depth (Ft)		
Time		
Date		

ELEV (FT)	DEPTH (FT)	SAMPLE NUMBER	RECOVERY %	RQD %
420.0	-100.0			
410.0	-110.0	11	100	
400.0	-120.0	12	100	
390.0	-130.0	13	100	
380.0	-140.0	14	73	
370.0	-150.0			
360.0	-160.0			
350.0	-170.0			
340.0	-180.0			
330.0	-190.0			
	-200.0			

RQD %: 20 40 60 80

DESCRIPTION

DOLOMITE SHALEY 100 2' - 132 8' light grey, shale green and black. vuggy with some very vuggy horizons, lined with calcite and pyrite crystals, vuggy horizons 0 05' to 0 3' thick; shale partings irregularly spaced, <1/4" to 0 5', up to 0 3' thick. broken along shale partings and vuggy horizons, max 1 2', min <0 1', vug openings up to 0 1'. green speckles on rock. fossils

SHALE 132 8' - 141 3' top 4' green, remainder black. thin bedded. laminated with calcite (dolomite) layers. broken along bedding planes, breaks easily with hands, scratches easily with knife. dense

BOTTOM OF CORING AT 144 0 FT

LITHOLOGY

COMMENTS

ATTACHMENT B

Illinois Environmental Protection Agency — **Well Completion Report**

Site #: 1978090001 County: Will Well #: 92-5S G-30S

Site Name: Joliet/Lincoln Quarry Grid Coordinate: Northing 1,758,876.0 Easting 1,047,147.7

Drilling Contractor: TSC Date Drilled Start: 9/23/92

Driller: Greg Donovan Geologist: John E. Griggs Date Completed: 10/8/92

Drilling Method: NX Core/Rotary Drilling Fluids (type): Water

Annular Space Details

Type of Surface Seal: Concrete

Type of Annular Sealant: High Solids Bentonite Grout

Amount of cement: # of bags ____ lbs. per bag ____

Amount of bentonite: # of bags ____ lbs. per bag ____

Type of Bentonite Seal (Granular, Pellet): Pellet

Amount of bentonite: # of Bags ____ lbs. per bag ____

Type of Sand Pack: Silica Sand

Source of Sand: Colorado

Amount of Sand: # of bags ____ lbs. per bag ____

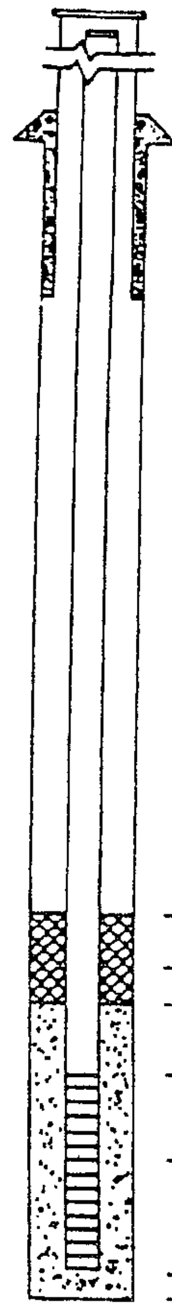
Well Construction Materials

	Stainless Steel Specify Type	Teflon Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint			40	
Riser pipe above w.t.			40	
Riser pipe below w.t.			40	
Screen			40	
Coupling joint screen to riser			40	
Protective casing				Steel

Measurements

to .01 ft. (where applicable).

Riser pipe length	52.16
Protective casing length	5
Screen length	10
Bottom of screen to end cap	0.5
Top of screen to first joint	10
Total length of casing	–
Screen slot size	10
% of openings in screen	1.6
Diameter of borehole (in)	6
ID of riser pipe (in)	2



Elevations – .01 ft.

____ MSL Top of Protective Casing
524.26 MSL Top of Riser Pipe
2.16 ft. Casing Stickup
522.1 MSL Ground Surface
3 ft. Top of annular sealant

Note: 92-5D installed in same boring

45 ft. Top of Seal
3 ft. Total Seal Interval
48 ft. Top of Sand
50 ft. Top of Screen
10 ft. Total Screen Interval
60 ft. Bottom of Screen
144 ft. Bottom of Borehole

Completed by: ____ Surveyed by: ____ Ill. registration #: ____

G310

HARZA — GEOLOGIC LOG

BOREHOLE NUMBER
G310

PROJECT NUMBER 15448 G
CLIENT ComEd
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1758807.242
(E) 1045388.601
LOGGED BY Jeff Dickson
DATE STARTED 07/30/99 DATE COMPLETED 08/03/99

WEATHER
TOTAL DEPTH 155 0' SOIL THICKNESS 6 5'
GROUND SURFACE ELEVATION pending (MSL)
SHEET 1 OF 2

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AD=After Drilling
Depth (Ft)		
Time		
Date		

ELEV (FT)	DEPTH (FT)	SAMPLE NUMBER	RECOVERY %	RQD %
0 0	0 0			20 40 60 80
		1		
		2	86	
10 0	-10 0			
		3	100	
20 0	-20 0			
		4	100	
30 0	-30 0			
		5	100	
		6	85	
40 0	-40 0			
		7	100	
50 0	-50 0			
		8	100	
60 0	-60 0			
		9	100	
70 0	-70 0			
		10	100	
80 0	-80 0			
		11	100	
90 0	-90 0			
		12	100	
	-100 0			

DESCRIPTION

GLACIAL DRIFT 0 - 6 5' NOT SAMPLED overburden, gravel with dark yellow-brown silty clay

DOLOMITE 6 5' - 48' dolomitized bioclastic calcarenite, oxidized yellow-orange, broken at top due to the weathering, thin wavy laminations with shale partings, fossiliferous, vugy where fossiliferous
11 5' 6" fracture with oxidized sides and some clay
13 0' many fossils showing modic porosity
20 0' white gray dolomite, thin laminations with green shale partings, fossiliferous
39 0'-48 0' white gray dolomite with green shale partings, rock easily breaks along partings

DOLOMITE CHERTY 48' - 85' shaley, white to light gray dolomite, chert white, shale green, chert nodules spaced <0 1' to 1', most <0 5', irregularly spaced, fossiliferous, shale partings spaced <0 1' to 0 3', <1/4" thick, irregularly spaced

DOLOMITE SHALEY 85' - 98 5' chert nodules discontinue, rock becomes more shaley, color change from light gray to gray as clay content increases with depth

SHALE 98 5' - 122 8' dolomitic, gray-green and chang

LITHOLOGY

COMMENTS

0' - 6 5' 3 1/4" ID Auger blind drill
6 5' - 155 0' NX core
Mobile Gus Pech 750 air rotary rig with potable water fluid
Coring rate ranged between 15' and 20' per hour
Reamed with 5 7/8" rotary bit to 156' using potable water fluid
Installed PVC well at 155'

G31 5/D

HARZA — GEOLOGIC LOG

BOREHOLE NUMBER
G310

PROJECT NUMBER 15448 G
CLIENT ComEd
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1758807.242
(E) 1045388.601
LOGGED BY Jeff Dickson
DATE STARTED 07/30/99 DATE COMPLETED 08/03/99

WEATHER
TOTAL DEPTH 155 0' SOIL THICKNESS 6 5'
GROUND SURFACE ELEVATION pending (MSL)
SHEET 2 OF 2

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AD=After Drilling
Depth (Ft)		
Time		
Date		

ELEV (FT)	DEPTH (FT)	SAMPLE NUMBER	RECOVERY %	RQD % (20 40 60 80)	DESCRIPTION	LITHOLOGY	COMMENTS
100 0	-100 0	13	100		to dark gray with depth, very thinly bedded <0 1' to 0 2' thick, rock broken along shale bedding planes, fossiliferous 122 4' color change from dark gray to green		
		14	100				
110 0	-110 0						
		15	100				
120 0	-120 0				DOLOMITE 122 9' - 155 0' gray dolomite 124 6' 4" thick soft green mud stone 125 0' -155.0' Fossiliferous dolomite, vuggy with some occasional very vuggy horizons, modic porosity, vuggy horizons 0 05' to 0 2' thick, shale partings irregularly spaced, broken along shale partings and vuggy horizons, fractures are cemented		
		16	100				
130 0	-130 0						
		17	100				
		18	100				
140 0	-140 0	19	100				
		20	99				
150 0	-150 0						
			100		BOTTOM OF CORING AT 155 0 FT		
160 0	-160 0						
170 0	-170 0						
180 0	-180 0						
190 0	-190 0						
	-200 0						

HARZA — GEOLOGIC LOG

BOREHOLE NUMBER 93-12

(R325)

PROJECT NUMBER 5444 6
CLIENT Commonwealth Edison
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1759706.812
(E) 1045763.421
LOGGED BY John Pyrich
DATE STARTED 9/1/93 DATE COMPLETED 9/3/93

WEATHER
TOTAL DEPTH 83.0' ~~SOIL~~ THICKNESS 3.0'
GROUND SURFACE ELEVATION 534.41' MSL
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AD=After Drilling		
Depth (Ft)		
Time		
Date		

ELEV (FT)	DEPTH (FT)	SAMPLE NUMBER	RECOVERY %	RQD % (20 40 60 80)
	0 0			
530 0		1	100	
	-10 0			
520 0		2	100	
	-20.0			
510 0		3	100	
	-30 0			
500 0		4	100	
	-40.0			
490 0		5	100	
	-50 0			
480 0		6	100	
	-60 0			
470 0		7	100	
	-70.0			
460 0		8	100	
	-80 0			
450 0				
	-90 0			
440 0				
	-100 0			

DESCRIPTION

GLACIAL DRIFT 0 - 3 0' NOT SAMPLED brown, silty clay

DOLOMITE SHALEY 3 0' - 49 5' light gray, shale green, thin bedded <0 1' to 0 4', shale partings thin <1/4" thick, irregularly spaced, shale is sticky, rock breaks along partings with light hammer blow, occasional fossils, occasional vuggy horizons, openings up to 0 05', lined with calcite and pyrite crystals
5 9' color change from light gray to pinkish

DOLOMITE CHERTY 49 5' - 83 0' shaley, light gray, chert white, shale green, chert nodules spaced <0 1' to 1 0', most <0 8', irregularly spaced, fossiliferous, chalky locally, shale partings spaced <0 1' to 0 3', <1/4" thick, irregularly spaced, sticky
49 5' - 62 0' broken along shale partings and chert nodules, max 0 7', min <0 1', chert nodules <0 1' to 0 2' in diameter, dolomite vuggy, openings up to 0 1', most <1/4", lined with calcite and pyrite crystals, occasional fossils
62 0'-83' dolomite less vuggy, shale wavey
77 6' dolomite darker and denser

BOTTOM OF CORING AT 83 0 FT

LITHOLOGY

COMMENTS

Drilling site 57' west of 6th wooden utility pole, west of Brandon, 15' inside fence

0-3' 5 7/8" OD SSA
3'-83' NX core with clear water

GUS PECH GP 1100 ATV rig

Coring rate ranged between 20' and 30' per hour

Return fluid initially milky

Reamed with 6 3/4" rotary bit to 77' using Super Gel X with GUS PECH GP 1100 ATV rig

Installed PVC well at 77'

Illinois Environmental Protection Agency — Well Completion Report

SITE #: 1978090001 COUNTY: Will WELL #: R32S

SITE NAME: Joliet/Lincoln Quarry Ash Landfill BOREHOLE #: R32S

STATE PLANE COORDINATE: N 1758697.521 E 1045764.711 (or) LATITUDE ___°___'___" LONGITUDE ___°___'___"

SURVEYED BY: Mark Wood ILL. REGISTRATION #: 0352958

DRILLING CONTRACTOR: Testing Service Corporation DRILLER: Bruce Alexander

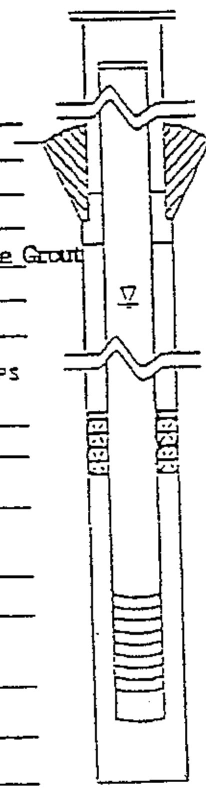
CONSULTING FIRM: Harza Engineering Company GEOLOGIST: Hoss Najjar-Pour

DRILLING METHOD: Air Rotary DRILLING FLUIDS (TYPE): Potable Water

LOGGED BY: Hoss Najjar-Pour DATE STARTED: 8/10/99 DATE FINISHED: 8/11/99

REPORT FORM COMPLETED BY: Hoss Najjar-Pour DATE: 9/3/99

ANNULAR SPACE DETAILS



TYPE OF SURFACE SEAL: Concrete

TYPE OF UPPER SEALANT: Bentonite Pellet
INSTALLATION METHOD: Surface Pour
SETTING TIME: 30 min.

TYPE OF ANNULAR SEALANT: High Solids Bentonite Grout
INSTALLATION METHOD: Tremie Pipe
SETTING TIME: 30 min.

TYPE OF BENTONITE SEAL - GRANULAR PELLET CHIPS
INSTALLATION METHOD: Surface Pour
SETTING TIME: 30 min.

TYPE OF FINE SAND PACK: Washed Silica Sand
GRAIN SIZE: 20-40 (SIEVE SIZE)
INSTALLATION METHOD: Surface Pour

TYPE OF SAND PACK: Washed Silica Sand
GRAIN SIZE: 10-20 (SIEVE SIZE)
INSTALLATION METHOD: Surface Pour

TYPE OF BACKFILL MATERIAL: Washed Silica Sand (IF APPLICABLE)
INSTALLATION METHOD: Surface Pour

ELEVATIONS (MSL)*	DEPTHS (BGS) (.01 ft)	
		TOP OF PROTECTIVE CASING
		TOP OF RISER PIPE
	0.00	GROUND SURFACE
	0.5	TOP OF UPPER SEALANT
	3.0	TOP OF ANNULAR SEALANT
	2.05	WATER LEVEL (TOC) (AFTER COMPLETION) DATE: ~~8/20/99~~
	60.5	TOP OF SEAL
	63.0	TOP OF FINE SANDPACK
	65.0	TOP OF SANDPACK
	67.0	TOP OF SCREEN
	77.0	BOTTOM OF SCREEN
	77.5	BOTTOM OF WELL
	78.0	BOTTOM OF BOREHOLE

* REFERENCED TO A NATIONAL GEODETIC VERTICAL DATUM

WELL CONSTRUCTION MATERIALS
(CIRCLE ONE)

PROTECTIVE CASING	SS304	SS316	PTFE	PVC	OTHER: steel
RISER PIPE ABOVE W.T.	SS304	SS316	PTFE	PVC	OTHER:
RISER PIPE BELOW W.T.	SS304	SS316	PTFE	PVC	OTHER:
SCREEN	SS304	SS316	PTFE	PVC	OTHER:

CASING MEASUREMENTS

DIAMETER OF BOREHOLE	(in)	6
ID OF RISER PIPE	(in)	2
PROTECTIVE CASING LENGTH	(ft)	5
RISER PIPE LENGTH	(ft)	
BOTTOM OF SCREEN TO END CAP	(ft)	0.5
SCREEN LENGTH (1st SLOT TO LAST SLOT)	(ft)	10
TOTAL LENGTH OF CASING	(ft)	5
SCREEN SLOT SIZE *	(in)	0.01

*HAND-SLOTTED WELL SCREENS ARE UNACCEPTABLE

REMARKS: Refer to boring log for well 93-12 for description of geologic materials encountered

G335/D

HARZA — GEOLOGIC LOG

BOREHOLE NUMBER: G330

PROJECT NUMBER 15449G
CLIENT ComEd
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1759485.478
(E) 1046925.246
LOGGED BY J. Dickson
DATE STARTED 7/19/99 DATE COMPLETED 7/22/99

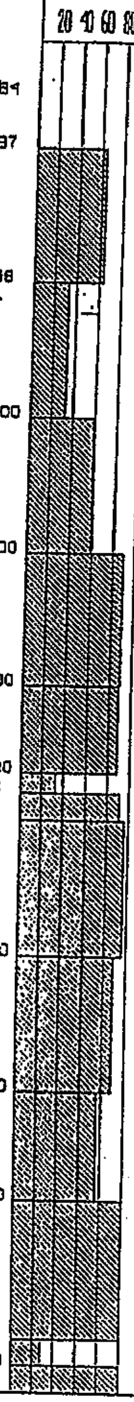
WEATHER
TOTAL DEPTH 155.0' SOIL THICKNESS 4.0'
GROUND SURFACE ELEVATION pending (MSL)
SHEET 1 OF 2

STATIC WATER LEVEL (BLS)	WD=While Drilling	AD=After Drilling
Depth (ft)		
Time		
Date		

SAMPLE NUMBER	RECOVERY %
1	84
2	97
3	98
4	100
5	100
6	100
7	100
8	86
9	93
10	100
11	100
12	100
13	70
14	100

ELEV (FT): 0.0, 10.0, 20.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0
DEPTH (FT): 0.0, -10.0, -20.0, -30.0, -40.0, -50.0, -60.0, -70.0, -80.0, -90.0, -100.0

RQD %



DESCRIPTION

GLACIAL DRIFT 0 - 4.0' NOT SAMPLED dark-brown silty clay

DOLOMITE 4.0' - 80.0' dolomitized bioclastic calcarenite. very highly weathered and broken on top. occasional green shale, some fractures and vugs ranging from 1 mm to 5mm. bedding is very wavy with green shale partings. Fossiliferous locally. chert nodules are irregularly shaped and increase with depth
60.0' - 80.0' shaly, very thinly bedded, rock breaks along bedding planes

DOLOMITE SHALEY 80.0' - 98.0' very thinly bedded. Fossiliferous. rock separates along beds with green shale partings. rock breaks along thin partings with light hammer blows. chert less abundant. Fossiliferous locally. some vugs 1-3mm in diameter with pyrite and calcite filling
87.0' - 98.0' chert almost absent. some corals. occasional pyrite filled vugs. rock breaks along partings with light tap of hammer

SHALE 98.0' - 119.5' dolomitic shale. gray, very

LITHOLOGY

COMMENTS

0-4.0' 3 7/8" air rotary
4.0' -155.0' NX core
mobile Gus Pech 750 rig
coring rate ranged 15' and 20' per hour with potable water fluid
Reamed with 5 7/8" bit to depth of 156'
Installed PVC well at 155'

G 33 S/D

HARZA — GEOLOGIC LOG

BOREHOLE NUMBER
G330

PROJECT NUMBER 15498G
CLIENT ComEd
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1759485.478
(E) 1046925.246
LOGGED BY J. Dickson
DATE STARTED 7/19/99 DATE COMPLETED 7/22/99

WEATHER
TOTAL DEPTH 155.0' SOIL THICKNESS 4.0'
GROUND SURFACE ELEVATION pending (MSL)
SHEET 2 OF 2

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AD=After Drilling
Depth (ft)		
Time		
Date		

ELEV (FT)	DEPTH (FT)	SAMPLE NUMBER	RECOVERY %	RQD % (20 40 60 80)	DESCRIPTION	LITHOLOGY	COMMENTS
100.0	-100.0				competant, thin partings, gray. shale becomes becomes black with increase in depth 118.0' - 119.5' shale, greenish		
		15	100				
110.0	-110.0						
		16	100				
120.0	-120.0				DOLOMITE 119.5' -150.0' bioclastic calcarenite, very vuggy locally with modic porosity. fossiliferous. shale partings with irregular bedding. Fractured locally and mostly cemented 127.0' -127.25' very thin laminated shale 130.0' -131.0' texture change: few fossils; highly fractured and cemented 140.0' - 148.0' dolomite is alternating between bioclastic calcarenite and thin bedded siltstone with green shale lenses. occasional fractures and mostly are cemented 148.0' -150.0' 2' vertical fracture and partially recemented		
		17	100				
130.0	-130.0						
		18	100				
140.0	-140.0						
		19	100				
150.0	-150.0	20	86		SHALE 150.0' - 155.0' green at top 1' and becoming black to very dark brown. thinly bedded and easily breaks along bedding planes. Fossiliferous BOTTOM OF CORING AT 155.0 FT		
160.0	-160.0						
170.0	-170.0						
180.0	-180.0						
190.0	-190.0						
	-200.0						

HARZA	GEOLOGIC LOG	BOREHOLE NUMBER G410 / G415

PROJECT NUMBER 15448 G
CLIENT ComEd
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1759183.828
(E) 1046293.576
LOGGED BY Jeff Dickson
DATE STARTED 07/23/99 DATE COMPLETED 07/27/99

WEATHER
TOTAL DEPTH 155.0' SOIL THICKNESS 9.0'
GROUND SURFACE ELEVATION pending (MSL)
SHEET 1 OF 2

STATIC WATER LEVEL (BLS)		
WD=While Drilling		AD=After Drilling
Depth (ft)		
Time		
Date		

ELEV (FT)	DEPTH (FT)	SAMPLE NUMBER	RECOVERY %
0 0	0 0		
10 0	-10 0	1	
20 0	-20 0	2	98
30 0	-30 0	3	100
40 0	-40 0	4	100
50 0	-50 0	5	100
60 0	-60 0	6	100
70 0	-70 0	7	100
80 0	-80 0	8	100
90 0	-90 0	9	100
	-100 0	10	100

RQD % 20 40 60 80

LITHOLOGY

DESCRIPTION

GLACIAL DRIFT 0 - 9 0' NOT SAMPLED gravel with dark-yellow brown silty clay

DOLOMITE 9' - 45' dolomitized bioclastic calcarenite, very highly weathered at upper surface, reddish-yellow iron color, vuggy and highly broken, dolomite is white-gray in color, some vertical stress fractures-cemented; the remaining portion of run is more competent showing thin laminations, shale partings, green, 1-2 mm thick; rock easily breaks along shale partings, fossiliferous
20 0' - 29 0' some grayish-white with many laminations, few vugs, rock separates along wavy bedding planes filled with green shale, 1-2 mm thick
29 0' - 39.0' with wavy shaley partings, occasional zones with fossils, 0 1'-0 3' thick showing modic porosity, rock breaks along bedding/fractures, filled with green shale
39 0' - 45 0' white gray dolomite, thinly laminated, larger coral zones, vugs associated with coral zones, 4-5 mm in diameter

DOLOMITE CHERTY 45' - 80' shaley, chert, irregular nodules up to 2" thick, gray-white, dolomite wavy and laminated, thin shale parting, green, fossiliferous, many coral zones with modic porosity, rock easily breaks along partings
73 7' - 74 7' shale lense
77 5' - 78 5' vertical fracture, filled with green shale

DOLOMITE SHALEY 80' - 113' dark gray cherty shaley dolomite, fossiliferous, increase in coral, vuggy where coral exist, 1-3mm in diameter, very wavy laminations, more shaley, chert nodules fewer
89 0' - 100 0' shaley dolomite with lenses of fossils chert nodules discontinue, rock becomes more shale rock very competent, core breaks along wavy bedding, fossiliferous, fossils exhibit modic porosity
100 0' - 113 0' shaley dolomite with fossiliferous zones, lenses 1/2" thick separated by very wavy laminations of dark gray shale and lighter dolomite, occasional irregular fractures

COMMENTS

0' - 9' 3 1/4" ID Auger blind drill
9' - 155 0' NX core
Mobile Gus Pech 750 air rotary rig with potable water fluid
Coring rate ranged between 15' and 20' per hour
Reamed with 5 7/8" rotary bit to 156' using potable water fluid
Installed PVC well at 155'

HARZA

GEOLOGIC LOG

BOREHOLE NUMBER G410 / G41S

PROJECT NUMBER 15448 G
CLIENT ComEd
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1759183.828
(E) 1046293.576
LOGGED BY Jeff Dickson
DATE STARTED 07/23/99 DATE COMPLETED 07/27/99

WEATHER
TOTAL DEPTH 155.0' SOIL THICKNESS 9.0'
GROUND SURFACE ELEVATION pending (MSL)
SHEET 2 OF 2

STATIC WATER LEVEL (BLS)

	WD=While Drilling	AD=After Drilling
Depth (ft)		
Time		
Date		

ELEV (FT)	DEPTH (FT)	SAMPLE NUMBER	RECOVERY %	RQD % (20 40 60 80)	DESCRIPTION	LITHOLOGY	COMMENTS
100.0	-100.0						
		11	100				
110.0	-110.0						
		12	100		SHALE 113.0' - 121.2' dark gray thinly laminated mudstone and shale, occasionally mottled. Fossil zone discontinued. 120.7'-121.2 abrupt change from very dark gray shale to green softer shale		
120.0	-120.0						
		13	100		DOLOMITE 122.5' - 154.5' bioclastic calcarenite dolomite, fossiliferous, very vuggy with modic porosity, wavy thin laminations, shale partings, green, occasional stress fractures, cemented 136.5' - 137' very vuggy 137.5' - 138.5' rock highly broken 145.5' - 146.5' clay filled, green, vertical fracture 150.5' - 151.5' very fossiliferous, vuggy 152.0' - 153.0' very fossiliferous, vuggy 153.5' - 154.0' fossiliferous, vuggy		
130.0	-130.0						
		14	100				
140.0	-140.0						
		15	100				
150.0	-150.0						
			100		SHALE black		
					BOTTOM OF CORING AT 155.0 FT		
160.0	-160.0						
170.0	-170.0						
180.0	-180.0						
190.0	-190.0						
	-200.0						

HARZA

GEOLOGIC LOG

BOREHOLE NUMBER
G920 / G425

PROJECT NUMBER 15998 G
CLIENT ComEd
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1759757.912
(E) 1047377.300
LOGGED BY Hoss Najjar-Pour
DATE STARTED 08/03/99 DATE COMPLETED: 08/09/99

WEATHER:
TOTAL DEPTH 155.0' SOIL THICKNESS 2.0'
GROUND SURFACE ELEVATION pending (MSL)
SHEET 1 OF 2

STATIC WATER LEVEL (BLS)		
WD=While Drilling AD=After Drilling		
Depth (Ft)		
Time		
Date		

ELEV (ft)	DEPTH (ft)	SAMPLE NUMBER	RECOVERY %	RQD % (20 40 60 80)
0.0	0.0	1		
		2	88	
10.0	-10.0			
		3	102	
20.0	-20.0			
		4	100	
		5	105	
	-30.0	6	95	
		7	97	
40.0	-40.0			
		8	98	
50.0				
		9	100	
60.0				
		10	99	
70.0				
		11	100	
		12	100	
		13	100	
	-100.0			

DESCRIPTION

GLACIAL DRIFT 0 - 2.0' NOT SAMPLED: gravel up to 2" in diameter with brown sand

DOLOMITE 2.0' - 39.0' dolomitized bioclastic calcarenite, light gray pinkish; occasional thin laminated bedding, shale partings, green, fossiliferous, vugs <1/4" in diameter; rock easily breaks along partings
17.0' - 39.0' dolomite, gray, irregular laminations, shale partings, green, fossiliferous, vugs associated with fossil horizons; rock easily breaks along partings

DOLOMITE CHERTY 39' - 74' shaley, white to light gray dolomite, chert white, chert nodules mostly <0.5', fossiliferous; vugs <1/8" in diameter; occasional wavy irregular laminations, shale partings, green

DOLOMITE SHALEY 74' - 103.7' chert nodules discontinue, rock becomes more shaley, less fossiliferous with occasional vugs of <1/8" in diameter
82' - 103.7' dark gray shaley dolomite, color changes from light gray to dark gray as clay content increases with depth

LITHOLOGY

COMMENTS

0' - 2' 3 1/4" ID Auger blind drill
2' - 155.0' NX core
Mobile Gus Pech 750 air rotary rig with potable water fluid
Coring rate ranged between 15' and 20' per hour
Reamed with 5 7/8" rotary bit to 151' using potable water fluid
Installed PVC well at 150'

HARZA

GEOLOGIC LOG

BOREHOLE NUMBER G420/G425

PROJECT NUMBER 15448 G
CLIENT ComEd
PROJECT NAME Joliet/Lincoln Quarry Ash Landfill
DRILLING COMPANY Testing Service Corporation
CORE SIZE NX
ANGLE 90 BEARING
COORDINATES (N) 1759757.912
(E) 1047377.300
LOGGED BY Hoss Najjar-Pour
DATE STARTED 08/03/99 DATE COMPLETED 08/09/99

WEATHER
TOTAL DEPTH 155.0' SOIL THICKNESS 2.0'
GROUND SURFACE ELEVATION pending (MSL)
SHEET 2 OF 2

STATIC WATER LEVEL (BLS)	WD-While Drilling	AD-After Drilling
Depth (Ft)		
Time		
Date		

ELEV (FT)	DEPTH (FT)	SAMPLE NUMBER	RECOVERY %	RQD % (20 40 60 80)	DESCRIPTION	LITHOLOGY	COMMENTS
-100.0	-100.0	14	100				
		15	96		SHALE 103.7' - 111.9' dolomitic, dark gray, increase in clay content with depth		
		16	100				
-110.0	-110.0				DOLOMITE 111.9' - 141.6' white gray dolomite, fossiliferous, vuggy, some occasional very vuggy horizons; modic porosity		
		17	94				
-120.0	-120.0						
		18	95				
-130.0	-130.0						
			91				
-140.0	-140.0						
		20	99		SHALE 141.6' - 155.0' dark gray dolomitic shale, rock is competent, occasional vugs with calcite filling		
		21	99				
-150.0	-150.0						
			101		BOTTOM OF CORING AT 155.0 FT		
-160.0	-160.0						
-170.0	-170.0						
-180.0	-180.0						
-190.0	-190.0						
	-200.0						

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124/2003-125

Location:
Coord. System: Site Grid
Northing: 57679.8
Easting: 45567.6

Weather:
Sunny, hot

Boring Information:
Boring No.: G44D
Well No.: G44S
Surf. Elev.: 585.14

Depth Information:
Total: 209.3
Auger:
Core:

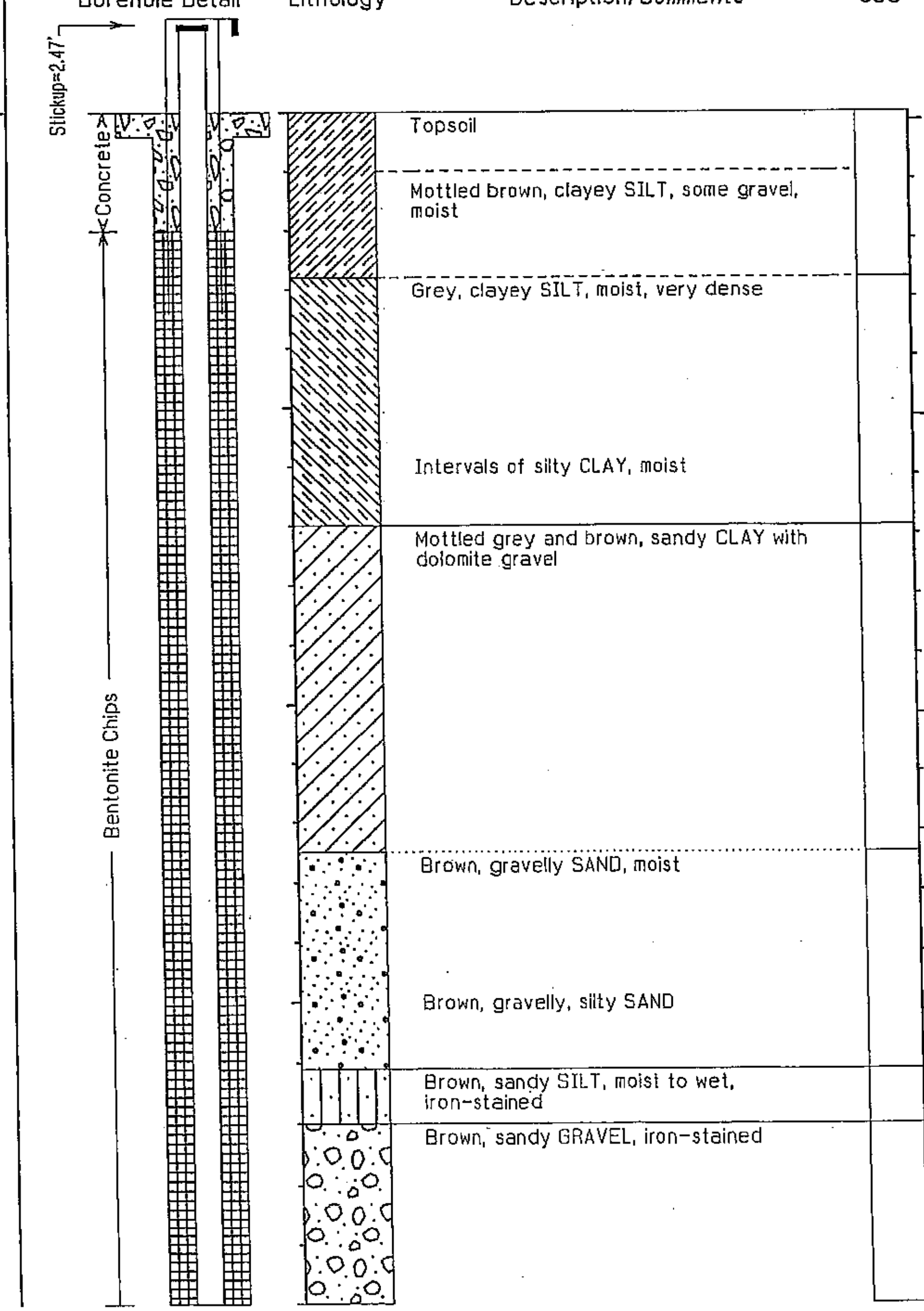
Dates:
Start: 7/19/2004
Finish: 7/21/2004

Drilling Contractor:
Name: Raimonde Drilling Corp.
City: Elmwood Park, Illinois
Equipment: CME 55 – 8 ¼" HSA

Personnel:
Geologist: L. Janczak
Driller: D. Stefenson
Helper (s):

Sample Type: – Continuous Barrel – Split Spoon – Shelby Tube – Core – Blind Drill

Depth (ft.)	Run No.	Type	No.	Recov.	RQD (%)	Fractures (no./ft.)	Unit
0–3.8	1	Split Spoon		3.6			
3.8–8.8	2	Split Spoon		3.9			
8.8–13.8	3	Split Spoon		3.4			
13.8–18.7	4	Split Spoon		4.0			
18.7–20	5						



Description/*Comments*	USC
Topsoil	
Mottled brown, clayey SILT, some gravel, moist	
Grey, clayey SILT, moist, very dense	
Intervals of silty CLAY, moist	
Mottled grey and brown, sandy CLAY with dolomite gravel	
Brown, gravelly SAND, moist	
Brown, gravelly, silty SAND	
Brown, sandy SILT, moist to wet, iron-stained	
Brown, sandy GRAVEL, iron-stained	

NOTES:

Andrews Environmental Engineering, Inc. — Field Boring Log

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124/2003-125

Location:
Coord. System: Site Grid
Northing: 57679.8
Easting: 45567.6

Weather:
Sunny, hot

Boring Information:
Boring No.: G44D
Well No.: G44S
Surf. Elev.: 585.14

Depth Information:
Total: 209.3
Auger:
Core:

Dates:
Start: 7/19/2004
Finish: 7/21/2004

Drilling Contractor:
Name: Raimonde Drilling Corp.
City: Elmwood Park, Illinois
Equipment: CME 55 - 8 ¼" HSA

Personnel:
Geologist: L. Janczak
Driller: D. Stefenson
Helper (s):

Sample Type: ▮ - Continuous Barrel ☒ - Split Spoon ⧄ - Shelby Tube ▮ - Core ☐ - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	RQD (%)	Fractures (no./ft.)	Unit	Borehole Detail	Lithology	Description/*Comments*	USC	Elev. (MSL)
								Bentonite Chips	Gravel	Continued- Brown, sandy GRAVEL, iron-stained		565
25	5											560
									Dolomite	Light blue-grey, DOLOMITE		
										Weathered, iron-stained		
30		Core								Light blue-grey, DOLOMITE		555
										Cemented joints		
	6									Blue-green DOLOMITE, iron-stained		
35										Occassional vugs filled with white, weathered calcite, less than 1/16 inch in diameter		550
				9.3								
40	7											

NOTES:

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:	Location:	Boring Information:
Name: Joliet/Lincoln Stone Quarry	Coord. System: Site Grid	Boring No.: G44D
Location: Joliet, Illinois	Northing: 57679.8	Well No.: G44S
County: Will	Easting: 45567.6	Surf. Elev.: 585.14
Site No.: 1978090001	Weather:	Depth Information:
AEEI No.: 2002-124/2003-125	Sunny, hot	Total: 209.3
Drilling Contractor:	Personnel:	Auger:
Name: Raimonde Drilling Corp.	Geologist: L. Janczak	Core:
City: Elmwood Park, Illinois	Driller: D. Stefenson	Dates:
Equipment: CME 55 - 8 ¼" HSA	Helper (s):	Start: 7/19/2004
		Finish: 7/21/2004

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	RQD (%)	Fractures (no./ft.)	Unit	Borehole Detail	Lithology	Description/*Comments*	USC	Elev. (MSL)
										Continued- Blue-green DOLOMITE, iron-stained Massive bedding		545
										Occassional clay-filled joints, less than 0.0625 inch thick		
										Blue-grey, DOLOMITE, trace pyrite		
	7											
45												540
				10.0				Bentonite Chips				
50												535
	8											
55												530
										Blue-green, DOLOMITE, pinkish hue		
				10.0								
	9											
60												

NOTES:

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124/2003-125

Location:
Coord. System: Site Grid
Northing: 57679.8
Easting: 45567.6

Weather:
Sunny, hot

Boring Information:
Boring No.: G44D
Well No.: G44S
Surf. Elev.: 585.14

Depth Information:
Total: 209.3
Auger:
Core:

Dates:
Start: 7/19/2004
Finish: 7/21/2004

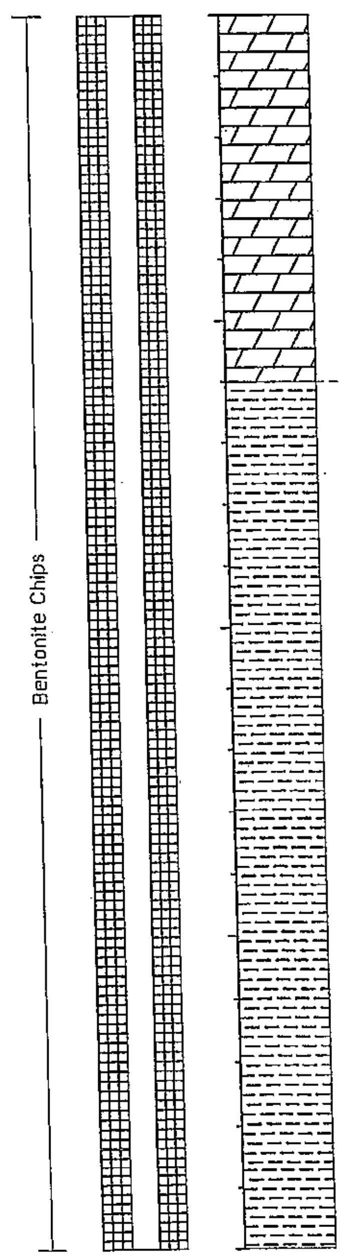
Drilling Contractor:
Name: Raimonde Drilling Corp.
City: Elmwood Park, Illinois
Equipment: CME 55 - 8 ¼" HSA

Personnel:
Geologist: L. Janczak
Driller: D. Stefenson
Helper (s):

Sample Type: – Continuous Barrel – Split Spoon – Shelby Tube – Core – Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	RQD (%)	Fractures (no./ft.)	Unit
65	9						
				10.0			
70							
75	10						
				10.0			
80	11						

Borehole Detail | Lithology | Description/*Comments* | USC | Elev. (MSL)



Continued- Blue-green, DOLOMITE, pinkish hue

Blue-green, dolomitic SHALE partings, wavy, pinkish hue

Shale partings up to 1 inch thick

Pink banding

Elev. (MSL): 525, 520, 515, 510

NOTES:

Andrews Environmental Engineering, Inc.
3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124/2003-125

Location:
Coord. System: Site Grid
Northing: 57679.8
Easting: 45567.6

Weather:
Sunny, hot

Boring Information:
Boring No.: G44D
Well No.: G44S
Surf. Elev.: 585.14

Depth Information:
Total: 209.3
Auger:
Core:

Dates:
Start: 7/19/2004
Finish: 7/21/2004

Drilling Contractor:
Name: Raimonde Drilling Corp.
City: Elmwood Park, Illinois
Equipment: CME 55 - 8 ¼" HSA

Personnel:
Geologist: L. Janczak
Driller: D. Stefenson
Helper (s):

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	RQD (%)	Fractures (no./ft.)	Unit	Borehole Detail	Lithology	Description/*Comments*	USC	Elev. (MSL)
								Bentonite Chips		Continued- Blue-green, dolomitic SHALE partings, pink banding		505
	11									Pink banding ends, increase in vugs, less than 0.0625 inch in diameter		
85												500
										Light blue-grey, DOLOMITE		
				10.0								
90												495
	12											
95												490
				10.0								
	13											
100												

NOTES:

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124/2003-125

Location:
Coord. System: Site Grid
Northing: 57679.8
Easting: 45567.6

Weather:
Sunny, hot

Boring Information:
Boring No.: G44D
Well No.: G44S
Surf. Elev.: 585.14

Depth Information:
Total: 209.3
Auger:
Core:

Dates:
Start: 7/19/2004
Finish: 7/21/2004

Drilling Contractor:
Name: Raimonde Drilling Corp.
City: Elmwood Park, Illinois
Equipment: CME 55 - 8 ¼" HSA

Personnel:
Geologist: L. Janczak
Driller: D. Stefenson
Helper (s):

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	RQD (%)	Fractures (no./ft.)	Unit	Borehole Detail	Description/*Comments*	USC	Elev. (MSL)
								Bentonite Chips	Continued-Light blue-grey, DOLOMITE Occassional vugs, 0.25 to 0.5 inch in diameter, increase in joints filled with blue-green clay, violet hue		485
	13								Fracture filled with blue-green CLAY		
105									Vuggy seam, 0.75 inch thick		480
									Vuggy seam, 0.5 inch thich		
				10.0							
110											475
	14								Large vug cavity, filled with calcite		
115											470
				10.0				Sand			
120	15										

NOTES:

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124/2003-125

Location:
Coord. System: Site Grid
Northing: 57679.8
Easting: 45567.6

Weather:
Sunny, hot

Boring Information:
Boring No.: G44D
Well No.: G44S
Surf. Elev.: 585.14

Depth Information:
Total: 209.3
Auger:
Core:

Dates:
Start: 7/19/2004
Finish: 7/21/2004

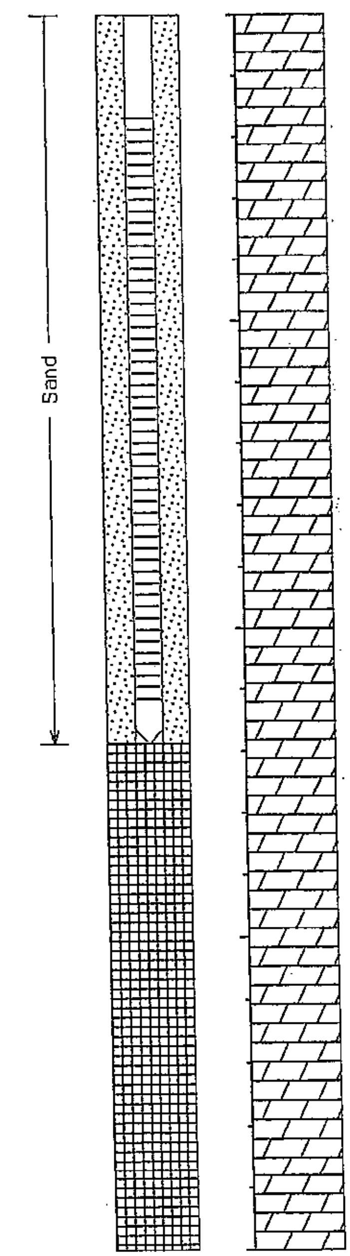
Drilling Contractor:
Name: Raimonde Drilling Corp.
City: Elmwood Park, Illinois
Equipment: CME 55 - 8 ¼" HSA

Personnel:
Geologist: L. Janczak
Driller: D. Stefenson
Helper (s):

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	RQD (%)	Fractures (no./ft.)	Unit
	15						
125							
				10.0			
130							
	16						
135							
				10.0			
	17						
140							

Borehole Detail | Lithology | Description/*Comments* | USC | Elev. (MSL)



DOLOMITE, increased weathering, dark blue-grey banding, increased vugs

Cavity in core sampler

Dark grey banding ends, iron-stained

Blue-grey, DOLOMITE

Elev. (MSL): 465, 460, 455, 450

NOTES:

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124/2003-125

Location:
Coord. System: Site Grid
Northing: 57679.8
Easting: 45567.6

Weather:
Sunny, hot

Boring Information:
Boring No.: G44D
Well No.: G44S
Surf. Elev.: 585.14

Depth Information:
Total: 209.3
Auger:
Core:

Dates:
Start: 7/19/2004
Finish: 7/21/2004

Drilling Contractor:
Name: Raimonde Drilling Corp.
City: Elmwood Park, Illinois
Equipment: CME 55 - 8 ¼" HSA

Personnel:
Geologist: L. Janczak
Driller: D. Stefenson
Helper (s):

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Type	No.	Recov.	RQD (%)	Fractures (no./ft.)	Unit	Description/*Comments*	Elev. (MSL)
								Continued- Blue-grey, DOLOMITE	445
								Iron-stained	
								Fracture filled with CLAY	
								Blue-grey, DOLOMITE	
								<--Fracture filled with CLAY	
	17							Iron-stained	
145									440
				10.0					
150									435
	18								
155								Dark blue, shale partings, wavy	430
				10.0					
	19								
160									

Borehole Detail | Lithology | USC

NOTES:

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124/2003-125

Location:
Coord. System: Site Grid
Northing: 57679.8
Easting: 45567.6

Weather:
Sunny, hot

Boring Information:
Boring No.: G44D
Well No.: G44S
Surf. Elev.: 585.14

Depth Information:
Total: 209.3
Auger:
Core:

Dates:
Start: 7/19/2004
Finish: 7/21/2004

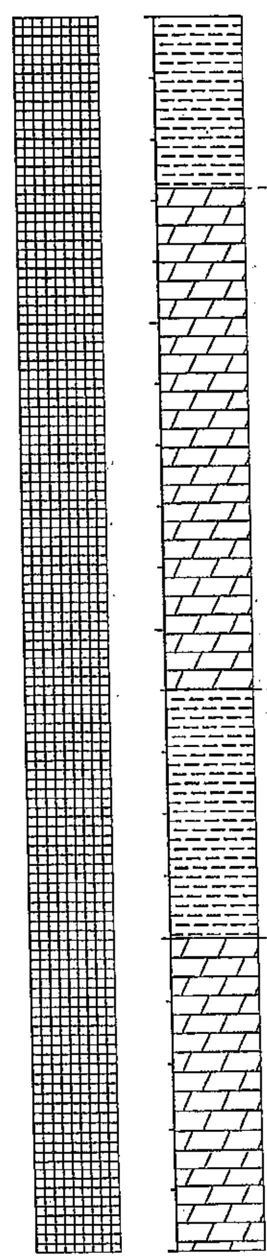
Drilling Contractor:
Name: Raimonde Drilling Corp.
City: Elmwood Park, Illinois
Equipment: CME 55 - 8 ¼" HSA

Personnel:
Geologist: L. Janczak
Driller: D. Stefenson
Helper (s):

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	RQD (%)	Fractures (no./ft.)	Unit	Description/*Comments*	Elev. (MSL)
								Dark blue, shale partings, wavy	425
								Dark blue-grey shale partings, trace pyrite, less than 0.5 inch thick	
								Blue-grey, DOLOMITE	
	19								
165								Calcite vein, vuggy, 0.5 inch thick, trace pyrite	420
								Increase vuggy veins	
				10.0					
170									415
								Dark blue-grey shale partings, decrease in vugs, 0.3 to 0.4 foot thick	
	20								
175								Blue-grey, DOLOMITE	410
								Trace fossils	
				10.0					
	21								
180									

Borehole Detail / Lithology / USC



NOTES:

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:	Location:	Boring Information:
Name: Joliet/Lincoln Stone Quarry	Coord. System: Site Grid	Boring No.: G44D
Location: Joliet, Illinois	Northing: 57679.8	Well No.: G44S
County: Will	Easting: 45567.6	Surf. Elev.: 585.14
Site No.: 1978090001	Weather: Sunny, hot	Depth Information: Total: 209.3; Auger: ; Core:
AEEI No.: 2002-124/2003-125		

Drilling Contractor:	Personnel:	Dates:
Name: Raimonde Drilling Corp.	Geologist: L. Janczak	Start: 7/19/2004
City: Elmwood Park, Illinois	Driller: D. Stefenson	Finish: 7/21/2004
Equipment: CME 55 - 8 ¼" HSA	Helper (s):	

Sample Type: Continuous Barrel; Split Spoon; Shelby Tube; Core; Blind Drill

Depth (ft.)	Run No.	Type	No.	Recov.	RQD (%)	Fractures (no./ft.)	Unit	Description/*Comments*	Elev. (MSL)
								Continued-Dark blue-grey, DOLOMITE	405
	21								
185								Dark grey, dolomitic SHALE, black streaks, tight, hardness increases with depth	400
								Thinly laminated, lighter color	
				10.0					
190									395
								DOLOMITE, with blue-green clay seams, pinkish hue	
	22								
195								Vugs, less than 0.125 inch in diameter	390
								Larger vugs, up to 1.5 inches in diameter, some calcite crystals 0.5 inch in length	
				10.0					
	23								
200									

NOTES:

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124/2003-125

Location:
Coord. System: Site Grid
Northing: 57679.8
Easting: 45567.6

Weather:
Sunny, hot

Boring Information:
Boring No.: G44D
Well No.: G44S
Surf. Elev.: 585.14

Depth Information:
Total: 209.3
Auger:
Core:

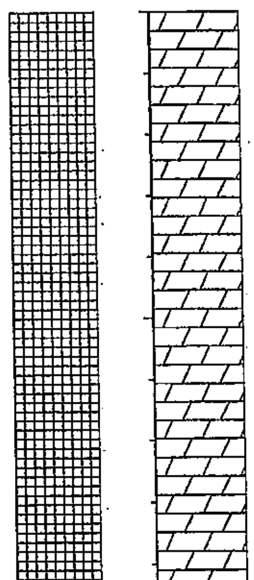
Dates:
Start: 7/19/2004
Finish: 7/21/2004

Drilling Contractor:
Name: Raimonde Drilling Corp.
City: Elmwood Park, Illinois
Equipment: CME 55 - 8 ¼" HSA

Personnel:
Geologist: L. Janczak
Driller: D. Stefenson
Helper (s):

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	RQD (%)	Fractures (no./ft.)	Unit	Borehole Detail	Lithology	Description/*Comments*	USC	Elev. (MSL)
										Contiued-DOLOMITE		385
										Light grey, DOLOMITE, chalky		
205	23									Numerous blue-green clay-filled joints and intervals of small vugs less than 0.0625 inch in diameter		380
				10.0						*End of Boring = 209.3'*		
210												375
215												370
220												



NOTES:

Illinois Environmental Protection Agency — Well Completion Report

Site #: 1978090001 County: Will Well #: G44S

Site Name: Joliet/Lincoln Stone Quarry Borehole #: G44S

Coordinates: X 45568.1 Y 57679.8 (or) Latitude: ° ' " Longitude: ° ' "

Surveyed by: Peter Campbell, Andrews Environmental Engineering, Inc. IL Registration #:

Drilling Contractor: Raimonde Drilling Corp. Consulting Firm: AEEI

Driller: D. Stefenson Geologist: S. Radulovic

Drilling Method: Hollow stem auger/rotary Logged by: S. Radulovic

Drilling Fluids (type): water for reaming Report Form Completed by: S. Radulovic

Date Well Started: 07/19/2004 Date Well Finished: 07/23/2004 Date Form Completed: 07/30/2004

ANNULAR SPACE DETAILS

Type of surface seal: Concrete

Type of annular sealant: Bentonite chips

Installation method: Free drop

Setting time: 24+ hours

Type of bentonite seal – Granular, Chips (circle one)

Installation method: Free drop

Setting time: 24+ hours

Type of sand pack: Quartz Sand

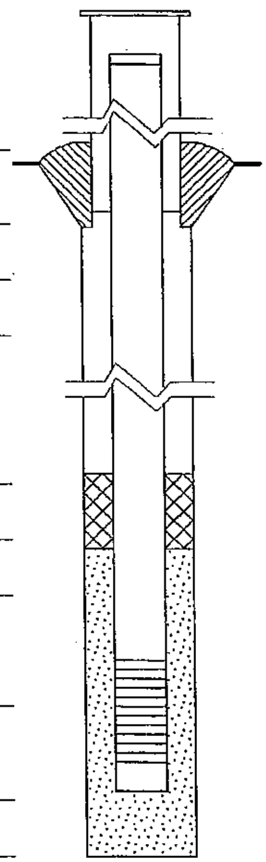
Grain size: 10/30 (sieve size)

Installation method: Free drop

Type of backfill material: Bentonite Chips (if applicable)

Installation method: Free drop

Notes: Nested well pair G44D/G44S are installed in the same borehole.



ELEVATION (MSL)[@]	DEPTH (BGS)[*]	(0.01 ft)
587.03	-1.89	Top of Protective Casing
586.52	-1.38	Top of Riser Pipe
585.14	.00	Ground Surface
583.14	2.00	Top of Annular Sealant
n/a	n/a	Static Water Level Measured on (after completion)
583.14	2.00	Top of Seal
466.64	118.50	Top of Sandpack
463.46	121.68	Top of Screen
453.97	131.17	Bottom of Screen
453.26	131.88	Bottom of Well
376.11	209.03	Bottom of Borehole

[@] Referenced to a National Geodetic Vertical Datum
[*] positive (+) values below GS, negitive (−) values above GS

CASING MEASUREMENTS

Diameter of Borehole (in)	8.0
ID of Riser Pipe (in)	2.0
Protective Casing Length (ft)	5.0
Riser Pipe Length (ft)	123.06
Bottom of Screen to End Cap (ft)	.71
Screen Length (1st slot to last slot) (ft)	9.49
Total Length of Casing (ft)	133.26
Screen Slot Size[*]	#10 (0.01")

[*]Hand–slotted well screens are unacceptable.

WELL CONSTRUCTION MATERIALS
(circle one)

Protective Casing	SS304, SS316, PTFE, PVC or Other:
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC or Other:
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other:
Screen	SS304, SS316, PTFE, PVC, or Other:

(AE950315)

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124

Location:
Coord. System: Site Grid
Northing: 58057.56
Easting: 48125.64

Boring Information:
Boring No.: G45S
Well No.: G45S
Surf. Elev.: 600.30

Weather:
Sunny/60 deg F

Depth Information:
Total: 132.48
Auger: 4.0
Core: 132.48

Drilling Contractor:
Name: RD-n-P Drilling, Inc.
City: Crown Point, Indiana
Equipment: HQ Core

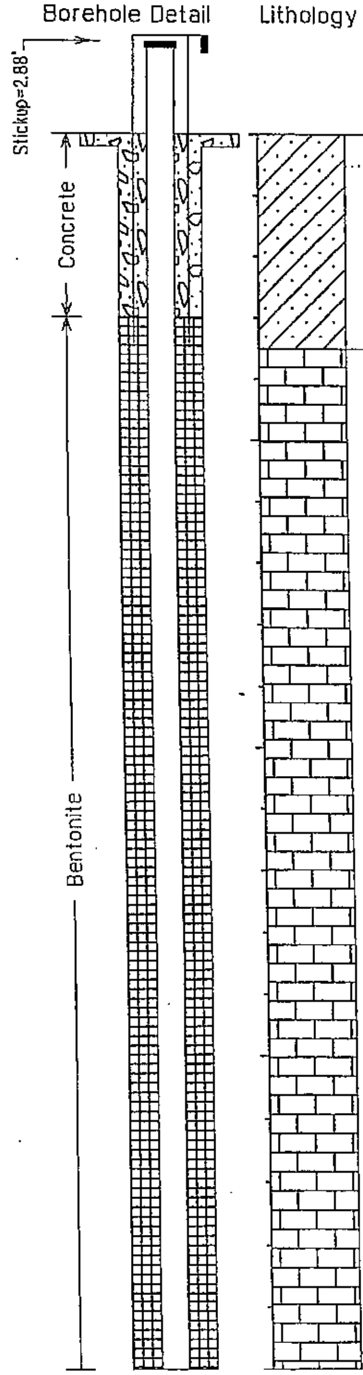
Personnel:
Geologist: S. Radulovic
Driller: D. Eger
Helper (s):

Dates:
Start: 11/2/2004
Finish: 11/4/2004

Sample Type: Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	Blow Count	q_p $[q_s]$ (in tsf)	% Moisture	Description/*Comments*	USC	Elev. (MSL)
	1							Topsoil		600
								Dark grey, Clayey SAND, with trace intervals of grey clayey silt.		
	2									
								Light grey with a beige hue, LIMESTONE, with small vugs (1/16-1/2"). Weathered from 4-10'.		
5	3									595
	4									
	5									
10								Trace shale partings.		590
	6									
15										585
	7							6" vertical joint with trace iron staining on exposed faces.		
20										

Borehole Detail / Lithology



NOTES: Geological descriptions obtained from the boring log for G45D.

Andrews Environmental Engineering, Inc.
3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124

Location:
Coord. System: Site Grid
Northing: 58057.56
Easting: 48125.64

Boring Information:
Boring No.: G45S
Well No.: G45S
Surf. Elev.: 600.30

Weather:
Sunny/60 deg F

Depth Information:
Total: 132.48
Auger: 4.0
Core: 132.48

Drilling Contractor:
Name: RD-n-P Drilling, Inc.
City: Crown Point, Indiana
Equipment: HQ Core

Personnel:
Geologist: S. Radulovic
Driller: D. Eger
Helper (s):

Dates:
Start: 11/2/2004
Finish: 11/4/2004

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	Blow Count	q_p [q_s] (in tsf)	% Moisture	Borehole Detail	Lithology	Description/*Comments*	USC	Elev. (MSL)
								Bentonite	Limestone	(continued) Light grey with a beige hue, LIMESTONE, with small vugs (1/16-1/2").		580
	8											
25										1" thick chert layer.		575
										Vertical joint from 28.3-29.3'.		
	9											
30										Pinkish banding commences.		570
										Increased amount of blueish green shale partings, some fractures along shale partings.		
35	10											565
										1-2" thick vuggy intervals, vug diameter <1/16".		
40												

NOTES: Geological descriptions obtained from the boring log for G45D.

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:	Location:	Boring Information:
Name: Joliet/Lincoln Stone Quarry	Coord. System: Site Grid	Boring No.: G45S
Location: Joliet, Illinois	Northing: 58057.56	Well No.: G45S
County: Will	Easting: 48125.64	Surf. Elev.: 600.30
Site No.: 1978090001	**Weather:**	**Depth Information:**
AEEI No.: 2002-124	Sunny/60 deg F	Total: 132.48
Drilling Contractor:	**Personnel:**	Auger: 4.0
Name: RD-n-P Drilling, Inc.	Geologist: S. Radulovic	Core: 132.48
City: Crown Point, Indiana	Driller: D. Eger	**Dates:**
Equipment: HQ Core	Helper (s):	Start: 11/2/2004
		Finish: 11/4/2004

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	Blow Count	q_p [q_s] (in tsf)	% Moisture	Borehole Detail	Lithology	Description/*Comments*	USC	Elev. (MSL)
								Bentonite		(continued) Light grey with pink banding, LIMESTONE, some small vugs.		560
45	11											555
										Color grading to a pinkish red.		
50										4" vertical fracture.		550
55	12											545
										Vertical fracture from 57.5-58.5', filled with blueish grey clayey shale.		
60												

NOTES: Geological descriptions obtained from the boring log for G45D.

Andrews Environmental Engineering, Inc.

3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:	Location:	Boring Information:
Name: Joliet/Lincoln Stone Quarry	Coord. System: Site Grid	Boring No.: G45S
Location: Joliet, Illinois	Northing: 58057.56	Well No.: G45S
County: Will	Easting: 48125.64	Surf. Elev.: 600.30
Site No.: 1978090001	Weather:	Depth Information:
AEEI No.: 2002-124	Sunny/60 deg F	Total: 132.48
Drilling Contractor:	Personnel:	Auger: 4.0
Name: RD-n-P Drilling, Inc.	Geologist: S. Radulovic	Core: 132.48
City: Crown Point, Indiana	Driller: D. Eger	Dates:
Equipment: HQ Core	Helper (s):	Start: 11/2/2004
		Finish: 11/4/2004

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	Blow Count	qp [qs] (in tsf)	% Moisture	Borehole Detail	Lithology	Description/*Comments*	USC	Elev. (MSL)
								Bentonite		(continued) Pinkish, LIMESTONE, some small vugs. Vertical fractures from 60.6-62.3', filled with blueish grey clayey shale and pyrite.		540
65	13									Vertical fractures from 65.0-65.8', filled with blueish grey clayey shale and pyrite.		535
										Vertical fractures from 67.2-68.2', filled with blueish grey clayey shale and pyrite.		
70										Vuggy intervals up to 1" thick.		530
										Closed vertical joint.		
75	14											525
80												

NOTES: Geological descriptions obtained from the boring log for G45D.

Andrews Environmental Engineering, Inc.
3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124

Location:
Coord. System: Site Grid
Northing: 58057.56
Easting: 48125.64

Boring Information:
Boring No.: G45S
Well No.: G45S
Surf. Elev.: 600.30

Depth Information:
Total: 132.48
Auger: 4.0
Core: 132.48

Dates:
Start: 11/2/2004
Finish: 11/4/2004

Weather:
Sunny/60 deg F

Drilling Contractor:
Name: RD-n-P Drilling, Inc.
City: Crown Point, Indiana
Equipment: HQ Core

Personnel:
Geologist: S. Radulovic
Driller: D. Eger
Helper (s):

Sample Type: Continuous Barrel; Split Spoon; Shelby Tube; Core; Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	Blow Count	q_p [q_s] (in tsf)	% Moisture	Borehole Detail	Lithology	Description/*Comments*	USC	Elev. (MSL)
								Bentonite		(continued) Grey with pink banding, LIMESTONE, some small vugs. 2" diameter vug.		520
85	15											515
90												510
										Increase in vugs. Open vuggy fracture from 92.2-92.4', some pyrite.		
95	16											505
										2-3" thick white cherty layers.		
100												

NOTES: Geological descriptions obtained from the boring log for G45D.

Andrews Environmental Engineering, Inc.
3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124

Location:
Coord. System: Site Grid
Northing: 58057.56
Easting: 48125.64

Boring Information:
Boring No.: G45S
Well No.: G45S
Surf. Elev.: 600.30

Weather:
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Depth Information:
Total: 132.48
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Drilling Contractor:
Name: RD-n-P Drilling, Inc.
City: Crown Point, Indiana
Equipment: HQ Core

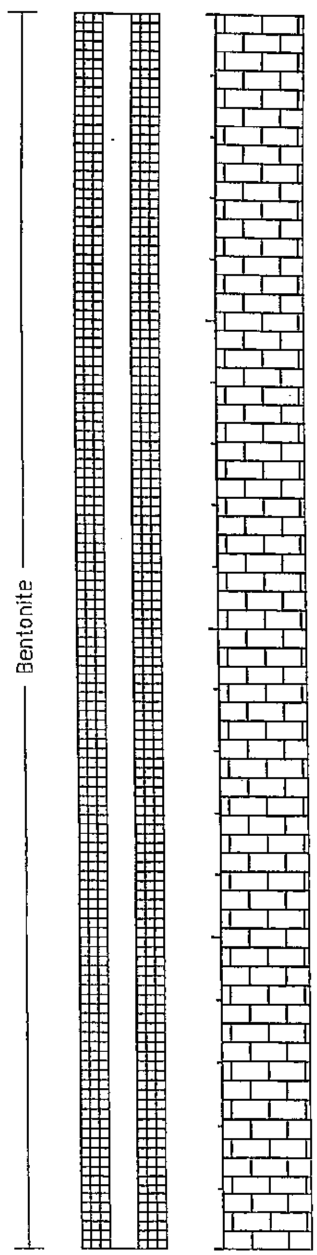
Personnel:
Geologist: S. Radulovic
Driller: D. Eger
Helper (s):

Dates:
Start: 11/2/2004
Finish: 11/4/2004

Sample Type: Continuous Barrel — Split Spoon — Shelby Tube — Core — Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	Blow Count	q_p [q_s] (in tsf)	% Moisture	Description/*Comments*	USC	Elev. (MSL)
								(continued) Grey with pink banding, LIMESTONE, some small vugs, some white cherty layers. Cherty layers becoming thicker (4"), with fossils and calcite crystals.		500
105	17									495
110								Pink banding ceases. Cherty layers becoming darker in color (grey). Some fossils.		490
115	18									485
120										

Borehole Detail / Lithology



NOTES: Geological descriptions obtained from the boring log for G45D.

Andrews Environmental Engineering, Inc.
3535 Mayflower Boulevard, Springfield, IL 62707 (217) 787-2334

Field Boring Log

Site Information:
Name: Joliet/Lincoln Stone Quarry
Location: Joliet, Illinois
County: Will
Site No.: 1978090001
AEEI No.: 2002-124

Location:
Coord. System: Site Grid
Northing: 58057.56
Easting: 48125.64

Boring Information:
Boring No.: G45S
Well No.: G45S
Surf. Elev.: 600.30

Weather:
Sunny/60 deg F

Depth Information:
Total: 132.48
Auger: 4.0
Core: 132.48

Drilling Contractor:
Name: RD-n-P Drilling, Inc.
City: Crown Point, Indiana
Equipment: HQ Core

Personnel:
Geologist: S. Radulovic
Driller: D. Eger
Helper (s):

Dates:
Start: 11/2/2004
Finish: 11/4/2004

Sample Type: - Continuous Barrel - Split Spoon - Shelby Tube - Core - Blind Drill

Depth (ft.)	Run No.	Sample Type	Sample No.	Sample Recov.	Blow Count	q_p [q_s] (in tsf)	% Moisture	Borehole Detail	Description/Comments	USC	Elev. (MSL)
								Bentonite	Grey to dark grey, DOLOMITE.		480
125	19							Sand			475
130	20										470
									End of Boring = 132.48'		
135											465
140											

NOTES: Geological descriptions obtained from the boring log for G45D.

Illinois Environmental Protection Agency — Well Completion Report

Site #: 1978090001 County: Will Well #: G45S

Site Name: Joliet/Lincoln Stone Quarry Borehole #: G45S

Coordinates: X 48125.64 Y 58057.56 (or) Latitude: ° ' " Longitude: ° ' "

Surveyed by: Andrews Environmental Engineering, Inc. IL Registration #:

Drilling Contractor: RD-n-P Drilling, Inc. Consulting Firm: AEEI

Driller: D. Eger Geologist: S. Radulovic

Drilling Method: HQ core Logged by: S. Radulovic

Drilling Fluids (type): water for reaming Report Form Completed by: S. Holland

Date Well Started: 11/02/2004 Date Well Finished: 11/04/2004 Date Form Completed: 12/30/2004

ANNULAR SPACE DETAILS

Type of surface seal: Concrete

Type of annular sealant: Bentonite

Installation method: Tremi

Setting time: 24+ hours

Type of bentonite seal – Granular, Chips (circle one)

Installation method: Free drop

Setting time: 24+ hours

Type of sand pack: Quartz Sand

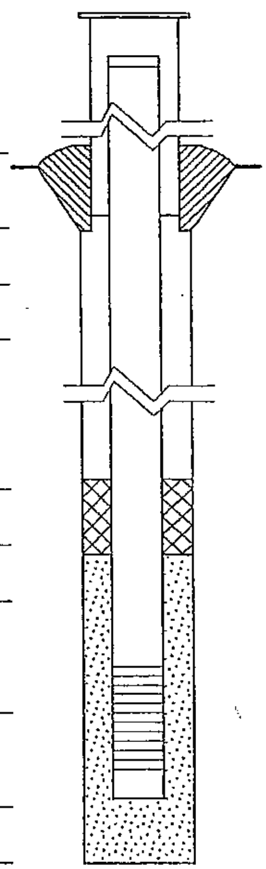
Grain size: 10/30 (sieve size)

Installation method: Free drop

Type of backfill material: na (if applicable)

Installation method: na

Notes:



ELEVATION (MSL)*	DEPTH (BGS)*	(0.01 ft)
n/a	n/a	Top of Protective Casing
603.18	-2.88	Top of Riser Pipe
600.30	.00	Ground Surface
600.30	.00	Top of Annular Sealant
n/a	n/a	Static Water Level Measured on (after completion)
597.30	3.00	Top of Seal
478.70	121.60	Top of Sandpack
477.90	122.40	Top of Screen
468.18	132.12	Bottom of Screen
467.82	132.48	Bottom of Well
467.82	132.48	Bottom of Borehole

* Referenced to a National Geodetic Vertical Datum
* positive (+) values below GS, negitive (-) values above GS

CASING MEASUREMENTS

Diameter of Borehole (in)	3.7
ID of Riser Pipe (in)	2.0
Protective Casing Length (ft)	5.0
Riser Pipe Length (ft)	125.28
Bottom of Screen to End Cap (ft)	.36
Screen Length (1st slot to last slot) (ft)	9.72
Total Length of Casing (ft)	135.36
Screen Slot Size*	#10 (0.01")

*Hand-slotted well screens are unacceptable.

WELL CONSTRUCTION MATERIALS
(circle one)

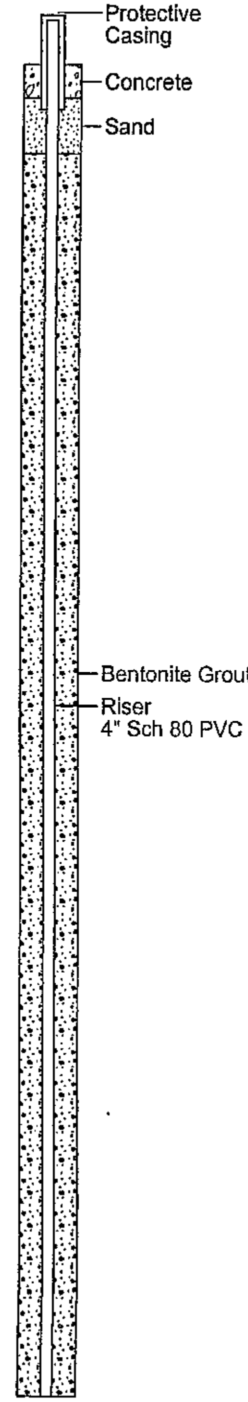
Protective Casing	SS304, SS316, PTFE, PVC or Other:
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC or Other:
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC or Other:
Screen	SS304, SS316, PTFE, PVC or Other:

(AE950315)

KPRG Environmental Consultation & Remediation KPRG and Associates, Inc.	# GEOLOGIC LOG OF G46D/S (Page 1 of 4)	
Midwest Generation, LLC Station # 9 - Lincoln Quarry Joliet, Illinois Project No. 21805	Date Started : 01/30/06 Date Well Set : 02/17/06 Coring Tools : 10' HQ conv. circ. Reaming Tools : 7.5" Tri-Cone w/ stab Drill Rig : DrillTech D40 Driller Name/Co : R. Treptow / Layne	Total Boring Depth : 225.0 feet Well Bottom Depth : 225.0 feet Surface Elev. : 598.290 feet above MSL TOC Elev. : 600.870 feet above MSL Groundwater Elev. : xxx feet above MSL Riser Material : 4" Sch 80 PVC Screen Material : 4" Sch 80 PVC, 0.010 slot Coordinate N : 1757410.291 Coordinate E : 1046479.383 Logged By : P. Allenstein

Depth in Feet	Surf. Elev. 598	DESCRIPTION	% RQD	% Recovery
0	598			
		Overburden was blind drilled to 25 feet.		
		Cuttings logged for general lithology.		
5	593			
		CLAY/ SILTY CLAY, brown. Dry.		
10	588			
15	583			
20	578	SAND, brown, mostly medium, some fine and coarse and silt, some gravel. Moist.		
		DOLOMITE, weathered.		
25	573			
		DOLOMITE, highly fractured, heavy iron staining.		
		DOLOMITE, white, some very light green hues, fine grained, slightly fractured (horz), some pits, no vugs.	34	
30	568			
35	563			
		- highly fractured 37-42, tight to extremely narrow, sediment infilling - vertical fracture, tight, pyrite and green/gray argilaceous sediment infilling - 0.15' chert, fractured, some pyrite	16.5	
40	558			
45	553	DOLOMITE, white, some light green/blue hues, fine grained, horz fractures every 0.1', tight with sediment and pyrite infilling, some white chert, some pits	100	
50	548			
55	543			
			71.5	
		- begin pink, increase occurance of green/blue hue		
60				

Well Diagram: G46D



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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

GEOLOGIC LOG OF G46D/S

Midwest Generation, LLC
Station # 9 - Lincoln Quarry
Joliet, Illinois

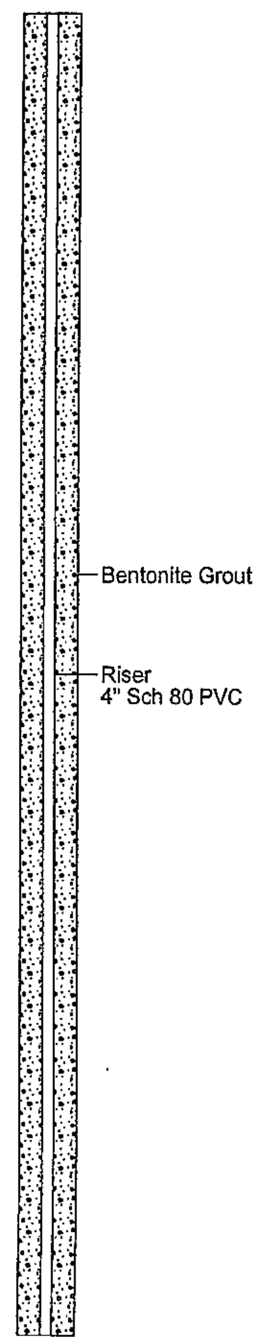
Project No. 21805

Date Started	: 01/30/06
Date Well Set	: 02/17/06
Coring Tools	: 10' HQ conv. circ.
Reaming Tools	: 7.5" Tri-Cone w/ stab
Drill Rig	: DrillTech D40
Driller Name/Co	: R. Treptow / Layne

Total Boring Depth	: 225.0 feet
Well Bottom Depth	: 225.0 feet
Surface Elev.	: 598.290 feet above MSL
TOC Elev.	: 600.870 feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 4" Sch 80 PVC
Screen Material	: 4" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757410.291
Coordinate E	: 1046479.383
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 598	DESCRIPTION	% RQD	% Recovery
60	538		71.5	
65	533	- 0.3' fracture zone, horz, sediment filled, extremely narrow	89	
70	528	DOLOMITE, pink, fine grained, some pits, no vugs, sediment filled fractures horz, wavy, very narrow, occ balck stain, oval-shaped - 0.2' darker layer, fractured, very narrow		
75	523		100	
80	518	- highly fractured zone 80-83, tight, sediment infilling		
85	513	DOLOMITE, white with light pink hue, trace to little pits, layers with many fractures, wavy tight to very narrow, sediment infilling, trace fossils - vert frac, very narrow	84.5	
90	508	- large vug, with pyrite on bottom - fractures with trace pyrite, sediment infilling - large cross fracture, sediment infilling		
95	503	- trace pyrite near vert fracture - chert, fossil vug mod soft	75.1	
100	498	- pitted, vuggy fossiliferous layer (0.1') - highly fract, horz and vert, tight to very narrow, trace pyrite, little sediment infilling		
105	493	-begin layers of darker and lighter pink - vug, trace pyrite	92.4	
110	488			
115	483	- fractured, horz and vert, tight - fractured, narrow	98	
120				

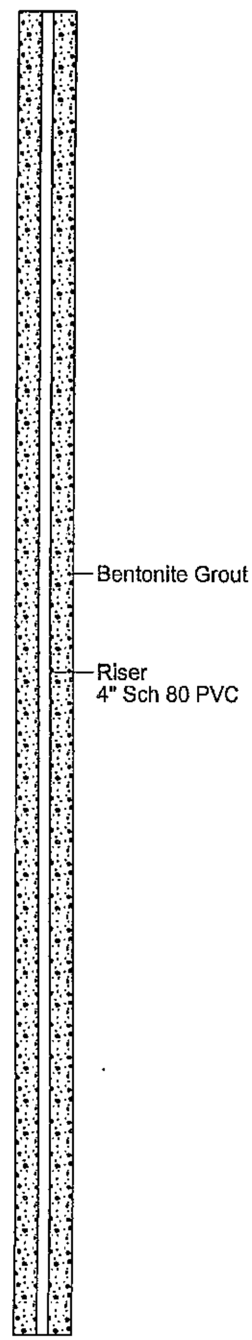
Well Diagram: G46D



KPRG ENVIRONMENTAL CONSULTATION & REMEDIATION KPRG and Associates, Inc.	GEOLOGIC LOG OF G46D/S (Page 3 of 4)			
Midwest Generation, LLC Station # 9 - Lincoln Quarry Joliet, Illinois Project No. 21805	Date Started Date Well Set Coring Tools Reaming Tools Drill Rig Driller Name/Co	: 01/30/06 : 02/17/06 : 10' HQ conv. circ. : 7.5" Tri-Cone w/ stab : DrillTech D40 : R. Treptow / Layne	Total Boring Depth Well Bottom Depth Surface Elev. TOC Elev. Groundwater Elev. Riser Material Screen Material Coordinate N Coordinate E Logged By	: 225.0 feet : 225.0 feet : 598.290 feet above MSL : 600.870 feet above MSL : xxx feet above MSL : 4" Sch 80 PVC : 4" Sch 80 PVC, 0.010 slot : 1757410.291 : 1046479.383 : P. Allenstein

Depth in Feet	Surf. Elev. 598	DESCRIPTION	% RQD	% Recovery
120	478		98	
		DOLOMITE, white to light gray, fine grained, pitted, some fossils, horz fracs sediment filled, tight to very narrow, some chert - white with darker centers, some laminations, little to trace pyrite		
125	473			
			74.3	
130	468	DOLOMITE, light gray with light green, fine grained, trace to no pits, horz frac wavy, sediment, tight to very narrow, fossils, chert - white to light gray with little pyrite		
135	463			
			100	
140	458	DOLOMITE, gray to dark gray, fine grained, some wavy bedding, trace pits and vugs, chert - light gray with some thin bedding, some fractures, tight to very narrow, sediment infilling with little pyrite		
145	453	- pitted layer - cross fracture		
			98.2	
150	448			
155	443			
			95.3	
160	438	- 0.1' fossiliferous zones, light gray (occ every 2 feet)		
		- 0.12' thin bedding lamination		
165	433			
			94.3	
170	428	- fractured, horz and cross, tight, some sediment infilling		
		- cross frac, 174-175.8, very narrow		
175	423	- fractures continue to 185, some displacement (<0.02'), tight	100	
		- also becomming mostly dark gray		
180				

Well Diagram: G46D



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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Station # 9 - Lincoln Quarry
Joliet, Illinois

Project No. 21805

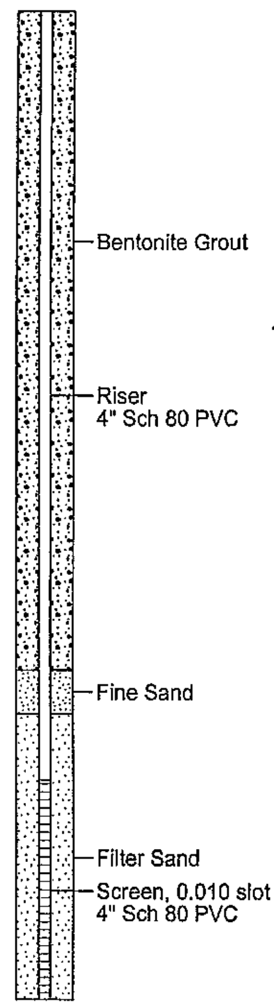
GEOLOGIC LOG OF G46D/S

Date Started	: 01/30/06
Date Well Set	: 02/17/06
Coring Tools	: 10' HQ conv. circ.
Reaming Tools	: 7.5" Tri-Cone w/ stab
Drill Rig	: DrillTech D40
Driller Name/Co	: R. Treptow / Layne

Total Boring Depth	: 225.0 feet
Well Bottom Depth	: 225.0 feet
Surface Elev.	: 598.290 feet above MSL
TOC Elev.	: 600.870 feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 4" Sch 80 PVC
Screen Material	: 4" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757410.291
Coordinate E	: 1046479.383
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 598	DESCRIPTION	% RQD	% Recovery
180	418		100	
		- transistion zone, DOLOMITE / MUDDY DOLOMITE		
185	413			
		MUDDY DOLOMITE, dark gray, platey becomming massive, black platlets, uniform, no visible grains	100	
190	408	- becoming near black		
		192.15-192.7 - SHALE, green, moderately soft, laminated 192.7-193.21 - DOLOMITIC SHALE, light gray, laminated gray, frac with pyrite 193.21-193.81 - transistion into FOSSILIFEROUS DOLOMITE 193.81-194.05 - DOLOMITIC SHALE, gray, laminated dark, frac with pyrite	100	
195	403			
		FOSSILIFEROUS DOLOMITE, white, pourous, vuggy, intensely fractured, some pyrite and quartz in vugs - at 196.05, void with quartz and pyrite crystals	64.3	
200	398			
		- begin horz frac, narrow, sediment, some black platelets		
205	393	- large vuggy layer, some pyrite and quartz	35.7	
210	388			
		- begin darker to light gray - void large pyrite, some calcite		
215	383	- begin white		
220	378			
225	373			
		End of Boring at 225 feet. Boring cored to 225, reamed to 225, well set at 225.		
230	368			
235	363			
240				

Well Diagram: G46D



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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Station # 9 - Lincoln Quarry
Joliet, Illinois

Project No. 21805

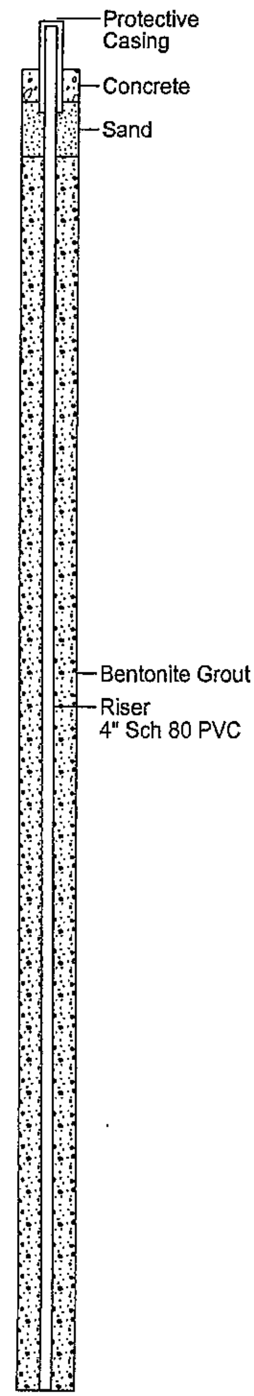
GEOLOGIC LOG OF G47D/S

Date Started	: 01/24/06
Date Well Set	: 02/17/06
Coring Tools	: 10' HQ conv. circ.
Reaming Tools	: 7.5" Tri-Cone w/ stab
Drill Rig	: DrillTech D40
Driller Name/Co	: R. Treptow / Layne

Total Boring Depth	: 225.0 feet
Well Bottom Depth	: 225.0 feet
Surface Elev.	: 609.454 feet above MSL
TOC Elev.	: 611.902 feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 4" Sch 80 PVC
Screen Material	: 4" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757455.119
Coordinate E	: 1047666.224
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 609	DESCRIPTION	% RQD	% Recovery
0	609			
		Overburden was blind drilled to 25.5 feet.		
		Cuttings logged for general lithology.		
5	604			
		CLAY / SILTY CLAY, brown. Dry.		
10	599			
15	594			
20	589			
		DOLOMITE, weathered.		
25	584			
		DOLOMITE, white, trace iron staining mostly on fractures, fractured, tight, jagged, fine to medium grained, some pits	25.7	
30	579	- no iron staining		
		- begin blue/green hue		
35	574			
		- begin trace chert - some pyrite, some large chert nodules	72.9	
40	569			
45	564			
			73.6	
50	559			
		- cresent shaped frac, narrow, pyrite, brown staining		
55	554	- 55.5-57.5 fractured, horz, wavy, sediment infilling with pink hue	84.8	
60				

Well Diagram: G47D



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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Station # 9 - Lincoln Quarry
Joliet, Illinois

Project No. 21805

GEOLOGIC LOG OF G47D/S

Date Started	: 01/24/06
Date Well Set	: 02/17/06
Coring Tools	: 10' HQ conv. circ.
Reaming Tools	: 7.5" Tri-Cone w/ stab
Drill Rig	: DrillTech D40
Driller Name/Co	: R. Treptow / Layne

Total Boring Depth	: 225.0 feet
Well Bottom Depth	: 225.0 feet
Surface Elev.	: 609.454 feet above MSL
TOC Elev.	: 611.902 feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 4" Sch 80 PVC
Screen Material	: 4" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757455.119
Coordinate E	: 1047666.224
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 609	DESCRIPTION	% RQD	% Recovery
60	549		84.8	
65	544	DOLOMITE, light pink, some lighter pink, fine grained, fractures, tight, horz wavy, some vert, with sediment and some pyrite infilling, trace to no pits or vugs	58.6	
70	539	- begin dark pink		
75	534	- some iron staining in bands	67.1	
80	529	- fractured zone, horz, sediment infilling		
85	524	DOLOMITE, white, fine grained, little pits, trace to no vugs or pyrite, little frac horz, tight, some sediment infilling - fractured zone - begin trace to no frac or pits	70.3	
90	519			
95	514	- some pyrite - fractured zone	24.2	
100	509			
105	504		49.4	
110	499	- some horz frac, sediment infilling		
115	494	begin - vugs and fossils, calcite, no pyrite, some layers with increase pits and small vugs	75.1	
120				

Well Diagram: G47D

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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Station # 9 - Lincoln Quarry
Joliet, Illinois

Project No. 21805

GEOLOGIC LOG OF G47D/S

Date Started	: 01/24/06
Date Well Set	: 02/17/06
Coring Tools	: 10' HQ conv. circ.
Reaming Tools	: 7.5" Tri-Cone w/ stab
Drill Rig	: DrillTech D40
Driller Name/Co	: R. Treptow / Layne

Total Boring Depth	: 225.0 feet
Well Bottom Depth	: 225.0 feet
Surface Elev.	: 609.454 feet above MSL
TOC Elev.	: 611.902 feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 4" Sch 80 PVC
Screen Material	: 4" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757455.119
Coordinate E	: 1047666.224
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 609	DESCRIPTION	% RQD	% Recovery
120	489	DOLOMITE, gray, large chert - white with dark gray and little to trace pyrite, some vugs with pyrite on bottom	75.1	
125	484	- several layers highly broken chert		
		DOLOMITE, white to light gray, some light green/blue, few layers with pits, horz wavy frac, sediment infilling, little chert, some pyrite in chert	88.8	
130	479			
135	474		100	
140	469			
		DOLOMITE, gray, fine grained, some chert, occ bedding, horz frac with black sediment infilling, occ cherty layers, trace pyrite usually in chert, little fossils, trace to no pits or vugs		
145	464		96.5	
150	459			
		begin - little to no chert		
155	454	- some bedding gray to light gray, dark gray sediment in horz frac		
		- 0.1' fossiliferous layer, pits, little pyrite	100	
160	449			
165	444		85.8	
170	439			
175	434		100	
180				

Well Diagram: G47D

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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Station # 9 - Lincoln Quarry
Joliet, Illinois

Project No. 21805

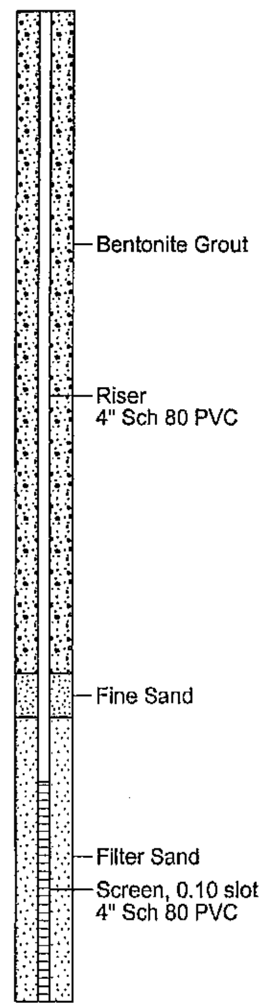
GEOLOGIC LOG OF G47D/S

Date Started	: 01/24/06
Date Well Set	: 02/17/06
Coring Tools	: 10' HQ conv. circ.
Reaming Tools	: 7.5" Tri-Cone w/ stab
Drill Rig	: DrillTech D40
Driller Name/Co	: R. Treptow / Layne

Total Boring Depth	: 225.0 feet
Well Bottom Depth	: 225.0 feet
Surface Elev.	: 609.454 feet above MSL
TOC Elev.	: 611.902 feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 4" Sch 80 PVC
Screen Material	: 4" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757455.119
Coordinate E	: 1047666.224
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 609	DESCRIPTION	% RQD	% Recovery
180	429		100	
		- becoming darker		
185	424	- 0.3' transitional layer		
		MUDDY DOLOMITE, dark gray, thin black platlets, no frac, no chert	100	
190	419			
195	414	193.9-194.15 - SHALE, light green, mod hard, thin bed 194.15-195.3 - DOLOMITIC SHALE, lighter, some pits with pyrite 195.3-195.5 - DOLOMITIC SHALE, dark gray, upper hard, lower soft		
200	409	FOSSILIFEROUS DOLOMITE, white, upper foot light green hues, pitted, vuggy, pyrite, calcite and quartz in vugs and voids - large crystal layer at 197, quartz and pyrite - horz frac, sediment at 200'		
205	404	begin - little vugs and pits		
		- 0.7' horz frac, mostly pyrite	43.9	
210	399			
		DOLOMITE, gray and black (peppered), thin black platelets and beds, vuggy, pitted, calcite quartz and pyrite throughout		
215	394	DOLOMITE, light gray, some pits and vugs, calcite quartz and pyrite, horz frac with green soft argillaceous sediment infilling	54.2	
220	389	- some black platelets		
			94.0	
225	384	End of Boring at 225 feet.		
230	379			
235	374			
240				

Well Diagram: G47D



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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

GEOLOGIC LOG OF G48D/S

Midwest Generation, LLC
Station # 9 - Lincoln Quarry
Joliet, Illinois

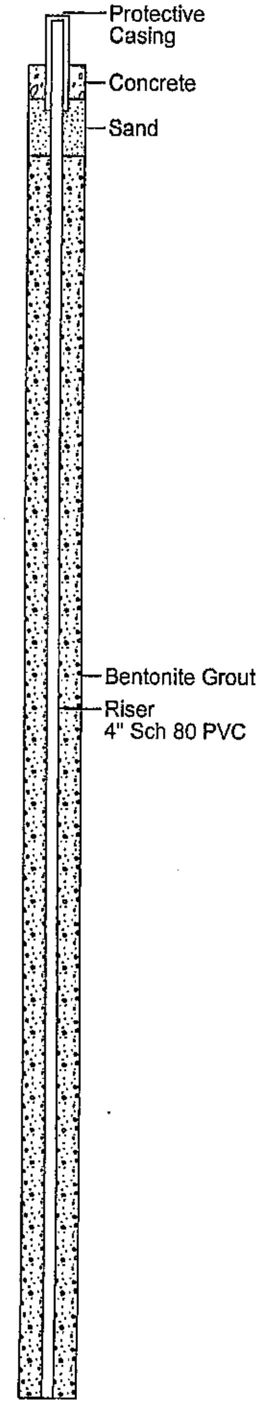
Project No. 21805

Date Started	: 12/19/05
Date Well Set	: 02/17/06
Coring Tools	: 10' HQ conv. circ.
Reaming Tools	: 7.5" Tri-Cone w/ stab
Drill Rig	: DrillTech D40
Driller Name/Co	: R. Treptow / Layne

Total Boring Depth	: 225.0 feet
Well Bottom Depth	: 225.0 feet
Surface Elev.	: 617.778 feet above MSL
TOC Elev.	: 620.530 feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 4" Sch 80 PVC
Screen Material	: 4" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757481.301
Coordinate E	: 1048124.052
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 617	DESCRIPTION	% RQD	% Recovery
0	617			
		Overburden was blind drilled to 40.		
		Cuttings logged for general lithology.		
5	612			
		CLAY / SILTY CLAY, brown. Dry.		
10	607			
15	602			
20	597			
25	592			
30	587			
		SAND, brown, fine to medium, some silt and gravel.		
35	582			
		GRAVEL, brown, fine to medium, some sand and silt.		
		DOLOMITE, weathered.		
40	577			
		DOLOMITE, white to light gray, fine grained, trace pits		
45	572			
		- greenish hue	43.6	
		- dark gray layer		
50	567	DOLOMITE, green/gray to light gray with pink hue, colors in blending layers ,few vugs, less pits, several pyrite filled frac vert and horz, tight, some horz frac, dark gray sediment and pyrite infilling, some wavy		
55	562			
			23.8	
60				

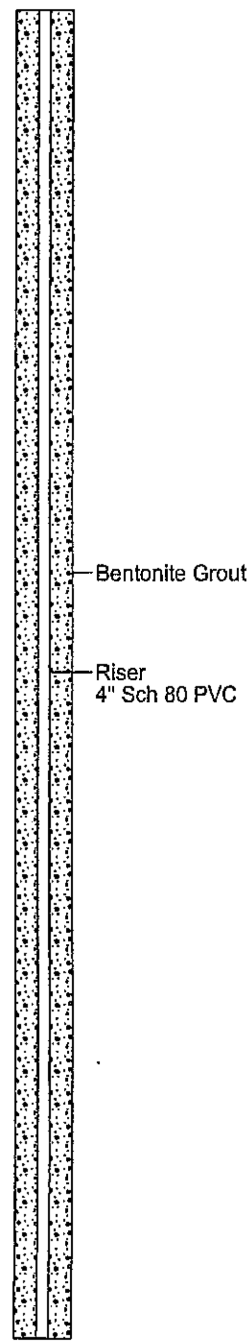
Well Diagram: G48D



KPRG ENVIRONMENTAL CONSULTATION & REMEDIATION KPRG and Associates, Inc.	# GEOLOGIC LOG OF G48D/S (Page 2 of 4)	Total Boring Depth : 225.0 feet Well Bottom Depth : 225.0 feet Surface Elev. : 617.778 feet above MSL TOC Elev. : 620.530 feet above MSL Groundwater Elev. : xxx feet above MSL Riser Material : 4" Sch 80 PVC Screen Material : 4" Sch 80 PVC, 0.010 slot Coordinate N : 1757481.301 Coordinate E : 1048124.052 Logged By : P. Allenstein
Midwest Generation, LLC Station # 9 - Lincoln Quarry Joliet, Illinois Project No. 21805	Date Started : 12/19/05 Date Well Set : 02/17/06 Coring Tools : 10' HQ conv. circ. Reaming Tools : 7.5" Tri-Cone w/ stab Drill Rig : DrillTech D40 Driller Name/Co : R. Treptow / Layne	

Depth in Feet	Surf. Elev. 617	DESCRIPTION	% RQD	% Recovery
60	557	- coloring becoming more distinct - pink hue is darker 62-64, vert frac, pyrite, vugs have calcite and pyrite	23.8	
65	552	- light and dark gray, trace to no pink, pitted 67-70	15.3	
70	547	- pink resumes, some chert, tight fracs		
75	542	- light pink	84.9	
80	537	DOLOMITE, light gray with green/gray, vuggy, cherty, trace pyrite - 79-80 cross frac, 1.0', some vugs with pyrite, trace to no green hue - some wavy frac		
85	532	- 0.35' vert frac, tight, no pyrite - 1.0' vert frac, tight, some pyrite	67.5	
90	527	- 88-90 - wavy horz frac zone, vug with pyrite - 89-92 - no pyrite		
95	522	begin gray, increase wavy horz frac, some vugs with calcite, little vert frac	13.4	
100	517	- 0.05 layer pitted, vuggy, fossiliferous, white - becoming lighter		
105	512		22.7	
110	507	DOLOMITE, gray with pink hue, fine grained, layers with darker shade, little pits and vugs, some with pyrite		
115	502		69.7	
120				

Well Diagram: G48D



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ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

Midwest Generation, LLC
Station # 9 - Lincoln Quarry
Joliet, Illinois

Project No. 21805

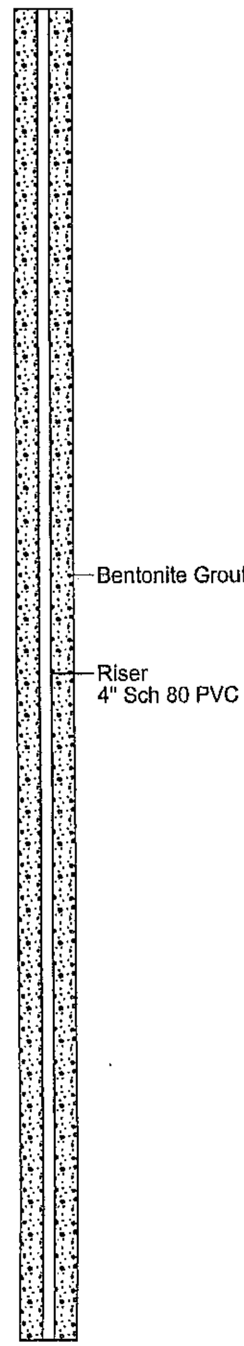
GEOLOGIC LOG OF G48D/S

Date Started	: 12/19/05
Date Well Set	: 02/17/06
Coring Tools	: 10' HQ conv. circ.
Reaming Tools	: 7.5" Tri-Cone w/ stab
Drill Rig	: DrillTech D40
Driller Name/Co	: R. Treptow / Layne

Total Boring Depth	: 225.0 feet
Well Bottom Depth	: 225.0 feet
Surface Elev.	: 617.778 feet above MSL
TOC Elev.	: 620.530 feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 4" Sch 80 PVC
Screen Material	: 4" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757481.301
Coordinate E	: 1048124.052
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 617	DESCRIPTION	% RQD	% Recovery
120	497	DOLOMITE, white to light gray with light green, trace to no vugs or pits or pyrite, less chert, some oval shaped, trace fossils	69.7	
125	492		41.3	
130	487			
135	482	DOLOMITE, gray, layers of fine bedding, fine grained, trace pyrite, some chert, little to no fossils	61.0	
140	477	- 141.7 to 142.2 - light brown - 0.3' dark gray cherty layer		
145	472		100	
150	467	DOLOMITE, gray, fine grained, some bedding, no vugs, little to no pits, trace pyrite in horz frac		
155	462		55.1	
160	457	- 0.02' vug, pyrite		
165	452		71.1	
170	447	- becoming muddy and platey, uniform, no vugs or pits		
175	442		100	
180				

Well Diagram: G48D



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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Station # 9 - Lincoln Quarry
Joliet, Illinois

Project No. 21805

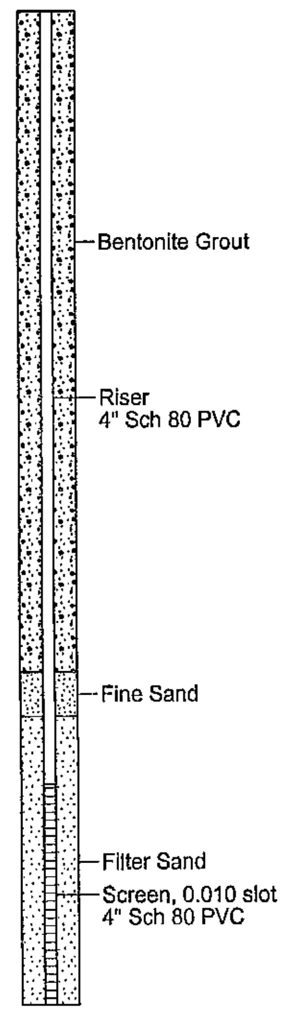
GEOLOGIC LOG OF G48D/S

Date Started	: 12/19/05
Date Well Set	: 02/17/06
Coring Tools	: 10' HQ conv. circ.
Reaming Tools	: 7.5" Tri-Cone w/ stab
Drill Rig	: DrillTech D40
Driller Name/Co	: R. Treptow / Layne

Total Boring Depth	: 225.0 feet
Well Bottom Depth	: 225.0 feet
Surface Elev.	: 617.778 feet above MSL
TOC Elev.	: 620.530 feet above MSL
Groundwater Elev.	: xxx feet above MSL
Riser Material	: 4" Sch 80 PVC
Screen Material	: 4" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757481.301
Coordinate E	: 1048124.052
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 617	DESCRIPTION	% RQD	% Recovery
180	437	MUDDY DOLOMITE, dark gray, platey	100	
185	432	186.05-187.2 - DOLOMITIC SHALE, light green/gray 187.2-189.0 - transistion layer, alt upper and lower	100	
190	427	FOSSILIFEROUS DOLOMITE, white, vuggy, pitted, highly fractured, some pyrite and sediment infilling, some quartz		
195	422		31.2	
200	417	- horz and vert frac, very narrow, some sediment and pyrite infilling		
205	412	- 205 to 211 - little to trace vugs	31.7	
210	407		48.9	
215	402			
220	397	SHALE, light green/gray, platey, mod hard		
		MUDDY DOLOMITE, dark gray, white sediment/crystal filled frac, tight, some wavy lamination		
225	392	End of Boring at 225 feet.		
230	387			
235	382			
240				

Well Diagram: G48D



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GEOLOGIC LOG OF T01S

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

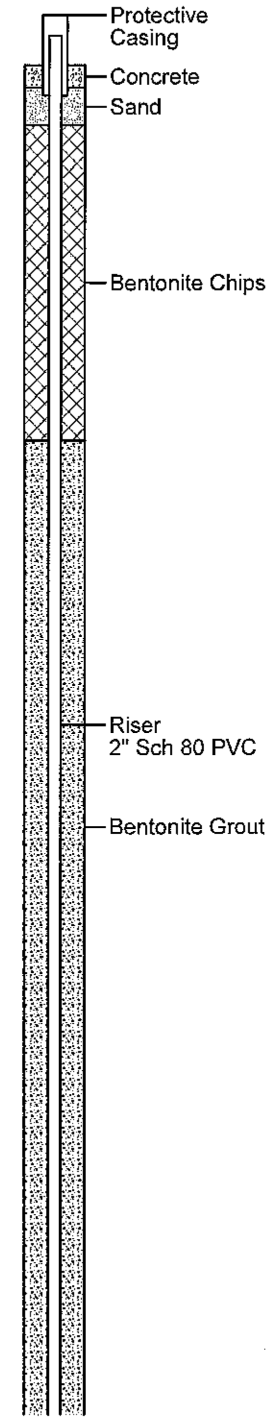
Project No. 11306.11

Date Started	: 06/14/2010
Date Well Set	: 06/16/2010
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 167.0 feet
Well Bottom Depth	: 165.0 feet
Surface Elev.	: 619.00 feet above MSL
TOC Elev.	: 621.46 feet above MSL
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757503.340
Coordinate E	: 1048268.702
Logged By	: C. Higgins

Depth in Feet	Surf. Elev. 619.00	DESCRIPTION	% RQD	% Recovery
0	619			
5	614	Boring drilled through overburden to set temporary 6" casing.		
10	609			
15	604			
20	599			
25	594			
30	589			
35	584			
40	579	Top of Bedrock at 45 feet.		
45	574	Gray DOLOMITE, weathered		
50	569	Gray to White DOLOMITE		
55	564	Gray DOLOMITE, little, green		
60	559	Gray DOLOMITE, some Tan, trace Green		
65	554	Gray and Pink DOLOMITE, some Green		
70	549	Pink and Green DOLOMITE,little chert		
75	544	Light Brown DOLOMITE, some Pink and Green, trace chert		
80	539	- trace Black SAND		
85	534	Dark Gray DOLOMITE, trace Pink		
90		- trace Green		

Well Diagram: T01S



ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 11306.11

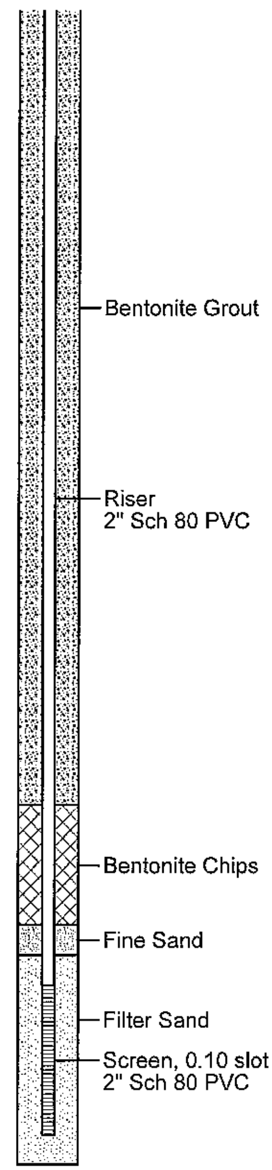
GEOLOGIC LOG OF T01S

Date Started	: 06/14/2010
Date Well Set	: 06/16/2010
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 167.0 feet
Well Bottom Depth	: 165.0 feet
Surface Elev.	: 619.00 feet above MSL
TOC Elev.	: 621.46 feet above MSL
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757503.340
Coordinate E	: 1048268.702
Logged By	: C. Higgins

Depth in Feet	Surf. Elev. 619.00	DESCRIPTION	% RQD	% Recovery
90	529			
95	524			
		Brown and Gray DOLOMITE, trace Green		
100	519			
		Brown and Gray DOLOMITE, some Pink and Green, trace chert		
105	514	- increase chert		
110	509			
115	504			
120	499			
		Light Brown to Tan DOLOMITE, trace chert		
125	494	- increase chert		
130	489			
		Light Brown and Gray DOLOMITE, cherty		
135	484			
140	479			
145	474			
150	469			
155	464			
160	459			
		Dark Gray DOLOMITE		
165	454			
170	449	End of Boring at 167 feet.		
175	444			
180				

Well Diagram: T01S



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRC and Associates, Inc

GEOLOGIC LOG OF T02S

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

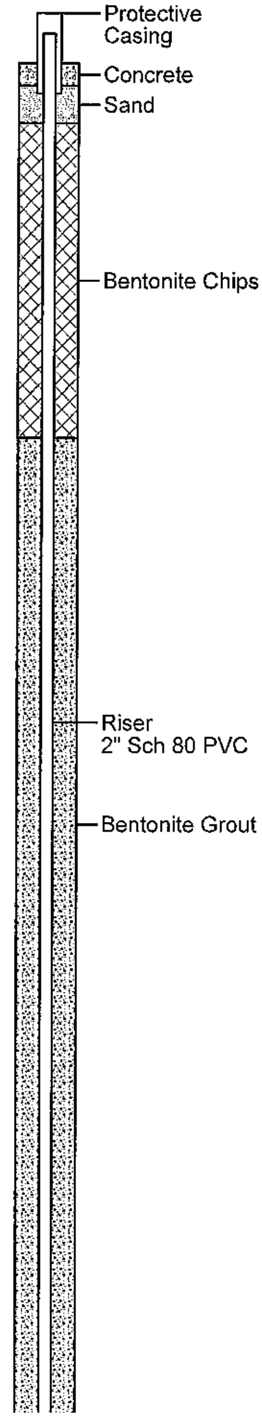
Project No. 11306.11

Date Started	: 04/27/2010
Date Well Set	: 04/27/2010
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 171.0 feet
Well Bottom Depth	: 170.0 feet
Surface Elev.	: 623.79 feet above MSL
TOC Elev.	: 626.15 feet above MSL
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1756750.288
Coordinate E	: 1048104.390
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 623.79	DESCRIPTION	% RQD	% Recovery
0	623			
5	618	Boring drilled through overburden to set temporary 6" casing.		
10	613			
15	608			
20	603			
25	598			
30	593			
35	588			
40	583			
45	578			
50	573			
55	568	Top of Bedrock at 55 feet. Boring reamed to 62 feet in order to set air hammer.		
60	563			
62		Light Brown DOLOMITE, some Rust, weathered		
65	558			
70	553	White to Light Gray DOLOMITE, some chert, less competent		
75	548			
80	543	Tan DOLOMITE, moderately competent		
85	538	Light Gray with Greenish Gray DOLOMITE		
90				

Well Diagram: T02S



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 11306.11

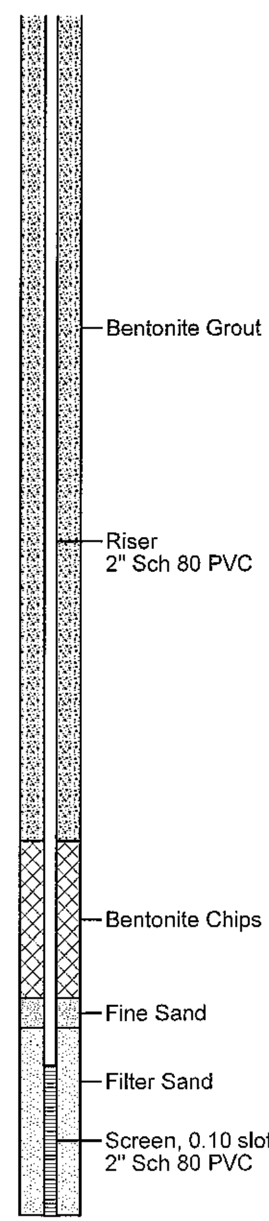
GEOLOGIC LOG OF T02S

Date Started	: 04/27/2010
Date Well Set	: 04/27/2010
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 171.0 feet
Well Bottom Depth	: 170.0 feet
Surface Elev.	: 623.79 feet above MSL
TOC Elev.	: 626.15 feet above MSL
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1756750.288
Coordinate E	: 1048104.390
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 623.79	DESCRIPTION	% RQD	% Recovery
90	533	Darker Greenish Gray DOLOMITE, trace Light Pink, competent		
95	528	Greenish Gray and Pink DOLOMITE		
100	523			
105	518	White DOLOMITE, some Pink, cherty, moderately competent		
110	513	Pink DOLOMITE, trace White, moderately to less competent		
115	508	Light Brown DOLOMITE, trace Greenish Gray, moderately to less competent		
120	503			
125	498	- loss circulation, no recovery		
130	493	- some cohesive clay infilling		
135	488			
140	483	Light Brown DOLOMITE, trace to no Greenish Gray, moderately competent		
145	478	- little recovery		
150	473			
155	468	Light Brown DOLOMITE, with Chert, less competent - less Chert		
160	463			
165	458	Fracture at 166 feet - 6" to 10" No recovery		
170	453	End of Boring at 171 feet.		
175	448			
180				

Well Diagram: T02S



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc

GEOLOGIC LOG OF T03S

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

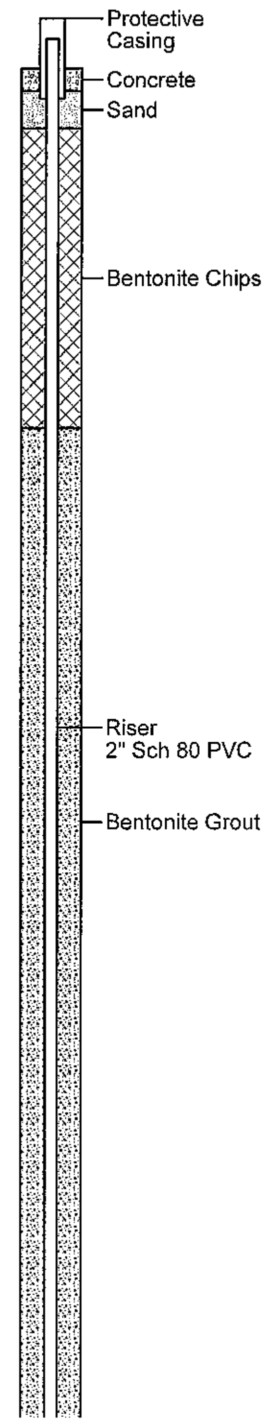
Project No. 11306.11

Date Started	: 04/28/2010
Date Well Set	: 04/29/2010
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 172.0 feet
Well Bottom Depth	: 170.0 feet
Surface Elev.	: 627.22 feet above MSL
TOC Elev.	: 629.65 feet above MSL
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1755962.898
Coordinate E	: 1048165.667
Logged By	: R. Gnat

Depth in Feet	Surf. Elev. 627.22	DESCRIPTION	% RQD	% Recovery
0	627			
5	622	Boring drilled through overburden to set temporary 6" casing.		
10	617			
15	612			
20	607			
25	602			
30	597			
35	592			
40	587			
45	582			
50	577			
55	572	Top of Bedrock at 54 feet. Boring reamed to 62 feet in order to set air hammer.		
60	567			
65	562	Light Gray DOLOMITE, moderately competent to weathered		
70	557			
75	552			
80	547	Light Gray DOLOMITE, some Blue Green matrix, less competent		
85	542			
90				

Well Diagram: T03S



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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

GEOLOGIC LOG OF T03S

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

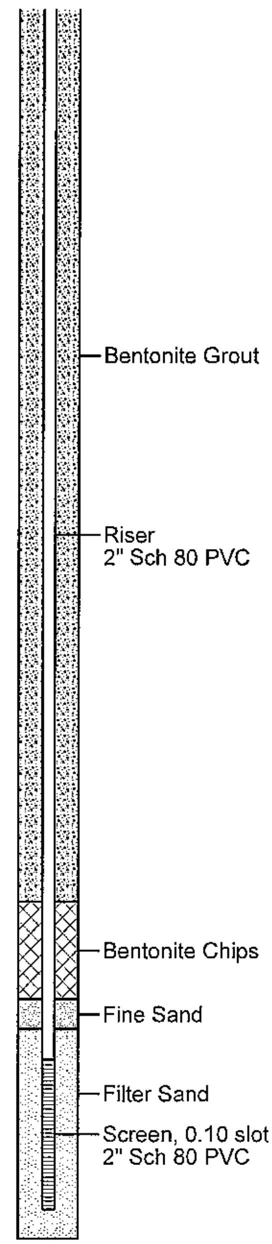
Project No. 11306.11

Date Started	: 04/28/2010
Date Well Set	: 04/29/2010
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 172.0 feet
Well Bottom Depth	: 170.0 feet
Surface Elev.	: 627.22 feet above MSL
TOC Elev.	: 629.65 feet above MSL
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1755962.898
Coordinate E	: 1048165.667
Logged By	: R. Gnat

Depth in Feet	Surf. Elev. 627.22	DESCRIPTION	% RQD	% Recovery
90	537	Tan, Dark Gray and Light Gray DOLOMITE, moderately competent		
95	532	Dark Gray to Gray DOLOMITE, no Tan, some shaley chips		
100	527	Dark Gray and Tan DOLOMITE, some shaley chips		
105	522	Brown and some Gray DOLOMITE		
110	517	Brown and Dark Greenish Gray DOLOMITE, some gray, competent to moderately competent		
115	512			
120	507	Light Gray DOLOMITE, competent		
125	502			
130	497	Gray, tan and Dark Greenish Gray DOLOMITE, moderately competent		
135	492			
140	487	Light Gray to Tan DOLOMITE, competent		
145	482	- no Tan, Cherty		
150	477	Tan DOLOMITE, some Chert, moderately competent		
155	472			
160	467	White to Light Gray DOLOMITE, Cherty, moderately competent		
165	462			
170	457	- fractured, Gray		
175	452	End of Boring at 172 feet.		
180				

Well Diagram: T03S



ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 11306.11

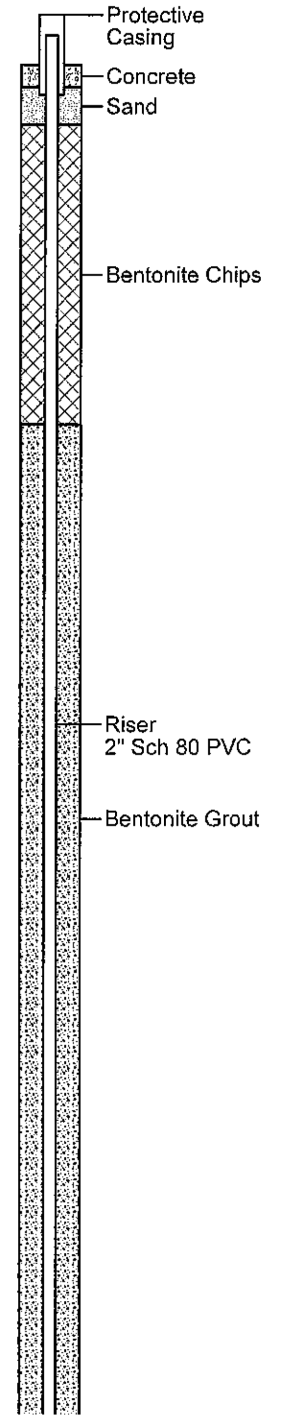
GEOLOGIC LOG OF T04S

Date Started	: 04/20/2010
Date Well Set	: 04/21/2010
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 171.5 feet
Well Bottom Depth	: 170.0 feet
Surface Elev.	: 628.63 feet above MSL
TOC Elev.	: 631.07 feet above MSL
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1756411.076
Coordinate E	: 1048857.472
Logged By	: C. Higgins

Depth in Feet	Surf. Elev. 628.63	DESCRIPTION	% RQD	% Recovery
0	628			
5	623	Boring drilled through overburden to set temporary 6" casing.		
10	618			
15	613			
20	608			
25	603			
30	598			
35	593			
40	588			
45	583			
50	578	Top of Bedrock at 52 feet.		
55	573	Gray to Tan DOLOMITE, weathered to moderately competent, some gray clay infilling		
60	568	Tan to Light Gray DOLOMITE, moderately competent		
65	563	- some orange/rust		
70	558	- trace to some chert		
75	553			
80	548	Greenish Gray DOLOMITE		
85	543	- no Green		
90				

Well Diagram: T04S



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 11306.11

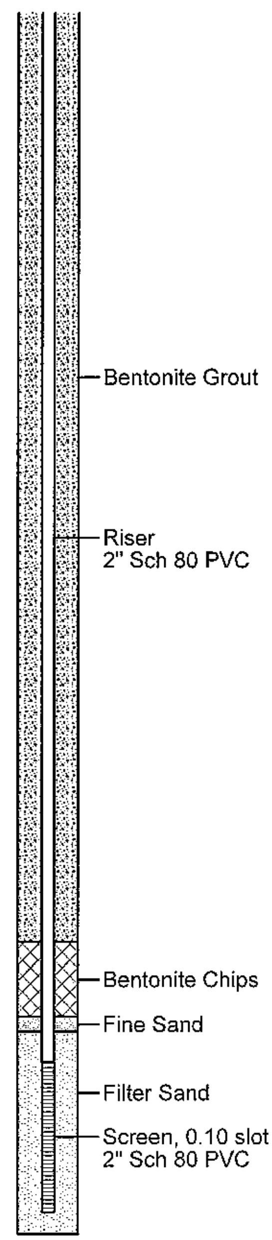
GEOLOGIC LOG OF T04S

Date Started	: 04/20/2010
Date Well Set	: 04/21/2010
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 171.5 feet
Well Bottom Depth	: 170.0 feet
Surface Elev.	: 628.63 feet above MSL
TOC Elev.	: 631.07 feet above MSL
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1756411.076
Coordinate E	: 1048857.472
Logged By	: C. Higgins

Depth in Feet	Surf. Elev. 628.63	DESCRIPTION	% RQD	% Recovery
90	538			
95	533			
100	528	Green and Brown DOLOMITE		
105	523			
110	518	Brown, Dark Brown and Greenish Gray DOLOMITE, trace Chert		
115	513			
120	508			
125	503	Greenish Gray DOLOMITE, some Light Brown		
130	498			
135	493	Brown DOLOMITE, trace Chert		
140	488			
145	483	Brown with trace Greenish Gray DOLOMITE, trace Chert		
150	478			
155	473			
160	468	Brown DOLOMITE, trace Chert		
		Brown DOLOMITE, Cherty		
165	463			
170	458			
175	453	End of Boring at 171.5 feet.		
180				

Well Diagram: T04S



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 11306.15

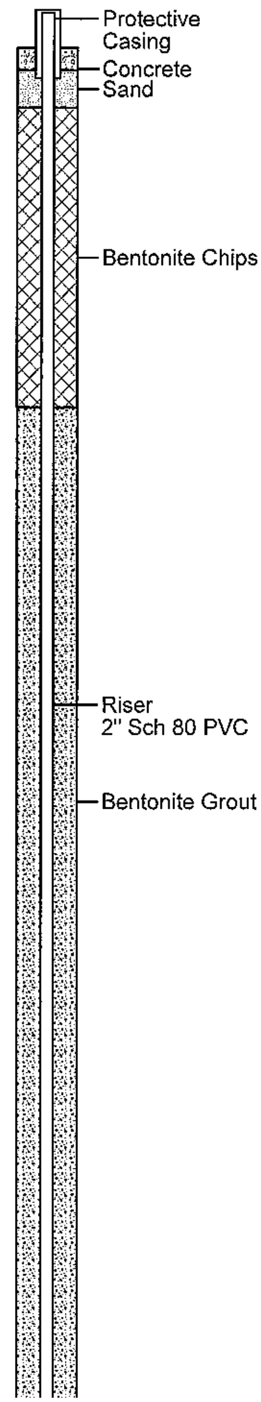
GEOLOGIC LOG OF T05S

Date Started	: 02/08/2012
Date Well Set	: 02/09/2012
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 177.0 feet
Well Bottom Depth	: 175.0 feet
Surface Elev.	: 620.97 feet above MSL
TOC Elev.	: 623.35 feet above MSL
Groundwater Elev.	: not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757056.894
Coordinate E	: 1048117.832
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 620.97	DESCRIPTION	% RQD	% Recovery
0	620			
5	615	Unconsolidated overburden blind-drilled.		
10	610			
15	605			
20	600			
25	595			
30	590			
35	585			
40	580			
45	575			
50	570	Bedrock at 52 feet.		
55	565	Tan DOLOMITE, tace light pink, blue/green argillaceous		
60	560	Tan DOLOMITE, trace pyrite		
65	555			
70	550	Tan DOLOMITE, some pink, trace chert		
75	545	Brown DOLOMITE, some tan with green argillaceous		
80	540	White DOLOMITE, trace gray		
85	535	Pink DOLOMITE, trace chert		
90				

Well Diagram: T05S



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 11306.15

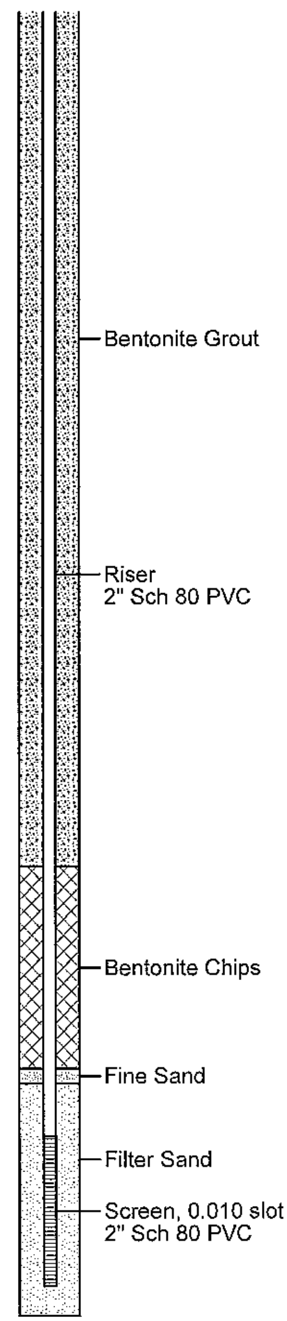
GEOLOGIC LOG OF T05S

Date Started	: 02/08/2012
Date Well Set	: 02/09/2012
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 177.0 feet
Well Bottom Depth	: 175.0 feet
Surface Elev.	: 620.97 feet above MSL
TOC Elev.	: 623.35 feet above MSL
Groundwater Elev.	: not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757056.894
Coordinate E	: 1048117.832
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 620.97	DESCRIPTION	% RQD	% Recovery
90	530	White DOLOMITE, light yellow hue		
95	525	White DOLOMITE, light green hue		
100	520			
105	515	Tan DOLOMITE, trace blue/gray		
110	510	Blue/gray DOLOMITE		
115	505	Tan DOLOMITE, trace blue/gray		
120	500			
125	495			
130	490	Tan DOLOMITE, cherty		
135	485			
140	480	Gray DOLOMITE, trace chert and quartz		
145	475			
150	470			
155	465			
160	460			
165	455			
170	450			
175	445			
		End of boring at 177 feet.		
180				

Well Diagram: T05S



ENVIRONMENTAL CONSULTATION & REMEDIATION

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Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 11306.15

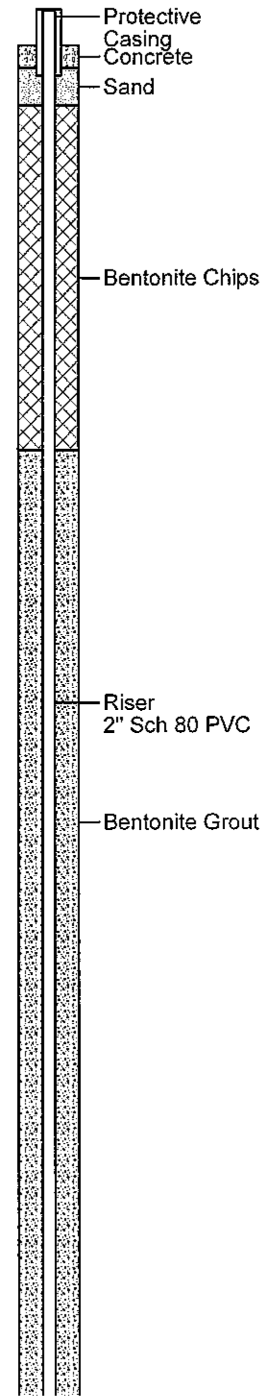
GEOLOGIC LOG OF T06S

Date Started	: 02/10/2012
Date Well Set	: 02/13/2012
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 175.0 feet
Well Bottom Depth	: 173.0 feet
Surface Elev.	: 618.58 feet above MSL
TOC Elev.	: 620.94 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757090.355
Coordinate E	: 1047415.925
Logged By	: A. Jakubowski

Depth in Feet	Surf. Elev. 618.58	DESCRIPTION	% RQD	% Recovery
0	618			
5	613	Unconsolidated overburden blind-drilled.		
10	608			
15	603			
20	598			
25	593			
30	588			
35	583			
40	578			
45	573	Bedrock at 47 feet		
50	568	Light brown DOLOMITE		
55	563	Light gray/white DOLOMITE, trace light brown		
60	558	Tan DOLOMITE, trace light brown		
65	553	Light gray DOLOMITE, trace tan		
70	548	Light blue/green DOLOMITE		
75	543	Dark blue/green DOLOMITE, trace tan, quartz and pyrite		
80	538	Pink and blue/green DOLOMITE		
85	533	Brown with blue/green DOLOMITE, trace pink		
90				

Well Diagram: T06S



ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

GEOLOGIC LOG OF T06S

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Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

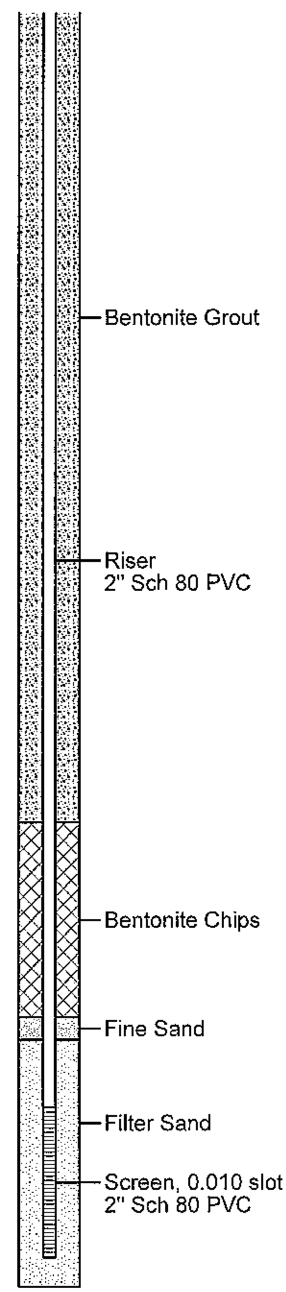
Project No. 11306.15

Date Started	: 02/10/2012
Date Well Set	: 02/13/2012
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 175.0 feet
Well Bottom Depth	: 173.0 feet
Surface Elev.	: 618.58 feet above MSL
TOC Elev.	: 620.94 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757090.355
Coordinate E	: 1047415.925
Logged By	: A. Jakubowski

Depth in Feet	Surf. Elev. 618.58	DESCRIPTION	% RQD	% Recovery
90	528	Pink with white/light gray DOLOMITE		
95	523	Blue/green DOLOMITE, some pink, trace tan/brown		
100	518	Blue/green DOLOMITE, trace tan		
105	513	Blue/green DOLOMITE, some pink, trace tan		
110	508	Light pink DOLOMITE, some tan, trace chert and blue/green		
115	503	Light tan DOLOMITE, trace blue/green		
120	498	Tan DOLOMITE, some blue/green		
125	493			
130	488	- less blue/green		
135	483			
140	478	Light tan DOLOMITE, cherty, trace pyrite		
145	473			
150	468	Green/blue DOLOMITE, some tan		
155	463	Green/blue DOLOMITE, trace tan and chert		
160	458	- no chert		
165	453	Dark gray DOLOMITE		
170	448	Dark gray DOLOMITE, trace pyrite		
175	443	End of boring at 175 feet.		
180				

Well Diagram: T06S



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ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 11306.15

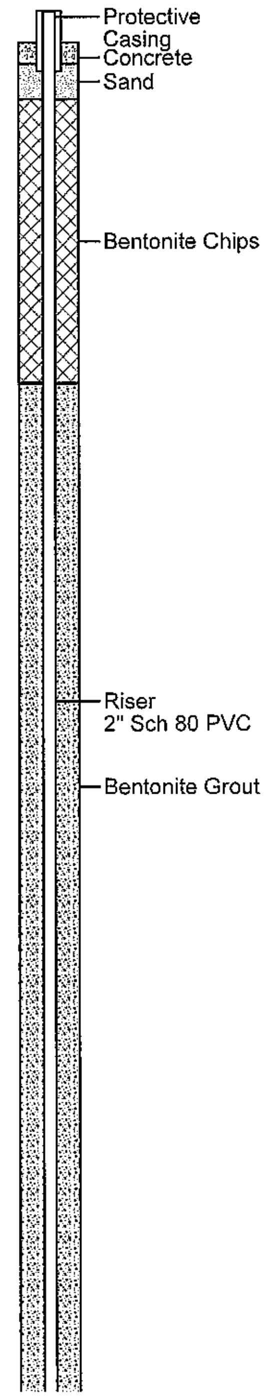
GEOLOGIC LOG OF T07S

Date Started	: 02/14/2012
Date Well Set	: 02/16/2012
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 180.0 feet
Well Bottom Depth	: 178.0 feet
Surface Elev.	: 623.98 feet above MSL
TOC Elev.	: 626.20 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1756776.672
Coordinate E	: 1047262.579
Logged By	: A. Jakubowski

Depth in Feet	Surf. Elev. 623.98	DESCRIPTION	% RQD	% Recovery
0	623	Unconsolidated overburden blind-drilled.		
5	618			
10	613			
15	608			
20	603			
25	598			
30	593			
35	588			
40	583			
45	578			
50	573			
55	568	Bedrock at 55 feet		
60	563	Light tan DOLOMITE, trace brown		
65	558			
70	553	Light tan and white DOLOMITE		
75	548	Tan DOLOMITE, trace pyrite		
80	543	- increase pyrite		
85	538	Blue/green DOLOMITE, some light tan		
90	533	Pink and tan DOLOMITE, some blue/green, trace white		
95				

Well Diagram: T07S



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ENVIRONMENTAL CONSULTATION & REMEDIATION

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Lincoln Stone Quarry
Joliet, Illinois

Project No. 11306.15

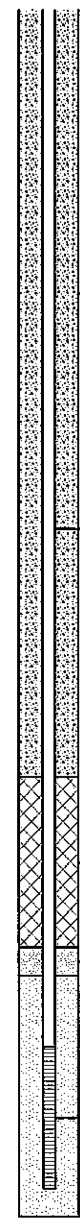
GEOLOGIC LOG OF T07S

Date Started	: 02/14/2012
Date Well Set	: 02/16/2012
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 180.0 feet
Well Bottom Depth	: 178.0 feet
Surface Elev.	: 623.98 feet above MSL
TOC Elev.	: 626.20 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1756776.672
Coordinate E	: 1047262.579
Logged By	: A. Jakubowski

Depth in Feet	Surf. Elev. 623.98	DESCRIPTION	% RQD	% Recovery
95	528	Light tan and blue/green DOLOMITE, trace pink and white		
100	523	Pink DOLOMITE, trace tan and blue/green		
105	518	Light tan DOLOMITE, some brown, trace blue/green		
110	513	Tan DOLOMITE, trace blue/green		
115	508			
120	503	Gray DOLOMITE, some blue/green		
125	498	Tan DOLOMITE, trace blue/green		
130	493			
135	488	- trace chert		
140	483	- no chert		
145	478	Tan DOLOMITE, cherty		
150	473	Brown and tan DOLOMITE, some chert, trace pyrite		
155	468	- no pyrite		
160	463	Dark and medium gray DOLOMITE		
165	458	- some chert, trace pyrite		
170	453	Dark gray DOLOMITE		
175	448	- trace pyrite		
180	443	End of boring at 180 feet		
185	438			
190				

Well Diagram: T07S



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ENVIRONMENTAL CONSULTATION & REMEDIATION

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Joliet, Illinois

Project No. 11306.15

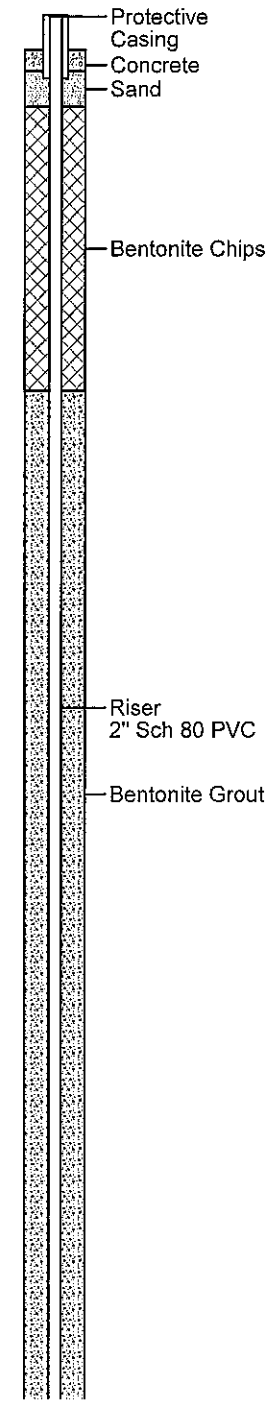
GEOLOGIC LOG OF T08S

Date Started	: 02/01/2012
Date Well Set	: 02/06/2012
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 181.0 feet
Well Bottom Depth	: 180.0 feet
Surface Elev.	: 625.00 feet above MSL
TOC Elev.	: 627.38 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1756815.956
Coordinate E	: 1047687.785
Logged By	: K. VanAllen

Depth in Feet	Surf. Elev. 625.00	DESCRIPTION	% RQD	% Recovery
0	625			
		Unconsolidated overburden blind-drilled.		
5	620			
10	615			
15	610			
20	605			
25	600			
30	595			
35	590			
40	585			
45	580			
50	575			
55	570	Bedrock at 56.5 feet.		
60	565	Tan and light gray DOLOMITE, trace brown		
65	560			
70	555	Light gray DOLOMITE		
75	550			
80	545	- trace medium gray dolomite		
85	540	Blue/green, pink, and light gray DOLOMITE		
90	535			
95				

Well Diagram: T08S



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ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 11306.15

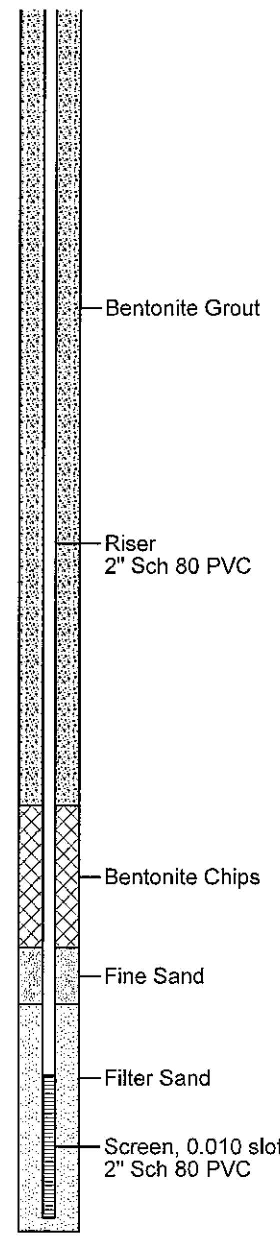
GEOLOGIC LOG OF T08S

Date Started	: 02/01/2012
Date Well Set	: 02/06/2012
Coring Tools	: Not cored
Drilling Tools	: 4.75 Air Hammer
Drill Rig	: Atlas Copco TH60
Driller Name/Co	: D. Jones / Layne

Total Boring Depth	: 181.0 feet
Well Bottom Depth	: 180.0 feet
Surface Elev.	: 625.00 feet above MSL
TOC Elev.	: 627.38 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1756815.956
Coordinate E	: 1047687.785
Logged By	: K. VanAllen

Depth in Feet	Surf. Elev. 625.00	DESCRIPTION	% RQD	% Recovery
95	530	Reddish brown DOLOMITE, trace green/gray		
100	525	Dark pink/gray DOLOMITE, trace blue/gray		
105	520			
110	515	Blue/green DOLOMITE, trace dark pink/gray		
115	510	Light gray/pink DOLOMITE		
120	505			
125	500	Light pink/gray-tan DOLOMITE, trace green/gray		
130	495	Blue/green DOLOMITE, trace light pink/gray		
135	490	Light pink/gray-tan DOLOMITE		
140	485	- occasional white chert		
145	480	Tan DOLOMITE, some chert		
150	475	- trace white chert		
155	470	Tan and gray/green DOLOMITE, some chert		
160	465	- no chert		
165	460	Light gray DOLOMITE		
170	455	Medium gray and white DOLOMITE		
175	450	Light blue/green and white DOLOMITE		
180	445	- less white dolomite		
		End of boring at 181 feet		
185	440			
190				

Well Diagram: T08S



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KPRG and Associates, Inc.

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 18713

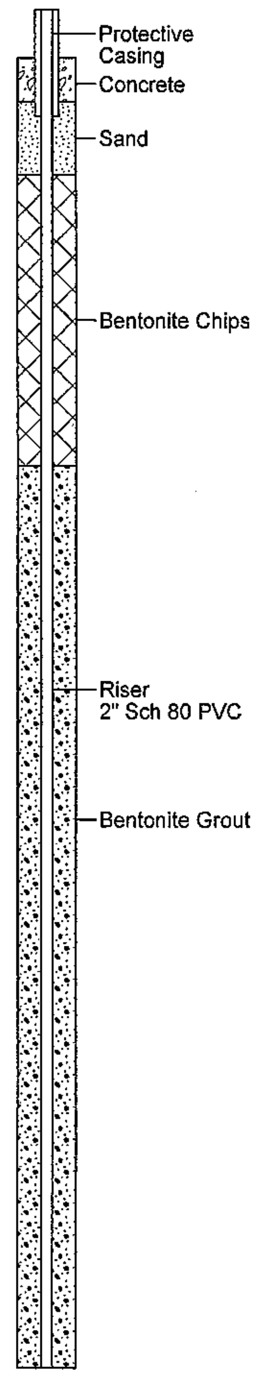
GEOLOGIC LOG OF T09S

Date Started	: 10/18/2013
Date Well Set	: 10/24/2013
Coring Tools	: NQ Double Wall 10' Barrel
Drilling Tools	: 6" Air Hammer
Drill Rig	: Mobile B61/Gus Pech
Driller Name/Co	: D. Mahurin/D. Jones/ Layne

Total Boring Depth	: 158.0 feet
Well Bottom Depth	: 155.7 feet
Surface Elev.	: 600.70 feet above MSL
TOC Elev.	: 603.39 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757070.03
Coordinate E	: 1046676.53
Logged By	: C. Higgins

Depth in Feet	Surf. Elev. 600.7	DESCRIPTION	% RQD	% Recovery
0	601	Brown SILTY SAND, fine grained, dense, dry, few rootlets, trace clay	NA	47
5	596	Brown and gray, fine GRAVEL with trace silt and clay, loose, dry,		
		Dark brown SANDY SILT, light brown mottling, fine grained, trace clay, dry - 6-8 mottling, iron stain - 9.5 brown silt seam, dry	NA	100
10	591	Brown SILTY CLAY, some fine to coarse sand, slightly moist	NA	100
		Gray SILTY CLAY, trace fine sand, moist		
15	586	Gray CLAY, trace silt and fine sand, slightly moist, very stiff	NA	70
		Brown SILTY CLAY, trace fine sand, moderately dense, slightly moist		
20	581	Brown CLAYEY SAND, fine grained, dense, moist		
		Light brown fine SAND, slightly moist, dense	NA	100
		Brown fine SAND, well sorted, moist, loose		
		Brown SANDY SILT, fine to coarse, dolomite gravel and cobbles, very moist		
25	576	Brown CLAY with fine to coarse sand, fine gravel, wet, very soft		
		White DOLOMITE, tan hue, pits, chert nodules - 27-28 vert frac	NA	42
30	571	White DOLOMITE, tan hue, pits (decrease downwards) - iron stain in horiz frac	NA	86
35	566	White DOLOMITE, tan hue, few pits		
40	561	- 40-45 blue/gray hue, few white chert nodules - 41-45 iron stain - gray/blue clay infill in horiz frac, trace vugs	97	100
45				

Well Diagram: T09S
TOC Elev: 603.39



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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 18713

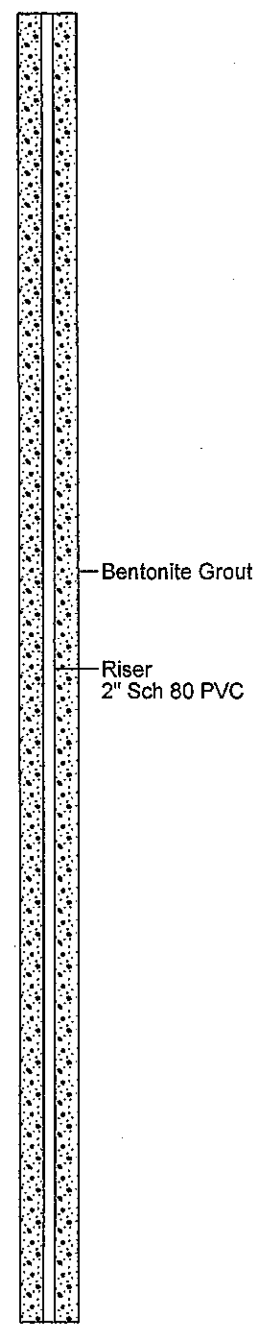
GEOLOGIC LOG OF T09S

Date Started	: 10/18/2013
Date Well Set	: 10/22/2013
Coring Tools	: NQ Double Wall 10' Barrel
Drilling Tools	: 6" Air Hammer
Drill Rig	: Mobile B61/Gus Pech
Driller Name/Co	: D. Mahurin/D. Jones/ Layne

Total Boring Depth	: 158.0 feet
Well Bottom Depth	: 155.7 feet
Surface Elev.	: 600.70 feet above MSL
TOC Elev.	: 603.39 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757070.03
Coordinate E	: 1046676.53
Logged By	: C. Higgins

Depth in Feet	Surf. Elev. 600.7	DESCRIPTION	% RQD	% Recovery
45	556	White DOLOMITE, light blue hue - 45-47 iron stain, vert frac, pits - 47-50 cherty - trace clay infill in frac		
50	551		95	99
55	546	Tan DOLOMITE, faint pink and green/blue mottling, trace pits, trace black chert		
		Tan DOLOMITE, pink/green hue, trace vugs		
60	541		92	100
		- 61-65 gray clay in frac		
65	536	Tan DOLOMITE, green hue, trace pits, gray clay in horiz frac		
70	531		81	100
		- 74-75 pyrite in vert frac		
75	526	White DOLOMITE, tan/green hue, clay and fine sand in horiz frac, few pits		
80	521		93	100
		- 82-85 pyrite in horiz frac		
85	516	Tan DOLOMITE, vuggy, light gray clay in horiz frac		
		Tan DOLOMITE, trace purple vugs	93	100
90				

Well Diagram: T09S
TOC Elev: 603.39



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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 18713

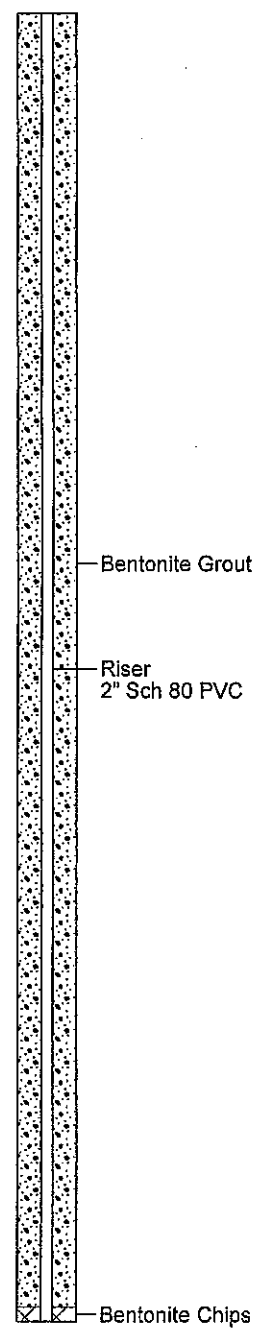
GEOLOGIC LOG OF T09S

Date Started	: 10/18/2013
Date Well Set	: 10/22/2013
Coring Tools	: NQ Double Wall 10' Barrel
Drilling Tools	: 6" Air Hammer
Drill Rig	: Mobile B61/Gus Pech
Driller Name/Co	: D. Mahurin/D. Jones/ Layne

Total Boring Depth	: 158.0 feet
Well Bottom Depth	: 155.7 feet
Surface Elev.	: 600.70 feet above MSL
TOC Elev.	: 603.39 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757070.03
Coordinate E	: 1046676.53
Logged By	: C. Higgins

Depth in Feet	Surf. Elev. 600.7	DESCRIPTION	% RQD	% Recovery
90	511	Tan DOLOMITE, trace purple vugs - vert frac infill with clay and silt	93	100
95	506	Tan/green DOLOMITE, vuggy - 95-97 bands of vugs/solution cavity - green clay infill of horiz frac		
100	501		94	97
105	496	Tan DOLOMITE, green hue, vuggy - 105-106 gray/white clay and silt infill in horiz frac		
110	491	- 110-112 1" vuggy bands	97	99
115	486	Tan DOLOMITE, green hue - 117 vugs with remineralization		
120	481	- 120-122 few chert nodules throughout wavy, horiz frac	96	100
125	476	Tan/gray DOLOMITE, with blue/green, vuggy, chert nodules, pyrite in vugs		
130	471	- 133.5 iron stain in frac	98	98
135				

Well Diagram: T09S
TOC Elev: 603.39



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ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG and Associates, Inc.

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 18713

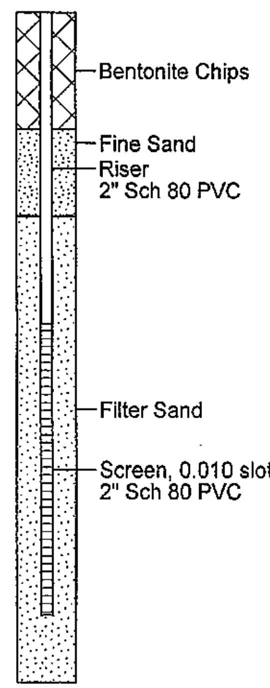
GEOLOGIC LOG OF T09S

Date Started	: 10/18/2013
Date Well Set	: 10/22/2013
Coring Tools	: NQ Double Wall 10' Barrel
Drilling Tools	: 6" Air Hammer
Drill Rig	: Mobile B61/Gus Pech
Driller Name/Co	: D. Mahurin/D. Jones/ Layne

Total Boring Depth	: 158.0 feet
Well Bottom Depth	: 155.7 feet
Surface Elev.	: 600.70 feet above MSL
TOC Elev.	: 603.39 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757070.03
Coordinate E	: 1046676.53
Logged By	: C. Higgins

Depth in Feet	Surf. Elev. 600.7	DESCRIPTION	% RQD	% Recovery
135	466	Tan DOLOMITE, green mottling, white chert nodules - clay and silt infill in horiz frac - 138.5-141 vert frac, tight, filled with green clay and silt - 141-145 few fossils (endocrinus, et. al)	97	100
140	461			
145	456	Tan/green DOLOMITE, few purple vugs, some fossil layers Gray DOLOMITE, some dark gray, few purple vugs, fossil layers -150 dark gray clay and fine white sand fill in horiz frac, white chert nodules	95	97
150	451			
155	446	Tan DOLOMITE, gray hue and dark gray banding, chert nodules, few purple vugs, trace fossils	100	100
		End of boring at 158 feet		
160	441			
165	436			
170	431			
175	426			
180				

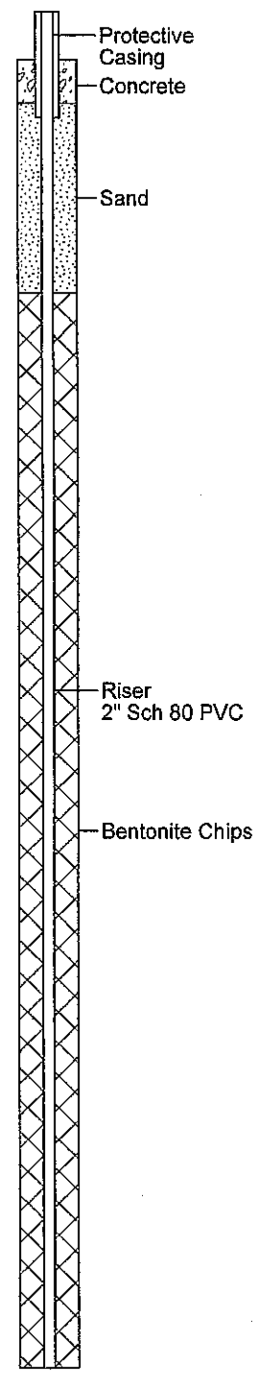
Well Diagram: T09S
TOC Elev: 603.39



KPRG ENVIRONMENTAL CONSULTATION & REMEDIATION KPRG and Associates, Inc.	GEOLOGIC LOG OF T10S (Page 1 of 4)	
Midwest Generation, LLC Lincoln Stone Quarry Joliet, Illinois Project No. 18713	Date Started : 10/21/2013 Date Well Set : 10/29/2013 Coring Tools : NQ Double Wall 10' Barrel Drilling Tools : 6" Air Hammer Drill Rig : Mobile B61/Gus Pech Driller Name/Co : D. Mahurin/D. Jones/Layne	Total Boring Depth : 170.0 feet Well Bottom Depth : 169.0 feet Surface Elev. : 614.61 feet above MSL TOC Elev. : 617.10 feet above MSL Groundwater Elev. : Not measured Riser Material : 2" Sch 80 PVC Screen Material : 2" Sch 80 PVC, 0.010 slot Coordinate N : 1755962.63 Coordinate E : 1047391.39 Logged By : P. Allenstein

Depth in Feet	Surf. Elev. 614.61	DESCRIPTION	% RQD	% Recovery
0	615	Brown SILTY CLAY, sand and gravel, moist, concrete pieces		20
5	610	Black SILTY CLAY, soft, organic odor, slightly moist		60
		Green/gray SILTY CLAY, soft, organic odor, slightly moist - brown and gray mottling - 9.5-10.5 gravel/cobble - organics, rust stain		
10	605			100
15	600	Brown SILTY CLAY, moist, wet silt seams		
		Dark green SILTY CLAY, moist, wet silt seams		100
		Green SILTY CLAY, moist, wet silt seams		
		Green/brown SILTY CLAY, moist, wet silt seams		
20	595	Gray CLAY, trace medium sand - some mottling, rust		80
		Brown SAND, fine to medium silty sand, beach, slightly moist		
25	590	Brown/gray SILT, layered and cross-bedded, slightly moist		
		Brown, fine to medium SILTY SAND, slightly moist		70
30	585	- coarser sand		
		- coarse sand - gray at 34'		60
35	580	Dark gray CLAYEY SILT, very coarse gravel, moist		
		Dark gray clayey silt and light gray silt banded and cross-bedded		60
		Light gray SILT, moist		
40	575	Gray SILT, moist - occassional band of clay		
45				

Well Diagram: T10S
TOC Elev: 617.10



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GEOLOGIC LOG OF T10S

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

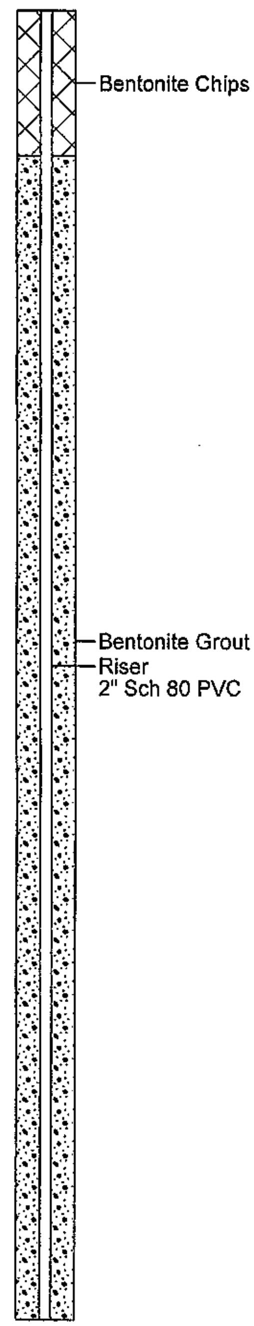
Project No. 18713

Date Started	: 10/21/2013
Date Well Set	: 10/29/2013
Coring Tools	: NQ Double Wall 10' Barrel
Drilling Tools	: 6" Air Hammer
Drill Rig	: Mobile B61/Gus Pech
Driller Name/Co	: D. Mahurin/D. Jones/Layne

Total Boring Depth	: 170.0 feet
Well Bottom Depth	: 169.0 feet
Surface Elev.	: 614.61 feet above MSL
TOC Elev.	: 617.10 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1755962.63
Coordinate E	: 1047391.39
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 614.61	DESCRIPTION	% RQD	% Recovery
45	570			
		Gray SILT - sandy seam, wet - gravel		
		Light gray/green SILT, sand and gravel, some very coarse gravel, wet		
50	565	Tan/light brown DOLOMITE, tight horiz and vert frac, many pits & sm vugs		
			58	
		White DOLOMITE, many pits, no frac, trace large chert		
55	560			
		- chert, horiz frac, rust stain		
60	555		99	100
		- many horiz frac, very narrow, green filled frac, with pyrite		
65	550			
		- vert frac, very narrow, pyrite	97	100
70	545	White DOLOMITE, green hue, trace pink, pits, wavy horiz with green fill, some pits - 60 degree frac, 0.05' wide, clay and dolomite bits infill - 45 deg frac with pyrite		
			93	100
		- 45 deg frac, 0.02', gree/gray clay filled		
75	540	- 45 deg frac, tight		
80	535		93	100
		Greenish gray DOLOMITE, some tan, some pyrite swirl with stain cloud, trace pits		
		White DOLOMITE, green and pink hue, pyrite cloud, trace wavy, horiz frac, trace pits		
85	530			
		Pink DOLOMITE, horiz frac, green clay and pyrite		
			100	100
		White DOLOMITE, pink and green hue, long vert frac, tight, pits, trace vugs		
90				

Well Diagram: T10S
TOC Elev: 617.10



GEOLOGIC LOG OF T10S

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 18713

Date Started	: 10/21/2013
Date Well Set	: 10/29/2013
Coring Tools	: NQ Double Wall 10' Barrel
Drilling Tools	: 6" Air Hammer
Drill Rig	: Mobile B61/Gus Pech
Driller Name/Co	: D. Mahurin/D. Jones/Layne

Total Boring Depth	: 170.0 feet
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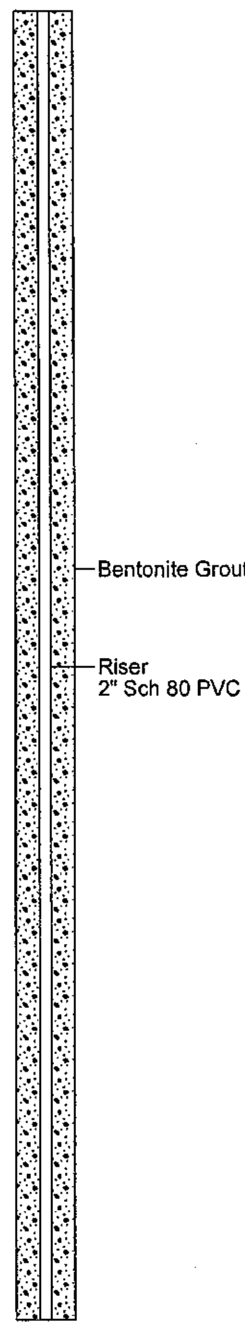
Surface Elev.	: 614.61 feet above MSL
TOC Elev.	: 617.10 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1755962.63
Coordinate E	: 1047391.39
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 614.61	DESCRIPTION	% RQD	% Recovery
90	525			
		Pink DOLOMITE, green hue, wavy horiz frac, narrow to tight, trace pits		
95	520		100	100
		White DOLOMITE, light pink hue, pitted, some vugs, some horiz frac with green clay fill, 1.5' long vert frac, tight, pyrite		
100	515			
		White DOLOMITE, very light occassional pink hue, pits with small vugs in layers with trace pyrite, wavy horiz frac, tight to narrow with green clay fill		
105	510		93	100
110	505			
		Gray DOLOMITE, light pink hue, wavy horiz frac, tight to narrow with green clay fill, pitted layers, trace occassional vugs, pyrite		
115	500		94	100
		- gray fill in fractures - 3" horiz frac, gray clay filled		
120	495			
		- large vug, 2", little pyrite - 2" horiz frac, gray clay filled		
125	490		99	100
		- 126-128 no pits		
130	485			
			99	100
135				

Well Diagram: T10S
TOC Elev: 617.10



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Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 18713

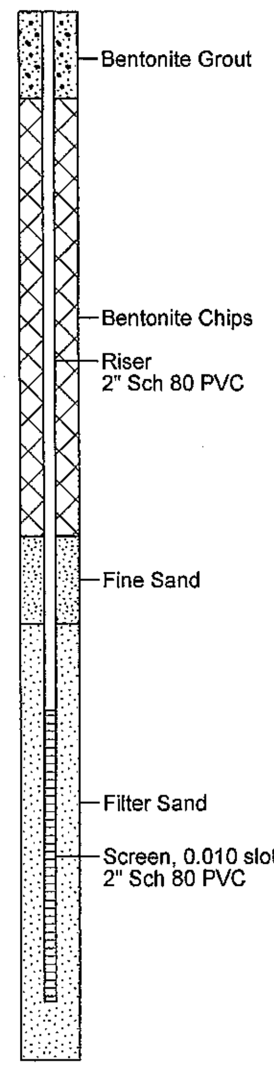
GEOLOGIC LOG OF T10S

Date Started	: 10/21/2013
Date Well Set	: 10/29/2013
Coring Tools	: NQ Double Wall 10' Barrel
Drilling Tools	: 6" Air Hammer
Drill Rig	: Mobile B61/Gus Pech
Driller Name/Co	: D. Mahurin/D. Jones/Layne

Total Boring Depth	: 170.0 feet
Well Bottom Depth	: 169.0 feet
Surface Elev.	: 614.61 feet above MSL
TOC Elev.	: 617.10 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1755962.63
Coordinate E	: 1047391.39
Logged By	: P. Allenstein

Depth in Feet	Surf. Elev. 614.61	DESCRIPTION	% RQD	% Recovery
135	480	Gray DOLOMITE, cherty, fossils, trace green hue, pitted, some vugs, wavy horiz frac, tight to narrow with green clay fill, layers of pits/vugs	99	100
140	475	- 0.1 vug whole core width - horiz frac with calcite and pyrite crystals		
145	470		95	98
150	465			
155	460	Gray DOLOMITE, some horiz frac, tight to narrow, dark gray clay filled - vert frac, narrow, pyrite White DOLOMITE, trace green hue, pitted layers, small vugs	95	100
160	455	Dark gray DOLOMITE, dark gray filled, tight to narrow horiz frac, pits, trace large chert - pitted and vuggy layer with fossils - trace pits, trace vugs	99	99
165	450			
170	445	End of boring at 170 feet		
175	440			
180				

Well Diagram: T10S
TOC Elev: 617.10



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Lincoln Stone Quarry
Joliet, Illinois

Project No. 18713

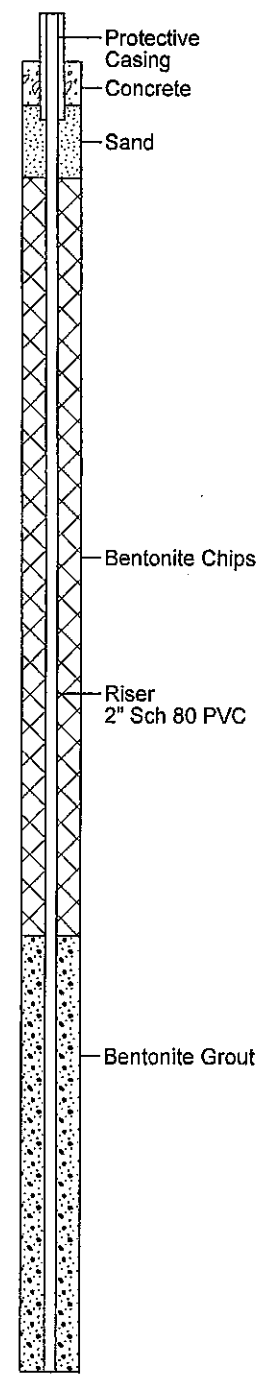
GEOLOGIC LOG OF T11S

Date Started	: 10/17/2013
Date Well Set	: 10/30/2013
Coring Tools	: NQ Double Wall 10' Barrel
Drilling Tools	: 6" Air Hammer
Drill Rig	: Mobile B61/Gus Pech
Driller Name/Co	: D. Mahurin/D. Jones/Layne

Total Boring Depth	: 115.0 feet
Well Bottom Depth	: 111.0 feet
Surface Elev.	: 556.60 feet above MSL
TOC Elev.	: 559.36 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757727.76
Coordinate E	: 1046697.50
Logged By	: C. Higgins

Depth in Feet	Surf. Elev. 556.60	DESCRIPTION	% RQD	% Recovery
0	557	Brown SILTY CLAY, trace fine to coarse sand, wet		
		Tan DOLOMITE, vuggy, weathered, fractured		
5	552	Tan DOLOMITE, trace vugs, green hue, iron stain in horiz frac	0	67
10	547	Tan DOLOMITE, trace green hue, trace pits - vert and horiz frac with clay and fine sand fill		
15	542		31	100
		- 18.5-19.75 green and red banding - 19.75-20 dark gray laminated shale with clay fill		
20	537	Tan DOLOMITE, green hue/banding, trace chert nodules, few vugs - green clay and fine to medum sand infill of horiz frac		
		- 22-28 vert frac with little displacement, trace fine sand infill, some pits		
25	532		43	100
30	527	Tan DOLOMITE, green hue, trace pits, trace micro fossil layers, some iron stain in vugs and fractures		
35	522	- 33.67-40 horiz frac, green and gray clay and fine sand infill	55	100
40	517	Tan DOLOMITE, green hue, green clay in horiz frac - 40-41.5 vert frac	76	100
45				

Well Diagram: T11S
TOC Elev: 559.36



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Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 18713

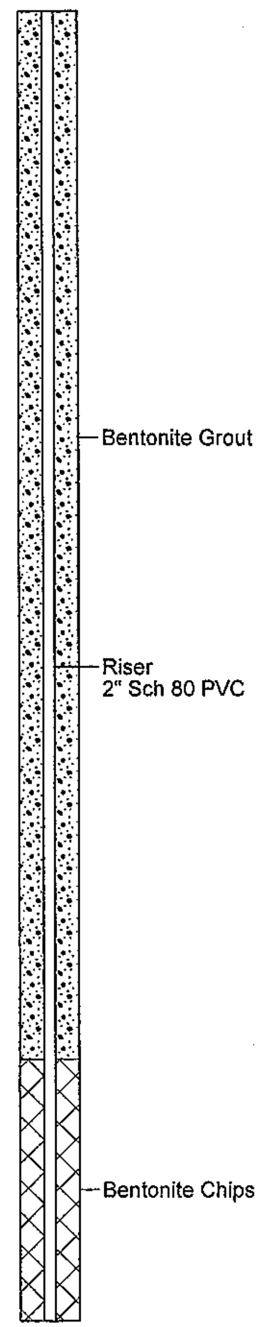
GEOLOGIC LOG OF T11S

Date Started	: 10/17/2013
Date Well Set	: 10/24/2013
Coring Tools	: NQ Double Wall 10' Barrel
Drilling Tools	: 6" Air Hammer
Drill Rig	: Mobile B61/Gus Pech
Driller Name/Co	: D. Mahurin/D. Jones/Layne

Total Boring Depth	: 115.0 feet
Well Bottom Depth	: 111.0 feet
Surface Elev.	: 556.60 feet above MSL
TOC Elev.	: 559.36 feet above MSL
Groundwater Elev.	: Not measured
Riser Material	: 2" Sch 80 PVC
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757727.76
Coordinate E	: 1048697.50
Logged By	: C. Higgins

Depth in Feet	Surf. Elev. 556.60	DESCRIPTION	% RQD	% Recovery
45	512	Tan DOLOMITE, green hue, green clay in horiz frac		
		- 48-50 few calcite nodules, chert	76	100
50	507	Gray DOLOMITE, green hues, trace micro fossils, green clay and fine sand infill in layers		
55	502		66	100
		- 57-60 green clay and fine sand infill in layers, vuggy		
60	497	Tan DOLOMITE, green hue, trace to few pits, gray clay in horiz frac		
		- 63 pyrite in vugs		
65	492		82	100
70	487	Gray DOLOMITE, trace green hue, white calcite layers, gray clay and fine sand in horiz frac and vert frac		
75	482		50	100
		- 75-77 iron stain, fossils		
80	477	Tan DOLOMITE, green hue, iron stain, pits, chert nodules, wavy horiz frac, vert frac, filled with green clay and fine sand		
85	472		88	100
90				

Well Diagram: T11S
TOC Elev: 559.36



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GEOLOGIC LOG OF T11S

Midwest Generation, LLC
Lincoln Stone Quarry
Joliet, Illinois

Project No. 18713

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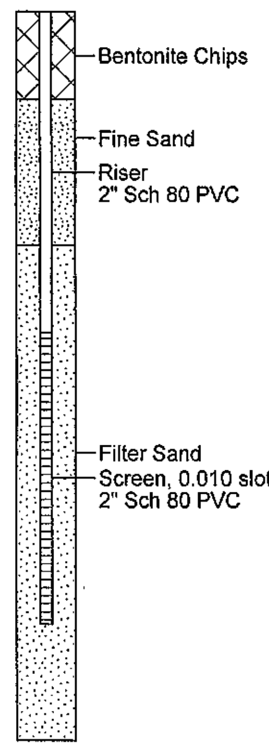
Screen Material	: 2" Sch 80 PVC, 0.010 slot
Coordinate N	: 1757727.76
Coordinate E	: 1048697.50
Logged By	: C. Higgins

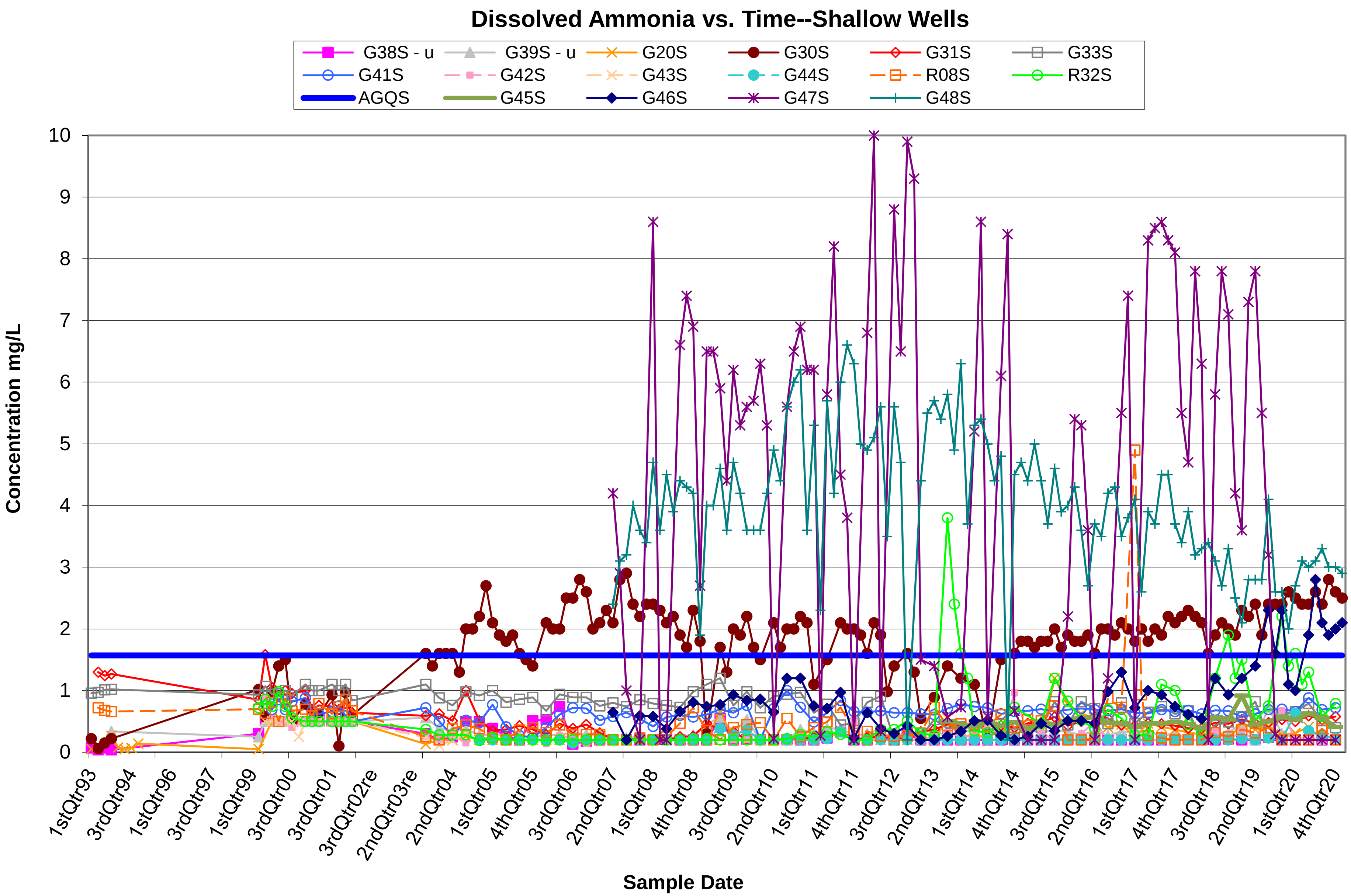
Depth in Feet	Surf. Elev. 556.60	DESCRIPTION	% RQD	% Recovery
90	467	Gray DOLOMITE, green hue, tan/white chert nodules, few vugs - 92-93 iron stain layers		
95	462		95	100
100	457	Gray DOLOMITE, tan and green hue, white chert, marbling, few small vugs, green clay and fine sand in horiz frac		
105	452		97	100
110	447	Gray DOLOMITE, tan and green hue, chert, marbling, few small vugs with trace calcite and pyrite crystals	88	100
115	442	End of boring at 115 feet		
120	437			
125	432			
130	427			
135				

Well Diagram: T11S
TOC Elev: 559.36



Attachment 9-2 – Time vs Concentration Curves

Joliet/Lincoln Stone Quarry



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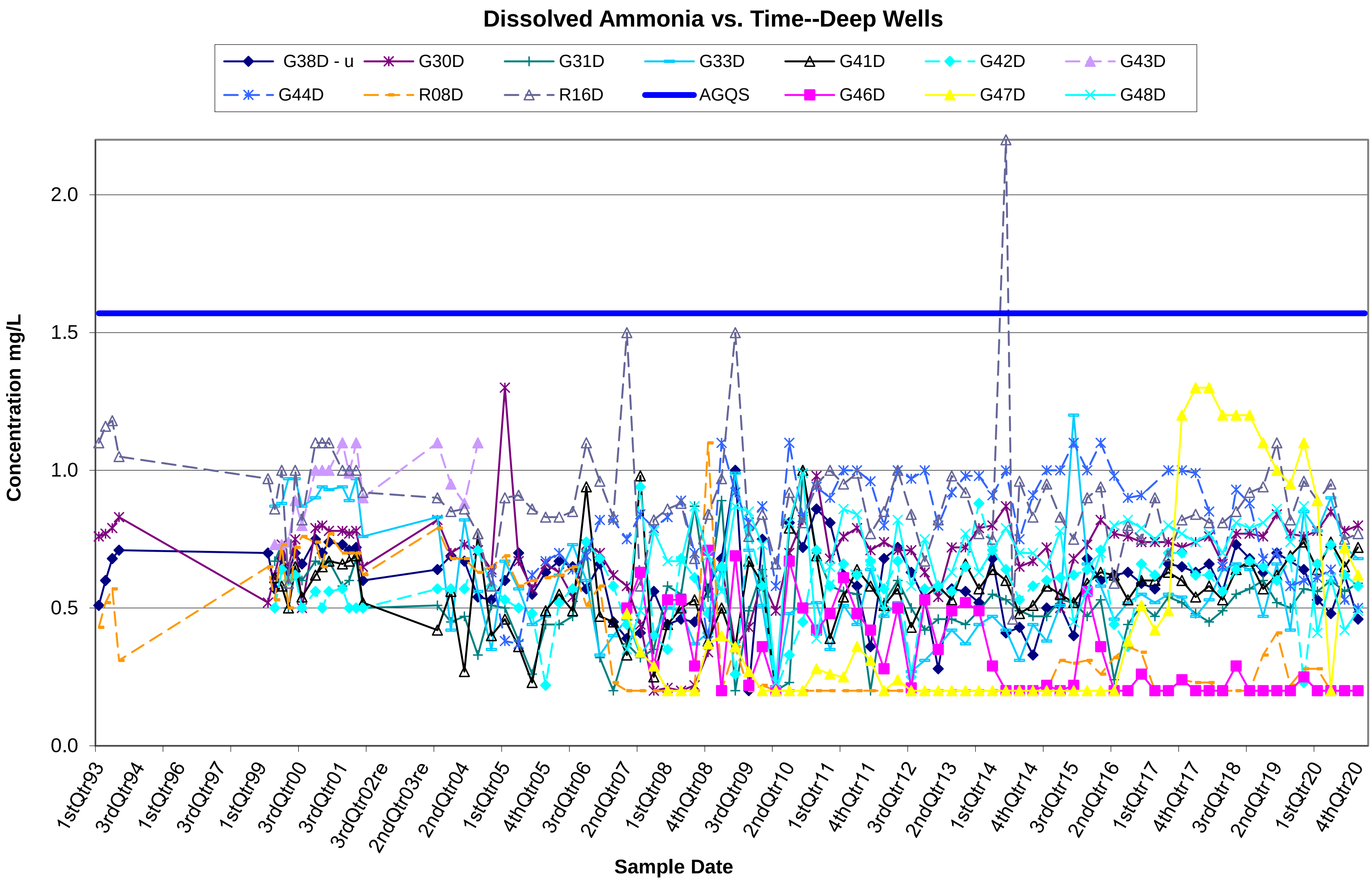

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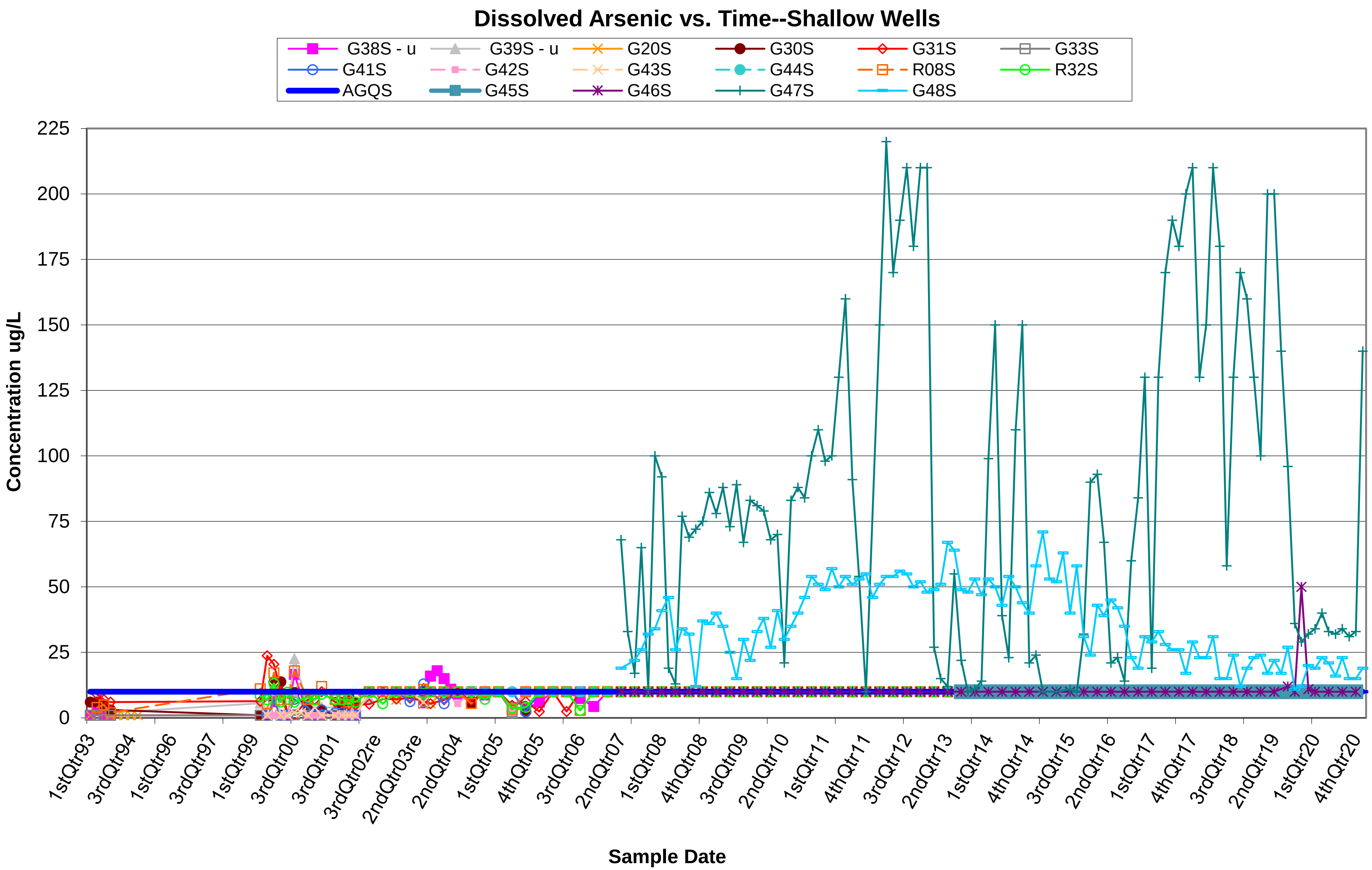

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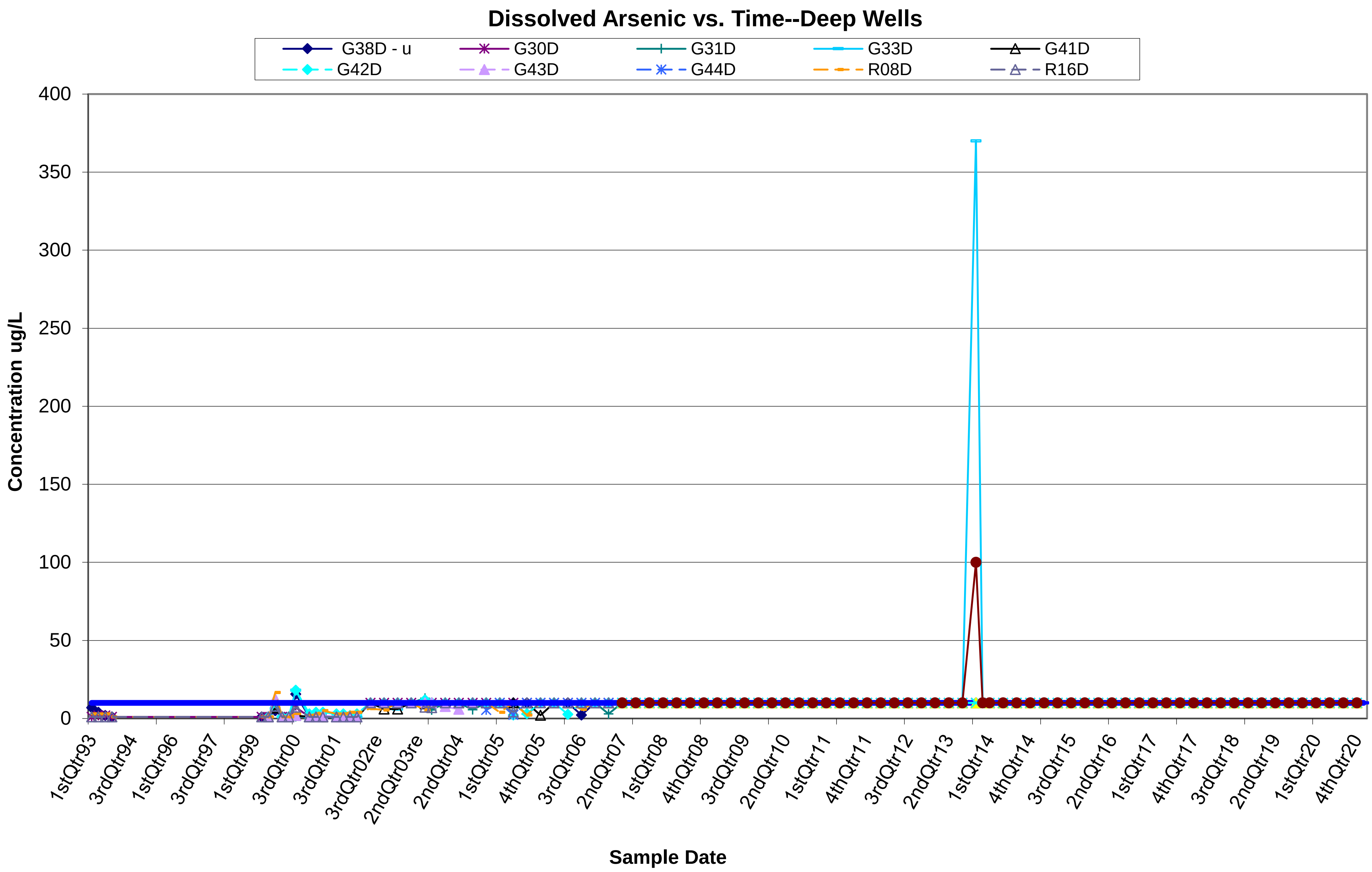

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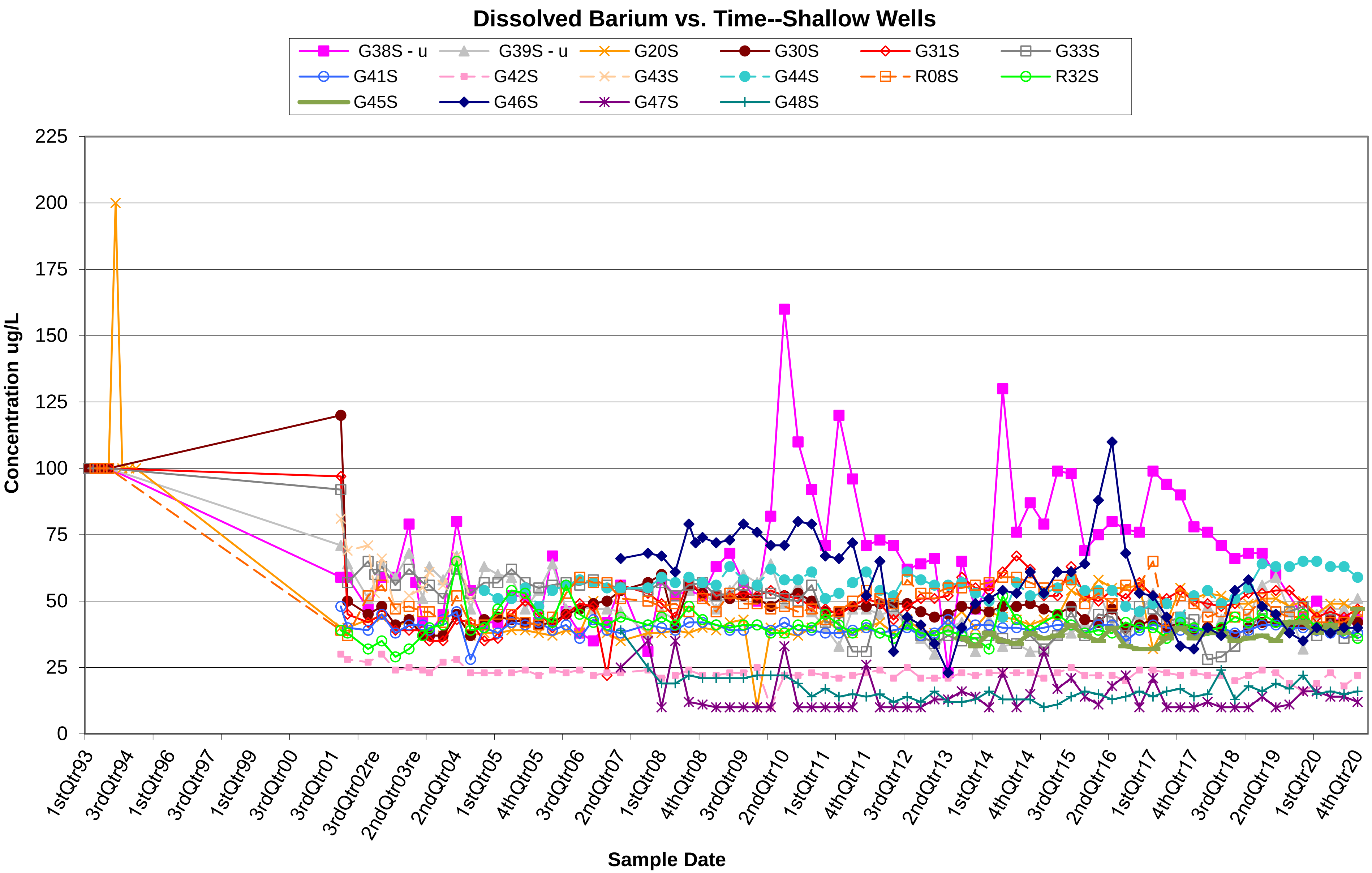

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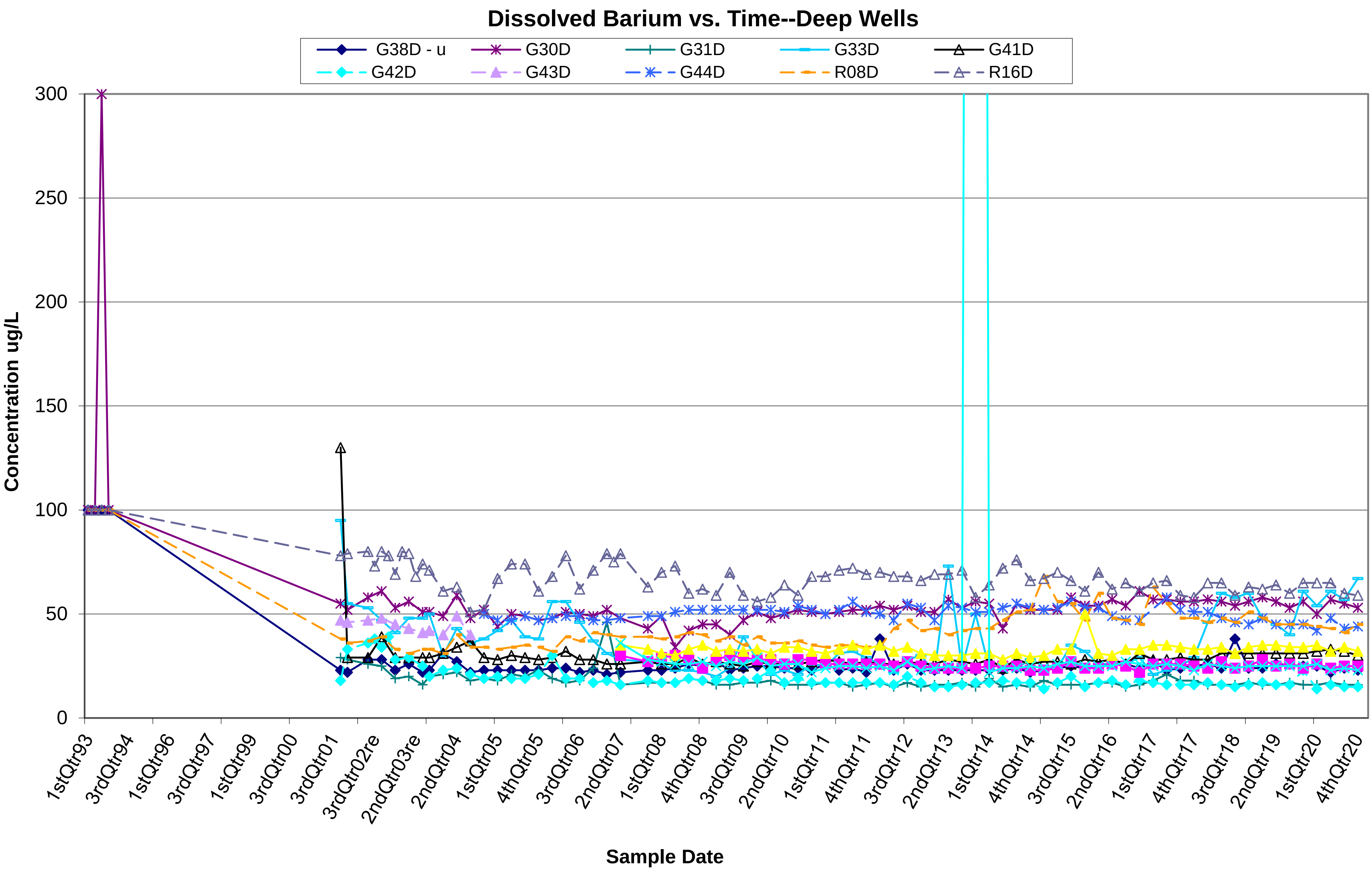

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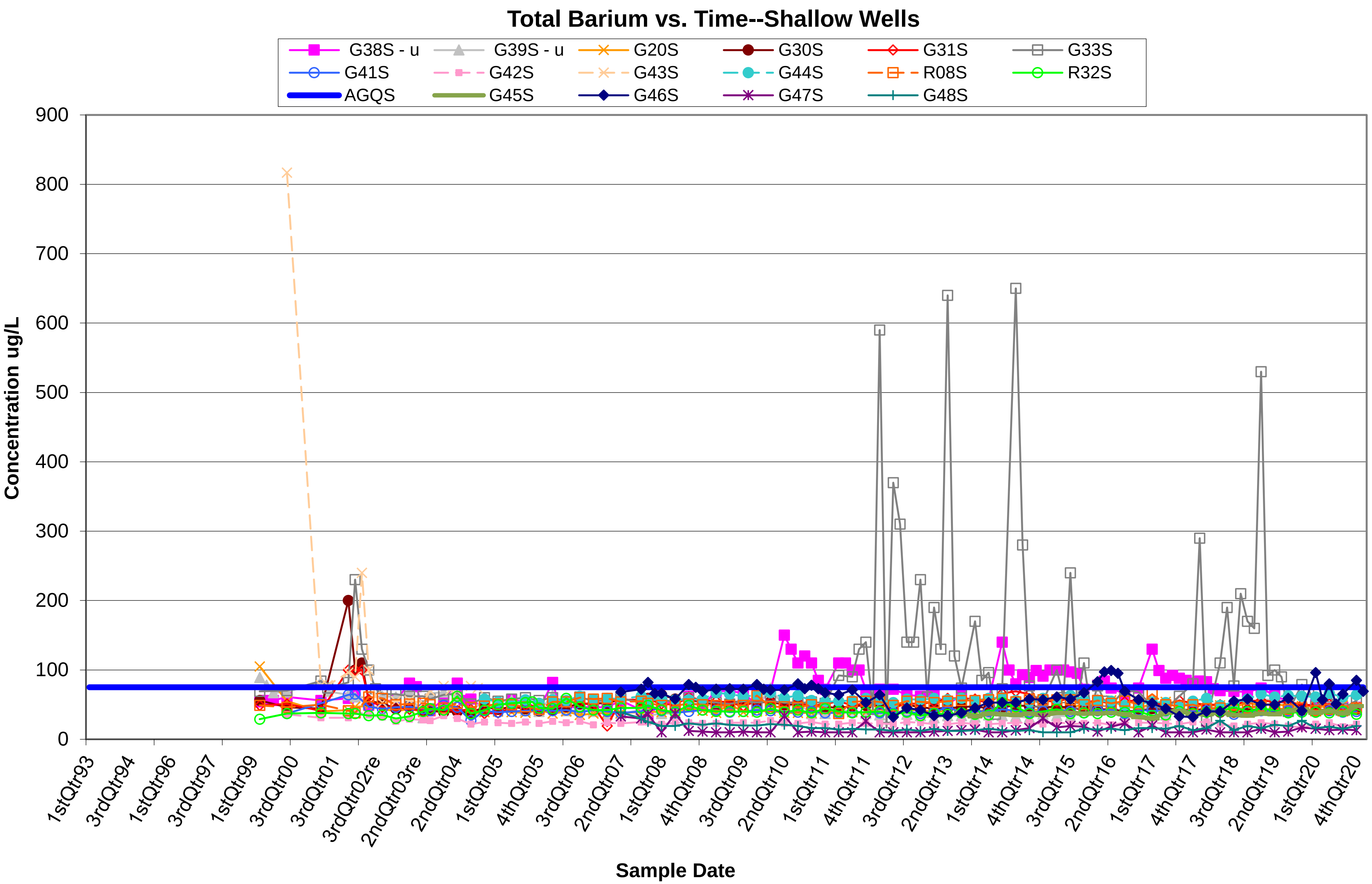

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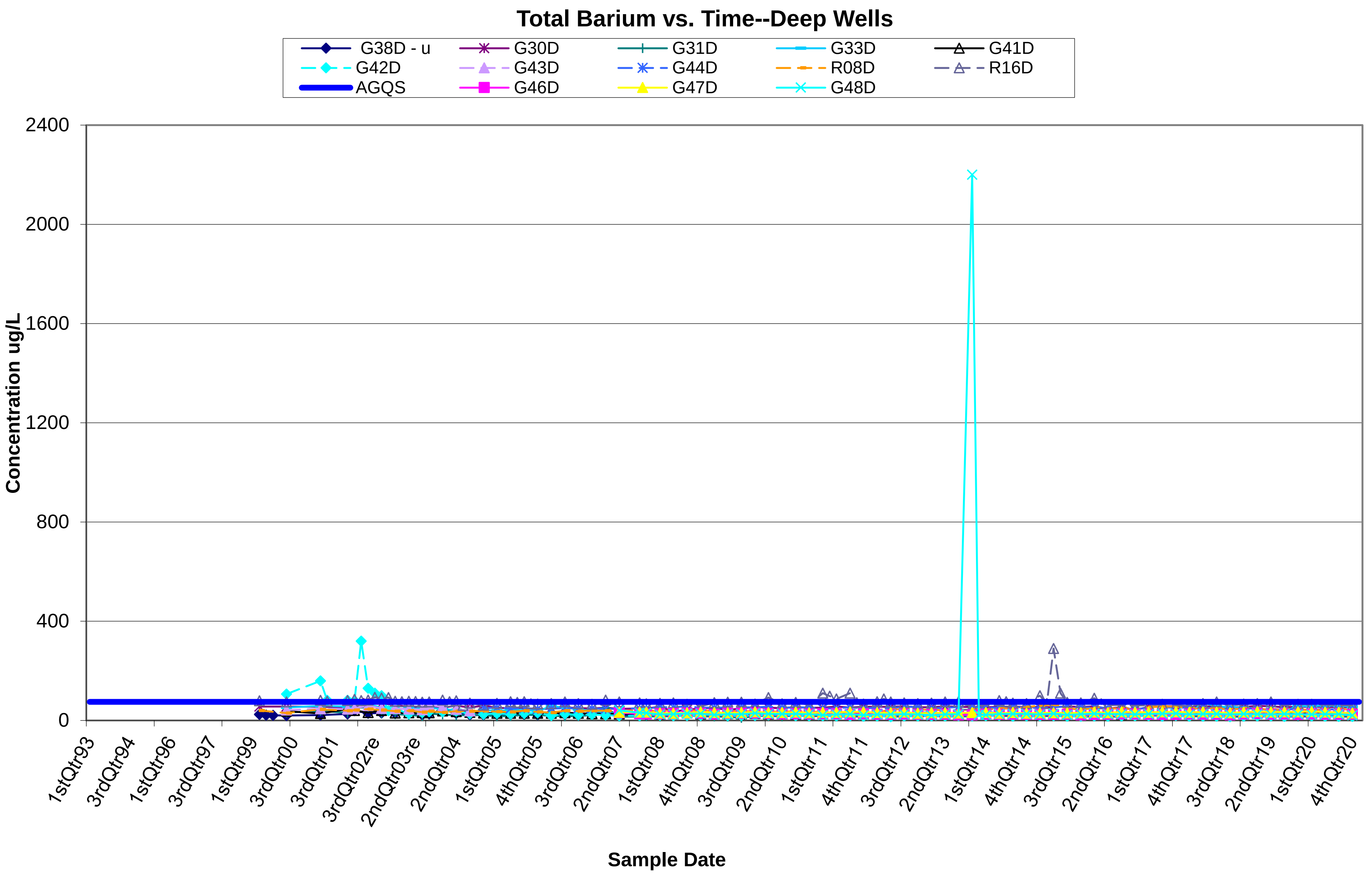

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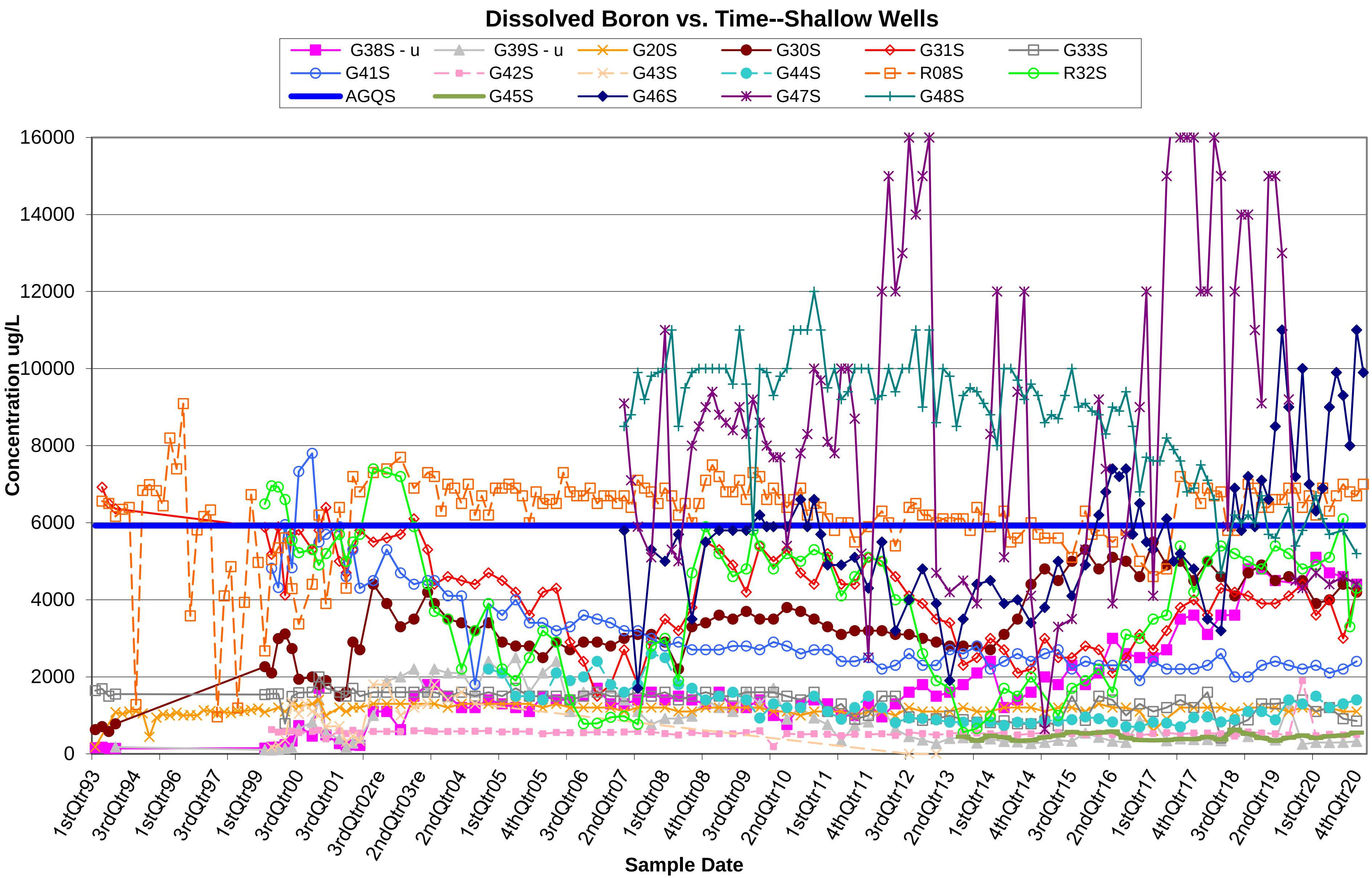

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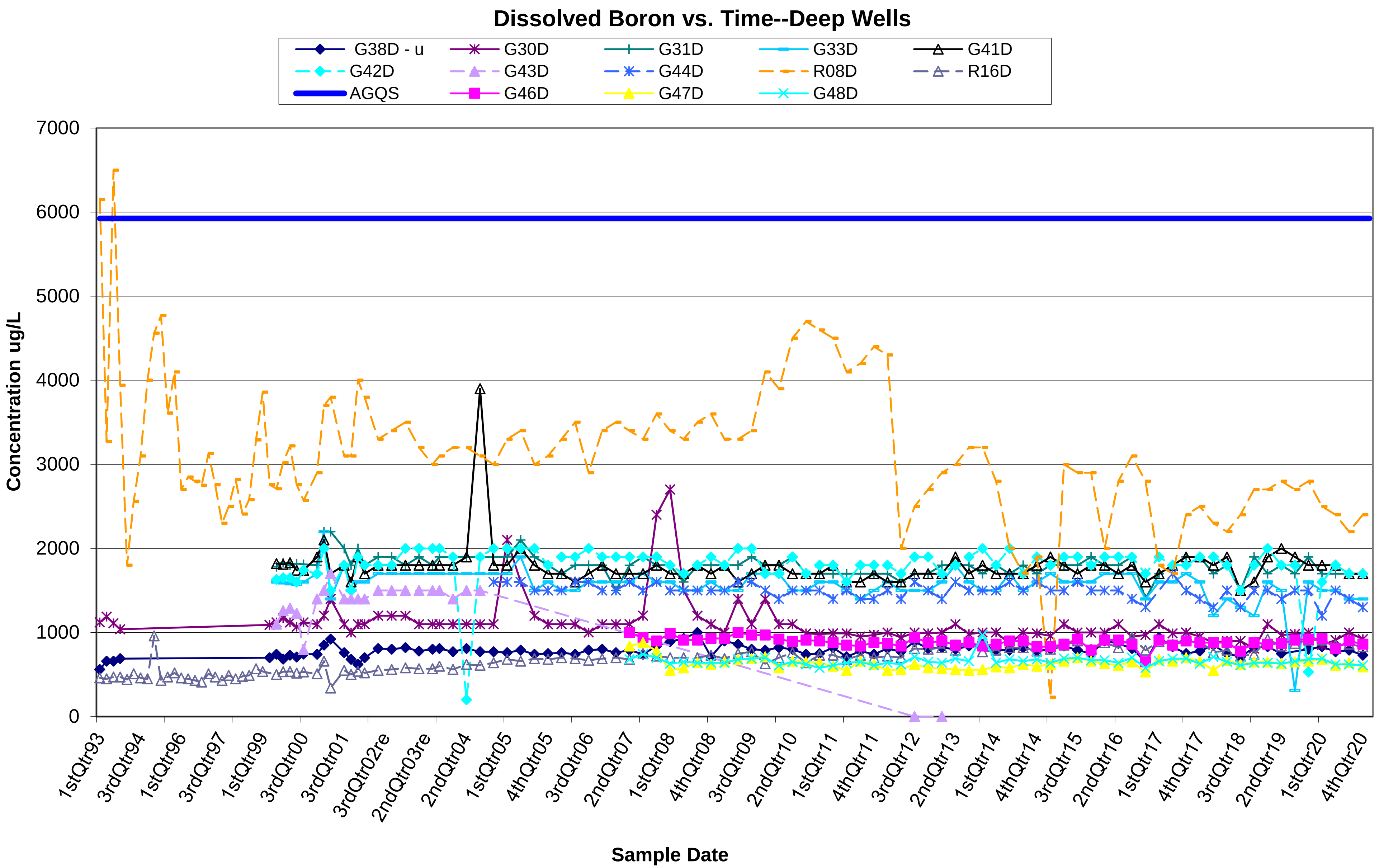

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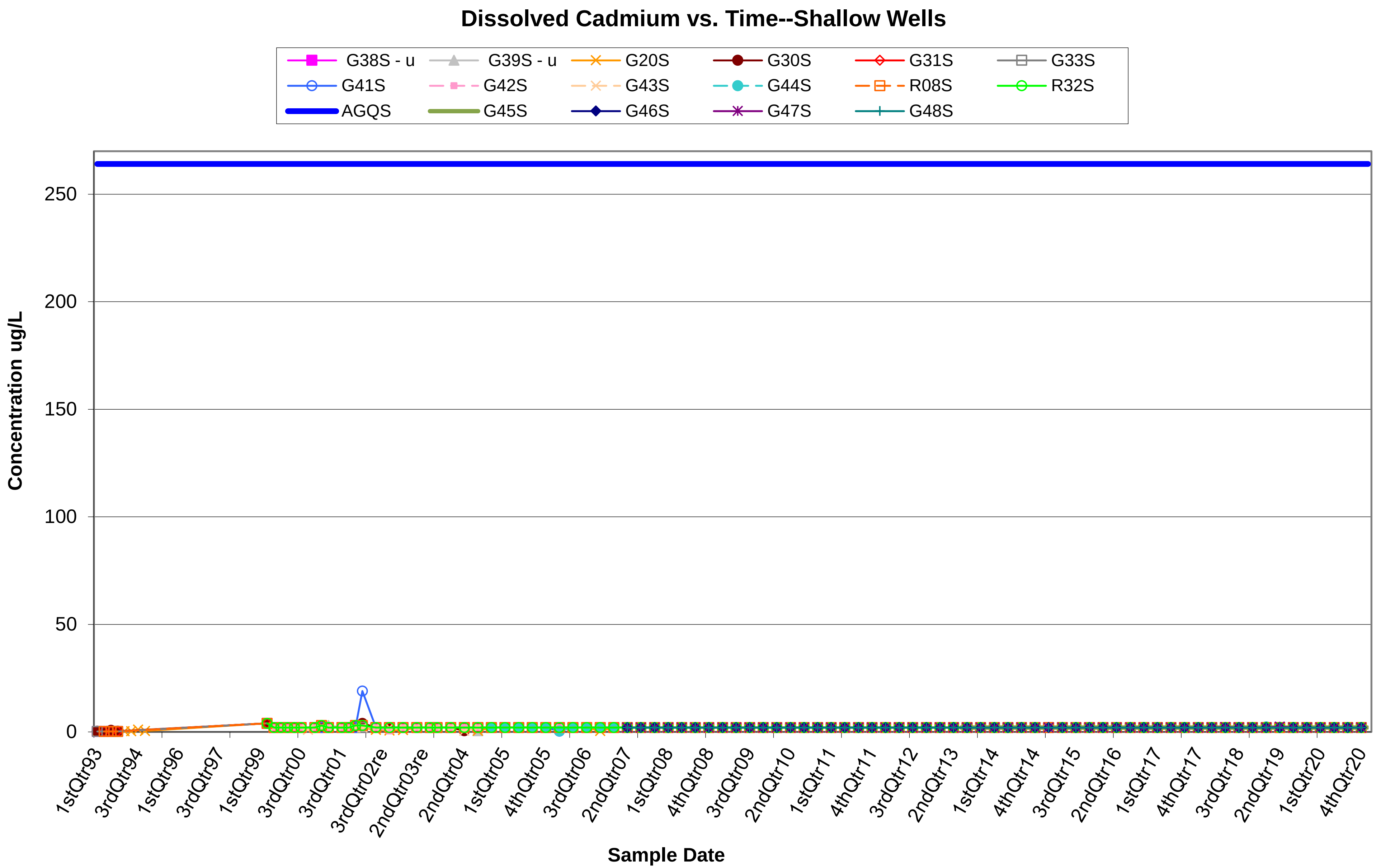
Dissolved Cadmium vs. Time--Shallow Wells
G38S - u
G39S - u
G20S
G30S
G31S
G33S
G41S
G42S
G43S
G44S
R08S
R32S
AGQS
G45S
G46S
G47S
G48S
Concentration ug/L
0
50
100
150
200
250
1stQtr93
3rdQtr94
1stQtr96
3rdQtr97
1stQtr99
3rdQtr00
3rdQtr01
3rdQtr02re
2ndQtr03re
2ndQtr04
1stQtr05
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3rdQtr06
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4thQtr08
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1stQtr11
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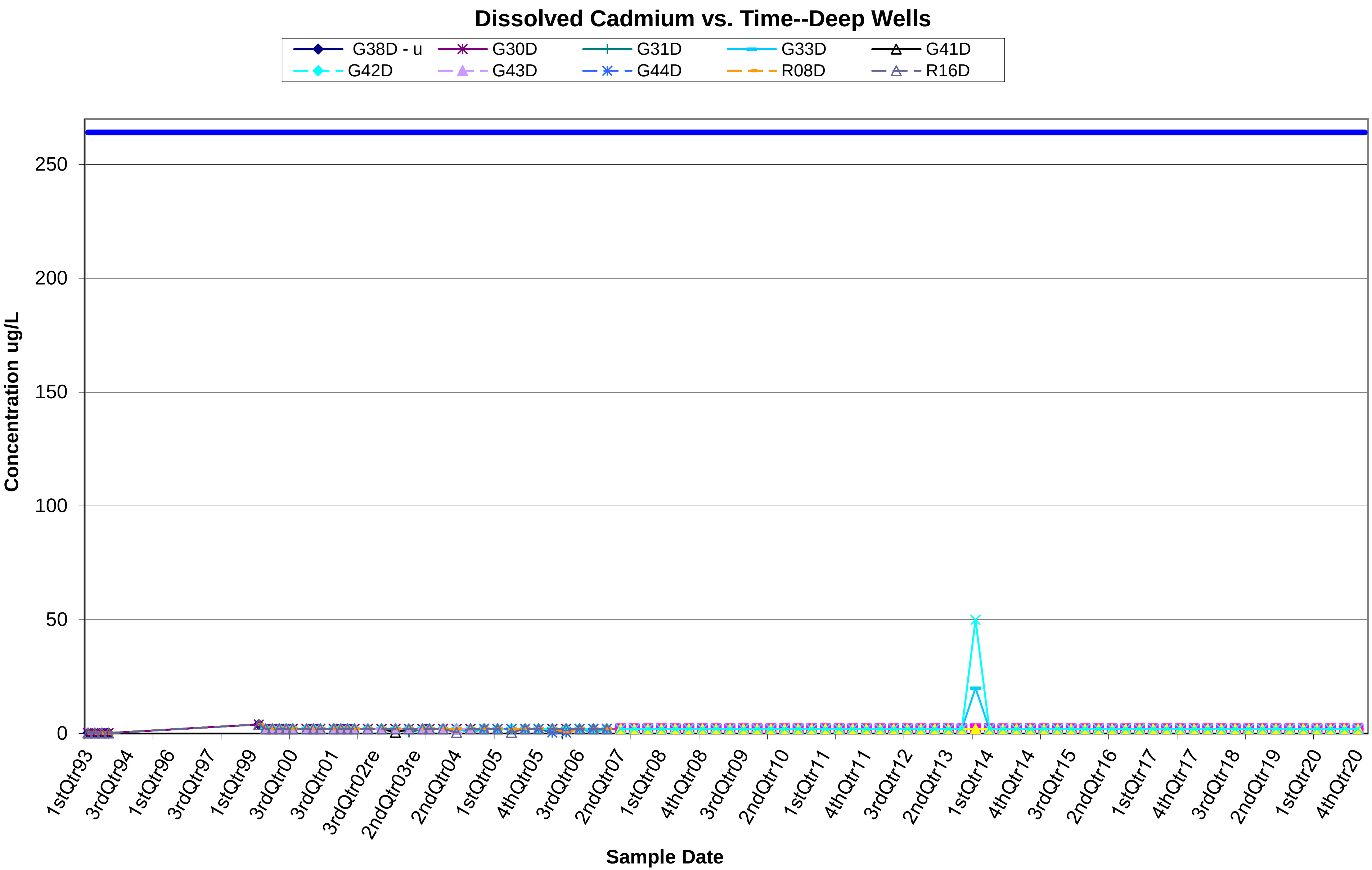
3rdQtr12
2ndQtr13
1stQtr14
4thQtr14
3rdQtr15
2ndQtr16
1stQtr17
4thQtr17
3rdQtr18
2ndQtr19
1stQtr20
4thQtr20
Sample Date

Joliet/Lincoln Stone Quarry



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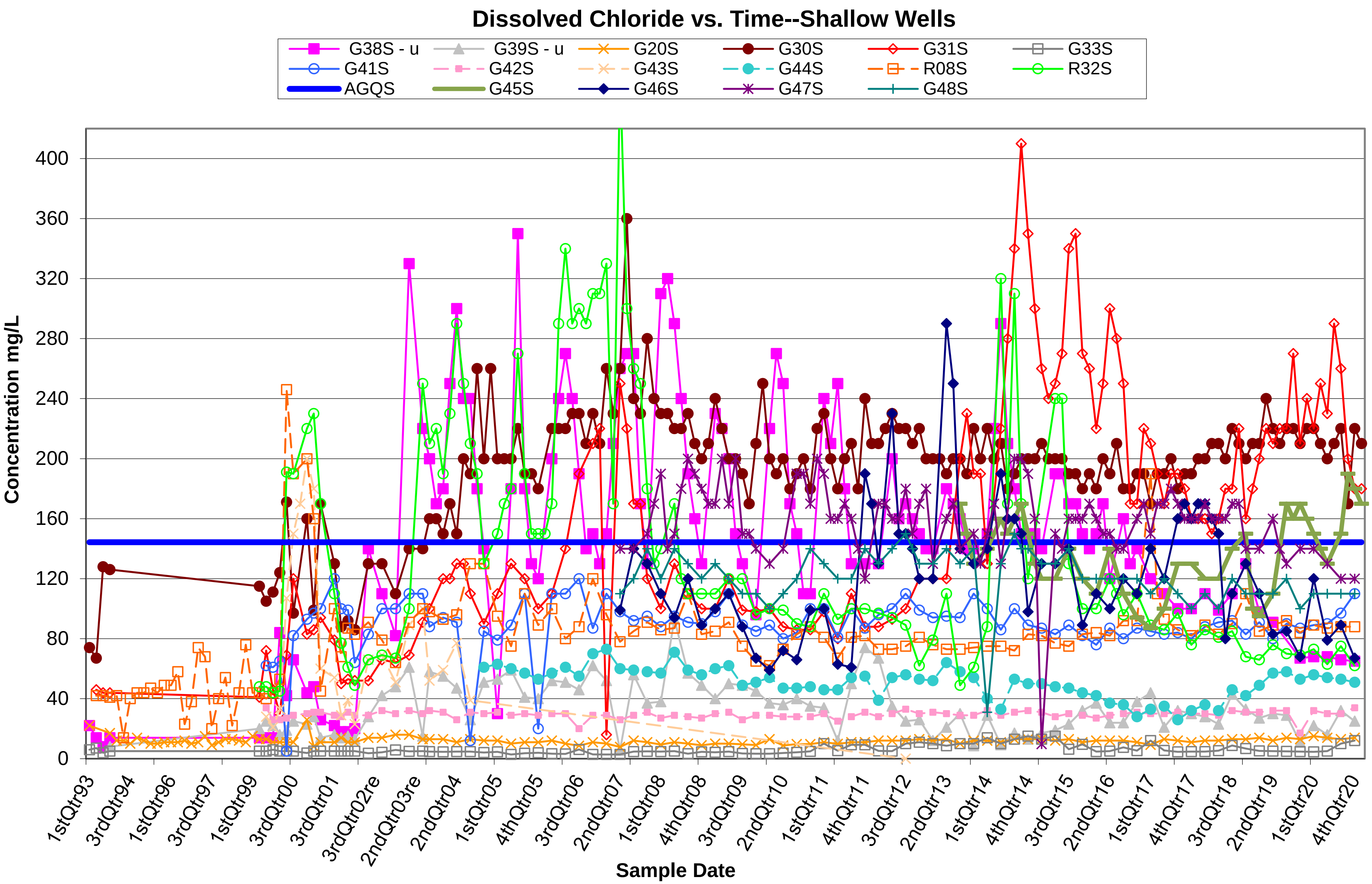

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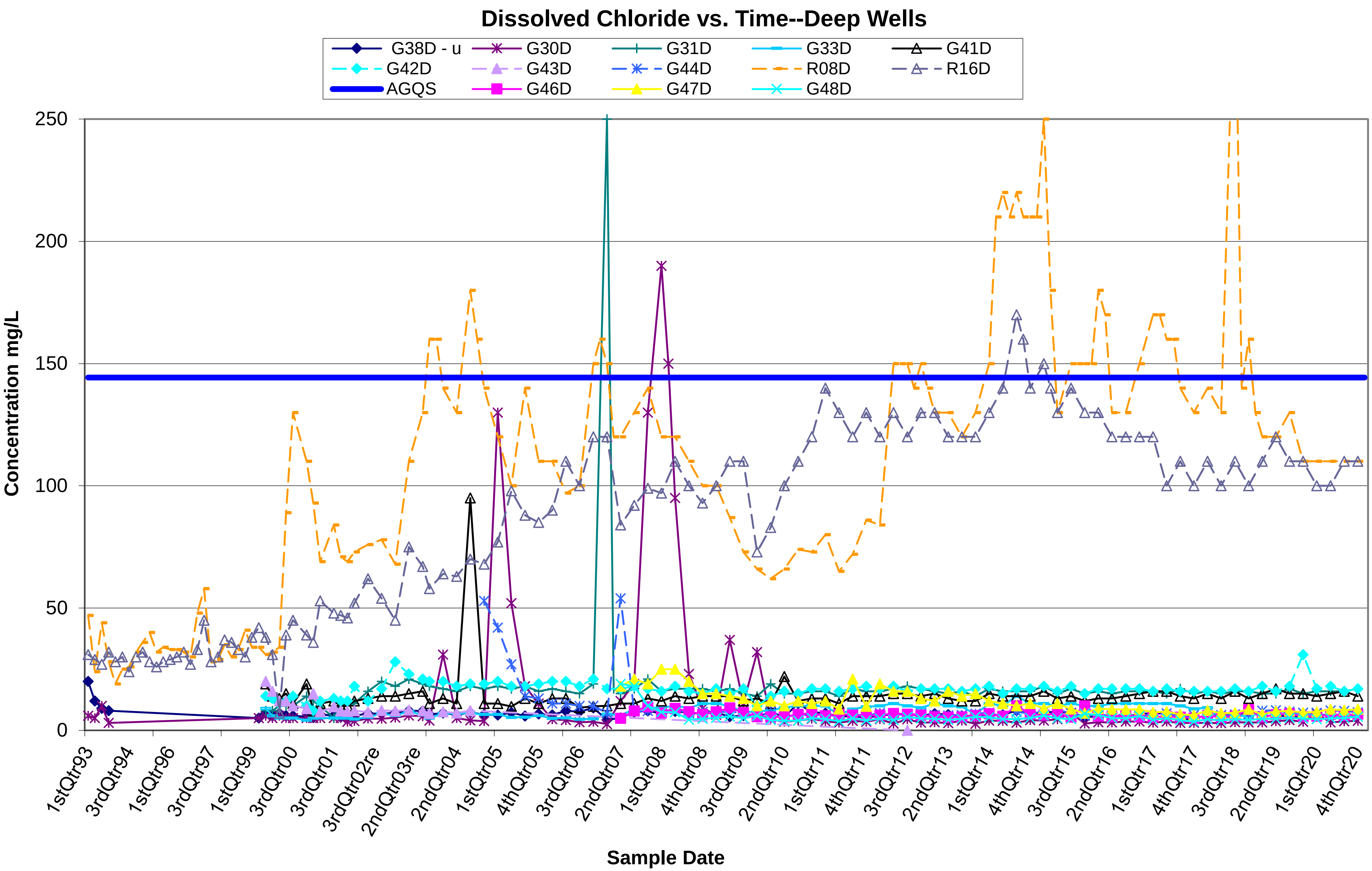

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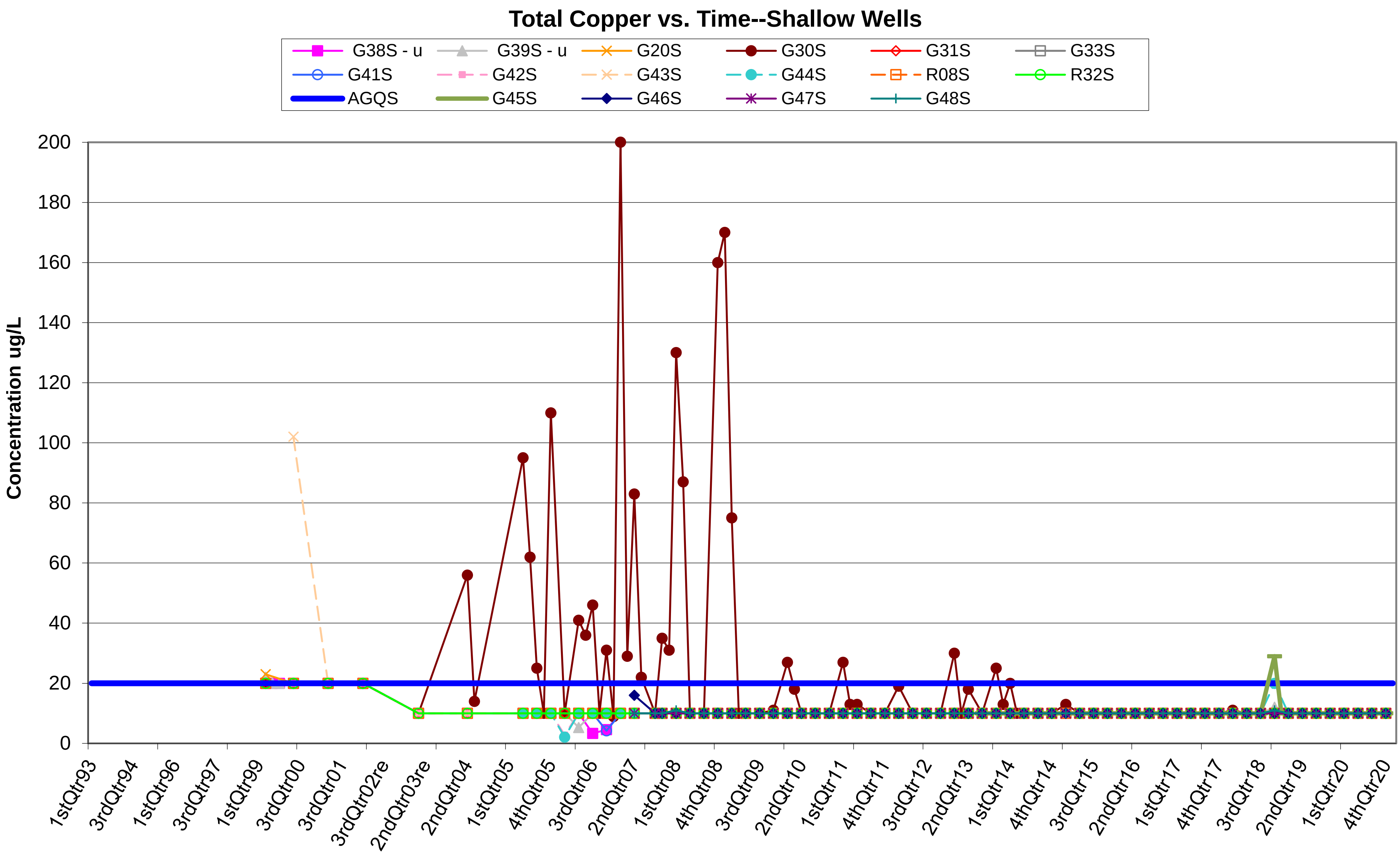

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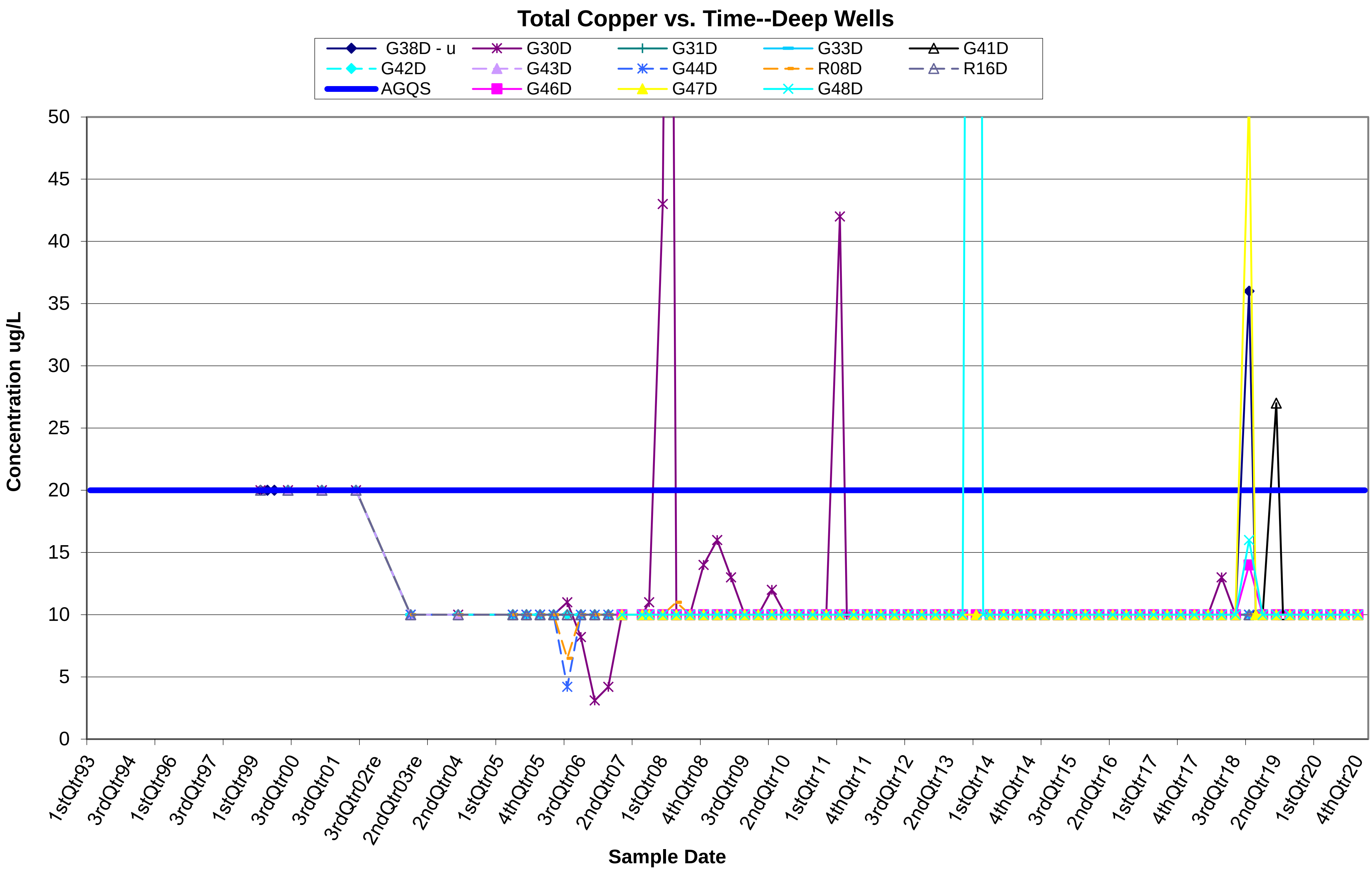

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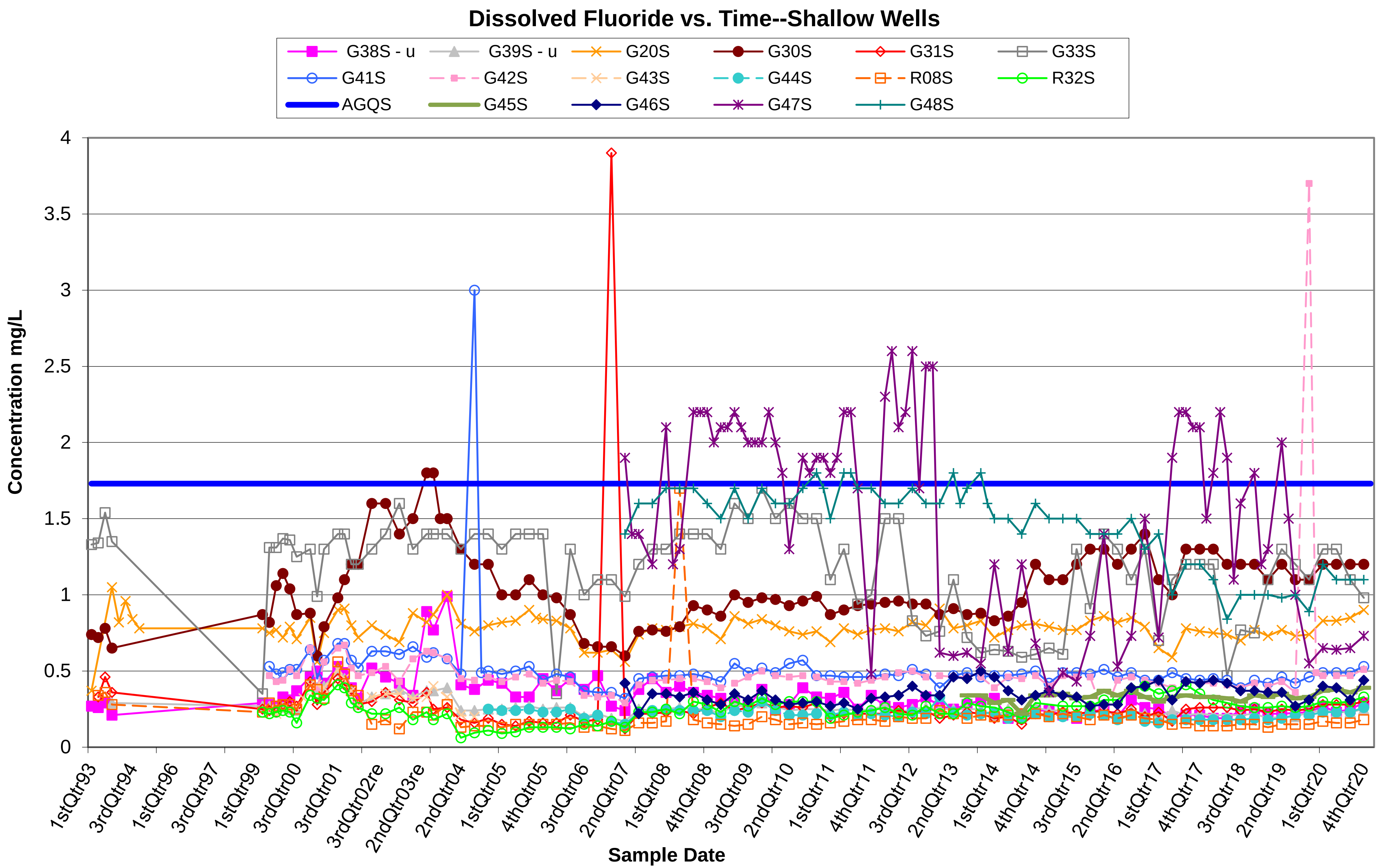
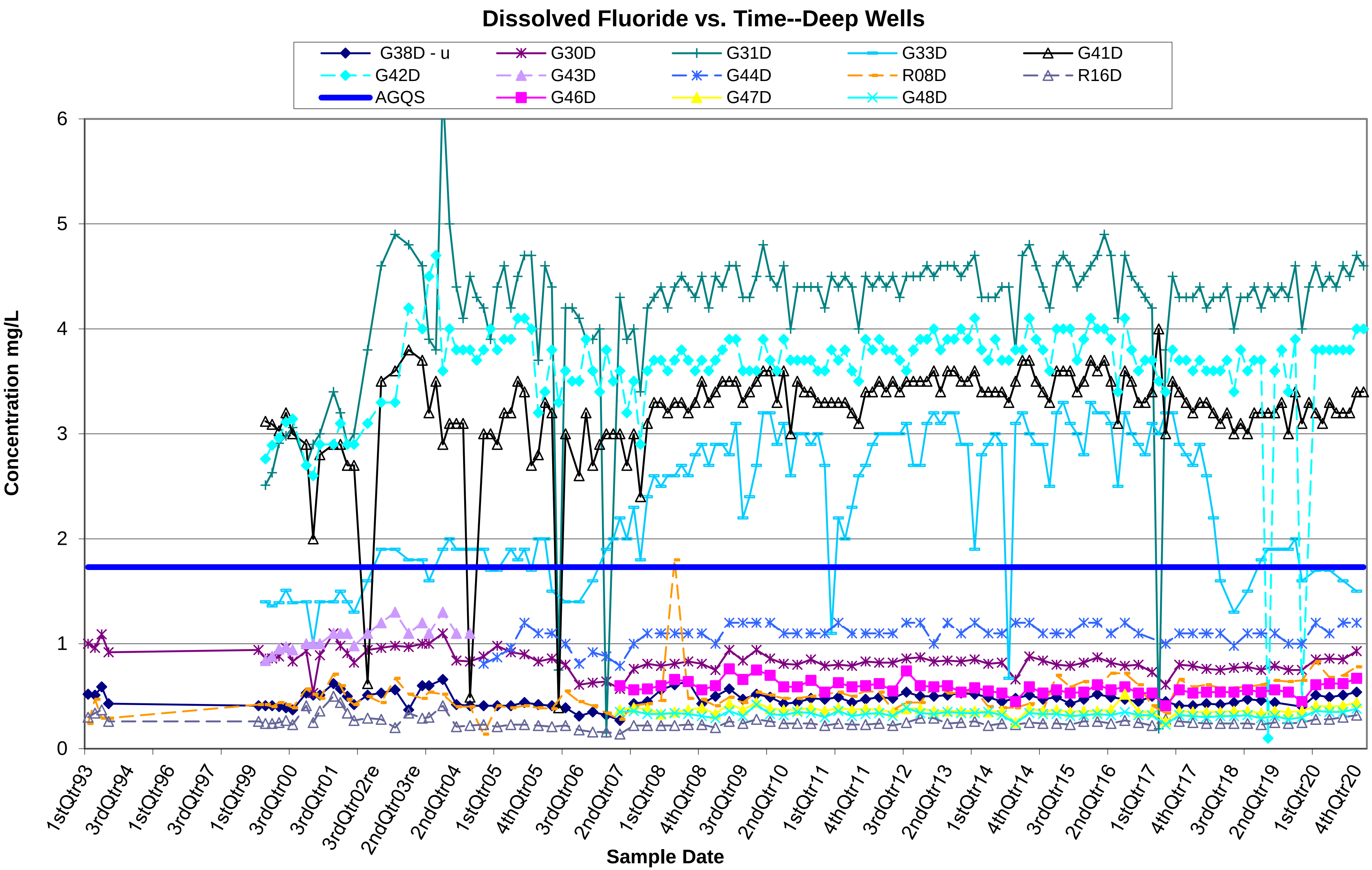


KPRG and Associates, Inc.

Joliet/Lincoln Stone Quarry



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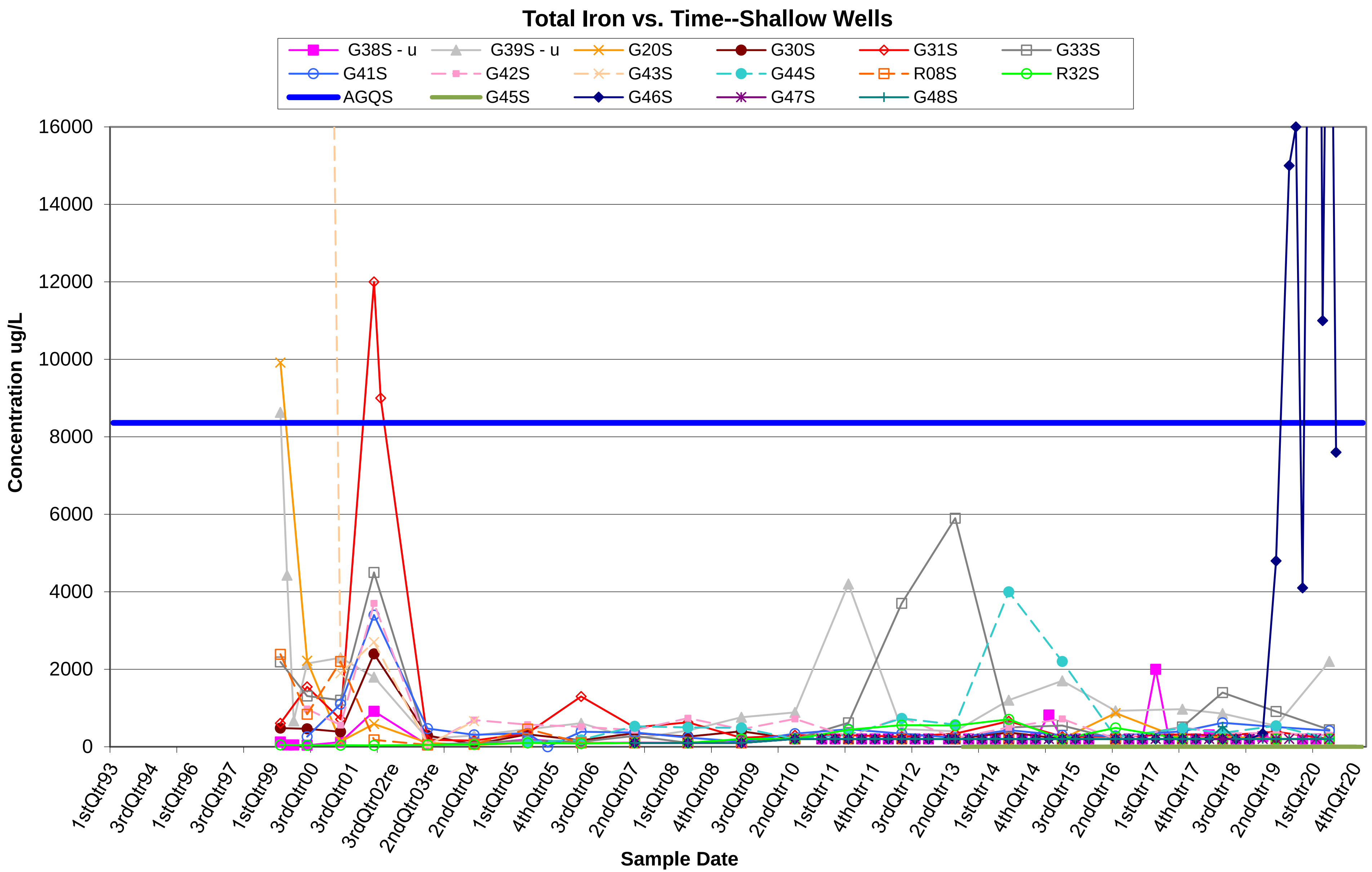
Joliet/Lincoln Stone Quarry



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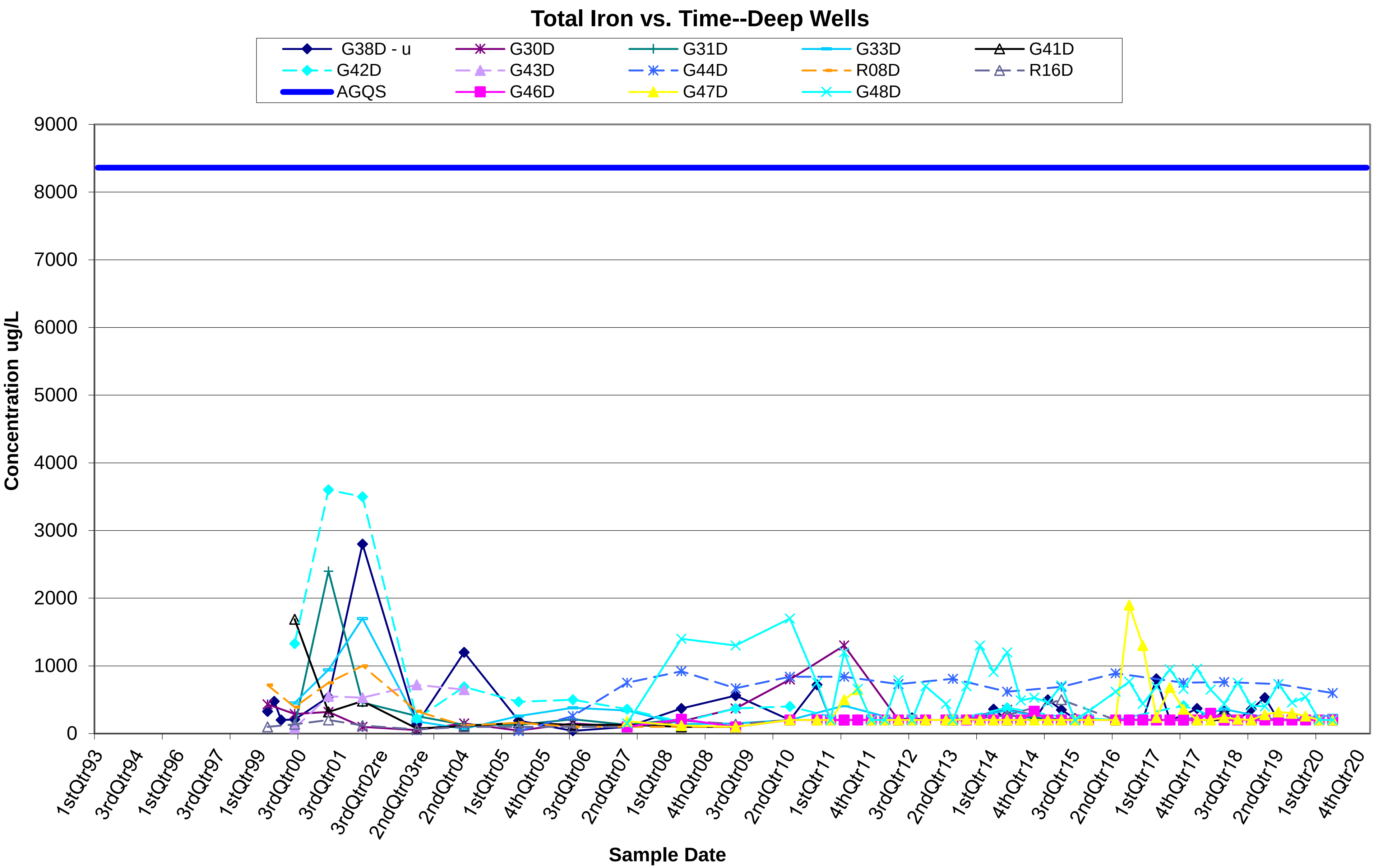

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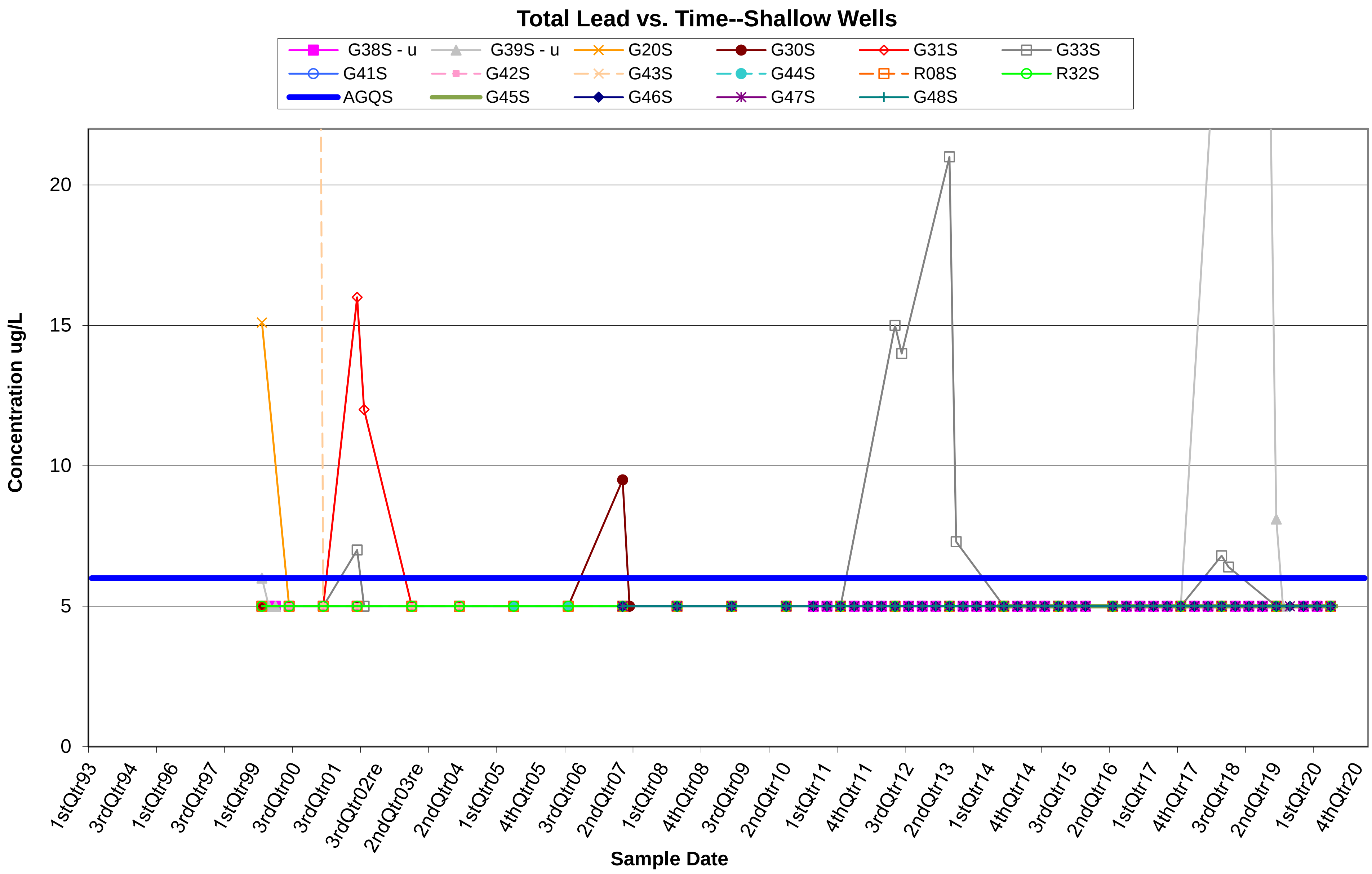

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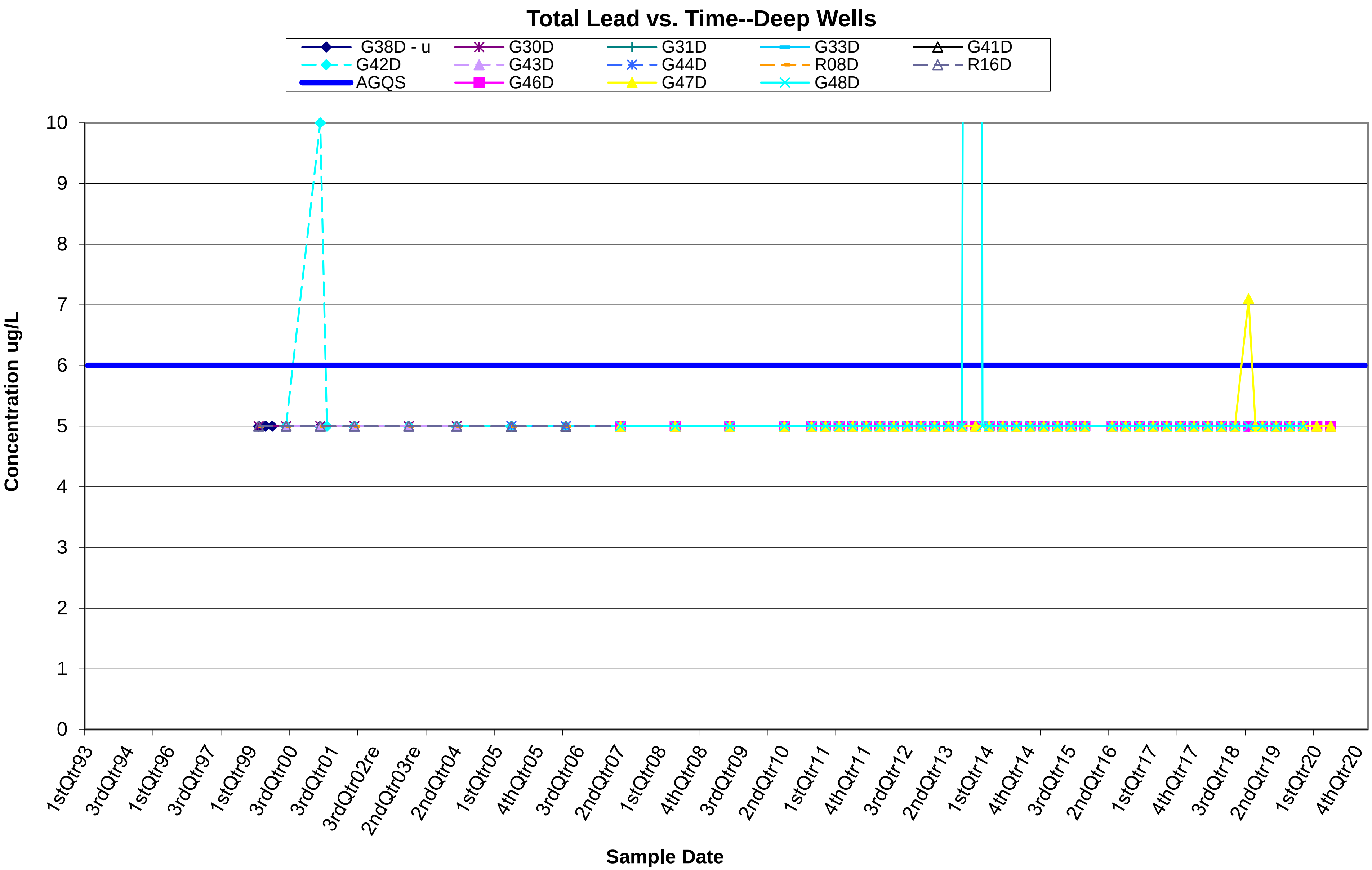

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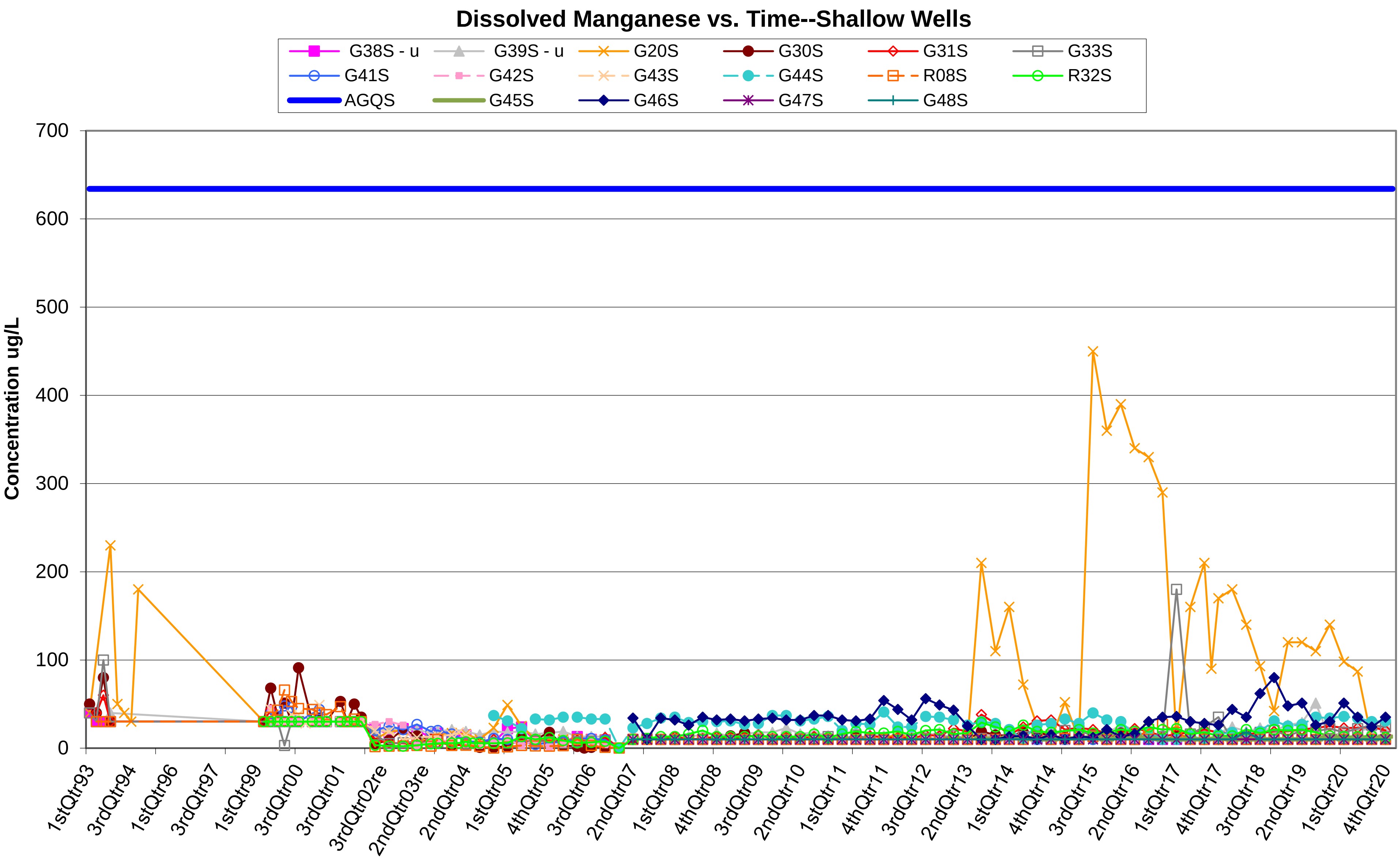

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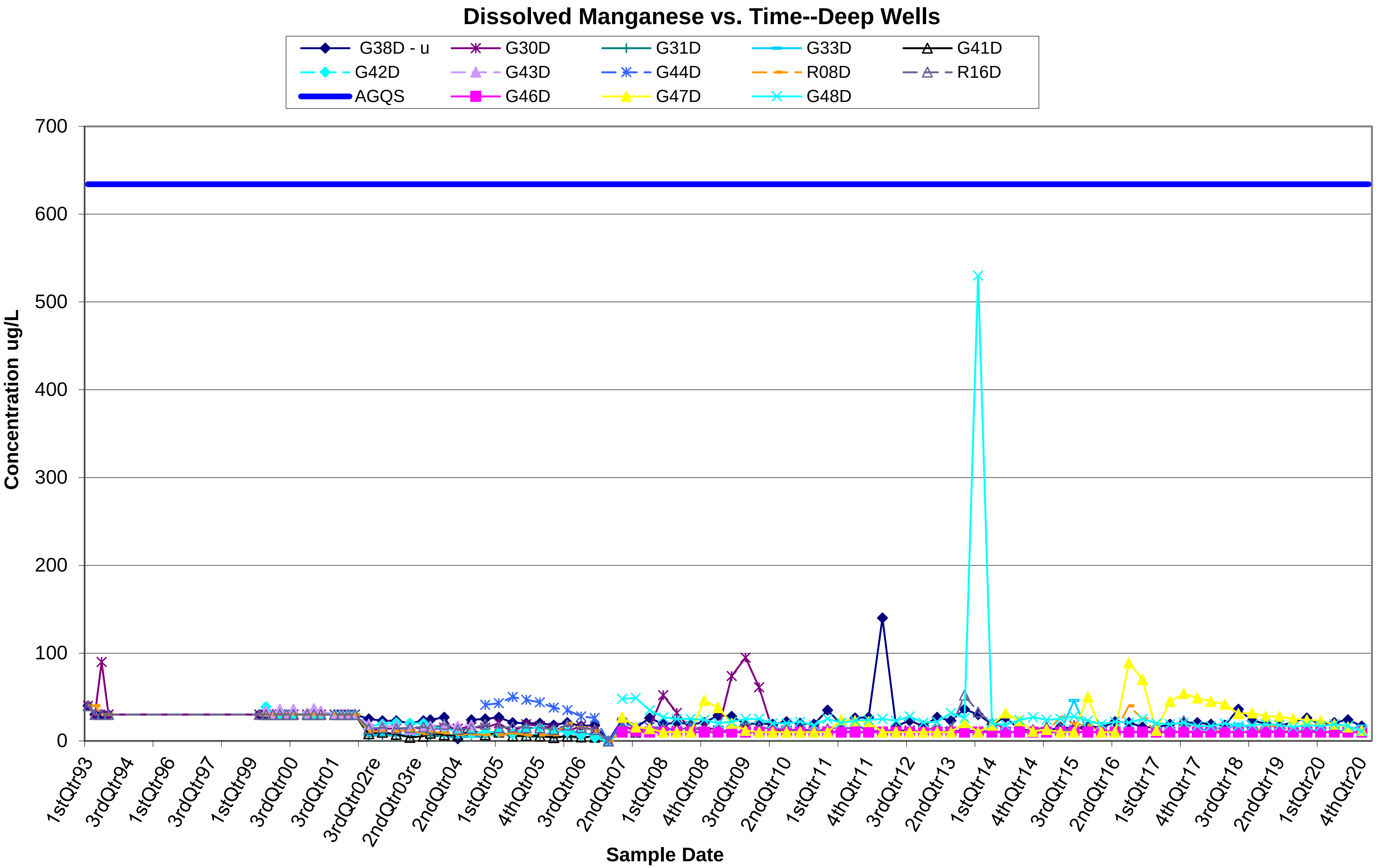

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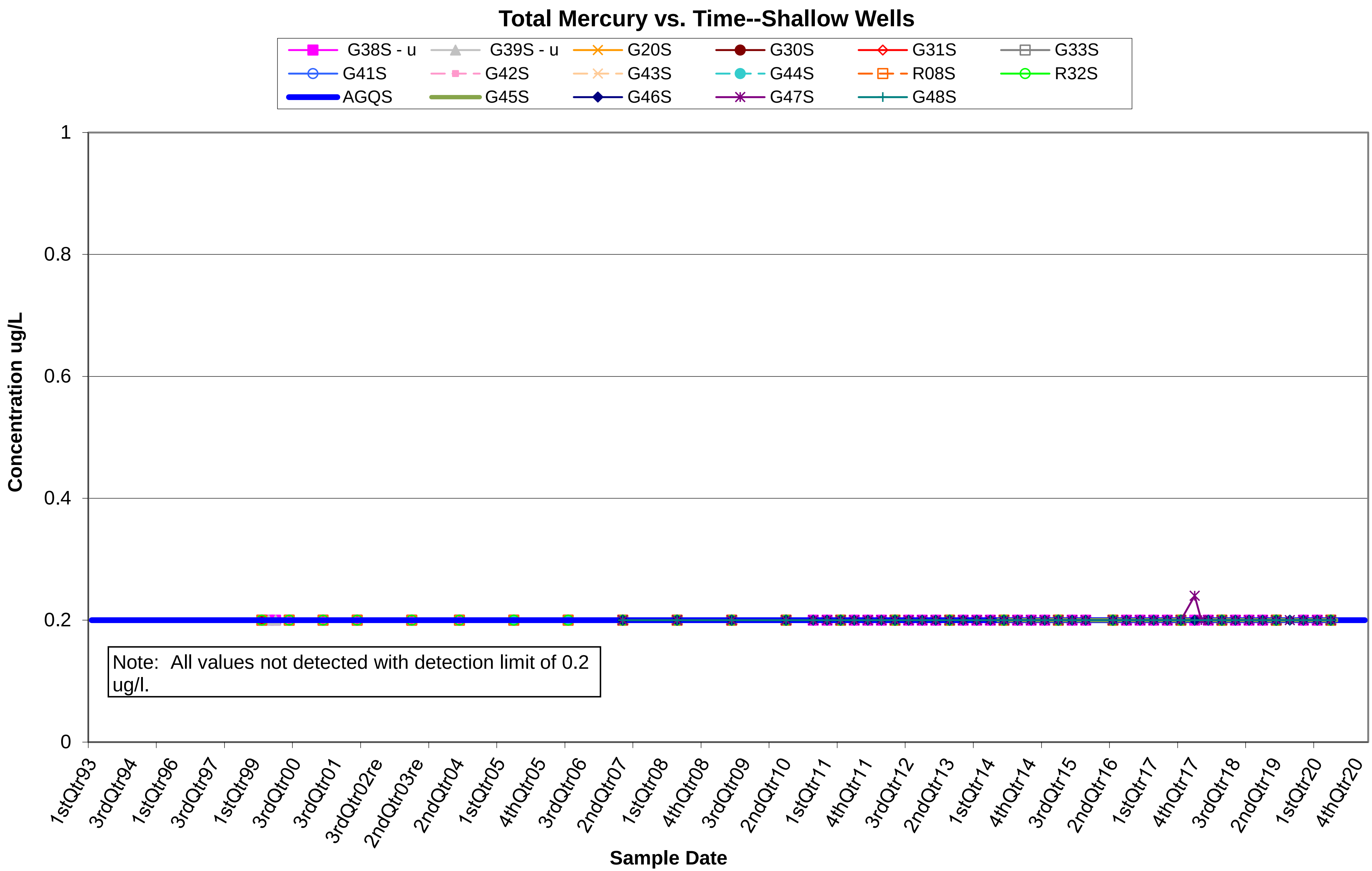

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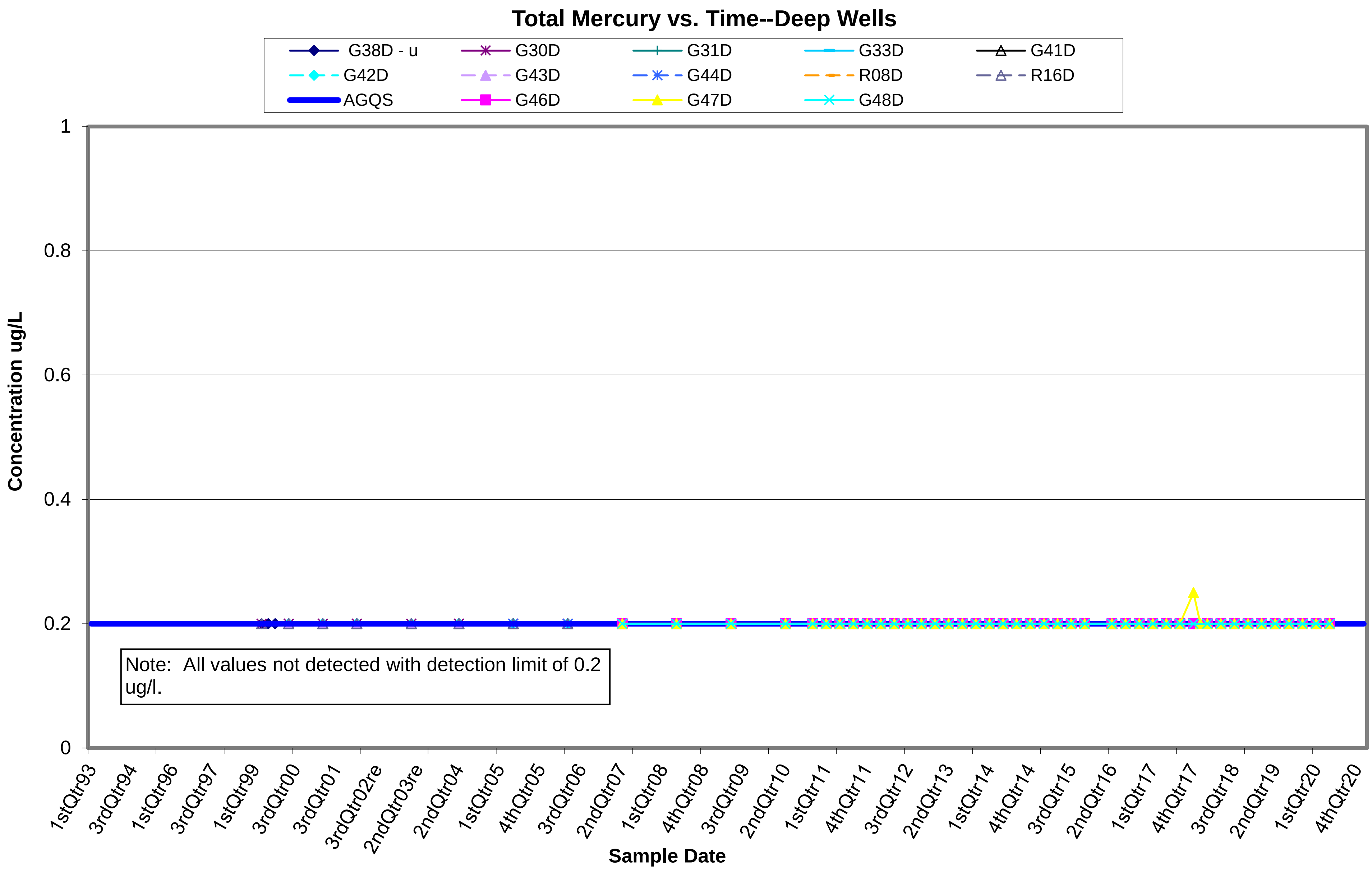

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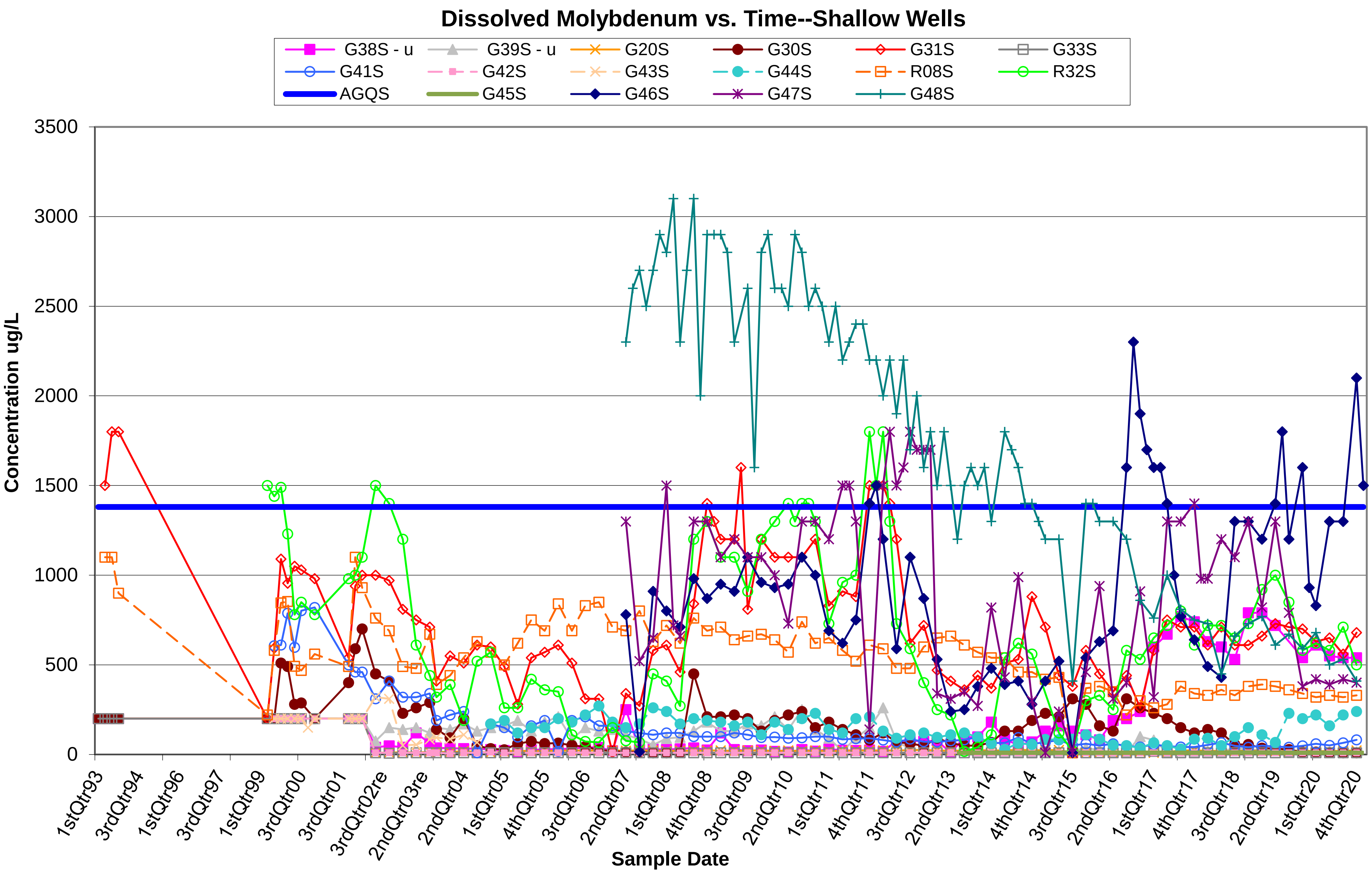

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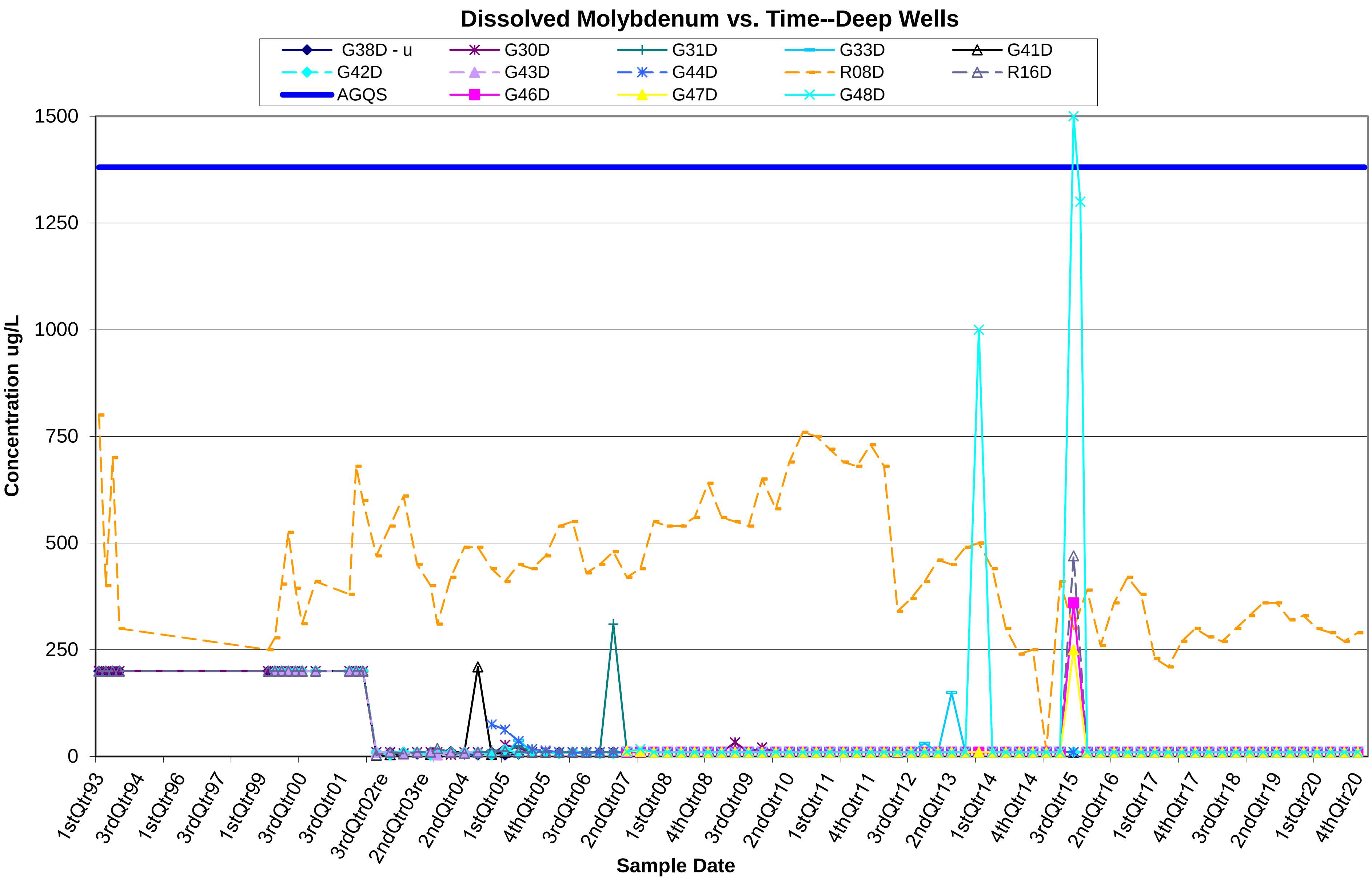

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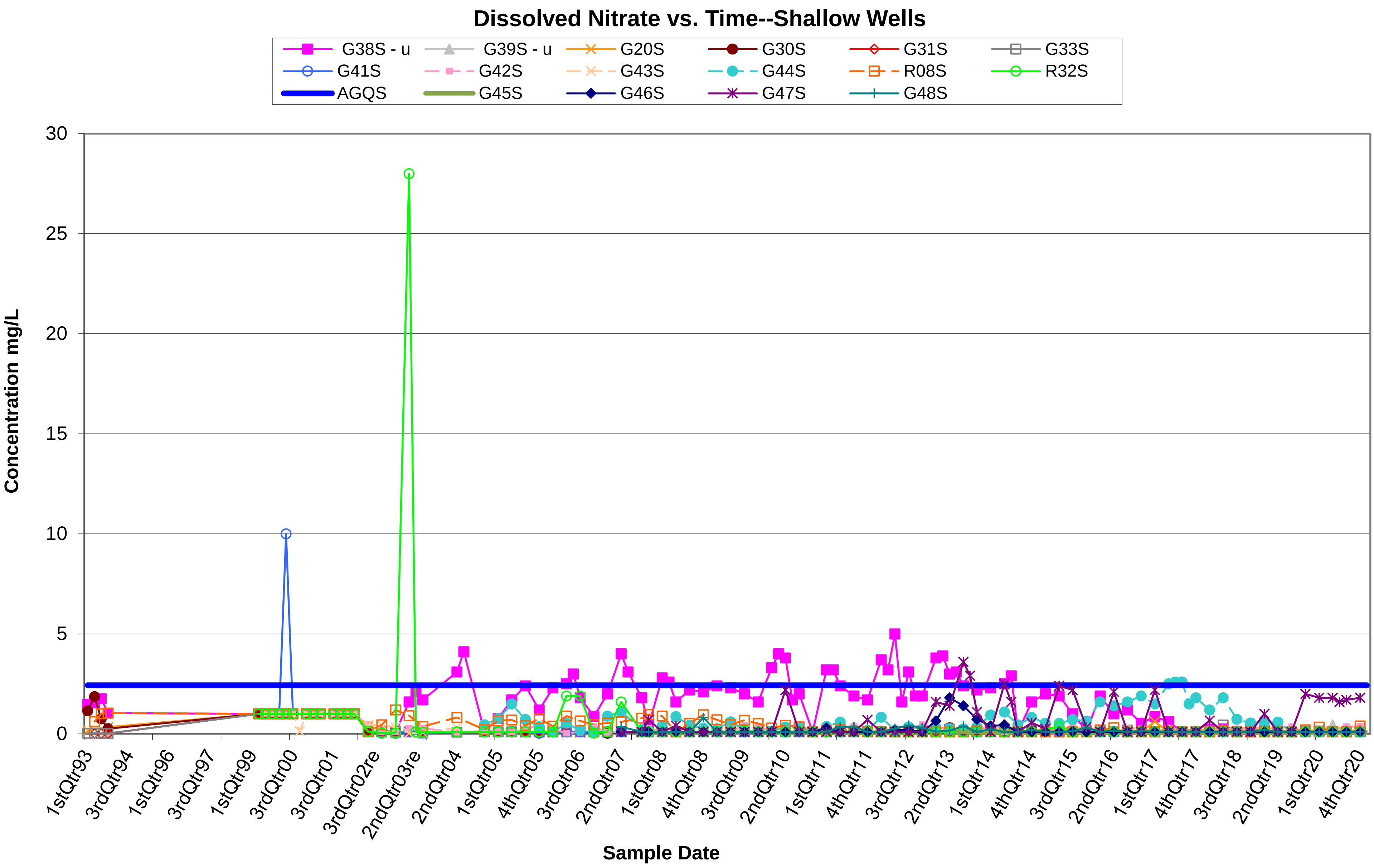

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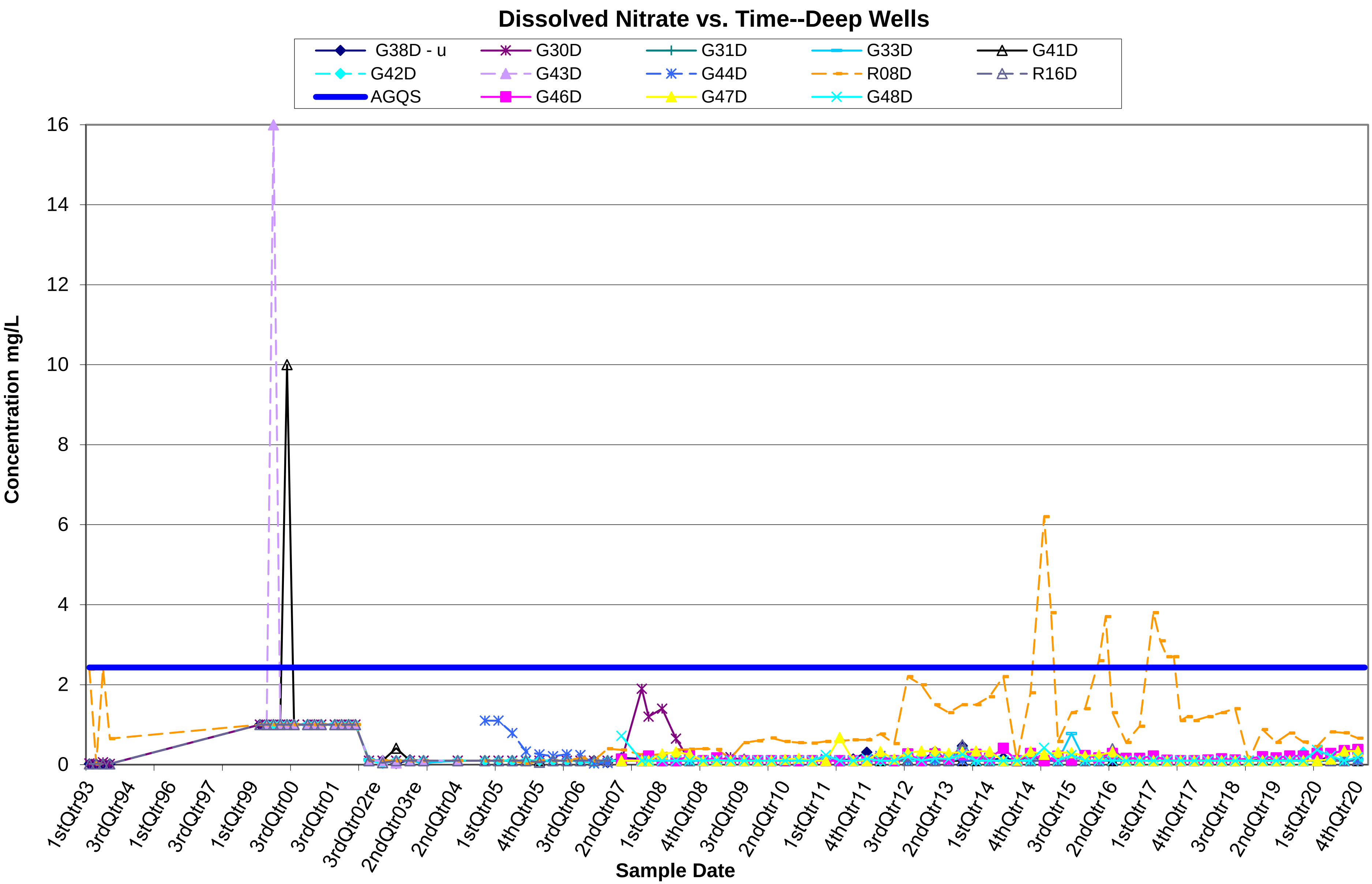

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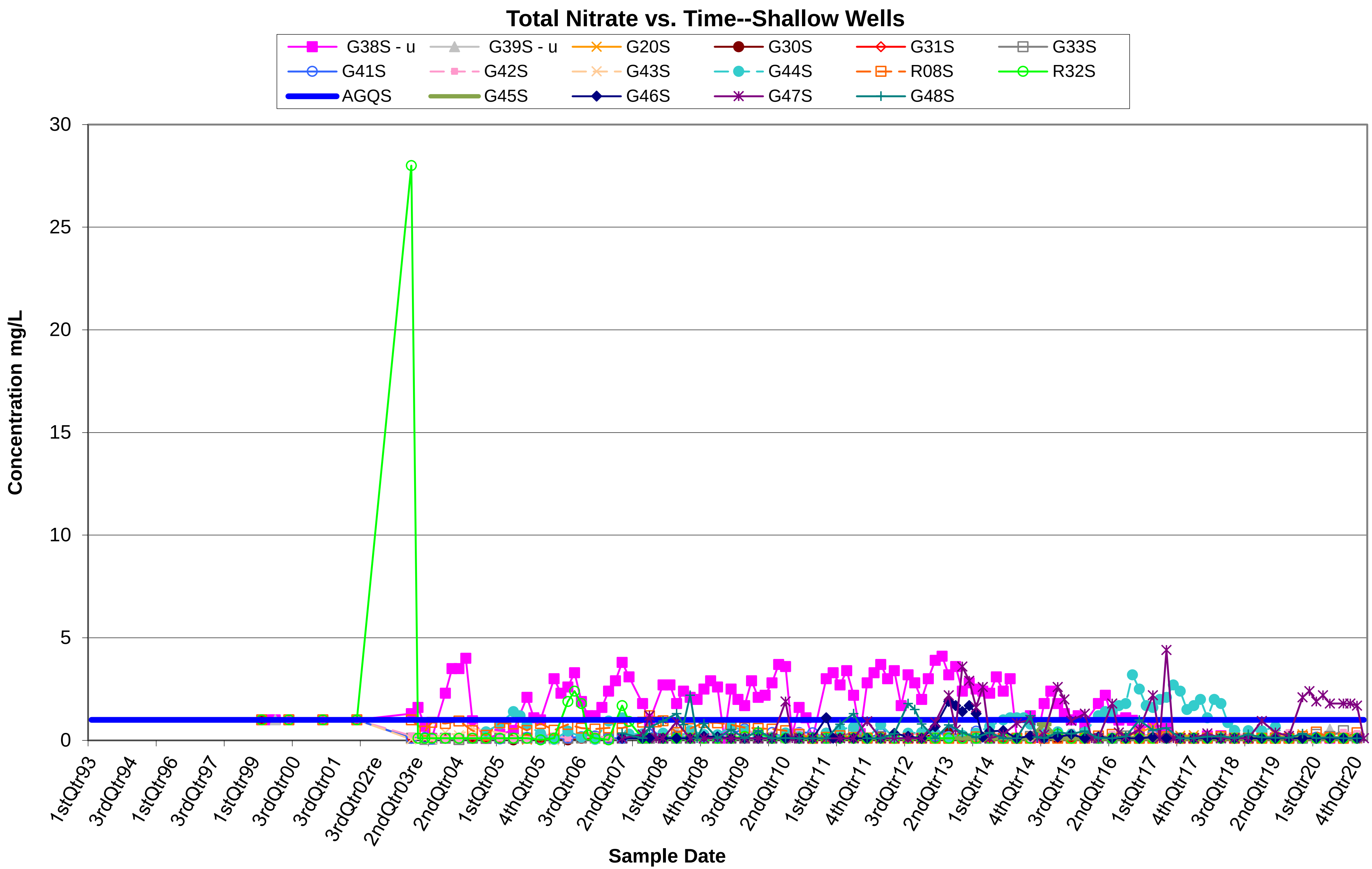

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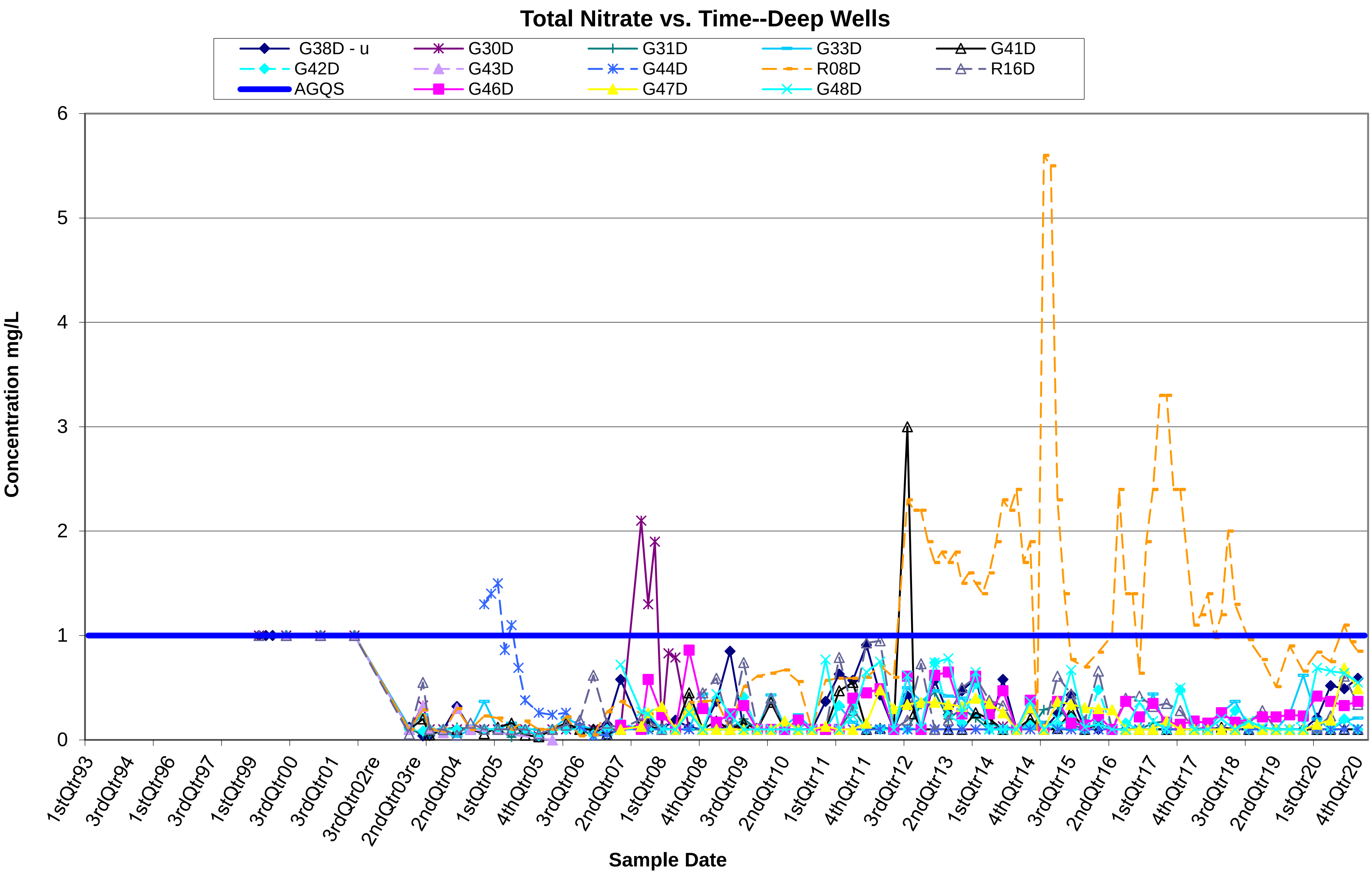

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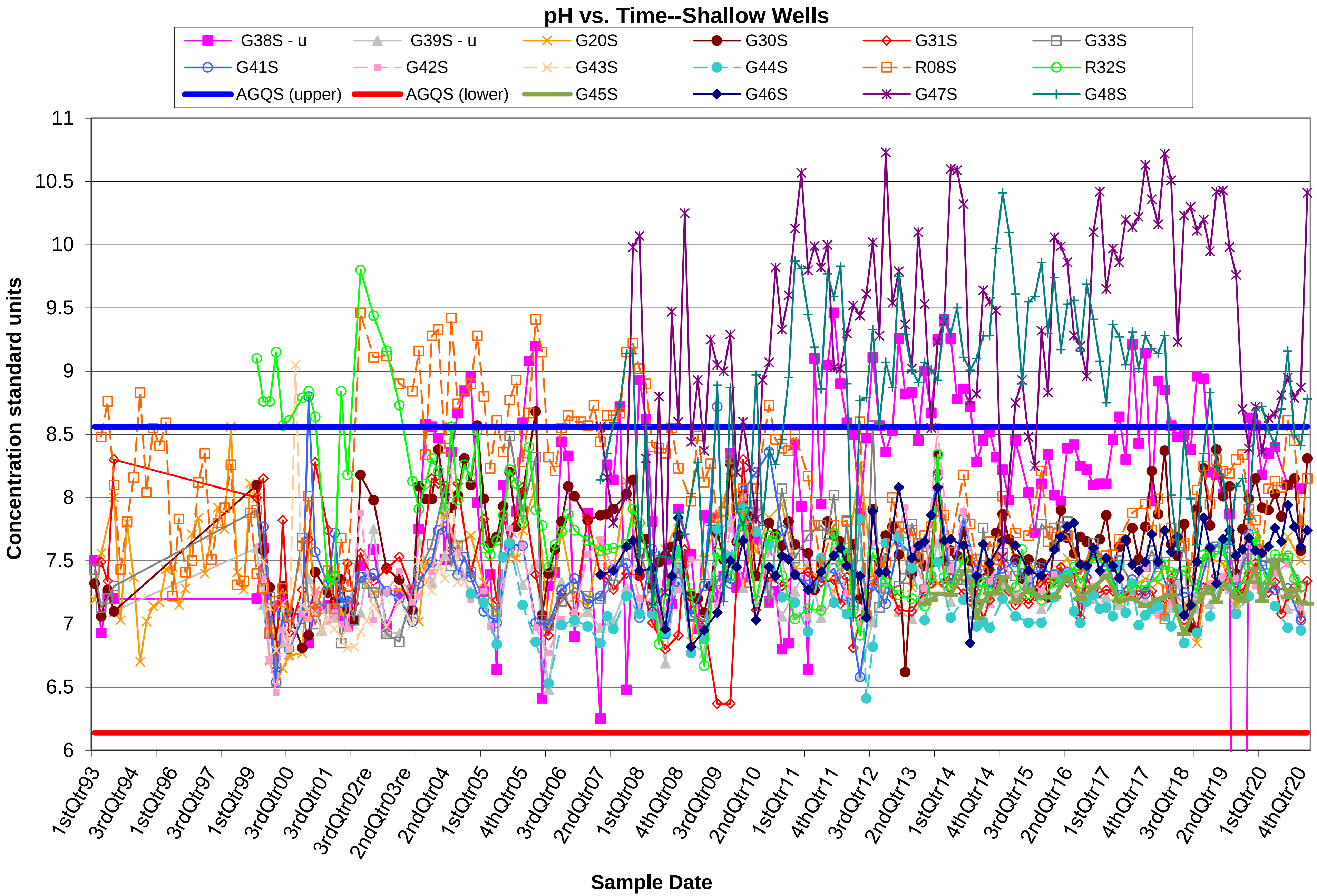

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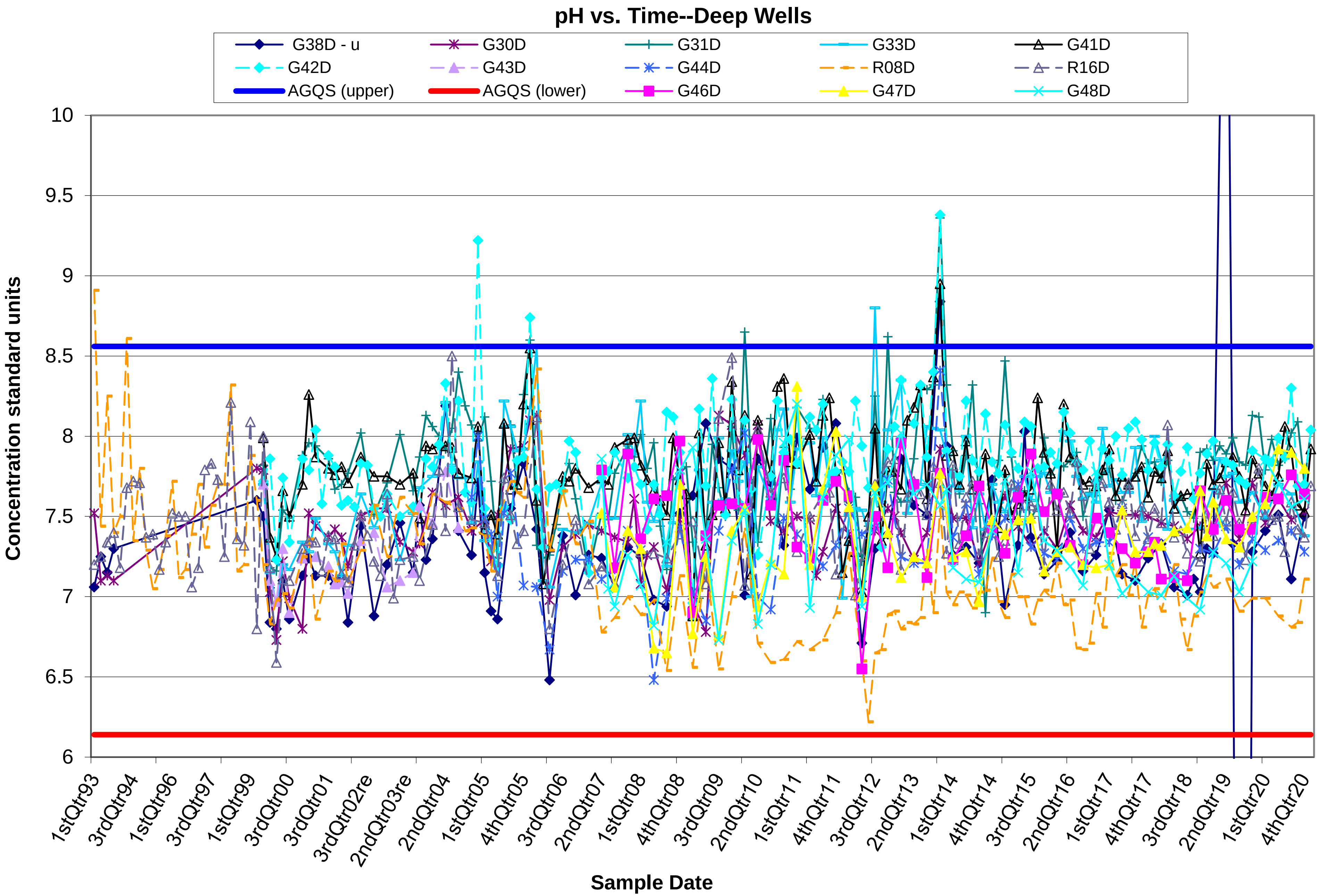

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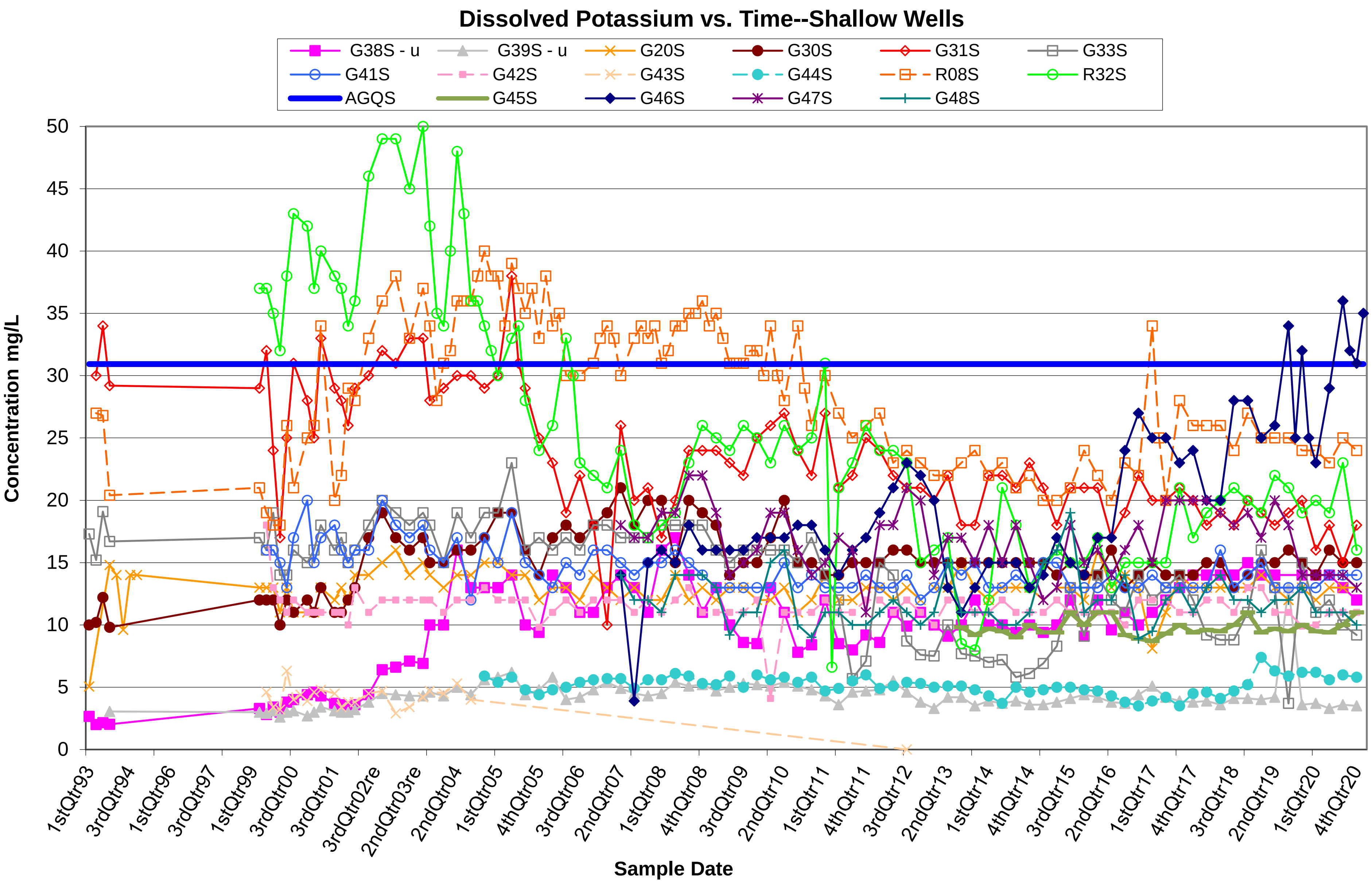

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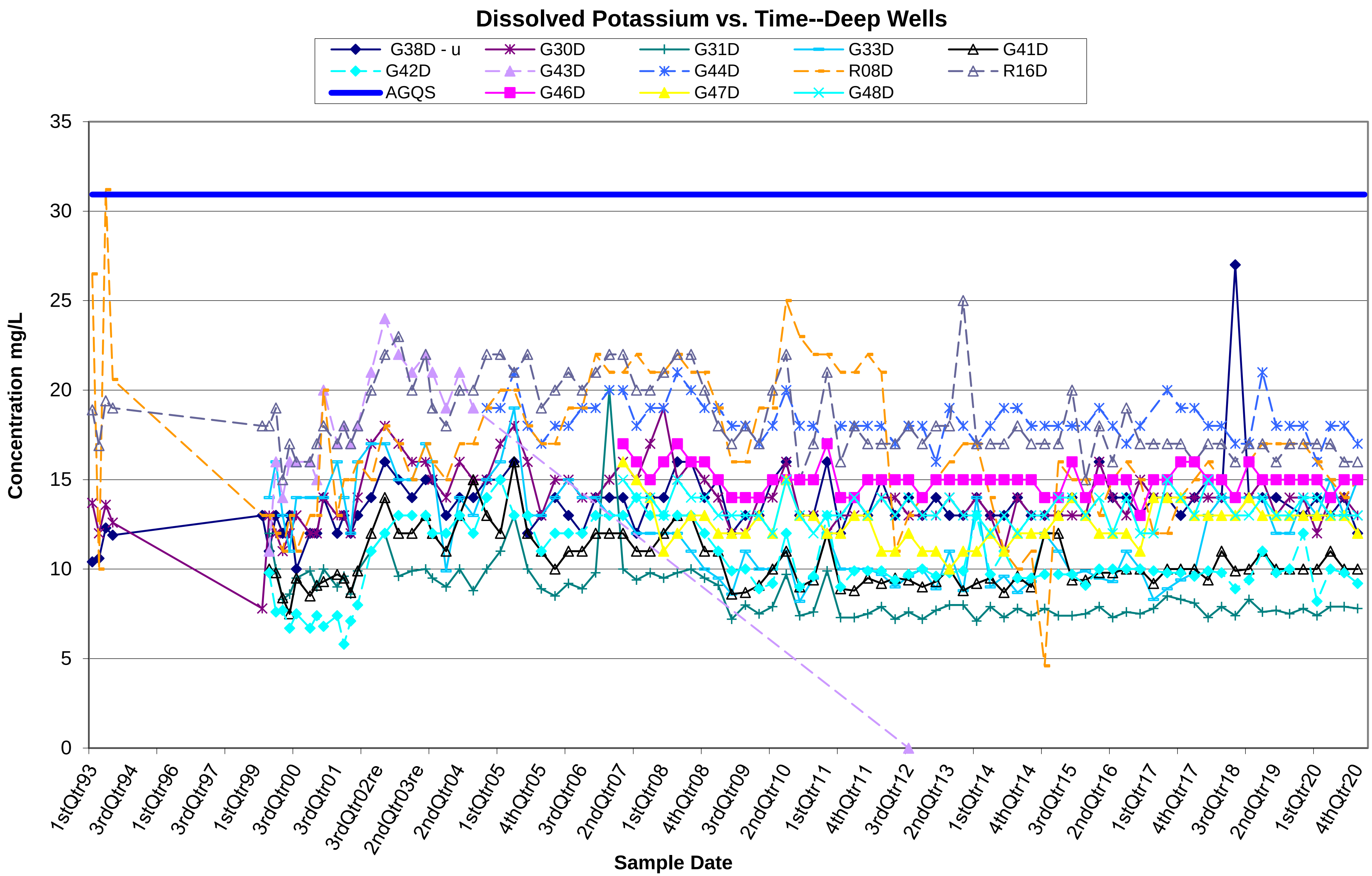

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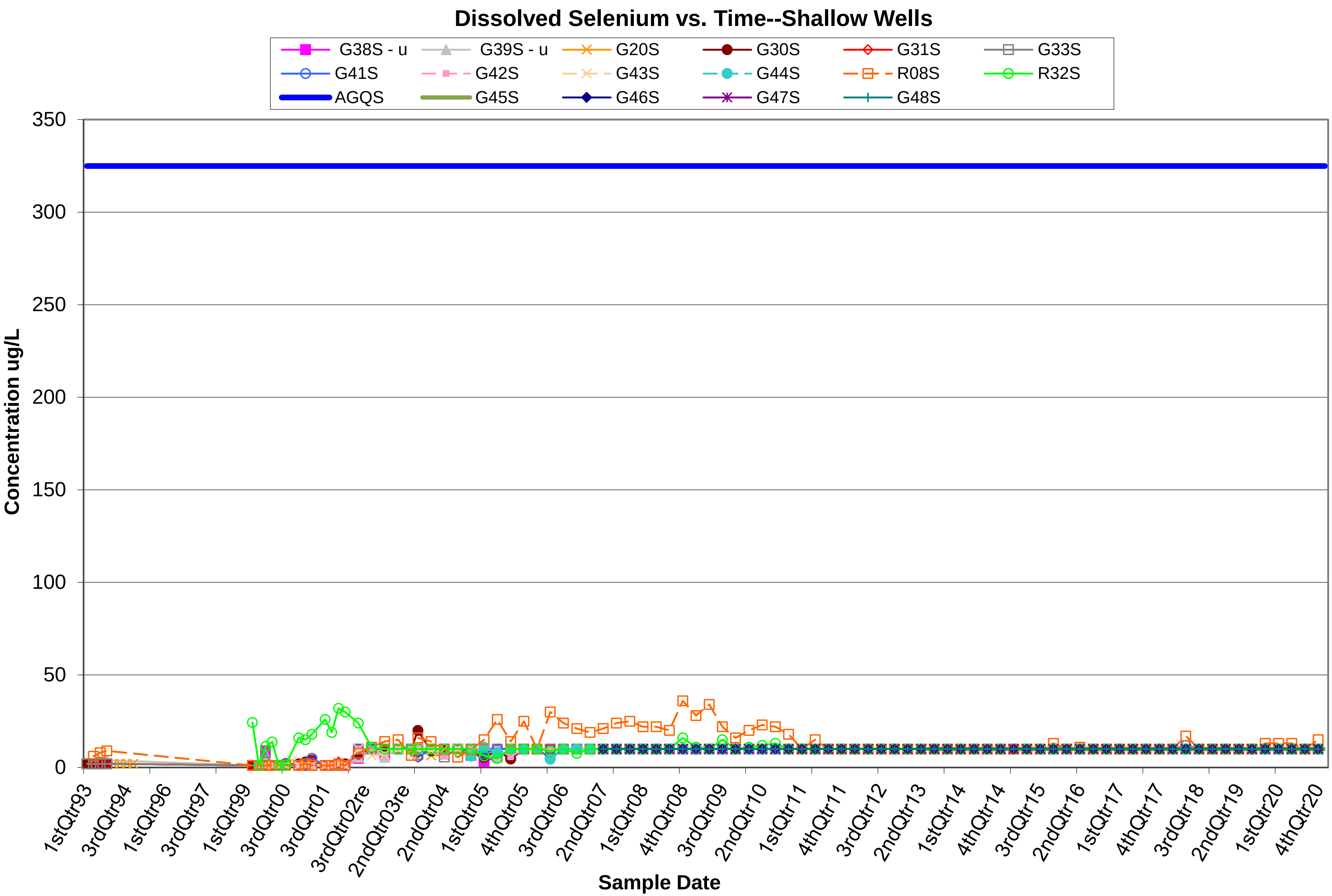

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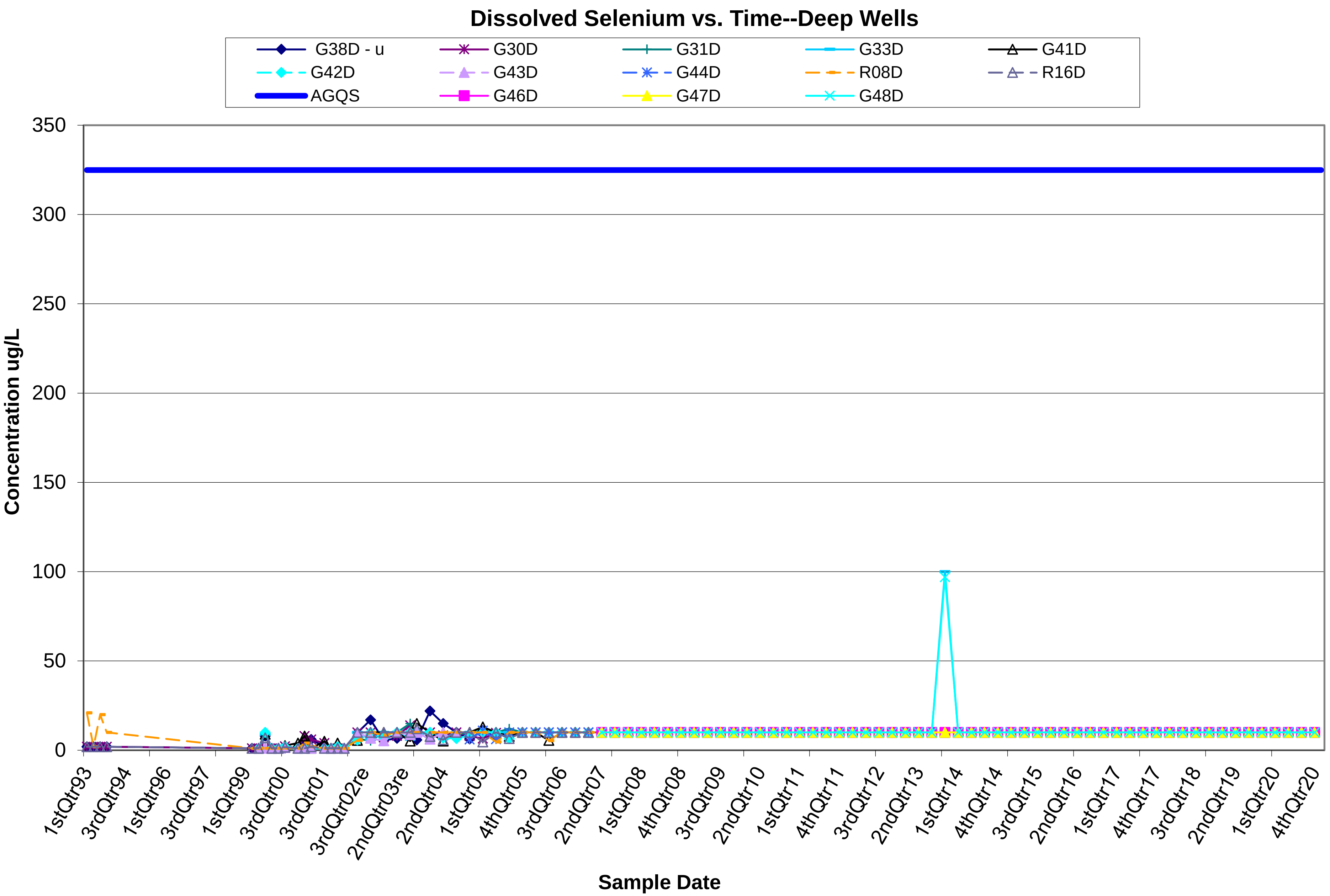

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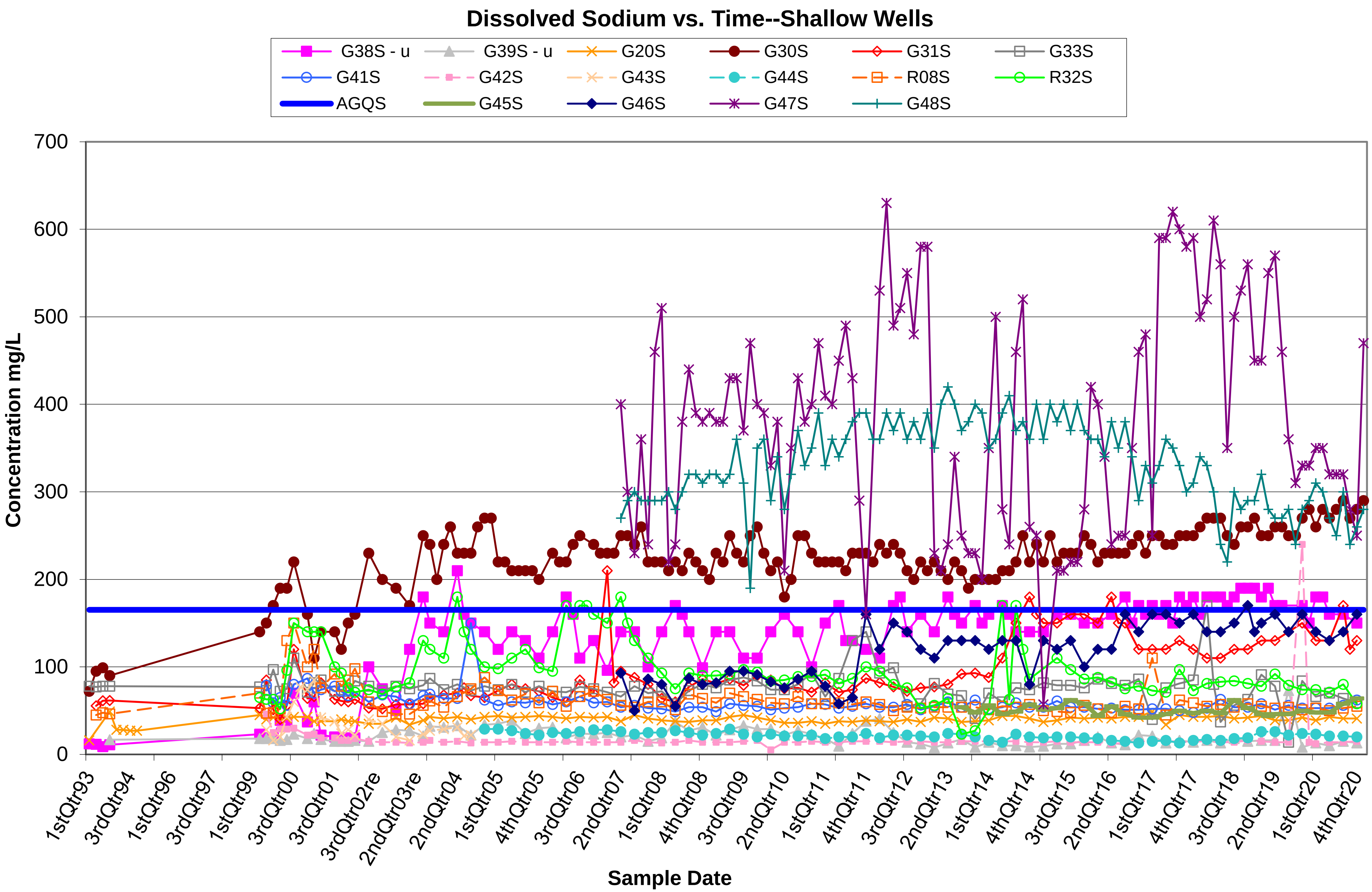
Dissolved Sodium vs. Time--Shallow Wells
G38S - u
G39S - u
G20S
G30S
G31S
G33S
G41S
G42S
G43S
G44S
R08S
R32S
AGQS
G45S
G46S
G47S
G48S
Concentration mg/L
0
100
200
300
400
500
600
700
1stQtr93
3rdQtr94
1stQtr96
3rdQtr97
1stQtr99
3rdQtr00
3rdQtr01
3rdQtr02re
2ndQtr03re
2ndQtr04
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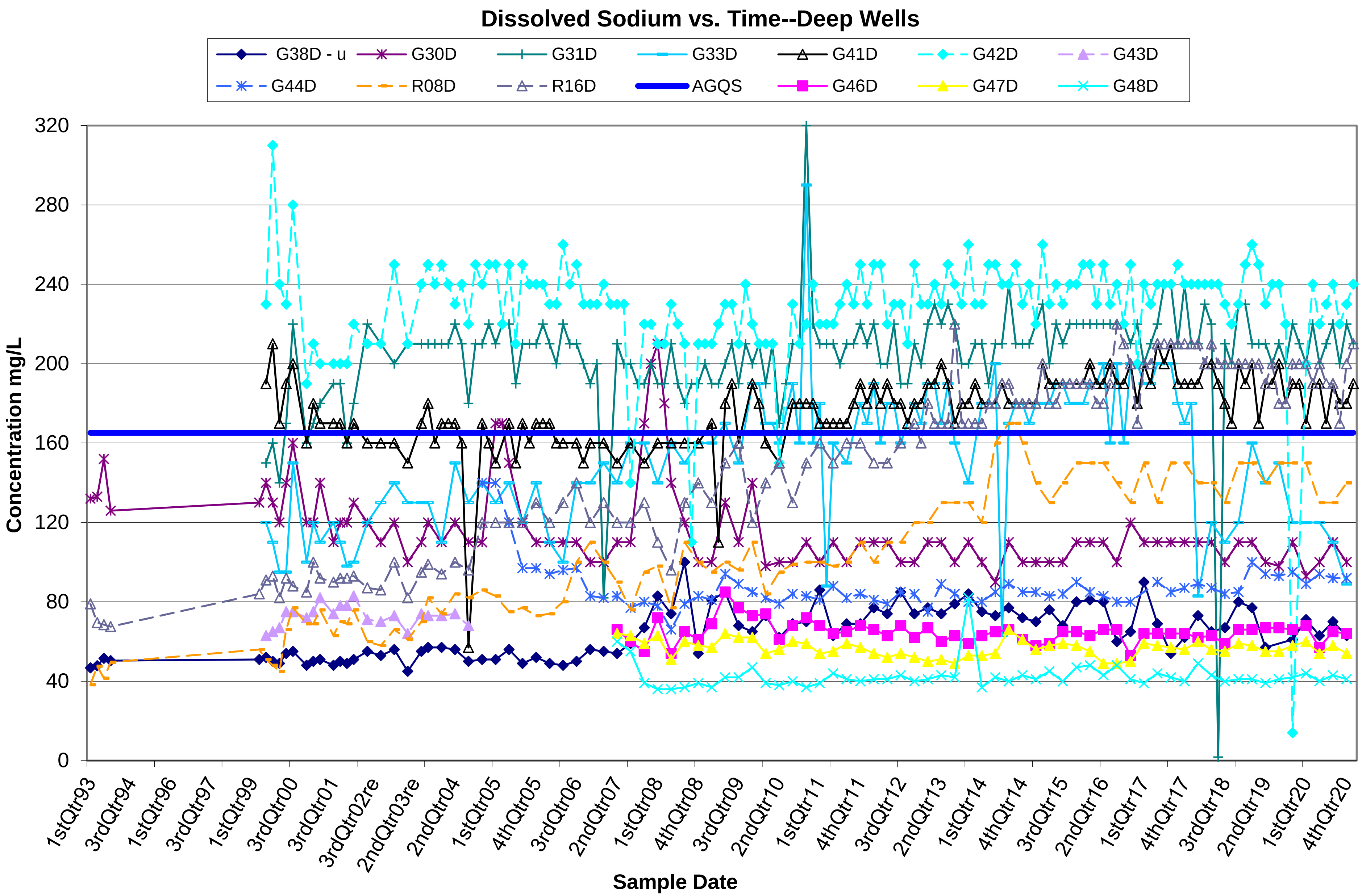
4thQtr20
Sample Date


Dissolved Sodium vs. Time--Deep Wells
G38D - u
G30D
G31D
G33D
G41D
G42D
G43D
G44D
R08D
R16D
AGQS
G46D
G47D
G48D
Concentration mg/L
0
40
80
120
160
200
240
280
320
1stQtr93
3rdQtr94
1stQtr96
3rdQtr97
1stQtr99
3rdQtr00
3rdQtr01
3rdQtr02re
2ndQtr03re
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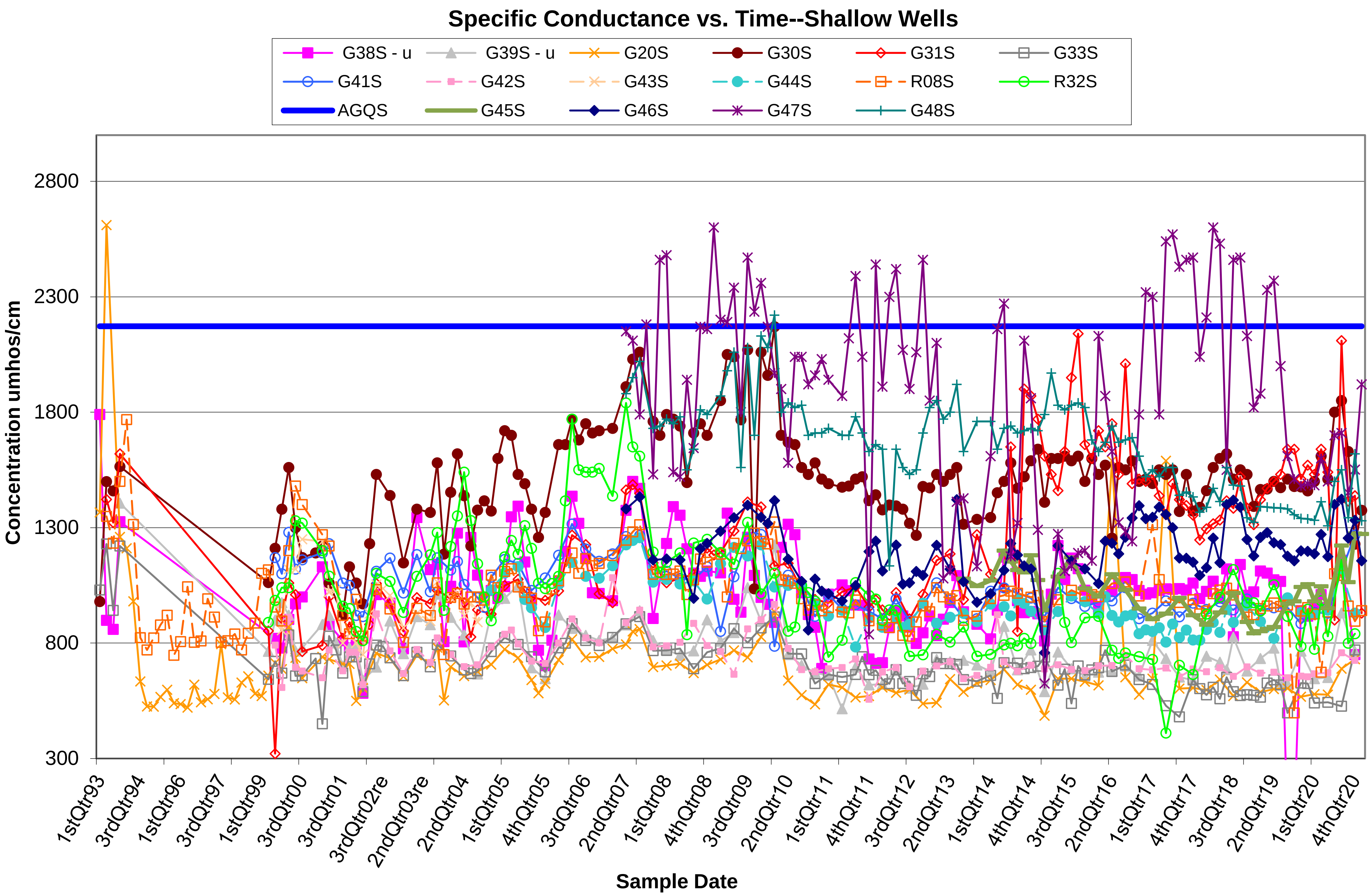
Sample Date

Joliet/Lincoln Stone Quarry



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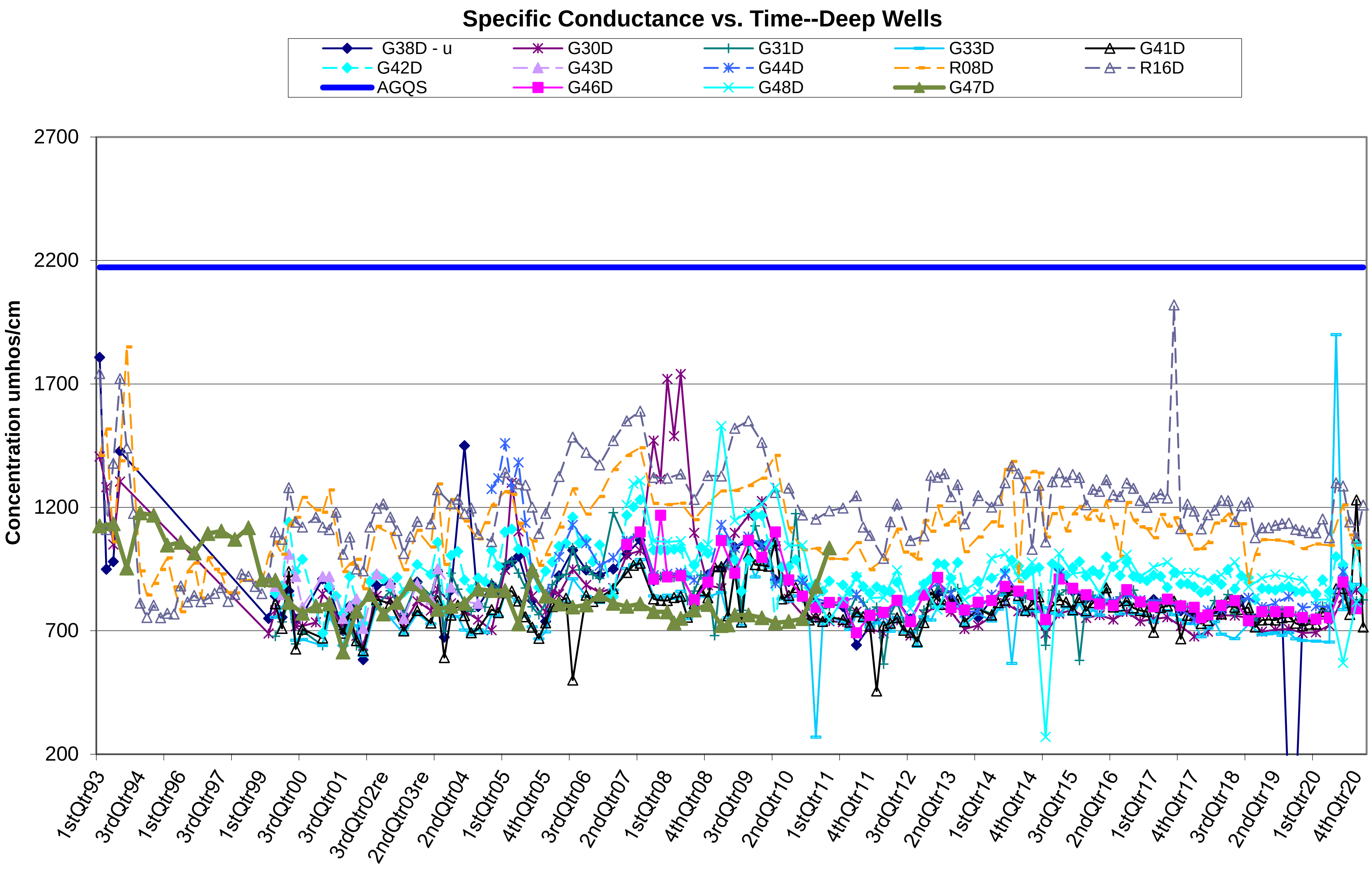

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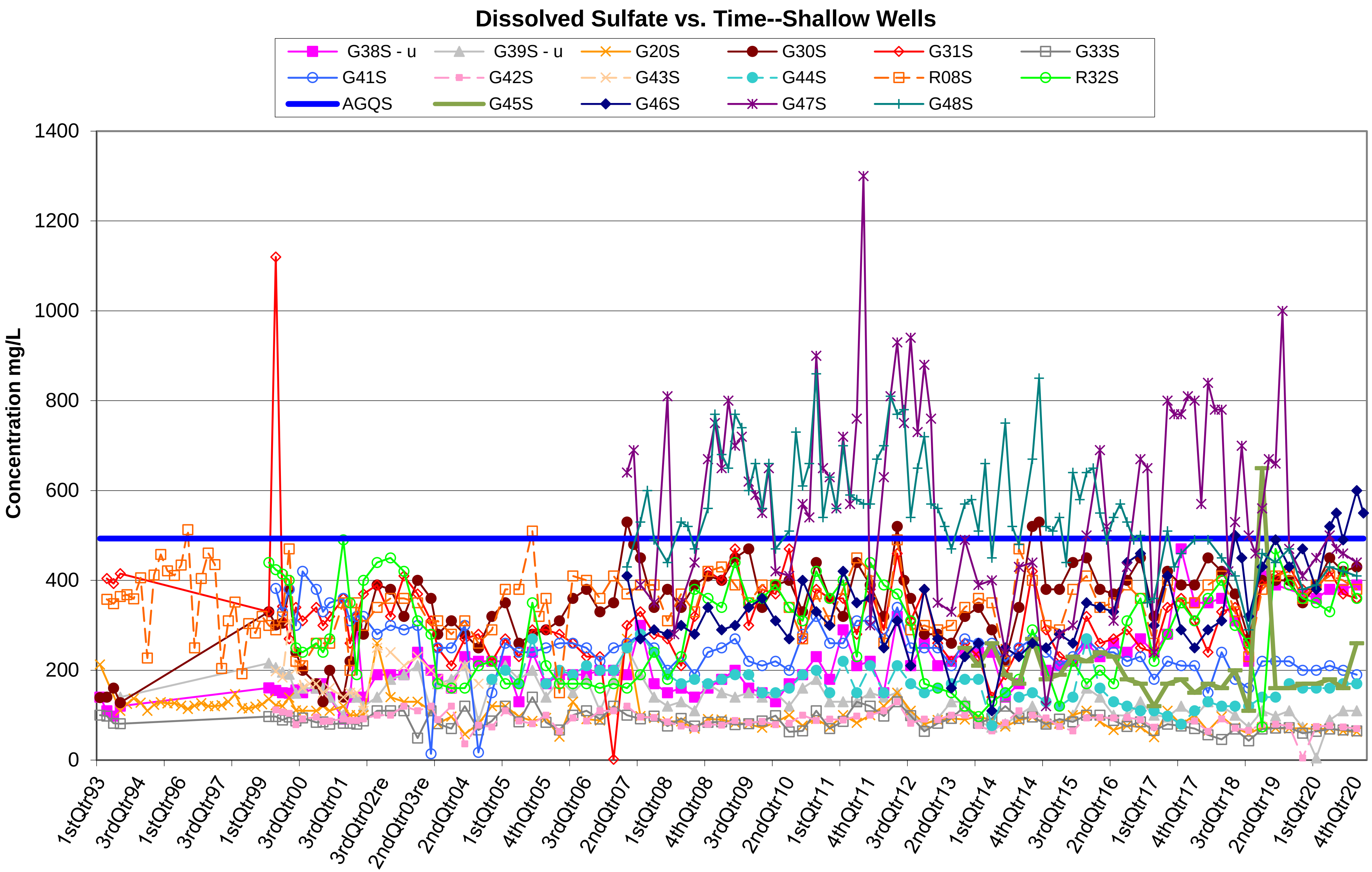

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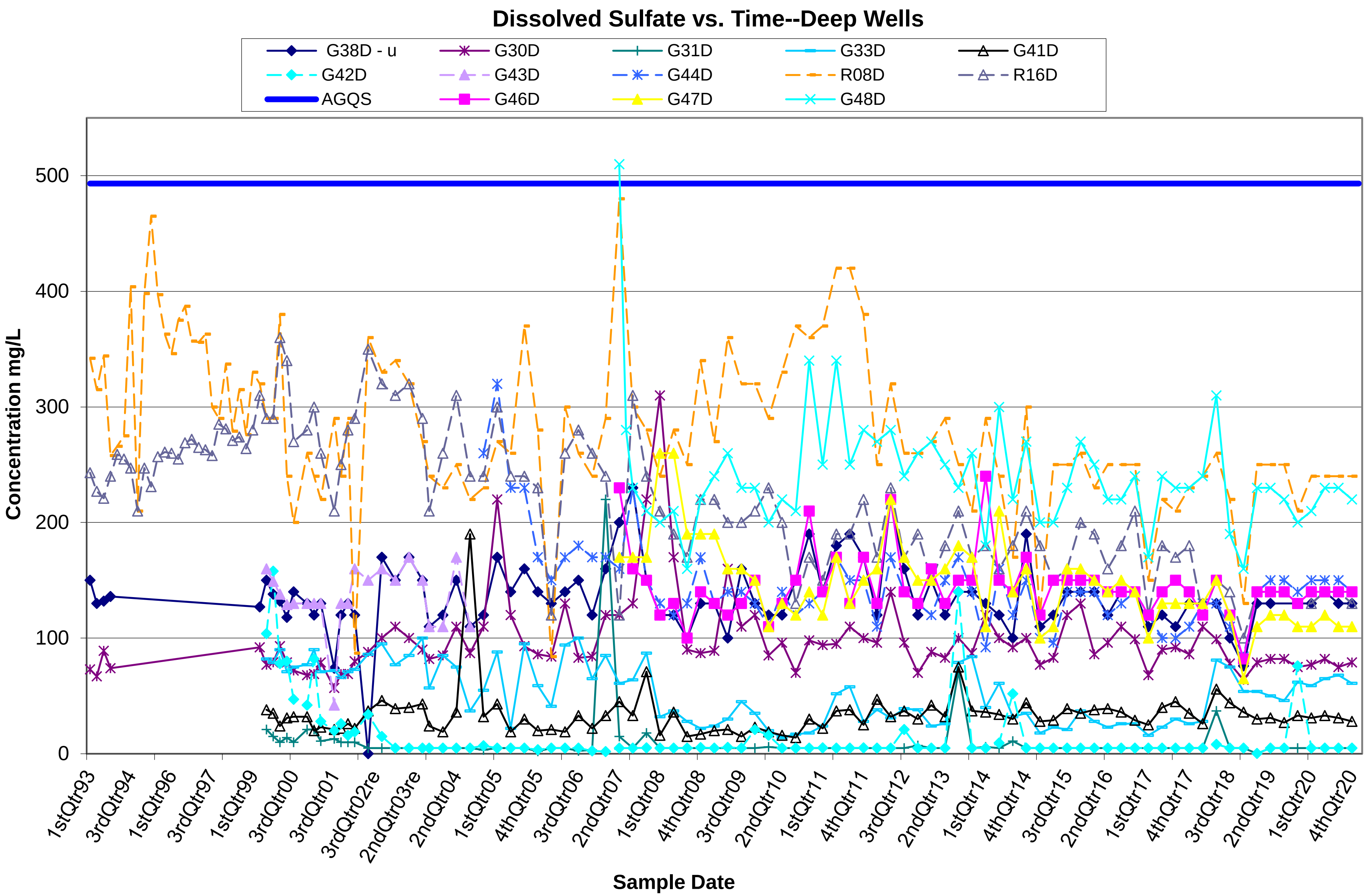

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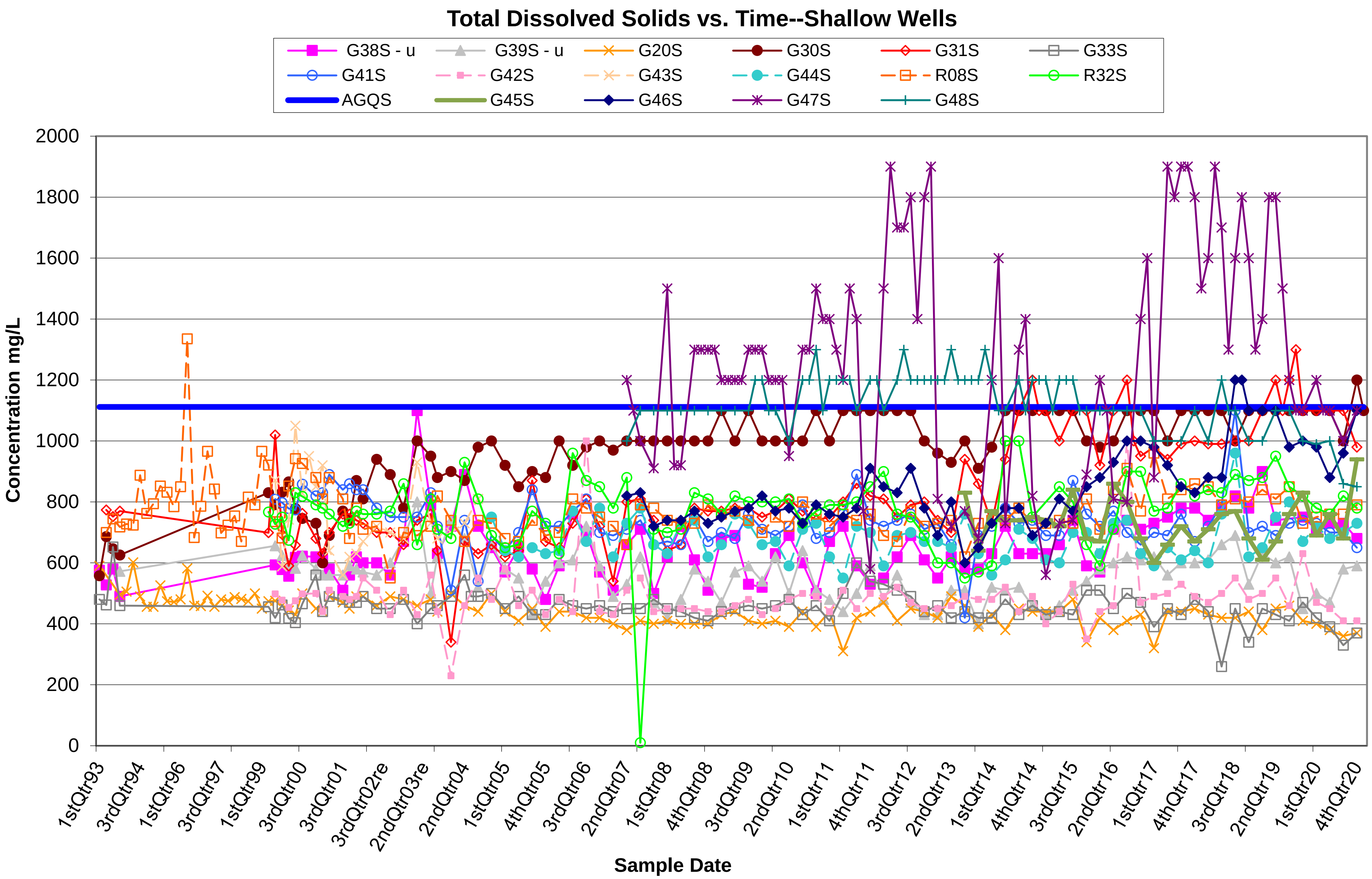

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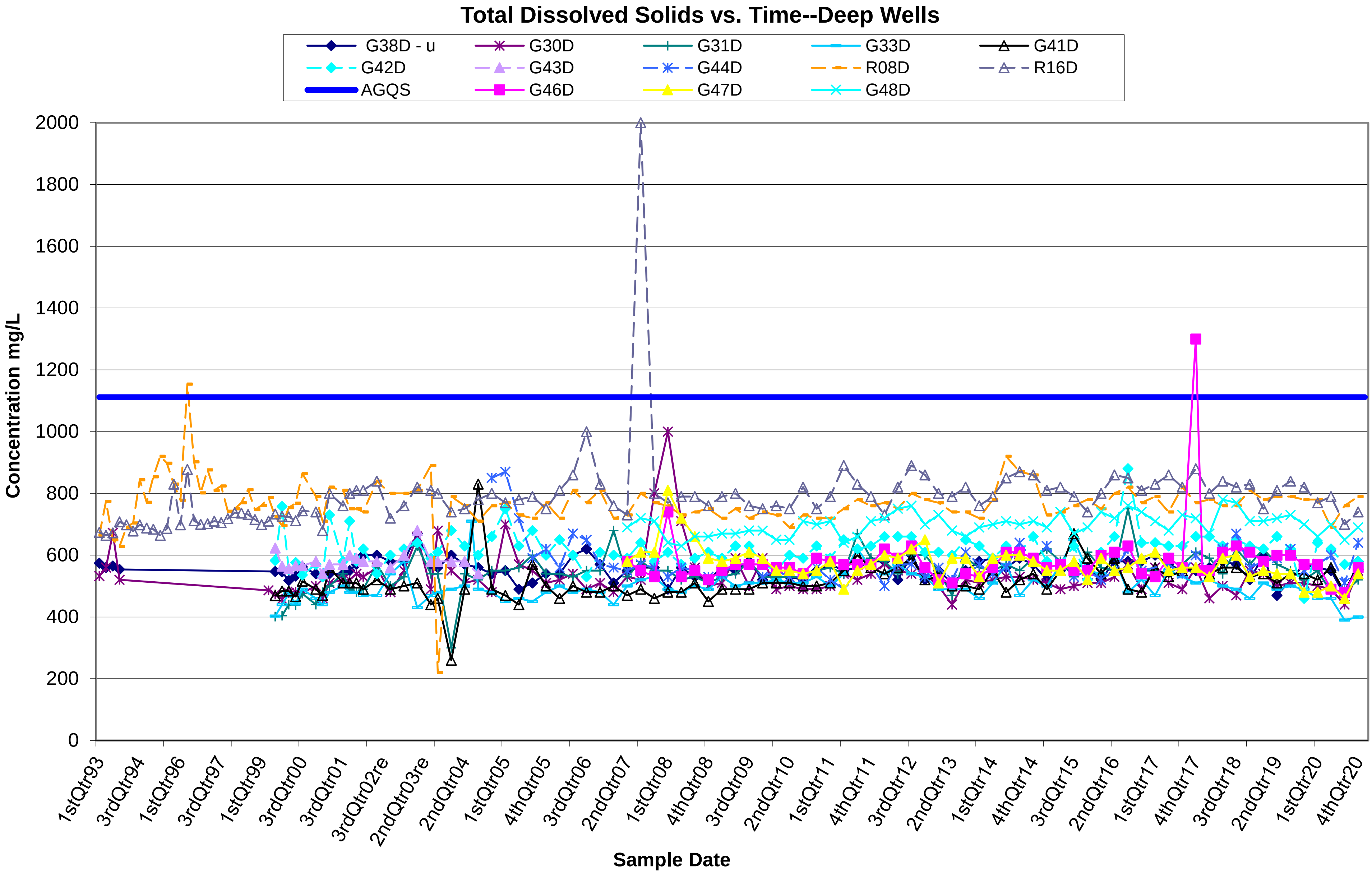

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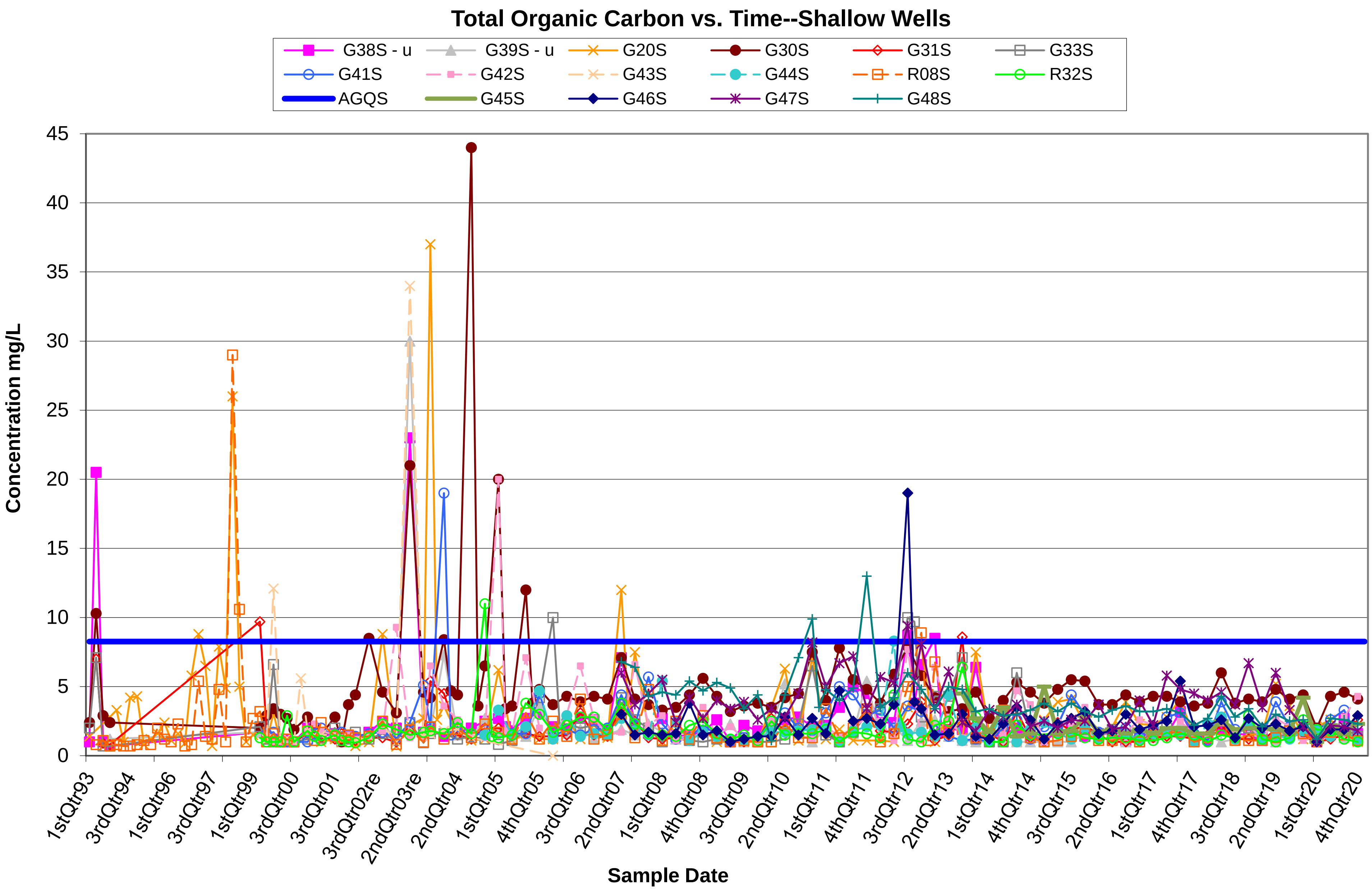

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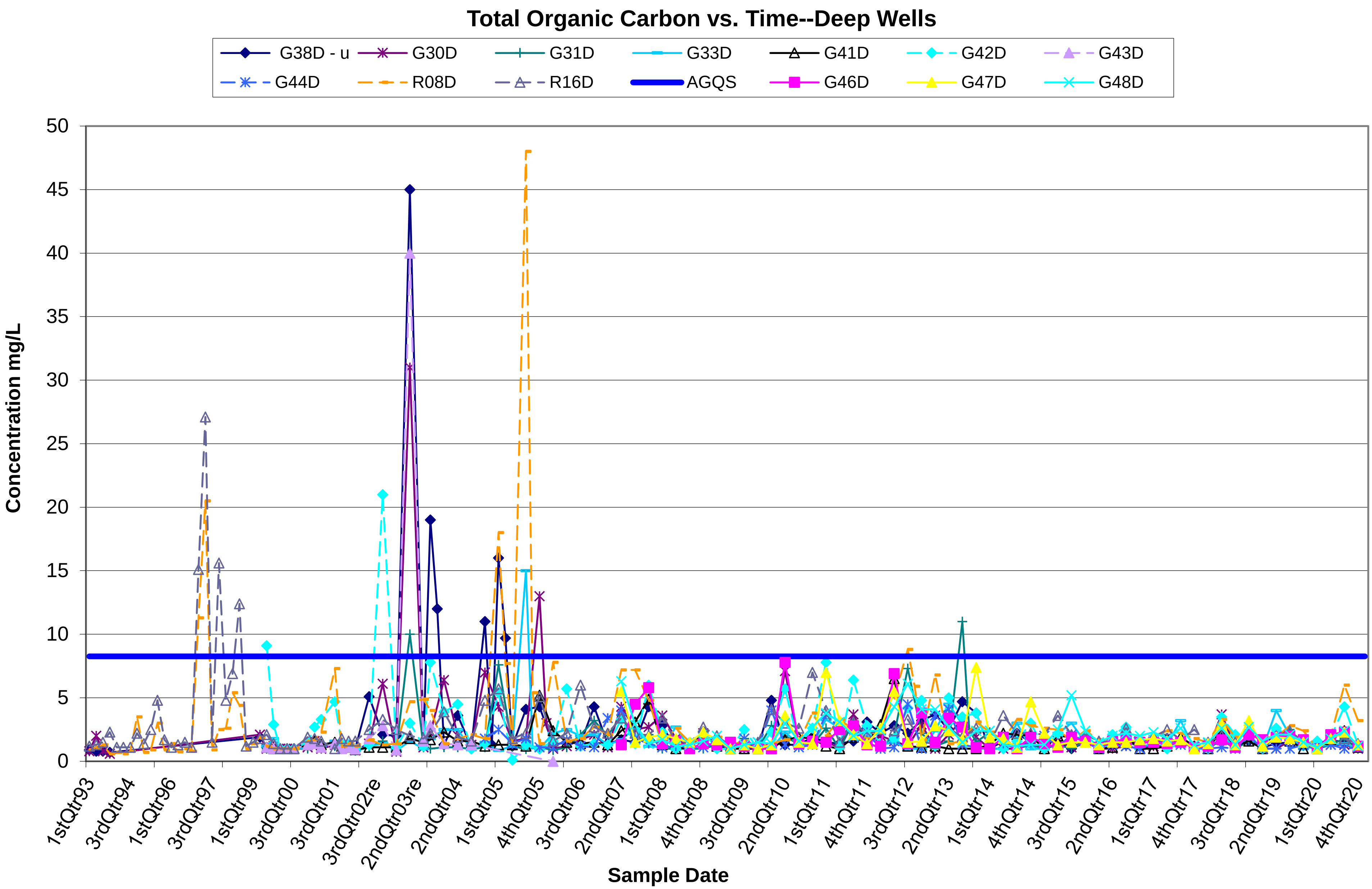

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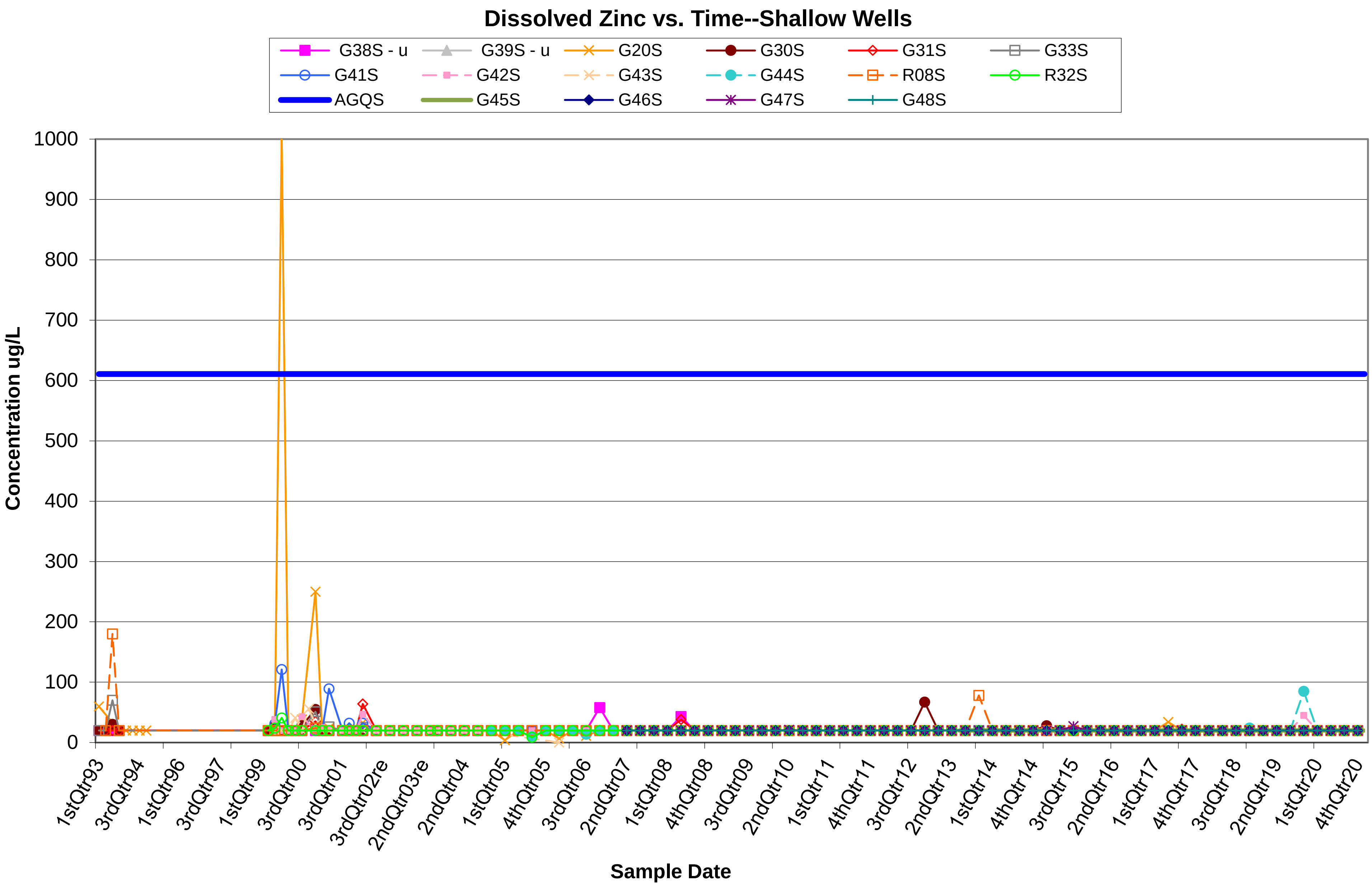

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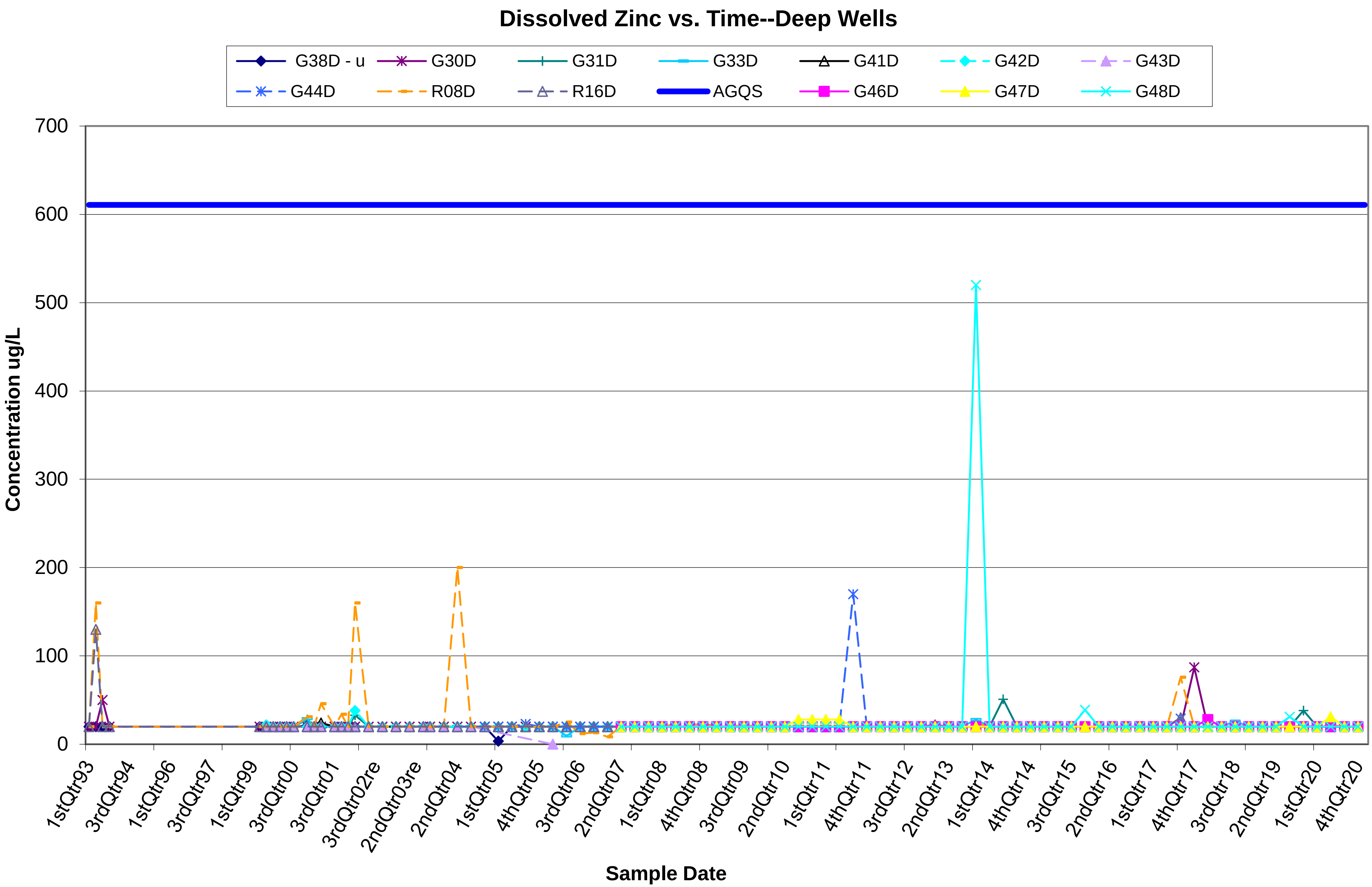


KPRG and Associates, Inc.

Attachment 9-3 – 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 #9 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
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS

Attachment 9-4 – 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 #9 Generating Station
Lincoln Stone Quarry
Patterson Rd.
Joliet, Illinois 60436

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

August 2, 2021

TABLE OF CONTENTS

SECTION/DESCRIPTION **PAGE**

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 #9 generating station, the Lincoln Stone Quarry (LSQ) requires monitoring under the State CCR Rule. The monitoring well network around the LSQ consists of ten monitoring wells. These wells are R08S, G20S, G30S, R32S, G44S, G45S, G46S, G47S, G48S and T03S). Wells T03S (side-gradient) and G45S are considered background monitoring wells and the remaining wells are considered downgradient wells. The locations of these wells are shown on Figure 1.

Section 845.640(f) of the State CCR Rule requires the development of the statistical approach that will be used for assessing the data and determining whether a statistically significant increase over background concentrations in groundwater has occurred at identified downgradient monitoring points. Potential statistical methods that can be applied to the data are listed in Section 845.640(f) and performance standards are provided in 845.640(g).

This narrative of the statistical approach that will be used for the LSQ 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 locations will be used to develop prediction limits for the regulated unit for each constituent listed in Section 845.600(a) and (b) as provided in Table 1.

Statistical evaluations will be performed with the assistance of the Sanitas™ software package.

2.1 Outlier Testing

The background dataset will be first checked for potential outliers for each constituent. Potential causes of outliers can be, but are not limited to:

- Changes in sampling technique;
- Changes in analytical methods;
- Data transcription errors;
- Unnatural localized event such as a spill; or
- Natural but extreme variations in constituent concentration.

The Unified Guidance does not recommend removing an outlier from the data set unless it can be shown that the outlier is not caused by extreme natural variation. If the outlier can be traced to other than natural causes, the data set will be adjusted appropriately.

2.2 Spatial Variability

If more than one background well is being used for the monitored unit, an evaluation of spatial variability will be performed to determine whether the mean concentration of a constituent varies statistically between the background points. This is generally accomplished by performing an Analysis of Variance (ANOVA). If statistically significant spatial variation is determined to be present, the background points will not be combined between the wells. If the spatial variability is determined to be natural, an intrawell data evaluation approach may be considered for both upgradient and downgradient wells.

2.3 Temporal Variability

Temporal variability in groundwater data from a specific monitoring point occurs when a consistent fluctuation of constituent concentrations occurs over time. The most common example is seasonal variation. If such a variation is noted in the data, the dataset should be corrected to account for the trend; however, any such corrections must be applied judiciously and would be completed in accordance with the Unified Guidance recommended procedures.

2.4 Trend Testing

As discussed above, it is intended to expand the initial background dataset collected under the Federal CCR Rule which consisted of eight rounds of quarterly sampling, with any additional data collected for a specific well since that time to facilitate a larger background data set upon which to develop subsequent interwell, and if necessary intrawell, prediction limits. The expanded background dataset for each upgradient well, for each constituent listed in Table 1, will undergo trend analysis to determine if there may be a potential statistically significant trend in the data. Linear regression will be the primary trend analysis tool, however, other methods such Sen's Slope Estimator may also be used. If a statistically significant trend is identified in the larger combined background dataset, the new data cannot be added to the initial background dataset, and only the original eight rounds of data can be used for that well in background development and associated subsequent calculations.

2.5 Test of Normality

The main underlying assumption in parametric data evaluations, such as establishing prediction limits, is that the underlying data distribution is normal. A quick approximation can be made by calculating the Coefficient of Variance (CV) which is the quotient of the standard deviation divided by the sample mean. In general, if this quotient is greater than 1, the underlying data distribution is probably not normal. The new Unified Guidance is more conservative and suggests that if this quotient is greater than 0.5, the dataset may not be normal and a more robust distribution evaluation should be performed. Therefore, for any CV value greater than 0.5 for a specific dataset, normality will be evaluated using the Shapiro-Wilk Test with an alpha (α) value of 0.05 (or 95%).

If the dataset does not pass this initial test, the data will undergo a log transformation and the test will be repeated for the natural log values of the dataset. If it is determined that this dataset is log-normal, statistical evaluations will be completed on those values and the result converted back to the standard value. If the underlying distribution is also determined not to be log-normal, the Unified Guidance provides for a number of other data transformations that can be performed to evaluate whether those underlying distributions may be normal at which point the entire dataset would be transformed for subsequent calculations.

If a normal underlying distribution can not be determined, non-parametric statistical evaluations will need to be considered which do not rely on a specific underlying distribution.

2.6 Non-Detects

It is not uncommon in environmental datasets to have parameters being detected at low concentrations during one sampling event and being not detected in other sampling events. Having a consistent approach to the handling of non-detect values is an important part of the statistical evaluation process. The handling of non-detect values will be accomplished as follows:

- 100 Percent Non-Detects – Assumed that the constituent is not present and no statistical evaluations will be performed. The upper prediction limit will be set at the Reporting Limit (RL) established by the analytical laboratory.

- 50 Percent or Greater Non-Detects – A non-parametric evaluation will be performed where the confidence interval will be constructed using the highest detected concentration as the upper prediction limit.

- 15 to 50 Percent Non-Detects – Aitchison's Adjustment will be used with subsequent parametric or non-parametric evaluations, as appropriate, based on underlying distributions.

- 0 to 15 Percent Non-Detects - The non-detect values will be replaced with RL/2 and the dataset will be evaluated for distribution normality with subsequent parametric or non-parametric evaluations, as appropriate, based on underlying distributions.

2.7 Prediction Limit Calculation for Normally Distributed Data

For datasets where the distribution or underlying transformed distribution is normal, a parametric statistical approach will be used for establishing the prediction limit at the required 95% statistical confidence. In accordance with Unified Guidance, the following equation will be used:

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

Where:

$\bar{x}$ = the sample mean of the detected or adjusted results
S = sample standard deviation of the detected or adjusted results
$t_{1-0.05\ /m,n-1}$ = the students t-coefficient for degrees of freedom (n-1) and confidence level (1-0.05/m)
n = the number of samples
m = the number of future samples

The number of future sampling events (*m*) will be set at 2 which will account for one sampling event and a confirmation resampling. This will assist in limiting the potential number of false positives. An acceptable site-wide false positive (SWFP) rate of 10% or less is acceptable under the Unified Guidance.

2.8 Prediction Limit Calculation for Non-Normally Distributed Data

If the dataset distribution or underlying distribution is determined not to be normal, a non-parametric approach will need to be used for the establishment of the prediction limit. The non-parametric evaluation will use the highest detected concentration as the upper prediction limit for the specific constituent.

3.0 GROUNDWATER MONITORING

The State CCR Rule does not distinguish between detection monitoring or assessment monitoring as was defined under the Federal CCR Rule. To meet the requirements set forth in Section 845.650(b), a minimum of eight rounds of groundwater data need to be collected for establishing background. As noted above, if more than eight rounds of data are available, then the larger dataset will be evaluated to determine whether the background dataset can be expanded to provide a more robust statistical assessment. At that point, statistical evaluation of the background dataset will be performed to establish the upper prediction limits for each Section 845.600(a) and (b) constituent. It is noted that in the case of pH, a lower prediction limit will also be established since this parameter has an established upper and lower value range for compliance.

Site specific Groundwater Protection Standards (GWPSs) will be developed in accordance with Section 845.600(a)(2) as follows:

- If the constituent has an established State standard listed in Section 845.600(a)(1) and the standard is greater than the calculated background upper prediction limit, then the standard will serve as the GWPS. If the background upper prediction limit is greater than the standard, the upper prediction limit will serve as the GWPS.

- If the constituent does not have an established standard (i.e., calcium and turbidity) then the calculated upper prediction limit will serve as the GWPS.

Once the proposed GWPSs are determined and approved by Illinois EPA, subsequent downgradient well concentrations will be compared against the upper prediction limit (and lower prediction limit in the case of pH), and the GWPSs. If an exceedance of the GWPS is identified during a quarterly sampling event, an immediate resampling of the specific well(s) will be completed for those specific parameters. If the exceedance is confirmed by the resampling, the Illinois EPA will be notified of the exceedance(s) and the notification will be placed in the facilities operating record in accordance with 845.800(d)(16). It is noted that there are some constituents that historically may have had no detections (i.e., 100% non-detects). In this case, in accordance with the Unified Guidance, if there is a detection of such a constituent, then the Double Quantification Rule will be applied. Under this rule, a confirmed exceedance is registered if any well-constituent pair in the 100% non-detect group exhibits quantified measurements (i.e., at or above the Reporting Limit in two consecutive sample and resample events.

If an exceedance of the GWPS is recorded and reported to Illinois EPA, an Alternate Source Demonstration (ASD) may be completed within 60-days of the confirmed exceedance in accordance with Section 845.650(e) and submitted to the Illinois EPA as well as placing the ASD on the facility's publically accessible CCR website. Illinois EPA will review and approve or disapprove the ASD.

If it is decided not to complete an ASD or if Illinois EPA does not concur with and approve the ASD, a characterization of the nature and extent of the potential release must be completed in accordance with Section 845.650(d)(1) as well as meeting the requirements of Sections 845.660, 845.670 and 845.680.

4.0 CERTIFICATION

In accordance with Section 845.640(f)(2) of the State CCR Rule, I hereby certify based on a review of the information contained within this Illinois State CCR Rule Compliance Statistical Approach for Groundwater Data Evaluation dated August 2, 2021, the statistical procedures developed and selected for evaluation of groundwater data associated with the Midwest Generation Waukegan Station CCR Units are adequate and appropriate for evaluating the groundwater data.

Certified by: ____________________________

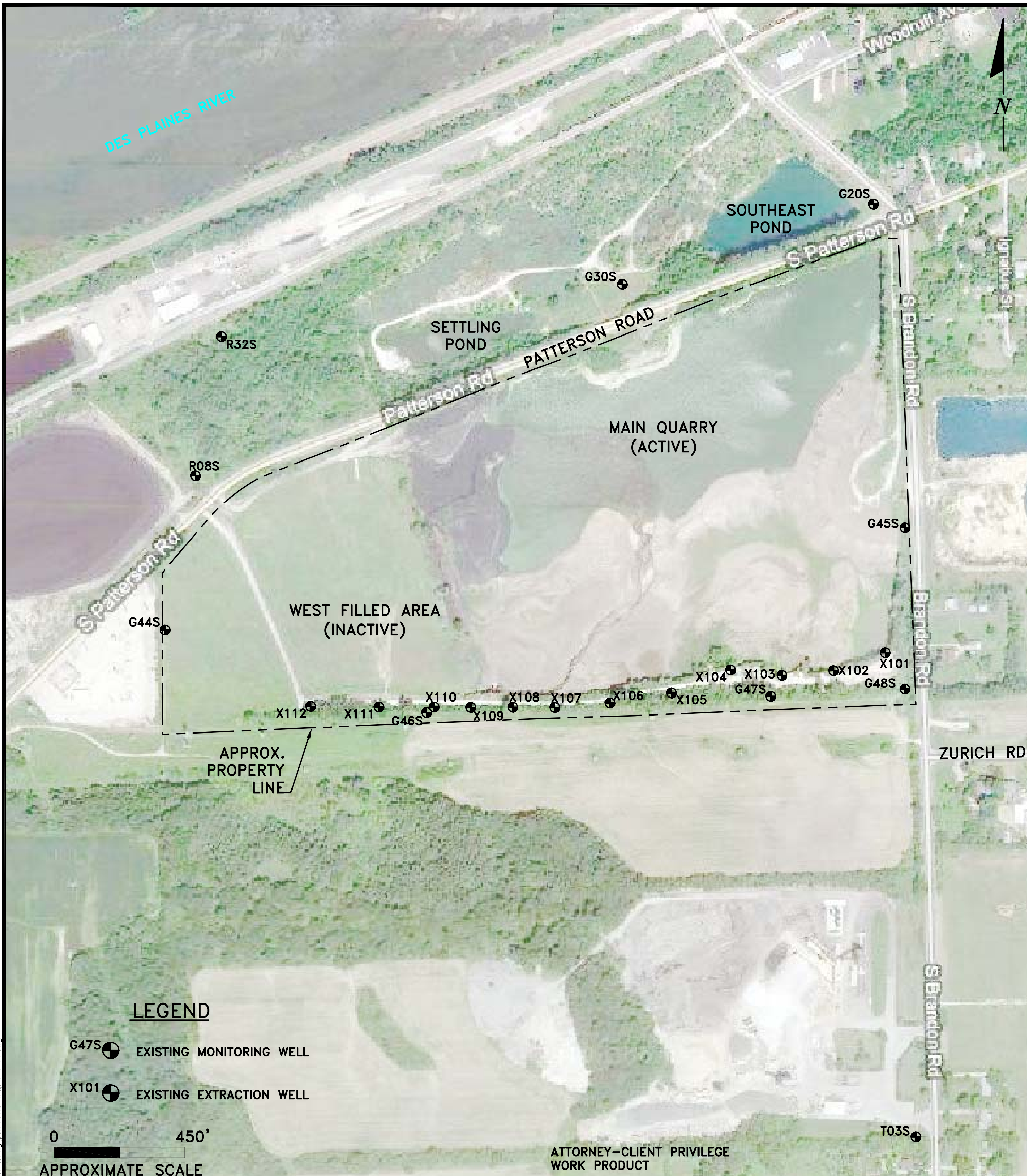
Date: 8/2/21

Joshua Davenport, P.E.

Professional Engineer Registration No. 062-061945

KPRG and Associates, Inc.

FIGURE



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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

K P R G

KPRG and Associates, inc.

14665 West Lisbon Road, Suite 2B 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

CCR MONITORING WELL SITE MAP

LINCOLN STONE QUARRY
JOLIET, ILLINOIS

Scale: 1" = 450'	Date: February 11, 2016
KPRG Project No. 12313	FIGURE 1

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 9-5 – Statistical Evaluation Summary

ATTACHMENT 9-5

BACKGROUND STATISTICAL EVALUATION SUMMARY
STATE RULE CCR GROUNDWATER MONITORING
JOLIET #9 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 9-4 of this Operating Permit.

The proposed site-specific GWPSs for the Joliet #9 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 from the two background monitoring wells. 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 a specific upgradient monitoring well location, and whether datasets from individual upgradient monitoring points can also be combined or “pooled”. The turbidity data was collected this calendar year (2021) since this was a new state requirement that was not part of the Federal CCR Rule. The following general decision process was followed to determine whether background data from within a well and/or between upgradient wells can be pooled for background calculations:

- If the combined dataset (original eight rounds of data plus any subsequent data generated since the initial background sampling) at a specific well location (intrawell evaluation) for a specific parameter does not show a statistically 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. If there is more than one background monitoring well, and one of the combined datasets for a specific parameter shows a statistically significant trend but the other does not, then the specific parameter data for the well that did not indicate a trend can potentially be used for subsequent evaluations.

- If there is more than one background monitoring well, then datasets for individual parameters between the wells (interwell evaluation) must pass an analysis of variance to determine whether there may be a statistically significant variation between the two datasets. If no statistically significant variance is noted between the two background monitoring points, and the individual parameter data passes the intrawell trend evaluation noted above, then the datasets for that parameter can be pooled between the wells to establish a larger background dataset. If there is a statistically significant variation noted between the two background monitoring points, then the specific parameter datasets from those wells cannot be combined.

- If it is determined that datasets from background monitoring points cannot be combined, then a decision needs to be made as to which monitoring point will be used for a specific parameter for background calculations. At this point some professional judgement needs to be used by considering the number of data points within each dataset, any potential statistical outliers, any statistical seasonality/temporal variance, the distribution and/or underlying distribution of that data, number of detects versus non-detects, etc.

With the above decision process in mind, the various statistical evaluations performed are summarized below. The evaluations were performed with the assistance of the Sanitas® statistical software package.

Outlier Testing

Outlier tests were performed for all monitoring wells in the proposed State CCR monitoring well network for all data available since the start of Federal CCR monitoring. Wells G45S and T03S are the designated background wells. The following statistically significant outliers (dates in parentheses) were noted in these background wells:

- Barium – T03S (11/19/15 and 7/7/17)
- Combined Radium – G45S (11/21/17)
- Fluoride – G45S (7/7/17)
- Turbidity – T03S (3/15/21 and 4/22/21)

Since the outliers cannot be attributed to either lab error, transcription error or field sampling error, the outlier values were not removed from the datasets at this time but may be considered during subsequent data evaluations. A statistical run summary which includes the specific statistical method used for each parameter for each well is provided at the end of this discussion.

Seasonality/Temporal Variability Testing

Seasonality/temporal variability tests were performed for all monitoring wells in the proposed State CCR monitoring well network for all data available since the start of Federal CCR monitoring. Wells T03S and G45S are the designated background monitoring wells. No statistically significant seasonal/temporal variations were noted in these 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 a specific background monitoring well location (T03S and G45S), trend analysis for each constituent at each upgradient well location was performed. The results are summarized as flows:

- T03S – Statistically significant trends were noted for barium, boron, fluoride, lithium and molybdenum.
- G45S – Statistically significant trends was noted for arsenic.

A statistical run summary which includes the specific statistical method used for each parameter for each well is provided at the end of this discussion.

Spatial Variability Testing

To determine whether the background data sets from background wells can be pooled to establish a representative statistical background, spatial variability testing was performed on the datasets using a parametric analysis of variance (ANOVA). This analysis was done for each of the monitoring parameters. The following observations are made:

- Upgradient wells T03S and G45S all parameter values pooled – No statistically significant variance between the full datasets for pH, lead and turbidity.

It is noted that antimony, beryllium, cadmium, chromium, mercury, selenium and thallium had no detections at any of the two background well locations during any sampling event, therefore, although an analysis of variance cannot be formally completed, these data sets can be pooled since there is no variation in the reporting limits.

Statistical run summaries which include the specific statistical method used for each parameter for each of the dataset comparisons are provided at the end of this discussion.

Test of Normality

The Shapiro-Wilk Normality Test with an alpha (α) value of 0.05 (or 95%) was used to evaluate the distribution of the background datasets for each constituent at each background well location and the distribution of pooled datasets. A Test of Ladders was also run to evaluate other potential underlying transformational distributions in the case that the non-transformed dataset was found not to be normally distributed. The statistical runs are provided for the various combinations of upgradient wells by parameter at the end of this discussion.

Prediction Limits

Based on the various statistical evaluations discussed above, the following background data sets were used for background prediction limit calculations:

- Background wells G45S and T03S all parameter values pooled for antimony, beryllium, cadmium, chromium, pH, lead, mercury, selenium, thallium and turbidity. Relative to lead pH and turbidity, there were no statistically significant trends within the wells for the combined data observations and there was no statistically significant variance noted between the datasets. Relative to the other parameters, all values at both background well locations were non-detects with no differences in detection limits.
- Background well G45S all parameter values were pooled for barium, boron, calcium, chloride, cobalt, fluoride, lithium, molybdenum, sulfate and total dissolved solids (TDS). For each of these combine parameter datasets, there were no individual statistically significant trends within the well. Fluoride was noted to have an outlier value at well G45S (0.05 mg/l), however there was a statistically significant data trend noted in the other background well (T03S) for fluoride precluding that expanded fluoride dataset to be pooled. Since the noted fluoride outlier concentration was still substantially below the Section 845.600 standard of 4.0 mg/l, and as stated above there is no known laboratory or field sampling error basis on which to remove this data point, it was decided to include the full available fluoride dataset for G45S in the statistical background calculation.
- Background well T03S all parameter values were used for arsenic and combined radium. None of these parameters indicated statistically significant trends within this well and none of these parameters were noted as statistical outliers at this well location. Combined radium was noted as having an outlier concentration within the G45S background dataset.

The calculated prediction limits under the various 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 for each well scenario noted above are provided at the end of this discussion.

Outlier Analysis - Joliet #9 - UG Wells G45S and T03S

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29 Printed 8/12/2021, 2:29 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony (mg/L)	G45S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.003	0	unknown	ShapiroWilk
Antimony (mg/L)	T03S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.003	0	unknown	ShapiroWilk
Arsenic (mg/L)	G45S (bg)	No	n/a	n/a	EPA 1989	0.05	18	0.008961	0.001186	normal	ShapiroWilk
Arsenic (mg/L)	T03S (bg)	No	n/a	n/a	EPA 1989	0.05	18	0.00145	0.0005649	normal	ShapiroWilk
Barium (mg/L)	G45S (bg)	No	n/a	n/a	EPA 1989	0.05	18	0.0385	0.005136	normal	ShapiroWilk
Barium (mg/L)	**T03S (bg)**	**Yes**	**0.11,0.063**	**12/15/202...**	**Dixon`s**	**0.05**	**18**	**0.0875**	**0.009256**	**normal**	**ShapiroWilk**
Beryllium (mg/L)	G45S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.001	0	unknown	ShapiroWilk
Beryllium (mg/L)	T03S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.001	0	unknown	ShapiroWilk
Boron (mg/L)	G45S (bg)	No	n/a	n/a	NP (nrm)	NaN	18	0.5044	0.144	unknown	ShapiroWilk
Boron (mg/L)	T03S (bg)	No	n/a	n/a	EPA 1989	0.05	18	1.464	0.6131	normal	ShapiroWilk
Cadmium (mg/L)	G45S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0005	0	unknown	ShapiroWilk
Cadmium (mg/L)	T03S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.0005	0	unknown	ShapiroWilk
Calcium (mg/L)	G45S (bg)	No	n/a	n/a	EPA 1989	0.05	18	101.6	12.86	ln(x)	ShapiroWilk
Calcium (mg/L)	T03S (bg)	No	n/a	n/a	NP (nrm)	NaN	18	106.8	11.05	unknown	ShapiroWilk
Chloride (mg/L)	G45S (bg)	No	n/a	n/a	EPA 1989	0.05	18	133.2	34.65	ln(x)	ShapiroWilk
Chloride (mg/L)	T03S (bg)	No	n/a	n/a	EPA 1989	0.05	18	98.61	25.97	ln(x)	ShapiroWilk
Chromium (mg/L)	G45S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.005	0	unknown	ShapiroWilk
Chromium (mg/L)	T03S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.005	0	unknown	ShapiroWilk
Cobalt (mg/L)	G45S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.001	0	unknown	ShapiroWilk
Cobalt (mg/L)	T03S (bg)	No	n/a	n/a	NP (nrm)	NaN	18	0.001156	0.0001756	unknown	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	**G45S (bg)**	**Yes**	**8.45**	**11/21/2017**	**NP (nrm)**	**NaN**	**16**	**2.526**	**1.648**	**unknown**	**ShapiroWilk**
Combined Radium 226 + 228 (pCi/L)	T03S (bg)	No	n/a	n/a	EPA 1989	0.05	16	1.334	0.1996	normal	ShapiroWilk
Fluoride (mg/L)	**G45S (bg)**	**Yes**	**0.05**	**7/7/2017**	**Dixon`s**	**0.05**	**18**	**0.3217**	**0.07006**	**normal**	**ShapiroWilk**
Fluoride (mg/L)	T03S (bg)	No	n/a	n/a	NP (nrm)	NaN	18	0.225	0.05943	unknown	ShapiroWilk
Lead (mg/L)	G45S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.0005	0	unknown	ShapiroWilk
Lead (mg/L)	T03S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.0006	0.0004243	unknown	ShapiroWilk
Lithium (mg/L)	G45S (bg)	No	n/a	n/a	EPA 1989	0.05	18	0.03189	0.003628	normal	ShapiroWilk
Lithium (mg/L)	T03S (bg)	No	n/a	n/a	EPA 1989	0.05	18	0.02194	0.004304	normal	ShapiroWilk
Mercury (mg/L)	G45S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	11	0.0002	0	unknown	ShapiroWilk
Mercury (mg/L)	T03S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	11	0.0002	0	unknown	ShapiroWilk
Molybdenum (mg/L)	G45S (bg)	No	n/a	n/a	EPA 1989	0.05	18	0.009194	0.001668	ln(x)	ShapiroWilk
Molybdenum (mg/L)	T03S (bg)	No	n/a	n/a	EPA 1989	0.05	18	0.157	0.1007	normal	ShapiroWilk
Selenium (mg/L)	G45S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.0025	0	unknown	ShapiroWilk
Selenium (mg/L)	T03S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	18	0.0025	0	unknown	ShapiroWilk
Sulfate (mg/L)	G45S (bg)	No	n/a	n/a	EPA 1989	0.05	18	181.1	59.4	ln(x)	ShapiroWilk
Sulfate (mg/L)	T03S (bg)	No	n/a	n/a	EPA 1989	0.05	18	212.8	38.32	normal	ShapiroWilk
Thallium (mg/L)	G45S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.002	0	unknown	ShapiroWilk
Thallium (mg/L)	T03S (bg)	n/a	n/a	n/a	NP (nrm)	NaN	12	0.002	0	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	G45S (bg)	No	n/a	n/a	EPA 1989	0.05	18	745	107.4	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	T03S (bg)	No	n/a	n/a	EPA 1989	0.05	18	834.4	79.72	normal	ShapiroWilk

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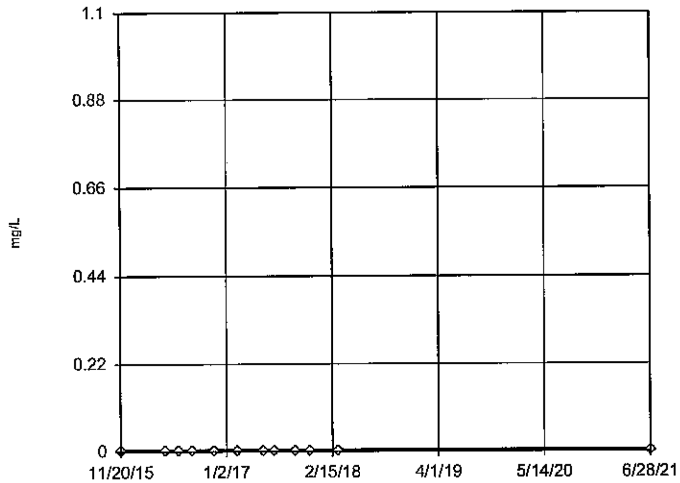
Tukey's Outlier Screening

G45S (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 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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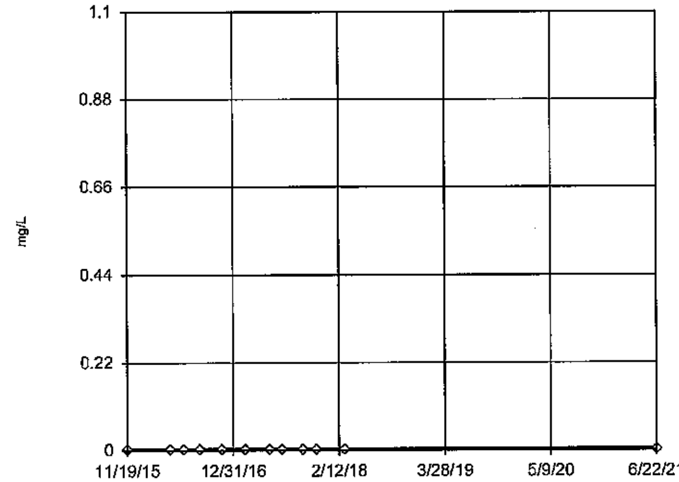
Tukey's Outlier Screening

T03S (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 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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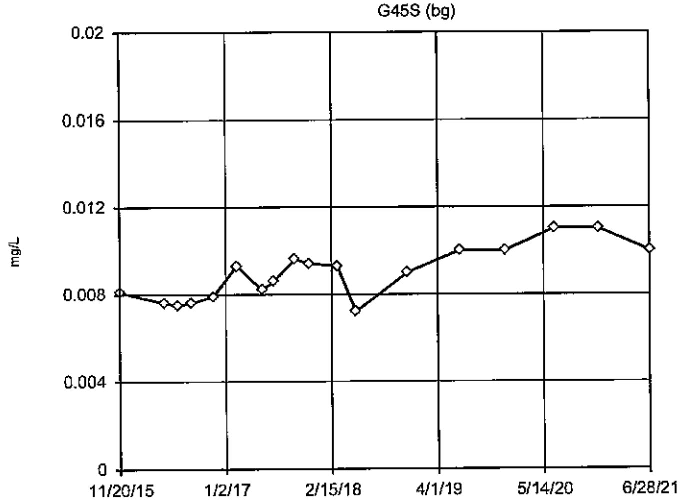
EPA Screening (suspected outliers for Dixon's Test)

G45S (bg)



n = 18

Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 0.008981, std. dev. 0.001186, critical Tn 2.504

Normality test used: Shapiro Wilk@alpha = 0.1 Calculated = 0.9429 Critical = 0.914 The distribution was found to be normally distributed.

Constituent: Arsenic Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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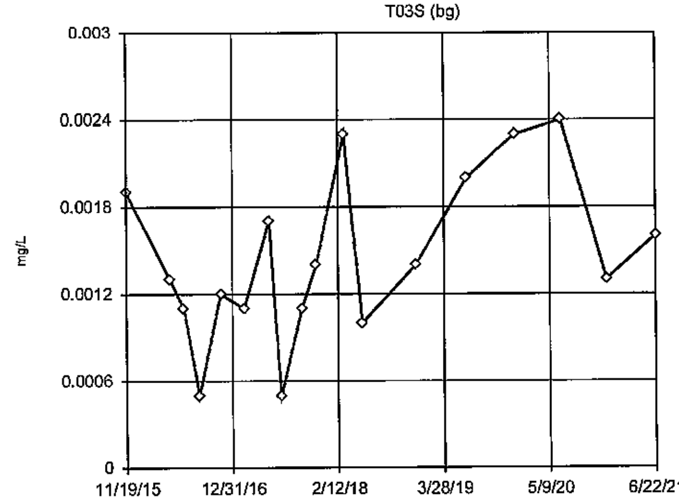
EPA Screening (suspected outliers for Dixon's Test)

T03S (bg)



n = 18

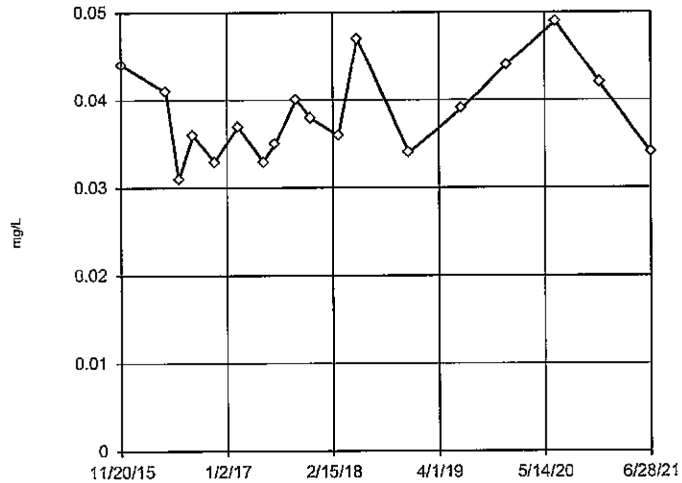
Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 0.00145, std. dev. 0.0005849, critical Tn 2.504

Normality test used: Shapiro Wilk@alpha = 0.1 Calculated = 0.9474 Critical = 0.914 The distribution was found to be normally distributed.

Constituent: Arsenic Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

G45S (bg)



n = 18

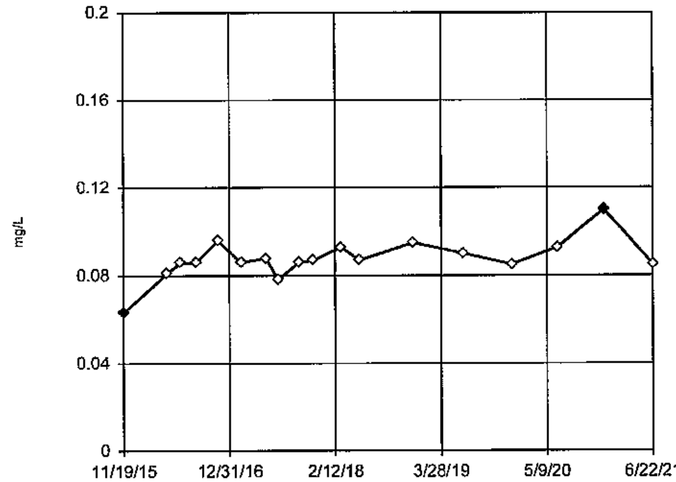
Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.0385, std. dev.
0.005136, critical Tn
2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9528
Critical = 0.914
The distribution was found
to be normally distrib-
uted.

Constituent: Barium Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Dixon's Outlier Test

T03S (bg)



n = 18

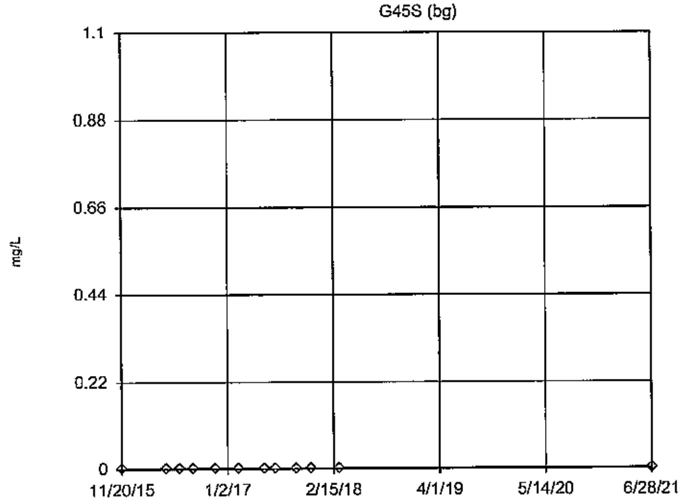
Statistical outliers are
drawn as solid.
Testing for 1 high and
1 low outliers.
Mean = 0.0875.
Std. Dev. = 0.009256.
0.11: c = 0.5172
tabl = 0.475.
0.063: c = 0.5625
tabl = 0.475.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9402
Critical = 0.906
The distribution, after
removal of suspect val-
ues, was found to be nor-
mally distributed.

Constituent: Barium Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

G45S (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.

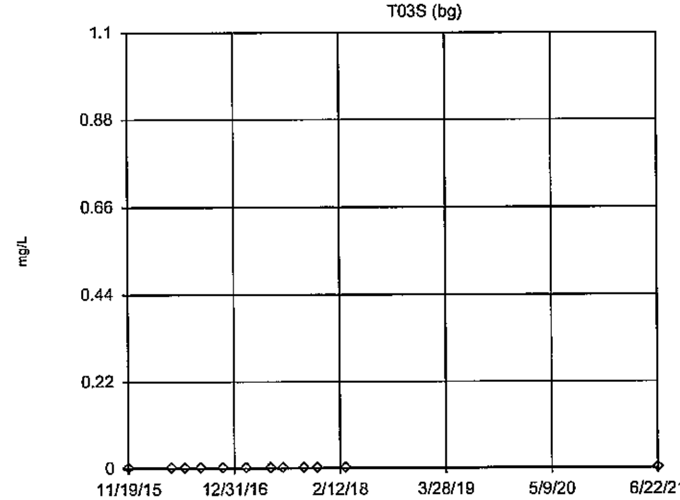
Data were cube root trans-
formed to achieve best
W statistic (graph shown
in original units).

The results were invalid-
ated, because the lower
and upper quartiles are
equal.

Constituent: Beryllium Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

T03S (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: Beryllium Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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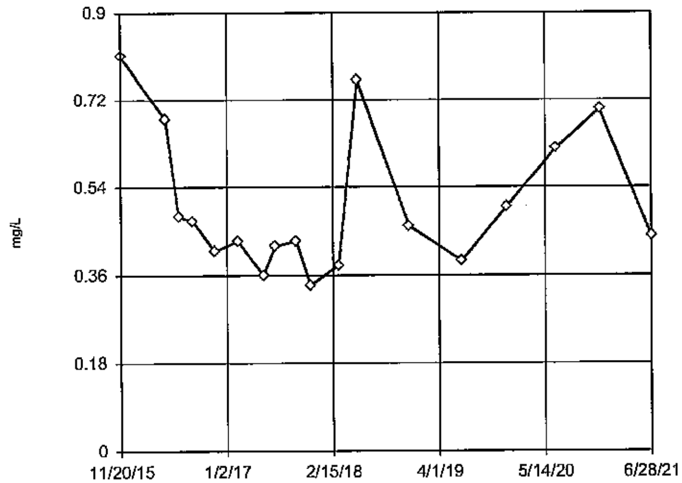
Tukey's Outlier Screening

G45S (bg)



n = 18

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 = 2.78, low cutoff = 0.0934, based on IQR multiplier of 3.

Constituent: Boron   Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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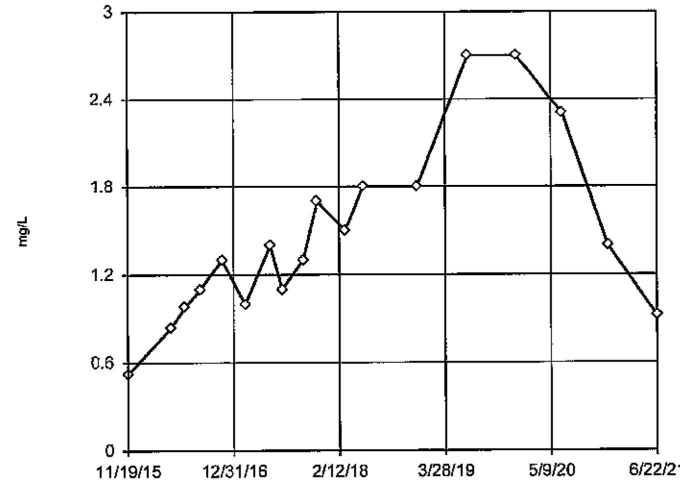
EPA Screening (suspected outliers for Dixon's Test)

T03S (bg)



n = 18

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 1.464, std. dev. 0.6131, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9222
Critical = 0.914
The distribution was found to be normally distributed.

Constituent: Boron   Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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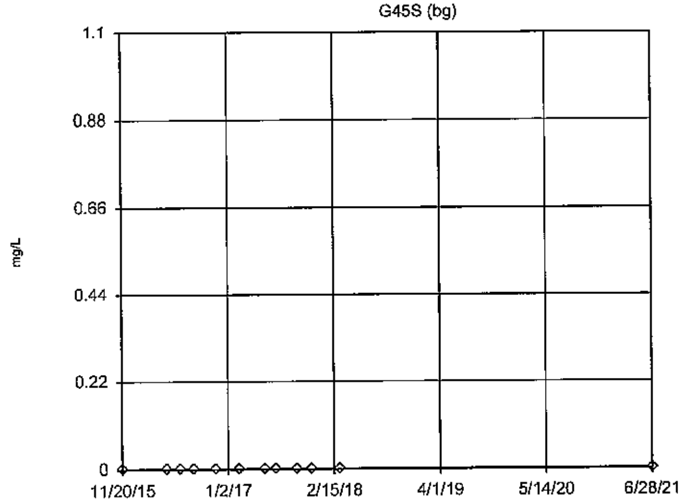
Tukey's Outlier Screening

G45S (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 8/9/2021 2:25 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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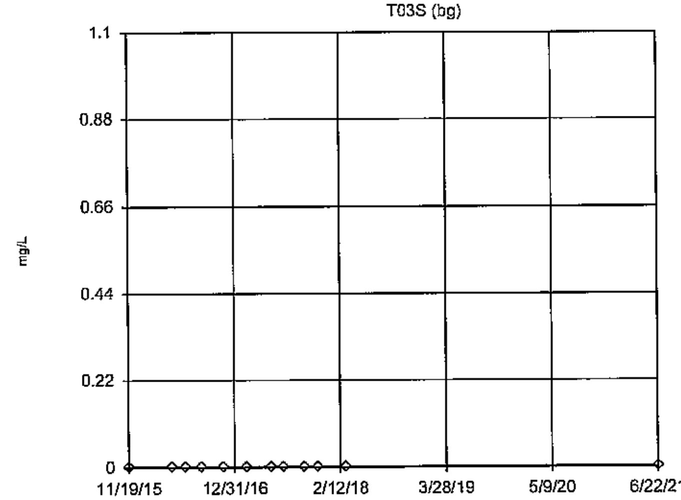
Tukey's Outlier Screening

T03S (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).

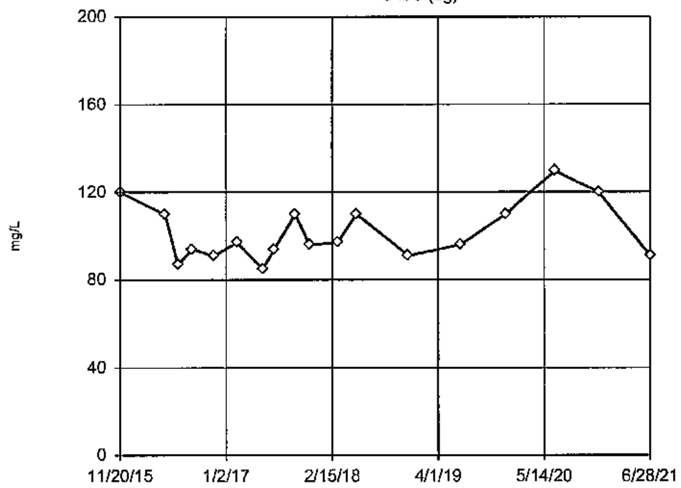
The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cadmium   Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

G45S (bg)



n = 18

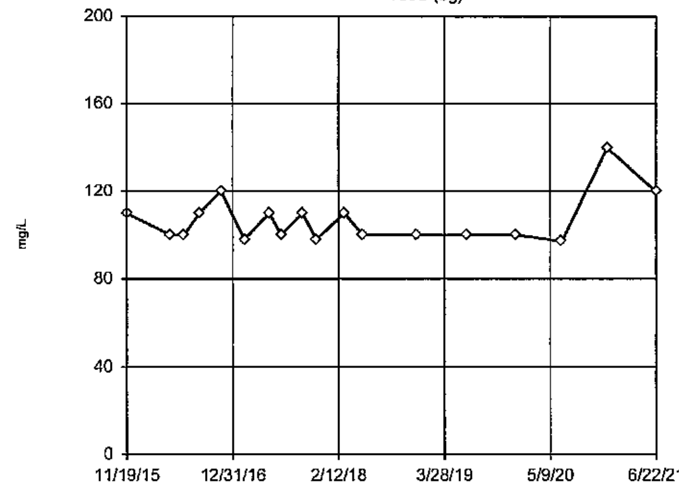
Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 101.6, std. dev. 12.86, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9165
Critical = 0.914 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Calcium Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

T03S (bg)



n = 18

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.

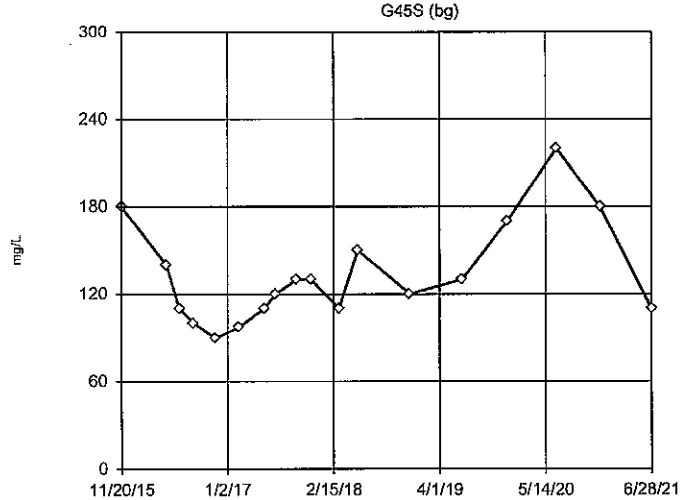
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 146.4, low cutoff = 75.13, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

G45S (bg)



n = 18

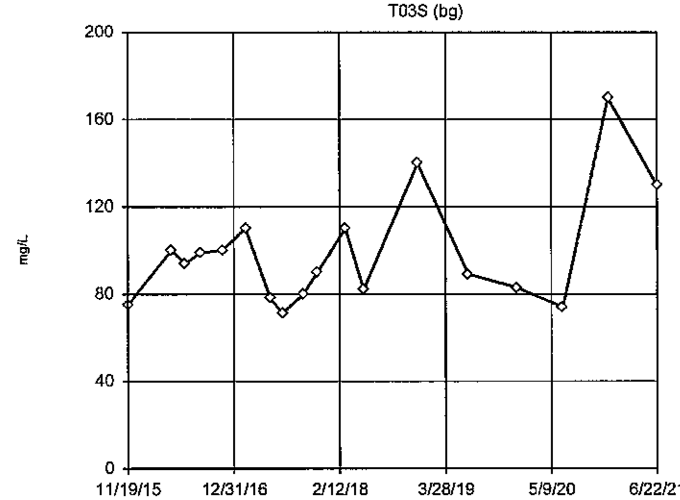
Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 133.2, std. dev. 34.65, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9474
Critical = 0.914 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Chloride Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

T03S (bg)



n = 18

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 98.61, std. dev. 25.97, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9257
Critical = 0.914 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Chloride Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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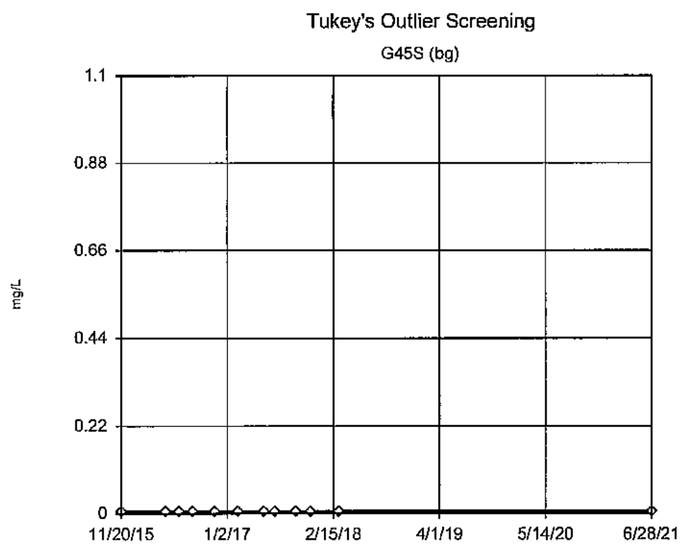

n = 12

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 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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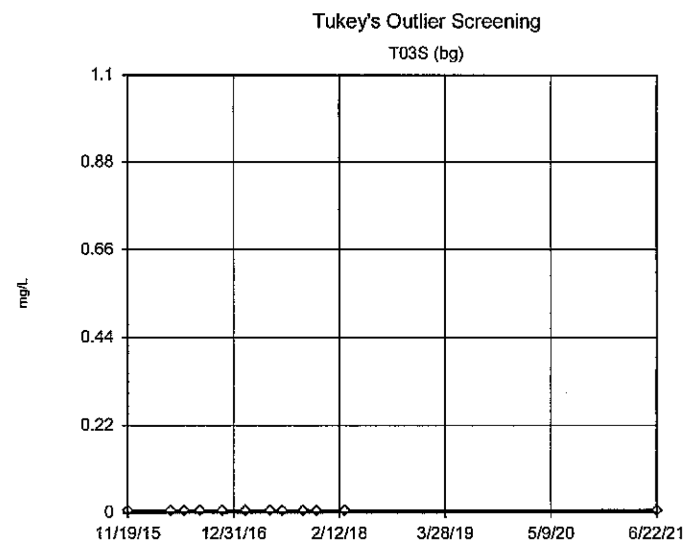

n = 12

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 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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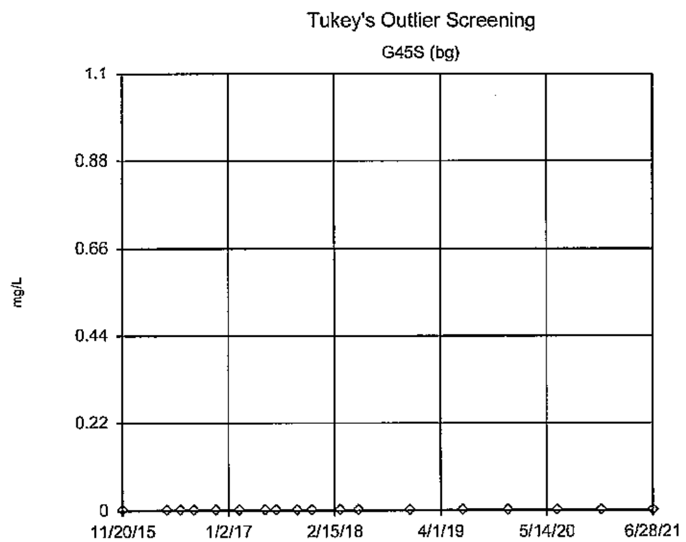

n = 18

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: Cobalt Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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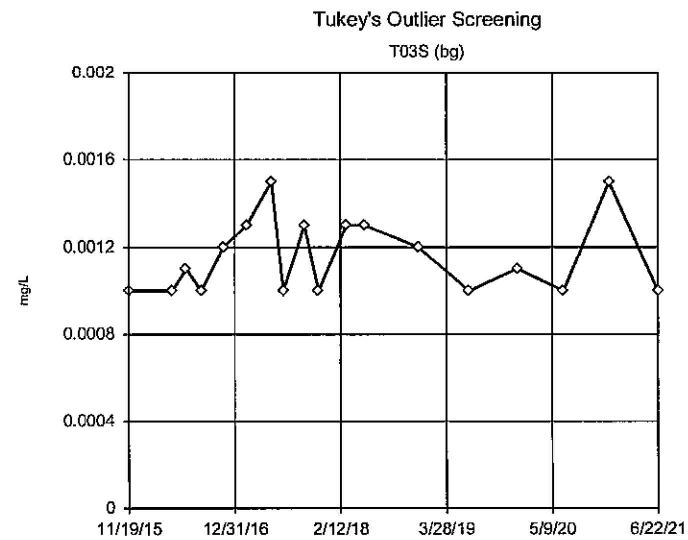

n = 18

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 = 0.002856, low cutoff = 0.0004552, based on IQR multiplier of 3.

Constituent: Cobalt Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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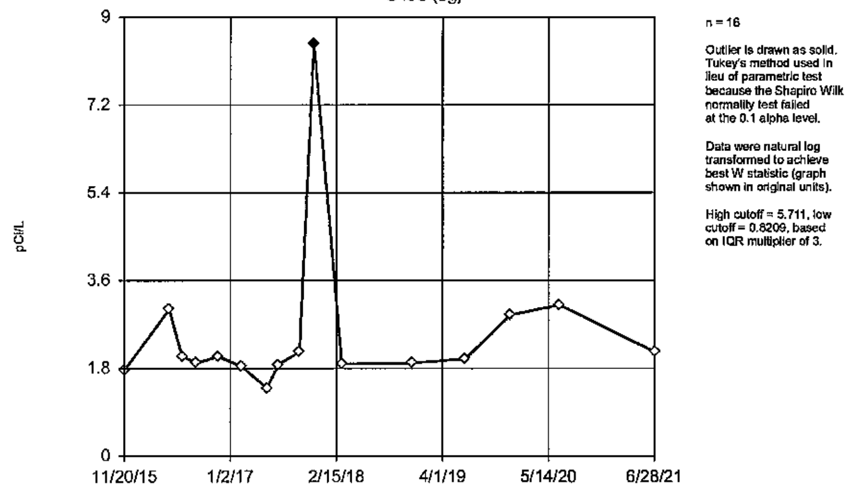
Tukey's Outlier Screening

G45S (bg)



Constituent: Combined Radium 226 + 228 Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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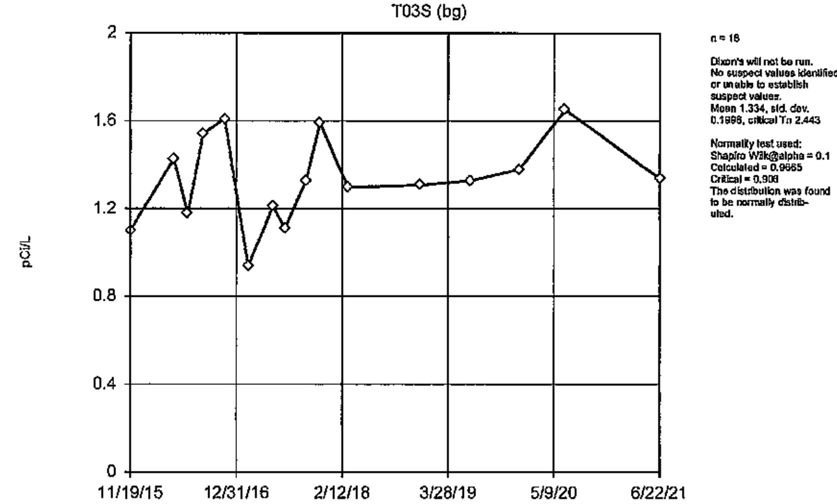
EPA Screening (suspected outliers for Dixon's Test)

T03S (bg)



Constituent: Combined Radium 226 + 228 Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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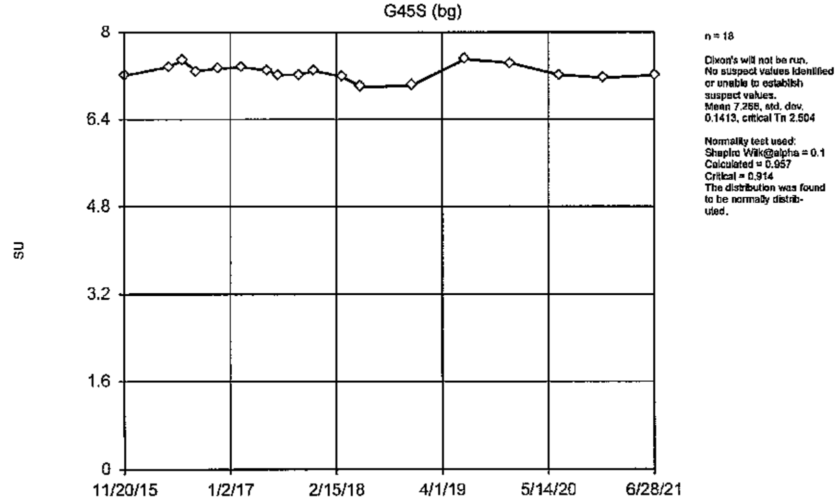
EPA Screening (suspected outliers for Dixon's Test)

G45S (bg)



Constituent: Field pH Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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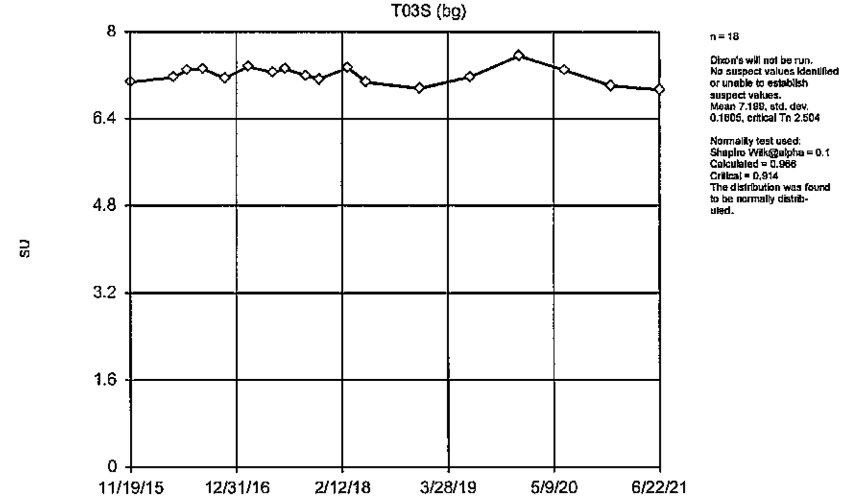
EPA Screening (suspected outliers for Dixon's Test)

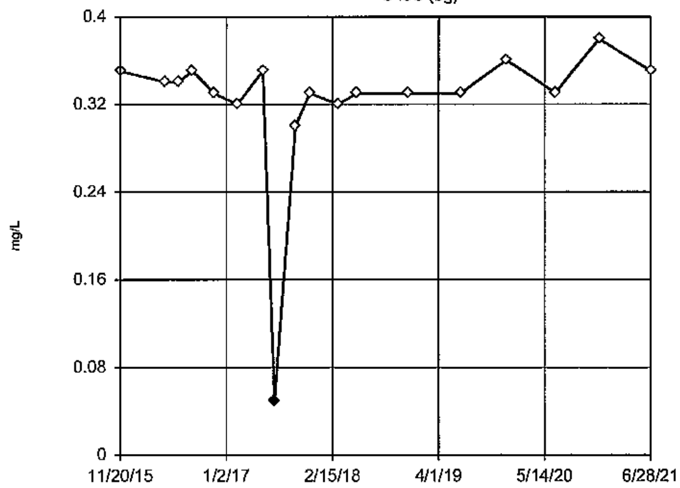
T03S (bg)



Constituent: Field pH Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Dixon's Outlier Test

G45S (bg)



n = 18

Statistical outlier is drawn as solid.
Testing for 1 low outlier.
Mean = 0.3217.
Std. Dev. = 0.07006.
<0.1: c = 0.9
tabl = 0.475.
Alpha = 0.05.

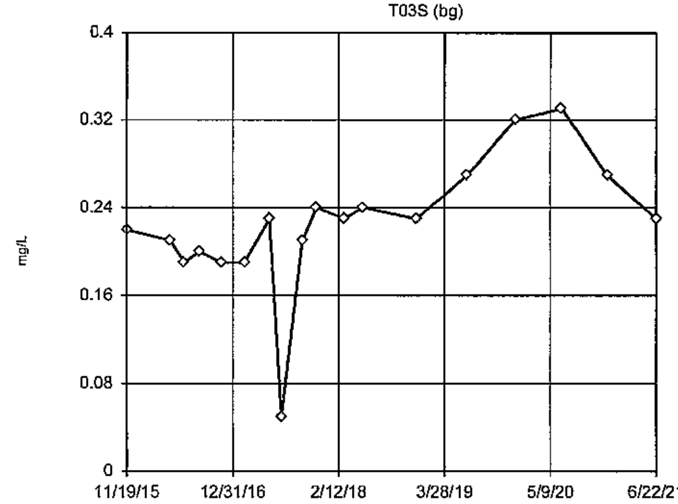
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9443
Critical = 0.91
The distribution, after removal of suspect value, was found to be normally distributed.

Constituent: Fluoride Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

T03S (bg)



n = 18

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 transformed to achieve best W statistic (graph shown in original units).

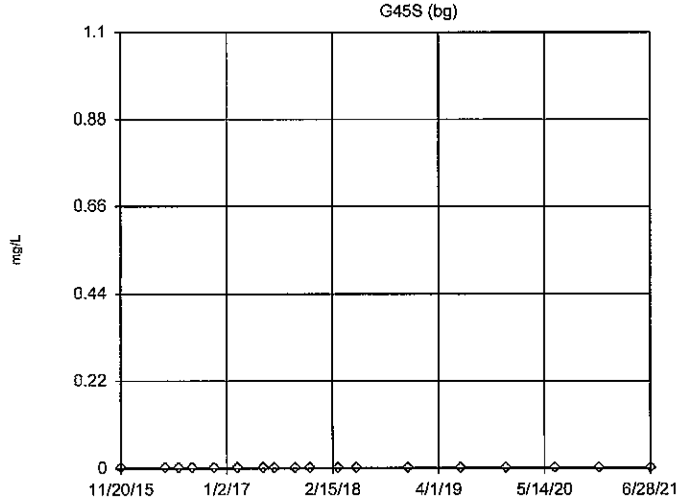
High cutoff = 0.3832, low cutoff = -0.2087, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

G45S (bg)



n = 18

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).

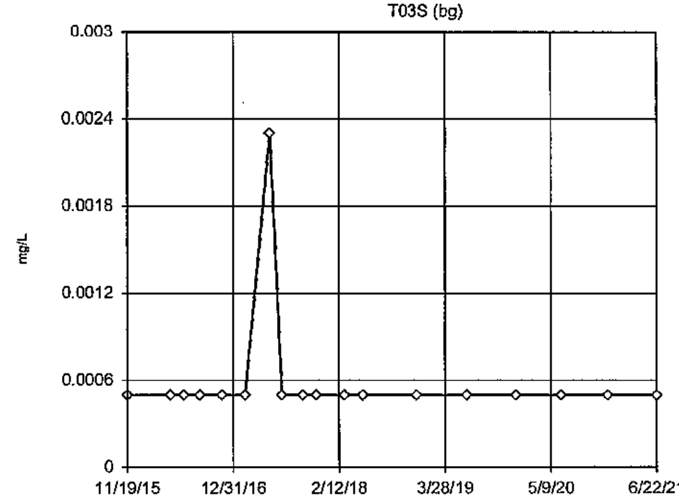
The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Lead Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Tukey's Outlier Screening

T03S (bg)



n = 18

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^5 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 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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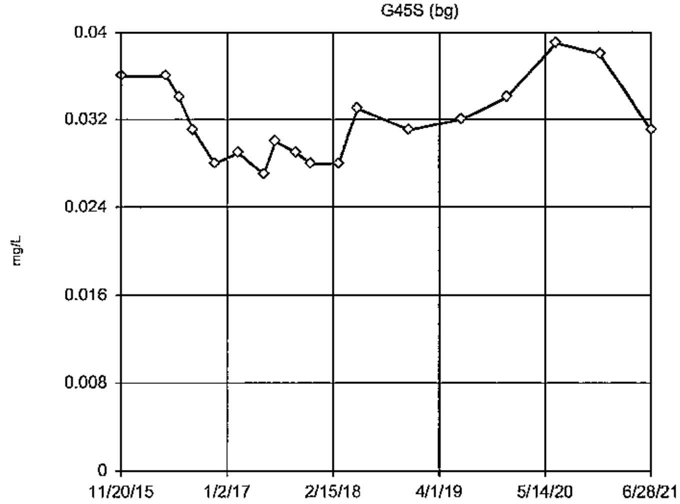
EPA Screening (suspected outliers for Dixon's Test)

G45S (bg)



n = 18

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 0.03189, std. dev. 0.003628, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.936
Critical = 0.914
The distribution was found to be normally distributed.

Constituent: Lithium Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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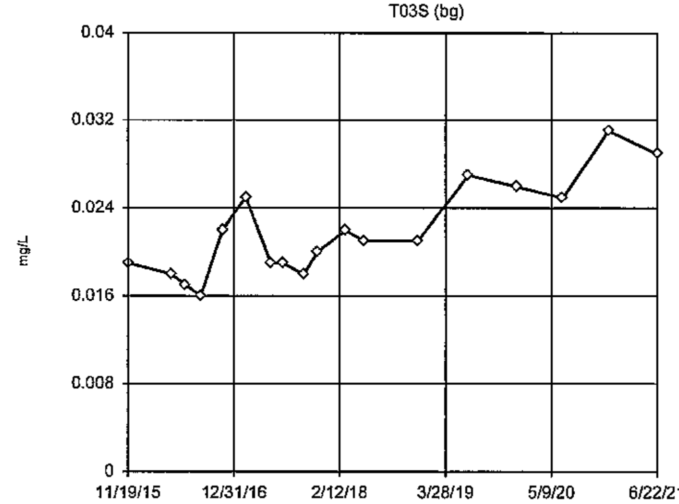
EPA Screening (suspected outliers for Dixon's Test)

T03S (bg)



n = 18

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 0.02194, std. dev. 0.004304, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9363
Critical = 0.914
The distribution was found to be normally distributed.

Constituent: Lithium Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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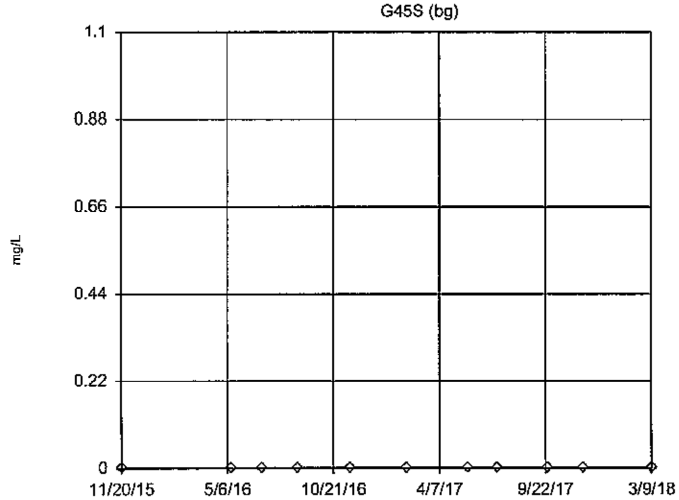
Tukey's Outlier Screening

G45S (bg)



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 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: Mercury Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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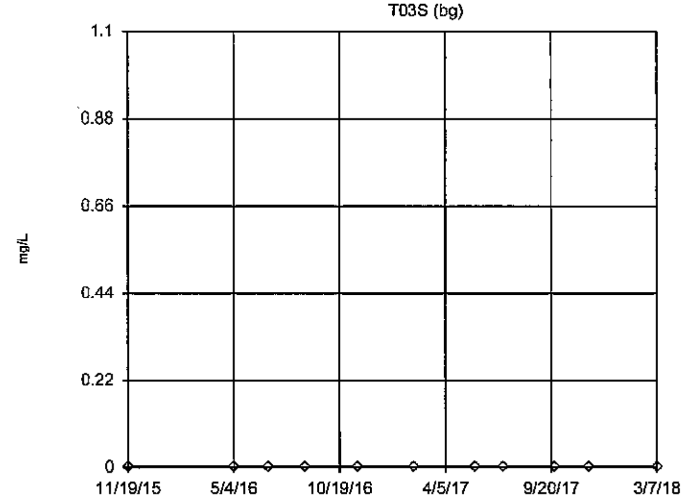
Tukey's Outlier Screening

T03S (bg)



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 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: Mercury Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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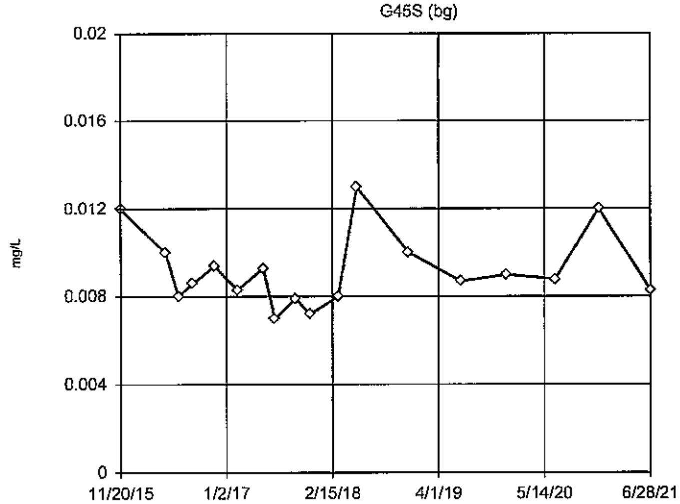
EPA Screening (suspected outliers for Dixon's Test)

G45S (bg)



n = 18

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.009194, std. dev.
0.001668, critical Tn
2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9334
Critical = 0.914 (after
natural log transforma-
tion)
The distribution was found
to be log-normal.

Constituent: Molybdenum Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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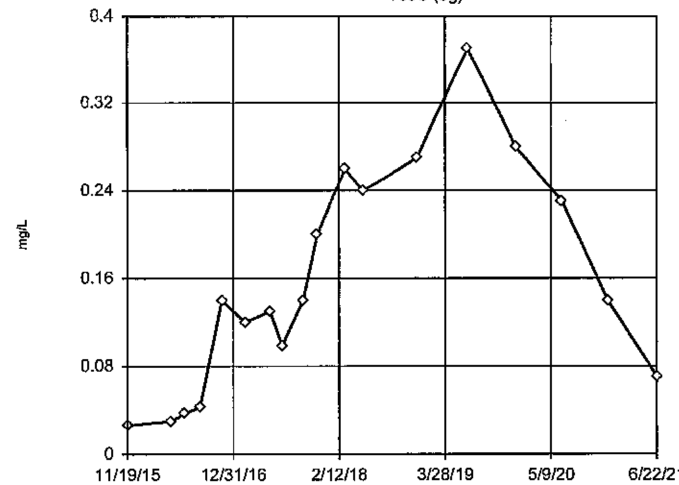
EPA Screening (suspected outliers for Dixon's Test)

T03S (bg)



n = 18

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.157, std. dev.
0.1007, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9403
Critical = 0.914
The distribution was found
to be normally distrib-
uted.

Constituent: Molybdenum Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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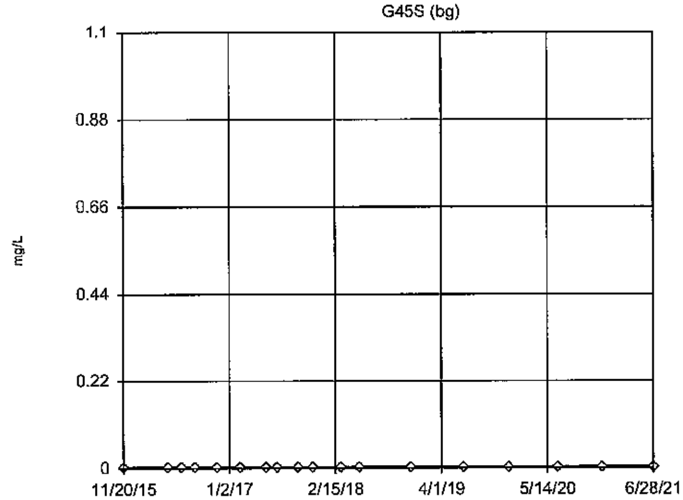
Tukey's Outlier Screening

G45S (bg)



n = 18

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: Selenium Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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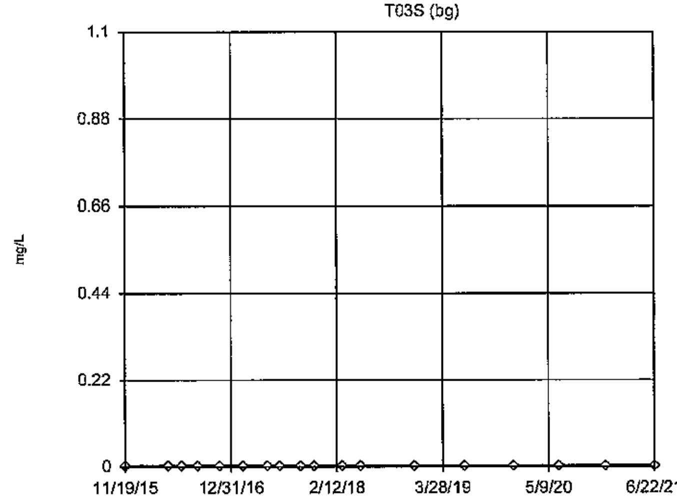
Tukey's Outlier Screening

T03S (bg)



n = 18

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: Selenium Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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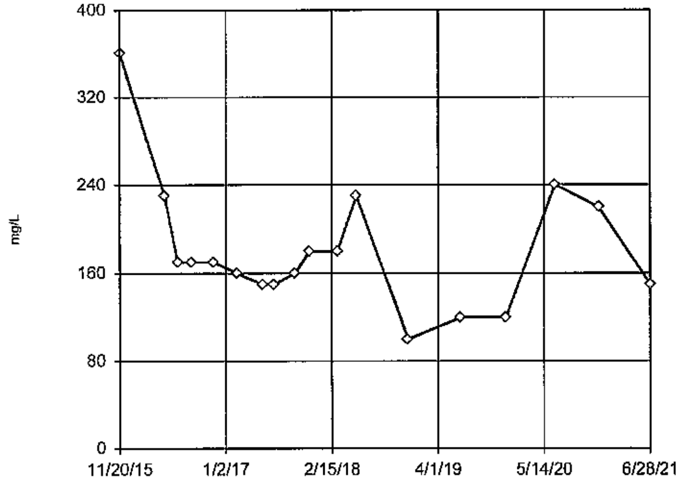
EPA Screening (suspected outliers for Dixon's Test)

G45S (bg)



n = 18

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 181.1, std. dev.
59.4, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9533
Critical = 0.914 (after
natural log transforma-
tion)
The distribution was found
to be log-normal.

Constituent: Sulfate Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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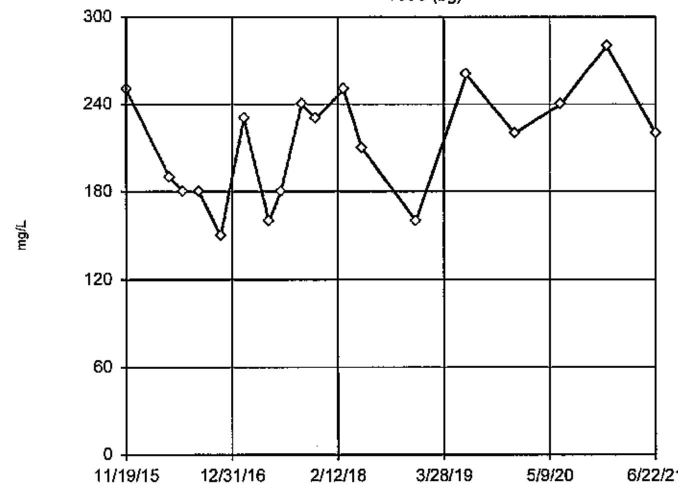
EPA Screening (suspected outliers for Dixon's Test)

T03S (bg)



n = 18

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 212.8, std. dev.
38.32, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9533
Critical = 0.914
The distribution was found
to be normally distrib-
uted.

Constituent: Sulfate Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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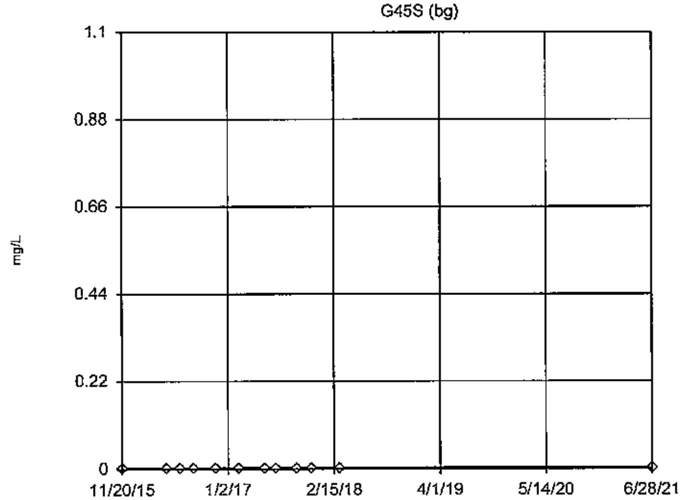
Tukey's Outlier Screening

G45S (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 invalid-
ated, because the lower
and upper quartiles are
equal.

Constituent: Thallium Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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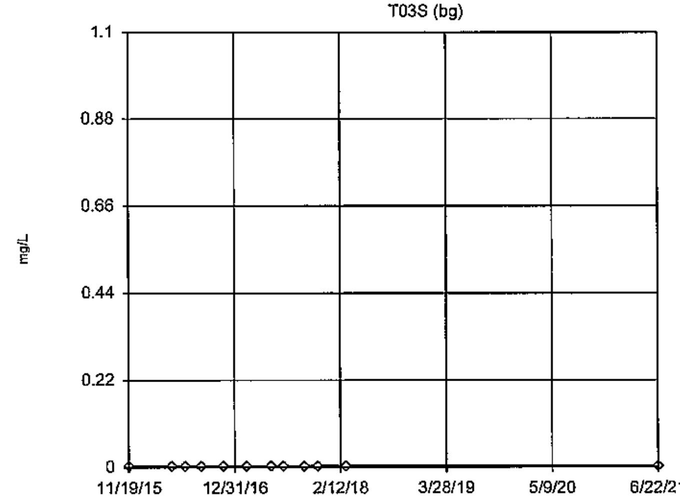
Tukey's Outlier Screening

T03S (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).

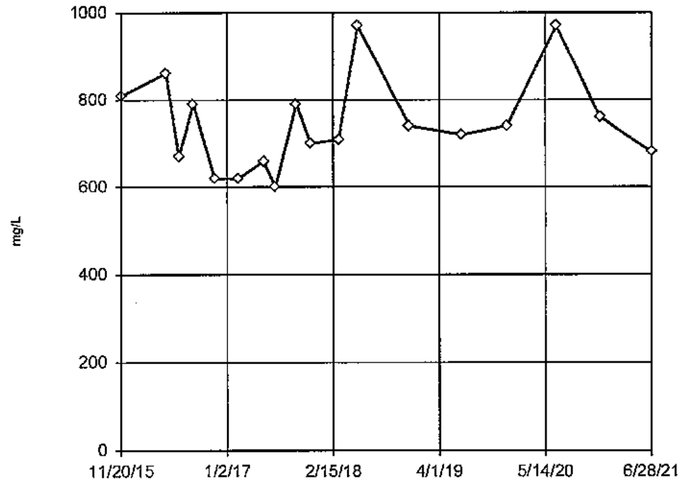
The results were invalid-
ated, because the lower
and upper quartiles are
equal.

Constituent: Thallium Analysis Run 8/9/2021 2:25 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

G45S (bg)



n = 18

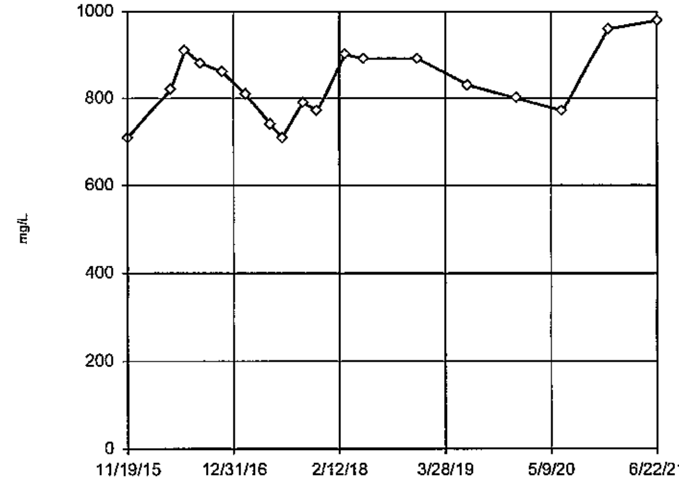
Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 745, std. dev. 107.4,
critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9219
Critical = 0.914
The distribution was found
to be normally distrib-
uted.

Constituent: Total Dissolved Solids Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

EPA Screening (suspected outliers for Dixon's Test)

T03S (bg)



n = 18

Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 834.4, std. dev.
79.72, critical Tn 2.504

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9677
Critical = 0.914
The distribution was found
to be normally distrib-
uted.

Constituent: Total Dissolved Solids Analysis Run 8/9/2021 2:25 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

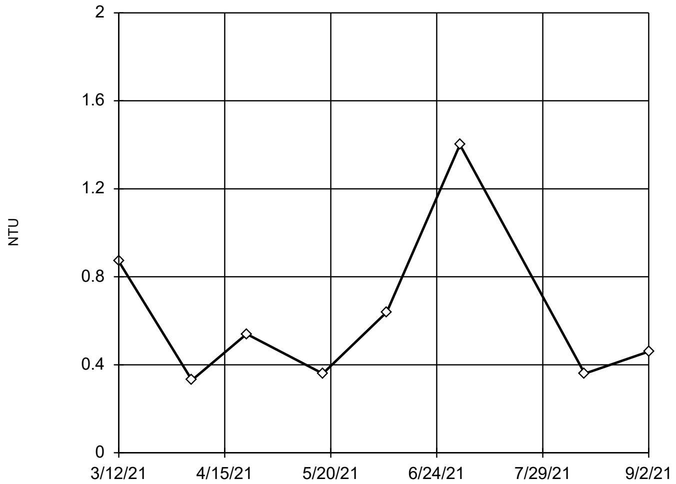
Outlier Analysis - Joliet 9 - UG Wells Turbidity

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29   Printed 10/8/2021, 11:50 AM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Turbidity (NTU)	G45S (bg)	No	n/a	n/a	EPA 1989	0.05	8	0.62	0.363	ln(x)	ShapiroWilk
Turbidity (NTU)	**T03S (bg)**	**Yes**	**2.42,94**	**3/15/2021...**	**Dixon`s**	**0.05**	**8**	**12.39**	**32.98**	**normal**	**ShapiroWilk**

EPA Screening (suspected outliers for Dixon's Test)

G45S (bg)



n = 8

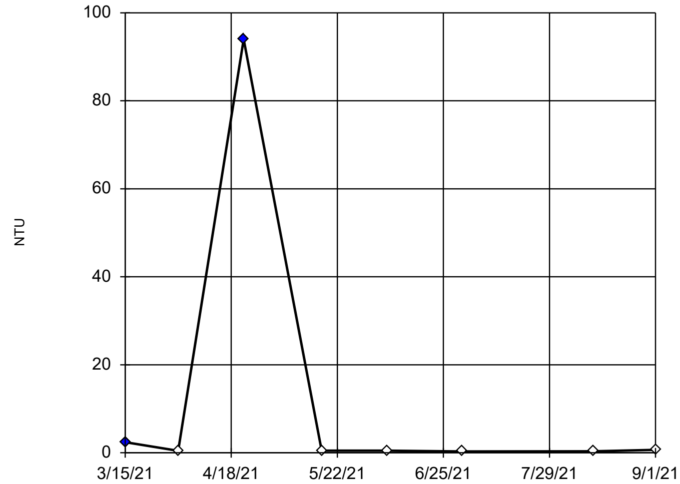
Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 0.62, std. dev. 0.363, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9071
Critical = 0.851 (after natural log transformation)
The distribution was found to be log-normal.

Constituent: Turbidity Analysis Run 10/8/2021 11:49 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Dixon's Outlier Test

T03S (bg)



n = 8

Statistical outliers are drawn as solid.
Testing for 2 high outliers.
Mean = 12.39.
Std. Dev. = 32.98.
2.42: c = 0.8413
tabl = 0.554.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.915
Critical = 0.826
The distribution, after removal of suspect values, was found to be normally distributed.

Constituent: Turbidity Analysis Run 10/8/2021 11:49 AM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

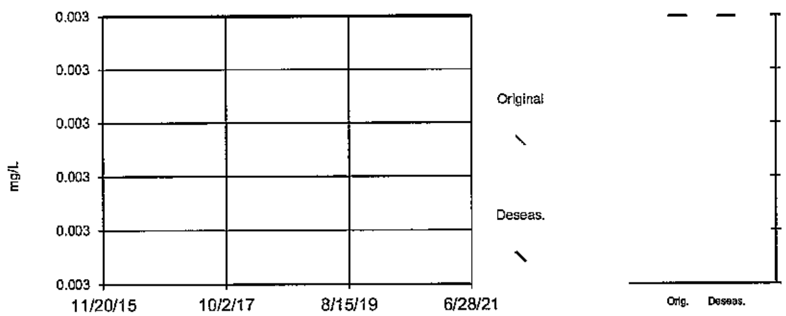
Seasonality - Joliet #9 - UG CCR Wells

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29 Printed 8/9/2021, 2:40 PM

Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Antimony (mg/L)	G45S (bg)	No	0	0	0	12	0.05
Antimony (mg/L)	T03S (bg)	No	0	0	0	12	0.05
Arsenic (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Arsenic (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Barium (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Barium (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Beryllium (mg/L)	G45S (bg)	No	0	0	0	12	0.05
Beryllium (mg/L)	T03S (bg)	No	0	0	0	12	0.05
Boron (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Boron (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Cadmium (mg/L)	G45S (bg)	No	0	0	0	12	0.05
Cadmium (mg/L)	T03S (bg)	No	0	0	0	12	0.05
Calcium (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Calcium (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Chloride (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Chloride (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Chromium (mg/L)	G45S (bg)	No	0	0	0	12	0.05
Chromium (mg/L)	T03S (bg)	No	0	0	0	12	0.05
Cobalt (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Cobalt (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Combined Radium 226 + 228 (pCi/L)	G45S (bg)	No	0	0	0	16	0.05
Combined Radium 226 + 228 (pCi/L)	T03S (bg)	No	0	0	0	16	0.05
Field pH (SU)	G45S (bg)	No	0	0	0	18	0.05
Field pH (SU)	T03S (bg)	No	0	0	0	18	0.05
Fluoride (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Fluoride (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Lead (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Lead (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Lithium (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Lithium (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Mercury (mg/L)	G45S (bg)	No	0	0	0	11	0.05
Mercury (mg/L)	T03S (bg)	No	0	0	0	11	0.05
Molybdenum (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Molybdenum (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Selenium (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Selenium (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Sulfate (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Sulfate (mg/L)	T03S (bg)	No	0	0	0	18	0.05
Thallium (mg/L)	G45S (bg)	No	0	0	0	12	0.05
Thallium (mg/L)	T03S (bg)	No	0	0	0	12	0.05
Total Dissolved Solids (mg/L)	G45S (bg)	No	0	0	0	18	0.05
Total Dissolved Solids (mg/L)	T03S (bg)	No	0	0	0	18	0.05

Seasonality: G45S (bg)

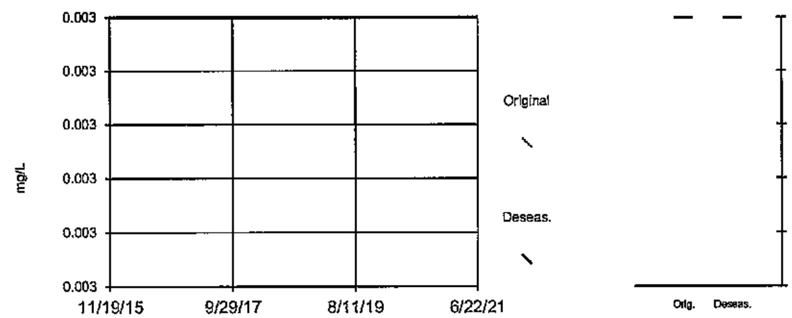
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Antimony Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (bg)

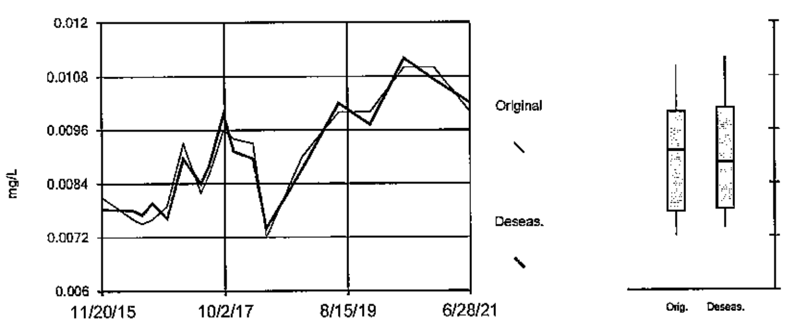
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Antimony Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (bg)

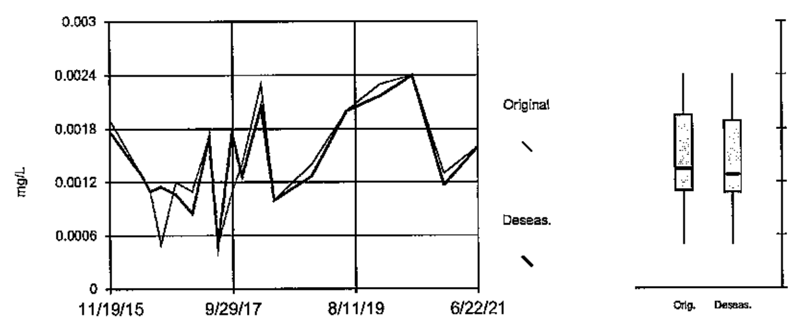
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Arsenic Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (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: Arsenic Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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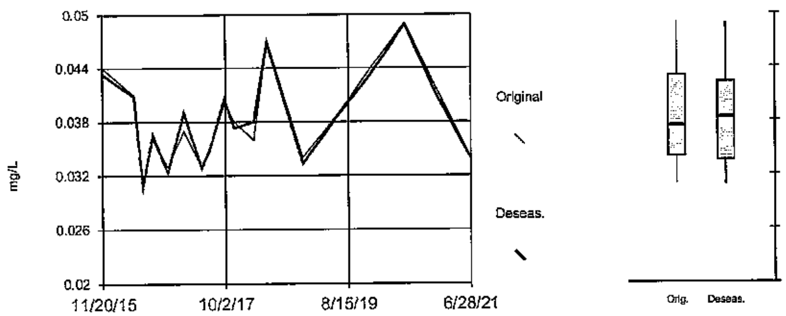
Seasonality: G45S (bg)

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: Barium Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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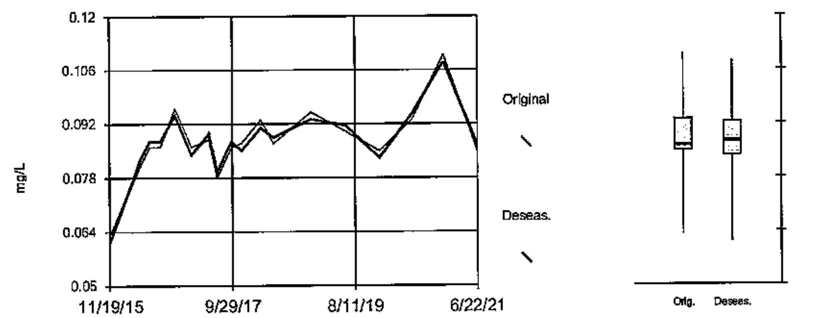
Seasonality: T03S (bg)

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: Barium Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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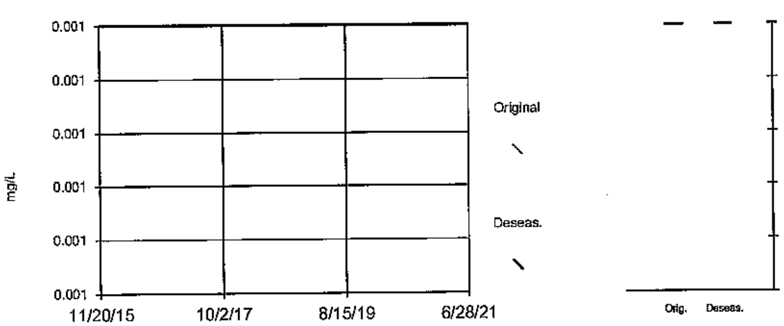
Seasonality: G45S (bg)

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: Beryllium Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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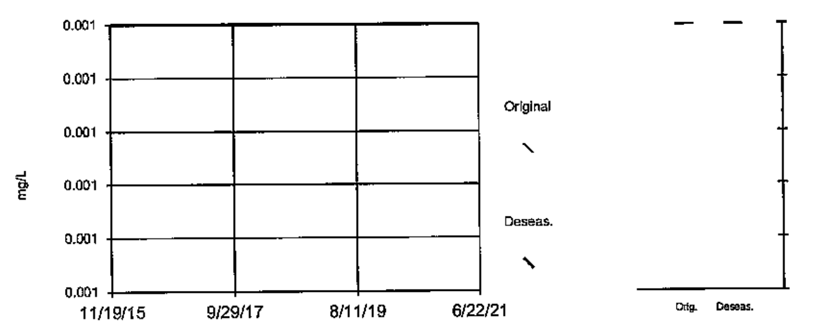
Seasonality: T03S (bg)

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: Beryllium Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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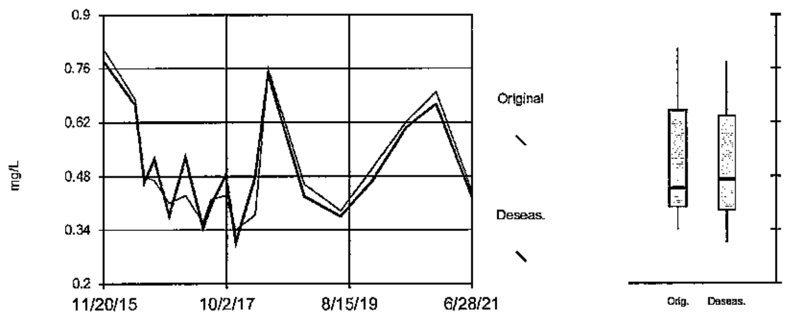
Seasonality: G45S (bg)

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: Boron Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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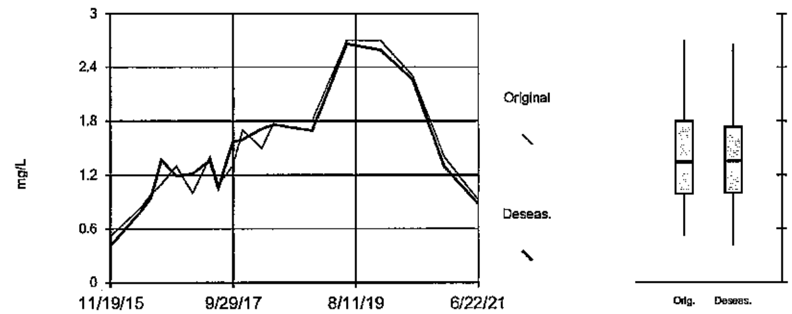
Seasonality: T03S (bg)

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: Boron Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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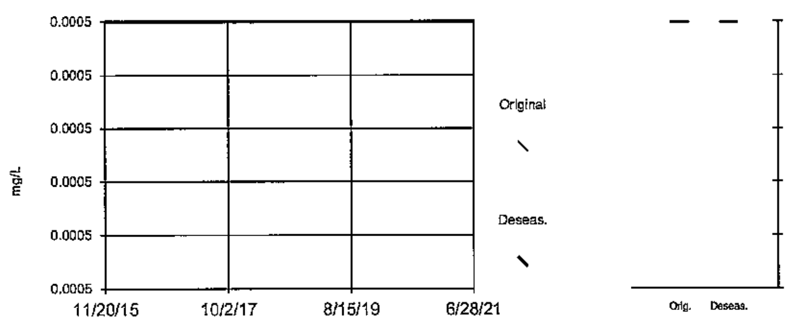
Seasonality: G45S (bg)

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: Cadmium Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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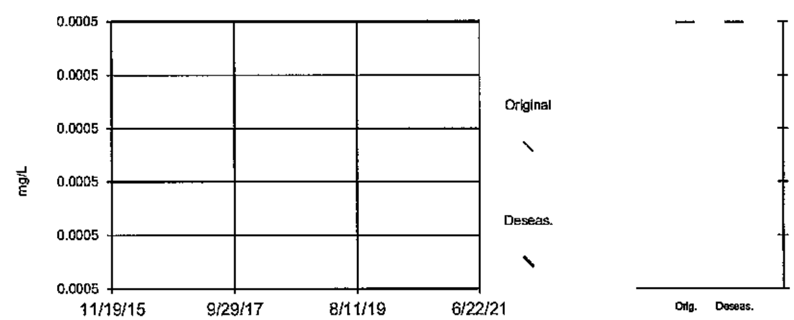
Seasonality: T03S (bg)

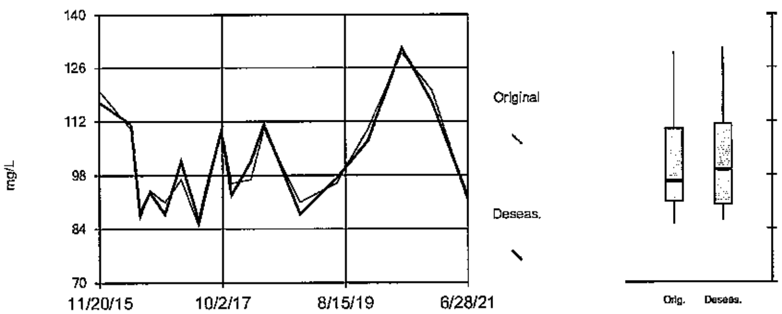
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Cadmium Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (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).

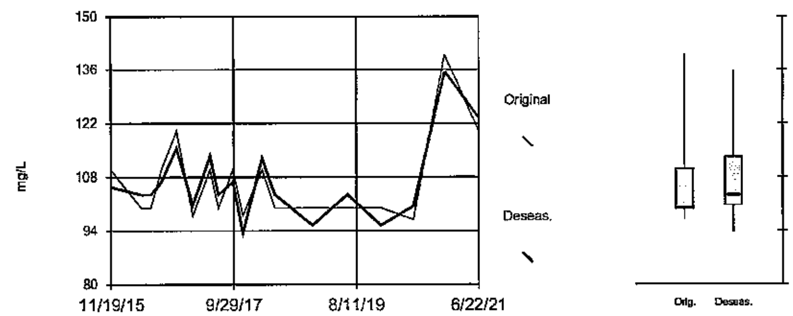


Constituent: Calcium Analysis Run 8/9/2021 2:38 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (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).

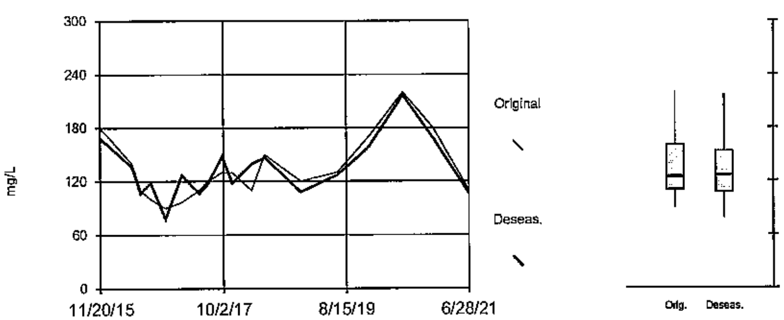


Constituent: Calcium Analysis Run 8/9/2021 2:38 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (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).

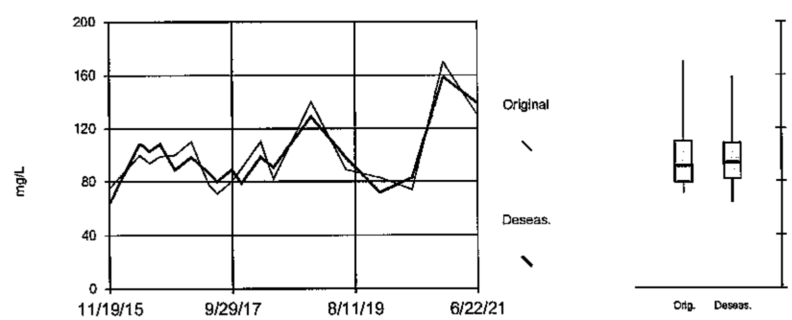


Constituent: Chloride Analysis Run 8/9/2021 2:38 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (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).

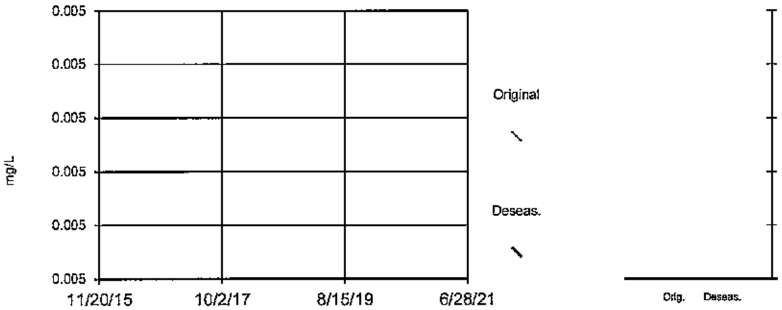


Constituent: Chloride Analysis Run 8/9/2021 2:38 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (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).

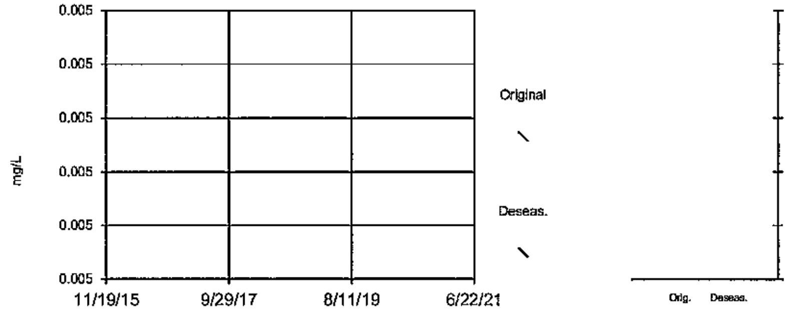


Constituent: Chromium Analysis Run 8/9/2021 2:38 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (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).

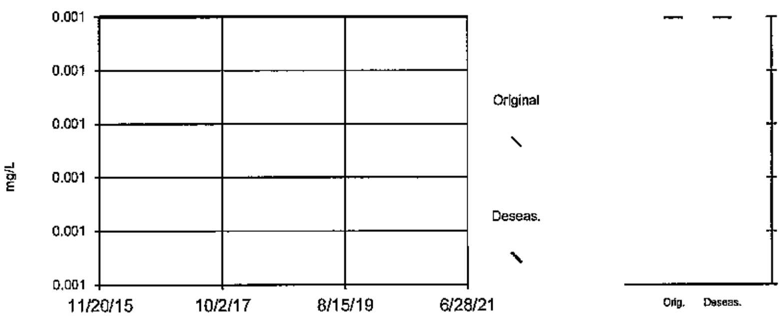


Constituent: Chromium Analysis Run 8/9/2021 2:38 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (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).

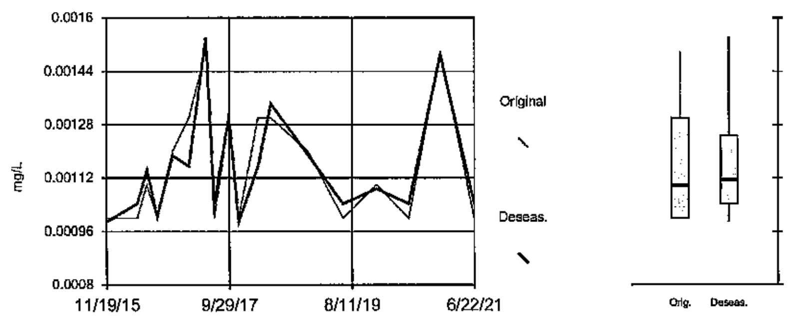


Constituent: Cobalt Analysis Run 8/9/2021 2:38 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (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).

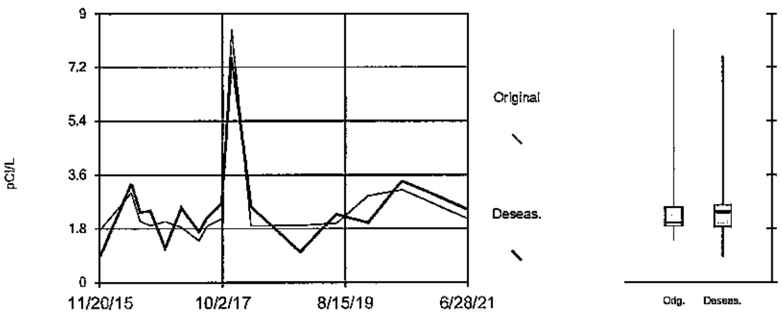


Constituent: Cobalt Analysis Run 8/9/2021 2:38 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (bg)

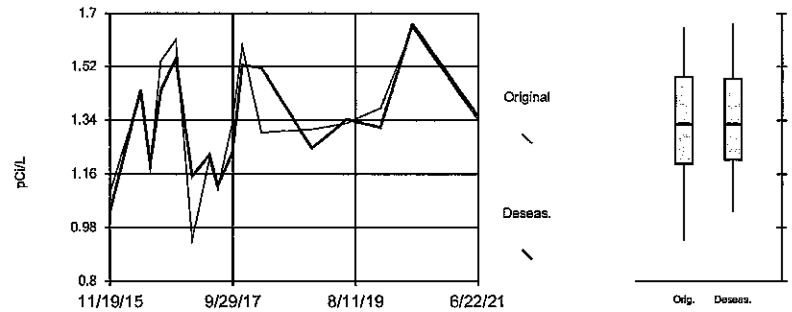
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Combined Radium 226 + 228   Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Seasonality: T03S (bg)

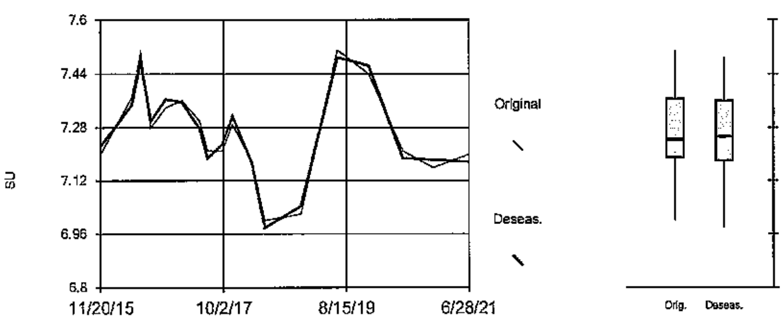
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Combined Radium 226 + 228   Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Seasonality: G45S (bg)

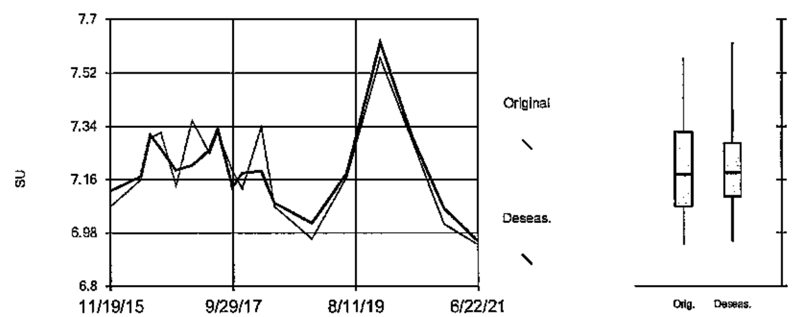
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Field pH   Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Seasonality: T03S (bg)

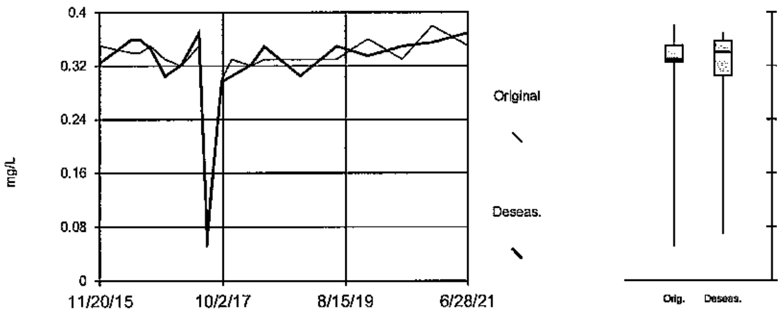
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Field pH   Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Seasonality: G45S (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 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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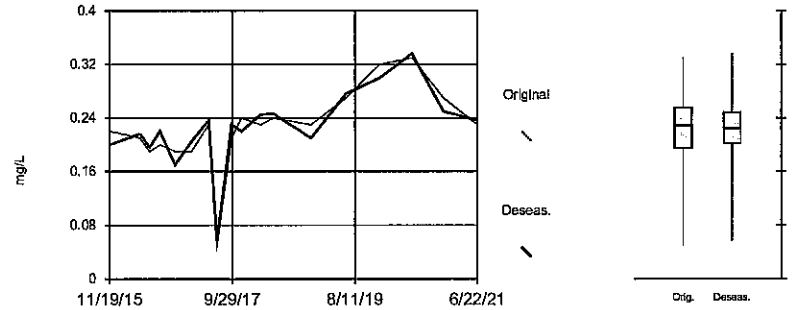
Seasonality: T03S (bg)

Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).

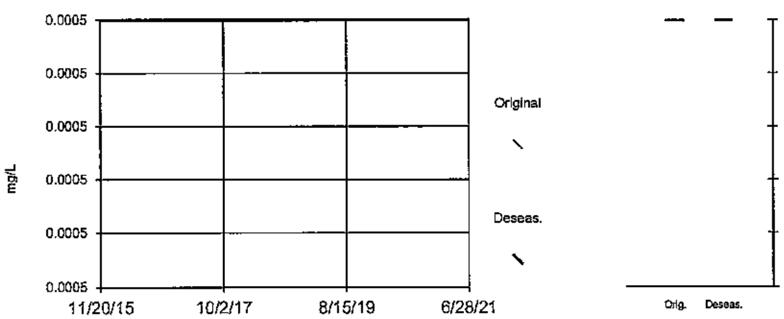


Constituent: Fluoride Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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

Seasonality: G45S (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).

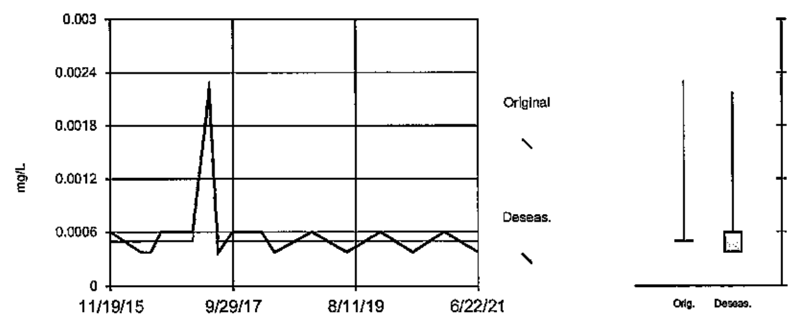


Constituent: Lead Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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

Seasonality: T03S (bg)

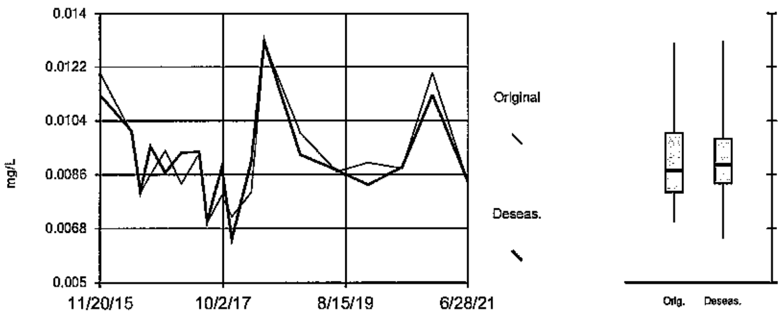
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Lead Analysis Run 8/9/2021 2:38 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (bg)

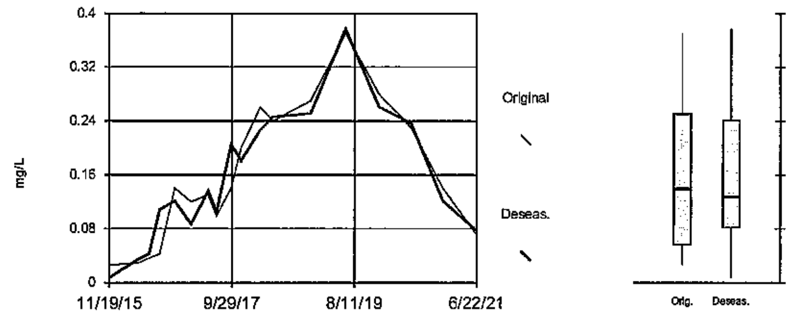
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Molybdenum Analysis Run 8/9/2021 2:39 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (bg)

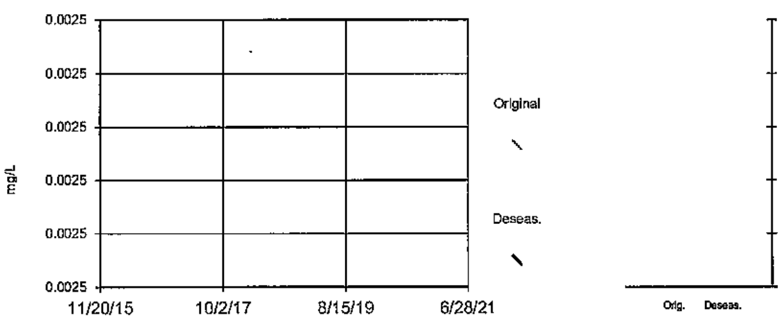
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Molybdenum Analysis Run 8/9/2021 2:39 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (bg)

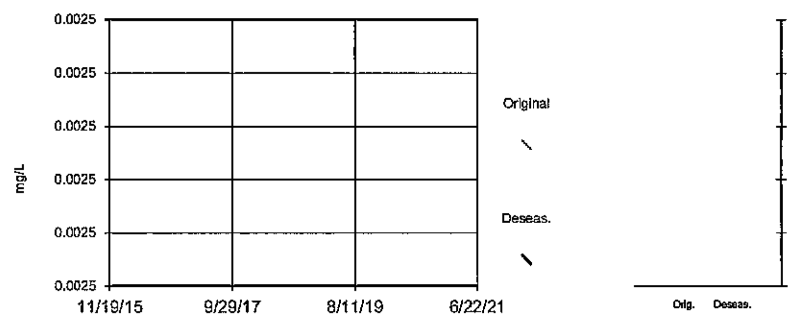
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Selenium Analysis Run 8/9/2021 2:39 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (bg)

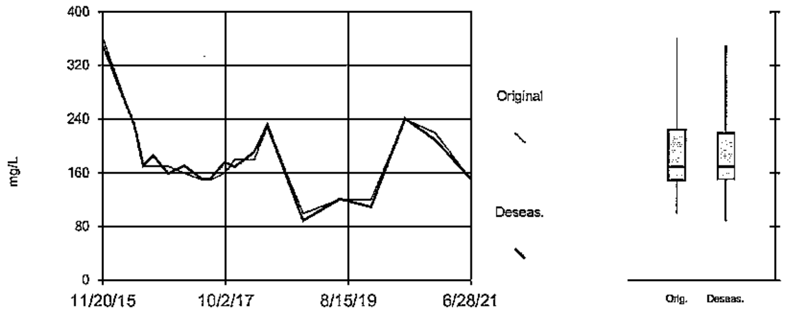
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Selenium Analysis Run 8/9/2021 2:39 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (bg)

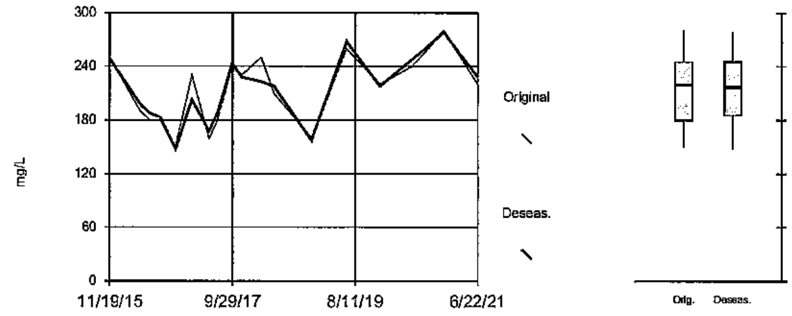
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Sulfate Analysis Run 8/9/2021 2:39 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (bg)

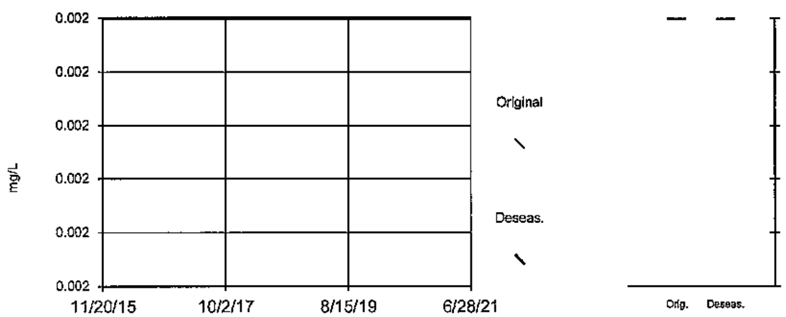
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Sulfate Analysis Run 8/9/2021 2:39 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (bg)

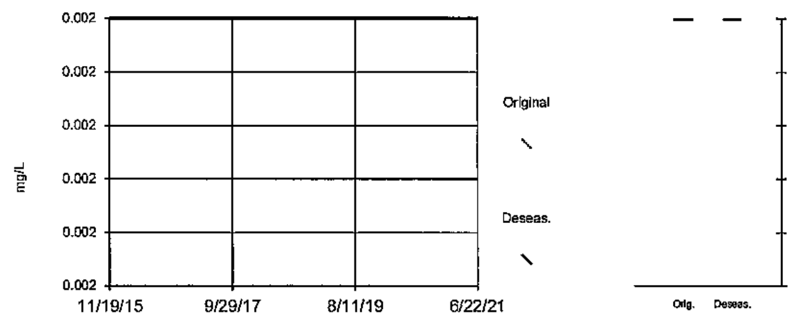
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Thallium Analysis Run 8/9/2021 2:39 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (bg)

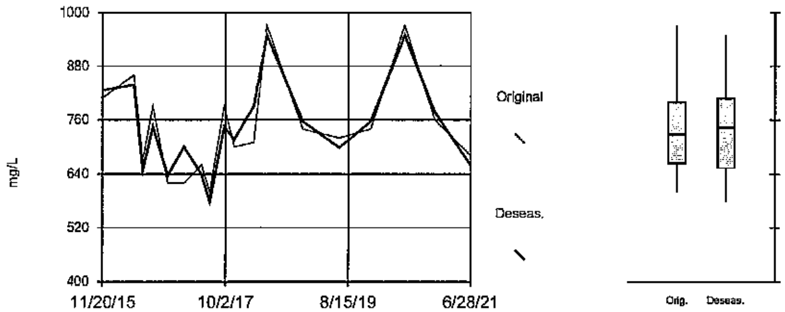
Data set is of insufficient size to test for seasonality (non-parametric ANOVA requires a minimum of three observations per group, i.e. season).



Constituent: Thallium Analysis Run 8/9/2021 2:39 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: G45S (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).

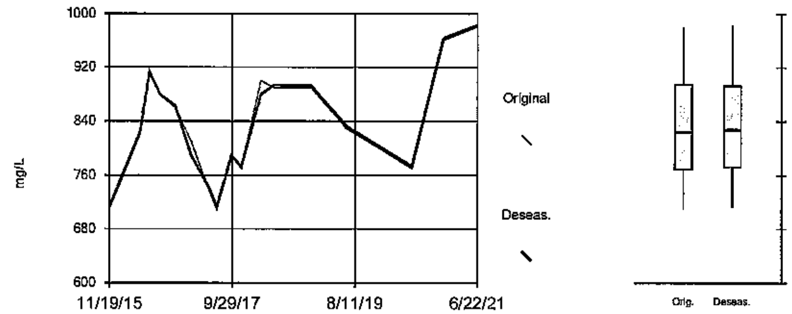


Constituent: Total Dissolved Solids Analysis Run 8/9/2021 2:39 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Seasonality: T03S (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 8/9/2021 2:39 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Trend Test Joliet #9 UG Wells

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29 Printed 8/9/2021, 2:47 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Antimony (mg/L)	G45S (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Antimony (mg/L)	T03S (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Arsenic (mg/L)	**G45S (bg)**	**0.000...**	**5.446**	**2.235**	**Yes**	**18**	**0**	**Yes**	**no**	**0.02**	**Param.**
Arsenic (mg/L)	T03S (bg)	0.000...	1.929	2.235	No	18	11.11	Yes	no	0.02	Param.
Barium (mg/L)	G45S (bg)	0.000...	1.203	2.235	No	18	0	Yes	no	0.02	Param.
Barium (mg/L)	**T03S (bg)**	**0.002987**	**2.556**	**2.235**	**Yes**	**18**	**0**	**Yes**	**no**	**0.02**	**Param.**
Beryllium (mg/L)	G45S (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Beryllium (mg/L)	T03S (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Boron (mg/L)	G45S (bg)	0.003884	0.098	2.235	No	18	5.556	Yes	natura...	0.02	Param.
Boron (mg/L)	**T03S (bg)**	**0.2068**	**2.723**	**2.235**	**Yes**	**18**	**0**	**Yes**	**no**	**0.02**	**Param.**
Cadmium (mg/L)	G45S (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Cadmium (mg/L)	T03S (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Calcium (mg/L)	G45S (bg)	2.031	1.091	2.235	No	18	0	Yes	no	0.02	Param.
Calcium (mg/L)	T03S (bg)	1.952	1.233	2.235	No	18	0	Yes	no	0.02	Param.
Chloride (mg/L)	G45S (bg)	8.491	1.791	2.235	No	18	0	Yes	no	0.02	Param.
Chloride (mg/L)	T03S (bg)	6.822	1.951	2.235	No	18	0	Yes	no	0.02	Param.
Chromium (mg/L)	G45S (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Chromium (mg/L)	T03S (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Cobalt (mg/L)	G45S (bg)	0	0	63	No	18	100	n/a	n/a	0.02	NP (NDs)
Cobalt (mg/L)	T03S (bg)	0.000...	0.341	2.235	No	18	44.44	Yes	no	0.02	Param.
Combined Radium 226 + 228 (pCi/L)	G45S (bg)	0.06457	32	53	No	16	0	n/a	n/a	0.02	NP (Nor...
Combined Radium 226 + 228 (pCi/L)	T03S (bg)	0.03416	1.078	2.264	No	16	0	Yes	no	0.02	Param.
Field pH (SU)	G45S (bg)	-0.01842	-0.8901	2.235	No	18	0	Yes	no	0.02	Param.
Field pH (SU)	T03S (bg)	-0.01944	-0.8257	2.235	No	18	0	Yes	no	0.02	Param.
Fluoride (mg/L)	G45S (bg)	0	10	63	No	18	5.556	n/a	n/a	0.02	NP (Nor...
Fluoride (mg/L)	**T03S (bg)**	**0.01913**	**79**	**63**	**Yes**	**18**	**5.556**	**n/a**	**n/a**	**0.02**	**NP (Nor...**
Lead (mg/L)	G45S (bg)	0	0	63	No	18	100	n/a	n/a	0.02	NP (NDs)
Lead (mg/L)	T03S (bg)	0	-5	-63	No	18	94.44	n/a	n/a	0.02	NP (NDs)
Lithium (mg/L)	G45S (bg)	0.000...	1.233	2.235	No	18	0	Yes	no	0.02	Param.
Lithium (mg/L)	**T03S (bg)**	**0.002177**	**6.3**	**2.235**	**Yes**	**18**	**5.556**	**Yes**	**no**	**0.02**	**Param.**
Mercury (mg/L)	G45S (bg)	0	0	31	No	11	100	n/a	n/a	0.02	NP (NDs)
Mercury (mg/L)	T03S (bg)	0	0	31	No	11	100	n/a	n/a	0.02	NP (NDs)
Molybdenum (mg/L)	G45S (bg)	0.000...	0.2117	2.235	No	18	0	Yes	no	0.02	Param.
Molybdenum (mg/L)	**T03S (bg)**	**0.03093**	**2.388**	**2.235**	**Yes**	**18**	**0**	**Yes**	**no**	**0.02**	**Param.**
Selenium (mg/L)	G45S (bg)	0	0	63	No	18	100	n/a	n/a	0.02	NP (NDs)
Selenium (mg/L)	T03S (bg)	0	0	63	No	18	100	n/a	n/a	0.02	NP (NDs)
Sulfate (mg/L)	G45S (bg)	-9.969	-1.166	2.235	No	18	0	Yes	no	0.02	Param.
Sulfate (mg/L)	T03S (bg)	10.09	1.957	2.235	No	18	0	Yes	no	0.02	Param.
Thallium (mg/L)	G45S (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Thallium (mg/L)	T03S (bg)	0	0	35	No	12	100	n/a	n/a	0.02	NP (NDs)
Total Dissolved Solids (mg/L)	G45S (bg)	10.49	0.66	2.235	No	18	0	Yes	no	0.02	Param.
Total Dissolved Solids (mg/L)	T03S (bg)	20.44	1.894	2.235	No	18	0	Yes	no	0.02	Param.

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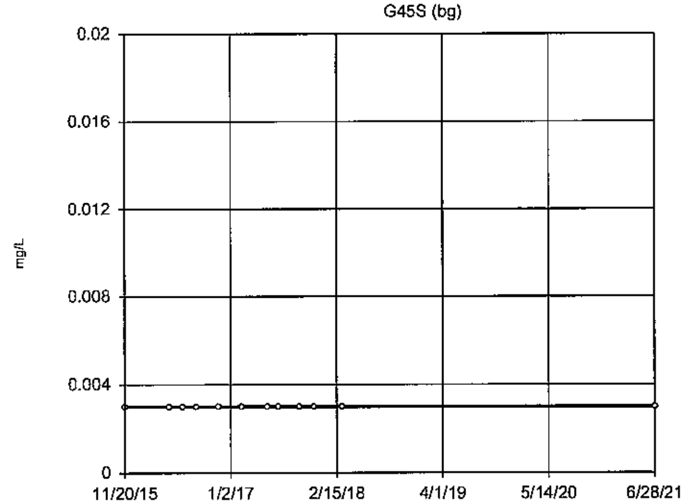
Hollow symbols indicate censored values.

Sen's Slope Estimator

G45S (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: Antimony Analysis Run 8/9/2021 2:44 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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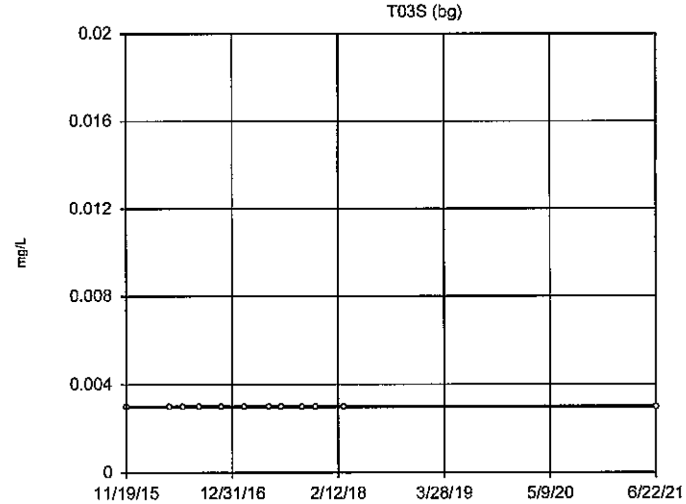
Hollow symbols indicate censored values.

Sen's Slope Estimator

T03S (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: Antimony Analysis Run 8/9/2021 2:44 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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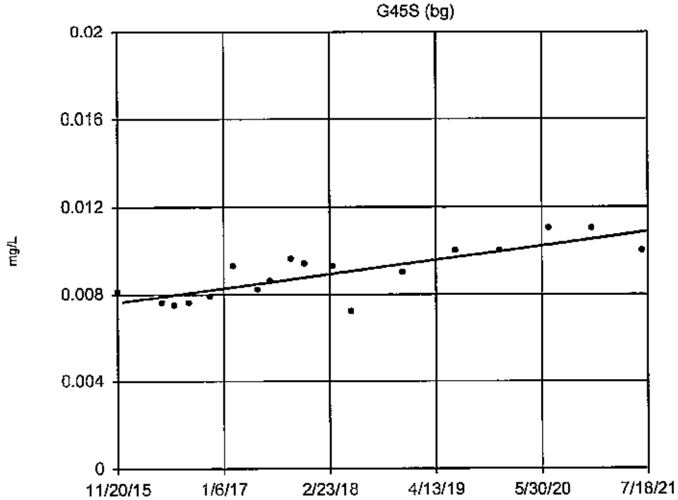
Linear Regression

G45S (bg)



n = 18

Slope = 0.0005729 units/year.

alpha = 0.02
t = 5.446
critical = 2.235

Significant increasing trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.01, calculated = 0.9304, critical = 0.858.

Constituent: Arsenic Analysis Run 8/9/2021 2:44 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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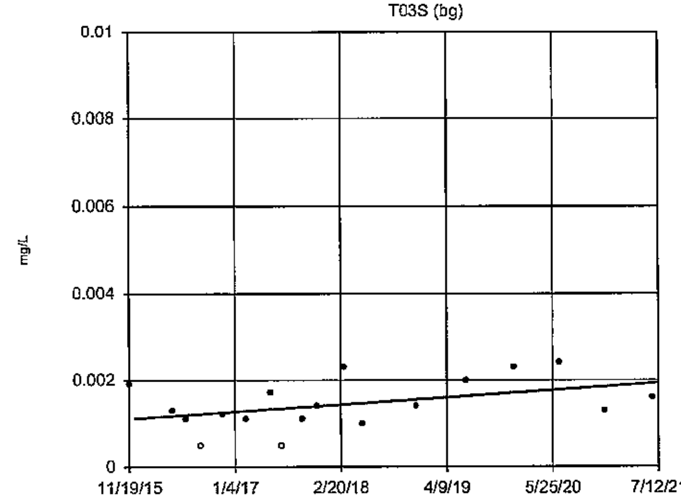
Hollow symbols indicate censored values.

Linear Regression

T03S (bg)



n = 18
11.11% NDs

Slope = 0.0001471 units/year.

alpha = 0.02
t = 1.929
critical = 2.235

No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.01, calculated = 0.9655, critical = 0.858.

Constituent: Arsenic Analysis Run 8/9/2021 2:44 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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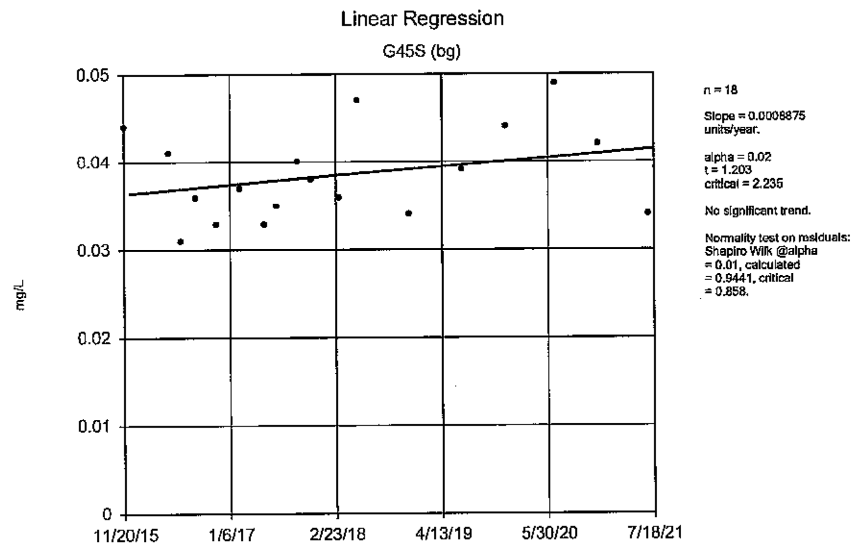

Constituent: Barium Analysis Run 8/9/2021 2:44 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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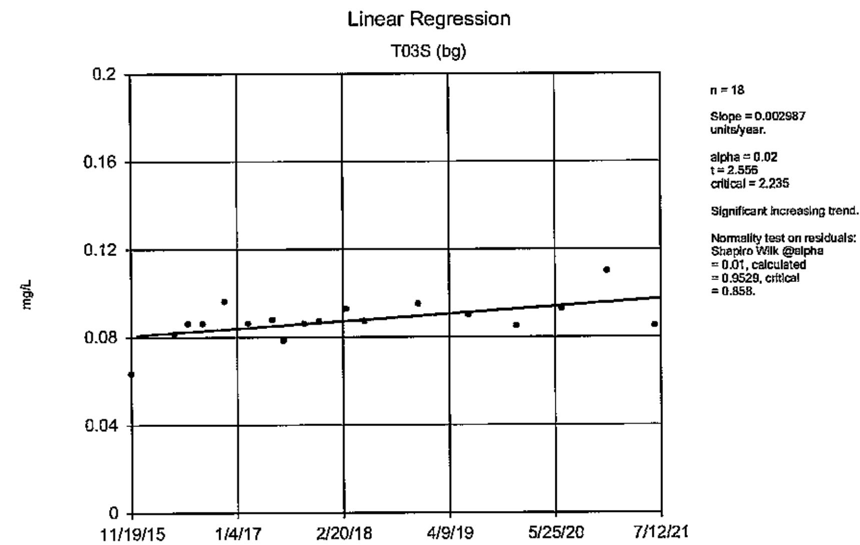

Constituent: Barium Analysis Run 8/9/2021 2:44 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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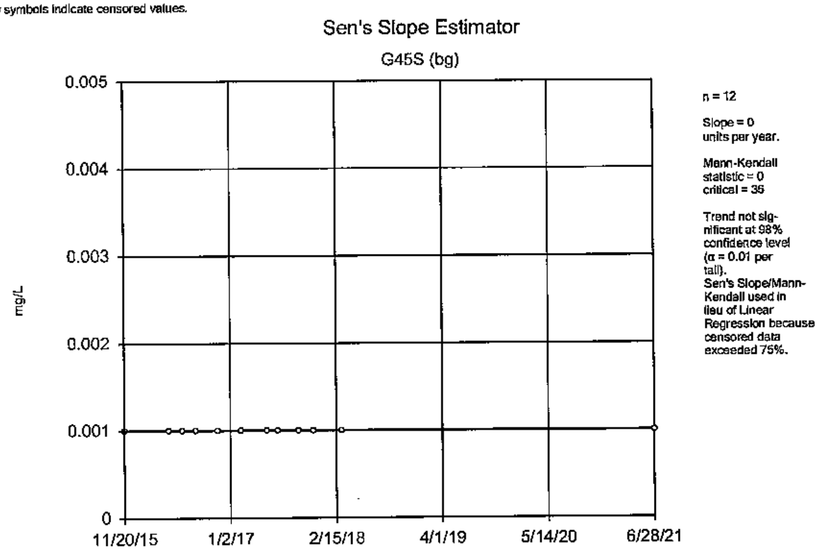
Hollow symbols indicate censored values.



Constituent: Beryllium Analysis Run 8/9/2021 2:44 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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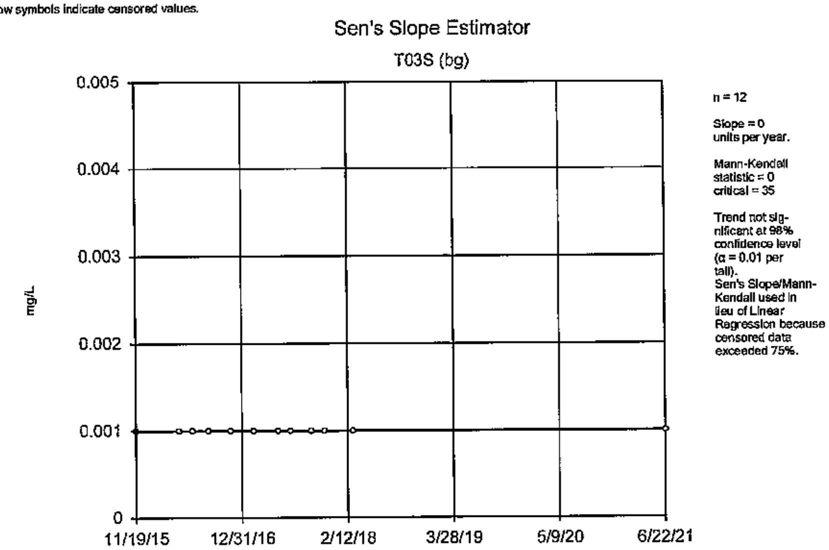
Hollow symbols indicate censored values.



Constituent: Beryllium Analysis Run 8/9/2021 2:44 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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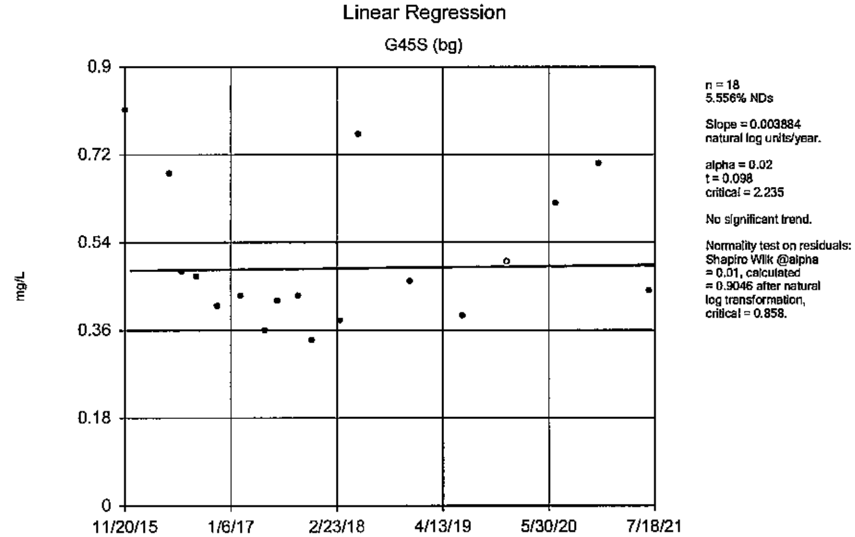
Hollow symbols indicate censored values.



Constituent: Boron Analysis Run 8/9/2021 2:44 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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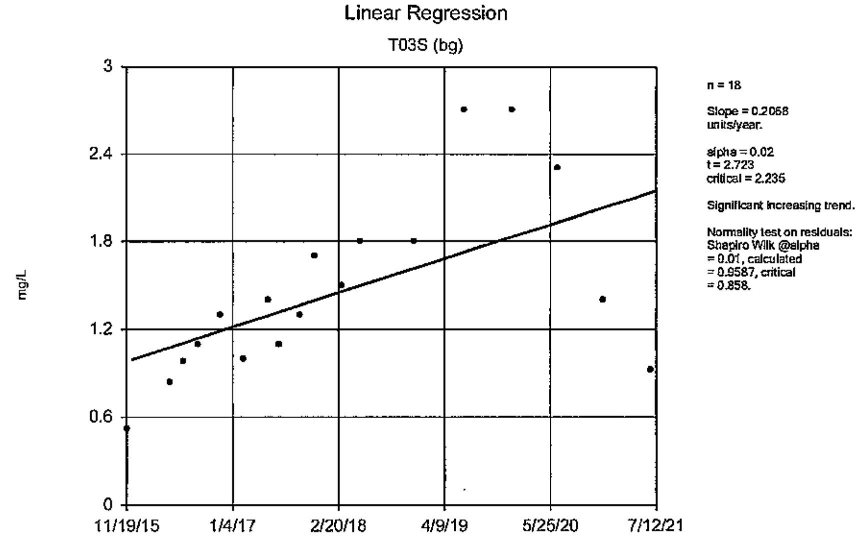

Constituent: Boron Analysis Run 8/9/2021 2:44 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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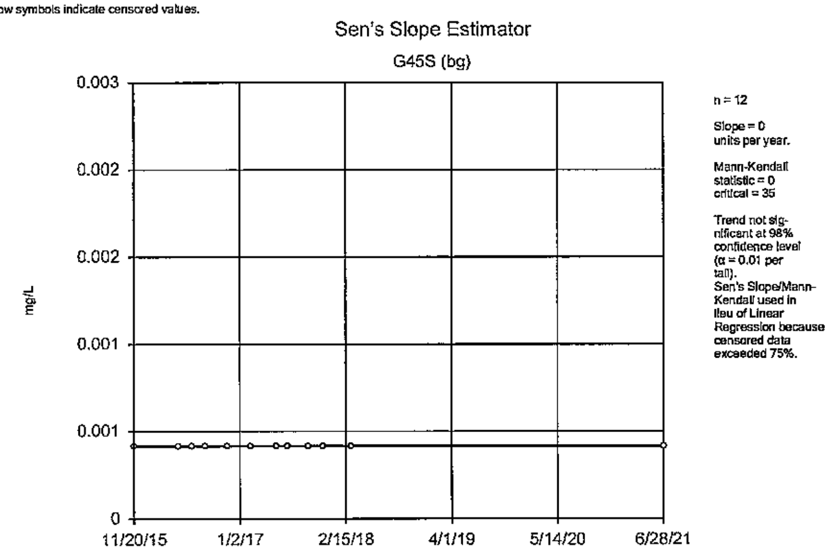
Hollow symbols indicate censored values.



Constituent: Cadmium Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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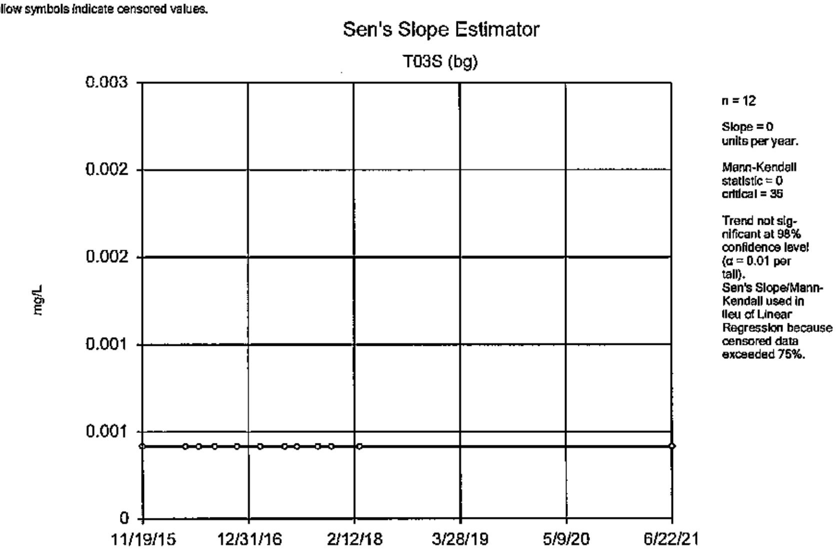
Hollow symbols indicate censored values.



Constituent: Cadmium Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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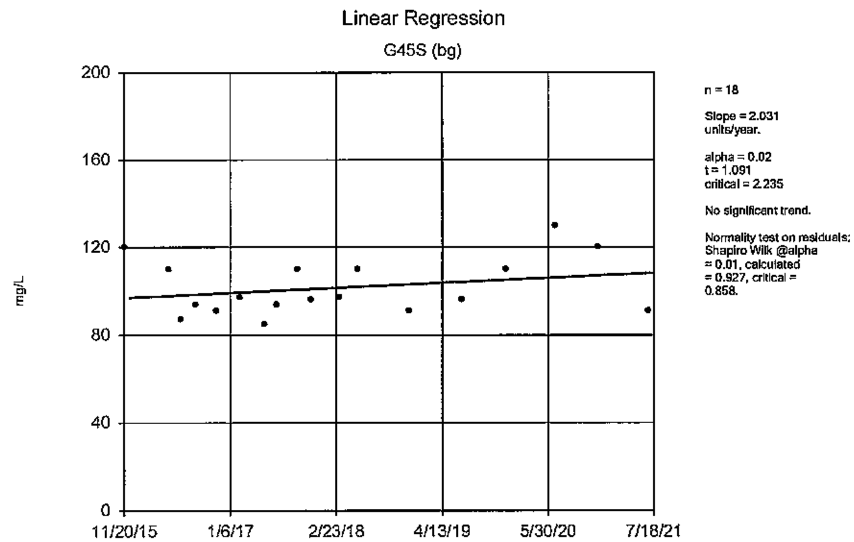

Constituent: Calcium Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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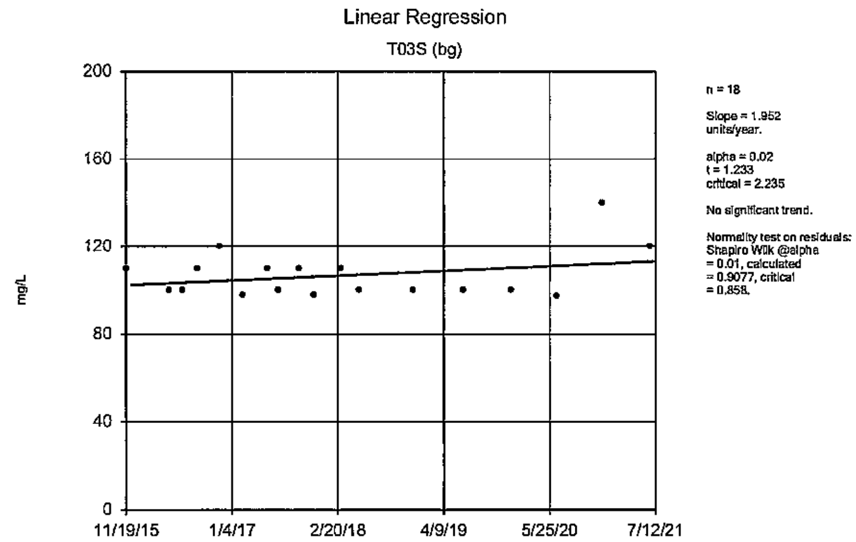

Constituent: Calcium Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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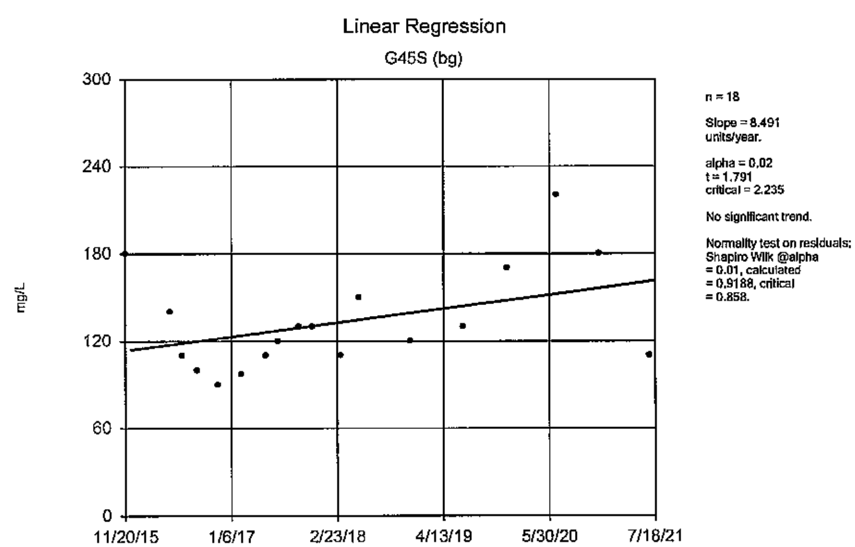

Constituent: Chloride Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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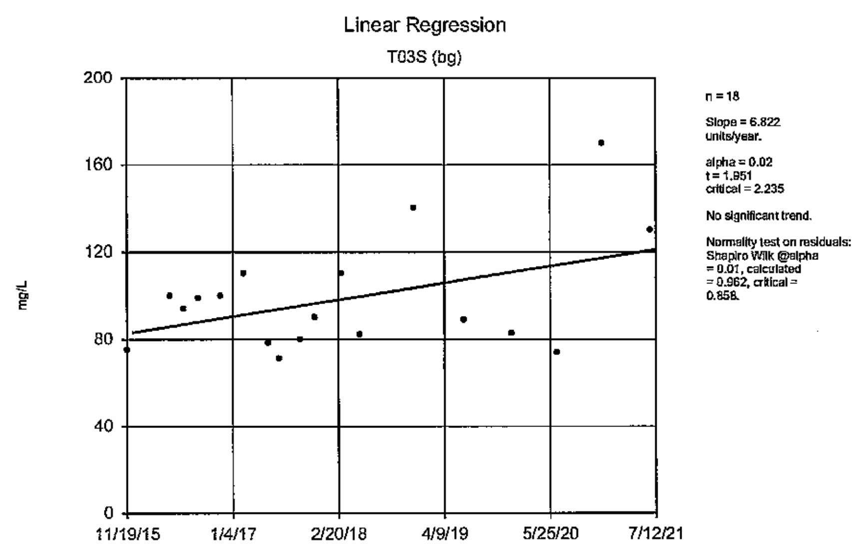

Constituent: Chloride Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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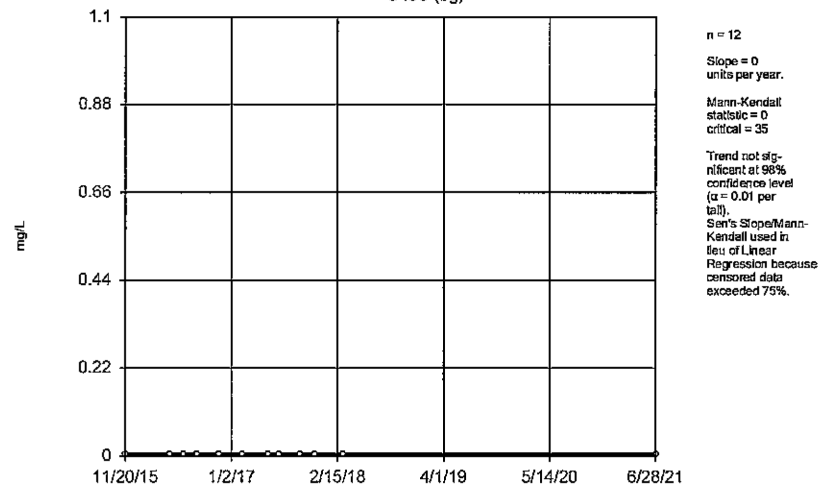
Hollow symbols indicate censored values.

Sen's Slope Estimator

G45S (bg)



Constituent: Chromium Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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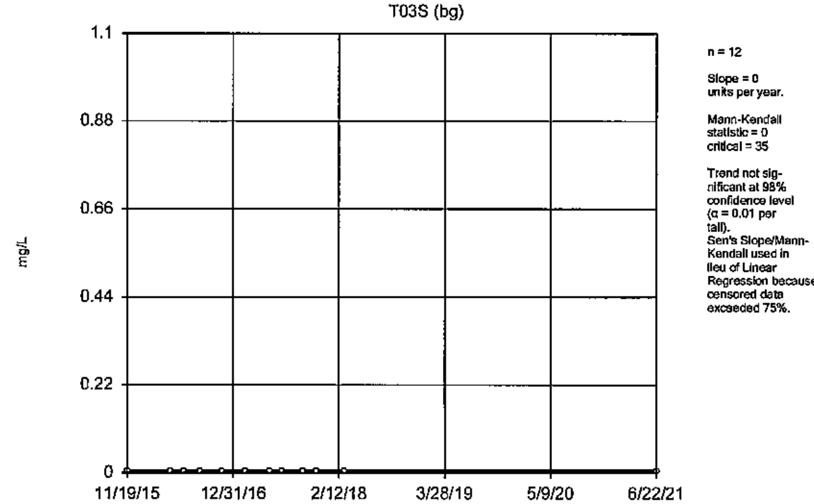
Hollow symbols indicate censored values.

Sen's Slope Estimator

T03S (bg)



Constituent: Chromium Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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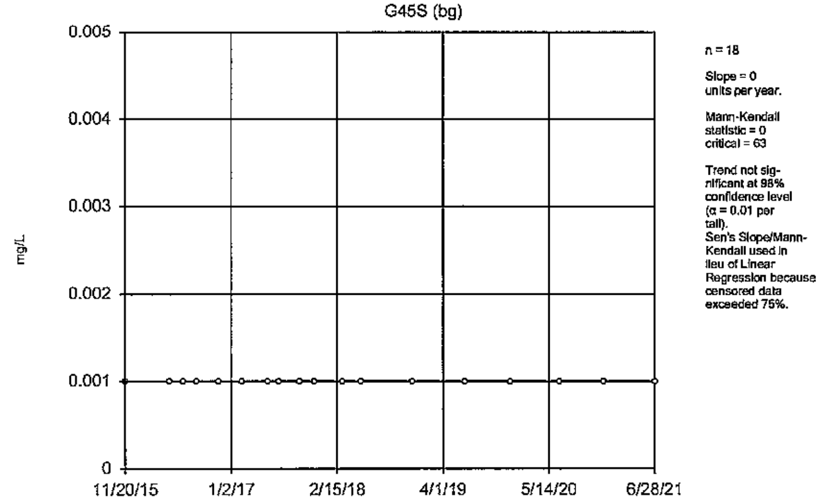
Hollow symbols indicate censored values.

Sen's Slope Estimator

G45S (bg)



Constituent: Cobalt Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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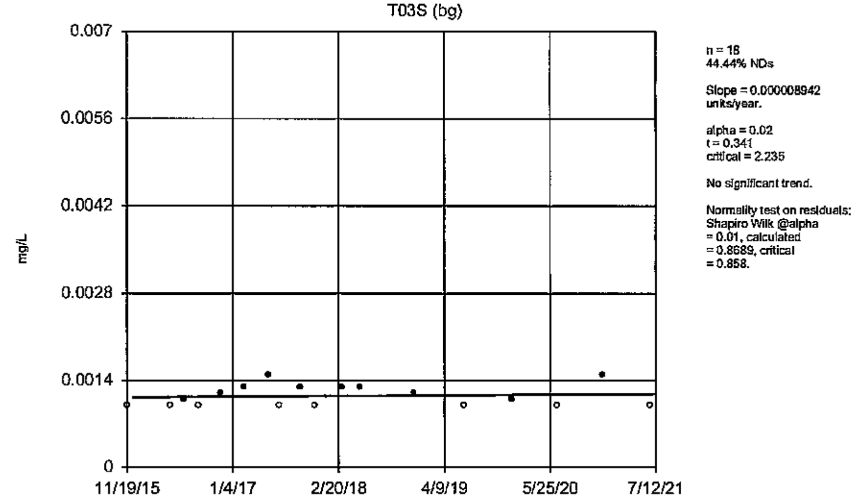
Hollow symbols indicate censored values.

Linear Regression

T03S (bg)



Constituent: Cobalt Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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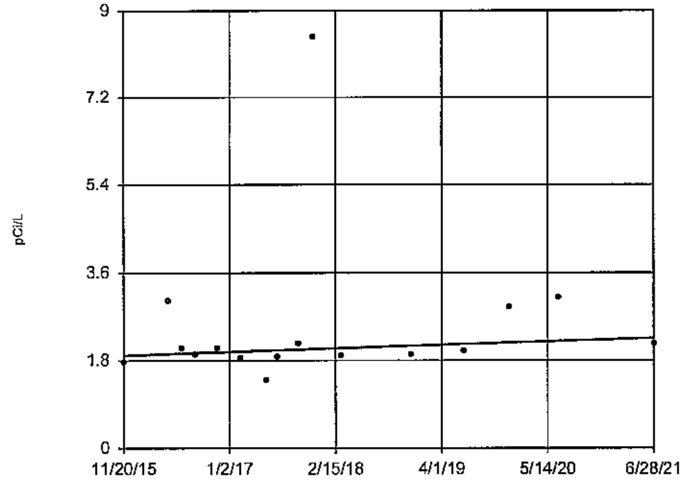
Sen's Slope Estimator

G45S (bg)



n = 16

Slope = 0.06457
units per year.

Mann-Kendall
statistic = 32
critical = 53

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.01 alpha level, calculated = 0.7001, critical = 0.844.

Constituent: Combined Radium 226 + 228 Analysis Run 8/9/2021 2:45 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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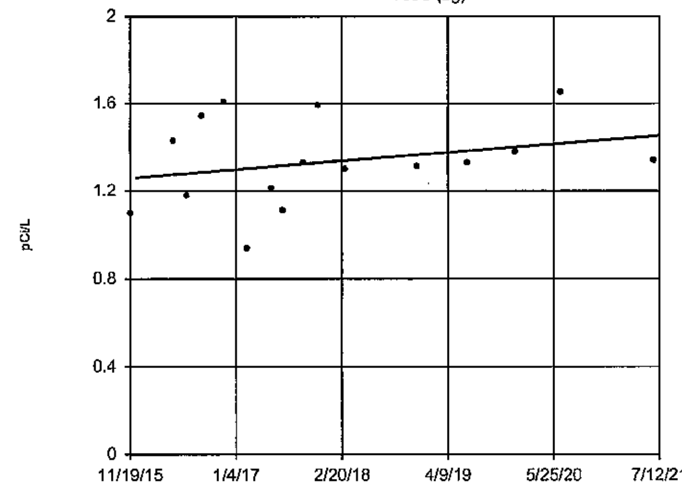
Linear Regression

T03S (bg)



n = 16

Slope = 0.03416
units/year.

alpha = 0.02
t = 1.078
critical = 2.264

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha = 0.01, calculated = 0.9362, critical = 0.844.

Constituent: Combined Radium 226 + 228 Analysis Run 8/9/2021 2:45 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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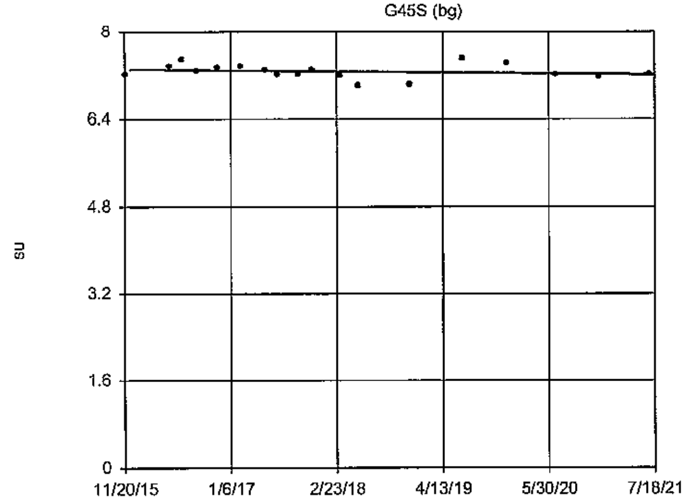
Linear Regression

G45S (bg)



n = 18

Slope = -0.01842
units/year.

alpha = 0.02
t = -0.8901
critical = 2.235

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha = 0.01, calculated = 0.9608, critical = 0.858.

Constituent: Field pH Analysis Run 8/9/2021 2:45 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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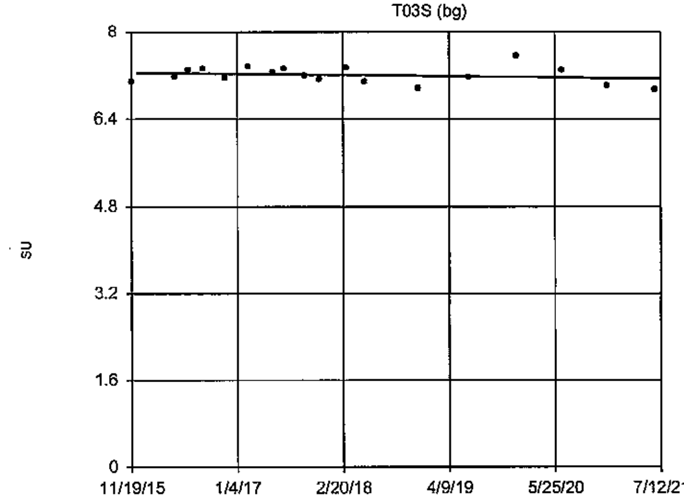
Linear Regression

T03S (bg)



n = 18

Slope = -0.01944
units/year.

alpha = 0.02
t = -0.8257
critical = 2.235

No significant trend.

Normality test on residuals;
Shapiro Wilk @alpha = 0.01, calculated = 0.9395, critical = 0.858.

Constituent: Field pH Analysis Run 8/9/2021 2:45 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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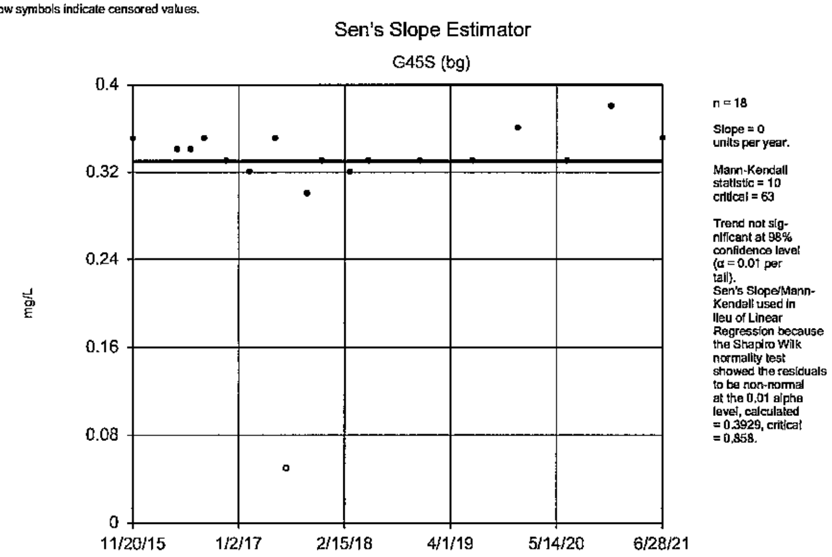
Hollow symbols indicate censored values.



Constituent: Fluoride Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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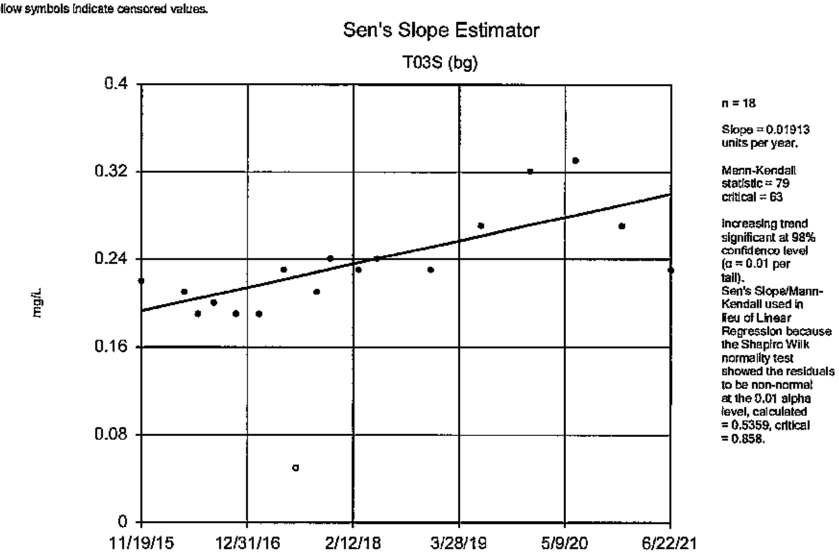
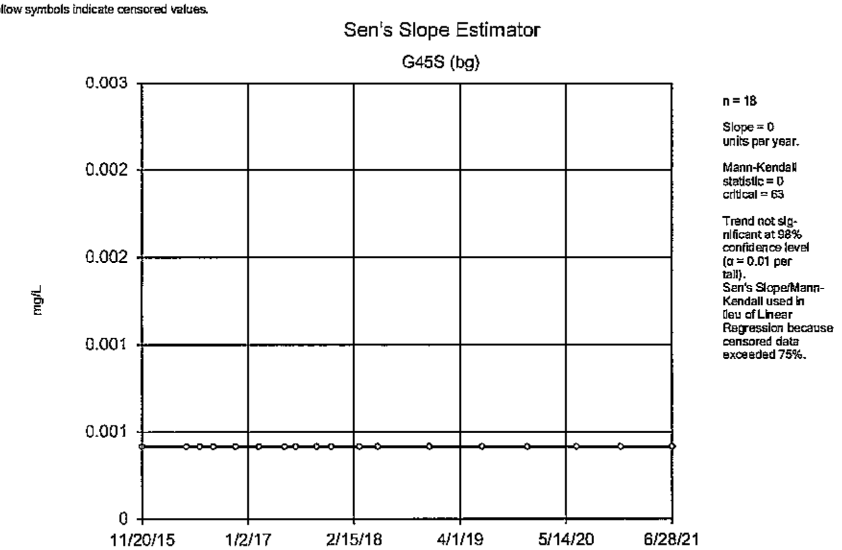
Hollow symbols indicate censored values.



Constituent: Fluoride Analysis Run 8/9/2021 2:45 PM
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.



Constituent: Lead Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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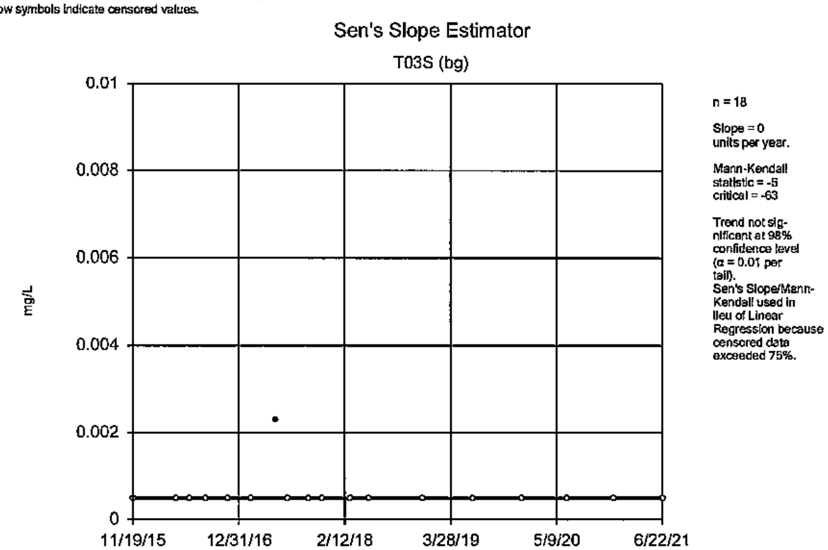
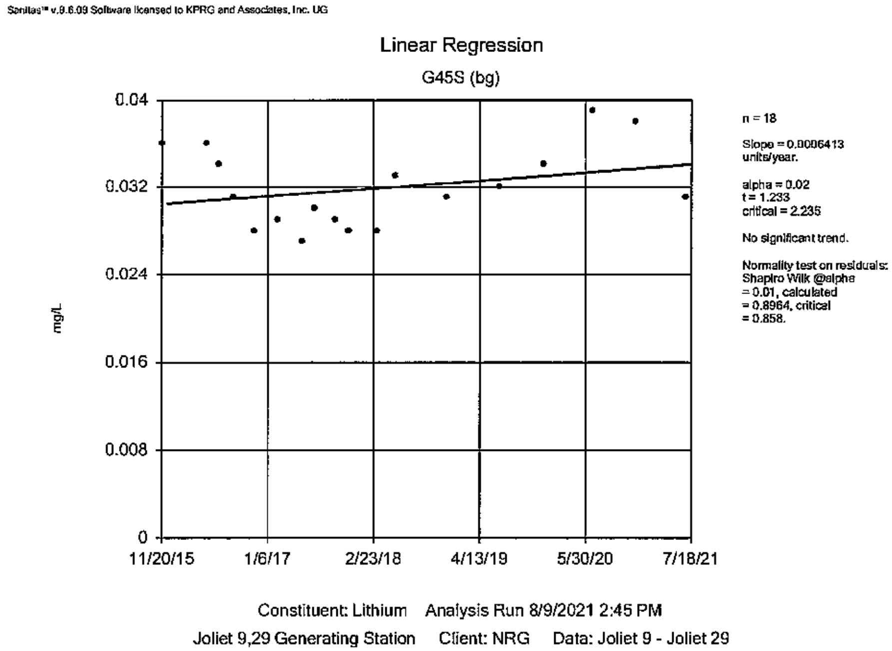
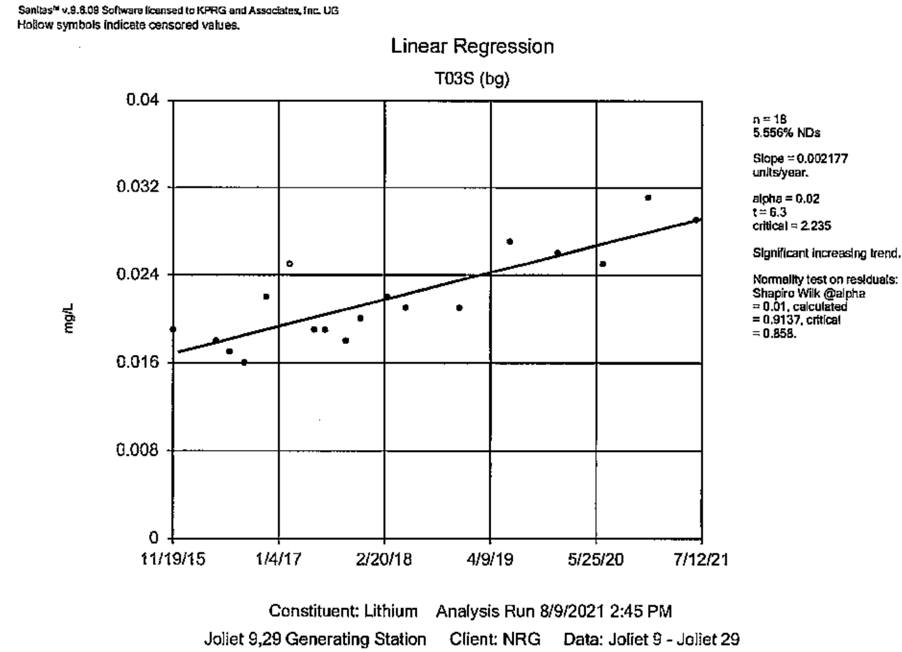
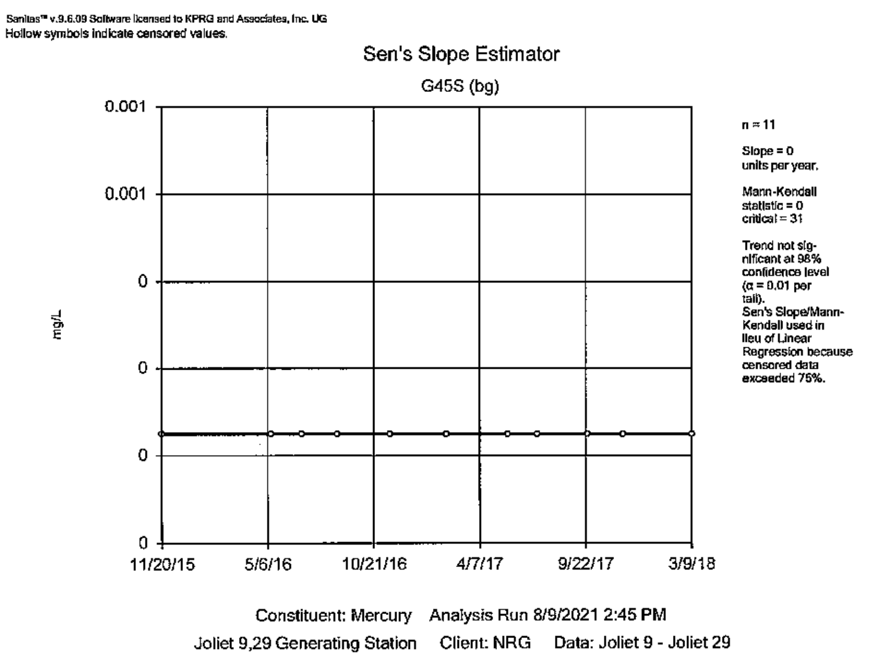
Hollow symbols indicate censored values.

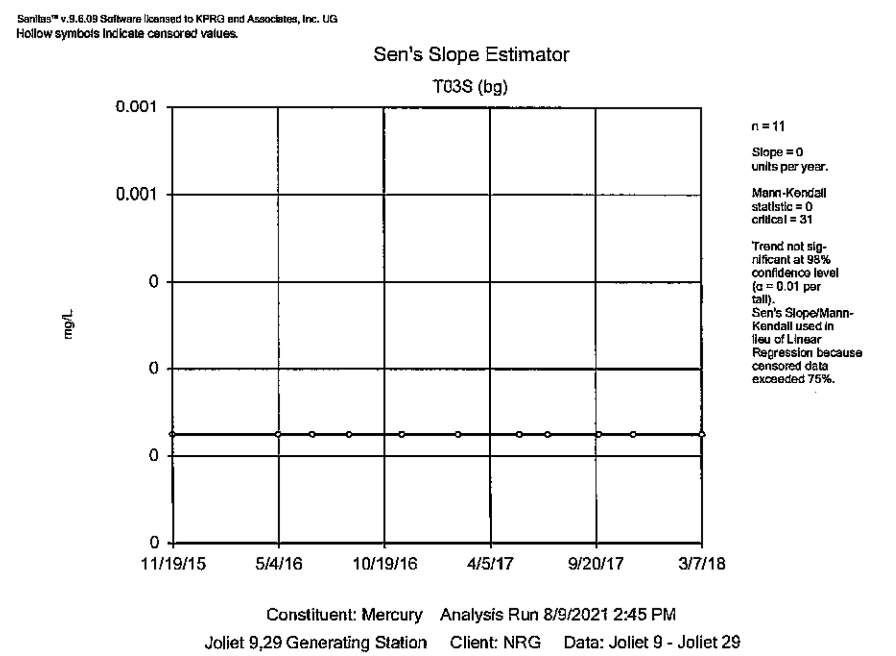


Constituent: Lead Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29


Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG
Linear Regression
G45S (bg)
0.04
0.032
0.024
0.016
0.008
0
mg/L
11/20/15
1/6/17
2/23/18
4/13/19
5/30/20
7/18/21
n = 18
Slope = 0.0006413 units/year.
alpha = 0.02
t = 1.233
critical = 2.235
No significant trend.
Normality test on residuals: Shapiro Wilk @alpha = 0.01, calculated = 0.8964, critical = 0.858.
Constituent: Lithium Analysis Run 8/9/2021 2:45 PM
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
T03S (bg)
0.04
0.032
0.024
0.016
0.008
0
mg/L
11/19/15
1/4/17
2/20/18
4/9/19
5/25/20
7/12/21
n = 18
5.556% NDs
Slope = 0.002177 units/year.
alpha = 0.02
t = 6.3
critical = 2.235
Significant increasing trend.
Normality test on residuals: Shapiro Wilk @alpha = 0.01, calculated = 0.9137, critical = 0.858.
Constituent: Lithium Analysis Run 8/9/2021 2:45 PM
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
G45S (bg)
0.001
0.001
0
0
0
0
mg/L
11/20/15
5/6/16
10/21/16
4/7/17
9/22/17
3/9/18
n = 11
Slope = 0 units per year.
Mann-Kendall statistic = 0
critical = 31
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Mercury Analysis Run 8/9/2021 2:45 PM
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
T03S (bg)
0.001
0.001
0
0
0
0
mg/L
11/19/15
5/4/16
10/19/16
4/5/17
9/20/17
3/7/18
n = 11
Slope = 0 units per year.
Mann-Kendall statistic = 0
critical = 31
Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.
Constituent: Mercury Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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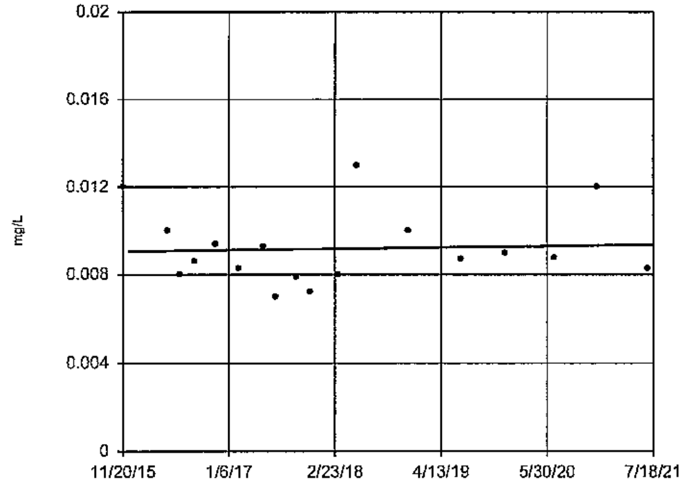
Linear Regression

G45S (bg)



n = 18

Slope = 0.00005288 units/year.

alpha = 0.02
t = 0.2117
critical = 2.235

No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.01, calculated = 0.8925, critical = 0.858.

Constituent: Molybdenum Analysis Run 8/9/2021 2:45 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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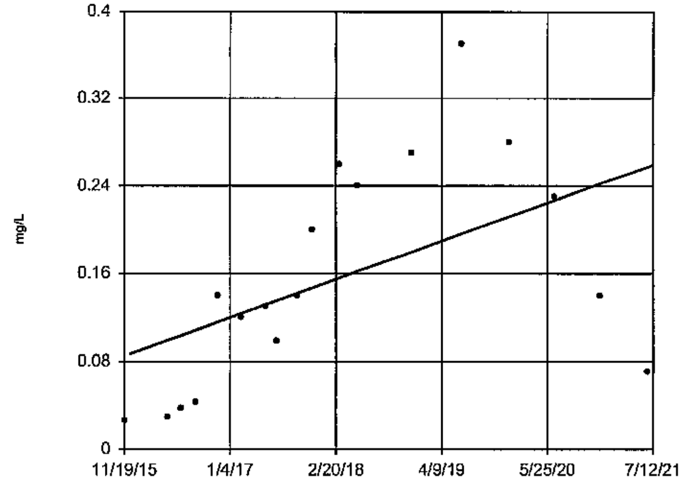
Linear Regression

T03S (bg)



n = 18

Slope = 0.03093 units/year.

alpha = 0.02
t = 2.388
critical = 2.235

Significant increasing trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.01, calculated = 0.9829, critical = 0.858.

Constituent: Molybdenum Analysis Run 8/9/2021 2:45 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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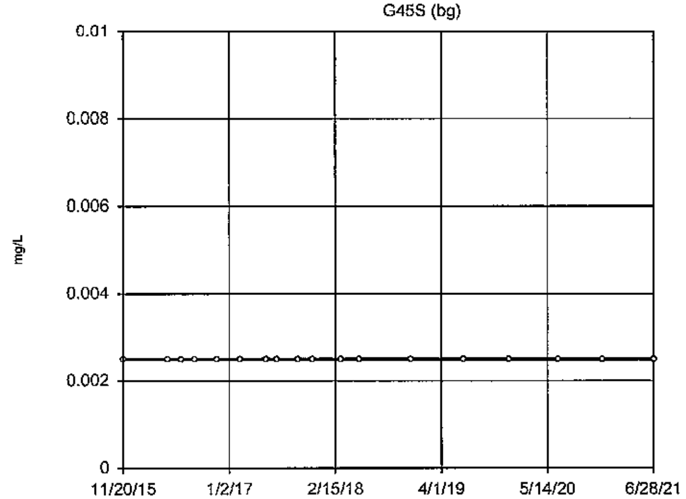
Hollow symbols indicate censored values.

Sen's Slope Estimator

G45S (bg)



n = 18

Slope = 0 units per year.

Mann-Kendall statistic = 0
critical = 63

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

Constituent: Selenium Analysis Run 8/9/2021 2:45 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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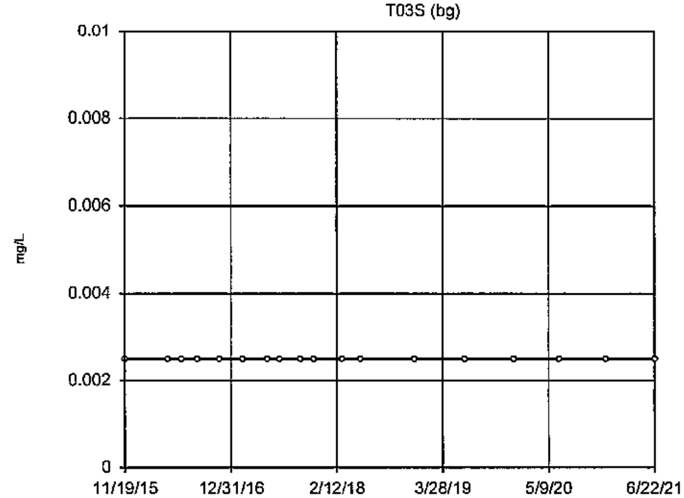
Hollow symbols indicate censored values.

Sen's Slope Estimator

T03S (bg)



n = 18

Slope = 0 units per year.

Mann-Kendall statistic = 0
critical = 63

Trend not significant at 98% confidence level (α = 0.01 per tail).
Sen's Slope/Mann-Kendall used in lieu of Linear Regression because censored data exceeded 75%.

Constituent: Selenium Analysis Run 8/9/2021 2:45 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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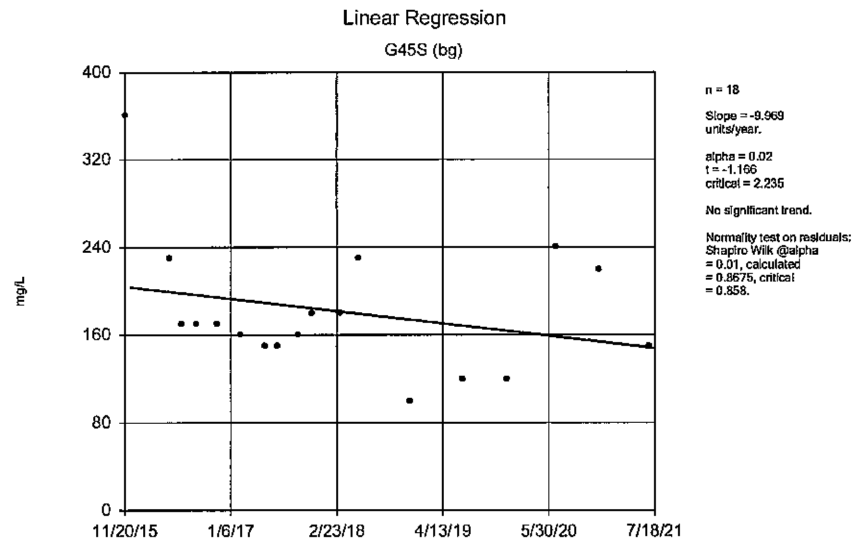
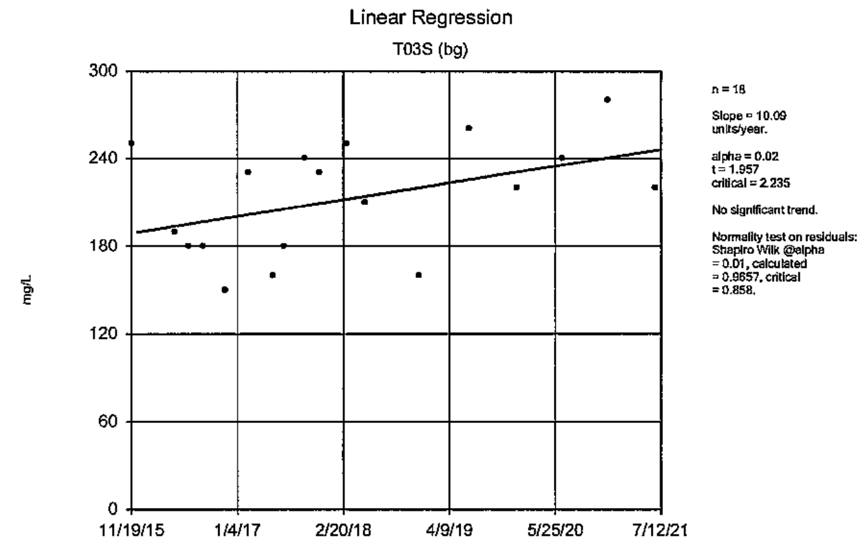


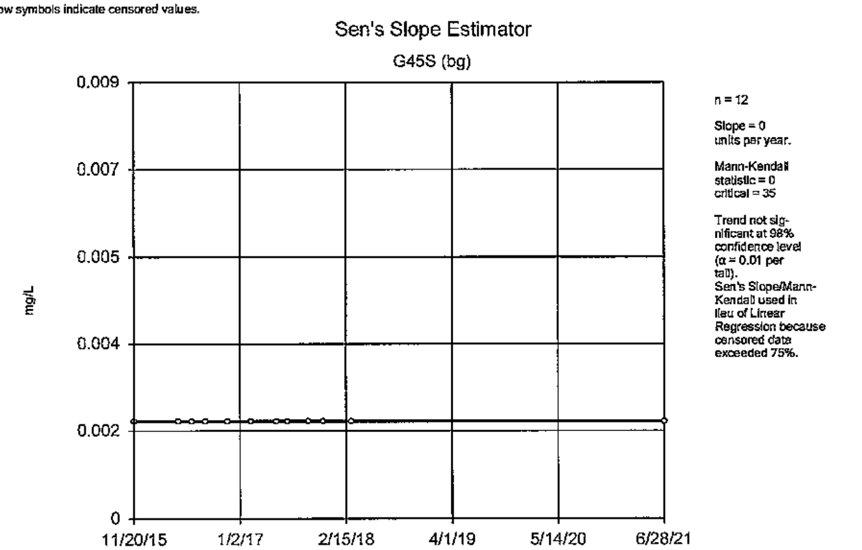
Constituent: Sulfate Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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



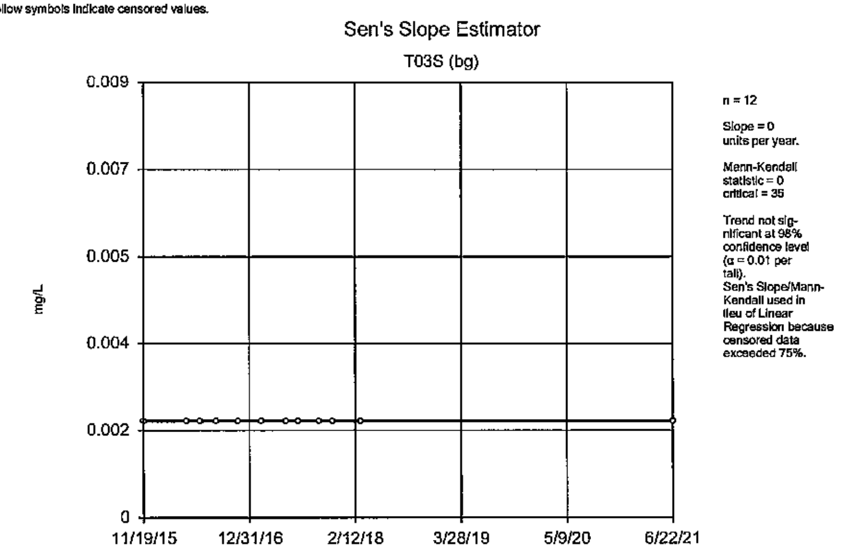
Constituent: Sulfate Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



Constituent: Thallium Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

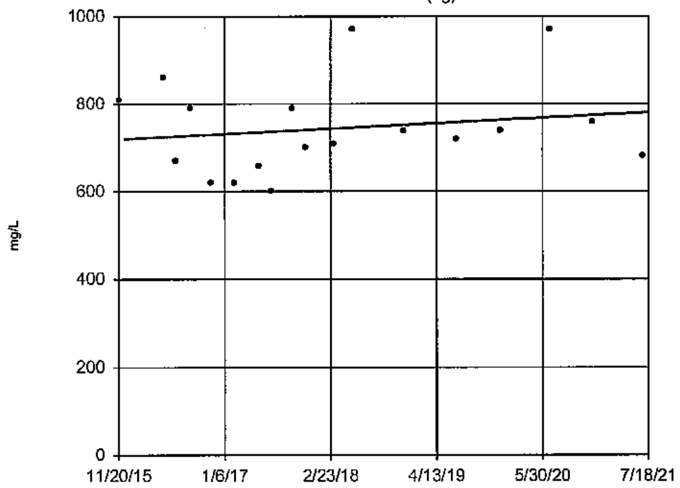
Sanitas™ v.9.6.09 Software licensed to KPRG and Associates, Inc. UG
Hollow symbols indicate censored values.



Constituent: Thallium Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Linear Regression

G45S (bg)



n = 18

Slope = 10.49 units/year.

alpha = 0.02
t = 0.66
critical = 2.235

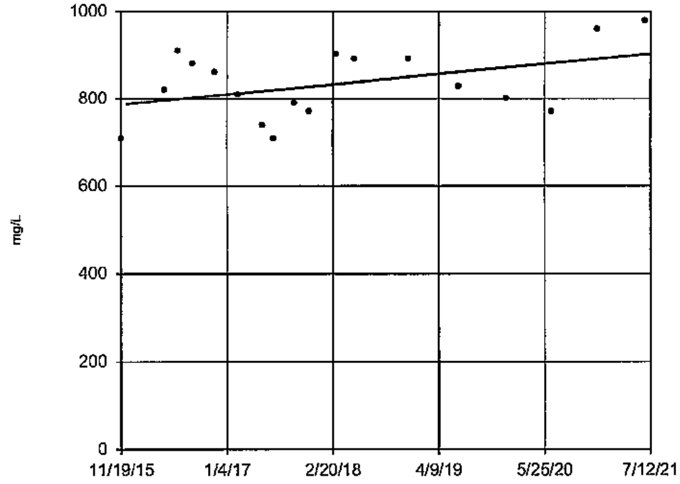
No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.01, calculated = 0.9152, critical = 0.858.

Constituent: Total Dissolved Solids Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Linear Regression

T03S (bg)



n = 18

Slope = 20.44 units/year.

alpha = 0.02
t = 1.894
critical = 2.235

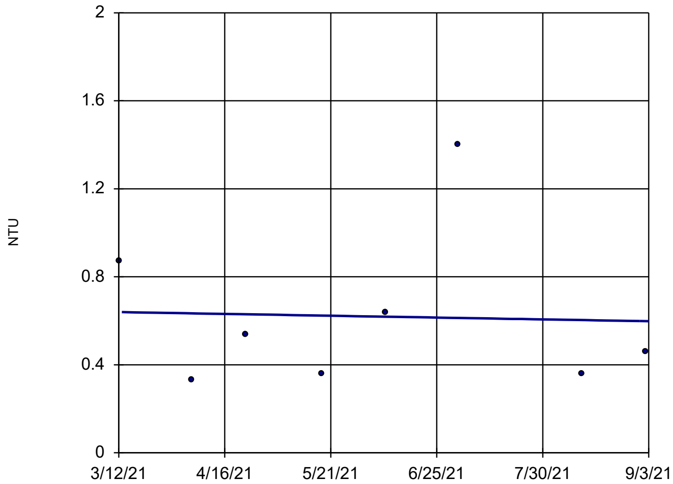
No significant trend.

Normality test on residuals: Shapiro Wilk @alpha = 0.01, calculated = 0.9216, critical = 0.858.

Constituent: Total Dissolved Solids Analysis Run 8/9/2021 2:45 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Linear Regression

G45S (bg)



n = 8

Slope = -0.08649
units/year.

alpha = 0.02
t = -0.09738
critical = 2.612

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.813, critical =
0.749.

Constituent: Turbidity   Analysis Run 10/8/2021 11:52 AM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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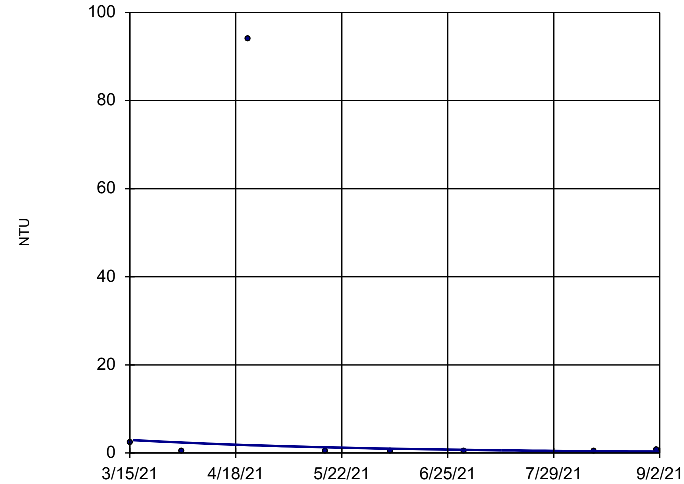
Linear Regression

T03S (bg)



n = 8

Slope = -4.804
natural log units/year.

alpha = 0.02
t = -1.117
critical = 2.612

No significant trend.

Normality test on residuals:
Shapiro Wilk @alpha
= 0.01, calculated
= 0.7908 after natural
log transformation,
critical = 0.749.

Constituent: Turbidity   Analysis Run 10/8/2021 11:52 AM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Trend Test Joliet #9 UG WellsTurbidity

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29   Printed 10/8/2021, 11:53 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Turbidity (NTU)	G45S (bg)	-0.08649	-0.09738	2.612	No	8	0	Yes	no	0.02	Param.
Turbidity (NTU)	T03S (bg)	-4.804	-1.117	2.612	No	8	0	Yes	natura...	0.02	Param.

Joliet #9 ANOVA UG Wells All Values

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29   Printed 8/9/2021, 2:49 PM

Constituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
Arsenic (mg/L)	n/a	n/a	n/a	n/a	n/a	sqrt(x)	Yes	0.05	Param.
Barium (mg/L)	n/a	n/a	n/a	n/a	n/a	sqrt(x)	Yes	0.05	Param.
Boron (mg/L)	n/a	n/a	n/a	n/a	n/a	ln(x)	Yes	0.05	Param.
Calcium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Chloride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Cobalt (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Combined Radium 226 + 228 (pCi/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Field pH (SU)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	Param.
Fluoride (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Lead (mg/L)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (NDs)
Lithium (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.
Molybdenum (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	NP (normality)
Sulfate (mg/L)	n/a	n/a	n/a	n/a	n/a	sqrt(x)	Yes	0.05	Param.
Total Dissolved Solids (mg/L)	n/a	n/a	n/a	n/a	n/a	No	Yes	0.05	Param.

Parametric ANOVA

Constituent: Arsenic Analysis Run 8/9/2021 2:49 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021 the parametric analysis of variance test (after square root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 592.4

Tabulated F statistic = 4.134 with 1 and 34 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	72003	1	72003	8.045
Error Within Groups	304294	34	8950	
Total	376297	35		

The Shapiro Wilk normality test on the residuals passed after square root transformation. Alpha = 0.05, calculated = 0.9646, critical = 0.935. Levene's Equality of Variance test passed. Calculated = 0.2153, tabulated = 4.134.

Parametric ANOVA

Constituent: Barium Analysis Run 8/9/2021 2:49 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021 the parametric analysis of variance test (after square root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 425.4

Tabulated F statistic = 4.134 with 1 and 34 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	72003	1	72003	8.045
Error Within Groups	304294	34	8950	
Total	376297	35		

The Shapiro Wilk normality test on the residuals passed after square root transformation. Alpha = 0.05, calculated = 0.9657, critical = 0.935. Levene's Equality of Variance test passed. Calculated = 0.06556, tabulated = 4.134.

Parametric ANOVA

Constituent: Boron   Analysis Run 8/9/2021 2:49 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021 the parametric analysis of variance test (after natural log transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 75.07

Tabulated F statistic = 4.134 with 1 and 34 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	72003	1	72003	8.045
Error Within Groups	304294	34	8950	
Total	376297	35		

The Shapiro Wilk normality test on the residuals passed after natural log transformation. Alpha = 0.05, calculated = 0.9672, critical = 0.935. Levene's Equality of Variance test passed. Calculated = 2.445, tabulated = 4.134.

Non-Parametric ANOVA

Constituent: Calcium   Analysis Run 8/9/2021 2:49 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 3.948

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 8 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 3.848
Adjusted Kruskal-Wallis statistic (H') = 3.948

Non-Parametric ANOVA

Constituent: Chloride Analysis Run 8/9/2021 2:49 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 11.33

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 8 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 11.25
Adjusted Kruskal-Wallis statistic (H') = 11.33

Non-Parametric ANOVA

Constituent: Cobalt   Analysis Run 8/9/2021 2:49 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 13.04

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 5 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 8.108
Adjusted Kruskal-Wallis statistic (H') = 13.04

Non-Parametric ANOVA

Constituent: Combined Radium 226 + 228 Analysis Run 8/9/2021 2:49 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 21.5

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 3 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 21.49
Adjusted Kruskal-Wallis statistic (H') = 21.5

Parametric ANOVA

Constituent: Field pH   Analysis Run 8/9/2021 2:49 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 1.721

Tabulated F statistic = 4.134 with 1 and 34 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	72003	1	72003	8.045
Error Within Groups	304294	34	8950	
Total	376297	35		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.05, calculated = 0.9749, critical = 0.935. Levene's Equality of Variance test passed. Calculated = 0.348, tabulated = 4.134.

Non-Parametric ANOVA

Constituent: Fluoride Analysis Run 8/9/2021 2:49 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 18.87

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 10 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 18.65
Adjusted Kruskal-Wallis statistic (H') = 18.87

Non-Parametric ANOVA

Constituent: Lead   Analysis Run 8/9/2021 2:49 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 1

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.08108
Adjusted Kruskal-Wallis statistic (H') = 1

Parametric ANOVA

Constituent: Lithium   Analysis Run 8/9/2021 2:49 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 56.17

Tabulated F statistic = 4.134 with 1 and 34 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	72003	1	72003	8.045
Error Within Groups	304294	34	8950	
Total	376297	35		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.05, calculated = 0.9351, critical = 0.935. Levene's Equality of Variance test passed. Calculated = 0.4952, tabulated = 4.134.

Non-Parametric ANOVA

Constituent: Molybdenum   Analysis Run 8/9/2021 2:49 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 26.3

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 5 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) = 26.27
Adjusted Kruskal-Wallis statistic (H') = 26.3

Parametric ANOVA

Constituent: Sulfate   Analysis Run 8/9/2021 2:49 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021 the parametric analysis of variance test (after square root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 4.453

Tabulated F statistic = 4.134 with 1 and 34 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	72003	1	72003	8.045
Error Within Groups	304294	34	8950	
Total	376297	35		

The Shapiro Wilk normality test on the residuals passed after square root transformation. Alpha = 0.05, calculated = 0.956, critical = 0.935. Levene's Equality of Variance test passed. Calculated = 0.9277, tabulated = 4.134.

Parametric ANOVA

Constituent: Total Dissolved Solids   Analysis Run 8/9/2021 2:49 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

For observations made between 11/19/2015 and 6/28/2021 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 8.045

Tabulated F statistic = 4.134 with 1 and 34 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	72003	1	72003	8.045
Error Within Groups	304294	34	8950	
Total	376297	35		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.05, calculated = 0.9494, critical = 0.935. Levene's Equality of Variance test passed. Calculated = 0.706, tabulated = 4.134.

Non-Parametric ANOVA

Constituent: Turbidity   Analysis Run 10/8/2021 11:54 AM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

For observations made between 3/12/2021 and 9/2/2021, the non-parametric analysis of variance test indicates NO DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 0.04425

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 0.04412
Adjusted Kruskal-Wallis statistic (H') = 0.04425

ANOVA Joliet #9 UG Wells - Turbidity

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29   Printed 10/8/2021, 11:54 AM

Constituent	Well	Calc.	Crit.	Sig.	Alpha	Transform	ANOVA Sig.	Alpha	Method
Turbidity (NTU)	n/a	n/a	n/a	n/a	n/a	No	No	0.05	NP (normality)

Shapiro-Wilk Normality Test

Constituent: Antimony Analysis Run 8/9/2021 3:02 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (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
T03S (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
Pooled Background (bg) (n = 24, alpha = 0.05)				
	no	-1	0.916	No
	square root	0	0.916	No
	square	-1	0.916	No
	cube root	0	0.916	No
	cube	-1	0.916	No
	natural log	0	0.916	No
	x^4	-1	0.916	No
	x^5	-1	0.916	No
	x^6	-1	0.916	No

Shapiro-Wilk Normality Test

Constituent: Arsenic Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.9429	0.897	Yes
	square root	0.9448	0.897	Yes
	square	0.9348	0.897	Yes
	cube root	0.9451	0.897	Yes
	cube	0.921	0.897	Yes
	natural log	0.9453	0.897	Yes
	x^4	0.9019	0.897	Yes
	x^5	0.878	0.897	No
	x^6	0.8503	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.9474	0.897	Yes
	square root	0.9415	0.897	Yes
	square	0.8931	0.897	No
	cube root	0.9319	0.897	Yes
	cube	0.8166	0.897	No
	natural log	0.9006	0.897	Yes
	x^4	0.7505	0.897	No
	x^5	0.6986	0.897	No
	x^6	0.6582	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.8046	0.935	No
	square root	0.8183	0.935	No
	square	0.8048	0.935	No
	cube root	0.825	0.935	No
	cube	0.8059	0.935	No
	natural log	0.8373	0.935	No
	x^4	0.7893	0.935	No
	x^5	0.7579	0.935	No
	x^6	0.7189	0.935	No

Shapiro-Wilk Normality Test

Constituent: Barium Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.9528	0.897	Yes
	square root	0.9604	0.897	Yes
	square	0.9333	0.897	Yes
	cube root	0.9626	0.897	Yes
	cube	0.9088	0.897	Yes
	natural log	0.9665	0.897	Yes
	x^4	0.8801	0.897	No
	x^5	0.8485	0.897	No
	x^6	0.815	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.8897	0.897	No
	square root	0.8798	0.897	No
	square	0.8899	0.897	No
	cube root	0.875	0.897	No
	cube	0.8667	0.897	No
	natural log	0.8635	0.897	No
	x^4	0.8258	0.897	No
	x^5	0.7745	0.897	No
	x^6	0.719	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.8261	0.935	No
	square root	0.8267	0.935	No
	square	0.8256	0.935	No
	cube root	0.8271	0.935	No
	cube	0.8211	0.935	No
	natural log	0.828	0.935	No
	x^4	0.8051	0.935	No
	x^5	0.7726	0.935	No
	x^6	0.7239	0.935	No

Shapiro-Wilk Normality Test

Constituent: Beryllium Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (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
T03S (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
Pooled Background (bg) (n = 24, alpha = 0.05)				
	no	-1	0.916	No
	square root	0	0.916	No
	square	-1	0.916	No
	cube root	0	0.916	No
	cube	-1	0.916	No
	natural log	0	0.916	No
	x^4	-1	0.916	No
	x^5	-1	0.916	No
	x^6	-1	0.916	No

Shapiro-Wilk Normality Test

Constituent: Boron   Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.8567	0.897	No
	square root	0.8817	0.897	No
	square	0.8047	0.897	No
	cube root	0.8897	0.897	No
	cube	0.7543	0.897	No
	natural log	0.9048	0.897	Yes
	x^4	0.7083	0.897	No
	x^5	0.6671	0.897	No
	x^6	0.6303	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.9222	0.897	Yes
	square root	0.9612	0.897	Yes
	square	0.8093	0.897	No
	cube root	0.9684	0.897	Yes
	cube	0.7014	0.897	No
	natural log	0.9713	0.897	Yes
	x^4	0.6182	0.897	No
	x^5	0.5584	0.897	No
	x^6	0.5159	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.8415	0.935	No
	square root	0.8968	0.935	No
	square	0.6881	0.935	No
	cube root	0.9093	0.935	No
	cube	0.5503	0.935	No
	natural log	0.9249	0.935	No
	x^4	0.4566	0.935	No
	x^5	0.3971	0.935	No
	x^6	0.3588	0.935	No

Shapiro-Wilk Normality Test

Constituent: Cadmium Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (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
T03S (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
Pooled Background (bg) (n = 24, alpha = 0.05)				
	no	-1	0.916	No
	square root	0	0.916	No
	square	-1	0.916	No
	cube root	0	0.916	No
	cube	-1	0.916	No
	natural log	-1	0.916	No
	x^4	-1	0.916	No
	x^5	-1	0.916	No
	x^6	-1	0.916	No

Shapiro-Wilk Normality Test

Constituent: Calcium   Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.9001	0.897	Yes
	square root	0.9088	0.897	Yes
	square	0.88	0.897	No
	cube root	0.9115	0.897	Yes
	cube	0.8565	0.897	No
	natural log	0.9165	0.897	Yes
	x^4	0.8299	0.897	No
	x^5	0.8009	0.897	No
	x^6	0.7699	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.7677	0.897	No
	square root	0.7823	0.897	No
	square	0.735	0.897	No
	cube root	0.7868	0.897	No
	cube	0.6983	0.897	No
	natural log	0.7955	0.897	No
	x^4	0.6588	0.897	No
	x^5	0.6179	0.897	No
	x^6	0.5771	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.9187	0.935	No
	square root	0.9317	0.935	No
	square	0.8865	0.935	No
	cube root	0.9355	0.935	Yes
	cube	0.8467	0.935	No
	natural log	0.9425	0.935	Yes
	x^4	0.8008	0.935	No
	x^5	0.7504	0.935	No
	x^6	0.6978	0.935	No

Shapiro-Wilk Normality Test

Constituent: Chloride   Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.898	0.897	Yes
	square root	0.9255	0.897	Yes
	square	0.8298	0.897	No
	cube root	0.9335	0.897	Yes
	cube	0.7517	0.897	No
	natural log	0.9474	0.897	Yes
	x^4	0.6724	0.897	No
	x^5	0.5985	0.897	No
	x^6	0.5335	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.8597	0.897	No
	square root	0.8958	0.897	No
	square	0.7744	0.897	No
	cube root	0.9065	0.897	Yes
	cube	0.6829	0.897	No
	natural log	0.9257	0.897	Yes
	x^4	0.5969	0.897	No
	x^5	0.5233	0.897	No
	x^6	0.4638	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.9079	0.935	No
	square root	0.9401	0.935	Yes
	square	0.819	0.935	No
	cube root	0.9485	0.935	Yes
	cube	0.7133	0.935	No
	natural log	0.9618	0.935	Yes
	x^4	0.6088	0.935	No
	x^5	0.5167	0.935	No
	x^6	0.4408	0.935	No

Shapiro-Wilk Normality Test

Constituent: Chromium   Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (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
T03S (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
Pooled Background (bg) (n = 24, alpha = 0.05)				
	no	-1	0.916	No
	square root	0	0.916	No
	square	-1	0.916	No
	cube root	0	0.916	No
	cube	-1	0.916	No
	natural log	0	0.916	No
	x^4	-1	0.916	No
	x^5	-1	0.916	No
	x^6	-1	0.916	No

Shapiro-Wilk Normality Test

Constituent: Cobalt Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	-1	0.897	No
	square root	0	0.897	No
	square	-1	0.897	No
	cube root	0	0.897	No
	cube	-1	0.897	No
	natural log	0	0.897	No
	x^4	-1	0.897	No
	x^5	-1	0.897	No
	x^6	-1	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.8169	0.897	No
	square root	0.8202	0.897	No
	square	0.8059	0.897	No
	cube root	0.821	0.897	No
	cube	0.789	0.897	No
	natural log	0.8222	0.897	No
	x^4	0.7668	0.897	No
	x^5	0.7402	0.897	No
	x^6	0.7105	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.597	0.935	No
	square root	0.601	0.935	No
	square	0.5864	0.935	No
	cube root	0.6021	0.935	No
	cube	0.5724	0.935	No
	natural log	0.6041	0.935	No
	x^4	0.5549	0.935	No
	x^5	0.5345	0.935	No
	x^6	0.512	0.935	No

Shapiro-Wilk Normality Test

Constituent: Combined Radium 226 + 228 Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 16, alpha = 0.05)				
	no	0.511	0.887	No
	square root	0.6109	0.887	No
	square	0.3754	0.887	No
	cube root	0.6471	0.887	No
	cube	0.3128	0.887	No
	natural log	0.7197	0.887	No
	x^4	0.2877	0.887	No
	x^5	0.2782	0.887	No
	x^6	0.2747	0.887	No
T03S (bg) (n = 16, alpha = 0.05)				
	no	0.9665	0.887	Yes
	square root	0.9641	0.887	Yes
	square	0.9607	0.887	Yes
	cube root	0.9625	0.887	Yes
	cube	0.9439	0.887	Yes
	natural log	0.9579	0.887	Yes
	x^4	0.9198	0.887	Yes
	x^5	0.8917	0.887	Yes
	x^6	0.8621	0.887	No
Pooled Background (bg) (n = 32, alpha = 0.05)				
	no	0.5338	0.93	No
	square root	0.7014	0.93	No
	square	0.3089	0.93	No
	cube root	0.7569	0.93	No
	cube	0.2233	0.93	No
	natural log	0.855	0.93	No
	x^4	0.1951	0.93	No
	x^5	0.1858	0.93	No
	x^6	0.1827	0.93	No

Shapiro-Wilk Normality Test

Constituent: Field pH   Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.957	0.897	Yes
	square root	0.9568	0.897	Yes
	square	0.9571	0.897	Yes
	cube root	0.9567	0.897	Yes
	cube	0.957	0.897	Yes
	natural log	0.9566	0.897	Yes
	x^4	0.9566	0.897	Yes
	x^5	0.9559	0.897	Yes
	x^6	0.9549	0.897	Yes
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.966	0.897	Yes
	square root	0.9669	0.897	Yes
	square	0.9637	0.897	Yes
	cube root	0.9672	0.897	Yes
	cube	0.9611	0.897	Yes
	natural log	0.9678	0.897	Yes
	x^4	0.958	0.897	Yes
	x^5	0.9545	0.897	Yes
	x^6	0.9506	0.897	Yes
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.9765	0.935	Yes
	square root	0.9766	0.935	Yes
	square	0.976	0.935	Yes
	cube root	0.9766	0.935	Yes
	cube	0.9752	0.935	Yes
	natural log	0.9766	0.935	Yes
	x^4	0.9741	0.935	Yes
	x^5	0.9726	0.935	Yes
	x^6	0.9708	0.935	Yes

Shapiro-Wilk Normality Test

Constituent: Fluoride Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.486	0.897	No
	square root	0.4131	0.897	No
	square	0.6472	0.897	No
	cube root	0.3917	0.897	No
	cube	0.782	0.897	No
	natural log	0.3544	0.897	No
	x^4	0.8681	0.897	No
	x^5	0.9115	0.897	Yes
	x^6	0.9249	0.897	Yes
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.8645	0.897	No
	square root	0.7698	0.897	No
	square	0.9048	0.897	Yes
	cube root	0.7289	0.897	No
	cube	0.8395	0.897	No
	natural log	0.6408	0.897	No
	x^4	0.7587	0.897	No
	x^5	0.6875	0.897	No
	x^6	0.6288	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.8634	0.935	No
	square root	0.7876	0.935	No
	square	0.9107	0.935	No
	cube root	0.7525	0.935	No
	cube	0.9059	0.935	No
	natural log	0.6711	0.935	No
	x^4	0.8941	0.935	No
	x^5	0.8823	0.935	No
	x^6	0.8697	0.935	No

Shapiro-Wilk Normality Test

Constituent: Lead   Analysis Run 8/9/2021 3:03 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	-1	0.897	No
	square root	0	0.897	No
	square	-1	0.897	No
	cube root	0	0.897	No
	cube	-1	0.897	No
	natural log	0	0.897	No
	x^4	-1	0.897	No
	x^5	-1	0.897	No
	x^6	-1	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.2528	0.897	No
	square root	0.2528	0.897	No
	square	0.2528	0.897	No
	cube root	0.2528	0.897	No
	cube	0.2528	0.897	No
	natural log	0.2528	0.897	No
	x^4	0.2528	0.897	No
	x^5	0.2528	0.897	No
	x^6	0.2528	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.1702	0.935	No
	square root	0.1702	0.935	No
	square	0.1702	0.935	No
	cube root	0.1702	0.935	No
	cube	0.1702	0.935	No
	natural log	0.1702	0.935	No
	x^4	0.1702	0.935	No
	x^5	0.1702	0.935	No
	x^6	0.1702	0.935	No

Shapiro-Wilk Normality Test

Constituent: Lithium   Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.936	0.897	Yes
	square root	0.9417	0.897	Yes
	square	0.9221	0.897	Yes
	cube root	0.9433	0.897	Yes
	cube	0.9047	0.897	Yes
	natural log	0.9463	0.897	Yes
	x^4	0.8845	0.897	No
	x^5	0.8619	0.897	No
	x^6	0.8376	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.9363	0.897	Yes
	square root	0.9491	0.897	Yes
	square	0.9037	0.897	Yes
	cube root	0.9527	0.897	Yes
	cube	0.8637	0.897	No
	natural log	0.959	0.897	Yes
	x^4	0.819	0.897	No
	x^5	0.7723	0.897	No
	x^6	0.7259	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.9534	0.935	Yes
	square root	0.9488	0.935	Yes
	square	0.9476	0.935	Yes
	cube root	0.9462	0.935	Yes
	cube	0.9227	0.935	No
	natural log	0.9396	0.935	Yes
	x^4	0.8827	0.935	No
	x^5	0.8333	0.935	No
	x^6	0.7805	0.935	No

Shapiro-Wilk Normality Test

Constituent: Mercury   Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 11, alpha = 0.05)				
	no	-1	0.85	No
	square root	-1	0.85	No
	square	-1	0.85	No
	cube root	0	0.85	No
	cube	-1	0.85	No
	natural log	-1	0.85	No
	x^4	-1	0.85	No
	x^5	-1	0.85	No
	x^6	-1	0.85	No
T03S (bg) (n = 11, alpha = 0.05)				
	no	-1	0.85	No
	square root	-1	0.85	No
	square	-1	0.85	No
	cube root	0	0.85	No
	cube	-1	0.85	No
	natural log	-1	0.85	No
	x^4	-1	0.85	No
	x^5	-1	0.85	No
	x^6	-1	0.85	No
Pooled Background (bg) (n = 22, alpha = 0.05)				
	no	-1	0.911	No
	square root	-1	0.911	No
	square	-1	0.911	No
	cube root	0	0.911	No
	cube	-1	0.911	No
	natural log	0	0.911	No
	x^4	-1	0.911	No
	x^5	-1	0.911	No
	x^6	-1	0.911	No

Shapiro-Wilk Normality Test

Constituent: Molybdenum Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.8933	0.897	No
	square root	0.9147	0.897	Yes
	square	0.8446	0.897	No
	cube root	0.9213	0.897	Yes
	cube	0.7927	0.897	No
	natural log	0.9334	0.897	Yes
	x^4	0.7415	0.897	No
	x^5	0.6939	0.897	No
	x^6	0.6511	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.9403	0.897	Yes
	square root	0.9496	0.897	Yes
	square	0.8352	0.897	No
	cube root	0.9422	0.897	Yes
	cube	0.7059	0.897	No
	natural log	0.9115	0.897	Yes
	x^4	0.5907	0.897	No
	x^5	0.4984	0.897	No
	x^6	0.4292	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.7558	0.935	No
	square root	0.8011	0.935	No
	square	0.6318	0.935	No
	cube root	0.8102	0.935	No
	cube	0.5175	0.935	No
	natural log	0.8187	0.935	No
	x^4	0.4246	0.935	No
	x^5	0.3531	0.935	No
	x^6	0.3004	0.935	No

Shapiro-Wilk Normality Test

Constituent: Selenium Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	-1	0.897	No
	square root	0	0.897	No
	square	-1	0.897	No
	cube root	-1	0.897	No
	cube	-1	0.897	No
	natural log	0	0.897	No
	x^4	-1	0.897	No
	x^5	-1	0.897	No
	x^6	-1	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	-1	0.897	No
	square root	0	0.897	No
	square	-1	0.897	No
	cube root	-1	0.897	No
	cube	-1	0.897	No
	natural log	0	0.897	No
	x^4	-1	0.897	No
	x^5	-1	0.897	No
	x^6	-1	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	-1	0.935	No
	square root	0	0.935	No
	square	-1	0.935	No
	cube root	-1	0.935	No
	cube	-1	0.935	No
	natural log	0	0.935	No
	x^4	-1	0.935	No
	x^5	-1	0.935	No
	x^6	-1	0.935	No

Shapiro-Wilk Normality Test

Constituent: Sulfate Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.861	0.897	No
	square root	0.9174	0.897	Yes
	square	0.7145	0.897	No
	cube root	0.9318	0.897	Yes
	cube	0.5709	0.897	No
	natural log	0.9533	0.897	Yes
	x^4	0.4606	0.897	No
	x^5	0.3857	0.897	No
	x^6	0.3373	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.9533	0.897	Yes
	square root	0.9485	0.897	Yes
	square	0.9556	0.897	Yes
	cube root	0.9464	0.897	Yes
	cube	0.9477	0.897	Yes
	natural log	0.9415	0.897	Yes
	x^4	0.9299	0.897	Yes
	x^5	0.9033	0.897	Yes
	x^6	0.8695	0.897	No
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.9499	0.935	Yes
	square root	0.9696	0.935	Yes
	square	0.8639	0.935	No
	cube root	0.9724	0.935	Yes
	cube	0.7354	0.935	No
	natural log	0.9723	0.935	Yes
	x^4	0.5974	0.935	No
	x^5	0.4771	0.935	No
	x^6	0.3852	0.935	No

Shapiro-Wilk Normality Test

Constituent: Thallium Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (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
T03S (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
Pooled Background (bg) (n = 24, alpha = 0.05)				
	no	-1	0.916	No
	square root	0	0.916	No
	square	-1	0.916	No
	cube root	0	0.916	No
	cube	-1	0.916	No
	natural log	0	0.916	No
	x^4	-1	0.916	No
	x^5	-1	0.916	No
	x^6	-1	0.916	No

Shapiro-Wilk Normality Test

Constituent: Total Dissolved Solids   Analysis Run 8/9/2021 3:03 PM
Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 18, alpha = 0.05)				
	no	0.9219	0.897	Yes
	square root	0.9374	0.897	Yes
	square	0.8843	0.897	No
	cube root	0.942	0.897	Yes
	cube	0.8402	0.897	No
	natural log	0.9502	0.897	Yes
	x^4	0.7925	0.897	No
	x^5	0.7443	0.897	No
	x^6	0.6979	0.897	No
T03S (bg) (n = 18, alpha = 0.05)				
	no	0.9677	0.897	Yes
	square root	0.9681	0.897	Yes
	square	0.9639	0.897	Yes
	cube root	0.968	0.897	Yes
	cube	0.9562	0.897	Yes
	natural log	0.9674	0.897	Yes
	x^4	0.9447	0.897	Yes
	x^5	0.9299	0.897	Yes
	x^6	0.9122	0.897	Yes
Pooled Background (bg) (n = 36, alpha = 0.05)				
	no	0.9658	0.935	Yes
	square root	0.9684	0.935	Yes
	square	0.9542	0.935	Yes
	cube root	0.9688	0.935	Yes
	cube	0.9354	0.935	Yes
	natural log	0.9687	0.935	Yes
	x^4	0.911	0.935	No
	x^5	0.8826	0.935	No
	x^6	0.852	0.935	No

Shapiro-Wilk Normality Test

Constituent: Turbidity Analysis Run 10/8/2021 11:51 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Well	Transformation	Calculated	Critical	Normal
G45S (bg) (n = 8, alpha = 0.05)				
	no	0.8058	0.818	No
	square root	0.8631	0.818	Yes
	square	0.6821	0.818	No
	cube root	0.8795	0.818	Yes
	cube	0.5827	0.818	No
	natural log	0.9071	0.818	Yes
	x^4	0.5174	0.818	No
	x^5	0.4778	0.818	No
	x^6	0.4542	0.818	No
T03S (bg) (n = 8, alpha = 0.05)				
	no	0.4327	0.818	No
	square root	0.4917	0.818	No
	square	0.419	0.818	No
	cube root	0.5363	0.818	No
	cube	0.4186	0.818	No
	natural log	0.6699	0.818	No
	x^4	0.4186	0.818	No
	x^5	0.4186	0.818	No
	x^6	0.4186	0.818	No
Pooled Background (bg) (n = 16, alpha = 0.05)				
	no	0.2879	0.887	No
	square root	0.3593	0.887	No
	square	0.273	0.887	No
	cube root	0.4178	0.887	No
	cube	0.2727	0.887	No
	natural log	0.6067	0.887	No
	x^4	0.2727	0.887	No
	x^5	0.2727	0.887	No
	x^6	0.2727	0.887	No

Interwell Joliet #9 Interwell PL UG G45S and T03S All Values

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29   Printed 8/9/2021, 3:56 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony (mg/L)	n/a	0.003	n/a	n/a	8 future	n/a	24	100	n/a	0.002646	NP (NDs) 1 of 2
Beryllium (mg/L)	n/a	0.001	n/a	n/a	8 future	n/a	24	100	n/a	0.002646	NP (NDs) 1 of 2
Cadmium (mg/L)	n/a	0.0005	n/a	n/a	8 future	n/a	24	100	n/a	0.002646	NP (NDs) 1 of 2
Chromium (mg/L)	n/a	0.005	n/a	n/a	8 future	n/a	24	100	n/a	0.002646	NP (NDs) 1 of 2
Field pH (SU)	n/a	7.618	6.847	n/a	8 future	n/a	36	0	No	0.000...	Param 1 of 2
Lead (mg/L)	n/a	0.0023	n/a	n/a	8 future	n/a	36	97.22	n/a	0.001311	NP (NDs) 1 of 2
Mercury (mg/L)	n/a	0.0002	n/a	n/a	8 future	n/a	22	100	n/a	0.003067	NP (NDs) 1 of 2
Selenium (mg/L)	n/a	0.0025	n/a	n/a	8 future	n/a	36	100	n/a	0.001311	NP (NDs) 1 of 2
Thallium (mg/L)	n/a	0.002	n/a	n/a	8 future	n/a	24	100	n/a	0.002646	NP (NDs) 1 of 2

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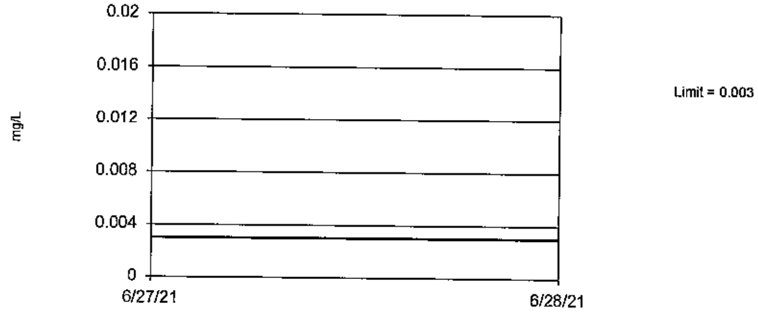
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 24) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.08129. Individual comparison alpha = 0.002646 (1 of 2). Assumes 8 future values. Seasonality was not detected with 95% confidence.

Constituent: Antimony Analysis Run 8/9/2021 3:55 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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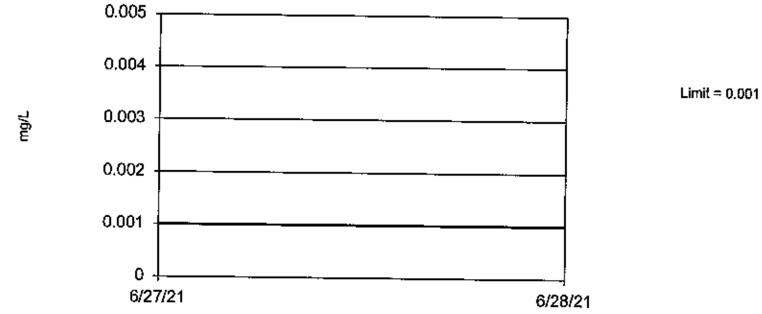
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 24) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.08129. Individual comparison alpha = 0.002646 (1 of 2). Assumes 8 future values. Seasonality was not detected with 95% confidence.

Constituent: Beryllium Analysis Run 8/9/2021 3:55 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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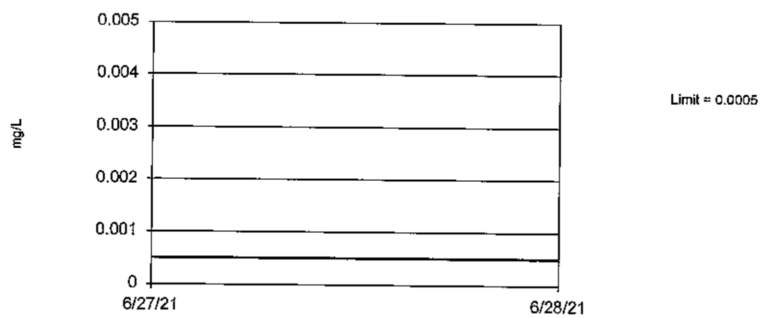
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 24) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.08129. Individual comparison alpha = 0.002646 (1 of 2). Assumes 8 future values. Seasonality was not detected with 95% confidence.

Constituent: Cadmium Analysis Run 8/9/2021 3:55 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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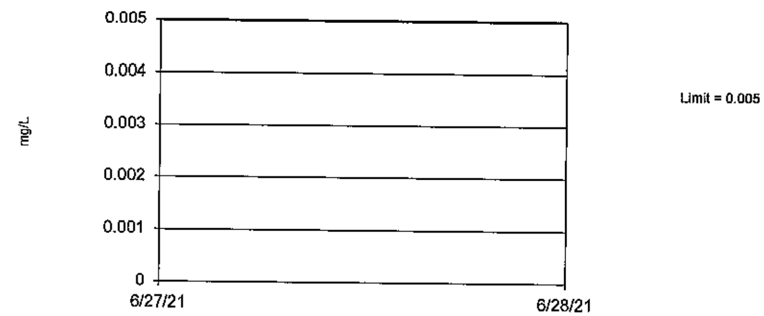
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 24) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.08129. Individual comparison alpha = 0.002646 (1 of 2). Assumes 8 future values. Seasonality was not detected with 95% confidence.

Constituent: Chromium Analysis Run 8/9/2021 3:55 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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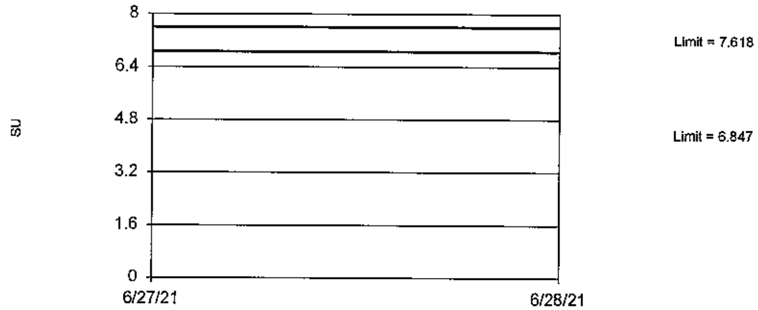
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=7.233, Std. Dev.=0.1528, n=36. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9765, critical = 0.935. Kappa = 2.522 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.00007482. Assumes 8 future values.

Constituent: Field pH Analysis Run 8/9/2021 3:55 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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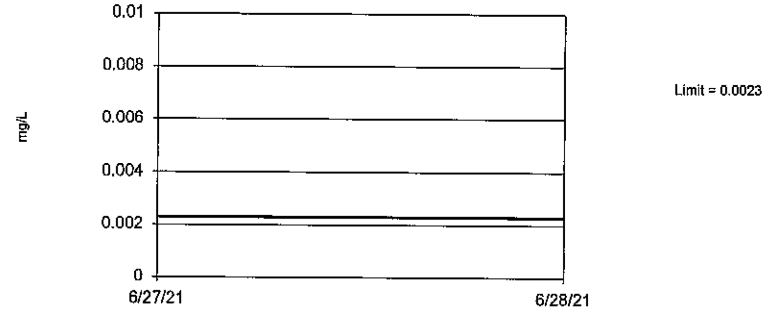
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 36 background values. 97.22% NDs. Annual per-constituent alpha = 0.04111. Individual comparison alpha = 0.001311 (1 of 2). Assumes 8 future values. Seasonality was not detected with 95% confidence.

Constituent: Lead Analysis Run 8/9/2021 3:55 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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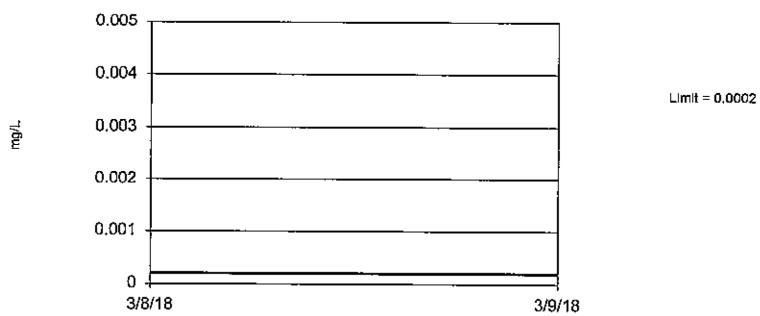
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 22) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.09361. Individual comparison alpha = 0.003067 (1 of 2). Assumes 8 future values. Seasonality was not detected with 95% confidence.

Constituent: Mercury Analysis Run 8/9/2021 3:55 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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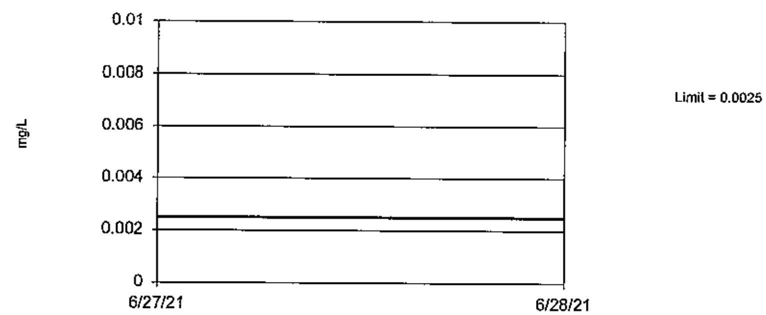
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 36) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.04111. Individual comparison alpha = 0.001311 (1 of 2). Assumes 8 future values. Seasonality was not detected with 95% confidence.

Constituent: Selenium Analysis Run 8/9/2021 3:55 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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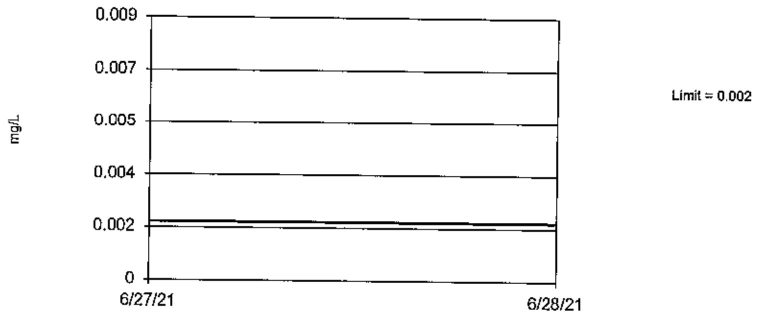
Prediction Limit

Interwell Non-parametric



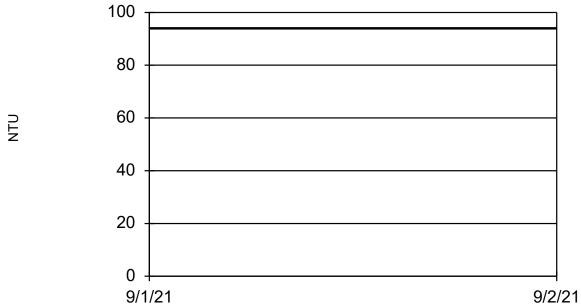
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 24) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.08129. Individual comparison alpha = 0.002646 (1 of 2). Assumes 8 future values. Seasonality was not detected with 95% confidence.

Constituent: Thallium Analysis Run 8/9/2021 3:55 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Prediction Limit

Interwell Non-parametric



Limit = 94

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 16 background values. Annual per-constituent alpha = 0.1454. Individual comparison alpha = 0.004899 (1 of 2). Assumes 8 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Turbidity Analysis Run 10/8/2021 11:54 AM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Interwell Prediction Limit Joliet #9 Comb G45S-T03S Turbidity

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29   Printed 10/8/2021, 11:56 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Turbidity (NTU)	n/a	94	n/a	n/a	8 future	n/a	16	0	n/a	0.004899	NP (normality) 1 of 2

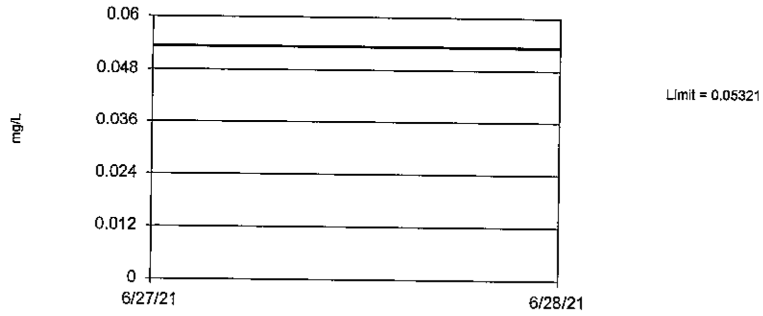
Interwell Joliet #9 Interwell PL UG G45S All Values

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29   Printed 8/9/2021, 3:50 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Barium (mg/L)	n/a	0.05321	n/a	n/a	8 future	n/a	18	0	No	0.000...	Param 1 of 2
Boron (mg/L)	n/a	1.039	n/a	n/a	8 future	n/a	18	5.556	ln(x)	0.000...	Param 1 of 2
Calcium (mg/L)	n/a	138.4	n/a	n/a	8 future	n/a	18	0	No	0.000...	Param 1 of 2
Chloride (mg/L)	n/a	232.4	n/a	n/a	8 future	n/a	18	0	No	0.000...	Param 1 of 2
Cobalt (mg/L)	n/a	0.001	n/a	n/a	8 future	n/a	18	100	n/a	0.004188	NP (NDs) 1 of 2
Fluoride (mg/L)	n/a	0.3889	n/a	n/a	8 future	n/a	18	5.556	x^5	0.000...	Param 1 of 2
Lithium (mg/L)	n/a	0.04228	n/a	n/a	8 future	n/a	18	0	No	0.000...	Param 1 of 2
Molybdenum (mg/L)	n/a	0.01432	n/a	n/a	8 future	n/a	18	0	sqrt(x)	0.000...	Param 1 of 2
Sulfate (mg/L)	n/a	369.6	n/a	n/a	8 future	n/a	18	0	sqrt(x)	0.000...	Param 1 of 2
Total Dissolved Solids (mg/L)	n/a	1053	n/a	n/a	8 future	n/a	18	0	No	0.000...	Param 1 of 2

Prediction Limit

Interwell Parametric



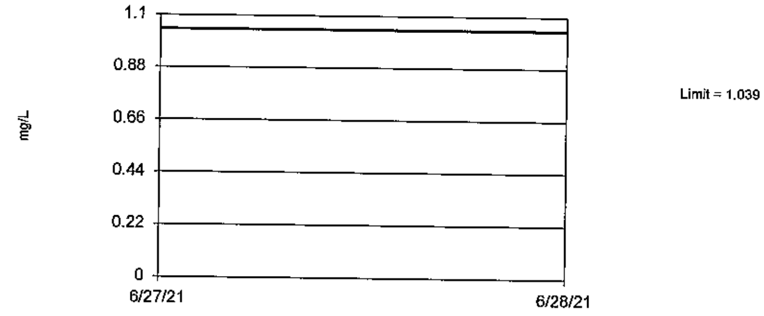
Background Data Summary: Mean=0.0385, Std. Dev.=0.005136, n=18. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9528, critical = 0.897. Kappa = 2.864 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Barium Analysis Run 8/9/2021 3:50 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Prediction Limit

Interwell Parametric



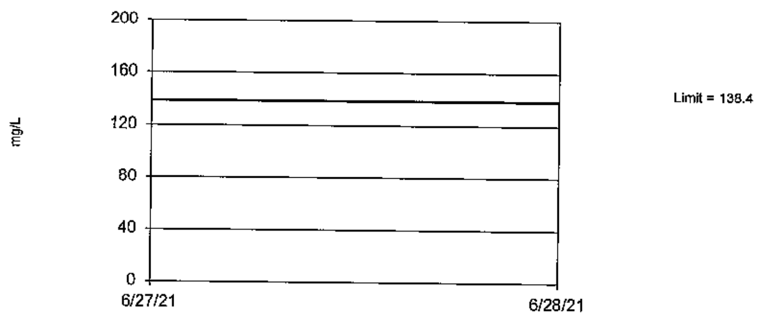
Background Data Summary (based on natural log transformation): Mean=-0.719, Std. Dev.=0.2643, n=18, 5.556% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9048, critical = 0.897. Kappa = 2.864 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Boron Analysis Run 8/9/2021 3:50 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Prediction Limit

Interwell Parametric



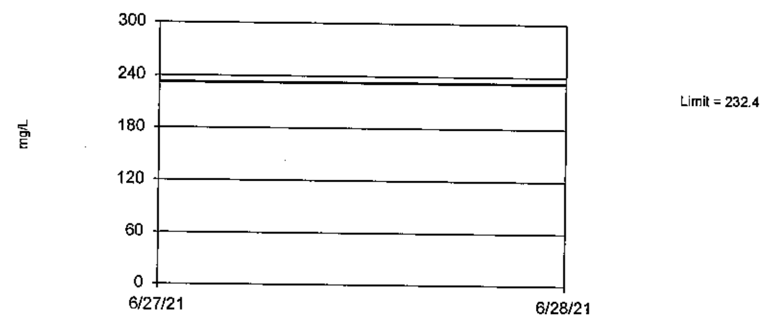
Background Data Summary: Mean=101.6, Std. Dev.=12.86, n=18. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9001, critical = 0.897. Kappa = 2.864 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Calcium Analysis Run 8/9/2021 3:50 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=133.2, Std. Dev.=34.65, n=18. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.898, critical = 0.897. Kappa = 2.864 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Chloride Analysis Run 8/9/2021 3:50 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

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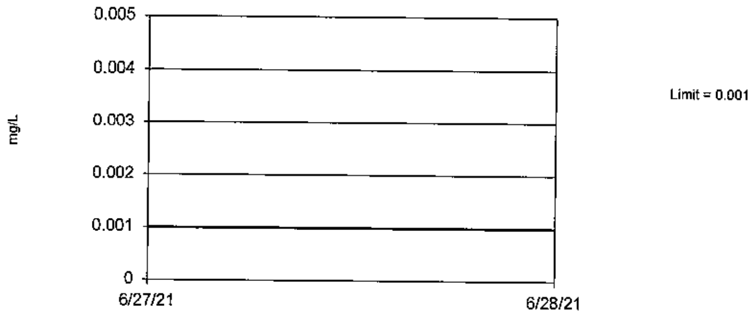
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 18) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.1257. Individual comparison alpha = 0.004188 (1 of 2). Assumes 8 future values. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Cobalt   Analysis Run 8/9/2021 3:50 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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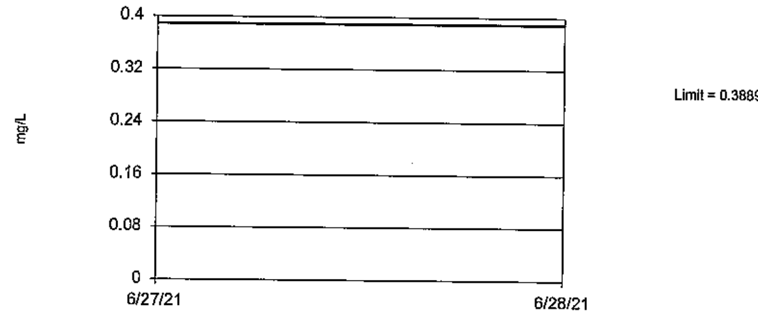
Prediction Limit

Interwell Parametric



Background Data Summary (based on x^5 transformation): Mean=0.00426, Std. Dev.=0.001619, n=18, 5.556% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9115, critical = 0.897. Kappa = 2.864 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Fluoride   Analysis Run 8/9/2021 3:50 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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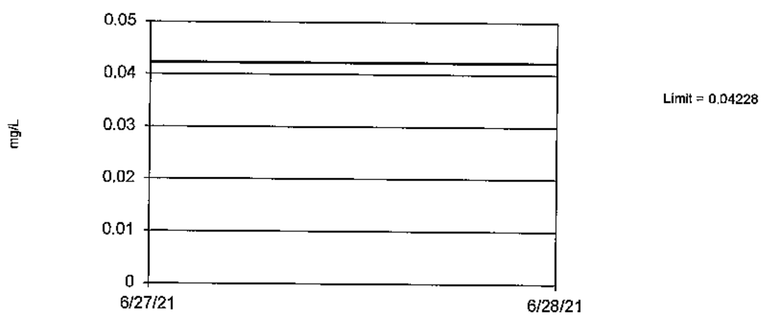
Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.03189, Std. Dev.=0.003628, n=18. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.936, critical = 0.897. Kappa = 2.864 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Lithium   Analysis Run 8/9/2021 3:50 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

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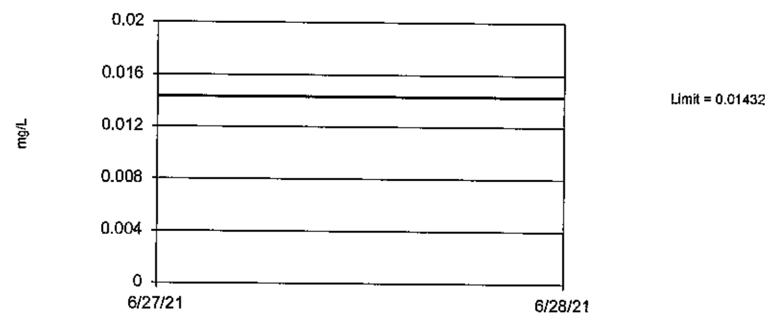
Prediction Limit

Interwell Parametric



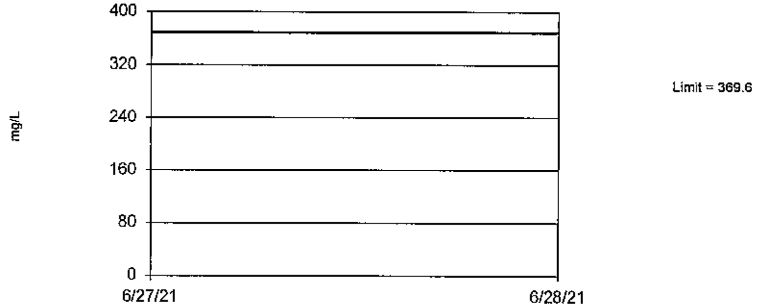
Background Data Summary (based on square root transformation): Mean=0.09554, Std. Dev.=0.008422, n=18. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9147, critical = 0.897. Kappa = 2.864 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Molybdenum   Analysis Run 8/9/2021 3:50 PM

Joliet 9,29 Generating Station   Client: NRG   Data: Joliet 9 - Joliet 29

Prediction Limit

Interwell Parametric



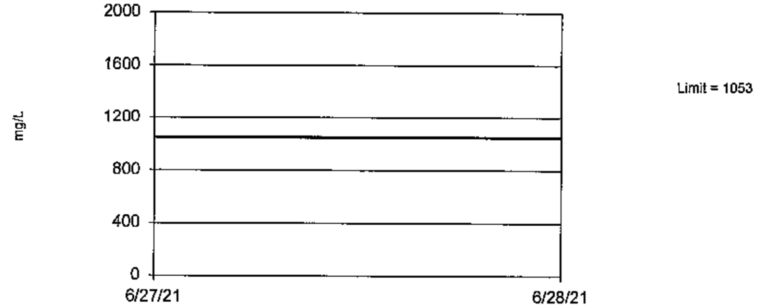
Background Data Summary (based on square root transformation): Mean=13.31, Std. Dev.=2.067, n=18. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9174, critical = 0.897. Kappa = 2.864 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Sulfate Analysis Run 8/9/2021 3:50 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=745, Std. Dev.=107.4, n=18. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9219, critical = 0.897. Kappa = 2.864 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Total Dissolved Solids Analysis Run 8/9/2021 3:50 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

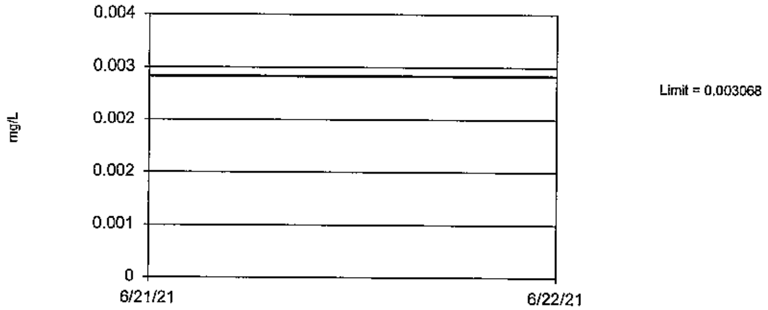
Interwell Joliet #9 Interwell PL UG T03S All Values

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29 Printed 8/9/2021, 3:49 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Arsenic (mg/L)	n/a	0.003068	n/a	n/a	8 future	n/a	18	11.11	No	0.000...	Param 1 of 2
Combined Radium 226 + 228 (pCi/L)	n/a	1.922	n/a	n/a	8 future	n/a	16	0	No	0.000...	Param 1 of 2

Prediction Limit

Interwell Parametric



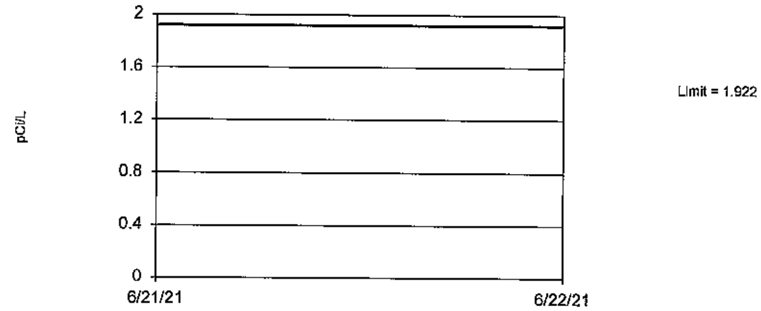
Background Data Summary: Mean=0.00145, Std. Dev.=0.0005649, n=18, 11.11% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9474, critical = 0.897. Kappa = 2.864 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Arsenic Analysis Run 8/9/2021 3:48 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=1.334, Std. Dev.=0.1996, n=16. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9665, critical = 0.887. Kappa = 2.946 (c=22, w=8, 1 of 2, event alpha = 0.026). Report alpha = 0.001197. Individual comparison alpha = 0.0001496. Assumes 8 future values.

Constituent: Combined Radium 226 + 228 Analysis Run 8/9/2021 3:48 PM

Joliet 9,29 Generating Station Client: NRG Data: Joliet 9 - Joliet 29

ATTACHMENT 10
WRITTEN CLOSURE PLAN

CLOSURE AND POST-CLOSURE PLAN
LINCOLN STONE QUARRY
JOLIET #9 STATION
OCTOBER 2016

This closure and post-closure plan has been prepared in accordance with 40 CFR Part 257.102(b) and 40 CFR Part 257.104(d) for Lincoln Stone Quarry (Quarry) at the Joliet #9 Station, operated by Midwest Generation, LLC (Midwest Generation), in Joliet, IL. Currently, the Quarry is a landfill being operated under Illinois Environmental Protection Agency Permit No. 1994-241-LFM, Modification No. 22, dated June 9, 2016. This closure and post-closure plan describes the schedule and steps necessary for closure and post closure and methods for compliance with closure and post-closure requirements for the Quarry.

1.0 Closure Narrative [257.102(b)(1)(i)]

The closure of the Quarry will be accomplished by leaving the coal combustion residual (CCR) in place and covering with a final cover system in accordance with 40 CFR Part 257.102(d). The closure will achieve the closure performance standards in accordance with 257.102(d)(1)(i) through (v).

2.0 CCR Removal and Decontamination [257.102(b)(1)(ii)]

The closure of the Quarry will occur by leaving the CCR in place in accordance with 257.102(d).

3.0 Closure with CCR Left in Place [257.102(b)(1)(iii)]

The Quarry will be closed by leaving the CCR in place in accordance with 257.102(d). As required, a final cover system (FCS) will be installed over the CCR in accordance with 257.102(d)(3)(ii).

The closure will be implemented using the following methods and procedures:

1. Unneeded portions of the pipelines in the Main Quarry will be demolished as necessary and hauled from the site to a disposal facility or a salvage yard;

2. The Main Quarry will be dewatered to an extent to allow the CCR to be regraded and compacted;

3. The CCR in the Quarry will be regraded to a more uniform elevation to allow for the placement of the FCS. The CCR will be compacted to stabilize it prior to placement of

the FCS and to reduce the potential for future settling;

4. The FCS will be installed over the regraded and compacted CCR. The FCS will consist of the following components (from the bottom layer to the top layer):
   - One (1) foot of imported clean material;
   - An infiltration layer consisting of a clay layer or an equivalent with a permeable no greater than $1x10^{-5}$ cm/sec;
   - Another layer of one (1) foot of imported clean material;
   - An erosion control layer consisting of six (6”) inches of topsoil; and
   - Vegetation (mulch, fertilizer, and seed).

4.0 Maximum Inventory of CCR [257.102(b)(1)(iv)]

The maximum inventory of CCR ever on-site is based upon the current quantity of CCR in the Quarry. The estimated maximum inventory of CCR that will be covered by the FCS is approximately 2,572,178 cubic yards (CY).

5.0 Largest Area of CCR Requiring a Final Cover [257.102(b)(1)(v)]

The FCS will cover a maximum area of approximately 46 acres.

6.0 Closure Schedule [257.102(b)(1)(vi)]

Implementation of closure, as described, is estimated to require 12 months. Closure is estimated to be completed by the end of 2018. Closure design documents will be prepared to support applications for required local, state, and federal permits, construction bidding specifications will be prepared, and contracting of the work for closure will also be performed. Closure construction design documents may include construction drawings for closure, technical specifications, and adequate CCR removal confirmation procedures. All necessary Federal, State, and Local permits required for closure construction will be evaluated and obtained, as necessary, at the time of closure, but are anticipated to 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 and associated dates is included below.

Closure Schedule

Activity No.	Closure Activity	Schedule
1	Demolition of Sluice Pipelines	2 Months
2	Dewatering	3 Months
3	Regrade and Compact CCR	3 Months
4	Installation of the Final Cover System	3 Months
5	Closure Certification	1 Month

It is not feasible to complete the closure activities within six months due to the significant amount of water to be dewatered from the Quarry and the surface area that will be covered by the regrade CCR. In addition, if it is not feasible to complete the closure activities within six months due to other factors such as those stemming from permitting and/or the climate and weather, MWG will place in the operating record a narrative demonstrating why it is not feasible to complete the closure in the time allowed pursuant to 40 CFR Part 257.102(f)(2)(i).

7.0 Closure Activities Initiation [257.102(e)]

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 §257.102(h), notification of closure of a CCR unit will be made within 30 days of the completion of closure of the CCR unit. The notification will include certification from a qualified professional engineer, as required by §257.102(f)(3).

8.0 Closure Plan Amendments [257.102(b)(3)]

This Closure Plan will be amended in accordance with §257.102(b)(3) if a change in the operation of the Quarry would substantially affect the content of this Closure Plan or if unanticipated events necessitate revision of the plan. If a change in operation requires amendment to the Closure Plan, the plan will be amended no later than 60 days prior to the change in operation being implemented. If an unexpected event occurs that requires amendment of the Closure Plan, the plan will be amended within 60 days of the unexpected event or within 30 days of the unexpected event if the event occurs after closure activities have commenced. Amendments to this Closure Plan will be certified by a professional engineer registered in the State of Illinois in accordance with §257.102(b)(4).

9.0 Post-Closure Plan

This post-closure plan has been prepared in accordance with 40 CFR Part 257.104(d) for the Quarry at the Joliet #9 Generating Station, operated by Midwest Generation, in Joliet, IL. This plan describes the schedule and steps necessary for post-closure and methods for compliance with post-closure requirements for the Quarry. The post-closure care period will begin once Midwest Generation has placed the certified notification of closure as required by 257.102(f)(3) in Joliet #9's operating record. This post-closure care plan is based upon the regulatory requirement to maintain and monitor the site for 30 years after closure.

10.0 Post-Closure Monitoring and Maintenance Description [257.104(d)(1)(i)]

The post-closure monitoring and maintenance activities will be performed in compliance with 257.10(4)(b). The post-closure care will consist of the following:

- Maintaining the integrity and effectiveness of the final cover system (FCS), including making repairs as necessary;
- Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with 257.90 through 257.98; and
- Maintenance of access controls to the Quarry (fencing and gates).

In accordance with 257.104(b)(1), the FCS will be inspected annually for settlement, subsidence, erosion, stressed vegetation, and stormwater damage to the final cover. The FCS will be repaired if any of the above conditions are observed.

Groundwater monitoring will be performed in accordance with 257.90 through 257.98 for the duration of the post-closure period. Groundwater sampling will be conducted at a minimum of semi-annually during the post-closure care period. The groundwater sampling and analysis methods will be appropriate for environmental groundwater monitoring (257.93(b)).

The access controls for the Quarry will be inspected annually for any damage that may allow for trespassing. The inspection will occur at the same time the FCS is inspected. Any damage noted during the inspections will be repaired.

11.0 Post-Closure Care Contact Information [257.104(d)(1)(ii)]

Environmental Specialist
Joliet #9 Generating Station
1601 S. Patterson Road
Joliet, IL
815-207-4918

12.0 Planned Uses of the Property [257.104(d)(1)(iii)]

The Quarry will be not developed during the post-closure care period. The Quarry will be inactive during the post-closure care period, and it will only be accessed to perform groundwater monitoring or inspections, as noted above. The groundwater monitoring will not involve access to the FCS. Access to the FCS for inspections will be kept to a minimum.

13.0 Post-Closure Plan Amendments [257.102(b)(3)]

This Post-Closure Plan will be amended in accordance with §257.104(d)(3) if a change in the operation of the Quarry would substantially affect the content of this Post-Closure Plan or if unanticipated events necessitate revision of the plan. If a change in operation requires amendment to the Post-Closure Plan, the plan will be amended no later than 60 days prior to the change in operation being implemented. If an unexpected event occurs that requires amendment of the Closure Plan, the plan will be amended within 60 days of the unexpected event 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 §257.102(b)(4).

14.0 Professional Engineer's Certification [257.102(b)(4) & 257.104(d)(4)]

This Closure and Post-Closure Plan has been prepared to meet the requirements of 40 CFR 257.102(b)(1) and 257.104(d)(1).

10/14/16

Joshua D. Davenport, P.E.
Illinois Professional Engineer

SEAL

JOSHUA D. DAVENPORT
062-061945
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS

ATTACHMENT 11
POST-CLOSURE PLAN

CLOSURE AND POST-CLOSURE PLAN
LINCOLN STONE QUARRY
JOLIET #9 STATION
OCTOBER 2016

This closure and post-closure plan has been prepared in accordance with 40 CFR Part 257.102(b) and 40 CFR Part 257.104(d) for Lincoln Stone Quarry (Quarry) at the Joliet #9 Station, operated by Midwest Generation, LLC (Midwest Generation), in Joliet, IL. Currently, the Quarry is a landfill being operated under Illinois Environmental Protection Agency Permit No. 1994-241-LFM, Modification No. 22, dated June 9, 2016. This closure and post-closure plan describes the schedule and steps necessary for closure and post closure and methods for compliance with closure and post-closure requirements for the Quarry.

1.0 Closure Narrative [257.102(b)(1)(i)]

The closure of the Quarry will be accomplished by leaving the coal combustion residual (CCR) in place and covering with a final cover system in accordance with 40 CFR Part 257.102(d). The closure will achieve the closure performance standards in accordance with 257.102(d)(1)(i) through (v).

2.0 CCR Removal and Decontamination [257.102(b)(1)(ii)]

The closure of the Quarry will occur by leaving the CCR in place in accordance with 257.102(d).

3.0 Closure with CCR Left in Place [257.102(b)(1)(iii)]

The Quarry will be closed by leaving the CCR in place in accordance with 257.102(d). As required, a final cover system (FCS) will be installed over the CCR in accordance with 257.102(d)(3)(ii).

The closure will be implemented using the following methods and procedures:

1. Unneeded portions of the pipelines in the Main Quarry will be demolished as necessary and hauled from the site to a disposal facility or a salvage yard;

2. The Main Quarry will be dewatered to an extent to allow the CCR to be regraded and compacted;

3. The CCR in the Quarry will be regraded to a more uniform elevation to allow for the placement of the FCS. The CCR will be compacted to stabilize it prior to placement of

the FCS and to reduce the potential for future settling;

4. The FCS will be installed over the regraded and compacted CCR. The FCS will consist of the following components (from the bottom layer to the top layer):
   - One (1) foot of imported clean material;
   - An infiltration layer consisting of a clay layer or an equivalent with a permeable no greater than $1x10^{-5}$ cm/sec;
   - Another layer of one (1) foot of imported clean material;
   - An erosion control layer consisting of six (6”) inches of topsoil; and
   - Vegetation (mulch, fertilizer, and seed).

4.0 Maximum Inventory of CCR [257.102(b)(1)(iv)]

The maximum inventory of CCR ever on-site is based upon the current quantity of CCR in the Quarry. The estimated maximum inventory of CCR that will be covered by the FCS is approximately 2,572,178 cubic yards (CY).

5.0 Largest Area of CCR Requiring a Final Cover [257.102(b)(1)(v)]

The FCS will cover a maximum area of approximately 46 acres.

6.0 Closure Schedule [257.102(b)(1)(vi)]

Implementation of closure, as described, is estimated to require 12 months. Closure is estimated to be completed by the end of 2018. Closure design documents will be prepared to support applications for required local, state, and federal permits, construction bidding specifications will be prepared, and contracting of the work for closure will also be performed. Closure construction design documents may include construction drawings for closure, technical specifications, and adequate CCR removal confirmation procedures. All necessary Federal, State, and Local permits required for closure construction will be evaluated and obtained, as necessary, at the time of closure, but are anticipated to 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 and associated dates is included below.

Closure Schedule

Activity No.	Closure Activity	Schedule
1	Demolition of Sluice Pipelines	2 Months
2	Dewatering	3 Months
3	Regrade and Compact CCR	3 Months
4	Installation of the Final Cover System	3 Months
5	Closure Certification	1 Month

It is not feasible to complete the closure activities within six months due to the significant amount of water to be dewatered from the Quarry and the surface area that will be covered by the regrade CCR. In addition, if it is not feasible to complete the closure activities within six months due to other factors such as those stemming from permitting and/or the climate and weather, MWG will place in the operating record a narrative demonstrating why it is not feasible to complete the closure in the time allowed pursuant to 40 CFR Part 257.102(f)(2)(i).

7.0 Closure Activities Initiation [257.102(e)]

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 §257.102(h), notification of closure of a CCR unit will be made within 30 days of the completion of closure of the CCR unit. The notification will include certification from a qualified professional engineer, as required by §257.102(f)(3).

8.0 Closure Plan Amendments [257.102(b)(3)]

This Closure Plan will be amended in accordance with §257.102(b)(3) if a change in the operation of the Quarry would substantially affect the content of this Closure Plan or if unanticipated events necessitate revision of the plan. If a change in operation requires amendment to the Closure Plan, the plan will be amended no later than 60 days prior to the change in operation being implemented. If an unexpected event occurs that requires amendment of the Closure Plan, the plan will be amended within 60 days of the unexpected event or within 30 days of the unexpected event if the event occurs after closure activities have commenced. Amendments to this Closure Plan will be certified by a professional engineer registered in the State of Illinois in accordance with §257.102(b)(4).

9.0 Post-Closure Plan

This post-closure plan has been prepared in accordance with 40 CFR Part 257.104(d) for the Quarry at the Joliet #9 Generating Station, operated by Midwest Generation, in Joliet, IL. This plan describes the schedule and steps necessary for post-closure and methods for compliance with post-closure requirements for the Quarry. The post-closure care period will begin once Midwest Generation has placed the certified notification of closure as required by 257.102(f)(3) in Joliet #9's operating record. This post-closure care plan is based upon the regulatory requirement to maintain and monitor the site for 30 years after closure.

10.0 Post-Closure Monitoring and Maintenance Description [257.104(d)(1)(i)]

The post-closure monitoring and maintenance activities will be performed in compliance with 257.10(4)(b). The post-closure care will consist of the following:

- Maintaining the integrity and effectiveness of the final cover system (FCS), including making repairs as necessary;
- Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with 257.90 through 257.98; and
- Maintenance of access controls to the Quarry (fencing and gates).

In accordance with 257.104(b)(1), the FCS will be inspected annually for settlement, subsidence, erosion, stressed vegetation, and stormwater damage to the final cover. The FCS will be repaired if any of the above conditions are observed.

Groundwater monitoring will be performed in accordance with 257.90 through 257.98 for the duration of the post-closure period. Groundwater sampling will be conducted at a minimum of semi-annually during the post-closure care period. The groundwater sampling and analysis methods will be appropriate for environmental groundwater monitoring (257.93(b)).

The access controls for the Quarry will be inspected annually for any damage that may allow for trespassing. The inspection will occur at the same time the FCS is inspected. Any damage noted during the inspections will be repaired.

11.0 Post-Closure Care Contact Information [257.104(d)(1)(ii)]

Environmental Specialist
Joliet #9 Generating Station
1601 S. Patterson Road
Joliet, IL
815-207-4918

12.0 Planned Uses of the Property [257.104(d)(1)(iii)]

The Quarry will be not developed during the post-closure care period. The Quarry will be inactive during the post-closure care period, and it will only be accessed to perform groundwater monitoring or inspections, as noted above. The groundwater monitoring will not involve access to the FCS. Access to the FCS for inspections will be kept to a minimum.

13.0 Post-Closure Plan Amendments [257.102(b)(3)]

This Post-Closure Plan will be amended in accordance with §257.104(d)(3) if a change in the operation of the Quarry would substantially affect the content of this Post-Closure Plan or if unanticipated events necessitate revision of the plan. If a change in operation requires amendment to the Post-Closure Plan, the plan will be amended no later than 60 days prior to the change in operation being implemented. If an unexpected event occurs that requires amendment of the Closure Plan, the plan will be amended within 60 days of the unexpected event 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 §257.102(b)(4).

14.0 Professional Engineer's Certification [257.102(b)(4) & 257.104(d)(4)]

This Closure and Post-Closure Plan has been prepared to meet the requirements of 40 CFR 257.102(b)(1) and 257.104(d)(1).

10/14/16

Joshua D. Davenport, P.E.
Illinois Professional Engineer

SEAL

JOSHUA D. DAVENPORT
062-061945
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS

<u>ATTACHMENT 12</u>
<u>LINER CERTIFICATION</u>

Attachment 12: Liquid Flow Rate through Alternative Composite Liner
Joliet 9 Lincoln Stone Quarry

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 = 2,257,198 ft^2 = 2,097,005,560.8 cm^2 Based on surface area at toe of embankment
q = calculated
k = 1.00E-07 cm/s
h = 45 ft = 1371.6 cm
t = 2 ft = 60.96 cm

Q = 1.00E-07 $\frac{1371.6}{60.96}$ +1 * 2,097,005,560.82

Q = 4927.96 cm^3/s	Compare to Surface Impoundment Flow Rate

Pond Profile

Layers	Depth (ft)	Elevation (ft msl) From	To	Layer Description	Permeability (cm/s)	Layer Thickness (inch)	Layer Thickness (cm)	Product of Permeability & Layer Thickness
Pond	0	580	500	Pond embankment crest	--	--	--	--
	80	500	500	Pond bottom	--	--	--	--
Upper Liner Component	5	500	495	Silurian dolomite	2.00E-04	60	152.4	0.03048
Lower Liner Component								
						Totals	152.4	3.05E-02

Permeability (weighted) =	0.0002

LSQ Flow Rate Calculation

Q/A = q = k((h/t)+1)
Q= calculated
A = 2,257,198 ft^2 = 2,097,005,560.82 cm^2 Based on surface area at toe of embankment
q = calculated
k = 2.00E-04 cm/s
h = 45 ft = 1371.6 cm
t = 5 ft = 152.4 cm

Q = 2.00E-04 $\frac{1371.6}{152.4}$ +1 * 2,097,005,560.82

Q = 4,194,011.12 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 4,194,011.12 less than the Section 845.400(c) Comparison Flow Rate of 4,928.0 **NO**

ATTACHMENT 13
HISTORY OF KNOWN EXCEEDANCES

Attachment 13 – No Attachment

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 9 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

Regan A. Shulman, Secretary

Arch Insurance Company CORPORATE SEAL 1971 Missouri

Arch Insurance Company

Stephen C. Ruschak

Stephen C. Ruschak, Executive Vice President

STATE OF PENNSYLVANIA SS
COUNTY OF PHILADELPHIA SS

I, **Michele Tripodi**, a Notary Public, do hereby certify that Regan A. Shulman and Stephen C. Ruschak personally known to me to be the same persons whose names are respectively as Secretary and Executive Vice President of the Arch Insurance Company, a Corporation organized and existing under the laws of the State of Missouri, subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that they being thereunto duly authorized signed, sealed with the corporate seal and delivered the said instrument as the free and voluntary act of said corporation and as their own free and voluntary acts for the uses and purposes therein set forth.

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
MICHELE TRIPODI, Notary Public
City of Philadelphia, Phila. County
My Commission Expires July 31, 2021

Michele Tripodi

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

Regan A. Shulman, Secretary

This Power of Attorney limits the acts of those named therein to the bonds and undertakings specifically named therein and they have no authority to bind the Company except in the manner and to the extent herein stated.

PLEASE SEND ALL CLAIM INQUIRIES RELATING TO THIS BOND TO THE FOLLOWING ADDRESS:
Arch Insurance – Surety Division
3 Parkway, Suite 1500
Philadelphia, PA 19102

Arch Insurance Company CORPORATE SEAL 1971 Missouri

To verify the authenticity of this Power of Attorney, please contact Arch Insurance Company at SuretyAuthentic@archinsurance.com
Please refer to the above named Attorney-in-Fact and the details of the bond to which the power is attached.

ATTACHMENT 15
HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

Attachment 15 – No Attachment

<u>ATTACHMENT 16</u>
<u>STRUCTURAL STABILITY ASSESSMENT</u>

Attachment 16 – No Attachment

<u>ATTACHMENT 17</u>
<u>SAFETY FACTOR ASSESSMENT</u>

Attachment 17 – No Attachment

ATTACHMENT 18
INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

Geosyntec consultants

1420 Kensington Road, Suite 103
Oak Brook, Illinois 60523
PH 630.203.3340
FAX 630.203.3341
www.geosyntec.com

INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN
LINCOLN STONE QUARRY
JOLIET 9 STATION
OCTOBER 2021

Pursuant to Illinois Administrative Code (IAC) Part 845.510, Geosyntec Consultants, Inc. (Geosyntec) prepared this Inflow Design Flood Control System Plan for the CCR surface impoundment referred to as the Lincoln Stone Quarry (Quarry) at the Joliet 9 Station (Site) in Joliet, Illinois. The Quarry is leased and operated by Midwest Generation, LLC (Midwest Generation).

Section 845.510(a) of the CCR Rule requires that operators of every existing or new CCR surface impoundment design, construct, operate, and maintain an inflow design flood control system plan that adequately manages flow into the CCR unit during and following the peak discharge of the inflow design flood.

This Inflow Design Flood Control System Plan is being completed in accordance with Section 845.510(c), which requires the plan be submitted with the first annual inspection report. The inflow design flood control system consists of an outflow pipe and maintaining minimum operating freeboard. Justification and documentation of the adequacy of the inflow design flood control systems are presented in the sections below.

The work presented in this report was performed under the direction of Ms. Olivia Covert, of Geosyntec in accordance with Section 845.510(c). Mr. Jesse Varsho, P.E. reviewed this plan in accordance with Geosyntec's senior review policy.

1. Quarry Design

The Quarry is located east of the Site's former coal pile and approximately 1,000 feet south of the Des Plaines River. The Quarry is bounded on the north by Patterson Road and on the east by Brandon Road. The Quarry is considered incised in accordance with 35 IAC Section 845.120 (Geosyntec, 2021) and is bounded on the north, south, and east boundaries by cut slopes. The western portion of the Quarry, referred to as the West Filled Area, has been backfilled to existing adjacent grades and capped. Prior to the conversion of the Joliet 9 Station to natural gas in spring 2016, the Quarry received sluiced CCR from Joliet Units 6, 7, and 8, through a piping system that discharged into the southwest corner (Units 7 and 8) and the northwest corner (Unit 6) of the Quarry. The Quarry stopped receiving CCR in 2019; therefore, rainfall and storm water runoff from the farmland and wooded area to the south are the only sources of discharge to the Quarry. Discharge of water from the Quarry is controlled through two pipes that gravity drain to a quarry located north of Patterson Road which is then discharged to the Des Plaines River. The invert elevation of these pipes is approximately 527 feet Mean Sea Level (ft MSL), above the ash accumulation level in that area of the Quarry. Gate valves on the outlet pipes are controlled manually by Midwest Generation staff to comply with the Quarry's Bureau of Land Permit No. 1994-241-LFM requirement that local groundwater gradients flow from east to west and from south to north. Discharge from the Quarry is handled in accordance with the surface water requirements in Section 845.110(b)(3) and 35 IAC Subtitle C.

2. *Inflow Design Flood Control System Plan Documentation*

Table 1 below provides a summary of applicable documentation demonstrating how the system has been designed and constructed to meet the requirements of Section 845.510.

Table 1: Additional Documentation

Documentation	Assessment
Identification of the design storm event for the catchment area and CCR unit	Identification of the design storm event is provided in Section 3. A drawing of the Quarry and catchment area is presented in **Figure 1**.
Characterization of the rainfall abstractions, including but not limited to depression storage and infiltration in the upstream catchment area and selection of the appropriate run-off model	The selected run-off model, calculations, and upstream catchment area assumptions are provided in **Appendix A**.
Identification and characterization of and intake or decant structures	Outflow pipes are described in Section 1. Because there is sufficient freeboard in the Quarry to prevent overflow during the design event, as described in Section 6, capacity of outflow pipes is not evaluated.
Appropriate characterization and capacity of spillways	The Quarry does include a spillway.
Characterization of downstream hydraulic structures	Because there is sufficient freeboard in the Quarry to prevent overflow during the design event, as described in Section 6, characterization of downstream structures is not required.

3. *Design Event*

As the Quarry is considered incised in accordance with 35 IAC Section 845.120 (Geosyntec, 2021), the inflow design flood is the 25-year flood in accordance with Section 845.510(a)(3). Flood flows are typically established by performing statistical analysis on historical stream gauge records. In instances where measured stream flow records are not available, deterministic methods such as a design storm method (ASCE, 1996) is used to establish flood flows. In the design storm method, a rainfall to runoff analysis (e.g., Runoff Curve Number Method) is used to establish the stormwater runoff flows. The underlying assumptions in the design storm method are: 1) rainfall will occur uniformly across the entire contributing watershed; and 2) a specified return period storm event produces the same return period flood flow (e.g., 25-year storm event produces the 25-year flood). Since there are no measured stream flow records at the Quarry, the design storm method was used to estimate the inflows to the Quarry for the 24-hour, 25-year precipitation event.

4. Existing Quarry Water Level

Water accumulates inside the Quarry due to its incised characteristics, and water levels within the Quarry are controlled to meet the Quarry's permitting requirements (see Section 1). Midwest Generation monitors the surface water level within the Quarry daily and controls outflow from the Quarry to influence the localized groundwater gradients. Average daily water level data within the Quarry is shown in **Figure 2** and indicates that the surface water level has been maintained below 548 ft MSL over the last five years. The operating level of the Quarry is assumed to be 548 ft MSL or below. Based on the site topography[1], the water level within the Quarry could rise to approximately 572 ft MSL before discharging from the Quarry.

5. Catchment Area

A description of the area surround ding the Quarry is shown in the following table.

Direction	**Land Use**
North	Patterson Road, two small quarries, woodland, Des Plaines River.
West	Woodland, heavy industrial site.
South	Grass and farmland, woodland, heavy industrial site.
East	South Brandon Road, low density residential area, inactive quarry, grass and farmland, large active quarry (Southeast)

The catchment area of the Quarry was delineated using topographic maps and images. The catchment area is approximately 89 acres, see **Figure 1**.

[1] Topography is dated May 2014, generated by Sidwell from Aerial photo taken in 2014.

6. Analysis of Inflow Design Flow and Storage Capacity

The inflow design flow for the 25-year event was calculated based on runoff associated with the 24-hour, 25-year storm event for the upstream catchment area, which was estimated based on regional topography and the Runoff Curve Number Method. Analysis demonstrating the inflow design flow is included in **Appendix A**. The total inflow into the Quarry during the 24-hour 25-year storm event is estimated to be 38.4 acre-feet. Based on 2021 surface water conditions, the surface area of the impounded water within the Quarry is approximately 12.5 acres. The estimated potential water level increase is calculated to be 3.1 ft from the design event. Therefore, the water level in the Quarry after the design event is estimated to be at or below 552 ft MSL (operating level of 548 ft MSL plus 4 ft).

The freeboard after the design event is estimated to be a minimum of 20 ft (572 ft MSL – 552 ft MSL). As the existing freeboard is estimated to be at least 20 feet, sufficient storage capacity exists within Quarry to manage the inflow from the design flood event. The inflow design system, as designed and constructed, meets the requirements of Section 845.510.

7. Limitations and Certification

The inflow design flood control system plan meets the requirements of 35 IAC Section 845.510 and 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 P. Varsho, P.E.
Illinois Professional Engineer No. 062.059069
License Expires: November 30, 2021

8. References

ASCE, 1996. American Society of Civil Engineers Task Committee on Hydrology Handbook. Hydrology Handbook. ASCE Publications.

Geosyntec Consultants, 2021, Lincoln Stone Quarry Site Visit, CCR Rule Compliance Demonstrations, Midwest Generation LLC Power Stations, Illinois, dated 31 August.

Attachments

Figure 1: Catchment Area
Figure 2: Quarry Water Level
Appendix A: Stormwater Run-on Calculations

Figures

Legend

Catchment Area

2 ft. Elevation Contours

1,000 500 0 1,000 Feet

Notes

- Aerial imagery from ArcGIS Online, September 2021.
- Topography based on May 2014 topography provided by KPRG.

Catchment Area
Lincoln Stone Quarry
Joliet 9 Station

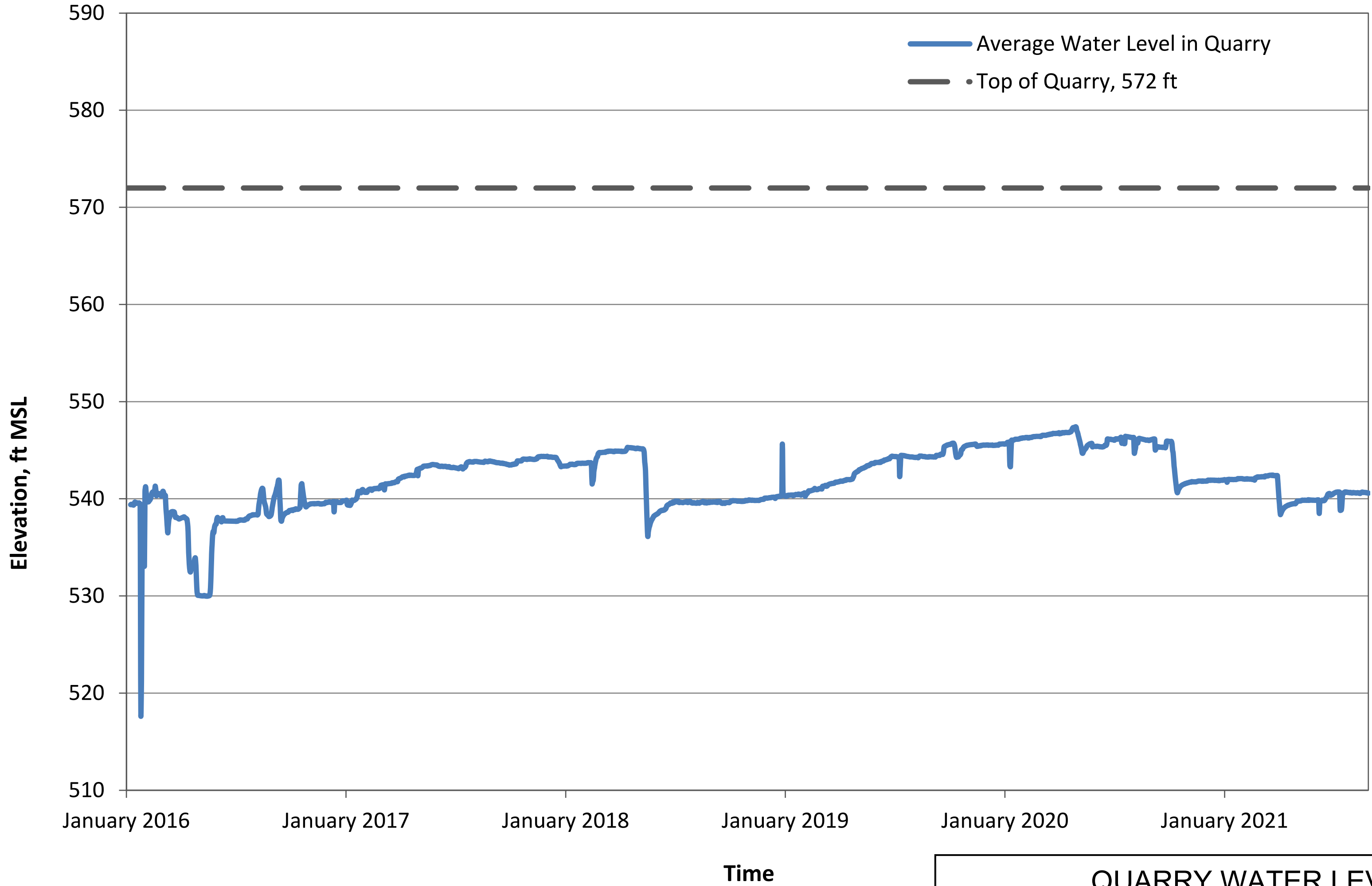
Joliet, Illinois

Geosyntec consultants

Figure **1**

Project No: GLW8016	September 2021

\\chicago-01\data\DWG\N\NRG\LSQ\IDFCP\2021 Plan\GIS\MXDs\20210915_Lincoln Stone Quarry.mxd. ASoltero. 9/16/2021. Project/Phase/Task.



QUARRY WATER LEVEL
LINCOLN STONE QUARRY
JOLIET 9 STATION
JOLIET, ILLINOIS

Geosyntec consultants

Figure 2

PROJECT NO: GLW8016

September 2021

Note: Daily Quarry water levels recorded by KPRG Associates.

Appendix A

Stormwater Run-on Calculations

Geosyntec consultants

COMPUTATION COVER SHEET

Client: **Midwest Generation** Project: **Joliet 9 Station** Project/ Proposal No.: Task No. **GLW8016**

Title of Computations **STORMWATER RUN-ON CALCULATIONS, LINCOLN STONE QUARRY**

Computations by:	Signature		20 September 2021
	Printed Name	Olivia Covert	Date
	Title	Professional	
Assumptions and Procedures Checked by: (peer reviewer)	Signature		27 September 2021
	Printed Name	Regan Welch	Date
	Title	Project Engineer	
Computations Checked by:	Signature		27 September 2021
	Printed Name	Regan Welch	Date
	Title	Project Engineer	
Computations backchecked by: (originator)	Signature		27 September 2021
	Printed Name	Olivia Covert	Date
	Title	Professional	
Approved by: (pm or designate)	Signature		29 September 2021
	Printed Name	Jesse Varsho, P.E.	Date
	Title	Principal Engineer	

Approval notes:

Revisions (number and initial all revisions)

No.	Sheet	Date	By	Checked by	Approval

Written by:	OC	Date:	20 / 09 / 21 DD MM YY	Reviewed by:	RW	Date:	27 / 09 /2021 DD MM YY
Client:	Midwest Generation	Project:	Joliet 9	Project/Prop No.:	GLW8016	Task No.:	1

STORMWATER RUN-ON CALCULATIONS
LINCOLN STONE QUARRY
JOLIET 9 STATION

INTRODUCTION

Pursuant to 35 Illinois Administration Code (IAC) Section 845.510(c), Geosyntec Consultants, Inc. (Geosyntec) prepared this calculation package to support development of the Inflow Design Flood Control System Plan for the Lincoln Stone Quarry (Quarry) at the Joliet 9 Station (Site) in Joliet, Illinois. 35 IAC Section 845.510(c) requires that operators of every existing or new CCR (Coal Combustion Residuals) surface impoundment design, construct, operate, and maintain an inflow design flood control system that adequately manages flow into the CCR unit during and following the peak discharge of the inflow design flood. This calculation evaluates the inflow design flood and evaluates the capacity of the Quarry to handle inflow from this event.

CALCULATION OF INFLOW DESIGN FLOW

The City of Joliet's "Consolidated Stormwater Management, Soil Erosion and Sediment Control and Floodplain Management Regulations specifies that the Soil Conservation Service (SCS) Runoff Curve Number Method be used to calculate design runoff volumes. The SCS method and its current application are documented in Technical Release 55 (TR-55) published by Natural Resources Conservation Service (NRCS). The SCS runoff equation is:

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S}$$

Where:

Q = runoff (in)

P = rainfall (in)

S = potential maximum retention after runoff begins (in) and

I_a = initial abstraction (in)

The initial abstraction (I_a) accounts for all losses prior to the beginning of runoff including water retained in surface depressions, intercepted by vegetation, evaporation, and

Written by:	OC	Date:	20 / 09 / 21 DD MM YY	Reviewed by:	RW	Date:	27 / 09 /2021 DD MM YY
Client:	Midwest Generation	Project:	Joliet 9	Project/Prop No.:	GLW8016	Task No.:	1

infiltration. I_a is typically correlated with soil cover parameters and is approximated by the equation:

$$I_a = 0.2S$$

S is a function of the soil type and cover and is related to the runoff curve number (CN) by the equation:

$$S = \frac{1000}{CN} - 10$$

Where:

CN = Runoff Curve Number

CN is determined by the Hydrologic Soils Group (HSG) and cover type, treatment, hydrologic condition, and antecedent moisture condition. In cases where multiple land uses occur in the same drainage area, a composite CN is determined by the area weighted method.

After calculating runoff (Q) for a design storm event, the total volume of runoff is then calculated by multiplying the runoff by the drainage area (A).

DRAINAGE AREA (A)

The area of the drainage basin of the Quarry was delineated using topographic maps[1] and aerial images[2]. The catchment area has an estimated area of 89.2 acres (refer to Figure 1), and was subdivided into four areas based on land use (cover) and soil type (HSG) for determination of CN. The catchment area outside of the Quarry footprint is located to the south.

RUNOFF CURVE NUMBER (CN)

The value of the runoff curve number (CN) has been extensively studied in the literature. Its value depends on the land use and type of soil (HSG). In general, the value of CN is

[1] Topography is dated May 2014, generated by Sidwell from Aerial photo taken in 2014.
[2] ESRI ArcGIS online images accessed in September 2021. Imagery credit: ESRI

higher for developed, impervious surfaces, and Type D soils. Correspondingly, CN has lower values for undeveloped pervious surfaces, and Type A soils.

Land use in the drainage basin within the Quarry is mostly rock or standing water. Land use in the drainage basin outside of the Quarry is mostly pasture, grass and farmland. Industrial sites to the south and east of the Quarry are located outside the drainage basin.

HSG for use in CN selection was determined by importing the watershed boundary into the Natural Resources Conservation Service Web Soil Survey (Attachment A). Approximately 0.5% of the site consists of vegetated Type B soils, 45.2% of the site consists of vegetated Type C soils, 11.4% vegetated Type D soils, 42.9% water. Based on the HSG and land use analysis a composite CN of 88.5 was determined for the drainage area. The following table summarized the analysis of the runoff curve number.

Description	Area (acres)	HSG	Cover Type	CN	Weighted
Pond	38.3	W	Water	100	42.9
Vegetated	0.4	B	Open Space-Fair	69	0.3
Vegetated	40.3	C	Open Space-Fair	79	35.7
Vegetated	10.2	D	Open Space-Fair	84	9.6
Total	89.2 acres		Composite		88.5

RAINFALL DEPTH (P)

In accordance with 35 IAC Section 845.510(a)(3)(C), the inflow design flood for an incised CCR surface impoundment, such as the Quarry, is the 25-year flood.

The City of Joliet requires the use of the Illinois State Water Survey Bulletin 70, Northeast Sectional rainfall statistics. Will County requires the use of the Illinois State Water Survey Updated Bulletin 70, Northeast Sectional Code (Angel and Marcus, 2019) in runoff volume calculations. The 1989 Bulletin 70 has a 25-year, 24-hour rainfall depth of 6.04 inches and the Updated Bulletin 70 has a higher 25-year, 24-hour rainfall depth (6.45 inches). Therefore, the Updated Bulletin 70 publication value was used in the calculations for the Quarry.

INFLOW DESIGN FLOW

The following table summarizes the inflow design flow calculations.

Written by:	OC	Date:	20 / 09 / 21 (DD MM YY)	Reviewed by:	RW	Date:	27 / 09 /2021 (DD MM YY)
Client:	Midwest Generation	Project:	Joliet 9	Project/Prop No.:	GLW8016	Task No.:	1

Parameter	25-Year, 24-Hour Precipitation Event
CN	88.5
S	1.3
P	6.5
I_a	0.3
Q (in)	5.2
Area (Ac)	89.2
Volume (ac-ft)	38.4

The potential increase in Quarry water surface elevation was estimated by dividing the total inflow (38.4 acre-ft for the design event) by the Quarry wet area (estimated to be 12.5 acres based on 2021 aerial images). The increase in water depth in the Quarry for the design event is approximately 3.1 ft.

WATER LEVEL AND FREEBOARD

Water accumulates inside the Quarry due to its incised characteristics, and water levels within the Quarry are controlled to meet the Quarry's Bureau of Land Permit No. 1994-241-LFM requirement that local groundwater gradients flow from east to west and from south to north. Midwest Generation monitors the surface water level within the Quarry daily and implements engineering controls to influence the localized groundwater gradients. Average daily water level data within the Quarry indicates that the surface water level has been maintained below 548 feet mean seal level (ft MSL) over the last five years (Figure 2). The water surface elevation for the design event, assuming the water level is at 548 ft prior to the start of the design event, is 552 ft.

Based on the site topography[3], the water level within the Quarry could rise to approximately 572 ft MSL before discharging. The freeboard after the design event is estimated to be at least 20 ft (572 ft MSL – 552 ft MSL). As the existing freeboard is estimated to be 20 feet (minimum), sufficient storage capacity exists within Quarry to manage the design flood event without discharge.

[3] Topography is dated May 2014, generated by Sidwell from Aerial photo taken in 2014.

Written by:	OC	Date:	20 / 09 / 21 (DD MM YY)	Reviewed by:	RW	Date:	27 / 09 /2021 (DD MM YY)
Client:	Midwest Generation	Project:	Joliet 9	Project/Prop No.:	GLW8016	Task No.:	1

1. REFERENCES

City of Joliet, 2003, Consolidated Storm Water Management, Soil Erosion and Sediment Control and Floodplain Management Regulations.

Angel, James, and Markus, Momcilo, March 2019. Frequency Distributions of Heavy Precipitation in Illinois: Updated Bulletin 70 (Updated Bulletin 70, Illinois State Water Survey).

Technical Release 55 (TR-55), Natural Resources Conservation Service, USDA, 2016, Soil Map, Will County, Illinois, Web Soil Survey, National Cooperative Soil Survey. USDA Natural Resources Conservation Service.

Water Resource Ordinance for Unincorporated Will County.

ATTACHMENTS

Attachment A: Soil Map from USDA – Natural Resources Conservation Service

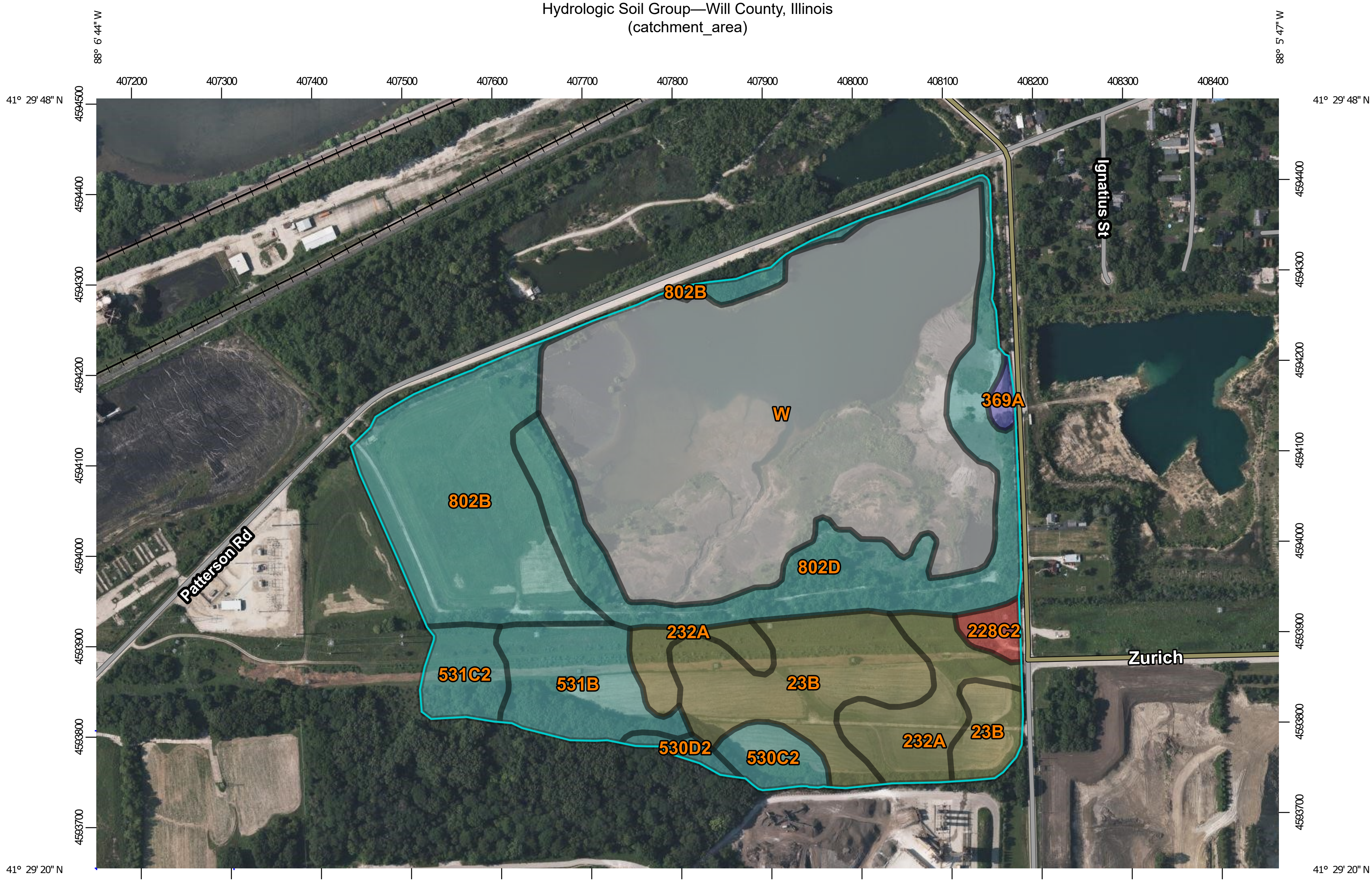
Attachment B: Illinois State Water Survey Updated Bulletin 70

Geosyntec consultants

Attachment A

Soil Map from USDA – Natural Resources Conservation Service

Hydrologic Soil Group—Will County, Illinois
(catchment_area)



Map Scale: 1:6,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Will County, Illinois
Survey Area Data: Version 15, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 4, 2020—Jul 6, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
23B	Blount silt loam, Lake Michigan Lobe, 2 to 4 percent slopes	C/D	9.4	10.5%
228C2	Nappanee silty clay loam, 4 to 6 percent slopes, eroded	D	0.8	0.9%
232A	Ashkum silty clay loam, 0 to 2 percent slopes	C/D	6.0	6.7%
369A	Waupecan silt loam, 0 to 2 percent slopes	B	0.4	0.5%
530C2	Ozaukee silt loam, 4 to 6 percent slopes, eroded	C	1.7	1.9%
530D2	Ozaukee silt loam, 6 to 12 percent slopes, eroded	C	0.6	0.6%
531B	Markham silt loam, 2 to 4 percent slopes	C	4.9	5.5%
531C2	Markham silt loam, 4 to 6 percent slopes, eroded	C	2.2	2.5%
802B	Orthents, loamy, undulating	C	12.6	14.2%
802D	Orthents, loamy, rolling	C	12.3	13.8%
W	Water		38.3	42.9%
Totals for Area of Interest			**89.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Attachment B

Illinois State Water Survey Updated Bulletin 70

ISWS CONTRACT REPORT 2019-05

Frequency Distributions of Heavy Precipitation in Illinois: Updated Bulletin 70

James Angel and Momcilo Markus

March 2019

ILLINOIS
Illinois State Water Survey
PRAIRIE RESEARCH INSTITUTE

Results

Frequency Estimates

To determine the precipitation frequency, the previously described regional frequency analysis was applied to the AMS data. The results were then converted to the PDS domain based on the relationship defined in Eq. 1 and adjusted for the trend (Eq. 3). These results, however, still had occasional minor inconsistencies caused by several factors, such as variable data length for different durations, which resulted in irregular frequency curves. To produce the final curves, these irregularities had to be smoothed out, which was done based on the authors' professional judgment and knowledge of specific regions and gages.

The results for all sections are shown in the following tables. Table 4 displays the key for the codes used in Table 5, where the results are presented numerically. The results are shown graphically in Figures 8–12.

Table 4 Storm and Sectional Codes for Table 5

Storm Code		*Sectional Code*	
1	240 hours	1	Northwest
2	120 hours	2	Northeast
3	72 hours	3	West
4	48 hours	4	Central
5	24 hours	5	East
6	18 hours	6	West Southwest
7	12 hours	7	East Southeast
8	6 hours	8	Southwest
9	3 hours	9	Southeast
10	2 hours	10	South
11	1 hour		

Table 5 (continued)

Storm code	*Section code*	*Rainfall (inches) for given recurrence interval* 2-year	*5-year*	*10-year*	*25-year*	*50-year*	*100-year*	*500-year*
4	1	3.61	4.59	5.43	6.72	7.73	8.83	11.53
4	2	3.66	4.71	5.62	6.99	8.13	9.28	12.10
4	3	3.76	4.76	5.62	6.81	7.72	8.60	10.58
4	4	3.59	4.61	5.47	6.65	7.55	8.40	10.21
4	5	3.54	4.49	5.32	6.48	7.38	8.27	10.26
4	6	3.66	4.61	5.38	6.48	7.33	8.11	9.93
4	7	3.92	4.85	5.61	6.67	7.46	8.21	9.76
4	8	4.28	5.29	6.10	7.25	8.15	9.08	11.40
4	9	4.64	5.54	6.27	7.24	7.94	8.58	10.06
4	10	4.06	5.02	5.86	7.04	8.01	9.02	11.56
5	1	3.34	4.22	5.03	6.20	7.20	8.25	10.84
5	2	3.34	4.30	5.15	6.45	7.50	8.57	11.24
5	3	3.48	4.45	5.24	6.38	7.25	8.06	9.91
5	4	3.32	4.30	5.10	6.20	7.05	7.85	9.53
5	5	3.12	3.97	4.71	5.78	6.62	7.43	9.32
5	6	3.23	4.07	4.76	5.79	6.56	7.31	9.04
5	7	3.49	4.33	5.00	5.98	6.71	7.40	8.84
5	8	3.69	4.56	5.27	6.30	7.14	7.96	10.06
5	9	4.07	4.89	5.55	6.42	7.06	7.68	8.99
5	10	3.63	4.52	5.28	6.38	7.29	8.23	10.57
6	1	3.14	3.97	4.73	5.83	6.77	7.75	10.19
6	2	3.14	4.04	4.84	6.06	7.05	8.06	10.57
6	3	3.27	4.18	4.93	6.00	6.82	7.58	9.32
6	4	3.12	4.04	4.79	5.83	6.63	7.38	8.96
6	5	2.93	3.73	4.43	5.43	6.22	6.98	8.76
6	6	3.04	3.83	4.47	5.44	6.17	6.87	8.50
6	7	3.28	4.07	4.70	5.62	6.31	6.96	8.31
6	8	3.47	4.29	4.95	5.92	6.71	7.48	9.45
6	9	3.83	4.60	5.22	6.03	6.64	7.22	8.45
6	10	3.41	4.25	4.96	6.00	6.85	7.73	9.93

Table 6 Precipitation Frequency Estimates (in inches) with 90% Confidence Intervals (continued)

Storm Code	Section Code	Recurrence interval						
		2-year	5-year	10-year	25-year	50-year	100-year	500-year
5	1	**3.34** (3.00 - 3.69)	**4.22** (3.79 - 4.68)	**5.03** (4.50 - 5.61)	**6.20** (5.51 - 6.99)	**7.20** (6.34 - 8.21)	**8.25** (7.20 - 9.54)	**10.84** (9.16 - 13.00)
5	2	**3.34** (3.00 - 3.69)	**4.30** (3.85 - 4.77)	**5.15** (4.60 - 5.73)	**6.45** (5.71 - 7.26)	**7.50** (6.59 - 8.55)	**8.57** (7.46 - 9.93)	**11.24** (9.48 - 13.63)
5	3	**3.48** (3.19 - 3.79)	**4.45** (4.07 - 4.86)	**5.24** (4.79 - 5.74)	**6.38** (5.81 - 7.05)	**7.25** (6.56 - 8.09)	**8.06** (7.23 - 9.07)	**9.91** (8.61 - 11.47)
5	4	**3.32** (3.01 - 3.65)	**4.30** (3.89 - 4.74)	**5.10** (4.61 - 5.64)	**6.20** (5.58 - 6.91)	**7.05** (6.31 - 7.93)	**7.85** (6.99 - 8.92)	**9.53** (8.31 - 11.16)
5	5	**3.12** (2.86 - 3.38)	**3.97** (3.64 - 4.31)	**4.71** (4.30 - 5.15)	**5.78** (5.25 - 6.38)	**6.62** (5.97 - 7.39)	**7.43** (6.63 - 8.41)	**9.32** (8.08 - 10.96)
5	6	**3.23** (2.95 - 3.54)	**4.07** (3.71 - 4.47)	**4.76** (4.32 - 5.26)	**5.79** (5.21 - 6.45)	**6.56** (5.85 - 7.37)	**7.31** (6.45 - 8.30)	**9.04** (7.73 - 10.59)
5	7	**3.49** (3.18 - 3.80)	**4.33** (3.93 - 4.74)	**5.00** (4.53 - 5.50)	**5.98** (5.39 - 6.64)	**6.71** (6.00 - 7.54)	**7.40** (6.54 - 8.42)	**8.84** (7.58 - 10.44)
5	8	**3.69** (3.36 - 4.04)	**4.56** (4.15 - 5.01)	**5.27** (4.78 - 5.82)	**6.3** (5.67 - 7.03)	**7.14** (6.37 - 8.03)	**7.96** (7.03 - 9.05)	**10.06** (8.60 - 11.78)
5	9	**4.07** (3.71 - 4.44)	**4.89** (4.45 - 5.35)	**5.55** (5.03 - 6.10)	**6.42** (5.79 - 7.12)	**7.06** (6.32 - 7.91)	**7.68** (6.80 - 8.70)	**8.99** (7.73 - 10.51)
5	10	**3.63** (3.29 - 4.00)	**4.52** (4.08 - 5.01)	**5.28** (4.73 - 5.88)	**6.38** (5.66 - 7.21)	**7.29** (6.36 - 8.36)	**8.23** (7.07 - 9.59)	**10.57** (8.67 - 13.03)

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 an area where a fall hazard of **4** feet or more exits. Mandatory fall protection is required when working within 6 feet of the edge of the quarry.

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 **CONTRACTOR'S FACILITIES**

2.1 Temporary chemical toilet accommodations shall be furnished and maintained by Contractor for the use of his employees. Location shall be as directed by Purchaser's Representative. Use of Purchaser's toilet facilities by Contractor's employees is not permitted.

2.2 Contractor shall provide his own storage vessels, coolers, ice, water containers, etc., as required for his own drinking water use. Contractor shall supply a trash can with each drinking water container to receive used paper cups. Contractor shall maintain drinking water container, supply suitable water cups and dispose of trash as required. Open drinking cups and containers in the plant areas are not permitted.

2.3 Each Contractor is expected to pre-arrange medical emergency services for on-site and off site treatment. This includes, but is not limited to, first aid and confined space rescue.

2.4 FIRE PROTECTION FACILITIES

A. Contractor shall provide his own temporary fire protection facilities for the equipment and materials furnished by him or by Purchaser and for his temporary construction buildings and structures. This equipment shall be maintained and inspected in accordance with applicable NFPA codes.

B. Furnish a suitable quantity and type of portable fire extinguishers and equipment, to meet OSHA and applicable codes.

2.5 Purchaser will not furnish any additional illumination of aisles, passages in the buildings, floodlighting of outdoor areas or lighting inside equipment other than that which is existing. Any additional lighting required by the Contractor shall be provided by the Contractor.

2.6 Contractor shall provide and maintain suitably located distribution centers with fused switching equipment and Ground Fault Interruption protection. The equipment supplied shall comply with OSHA regulations and standards.

2.7 Contractor shall supply all adapters and equipment required to connect to station air, water, and electrical systems. All air hoses shall be safety clipped together.

2.8 Any heating facilities required for the performance of the Work shall be furnished, maintained, and removed by Contractor. Open fires WILL NOT BE PERMITTED at any time. Heating equipment shall be as approved by Purchaser's Representative.

3.0 **<u>CONTRACTOR'S TOOLS AND EQUIPMENT</u>**

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