2022 Annual Groundwater Monitoring and Corrective Action Report

Nelson Dewey Generating Station Slag Pond
Cassville, Wisconsin

Prepared for:

Alliant Energy

SCS ENGINEERS

25222071.00 | January 31, 2023

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OVERVIEW OF CURRENT STATUS

Nelson Dewey Generating Station, Slag Pond
2022 Annual Report

In accordance with §257.90(e)(6), this section at the beginning of the annual report provides an overview of the current status of groundwater monitoring and corrective action programs for the coal combustion residual (CCR) units. Supporting information is provided in the text of the annual report.

Category	Rule Requirement	Site Status
Monitoring Status – Start of Year	(i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	Detection
Monitoring Status – End of Year	(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	Detection
Statistically Significant Increases (SSIs)	(iii) If it was determined that there was an SSI over background for one or more constituents listed in Appendix III to this part pursuant to §257.94(e):	
	(A) Identify those constituents listed in Appendix III to this part and the names of the monitoring wells associated with such an increase; and	<u>October 2021</u> Boron: B-11A, B-11B, B-11R, B-31A, B-31R Calcium: B-11R Field pH: B-11B Sulfate: B-11B, B-11R TDS: B-11B, B-11R <u>April 2022</u> Boron: B-7R, B-11A, B-11B, B-11R, B-31A, B-31R Calcium: B-11R Field pH: B-31A Sulfate: B-11B, B-11R, B-31R Total Dissolved Solids (TDS): B-11B, B-11R

Category	Rule Requirement	Site Status
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	Alternative Source Demonstrations prepared for October 2021 and April 2022 events during 2022. Assessment monitoring not required.
Statistically Significant Levels (SSL) Above Groundwater Protection Standard (GPS)	(iv) If it was determined that there was an SSL above the GPS for one or more constituents listed in appendix IV to this part pursuant to §257.95(g) include all of the following:	Not applicable In detection monitoring
	(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;	
	(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	
	(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	
	(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	
Selection of Remedy	(v) Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection; and	Not applicable In detection monitoring
Corrective Action	(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	Not applicable In detection monitoring

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1.0 INTRODUCTION

This 2022 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the Coal Combustion Residuals (CCR) Rule [40 CFR 257.50-107]. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.90(e). The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2022 Annual Groundwater Monitoring and Corrective Action Report for the CCR Unit. The site location is shown on **Figure 1**.

This report covers the period of groundwater monitoring from January 1, 2022, through December 31, 2022.

The groundwater monitoring system for the Nelson Dewey Generating Station (NED) Slag Pond monitors a single CCR unit:

- NED Slag Pond (existing surface impoundment – closed January 2018)

The system is designed to detect monitored constituents at the waste boundary of the Slag Pond as required by 40 CFR 257.91(d). The groundwater monitoring system consists of one background well and six downgradient monitoring wells (**Table 1** and **Figure 3**).

During 2017 and early 2018, the Slag Pond CCR unit was closed by leaving the CCR in place and installing a final cover system, in accordance with §257.102(d). Closure certification was completed on January 31, 2018.

The closed CCR landfill adjacent to the Slag Pond is not subject to regulation under the CCR rule, and is regulated by the Wisconsin Department of Natural Resources. The CCR landfill was initially licensed in 1976 and received fly ash from NED until it was closed in phases between 1996 and 2001.

2.0 BACKGROUND

To provide context for the annual report, the following background information is provided in this section of the report, prior to the annual report requirements sections:

- Geologic and hydrogeologic setting
- CCR Rule monitoring system

2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

2.1.1 Regional Information

The uppermost geologic formation beneath the NED plant that meets the definition of the "uppermost aquifer," as defined by section 257.53 of the CCR Rule, is the surficial alluvial aquifer. The alluvial aquifer consists of Mississippi River valley sand and gravel deposits. This deposit is prevalent along the edges of the entire Mississippi River valley in southwestern Wisconsin. A map of the regional glacial geology in the area is included in **Appendix A**.

The alluvial aquifer is underlain by dolomitic bedrock of the Prairie du Chien Group. A bedrock geology map of the area is provided in **Appendix A**. The dolomite bedrock is also an aquifer and is likely hydraulically connected to the alluvial aquifer above.

Regionally, groundwater flow is generally to the southwest and discharges to the Mississippi River.

2.1.2 Site Information

Soil boring logs for monitoring wells installed at the site also generally indicate sand and gravel soils within the monitored depths. During drilling of CCR well B-7R, the unconsolidated materials were identified as consisting primarily of poorly graded, medium to coarse grained sand, and silty sand. The boring log for the previously installed background monitoring well B-26 shows silt and poorly graded sand as the primary unconsolidated materials at this location. The boring logs for the CCR monitoring wells are provided in **Appendix B**. All CCR monitoring wells are screened within the unconsolidated glacial aquifer.

The groundwater flow direction in the vicinity of the plant is generally southwest toward the Mississippi River. Historically, infiltration at the former Slag Pond, former fly ash basin, and the former Wisconsin Pollutant Discharge Elimination System (WPDES) ponds caused groundwater mounding to be present around these features; however, these ponds have now all been closed and are no longer sources of infiltration.

Although historic site water level measurements have generally indicated that groundwater flow is toward the Mississippi River, groundwater flow in the Slag Pond area is influenced by variations in river water levels. During periods of high river water levels, the flow temporarily reverses and the river discharges to the shallow sand and gravel aquifer. The water table map for the April 2022 monitoring event (**Figure 4**) shows groundwater flow to the southwest toward the river, with localized flow to the east near the closed CCR landfill area. The water table map for the October 2022 monitoring event (**Figure 5**) shows flow to the south and southwest toward the river. The groundwater elevations for the CCR monitoring wells and additional wells in the state monitoring program for the closed CCR landfill are provided in **Table 3.** Calculated horizontal gradients and flow velocities for flow to the west and south in April 2022 and to the south in October 2022 are provided in **Table 4A**. Vertical gradients are provided in **Table 4B**.

2.2 CCR MONITORING SYSTEM

The groundwater monitoring system established in accordance with the CCR Rule consists of one upgradient (background) monitoring well and six downgradient monitoring wells (**Table 1** and **Figure 3**). The background well is B-26. The downgradient wells include B-7R, B-11A, B-11B, B-11R, B-31A, and B-31R. The CCR Rule wells are installed within the surficial alluvium aquifer. Well depths range from approximately 23 to 114 feet, measured from the top of the well casing.

3.0 § 257.90(E) ANNUAL REPORT REQUIREMENTS

Annual groundwater monitoring and corrective action report. *For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the*

preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by §257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

3.1 § 257.90(E)(1) SITE MAP

A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

A map showing the site location is provided on Figure 1. A map showing site features is provided on Figure 2. A map showing the CCR unit and all background (or upgradient) and downgradient monitoring wells with identification numbers for the groundwater monitoring program is provided on Figure 3. The Slag Pond CCR unit is closed, and the map shows the post-closure conditions.

3.2 § 257.90(E)(2) MONITORING SYSTEM CHANGES

Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

No new monitoring wells were installed and no wells were decommissioned as part of the groundwater monitoring program for the CCR unit in 2022.

3.3 § 257.90(E)(3) SUMMARY OF SAMPLING EVENTS

In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

Two groundwater sampling events were completed in 2022 at the NED Slag Pond as part of ongoing detection monitoring.

Groundwater samples collected during the semiannual events, in April and October 2022, were analyzed for the Appendix III constituents. A summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring program is included in Table 2.

The validation and evaluation of the April 2022 monitoring event data was completed and transmitted to WPL on August 1, 2022. The validation and evaluation of the October 2022 monitoring event data was in progress at the end of 2022 and will be transmitted to WPL in 2023; therefore, the October 2022 monitoring results will be included in the 2023 annual report. The October 2022 groundwater elevation data is included in this report.

The sampling results for Appendix III parameters in April 2022 are summarized in Table 5. Field parameter results for the April 2022 sampling events are provided in Table 6. The analytical

laboratory report for April 2022 are provided in **Appendix C**. Historical results for each monitoring well through April 2022 are summarized in **Appendix D**.

3.4 § 257.90(E)(4) MONITORING TRANSITION NARRATIVE

A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels);

There was no monitoring program transition in 2022. The NED Slag Pond remained in the detection monitoring program.

In 2022, the monitoring results for the October 2021 and April 2022 monitoring events were evaluated for statistically significant increases (SSIs) in detection monitoring parameters relative to background. The comparison to background was based on a prediction limit approach, comparing the results to interwell upper prediction limits (UPLs) based on background monitoring results from the upgradient well (B-26). The interwell UPLs were most recently updated in January 2021 using background data collected through October 2020. The January 2021 Statistical Analysis was included as an Appendix in the 2021 Annual Groundwater Monitoring Report. The Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities (U.S. EPA, 2009; Section 5.3.1) recommends periodic updating of background for both intrawell and interwell analyses. For semiannual monitoring, an update interval of 2 to 3 years is recommended; therefore, the next UPL update is planned for 2023 or 2024.

For the October 2021 and April 2022 events, SSIs were identified at one or more wells for boron, calcium, field pH, sulfate, and total dissolved solids (TDS) (**Table 5**).

Alternative source demonstrations were completed in 2022 for SSIs identified in the October 2021 and April 2022 events, demonstrating that sources other than the Slag Pond were the likely cause of the observed SSIs. The Alternative Source Demonstration (ASD) reports are provided in **Appendix E**.

3.5 § 257.90(E)(5) OTHER REQUIREMENTS

Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

Additional potentially applicable requirements for the annual report, and the location of the requirement within the Rule, are provided in the following sections. For each cited section of the Rule, the portion referencing the annual report requirement is provided below in italics, followed by applicable information relative to the 2022 Annual Groundwater Monitoring and Corrective Action Report for the NED Slag Pond CCR unit.

3.5.1 § 257.90(e) General Requirements

For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year.

Status of Groundwater Monitoring and Corrective Action Program. The groundwater monitoring and corrective action program was in detection monitoring throughout 2022.

Summary of Key Actions Completed.

- Two semiannual groundwater sampling and analysis events (April and October 2022).
- Statistical evaluation and determination of SSIs for the October 2021 and April 2022 monitoring events.
- ASD reports for the SSIs identified from the October 2021 and April 2022 monitoring events.

Description of Any Problems Encountered. During the October 2022 monitoring event, compliance well B-7R did not have sufficient groundwater for sample collection. B-7R is a shallow well located close to the Mississippi River, and the low water level within the well is attributed to the low river level in the late summer and fall of 2022. The groundwater elevation measured at B-7R in October 2022 is the lowest observed since the well was installed in 2009, and this well was able to be sampled during all previous monitoring events except in October 2021, when water levels in the Mississippi River were also low.

Discussion of Actions to Resolve the Problems. This well will be sampled again in April 2023.

Projection of Key Activities for the Upcoming Year (2023).

- Two semiannual groundwater sampling and analysis events (April and October 2023).
- Statistical evaluation and determination of any SSIs for the October 2022 and April 2023 monitoring events.
- If an SSI is determined, then within 90 days either:
  - Complete ASD (if applicable), or
  - Establish an assessment monitoring program.

3.5.2 § 257.94(d) Alternative Detection Monitoring Frequency

The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not applicable. No alternative detection monitoring frequency has been proposed.

3.5.3 § 257.94(e)(2) Alternative Source Demonstration for Detection Monitoring

The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

The ASD reports prepared to address the SSIs observed for the October 2021 and April 2022 sampling events are provided in **Appendix E**. The ASD reports are certified by a qualified professional engineer.

3.5.4 § 257.95(c) Alternative Assessment Monitoring Frequency

The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not applicable. Assessment monitoring has not been initiated.

3.5.5 § 257.95(d)(3) Assessment Monitoring Results and Standards

Include the recorded concentrations required by paragraph (d)(1) of this section, identify the background concentrations established under § 257.94(b), and identify the groundwater protection standards established under paragraph (d)(2) of this section in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not applicable. Assessment monitoring has not been initiated.

3.5.6 § 257.95(g)(3)(ii) Alternative Source Demonstration for Assessment Monitoring

The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not applicable. Assessment monitoring has not been initiated.

3.5.7 § 257.96(a) Extension of Time for Corrective Measures Assessment

The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measure due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer attesting that the demonstration is accurate. The 90-day deadline to complete the assessment of corrective measures may be extended for longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not applicable. Corrective measures assessment has not been initiated.

3.6 257.90(E)(6) OVERVIEW

A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit.

The specific requirements for the overview under §257.90(e)(6) are listed and the information is provided at the beginning of this report, before the Table of Contents.

4.0 REFERENCES

U.S. Environmental Protection Agency (U.S. EPA), 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, EPA 530-R-09-007, March 2009.

Tables

Table 1. Groundwater Monitoring Well Network
Nelson Dewey Closed Ash Disposal Facility
SCS Engineers Project #25222071.00

Monitoring Well	Location in Monitoring Network	Role in Monitoring Network
B-26	Upgradient / Sidegradient	Background
B-7R	Downgradient	Compliance
B-11R	Downgradient	Compliance
B-11A	Downgradient	Compliance
B-11B	Downgradient	Compliance
B-31R	Downgradient	Compliance
B-31A	Downgradient	Compliance

Created by: RM Date: 12/14/2020
Last revision by: NDK Date: 9/26/2022
Checked by: RM Date: 12/21/2022

Table 2. CCR Rule Groundwater Samples Summary
Nelson Dewey Closed Ash Disposal Facility / SCS Engineers Project #25222071.00

Sample Dates	Downgradient Wells						Upgradient Well
	B-7R[(1)]	B-11R	B-11A	B-11B	B-31R	B-31A	B-26
4/25-26/2022	D	D	D	D	D	D	D
10/18/2022	--	D	D	D	D	D	D
Total Samples	1	2	2	2	2	2	2

Abbreviations:
D = Required by Detection Monitoring Program
-- = No Sample

Notes:
(1) Insufficient amount of water for sampling at B-7R during October 2022 sampling event.

Created by: ACW Date: 11/12/2019
Last revision by: RM Date: 12/22/2022
Checked by: ACW Date: 12/28/2022

Table 3. Groundwater Elevation Summary
Nelson Dewey Closed Ash Disposal Facility / SCS Engineers Project #25222071.00

	Ground Water Elevation in feet above mean sea level (amsl)																									
Well Number	**B-7R**	**B-8R**	**B-11R**	**B-11A**	**B-11B**	**B-21R**	**B-26**	**B-26A**	**B-28**	**B-30R**	**B-30AR**	**B-31R**	**B-31A**	**B-32**	**B-32A**	**B-35**	**B-35A**	**B-36**	**B-36A**	**B-37**	**B-37A**	**B-39**	**MW-301**	**MW-302**	**MW-303**	**Barge Gauge (SG-12)^^**	**Pond Gauge (SG-13)**
Top of Casing Elevation (feet amsl)	623.35	627.51	622.62	622.12	621.89	623.31	626.40	626.40	616.81	621.81	622.4	622.42	622.69	614.18	614.4	620.78	621.09	621.11	621.33	614.85	614.85	626.48	619.09	619.21	618.49	622.34	See notes
Screen Length (ft)	10	10	10	5	5	10	10	5	10	10	5	10	5	10	5	10	5	9	4.5	10	5	10	10	10	10		
Total Depth (ft from top of casing)	23.05	27.25	24.15	52.00	113.90	22.78	31.67	45.78	16.70	22.20	46.90	22.82	35.52	14.79	52.00	16.60	47.00			19.95	48.20	26.90	21.11	21.27	20.15		
Top of Well Screen Elevation (ft)	610.30	610.26	608.47	575.12	512.99	610.53	604.73	585.62	610.11	609.61	580.50	609.60	592.17	609.39	567.40	614.18	579.20	609.60	575.50	604.90	571.65	609.58	607.98	607.94	608.34		
Measurement Date																		--	--								
October 5-6, 2011	604.94	606.29	604.57	604.36	604.32	604.43	604.52	604.55	604.61	604.37	605.21	608.37	604.42	604.88	604.82	604.87	604.81	--	--	604.37	604.39		--	--	--	--	--
April 25-26, 2012	606.58	606.30	606.07	606.30	606.28	--	605.89	605.91	--	--	--	608.65	606.31	604.33	--	606.29	#REF!	--	--	606.16	606.17	606.17	--	--	--	--	--
October 17, 2012	604.39	604.16	604.10	603.98	603.98	604.08	604.12	604.14	604.31	603.97	603.98	607.32	604.07	604.33	604.35	--	#REF!	--	--	603.93	603.93	603.93	--	--	--	--	--
April 2, 2013	607.04	608.01	606.15	607.20	607.17	606.30	605.60	605.64	605.90	605.91	605.93	607.13	607.13	606.11	606.14	606.13	606.25	--	--	606.99	607.02		--	--	--	--	--
October 16-17, 2013	604.51	605.89	604.17	603.90	603.87	604.11	604.31	604.32	604.36	604.08	604.06	604.87	604.00	604.53	604.56	604.46	604.44	--	--	604.05	604.04		--	--	--	--	--
April 10, 2014	607.42	608.97	607.45	607.28	607.26	--	607.22	607.23	--	--	--	607.37	607.28	--	--	607.46	607.39	--	--	607.25	607.26		--	--	--	--	--
October 14-15, 2014	605.67	606.82	605.17	604.90	604.91	614.92	605.00	605.01	605.13	604.92	604.92	606.36	605.54	605.41	605.45	605.36	605.33	--	--	604.94	604.99		--	--	--	--	--
April 16, 2015	607.26	608.50	607.11	607.15	607.05	--	606.40	606.41	--	--	--	607.37	607.09	--	--	606.73	606.78	--	--	606.99	606.88		--	--	--	--	--
October 1-2, 2015	605.14	604.66	604.53	604.42	604.38	604.36	604.43	604.50	604.54	604.34	604.32	605.13	604.38	604.76	604.82	604.76	604.75	--	--	604.30	604.39		--	--	--	--	--
December 8, 2015	606.69	--	606.71	606.30	606.26	--	606.80	--	--	--	--	607.40	606.39	--	--	--	--	--	--	--	--	607.54	--	--	--	--	--
April 12, 2016	609.32	609.36	609.32	608.71	608.68	--	609.81	609.72	--	--	--	609.34	609.01	--	--	609.73	609.65	--	--	608.79	608.79	610.23	--	--	--	--	--
July 18-19, 2016	606.54	--	606.14	606.76	606.74	--	606.09	--	--	--	--	606.55	606.73	--	--	--	--	--	--	--	--	606.28	--	--	--	--	--
October 19-20, 2016	608.59	608.46	608.35	608.21	608.19	608.37	608.84	608.76	608.63	608.45	608.46	608.51	608.20	608.69	608.73	608.78	608.74	--	--	608.20	608.18	609.09	--	--	--	--	--
January 11-12, 2017	608.02		607.96	607.83	607.78		608.56					607.90	607.84					--	--			608.92	--	--	--	--	--
April 17, 2017	609.08	608.82	608.34	609.05	608.99	NM	608.59	608.54	609.94	608.57	608.64	607.20	608.98	608.96	608.98	609.00	609.02	--	--	609.02	609.02	610.23	--	--	--	--	--
June 8, 2017	610.74	--	610.42	609.81	610.08	--	611.25	--	--	--	--	609.63	610.50	--	--	--	--	--	--	--	--	611.53	--	--	--	--	--
August 1-2, 2017	607.02	--	606.73	605.57	605.50	--	607.39	--	--	--	--	606.84	605.69	--	--	--	--	--	--	--	--	608.71	--	--	--	--	--
October 9-10, 2017	606.93	606.51	606.25	607.01	606.94	--	606.22	606.13	606.33	606.44	606.45	606.68	606.93	606.57	606.61	606.65	606.71	--	--	--	--	--	--	--	--	--	--
October 19, 2017	609.60	--	609.42	609.58	609.65	--	608.84	--	--	--	--	609.47	609.43	--	--	--	--	--	--	609.40	609.40	608.55	--	--	--	--	--
November 17, 2017	--	--	--	--	--	606.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December 19, 2017	--	--	--	--	--	604.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February 7, 2018	605.37	--	605.33	604.96	604.92	--	--	--	616.81	--	--	605.31	605.01	--	--	--	--	--	--	--	--	606.19	605.08	605.05	605.00	--	--
March 16, 2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	604.64	604.6	604.56	--	--
April 203, 2018 **	604.82	606.61	606.27	606.63	606.55	606.52	606.49	606.37	606.39	606.46	606.43	604.44	606.46	606.58	606.66	606.68	606.70	--	--	606.77	606.83	606.19	--	--	--	--	--
May 23, 2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	610.68	610.78	610.61	--	--
October 8-10, 2018	610.76	610.68	610.67	610.28	610.24	610.02	610.34	610.28	610.83	610.09	610.05	610.39	610.27	611.05	610.94	610.72	610.54	--	--	--	--	611.44	--	--	--	--	--
November 11, 2018	--	--	--	--	609.14	--	--	--	--	--	--	609.11	--	--	--	--	--	--	--	--	--	--	--	--	--	608.40	--
April 22-23, 2019	615.28	615.66	615.28	615.29	615.28	614.98	615.49	615.31	615.40	615.36	615.35	615.01	615.33	--	--	615.87	615.98	--	--	--	--	615.40	--	--	--	615.17	<615.06
October 14-16, 2019	613.43	613.11	613.06	613.29	613.18	612.47	613.10	613.10	612.71	612.83	612.78	612.50	613.20	613.10	613.00	613.10	613.15	--	--	--	--	613.35	--	--	--	612.33	<615.06
April 13-14, 2020	614.12	613.76	614.39	613.88	613.86	613.22	613.76	613.73	613.68	613.60	613.56	613.80	613.79	--	--	614.04	614.00	--	--	--	--	613.71	--	--	--	612.89	613.10
October 12-13, 2020	605.09	604.88	604.57	604.54	604.44	604.28	604.92	604.83	604.86	604.72	604.72	604.66	604.54	605.07	605.06	605.00	605.08	--	--	--	--	605.06	--	--	--	603.89	DRY
April 19-21, 2021	608.83	608.66	608.57	608.72	608.67	607.93	608.55	608.49	608.27	608.38	608.35	608.66	608.63	608.68	608.74	608.86	608.85	608.40	608.39	608.74	608.75	608.48	--	--	--	608.15	<609.00
October 6-8, 2021	604.05	604.04	603.85	603.79	603.74	603.56	604.21	604.13	604.11	604.00	603.97	603.98	603.84	604.32	604.38	604.35	604.34	603.93	603.92	NM	NM	604.23	--	--	--	602.90	<609.00
April 25-26, 2022	609.84	610.25	609.75	610.00	609.98	609.70	610.12	610.08	609.99	610.11	610.09	610.27	609.95	610.26	610.40	610.44	610.32	609.94	609.90	AB	AB	610.22	--	--	--	NM	609.25
October 18-19, 2022	603.81	603.82	603.59	603.63	603.57	603.39	603.99	603.81	603.84	603.78	603.77	603.69	603.61	604.07	604.09	604.12	604.05	603.64	603.65	AB	AB	603.91	--	--	--	601.29	<609.00
Bottom of Well Elevation (ft)	600.30	600.26	598.47	570.12	507.99	600.53	594.73	580.62	600.11	599.61	575.50	599.60	587.17	599.39	562.40	604.18	574.20	600.6	571	594.90	566.65	599.58	597.98	597.94	598.34	--	--

Notes:
-- = not measured
*The PVC casing at B-35A was cut down on June 28, 2018 to allow the protective cover to close. Groundwater elevations prior to 6/28/18 are calculated using the old top of casing (TOC) elevation of 621.20 ft amsl. Groundwater elevations after 6/28/18 are calculated using the new TOC elevation (621.09 ft amsl).
** The PVC casing at B-21R was extended in 2018 following well rehabilitation. The well was resurveyed on April 22, 2019. The old top of casing elevation was 621.03 ft. The new TOC elevation is 623.31 ft.
^ One pond staff gauge was installed on April 22, 2019. The base of the gauge (0 reading) is at 615.056 ft amsl. Two additional gauges were installed on March 24, 2020. These gauge bases are at 609' and 612' amsl.
^^SG-12 reestablished in 2022 following barge slip construction work. Previous elevation (applies to measurements before October 2022) was 616.60. New elevation (top of metal pipe) is 622.34'

Created by: MDB Date: 4/1/2013
Last revision by: DK Date: 10/24/2022
Checked by: NDK Date: 10/24/2022

\\Mad-fs01\data\Projects\25222071.00\Deliverables\2022 NED Fed CCR Annual Report\Tables\[Table 3 - Groundwater Elevation Summary.xls]levels

Table 4A. Horizontal Gradients and Flow Velocity
Nelson Dewey Generating Station
SCS Engineers Project #25222071.00
2022

	Flowpath A - West				
Sampling Dates	**h1 (ft)**	**h2 (ft)**	**Δl (ft)**	**Δh/Δl (ft/ft)**	**V (ft/d)**
April 25-26, 2022	610.00	609.75	154.98	0.0016	0.03

	Flowpath B - South				
Sampling Dates	**h1 (ft)**	**h2 (ft)**	**Δl (ft)**	**Δh/Δl (ft/ft)**	**V (ft/d)**
April 25-26, 2022	610.25	610.00	399.00	0.0006	0.01
October 18-19, 2022	603.91	603.59	582.00	0.0005	

Wells	**K Values (cm/sec)**	**K Values (ft/d)**
Geometric Mean	2.9E-03	8.2

Note: K value derived from averaging previous slug tests

Assumed Porosity, n
0.40

Groundwater flow velocity equation: V = [K*(Δh/Δl)] / n

ft = feet
ft/d = feet per day
K = hydraulic conductivity
n = effective porosity
V = groundwater flow velocity

h1, h2 = point interpreted groundwater elevation at locations 1 and 2
Δl = distance between location 1 and 2
Δh/Δl = hydraulic gradient

Created by:	NDK	Date:	9/26/2022
Last revision by:	RM	Date:	12/27/2022
Checked by:	ACW	Date:	12/28/2022

Table 4B. Summary of Calculated Vertical Hydraulic Gradients
Nelson Dewey Generating Station
SCS Engineers Project #25222071.00
2022

Date	B-11A/B-11B	B-31R/B-31A
April 25-26, 2022	-0.0002	-0.016
October 18-19, 2022	-0.0006	-0.006

Notes:
A positive vertical gradient indicates upward flow potential, and a negative vertical gradient indicates downward flow potential.

Created by:	NDK	Date:	9/26/2022
Last revision by:	RM	Date:	12/23/2022
Checked by:	ACW	Date:	12/28/2022

\\Mad-fs01\data\Projects\25222071.00\Deliverables\2022 NED Fed CCR Annual Report\Tables\[Table 4B - Vertical_Gradients_

Table 5. Groundwater Analytical Results Summary - 2022
Nelson Dewey Closed Ash Disposal Facility, Cassville, WI / SCS Engineers Project #25222071.00

Parameter Name	UPL	Background Well	Compliance Wells					
		B-26	B-7R	B-11A	B-11B	B-11R	B-31A	B-31R
		4/25/2022	4/26/2022	4/26/2022	4/26/2022	4/26/2022	4/26/2022	4/25/2022
Appendix III								
Boron, ug/L	72.3	52.5	98.1	88.6	2,590	2,330	198	454
Calcium, ug/L	108,000	75,900	59,200	51,600	97,100	114,000	55,300	81,100
Chloride, mg/L	77.6	45.3	12.0	58.3	36.5	18.0	56.0	36.0
Fluoride, mg/L	0.2	<0.48 D3, M0	<0.48 D3	<0.095	<0.48	<0.48 D3	0.22 J	<0.095
Field pH, Std. Units	7.71	7.19	6.43	7.53	7.63	7.01	7.82	6.77
Sulfate, mg/L	44.0	34.2	3.7 J, D3	8.5	513	58.1	15.4	60.0
Total Dissolved Solids, mg/L	553	470	318	350	1,000	560	316	428

7.81 Blue shaded cell indicates the compliance well result exceeds the UPL (background) and the Limit of Quantitation (LOQ).

Abbreviations:

UPL = Upper Prediction Limit
SSI = Statistically Significant Increase
DQ = Double Quantification
LOQ = Limit of Quantitation
LOD = Limit of Detection
ug/L = micrograms per liter
mg/L = milligrams per liter

Lab Notes:

J = Estimated concentration at or above the LOD and below the LOQ.
D3 = Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
M0 = Matrix Spike recovery and/or matric spike duplicate recovery was outside laboratory control limits.

Notes:

1. An individual result above the UPL may not constitute an SSI above background. See the accompanying report text for identification of statistically significant results.
2. Interwell UPLs calculated based on results from background well B-26. UPLs are based on a 1-of-2 retesting approach.
3. Interwell UPLs were updated in January 2021 with background well results from December 2015 through October 2020.

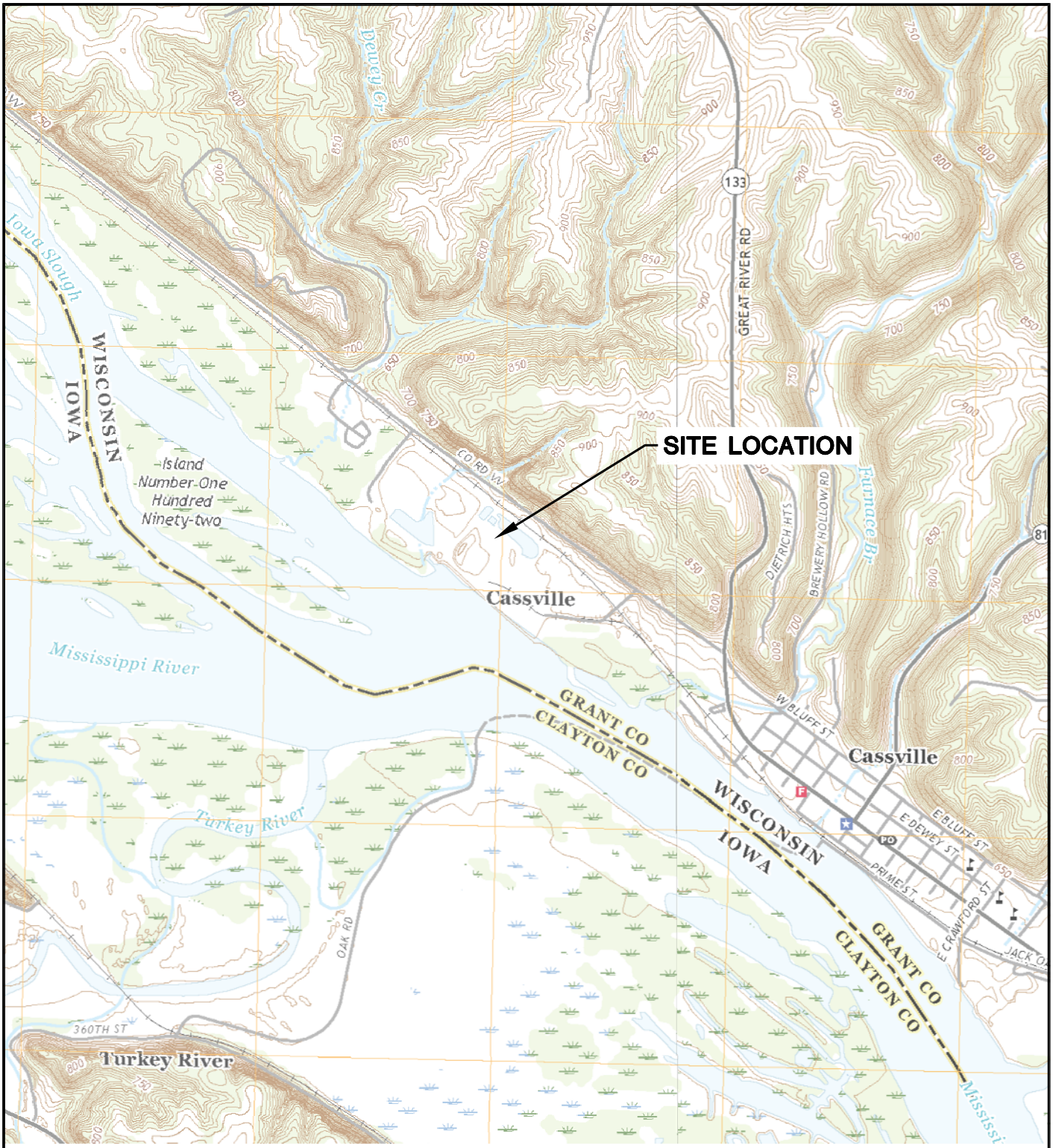
Created by: LMH Date: 9/26/2022
Last revision by: RM Date: 12/20/2022
Checked by: ACW Date: 12/28/2022
Proj Mgr QA/QC: TK Date: 1/17/2023

Table 6. 2022 Groundwater Field Data Summary
Nelson Dewey Closed Ash Disposal Facility / SCS Engineers Project #25222071.00

Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Field Specific Conductance (umhos/cm)	Oxygen, Dissolved (mg/L)	Field Oxidation Potential (mV)	Turbidity (NTU)
B-7R	4/26/2022	609.84	8.5	6.43	614.1	0.82	-86.1	3.56
B-11A	4/26/2022	610.00	13.0	7.53	633.7	0.15	0.3	0.00
B-11B	4/26/2022	609.98	13.0	7.63	1,432	0.22	45.4	0.00
B-11R	4/26/2022	609.75	10.4	7.01	934	0.07	-41.5	6.70
B-26	4/25/2022	610.12	11.0	7.19	826	10.44	252.4	0.30
B-31A	4/26/2022	609.95	13.2	7.82	556	0.17	59.6	0.00
B-31R	4/25/2022	610.27	11.3	6.77	728	0.38	-25.3	3.68

Created by: NDK Date: 9/26/2022
Last revision by: DK Date: 12/7/2022
Checked by: ACW Date: 12/28/2022

Figures



N

CASSVILLE AND TURKEY RIVER QUADRANGLES
WISCONSIN–IOWA
7.5 MINUTE SERIES (TOPOGRAPHIC)
2018
SCALE: 1" = 2,000'

CLIENT	ALLIANT ENERGY 4902 N. BILTMORE LANE, #1000 MADISON, WI 53718	SITE	ALLIANT ENERGY NELSON DEWEY GENERATING STATION CASSVILLE, WISCONSIN

SITE LOCATION MAP

PROJECT NO.	25220071.00	DRAWN BY:	BSS
DRAWN:	11/27/2019	CHECKED BY:	MDB
REVISED:	01/14/2020	APPROVED BY:	TK 04/10/2020

ENGINEER

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

FIGURE
1

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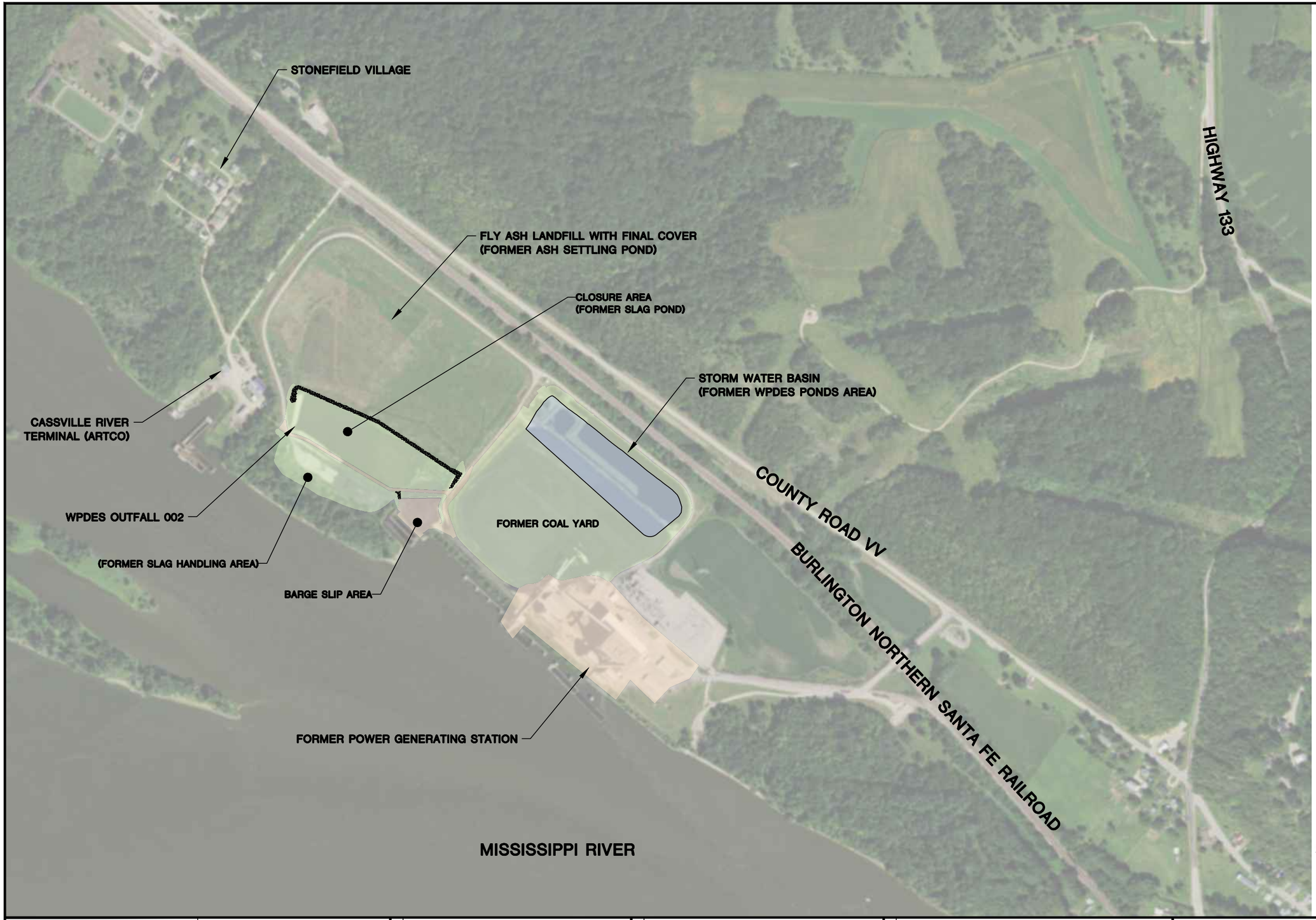

N

NOTES:

1. AERIAL PHOTOGRAPH FROM THE NATIONAL AGRICULTURE IMAGERY PROGRAM AND PUBLISHED BY THE USDA FSA AERIAL PHOTOGRAPHY FIELD OFFICE. DATE OF IMAGE IS AUGUST 24, 2015.

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25220071.00	DRAWN BY:	BJM
DRAWN:	12/18/13	CHECKED BY:	KAK
REVISED:	01/22/20	APPROVED BY:	TK 04/10/2020

ENGINEER: SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

CLIENT: WISCONSIN POWER AND LIGHT CO.
NELSON DEWEY GENERATING STATION
11999 COUNTY HIGHWAY VV
CASSVILLE WI, 53806

SITE: WISCONSIN POWER AND LIGHT
NELSON DEWEY GENERATING STATION
CASSVILLE WISCONSIN

AERIAL VIEW

FIGURE 2

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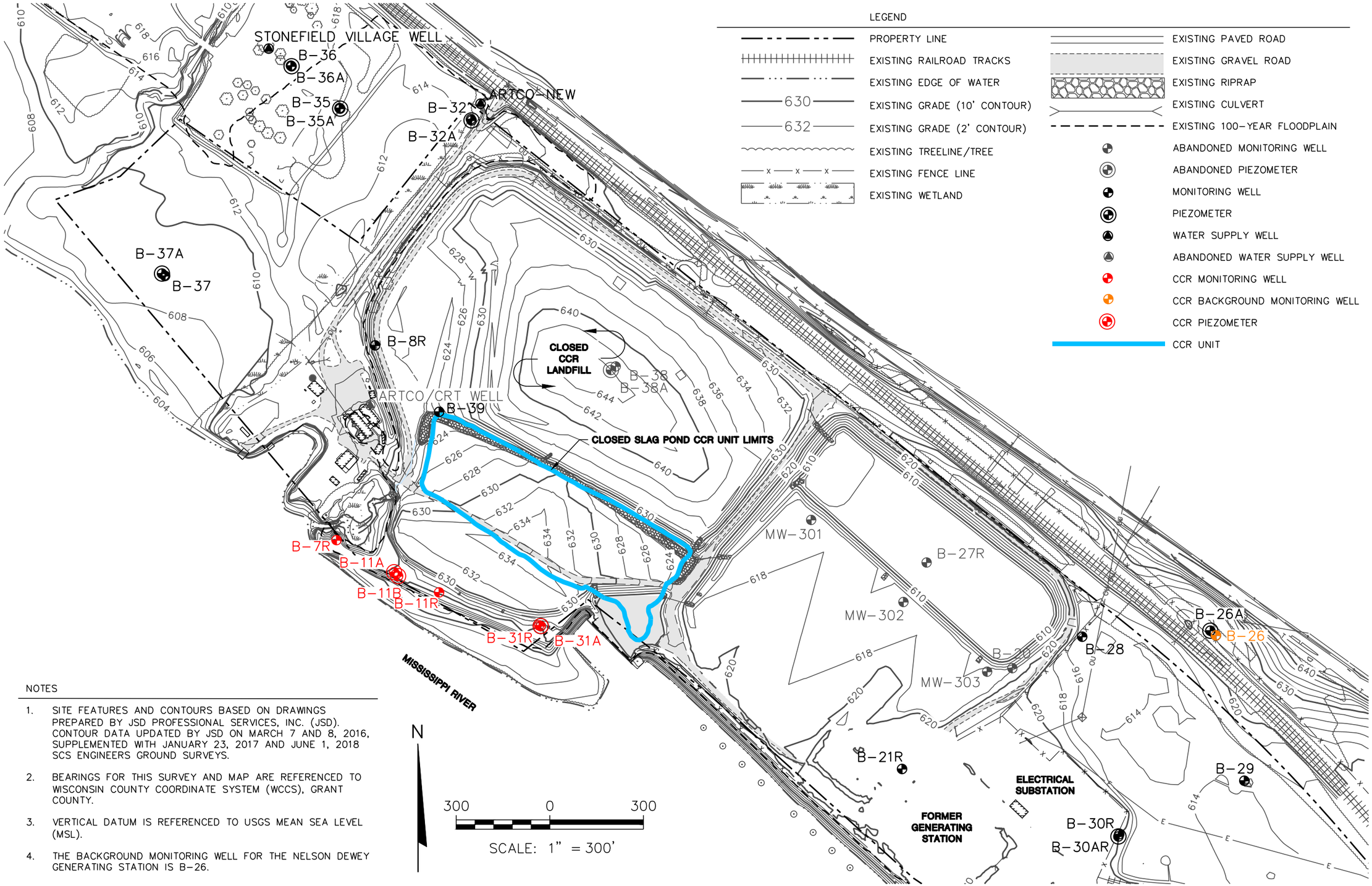

NOTES

1. SITE FEATURES AND CONTOURS BASED ON DRAWINGS PREPARED BY JSD PROFESSIONAL SERVICES, INC. (JSD). CONTOUR DATA UPDATED BY JSD ON MARCH 7 AND 8, 2016, SUPPLEMENTED WITH JANUARY 23, 2017 AND JUNE 1, 2018 SCS ENGINEERS GROUND SURVEYS.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO WISCONSIN COUNTY COORDINATE SYSTEM (WCCS), GRANT COUNTY.
3. VERTICAL DATUM IS REFERENCED TO USGS MEAN SEA LEVEL (MSL).
4. THE BACKGROUND MONITORING WELL FOR THE NELSON DEWEY GENERATING STATION IS B-26.

SITE
SITE PLAN AND MONITORING WELL LOCATIONS

CLIENT
ALLIANT ENERGY
NELSON DEWEY GENERATING STATION
CASSVILLE, WISCONSIN

ENGINEER
SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

FIGURE 3

PROJECT NO.	25221071.00
DRAWN:	11/27/2019
REVISED:	01/11/2022
DRAWN BY:	BSS
CHECKED BY:	MDB
APPROVED BY:	MDB 1/11/2022

ALLIANT ENERGY
4902 N. BILTMORE LANE, #1000
MADISON, WI 53718

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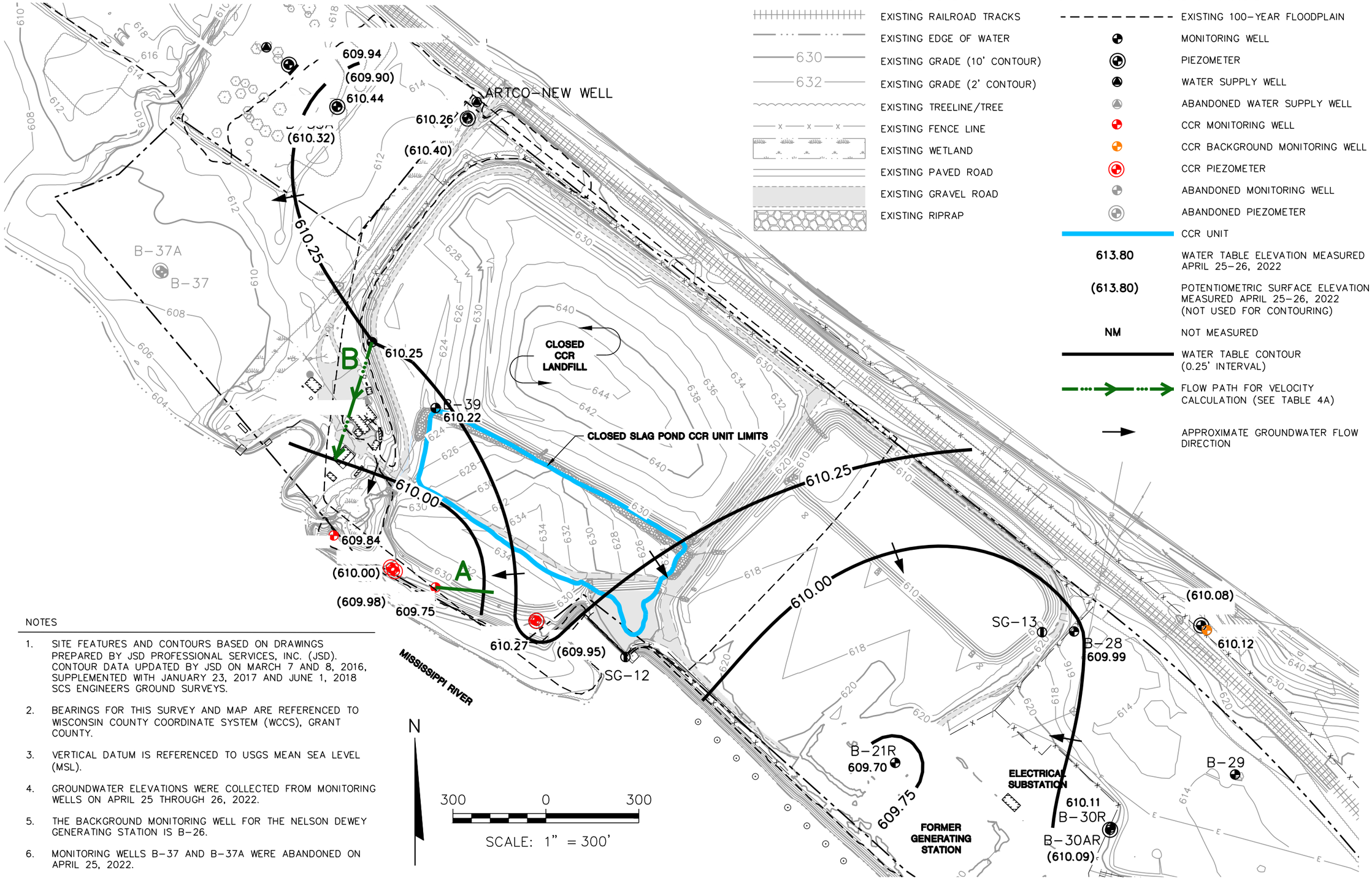

LEGEND

- PROPERTY LINE
- EXISTING RAILROAD TRACKS
- EXISTING EDGE OF WATER
- EXISTING GRADE (10' CONTOUR)
- EXISTING GRADE (2' CONTOUR)
- EXISTING TREELINE/TREE
- EXISTING FENCE LINE
- EXISTING WETLAND
- EXISTING PAVED ROAD
- EXISTING GRAVEL ROAD
- EXISTING RIPRAP
- EXISTING CULVERT
- EXISTING 100-YEAR FLOODPLAIN
- MONITORING WELL
- PIEZOMETER
- WATER SUPPLY WELL
- ABANDONED WATER SUPPLY WELL
- CCR MONITORING WELL
- CCR BACKGROUND MONITORING WELL
- CCR PIEZOMETER
- ABANDONED MONITORING WELL
- ABANDONED PIEZOMETER
- CCR UNIT
- 613.80 — WATER TABLE ELEVATION MEASURED APRIL 25-26, 2022
- (613.80) — POTENTIOMETRIC SURFACE ELEVATION MEASURED APRIL 25-26, 2022 (NOT USED FOR CONTOURING)
- NM — NOT MEASURED
- WATER TABLE CONTOUR (0.25' INTERVAL)
- FLOW PATH FOR VELOCITY CALCULATION (SEE TABLE 4A)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES

1. SITE FEATURES AND CONTOURS BASED ON DRAWINGS PREPARED BY JSD PROFESSIONAL SERVICES, INC. (JSD). CONTOUR DATA UPDATED BY JSD ON MARCH 7 AND 8, 2016, SUPPLEMENTED WITH JANUARY 23, 2017 AND JUNE 1, 2018 SCS ENGINEERS GROUND SURVEYS.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO WISCONSIN COUNTY COORDINATE SYSTEM (WCCS), GRANT COUNTY.
3. VERTICAL DATUM IS REFERENCED TO USGS MEAN SEA LEVEL (MSL).
4. GROUNDWATER ELEVATIONS WERE COLLECTED FROM MONITORING WELLS ON APRIL 25 THROUGH 26, 2022.
5. THE BACKGROUND MONITORING WELL FOR THE NELSON DEWEY GENERATING STATION IS B-26.
6. MONITORING WELLS B-37 AND B-37A WERE ABANDONED ON APRIL 25, 2022.

WATER TABLE FLOW MAP
APRIL 2022

FIGURE 4

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

ENGINEER

SITE
ALLIANT ENERGY
NELSON DEWEY GENERATING STATION
CASSVILLE, WISCONSIN

CLIENT
ALLIANT ENERGY
4902 N. BILTMORE LANE, #1000
MADISON, WI 53718

PROJECT NO.	25222071.00	
DRAWN BY:	KP	
CHECKED BY:	TK	
DRAWN:	05/12/2021	
APPROVED BY:	TK 1/30/2023	
REVISED:	01/27/2022	

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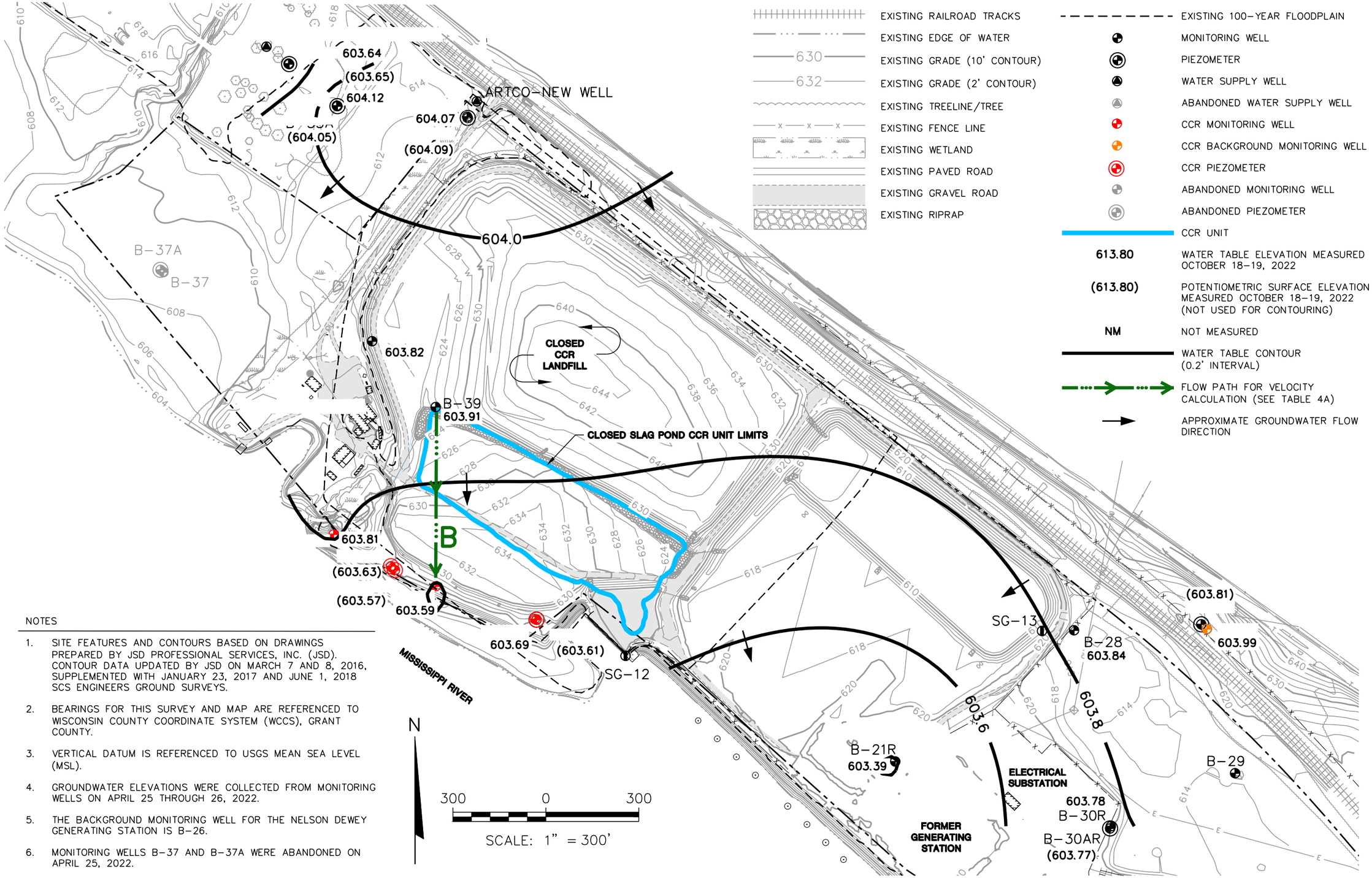

LEGEND

- PROPERTY LINE
- EXISTING RAILROAD TRACKS
- EXISTING EDGE OF WATER
- 630 EXISTING GRADE (10' CONTOUR)
- 632 EXISTING GRADE (2' CONTOUR)
- EXISTING TREELINE/TREE
- EXISTING FENCE LINE
- EXISTING WETLAND
- EXISTING PAVED ROAD
- EXISTING GRAVEL ROAD
- EXISTING RIPRAP
- EXISTING CULVERT
- EXISTING 100-YEAR FLOODPLAIN
- MONITORING WELL
- PIEZOMETER
- WATER SUPPLY WELL
- ABANDONED WATER SUPPLY WELL
- CCR MONITORING WELL
- CCR BACKGROUND MONITORING WELL
- CCR PIEZOMETER
- ABANDONED MONITORING WELL
- ABANDONED PIEZOMETER
- CCR UNIT
- 613.80 WATER TABLE ELEVATION MEASURED OCTOBER 18-19, 2022
- (613.80) POTENTIOMETRIC SURFACE ELEVATION MEASURED OCTOBER 18-19, 2022 (NOT USED FOR CONTOURING)
- NM NOT MEASURED
- WATER TABLE CONTOUR (0.2' INTERVAL)
- FLOW PATH FOR VELOCITY CALCULATION (SEE TABLE 4A)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES

1. SITE FEATURES AND CONTOURS BASED ON DRAWINGS PREPARED BY JSD PROFESSIONAL SERVICES, INC. (JSD). CONTOUR DATA UPDATED BY JSD ON MARCH 7 AND 8, 2016, SUPPLEMENTED WITH JANUARY 23, 2017 AND JUNE 1, 2018 SCS ENGINEERS GROUND SURVEYS.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO WISCONSIN COUNTY COORDINATE SYSTEM (WCCS), GRANT COUNTY.
3. VERTICAL DATUM IS REFERENCED TO USGS MEAN SEA LEVEL (MSL).
4. GROUNDWATER ELEVATIONS WERE COLLECTED FROM MONITORING WELLS ON APRIL 25 THROUGH 26, 2022.
5. THE BACKGROUND MONITORING WELL FOR THE NELSON DEWEY GENERATING STATION IS B-26.
6. MONITORING WELLS B-37 AND B-37A WERE ABANDONED ON APRIL 25, 2022.

WATER TABLE FLOW MAP
OCTOBER 2022

FIGURE 5

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

ENGINEER

SITE
ALLIANT ENERGY
NELSON DEWEY GENERATING STATION
CASSVILLE, WISCONSIN

CLIENT
ALLIANT ENERGY
4902 N. BILTMORE LANE, #1000
MADISON, WI 53718

PROJECT NO.	25222071.00	DRAWN BY:	KP
DRAWN:	10/28/2022	CHECKED BY:	TK
REVISED:	01/27/2023	APPROVED BY:	TK 1/30/2023

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Appendix A

Summary of Regional Geologic and Hydrogeologic Information

Regional Glacial Geology

Alluvial

al — **Alluvium.** Primarily sand or slightly gravelly sand on modern valley bottoms; most deposited during the last part of the Holocene; overlain by thin peat and thin silty overbank sediment in many places.

ate — **Alluvial sediment of the Elderon-phase terrace.** Sand or gravelly sand, at least a few meters thick up to 15 m thick, deposited by streams carrying meltwater from the margins of the Laurentide Ice Sheet during the Elderon phase of the late Wisconsin glaciation. Occurs as terraces formed during subsequent down-cutting during the latest Wisconsin and Holocene.

ats — **Alluvial sediment of the Savanna terrace.** Sand or gravelly sand, at least a few meters thick up to a15 m thick, deposited by streams carrying meltwater from the margins of the Laurentide Ice Sheet during the late Wisconsin glaciation. Occurs as the Savanna terrace formed during subsequent down-cutting during the latest Wisconsin and Holocene.

atb — **Alluvial sediment of the Bridgeport terrace.** Sand or gravelly sand, at least a few meters thick up to 15 m thick, deposited by streams carrying meltwater from the margins of the Laurentide Ice Sheet during the late Wisconsin glaciation. Occurs as remnants of the Bridgeport terrace; the terrace surface is likely largely underlain by a bedrock strath.

af — **Alluvial fan.** Moderately to well-sorted cobbles, gravel, pebbles, and fine sediment forming fan-shaped deposits on valley floors. Typically forms at the base of steep slopes and particularly at the mouths of steep tributaries.

Colluvial

cc — **Coarse-grained colluvium.** Unsorted slope sediment, derived from erosion of Paleozoic bedrock and windblown silt from upland surfaces moving downslope due to gravity. Typically associated with bedrock incision by major streams, and occurring on relatively steep slopes adjacent to major stream systems and deposits.

ls — **Landslide.** Poorly sorted gravel, boulder, and blocky debris. Forms chaotic, hummocky lobes on valley floors and at bases of slopes; may have associated scarps on adjacent upslope surfaces.

Windblown

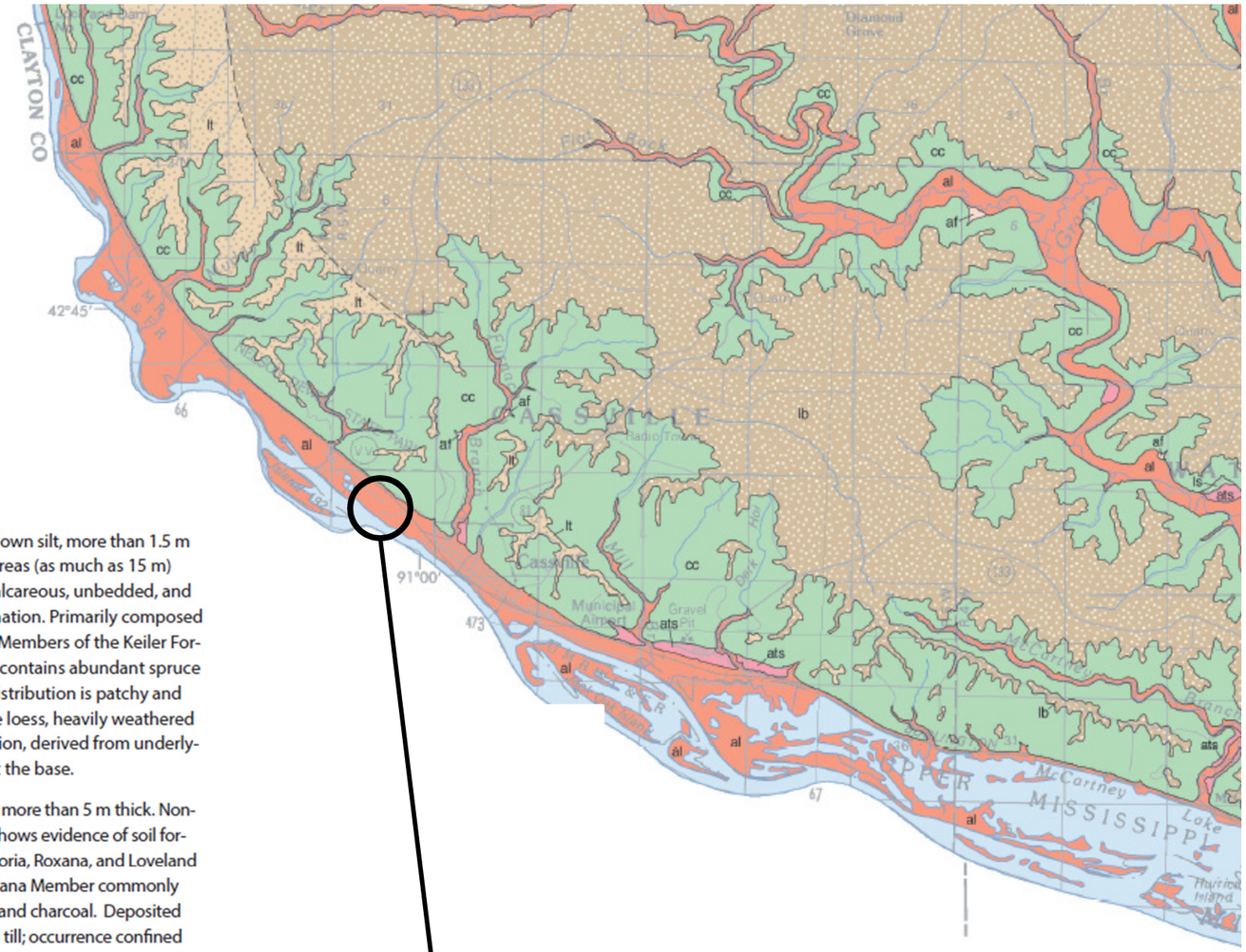
lb — **Loess on Paleozoic bedrock.** Windblown silt, more than 1.5 m thick; generally thickest in western areas (as much as 15 m) and thinning toward the east. Noncalcareous, unbedded, and massive; shows evidence of soil formation. Primarily composed of the Peoria, Roxana, and Loveland Members of the Keiler Formation. Roxana Member commonly contains abundant spruce fragments and charcoal. Although distribution is patchy and uncertain due to the thickness of the loess, heavily weathered residual clay of the Rountree Formation, derived from underlying Paleozoic bedrock, is common at the base.

lt — **Loess on till.** Windblown silt, typically more than 5 m thick. Noncalcareous, unbedded, and massive, shows evidence of soil formation. Primarily composed of the Peoria, Roxana, and Loveland Members of the Keiler Formation. Roxana Member commonly contains abundant spruce fragments and charcoal. Deposited on patchy, discontinuous pre-Illinoian till; occurrence confined to western Grant County, which was the easternmost extent of pre-Illinoian ice flowing from Minnesota and Iowa.

ws — **Windblown sand.** More than about 1.5 m thick; dunes generally no more than a few meters high.

Symbols

Geologic contact. Position shown on map is judged to be generally within 0.2 km of actual position. Dashed where approximate.

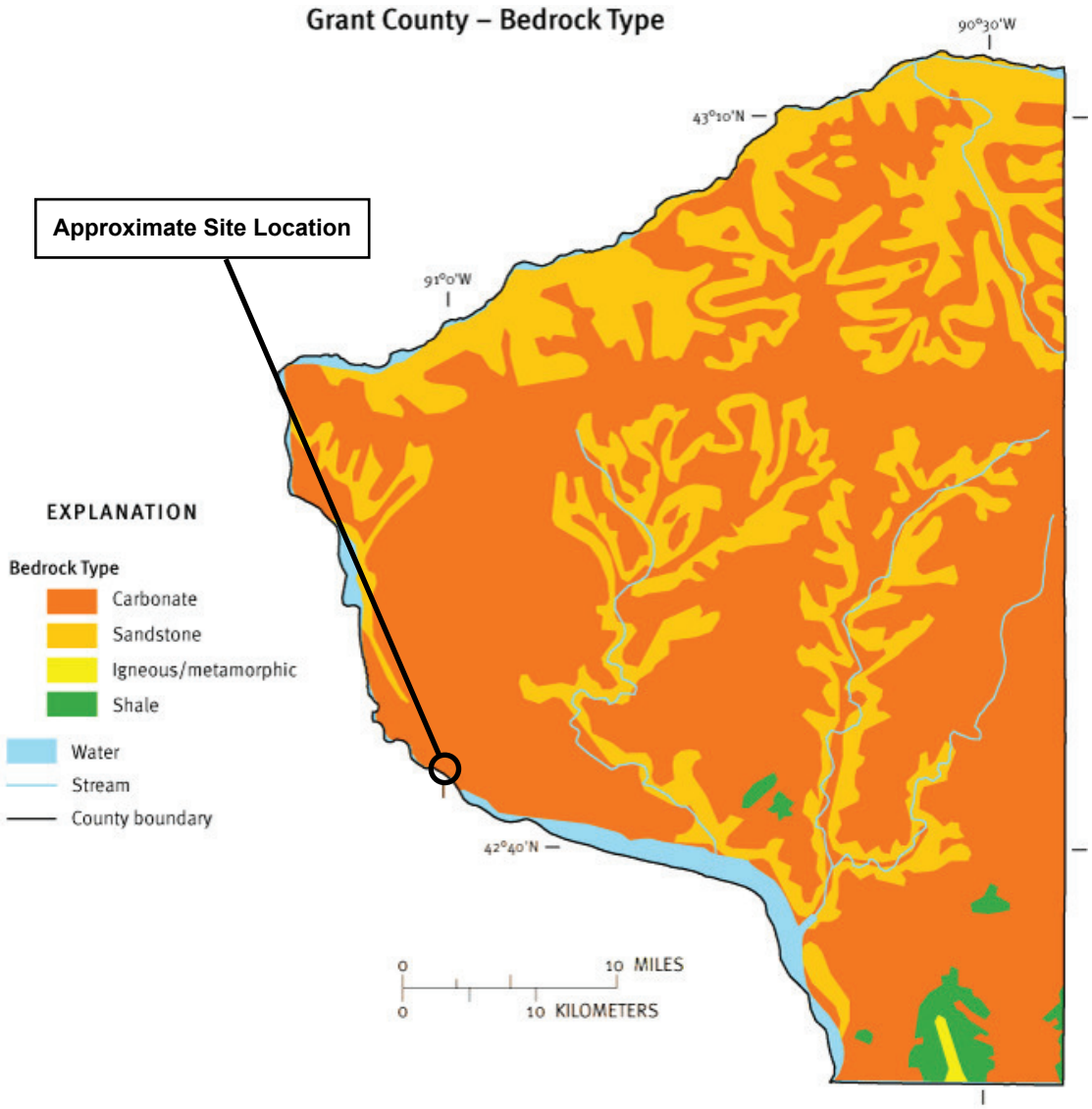


SCALE 1:100,000

1 0 1 2 3 4 5
MILES

1 0 1 2 3 4 5 6 7 8
KILOMETERS

Source: Carson, Eric C., Preliminary Quaternary Geology of Grant County, Wisconsin, Wisconsin Geological and Natural History Survey Open File Report 2012-06.

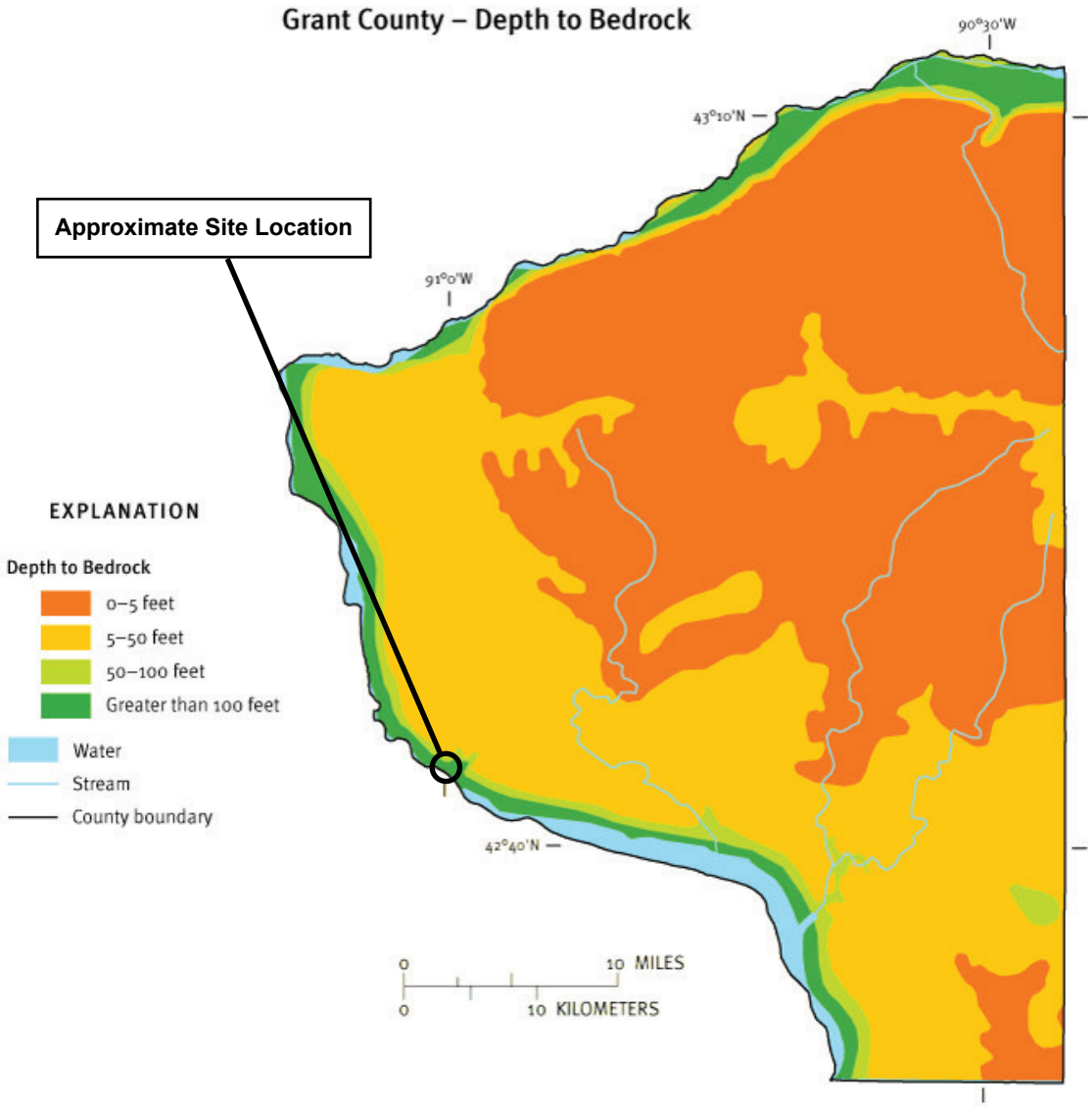


This resource characteristic map was derived from generalized statewide information at small scales, and cannot be used for any site-specific purposes.

Map source: Schmidt, R.R., 1987, Groundwater contamination susceptibility map and evaluation: Wisconsin Department of Natural Resources, Wisconsin's Groundwater Management Plan Report 5, PUBL-WR-177-87, 27 p.

Figure created for the "Protecting Wisconsin's Groundwater Through Comprehensive Planning" web site, 2007, *http://wi.water.usgs.gov/gwcomp/*

When bedrock is less than 50 feet from the land surface and the water table occurs in the bedrock, the type of bedrock is important in determining how easily a contaminant can reach the groundwater. Bedrock types that allow water to pass quickly through them will offer less protection from contaminants. In Wisconsin, these types of bedrock are typically limestone and dolomite which are highly fractured. Igneous and metamorphic rocks (e.g. granite) and sandstone are less fractured and offer some protection from infiltrating water which may contain contaminants. On the other hand, shale bedrock is almost impermeable, and doesn't allow water and accompanying contaminants to pass through it as easily. The bedrock categories used for this project are carbonates, sandstone, igneous/metamorphic/volcanic, and shale.



This resource characteristic map was derived from generalized statewide information at small scales, and cannot be used for any site-specific purposes.

Map source: Schmidt, R.R., 1987, Groundwater contamination susceptibility map and evaluation: Wisconsin Department of Natural Resources, Wisconsin's Groundwater Management Plan Report 5, PUBL-WR-177-87, 27 p.

Figure created for the "Protecting Wisconsin's Groundwater Through Comprehensive Planning" web site, 2007, *http://wi.water.usgs.gov/gwcomp/*

The depth to bedrock indicates the amount of soil and surficial deposits that exist in an area and, therefore how important the type of bedrock is in evaluating pollution potential. Information on the depth to bedrock map is used to determine the relative weight given to the other resource characteristic maps. For example, where the bedrock surface is deep and the water table occurs above the bedrock, the type of bedrock is not considered in determining groundwater contamination susceptibility. Where the depth to bedrock is shallow (less than 50 feet below the land surface), the water table is likely to occur in the bedrock. In that case, the type of bedrock is considered because it could influence a contaminant's ability to reach the groundwater. This map identifies areas where the depth to bedrock is 0-5 feet (in at least 35% of the area), 5-50 feet, 50-100 feet and greater than 100 feet.

Appendix B

Boring Logs, Well Construction, and Well Development Forms

SCS # 25215135.30

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Managemen ☐
Remediation/Redevelopment ☐ Other ☐

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 7-98

Facility/Project Name: WPL- Nelson Dewey Generating St.	Local Grid Location of Well: 479422.6 ft. ☒ N. ☐ S. 737324.8 ft. ☒ E. ☐ W.	Well Name: B-39
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☐ Lat. ° ' " Long. ° ' " or	Wis. Unique Well No.	DNR Well ID No.
Facility ID	St. Plane ft. N, ft. E. S/C/N	Date Well Installed: 10 / 20 / 2015 (m m d d y y y y)
Type of Well: Well Code 11 / MW	Section Location of Waste/Source: SE 1/4 of NW 1/4 of Sec. 19, T. 3 N, R. 5 ☐ E ☒ W	Well Installed By: Name (first, last) and Firm: Dave Cruise- Badger State Drilling; Kyle Kramer- SCS Engineers
Distance from Waste/Source ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number

A. Protective pipe, top elevation 626.65 ft. MSL
B. Well casing, top elevation 626.48 ft. MSL
C. Land surface elevation 623.58 ft. MSL
D. Surface seal, bottom 623.08 ft. MSL or 0.5 ft.

12. USCS classification of soil near screen:
GP ☒ GM ☐ GC ☐ GW ☐ SW ☐ SP ☒
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐ 50; Hollow Stem Auger ☒ 41; Other ☐ ___

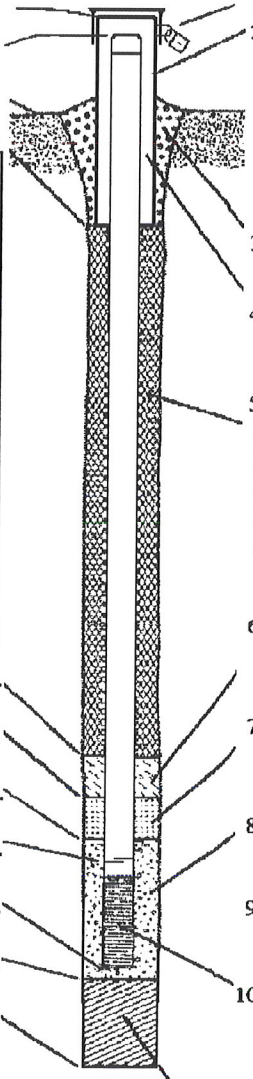
15. Drilling fluid used: Water ☐ 02; Air ☐ 01; Drilling Mud ☐ 03; None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe ___

17. Source of water (attach analysis, if required):

E. Bentonite seal, top 623.08 ft. MSL or 0.5 ft.
F. Fine sand, top 613.58 ft. MSL or 10 ft.
G. Filter pack, top 611.58 ft. MSL or 12 ft.
H. Screen joint, top 609.58 ft. MSL or 14 ft.
I. Well bottom 599.58 ft. MSL or 24 ft.
J. Filter pack, bottom 596.58 ft. MSL or 27 ft.
K. Borehole, bottom 596.58 ft. MSL or 27 ft.
L. Borehole, diameter 8.5 in.
M. O.D. well casing 2.4 in.
N. I.D. well casing 2.04 in.



1. Cap and lock? ☒ Yes ☒ No
2. Protective cover pipe:
a. Inside diameter: 6 in.
b. Length: 4 ft.
c. Material: Steel ☒ 04; Other ☐ ___
d. Additional protection? ☐ Yes ☐ No
If yes, describe: Bollards
3. Surface seal: Bentonite ☒ 30; Concrete ☐ 01; Other ☐ ___
Bentonite
4. Material between well casing and protective pipe: Bentonite ☐ 30; Other ☐ ___
#5 Filter Sand - Ohio
5. Annular space seal: a. Granular/Chipped Bentonite ☒ 33
b. ___ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. ___ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. ___ % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. ___ Ft^3 volume added for any of the above
f. How installed: Tremie ☐ 01; Tremie pumped ☐ 02; Gravity ☒ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☑ 32
c. ___ Other ☐ ___
7. Fine sand material: Manufacturer, product name & mesh size
a. #7 Fine Sand - Ohio ☐
b. Volume added ___ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
a. #5 Filter Sand - Ohio ☐
b. Volume added ___ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ 23; Flush threaded PVC schedule 80 ☐ 24; Other ☐ ___
10. Screen material: 40 PVC
a. Screen type: Factory cut ☒ 11; Continuous slot ☐ 01; Other ☐ ___
b. Manufacturer Monoflex
c. Slot size: 0.10 in.
d. Slotted length: 10 ft.
11. Backfill material (below filter pack): None ☐ 14; Other ☐ ___
#5 Coarse - Ohio

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [signature] Firm: SCS ENGINEERS, 2830 Dairy Drive, Madison, WI 53718-6751

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION
Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number	
WPL- Nelson Dewey Generating Station SCS#: 25215135.30		B-39	
Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Dave Cruise Badger State Drilling	10/20/2015	10/20/2015	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			Feet	623.58 Feet	8.5 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☐
State Plane 479,423 N, 737,325 E S/C/N
NW 1/4 of NW 1/4 of Section 19, T 3 N, R 5 W
Lat ___ ° ___ ' ___ "
Long ___ ° ___ ' ___ "
Local Grid Location: Feet ☐ N ☐ S; Feet ☐ E ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Grant	22	Cassville

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Pocket Penetration (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0	TOPSOIL, with medium grained sand, light brown.	TOPSOIL									
			0.5–11	POORLY GRADED SLAG, coarse grained, very dark brown (10YR 2/2), fly ash.	FILL									
S1	20	20 25 29 33	3							M				
S2	21	14 32 44 31	7							M				
S3	10	12 10 15 8	11	POORLY GRADED SAND, fine grained, dark gray (10YR4/1).	SP					M				
S4	18	3 4 4 4	13							M				
			15											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	
[signature]	SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number B-39 Use only as an attachment to Form 4400-122.

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Pocket Penetration (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S5	15	4 5 5 6	16	POORLY GRADED SAND, fine grained, dark gray (10YR 4/1).						M				
S6	16	3 4 4 6	17 18 19		SP					S				Saturation @ 16.5ft bgs
S7	22	4 6 8 11	20	POORLY GRADED GRAVEL WITH SAND, pebble size gravel, dark gray (10YR 4/1).	GP					S				
S8	14	7 4 4 5	21 22	POORLY GRADED SAND, coarse grained, dark gray (10YR 4/1).						S				
S9	6	4 7 8 10	23 24 25		SP					S				
S10	14	4 3 4 21	26	Trace pebbles						S				
			27	EOB @ 27' bgs.										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☒
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WPL - Nelson Dewey Generating Station	02525	B-07R

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Wes Imhoff Layne Christensen, Co.	4/28/2009	4/28/2009	Rotosonic

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VU600	156	B-07R	Feet MSL	620.5 Feet MSL	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 265,999 N, 1,695,529 E S/C/N
NW 1/4 of NW 1/4 of Section 19, T 3 N, R 5 W
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N Feet ☐ S ☐ E Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
122014530	Grant	22	Cassville

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 42		1	**WELL GRADED SAND WITH SILT (SW-SM),** non-plastic, 5YR 4/4 reddish brown, no odor, moist, some siltier layers at 4.5 feet.										
			2											
			3											
			4											
2 CS	60 48		5	Same as above.										
			6		SW-SM									
			7											
			8											
			9	Silty organic sand layer from 9 to 9.5 feet.										
3 CS	60 60		10	Same as above, color change to 7.5YR 4/1 dark gray, moist to wet above clay.										
			11											
			12											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	
Nate Keller /jcs	RMT, Inc. 744 Heartland Trail Madison, WI 53717	Tel: 608-831-4444 Fax: 608-831-3334

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number B-07R Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13		SW-SM									
			14	**LEAN CLAY WITH SAND (CL),** fine sand, plastic, 7.5YR 3/1 very dark gray, no odor, wet.	CL									
4 CS	60 60		15	**WELL GRADED SAND WITH SILT AND CLAY (SW-SM),** trace gravel, very low plasticity, 5YR 4/3 reddish brown, no odor, wet.										
			16											
			17		SW-SM									
			18											
			19											
			20	**End of boring at 20.0 feet.**										

State of Wisconsin
Department of Natural Resources

Route To: Watershed/Wastewater ☐ Waste Management ☒
Remediation/Redevelopment ☐ Other ☐

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 7-98

Facility/Project Name: WPL - Nelson Dewey Generating Station	Local Grid Location of Well: ______ ft. ☐N. ☐S. ______ ft. ☐E. ☐W.	Well Name: B-07R
Facility License, Permit or Monitoring No.: 02525	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. ___° ___' ___" Long. ___° ___' ___" or	Wis. Unique Well No.: VU600 / DNR Well Number: 156
Facility ID: 122014530	St. Plane 265,999 ft. N, 1,695,529 ft. E. S/C/N	Date Well Installed: 04/28/2009
Type of Well: Well Code 11/mw	Section Location of Waste/Source: NW 1/4 of NW 1/4 of Sec. 19, T. 3 N, R. 5 ☐E ☒W	Well Installed By: (Person's Name and Firm) Wes Imhoff, Layne Christensen, Co.
Distance from Waste/Source: 350 ft. / Enf. Stds. Apply ☒	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☒ Downgradient; n ☐ Not Known / Gov. Lot Number: ____	

A. Protective pipe, top elevation 623.50 ft. MSL
B. Well casing, top elevation 623.35 ft. MSL
C. Land surface elevation 620.5 ft. MSL
D. Surface seal, bottom 618.5 ft. MSL or 2.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☒ SP ☐
SM ☒ SC ☐ ML ☐ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐ 5 0; Hollow Stem Auger ☐ 4 1; Rotosonic Other ☒

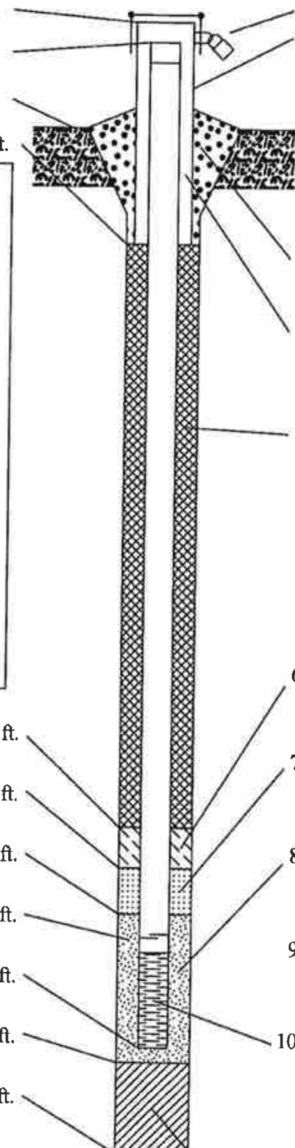
15. Drilling fluid used: Water ☒ 0 2; Air ☐ 0 1; Drilling Mud ☐ 0 3; None ☐ 9 9

16. Drilling additives used? ☐ Yes ☒ No

Describe ____________

17. Source of water (attach analysis, if required):
on-site hydrant

E. Bentonite seal, top 618.5 ft. MSL or 2.0 ft.
F. Fine sand, top 612.6 ft. MSL or 7.9 ft.
G. Filter pack, top 612.6 ft. MSL or 7.9 ft.
H. Screen joint, top 610.5 ft. MSL or 10.0 ft.
I. Well bottom 600.5 ft. MSL or 20.0 ft.
J. Filter pack, bottom 600.5 ft. MSL or 20.0 ft.
K. Borehole, bottom 600.5 ft. MSL or 20.0 ft.
L. Borehole, diameter 6.0 in.
M. O.D. well casing 2.38 in.
N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ 0 4; Other ☐
   d. Additional protection? ☐ Yes ☒ No
   If yes, describe: ____________
3. Surface seal: Bentonite ☒ 3 0; Concrete ☐ 0 1; Other ☐
4. Material between well casing and protective pipe: Bentonite ☒ 3 0; Upper Filter Sand/Lower Bentonite Other ☐
5. Annular space seal: a. Granular/Chipped Bentonite ☒ 3 3
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 3 5
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐ 3 1
   d. ____% Bentonite . . . Bentonite-cement grout ☐ 5 0
   e. 1.5 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ 0 1; Tremie pumped ☐ 0 2; Gravity ☒ 0 8
6. Bentonite seal: a. Bentonite granules ☐ 3 3
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒ 3 2
   c. ____________ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. NA
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Red Flint Filter Sand
   b. Volume added 2.1 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ 2 3; Flush threaded PVC schedule 80 ☐ 2 4; Other ☐
10. Screen material: PVC
   a. Screen Type: Factory cut ☒ 1 1; Continuous slot ☐ 0 1; Other ☐
   b. Manufacturer ____________
   c. Slot size: 0.010 in.
   d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ 1 4; Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Nate Keller /[illegible] Firm: RMTINC Tel: Fax:

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☒
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	County	Well Name
WPL - Nelson Dewey Generating Station	Grant	B-07R

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well Number
02525	22	VU600	156

1. Can this well be purged dry? ☐ Yes ☐ No

2. Well development method:

surged with bailer and bailed	☐	41
surged with bailer and pumped	☐	61
surged with block and bailed	☐	42
surged with block and pumped	☐	62
surged with block, bailed, and pumped	☐	70
compressed air	☐	20
bailed only	☐	10
pumped only	☐	51
pumped slowly	☐	50
other surged and pumped with Whaler pump	☒	71

3. Time spent developing well 115 min.

4. Depth of well (from top of well casing) 23.0 ft.

5. Inside diameter of well 2.07 in.

6. Volume of water in filter pack and well casing 1.5 gal.

7. Volume of water removed from well 20.0 gal.

8. Volume of water added (if any) 10.0 gal.

9. Source of water added fire suppression system hydrant

10. Analysis performed on water added? ☒ Yes ☐ No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing) a.	15.50 ft.	17.85 ft.
Date b.	4/29/2009	4/29/2009
Time c.	☒ a.m. 07:55 ☐ p.m.	☒ a.m. 09:50 ☐ p.m.
12. Sediment in well bottom	inches	inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe) dark reddish brown, no odor	Clear ☒ 20 Turbid ☐ 25 (Describe) light brown, no odor

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	mg/l	96.7 mg/l
15. COD	mg/l	mg/l

16. Well developed by: Person's Name and Firm
Roy Buckenberger
Layne Christensen, Co.

17. Additional comments on development:

Facility Address or Owner/Responsible Party Address

Name: Nathaniel Sievers
Firm: Nelson Dewey Generating Station
Street: 11999 County Rd VV
City/State/Zip: Cassville, WI 53806

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: Nate Keller /go
Print Name: Nathaniel Keller
Firm: RMT, Inc.

NOTE: See instructions for more information including a list of county codes and well type codes.

WDNR WELL DEVELOP 1998 03026W.GPJ WI DNR 2003.GDT 8/27/09

State of Wisconsin
Department of Natural Resources

Route To:
☒ Solid Waste
☐ Emergency Response
☐ Wastewater
☐ Haz. Waste
☐ Underground Tanks
☐ Water Resources
☐ Other

Soil Boring Log Information
Form 4400-122 7-91

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WP&L - Nelson Dewey 4293.02	2525	B-11R

Boring Drilled By (Firm name and name of crew chief)	Date Drilling Started	Date Drilling Completed	Drilling Method
Environmental & Foundation Drilling; Crew Chief: Kevin Hargis	11/17/97	11/17/97	4 1/4 HSA

DNR Facility Well No.	WI Unique Well No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
155			Feet MSL	620.4 Feet MSL	8.0 Inches

Boring Location
State Plane N, E
NW 1/4 of WW 1/4 of Section 19 T 3 N,R 5 W
Lat ° ' "
Long ° ' "

Local Grid Location (If applicable)
265,843 ☒ N 1,695,868 ☒ E
Feet ☐ S Feet ☐ W

County	DNR County Code	Civil Town/City/ or Village
Grant	22	Cassville

Sample Number	Sample Length (In) Recovered	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	Comments
			1–23	Boring B-11R was blind drilled to a depth of 23 ft. See boring log B-11 for geologic description.	SP/SW									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: John C Oswald

Firm: RMT
744 Heartland Trail, Madison Wisconsin
Tel: 608-831-4444, Fax: 608-831-3334

This form is authorized by Chapters 144, 147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than $10 nor more than $5,000 for each violation. Fined not less than $10 or more than $100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

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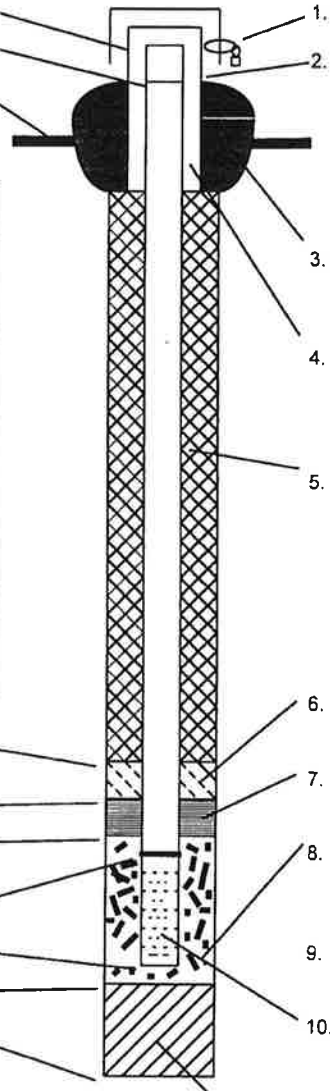
State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☒ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 4-90

Facility/Project Name WP&L Nelson Dewey 4293.01	Local Grid Location of Well ☐N. ☐E. ____ ft. ☐S. ____ ft. ☐W.	Well Name B-11R
Facility License, Permit or Monitoring Number 2525	Grid Origin Location Lat. ___ ° ___ ' ___ " Long. ___ ° ___ ' ___ " or St. Plane 265,843 ft. N, 1,695,868 ft. E.	Wis. Unique Well Number / DNR Well Number 155
Distance Well is From Waste/Source Boundary ft.	Section Location of Waste/Source ☐E. NW ¼ of NW ¼ of Sec. 19, T3N, R5 ☒W.	Date Well Installed 11/ 17/ 97 MM DD YY
Type of Well: Water Table Observation Well ☒11 Piezometer ☐12	Location of Well Relative to Waste/Source U ☐Upgradient S ☐Sidegradient D ☒Downgradient N ☐Not Known	Well Installed By: (Person's Name and Firm) Kevin Hargis Environmental and Foundation Drilling Waunakee, Wisconsin
Is Well A Point of Enforcement Std. Application? ☐Yes ☒No		



Protective pipe, top elevation 622.56 ft. MSL
Well casing, top elevation 622.62 ft. MSL
Land surface elevation 620.4 ft. MSL
Surface seal, bottom 619.4 ft. MSL or 1.0 ft.

USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☒ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

Sieve analysis attached? Yes ☐ No ☒

Drilling method used: Rotary ☐50
Hollow Stem Auger ☒41
Other ☐

Drilling fluid used: Water ☐02 Air ☐01
Drilling Mud ☐03 None ☒99

Drilling additives used? Yes ☐ No ☒
Describe:

Source of water (attach analysis):

Bentonite seal, top 619.4 ft. MSL or 1.0 ft.
Sand, top 606.4 ft. MSL or 14 ft.
Backfill, top 605.4 ft. MSL or 15 ft.
Filter pack, top 603.4 ft. MSL or 17 ft.
Screen 598.4 ft. MSL or 22 ft.
Backfill, bottom 597.4 ft. MSL or 23 ft.
Filter pack, bottom 597.4 ft. MSL or 23 ft.
Borehole diameter 8.25 in.
Well casing 2.38 in.
Screen 2.00 in.

1. Cap and lock? ☒Yes ☐No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 7.0 ft.
   c. Material: Steel ☒04 Other ☐
   d. Additional protection? ☐Yes ☒No
      If yes, describe: _____
3. Surface seal: Bentonite ☒30 Concrete ☐01 Other ☐
4. Material between well casing and protective pipe: Bentonite ☒30 Annular space seal ☐ Other ☐
5. Annular space seal: a. Granular Bentonite ☒33
   b. Lbs/gal mud weight....Bentonite-sand slurry ☐35
   c. Lbs/gal mud weight..... Bentonite slurry ☐31
   d. % Bentonite.....Bentonite-cement grout ☐50
   e. Ft^3 volume added for any of the above
   f. How installed: Tremie ☐01 Tremie pumped ☐02 Gravity ☒08
6. Bentonite seal: a. Bentonite granules ☐33
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite pellets ☒32
   c. Other ☐
7. Fine sand material: Manufacturer, product name, mesh size
   a. Badger Mining Corp.
   b. Volume added 20 lbs
8. Filter pack material: Manufacturer, product, mesh size
   a. 30 - 50
   b. Volume added 300 lbs
9. Well casing: Flush threaded PVC schedule 40 ☒23 Flush threaded PVC schedule 80 ☐24 Other ☐
10. Screen Material: Sch 40 PVC
    a. Screen type: Factory cut ☒11 Continuous slot ☐01 Other ☐ b.
    Manufacturer Boart Longyear
    c. Slot size: 0.010 in.
    d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☒14 Other ☐

I certify that the information on this form is true and correct to the best of my knowledge.

Firm
RMT, Inc.

Complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5,000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT
Form 4400-113B Rev. 4-90

Route to: Solid Waste ☒ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
WP&L Nelson Dewey	Grant	B-11R

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well Number
2525	22		155

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method
- surged with bailer and bailed ☐ 41
- surged with bailer and pumped ☒ 61
- surged with block and bailed ☐ 42
- surged with block and pumped ☐ 62
- surged with block, bailed and pumped ☐ 70
- compressed air ☐ 20
- bailed only ☐ 10
- pumped only ☐ 51
- pumped slowly ☐ 50
- Other _____ ☐

3. Time spent developing well: 35 min.

4. Depth of well (from top of well casing): 25.5 ft.

5. Inside diameter of well: 2.0 in.

6. Volume of water in filter pack and well casing: 3.0 gal.

7. Volume of water removed from well: 35 gal.

8. Volume of water added (if any): 0 gal.

9. Source of water added:

10. Analysis performed on water added? (If yes, attach results) ☐ Yes ☐ No

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 17.5 ft	17.5 ft
Date	b. 11/18/97 mm/dd/yy	11/18/97 mm/dd/yy
Time	c. 13:45 ☐ a.m. ☒ p.m.	14:20 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	0.5 inches	0.0 Inches
13. Water clarity	Clear ☐10 Turbid ☒15 (Describe)	Clear ☒20 Turbid ☐25 (Describe)
14. Total suspended solids	_____ mg/l	110 mg/L
15. COD	_____ mg/l	_____ mg/L

Fill in if drilling fluids were used and well is at solid waste facility:

16. Additional comments on development:

Well developed by: Person's Name and Firm
Name: Kevin Baker
Firm: RMT, Inc.

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature:
Print Initials: K L B
Firm:

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

I:\WPMSN\PJT\00-03026\14\B0003026.14A 03/20/98

6

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WP&L Nelson Dewey 3314.01		B11A

Boring Drilled By (Firm name and name of crew chief)	Date Drilling Started	Date Drilling Completed	Drilling Method
Environmental & Foundation Drilling, Crew Chief: G. Markgraf	12/1/94	12/1/94	DTRC

DNR Facitity Well No.	WI Unique Well No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			Feet MSL	620.2 Feet MSL	7.5 Inches

Boring Location
State Plane 265903.10 N, 1727265.86 E
NE 1/4 of NE — 1/4 of Section 19 T 3 N,R 5W
Lat ° ' "
Long ° ' "

Local Grid Location (If applicable)
Feet ☐ N ☐ S ☐ E ☐ W

County	DNR County Code	Civil Town/City/ or Village
Grant	22	Cassville

Sample Number	Sample Length (In) Recovered	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	Comments
			1–20	Boring blind drilled to 50' bgs. See log of B-11A for geologic description.										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	RMT 744 Heartland Trail, Madison Wisconsin Tel: 608-831-4444, Fax: 608-831-3334

Boring Number **B11A** Use only as an attachment to Form 4400-122. Page 2 of 3

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					Comments
Number	Length (In) Recovered								Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	
			21											
			22											
			23											
			24											
			25											
			26											
			27											
			28											
			29											
			30											
			31											
			32											
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			36											
			37											
			38											
			39											
			40											
			41											
			42											
			43											
			44											
			45											
			46											
			47											
			48											
			49											
			50											
			51											
			52											
			53											

Boring Number **B11A** Use only as an attachment to Form 4400-122.

Sample									Soil Properties					
Number	Length (In) Recovered	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	Comments
			54 55 56	Drill rod to 53'. End of Boring at 56 Ft.										

of Wisconsin
partment of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ ____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 4-

Facility/Project Name WP&L Nelson Dewey 3314.01	Local Grid Location of Well ____ ft. ☐ N. ____ ft. ☐ E. ☐ S. ☐ W.	Well Name B-11B A MCM 12/30/94
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. ___ ___ ___ Long. ___ ___ ___ or St. Plane ____ ft. N, ____ ft. E. 265,903.10N, 1,727,265.96E	Wis. Unique Well Number / DNR Well Number
Type of Well: Water Table Observation Well ☐ 11 Piezometer ■ 12	Section Location of Waste/Source NE¼ of NE¼ of Sec. 19, T. 3N, R. 5 ☐ E. ■ W.	Date Well Installed 12 / 01 / 94 M M D D Y Y
Distance Well is From Waste/Source Boundary Approx. 300' ft.	Location of Well Relative to Waste/Source U ☐ Upgradient S ☐ Sidegradient D ■ Downgradient N ☐ Not Known	Well Installed By: (Persons' Name and Firm) Greg Markgraf, Environmental & Foundation Drilling
Is Well A Point of Enforcement Std. Application? ■ Yes ☐ No		

A. Protective pipe, top elevation 622.20 ft. MSL

B. Well casing, top elevation 622.12 ft. MSL

C. Land surface elevation 620.2 ft. MSL

D. Surface seal, bottom ____.__ ft. MSL or ___.__ ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? Yes ☐ No ■

14. Drilling method used: Rotary ☐ 50
Hollow Stem Auger ☐ 41
Dual tube reverse circulation Other ■ ▒

15. Drilling fluid used: Water ☐ 02 Air ■ 01
Drilling Mud ☐ 03 None ☐ 99

16. Drilling additives used? Yes ☐ No ■
Describe ____

17. Source of water (attach analysis):
____

E. Bentonite seal, top ____.__ ft. MSL or 0.0 ft.

F. Fine sand, top ____.__ ft. MSL or 41.0 ft.

G. Filter pack, top ____.__ ft. MSL or 43.0 ft.

H. Screen joint, top ____.__ ft. MSL or 45.0 ft.

I. Well bottom ____.__ ft. MSL or 50.0 ft.

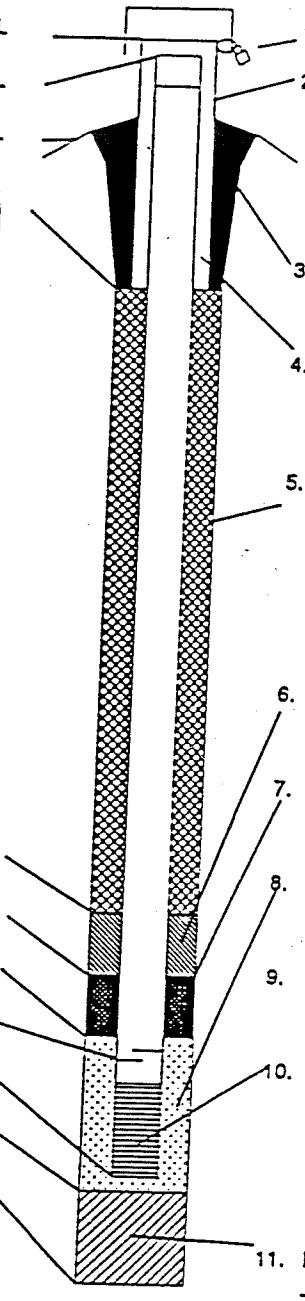
J. Filter pack, bottom ____.__ ft. MSL or 56.0 ft.

K. Borehole, bottom ____.__ ft. MSL or 56.0 ft.

L. Borehole, diameter 7.5 in.

M. O.D. well casing 2.2 in.

N. I.D. well casing 2.0 in.



1. Cap and lock? ■ Yes ☐ N

2. Protective cover pipe:
a. Inside diameter: 3.8 i
b. Length: 7.0
c. Material: Steel ■ 04
Other ☐ ▒
d. Additional protection? ☐ Yes ☐ N
If yes, describe: ____

3. Surface seal: Bentonite ■ 30
Concrete ☐ 01
Other ☐ ▒
____

4. Material between well casing and protective pipe: Bentonite ■ 30
Annular space seal ☐ ▒
Other ☐ ▒
____

5. Annular space seal: a. Granular Bentonite ☐ 33
b. __ Lbs/gal mud weight.... Bentonite-sand slurry ☐ 35
c. __ Lbs/gal mud weight..... Bentonite slurry ☐ 31
d. __ % Bentonite..... Bentonite-cement grout ☐ 50
e. __ lb volume added for any of the above
f. How installed: Tremie ☐ 01
Tremie pumped ☐ 02
Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ■ 3/8 in. ☐ 1/2 in. Bentonite pellets ■ 32
c. ____ Other ☐ ▒

7. Fine sand material: Manufacturer, product name, mesh size
a. Badger Mining 40-60 ▒
b. Volume added 1 bag, 50 lbs

8. Filter pack material: Manufacturer, product, mesh size
a. Badger Mining #30 ▒
b. Volume added 500 lbs, 10 bags

9. Well casing: Flush threaded PVC schedule 40 ■ 23
Flush threaded PVC schedule 80 ☐ 24
Other ☐ ▒
____

10. Screen Material: PVC Schedule 40 ▒
a. Screen type: Factory cut ■ 11
Continuous slot ☐ 01
Other ☐ ▒
b. Manufacturer Northern Air
c. Slot size: 0.01 in.
d. Slotted length: 5.0 ft.

11. Backfill material (below filter pack): None ■ 14
Other ☐ ▒
____

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Madeline Gottlieb 12/21/94 | Firm RMT, Inc

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5,000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

3314.01.0000:FTG

Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B

Rev.

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
WP & L Neslon Dewey/Casseville	Grant	B-11B/A MW 12/94
Facility License, Permit or Monitoring Number	**County Code**	**Wis. Unique Well Number** / **DNR Well Number**
_____	_____	_____ / _____

		Before Development	After Development
1. Can this well purged dry?	☐ Yes ■ No		
2. Well development method			
surged with bailer and bailed	☐ 41		
surged with bailer and pumped	■ 61		
surged with block and bailed	☐ 42		
surged with block and pumped	☐ 62		
surged with block, bailed and pumped	☐ 70		
compressed air	☐ 20		
bailed only	☐ 10		
pumped only	☐ 51		
pumped slowly	☐ 50		
Other _____	☐ ▒		
3. Time spent developing well	45 min.		
4. Depth of well (from top of well casing)	52.1 ft.		
5. Inside diameter of well	2.03 in.		
6. Volume of water in filter pack and well casing	2.2 gal./ft		
7. Volume of water removed from well	1000.0 gal.		
8. Volume of water added (if any)	____.__ gal.		
9. Source of water added _____			
10. Analysis performed on water added? (If yes, attach results)	☐ Yes ☐ No		
11. Depth of Water (from top of well casing)		a. 16.4 ft.	16.45 ft.
Date		b. 12/01/94 mm dd yy	12/01/94 mm dd yy
Time		c. 5:05 ■ p.m. ☐ a.m.	5:45 ■ p.m. ☐ a.m.
12. Sediment in well bottom		0.0 inches	0.0 inches
13. Water Clarity		Clear ☐ 10 Turbid ■ 15 (Describe) _____	Clear ■ 20 Turbid ☐ 25 (Describe) _____
Fill in if drilling fluids were used and well is at solid waste facility:			
14. Total suspended solids		____.__ mg/l	____.__ mg/l
15. COD		____.__ mg/l	____.__ mg/l

16. Additional comments on development:

Well developed by: Person's Name and Firm

Name: Charles Markgraf

Firm: Environmental & Foundation Drilling, Inc.

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: _____

Print Initials: G D A

Firm: Environmental & Foundation Drilling, Inc.

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

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Route To:
☐ Solid Waste ☐ Haz. Waste
☐ Emergency Response ☐ Underground Tanks
☐ Wastewater ☐ Water Resources
☐ Other

Soil Boring Log Informatic
Form 4400-122 7-91

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WP&L Nelson Dewey 3314.01		B11B

Boring Drilled By (Firm name and name of crew chief)	Date Drilling Started	Date Drilling Completed	Drilling Method
Environmental & Foundation Drilling, Crew Chief: G. Markgraf	11/29/94	11/30/94	DTRC

DNR Facitity Well No.	WI Unique Well No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			Feet MSL	619.7 Feet MSL	7.5 Inches

Boring Location
State Plane 265907.89 N, 1727255.90 E
NE 1/4 of NE 1/4 of Section 19 T 3 N,R 5W
Lat ° ' "
Long ° ' "
Local Grid Location (If applicable)
☐ N ☐ E
Feet ☐ S Feet ☐ W

County	DNR County Code	Civil Town/City/ or Village
Grant	22	Cassville

Sample Number	Sample Length (In) Recovered	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	Comments
A			1–5	POORLY GRADED SAND (SP), sand fine grained, yellowish brown 10YR 5/6.	SP					D				
B			10–11	As above, brown 10YR 4/3.						M				
C			15–16	As above, yellowish brown 10YR 5/6.						M				

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm RMT
744 Heartland Trail, Madison Wisconsin
Tel: 608-831-4444, Fax: 608-831-3334

This form is authorized by Chapters 144, 147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than $10 nor more than $5,000 for each violation. Fined not less than $10 or more than $100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

Boring Number **B11B** Use only as an attachment to Form 4400-122.

Sample Number	Sample Length (In) Recovered	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	Comments
D			21	As above.						W				
			22											
			23											
			24											
E			25	As above.						W				
			26											
			27											
			28											
			29											
F			30	As above, sand medium grained, grains are light yellowish brown, yellowish brown and very dark brown.						W				
			31											
			32											
			33											
			34											
G			35	As above, fine grained, light yellowish brown 10YR 6/4.						W				
			36											
			37											
			38											
			39											
H			40	As above, slightly coarser grained sand than at 35', fine to medium grained.						W				
			41											
			42											
			43											
			44											
I			45	As above.						W				
			46											
			47											
			48											
			49											
J			50	As above.						W				
			51											
			52											
			53											

Boring Number **B11B** Use only as an attachment to Form 4400-122.

Sample Number	Sample Length (In) Recovered	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	Comments
K			54–55	As above, sand finer grained than at 50', yellowish brown 10YR 5/4.						W				
			56–59											
L			60–64	As above, sand medium grained.						W				
M			65–69	As above.						W				
N			70–74	As above.						W				
O			75–78	As above, 75% medium and 25% coarse grained sand.						W				
P			80–84	As above, sand fine grained.						W				
Q			85–86	As above, 75% fine grained and 25% medium grained sand.						W				

Boring Number **B11B** Use only as an attachment to Form 4400-122. Page 4 of 4

Sample Number	Sample Length (In) Recovered	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plastic Limit	Soil Properties: P 200	Comments
			87											
			88											
			89							W				
R			90	As above.						W				
			91											
			92											
			93											
			94											
S			95	As above, 75% medium and 25% coarse grained sand.						W				
			96											
			97											
			98											
			99											
T			100	As above, 50% medium and 50% coarse sand.						W				
			101											
			102											
			103											
			104											
U			105	As above, 90% medium and 10% coarse sand.						W				
			106											
			107											
			108											
			109											
V			110	As above, 50% medium and 50% coarse sand.						W				
			111											
			112											
			113											
			114											
			115	As above.						W				
			116											
			117	End of Boring at 117 Ft.										

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Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev.

Facility/Project Name WP&L Nelson Dewey 3314.01	Local Grid Location of Well ☐ N. ____ ft. ☐ S. ☐ E. ____ ft. ☐ W.	Well Name B-11R B Mcm 12/30/94
Facility License, Permit or Monitoring Number	Grid Origin Location Lat ___ ___ ___ Long. ___ ___ ___ or St. Plane ____ ft. N, ____ ft. E. 265907.89N, 1,727,255.90E	Wis. Unique Well Number / DNR Well Numbe
Type of Well: Water Table Observation Well ☐ 11 Piezometer ■ 12	Section Location of Waste/Source NE¼ of NE¼ of Sec. 19, T 3N, R 5 ☐ E. ■ W.	Date Well Installed 11 / 30 / 94 M M D D Y Y
Distance Well is From Waste/Source Boundary Approx. 300' ft.	Location of Well Relative to Waste/Source U ☐ Upgradient S ☐ Sidegradient D ■ Downgradient N ☐ Not Known	Well Installed By: (Persons' Name and Firm) Greg Markoraf, Environmental & Foundation Drilling
Is Well A Point of Enforcement Std. Application? ■ Yes ☐ No		

A. Protective pipe, top elevation 622.02 ft. MSL

B. Well casing, top elevation 621.89 ft. MSL

C. Land surface elevation 619.7 ft. MSL

D. Surface seal, bottom ____ ft. MSL or 15.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? Yes ☐ No ■

14. Drilling method used: Rotary ☐ 50
Hollow Stem Auger ☐ 41
Dual-tube reverse circulation Other ■ ▒

15. Drilling fluid used: Water ☐ 02 Air ■ 01
Drilling Mud ☐ 03 None ☐ 99

16. Drilling additives used? Yes ☐ No ■

Describe ____

17. Source of water (attach analysis):

E. Bentonite seal, top ____ ft. MSL or 95.0 ft.

F. Fine sand, top ____ ft. MSL or 101.5 ft.

G. Filter pack, top ____ ft. MSL or 103.5 ft.

H. Screen joint, top ____ ft. MSL or 106.3 ft.

I. Well bottom ____ ft. MSL or 111.3 ft.

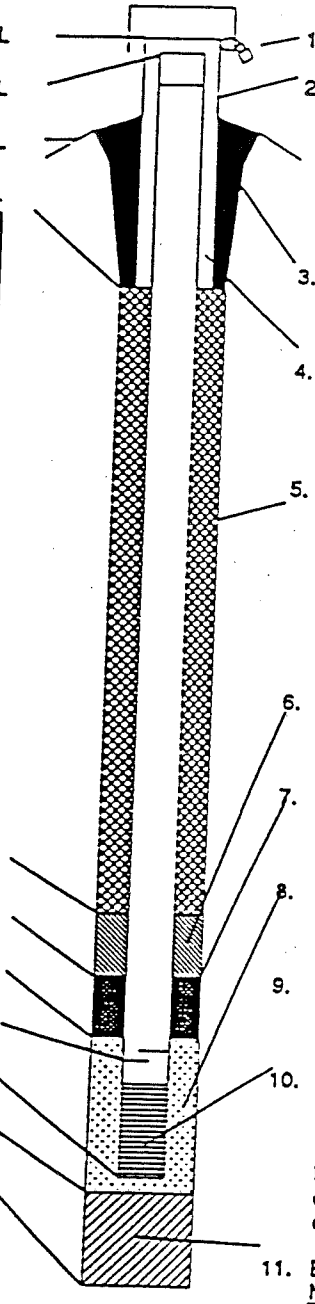
J. Filter pack, bottom ____ ft. MSL or 111.3 ft.

K. Borehole, bottom ____ ft. MSL or 117.0 ft.

L. Borehole, diameter 7.5 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 1.89 in.



1. Cap and lock? ■ Yes ☐ N

2. Protective cover pipe:
a. Inside diameter: 3.8
b. Length: 7.0
c. Material: Flush Mount Steel ■ Other ☐
d. Additional protection? ☐ Yes ☐ N
If yes, describe: ____

3. Surface seal: Bentonite ■ 3
Concrete ☐ 0
Other ☐
13 bags bentonite chips

4. Material between well casing and protective pipe:
Bentonite ■ 3
Annular space seal ☐
Other ☐

5. Annular space seal: a. Granular Bentonite ☐ 3
b. ___ Lbs/gal mud weight... Bentonite-sand slurry ☐ 3
c. 1.9 Lbs/gal mud weight..... Bentonite slurry ■ 3
d. ___ % Bentonite..... Bentonite-cement grout ☐ 5
e. 24 lb volume added for any of the above
f. How installed: Tremie ☐ 01
Tremie pumped ■ 02
Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ■ 3/8 in. ☐ 1/2 in. Bentonite pellets ■ 32
c. ____ Other ☐

7. Fine sand material: Manufacturer, product name, mesh siz
a. Unimin silica sand
b. Volume added 50 lbs, 1 bag

8. Filter pack material: Manufacturer, product, mesh size
a. Badger Mining #30
b. Volume added 4 bags, 200 lbs

9. Well casing: Flush threaded PVC schedule 40 ☐ 23
Flush threaded PVC schedule 80 ■ 24
Other ☐
____

10. Screen Material: PVC Schedule 80
a. Screen type: Factory cut ■ 11
Continuous slot ☐ 01
Other ☐
b. Manufacturer Northern Air
c. Slot size: 0.01 in.
d. Slotted length: 5.0 ft.

11. Backfill material (below filter pack): None ☐ 14
Natural material (medium sand) Other ■

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Michelle Gottwald 12/21/94 Firm RMT, Inc.

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5,000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

3314.01 0000 RTG

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPM

Form 4400-113B Rev

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
WP & L Neslon Dewey/Casseville	Grant	B-11XB MCM 12/3
Facility License, Permit or Monitoring Number	**County Code**	**Wis. Unique Well Number**	**DNR Well Number**
_ _ _ _ _ _ _	_ _	_ _ _ _ _ _ _	_ _ _ _

		Before Development	After Development
1. Can this well purged dry?	☐ Yes ■ No		
2. Well development method			
surged with bailer and bailed	☐ 41		
surged with bailer and pumped	■ 61		
surged with block and bailed	☐ 42		
surged with block and pumped	☐ 62		
surged with block, bailed and pumped	☐ 70		
compressed air	☐ 20		
bailed only	☐ 10		
pumped only	☐ 51		
pumped slowly	☐ 50		
Other _____	☐ ▒▒		
3. Time spent developing well	_ _45_ min.		
4. Depth of well (from top of well casing)	113.5 ft.		
5. Inside diameter of well	_2.03 in.		
6. Volume of water in filter pack and well casing	_ _2.2 gal./ft		
7. Volume of water removed from well	1350.0 gal.		
8. Volume of water added (if any)	_ _ _ _._ gal.		
9. Source of water added _____			
10. Analysis performed on water added? (If yes, attach results)	☐ Yes ☐ No		
11. Depth of Water (from top of well casing)		a. 16.4 ft.	15.8 ft.
Date		b. 12/01/94 mm dd yy	12/01/94 mm dd yy
Time		c. 10:00 ■ a.m. ☐ p.m.	10:45 ■ a.m. ☐ p.m.
12. Sediment in well bottom		0.0 inches	0.0 inches
13. Water Clarity		Clear ☐ 10 Turbid ■ 15 (Describe)	Clear ■ 20 Turbid ☐ 25 (Describe)
Fill in if drilling fluids were used and well is at solid waste facility:			
14. Total suspended solids		_ _ _ _ _._ mg/l	_ _ _ _ _._ mg/l
15. COD		_ _ _ _ _._ mg/l	_ _ _ _ _._ mg/l

16. Additional comments on development:

Well developed by: Person's Name and Firm

Name: Charles Markgraf

Firm: Environmental & Foundation Drilling, Inc.

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: _____

Print Initials: G D A

Firm: Environmental & Foundation Drilling, Inc.

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

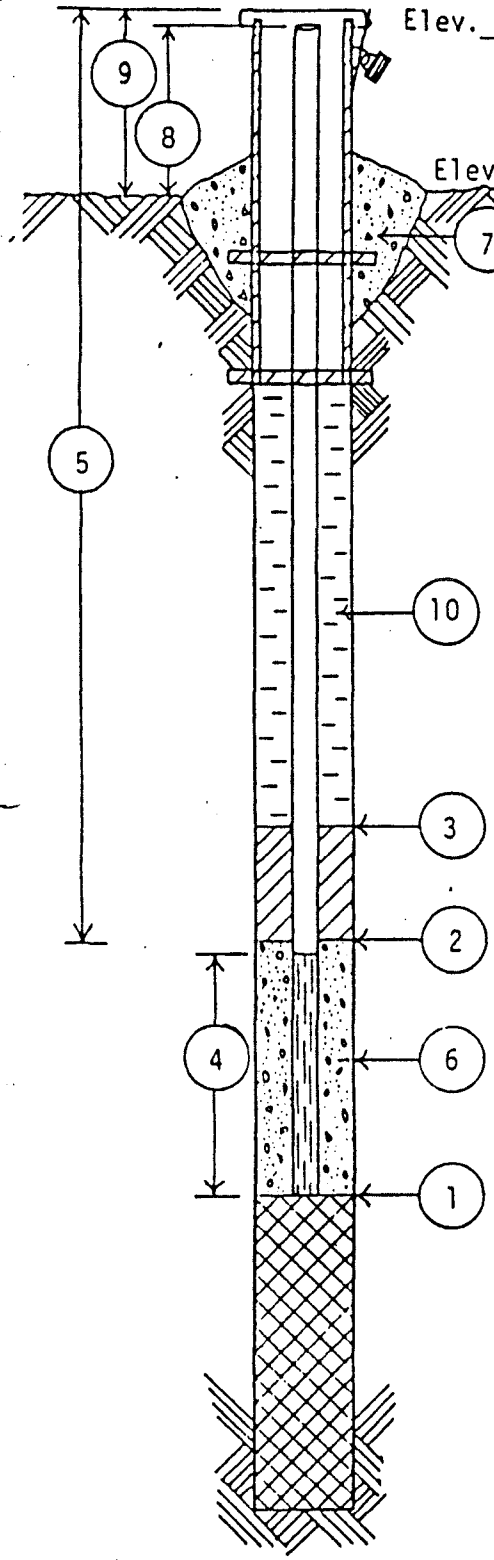
JOB NO. C 9065

BORING NO. B 31A

DATE 2/28/80

CHIEF D. Braun

LOCATION Cassville, Wisconsin



All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 34' FEET.
2. DEPTH OF BOTTOM OF SEAL (if installed) 28 FEET.
3. DEPTH TO TOP OF SEAL (if installed) 25 FEET.
4. LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 5 FEET. (Circle One)
5. TOTAL LENGTH OF PIPE 33 FEET @ 2 IN. DIAMETER.
6. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP, YES (NO) (Circle One)
8. HEIGHT OF WELL CASING ABOVE GROUND 4 FEET.
9. PROTECTIVE CASING? YES (NO) (Circle One)
   HEIGHT ABOVE GROUND -.
   LOCKING CAP? YES (NO) (Circle One)
10. TYPE OF BACKFILL: Soil & Bentonite Mix

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
31A	2/28/80		10.5'	¼ hour

WARZYN ENGINEERING INC

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Monitoring Well

Location: Cassville, Wisconsin

Boring No. 31
Surface Elevation
Job No. C 9065
Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9638, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		qu	W	LL	PL	D
					5	For Soil Classification See Boring Log 31A					
					10						
					15						
					20	End Boring at 20'					
						Install 19.5' Observation Well					
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Drilling
Upon Completion of Drilling
Time After Drilling
Depth to Water
Depth to Cave In

GENERAL NOTES

Start 2/28/80 Complete 2/28/80
Crew Chief DB Rig Bomb
Drilling Method

w-1

WARZYN

LOG OF TEST BORING

Project WP&L
Nelson Dewey Generating Station
Location Cassville, Wisconsin

Boring No. B-31R
Surface Elevation
Job No. 13758
Sheet 1 of 1

ONE SCIENCE COURT · P.O. BOX 5385, MADISON, WIS. 53705 · TEL.(608) 273-0440

SAMPLE No.	SAMPLE TYPE	SAMPLE Rec (in.)	SAMPLE Moist	SAMPLE N	Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LI
						TOPSOIL - Brown Silty Sand					
					5	FILL					
					10	Loose, Tan Fine to Medium SAND (SW)					
1		18	W	8	15						
						Medium Dense, Tan Medium to Coarse SAND (SW)					
2		18	W	12	20						
						End Boring at 22.0'					
					25						

WATER LEVEL OBSERVATIONS

While Drilling ▽ Upon Completion of Drilling
Time After Drilling
Depth to Water 14.0' ▽
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start 4/25/89 End 4/25/89
Driller E&F Chief GA Rig CME 65
Logger WB Editor AJS
Drill Method HSA 0-22'

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Nelson Dewey Generating Station

Location: Cassville, Wisconsin

Boring No.: B 31A
Surface Elevation: 6200
Job No.: C 9065
Sheet: 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

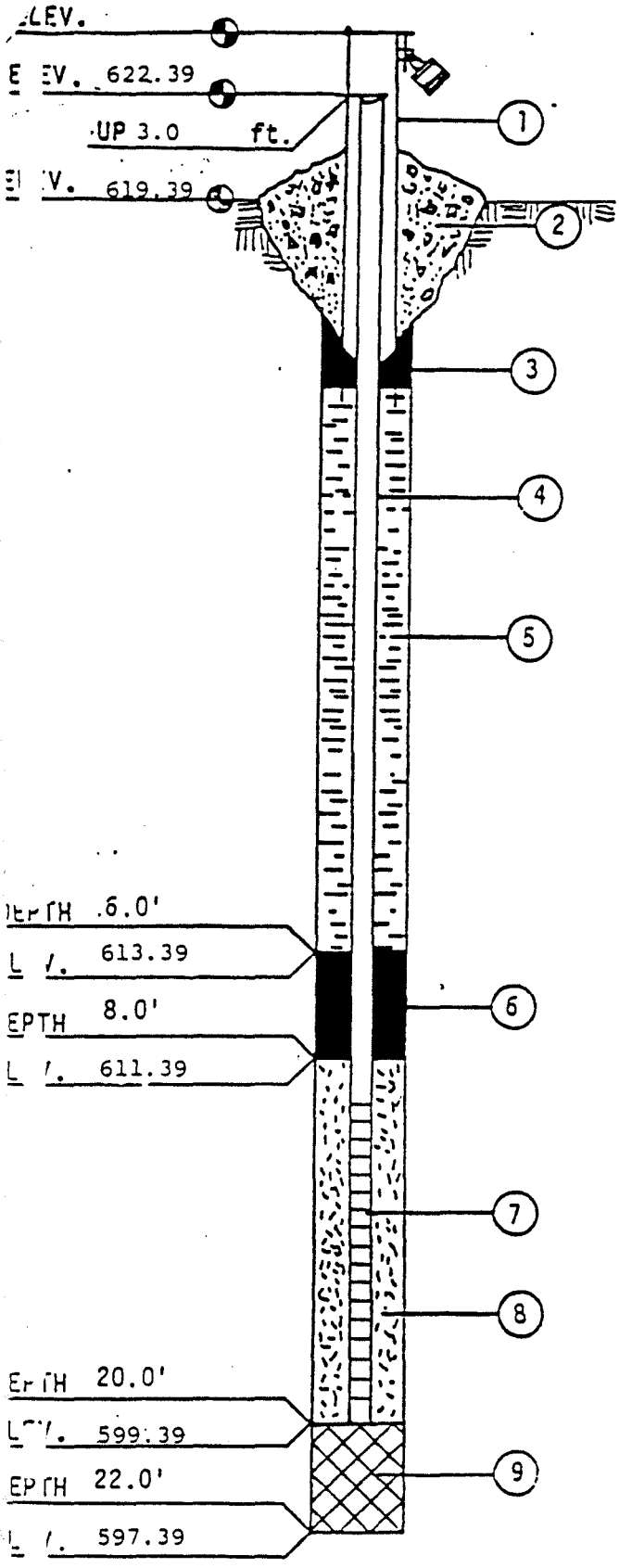
SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
		Recovery	Moisture								
No.	Type	↓	↓	N	Depth		q_u	W	LL	PL	D
						TOPSOIL-Brown Silty SAND					
1	SS	X	M	33							
2	SS	X	M	11	5	FILL					
3	SS	X	W	6							
4	SS	X	W	3	10						
						Tan Fine to Medium SAND					
5	SS	X	W	8	15						
6	SS	X	W	18	20	Tan Medium to Coarse SAND, Trace Gravel					
7	SS	X	W	11	25						
8	SS	NR	W	15	30						
						Very Fine Tan SAND, Little Silt					
9	SS	X	W	27	35	End Boring at 35'					
					40						

WATER LEVEL OBSERVATIONS

While Drilling
Upon Completion of Drilling
Time After Drilling: ½ hour
Depth to Water: 10.5'
Depth to Cave In

GENERAL NOTES

Start: 2/28/80 Complete: 2/28/80
Crew Chief: DB Rig: Bomb
Drilling Method: 0-10' Auger
10-35' Wash Bore



MONITORING WELL CONSTRUCTION INFORMATION

JOB NO. 13758

BORING/WELL NO. B-31R

DATE 4/25/89

CHIEF/UNIT Greg Anderson/CME 65

1. PROTECTIVE CASING (YES) NO

   LOCKING (YES) NO

2. CONCRETE SEAL (YES) NO

3. TYPE OF SURFACE SEAL (IF INSTALLED)

   Granular Bentonite

4. SOLID PIPE TYPE PVC

   SOLID PIPE LENGTH 13.0 ft.

   JOINT TYPE SLIP/GLUED (THREADED)

5. TYPE OF BACKFILL Granular Bentonite

   HOW INSTALLED - TREMIE (FROM SURFACE)

6. TYPE OF LOWER SEAL (IF INSTALLED)

   Bentonite Pellets

7. SCREEN TYPE PVC

   SCREEN LENGTH 10.0 ft

   SLOT-SIZE 0.010" LENGTH 10 ft.

   SCREEN DIAMETER 2.0 in.

8. TYPE OF BACKFILL AROUND SCREEN

   #20 Flint Sand

9. TYPE OF BACKFILL Natural Cave-in

10. DRILLING METHOD HSA

11. ADDITIVES USED (IF ANY)

    -

WATER LEVEL 14.0' DATE 4/25/89

*ALL DEPTHS MEASURED FROM GROUND SURFACE.

/ARZYN

ENGINEERING INC

WELL DETAIL INFORMATION SHEET

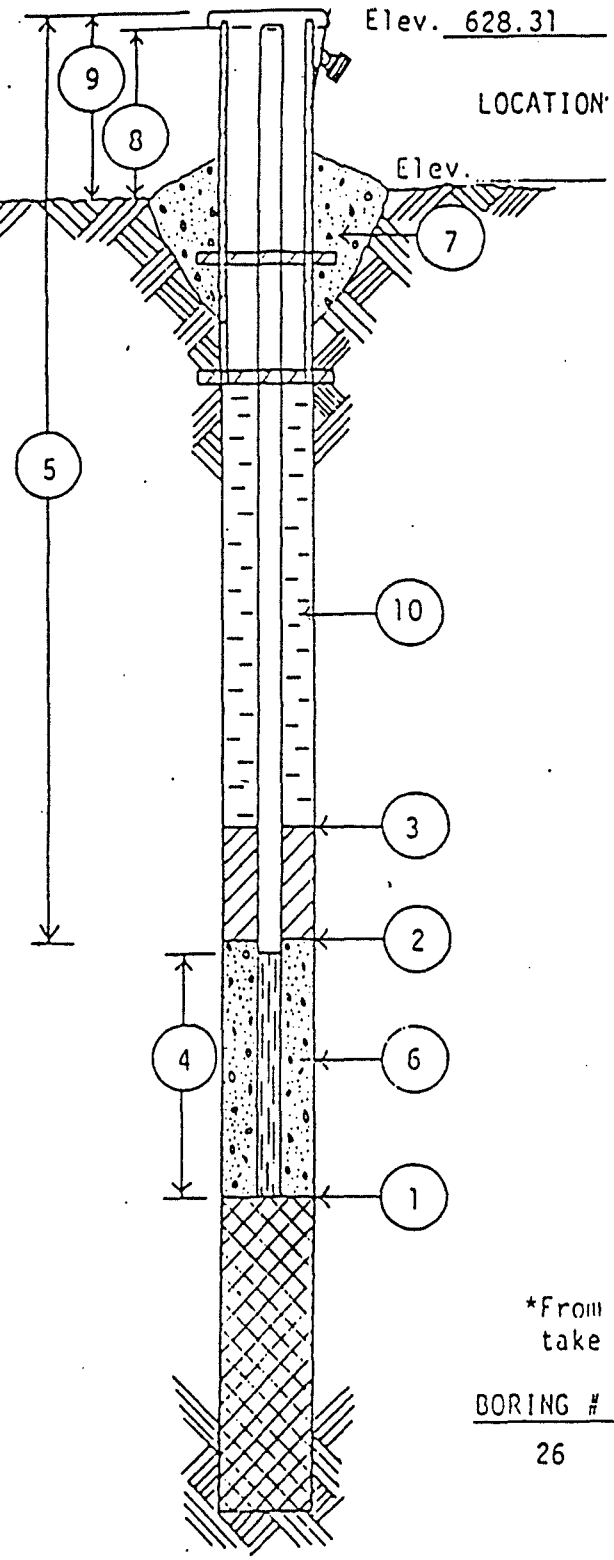
JOB NO. C 9036

BORING NO. 26

DATE 2/28/80

CHIEF D. Braun

LOCATION Nelson Dewey G.S.; Cassville, Wisconsin



* All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 29.5 FEET.

(2) DEPTH OF BOTTOM OF SEAL (if installed) 3 FEET.

(3) DEPTH TO TOP OF SEAL (if installed) 0 FEET.

(4) LENGTH OF WELL POINT, (PVC WELL SCREEN) OR SLOTTED PIPE 10 FEET. (Circle One)

(5) TOTAL LENGTH OF PIPE 23.5 FEET @ 2 IN. DIAMETER.

(6) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand.

(7) CONCRETE CAP, YES (NO) (Circle One)

(8) HEIGHT OF WELL CASING ABOVE GROUND 4 FEET.

(9) PROTECTIVE CASING? YES (NO) (Circle One)
HEIGHT ABOVE GROUND -.
LOCKING CAP? YES (NO) (Circle One)

(10) TYPE OF BACKFILL: Soil & Bentonite Mix

WATER LEVEL CHECKS

*From top of casing, if protective casing higher, take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
26	2/28/80		17'8"	½ hour

WARZYN ENGINEERING INC

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Nelson Dewey Generating Station
Proposed Slag Disposal Area
Location: Cassville, Wisconsin

Boring No. B 26A
Surface Elevation 624.6
Job No. C 9036
Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE No.	Type	Recovery ↓	Moisture ↓	N	Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu	W	LL	PL	D
						TOPSOIL					
1	SS	X	M	11			4.5				
2	SS	X	M	4	5	Brown SILT, Some Clay, Some Sand (CL-ML) Occasional Sand Lenses					
	SS	X	M	-							
3	SS	X	M	5							
	SS	X	M	-							
4	SS	X	M	6	10				25.4	19.9	
5	SS	X	M	9	15	Tan Coarse to Medium SAND, Some to Trace Gravel, Trace Silt and Clay (SP)					
6	SS	X	W	28	20						
7	SS	X	W	20	25	Tan Medium to Fine SAND, Trace Gravel, Little to Trace Silt and Clay (SP)					
8	SS	X	W	11	30						
9	SS	X	W	19	35						
1	SS	X	W	27	40	Tan Coarse to Medium SAND, Some to Trace Gravel, Trace Silt and Clay (SP)					
	SS	X	W	26	45						
						End Boring at 45'					

(Continued)

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Nelson Dewey Generating Station
Proposed Slag Disposal Area
Location: Cassville, Wisconsin

Boring No. B 26A
Surface Elevation 624.6
Job No. C 9036
Sheet 2 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		q_u	W	LL	PL	D
					50						
					55						
					60						
					65						
					70						
					75						
					80						
					85						

WATER LEVEL OBSERVATIONS

While Drilling 19.5'
Upon Completion of Drilling
Time After Drilling 3/10/80
Depth to Water 23.14
Depth to Cave In

GENERAL NOTES

Start 2/27/80 Complete 2/27/80
Crew Chief DB Rig Bomb
Drilling Method
Auger to 20'
Wash Bore to 45'

W-5

Appendix C

Laboratory Analytical Reports

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

May 13, 2022

Meghan Blodgett
SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718

RE: Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Dear Meghan Blodgett:

Enclosed are the analytical results for sample(s) received by the laboratory on April 28, 2022. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:
- Pace Analytical Services - Green Bay

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Dan Milewsky
dan.milewsky@pacelabs.com
(920)469-2436
Project Manager

Enclosures

cc: Matt Bizjack, Alliant Energy
Sherren Clark, SCS Engineers
Tom Karwoski, SCS ENGINEERS
Nicole Kron, SCS ENGINEERS
Ryan Matzuk, SCS Engineers
Jeff Maxted, ALLIANT ENERGY
Marc Morandi, ALLIANT ENERGY

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Pace Analytical Services Green Bay
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40244038001	**FIELD BLANK**	Water	04/25/22 15:00	04/28/22 08:20
40244038002	**B-7R**	Water	04/26/22 10:35	04/28/22 08:20
40244038003	**B-11R**	Water	04/26/22 13:15	04/28/22 08:20
40244038004	**B-11A**	Water	04/26/22 13:15	04/28/22 08:20
40244038005	**B11-B**	Water	04/26/22 12:15	04/28/22 08:20
40244038006	**B-26**	Water	04/25/22 15:05	04/28/22 08:20
40244038007	**B-31R**	Water	04/25/22 17:00	04/28/22 08:20
40244038008	**B-31A**	Water	04/26/22 14:50	04/28/22 08:20
40244038009	**B-39**	Water	04/25/22 13:00	04/28/22 08:20

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40244038001	**FIELD BLANK**	EPA 6020B	KXS	2
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40244038002	**B-7R**	EPA 6020B	KXS	2
			KPR	7
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40244038003	**B-11R**	EPA 6020B	KXS	2
			KPR	7
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40244038004	**B-11A**	EPA 6020B	KXS	2
			KPR	7
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40244038005	**B11-B**	EPA 6020B	KXS	2
			KPR	7
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40244038006	**B-26**	EPA 6020B	KXS	2
			KPR	7
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40244038007	**B-31R**	EPA 6020B	KXS	2
			KPR	7
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40244038008	**B-31A**	EPA 6020B	KXS	2
			KPR	7
		SM 2540C	SRK	1

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Lab ID	Sample ID	Method	Analysts	Analytes Reported
		EPA 9040	YER	1
		EPA 300.0	HMB	3
40244038009	**B-39**	EPA 6020B	KXS	2
			KPR	7
		SM 2540C	SRK	1
		EPA 9040	YER	1
		EPA 300.0	HMB	3

PASI-G = Pace Analytical Services - Green Bay

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Sample: FIELD BLANK **Lab ID: 40244038001** Collected: 04/25/22 15:00 Received: 04/28/22 08:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Boron	**<3.0**	ug/L	10.0	3.0	1	05/02/22 06:14	05/11/22 04:09	7440-42-8	
Calcium	**<76.2**	ug/L	254	76.2	1	05/02/22 06:14	05/11/22 04:09	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**<8.7**	mg/L	20.0	8.7	1		04/28/22 15:21		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.5**	Std. Units	0.10	0.010	1		04/28/22 14:13		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**<0.43**	mg/L	2.0	0.43	1		05/10/22 19:09	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/10/22 19:09	16984-48-8	
Sulfate	**<0.44**	mg/L	2.0	0.44	1		05/10/22 19:09	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Sample: B-7R **Lab ID: 40244038002** Collected: 04/26/22 10:35 Received: 04/28/22 08:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Boron	**98.1**	ug/L	10.0	3.0	1	05/02/22 06:14	05/11/22 04:16	7440-42-8	
Calcium	**59200**	ug/L	254	76.2	1	05/02/22 06:14	05/11/22 04:16	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**6.43**	Std. Units			1		04/26/22 10:35		
Field Specific Conductance	**614.1**	umhos/cm			1		04/26/22 10:35		
Oxygen, Dissolved	**0.82**	mg/L			1		04/26/22 10:35	7782-44-7	
REDOX	**-86.1**	mV			1		04/26/22 10:35		
Turbidity	**3.56**	NTU			1		04/26/22 10:35		
Static Water Level	**609.84**	feet			1		04/26/22 10:35		
Temperature, Water (C)	**8.5**	deg C			1		04/26/22 10:35		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**318**	mg/L	20.0	8.7	1		04/28/22 15:21		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**6.6**	Std. Units	0.10	0.010	1		04/28/22 14:19		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**12.0**	mg/L	10.0	2.2	5		05/10/22 19:24	16887-00-6	
Fluoride	**<0.48**	mg/L	1.6	0.48	5		05/10/22 19:24	16984-48-8	D3
Sulfate	**3.7J**	mg/L	10.0	2.2	5		05/10/22 19:24	14808-79-8	D3

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Sample: B-11R **Lab ID: 40244038003** Collected: 04/26/22 13:15 Received: 04/28/22 08:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Boron	**2330**	ug/L	100	30.3	10	05/02/22 06:14	05/11/22 12:56	7440-42-8	
Calcium	**114000**	ug/L	2540	762	10	05/02/22 06:14	05/11/22 12:56	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.01**	Std. Units			1		04/26/22 13:15		
Field Specific Conductance	**934**	umhos/cm			1		04/26/22 13:15		
Oxygen, Dissolved	**0.07**	mg/L			1		04/26/22 13:15	7782-44-7	
REDOX	**-41.5**	mV			1		04/26/22 13:15		
Turbidity	**6.70**	NTU			1		04/26/22 13:15		
Static Water Level	**609.75**	feet			1		04/26/22 13:15		
Temperature, Water (C)	**10.4**	deg C			1		04/26/22 13:15		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**560**	mg/L	20.0	8.7	1		04/28/22 15:21		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**6.9**	Std. Units	0.10	0.010	1		04/28/22 14:21		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**18.0**	mg/L	10.0	2.2	5		05/10/22 19:39	16887-00-6	
Fluoride	**<0.48**	mg/L	1.6	0.48	5		05/10/22 19:39	16984-48-8	D3
Sulfate	**58.1**	mg/L	10.0	2.2	5		05/10/22 19:39	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Sample: B-11A **Lab ID: 40244038004** Collected: 04/26/22 13:15 Received: 04/28/22 08:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Boron	**88.6**	ug/L	10.0	3.0	1	05/02/22 06:14	05/11/22 04:45	7440-42-8	
Calcium	**51600**	ug/L	254	76.2	1	05/02/22 06:14	05/11/22 04:45	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.53**	Std. Units			1		04/26/22 13:15		
Field Specific Conductance	**633.7**	umhos/cm			1		04/26/22 13:15		
Oxygen, Dissolved	**0.15**	mg/L			1		04/26/22 13:15	7782-44-7	
REDOX	**0.3**	mV			1		04/26/22 13:15		
Turbidity	**0.00**	NTU			1		04/26/22 13:15		
Static Water Level	**610.00**	feet			1		04/26/22 13:15		
Temperature, Water (C)	**13.0**	deg C			1		04/26/22 13:15		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**350**	mg/L	20.0	8.7	1		04/28/22 15:22		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.7**	Std. Units	0.10	0.010	1		04/28/22 14:26		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**58.3**	mg/L	2.0	0.43	1		05/10/22 19:54	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/10/22 19:54	16984-48-8	
Sulfate	**8.5**	mg/L	2.0	0.44	1		05/10/22 19:54	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Sample: B11-B **Lab ID: 40244038005** Collected: 04/26/22 12:15 Received: 04/28/22 08:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Boron	**2590**	ug/L	100	30.3	10	05/02/22 06:14	05/11/22 13:04	7440-42-8	
Calcium	**97100**	ug/L	2540	762	10	05/02/22 06:14	05/11/22 13:04	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.63**	Std. Units			1		04/26/22 12:15		
Field Specific Conductance	**1432**	umhos/cm			1		04/26/22 12:15		
Oxygen, Dissolved	**0.22**	mg/L			1		04/26/22 12:15	7782-44-7	
REDOX	**45.4**	mV			1		04/26/22 12:15		
Turbidity	**0.00**	NTU			1		04/26/22 12:15		
Static Water Level	**609.98**	feet			1		04/26/22 12:15		
Temperature, Water (C)	**13.0**	deg C			1		04/26/22 12:15		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**1000**	mg/L	20.0	8.7	1		04/28/22 15:22		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.8**	Std. Units	0.10	0.010	1		04/29/22 11:25		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**36.5**	mg/L	10.0	2.2	5		05/10/22 20:08	16887-00-6	
Fluoride	**<0.48**	mg/L	1.6	0.48	5		05/10/22 20:08	16984-48-8	
Sulfate	**513**	mg/L	40.0	8.9	20		05/11/22 15:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Sample: B-26 **Lab ID: 40244038006** Collected: 04/25/22 15:05 Received: 04/28/22 08:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Boron	**52.5**	ug/L	10.0	3.0	1	05/02/22 06:14	05/11/22 05:00	7440-42-8	
Calcium	**75900**	ug/L	254	76.2	1	05/02/22 06:14	05/11/22 05:00	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.19**	Std. Units			1		04/25/22 15:05		
Field Specific Conductance	**826**	umhos/cm			1		04/25/22 15:05		
Oxygen, Dissolved	**10.44**	mg/L			1		04/25/22 15:05	7782-44-7	
REDOX	**252.4**	mV			1		04/25/22 15:05		
Turbidity	**0.30**	NTU			1		04/25/22 15:05		
Static Water Level	**610.12**	feet			1		04/25/22 15:05		
Temperature, Water (C)	**11.0**	deg C			1		04/25/22 15:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**470**	mg/L	20.0	8.7	1		04/28/22 15:22		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.4**	Std. Units	0.10	0.010	1		04/29/22 11:28		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**45.3**	mg/L	10.0	2.2	5		05/11/22 09:22	16887-00-6	
Fluoride	**<0.48**	mg/L	1.6	0.48	5		05/11/22 09:22	16984-48-8	D3,M0
Sulfate	**34.2**	mg/L	2.0	0.44	1		05/09/22 23:07	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Sample: B-31R **Lab ID: 40244038007** Collected: 04/25/22 17:00 Received: 04/28/22 08:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Boron	**454**	ug/L	10.0	3.0	1	05/02/22 06:14	05/11/22 05:08	7440-42-8	
Calcium	**81100**	ug/L	254	76.2	1	05/02/22 06:14	05/11/22 05:08	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**6.77**	Std. Units			1		04/25/22 17:00		
Field Specific Conductance	**728**	umhos/cm			1		04/25/22 17:00		
Oxygen, Dissolved	**0.38**	mg/L			1		04/25/22 17:00	7782-44-7	
REDOX	**-25.3**	mV			1		04/25/22 17:00		
Turbidity	**3.68**	NTU			1		04/25/22 17:00		
Static Water Level	**610.27**	feet			1		04/25/22 17:00		
Temperature, Water (C)	**11.3**	deg C			1		04/25/22 17:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**428**	mg/L	20.0	8.7	1		04/28/22 15:23		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**6.9**	Std. Units	0.10	0.010	1		04/29/22 11:33		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**36.0**	mg/L	2.0	0.43	1		05/09/22 23:51	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/09/22 23:51	16984-48-8	
Sulfate	**60.0**	mg/L	2.0	0.44	1		05/09/22 23:51	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Sample: B-31A **Lab ID: 40244038008** Collected: 04/26/22 14:50 Received: 04/28/22 08:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Boron	**198**	ug/L	10.0	3.0	1	05/02/22 06:14	05/11/22 05:15	7440-42-8	
Calcium	**55300**	ug/L	254	76.2	1	05/02/22 06:14	05/11/22 05:15	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**7.82**	Std. Units			1		04/26/22 14:50		
Field Specific Conductance	**556**	umhos/cm			1		04/26/22 14:50		
Oxygen, Dissolved	**0.17**	mg/L			1		04/26/22 14:50	7782-44-7	
REDOX	**59.6**	mV			1		04/26/22 14:50		
Turbidity	**0.00**	NTU			1		04/26/22 14:50		
Static Water Level	**609.95**	feet			1		04/26/22 14:50		
Temperature, Water (C)	**13.2**	deg C			1		04/26/22 14:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**316**	mg/L	20.0	8.7	1		04/28/22 15:24		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.6**	Std. Units	0.10	0.010	1		04/29/22 11:38		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**56.0**	mg/L	2.0	0.43	1		05/10/22 00:06	16887-00-6	
Fluoride	**0.22J**	mg/L	0.32	0.095	1		05/10/22 00:06	16984-48-8	
Sulfate	**15.4**	mg/L	2.0	0.44	1		05/10/22 00:06	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Sample: B-39 **Lab ID: 40244038009** Collected: 04/25/22 13:00 Received: 04/28/22 08:20 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3010A Pace Analytical Services - Green Bay								
Boron	**212**	ug/L	10.0	3.0	1	05/02/22 06:14	05/11/22 05:22	7440-42-8	
Calcium	**82000**	ug/L	254	76.2	1	05/02/22 06:14	05/11/22 05:22	7440-70-2	
Field Data	Analytical Method: Pace Analytical Services - Green Bay								
Field pH	**6.89**	Std. Units			1		04/25/22 13:00		
Field Specific Conductance	**554.1**	umhos/cm			1		04/25/22 13:00		
Oxygen, Dissolved	**0.18**	mg/L			1		04/25/22 13:00	7782-44-7	
REDOX	**220.4**	mV			1		04/25/22 13:00		
Turbidity	**1.49**	NTU			1		04/25/22 13:00		
Static Water Level	**610.22**	feet			1		04/25/22 13:00		
Temperature, Water (C)	**11.7**	deg C			1		04/25/22 13:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Green Bay								
Total Dissolved Solids	**306**	mg/L	20.0	8.7	1		04/28/22 15:24		
9040 pH	Analytical Method: EPA 9040 Pace Analytical Services - Green Bay								
pH at 25 Degrees C	**7.0**	Std. Units	0.10	0.010	1		04/29/22 11:41		H6
300.0 IC Anions	Analytical Method: EPA 300.0 Pace Analytical Services - Green Bay								
Chloride	**0.63J**	mg/L	2.0	0.43	1		05/10/22 20:53	16887-00-6	
Fluoride	**<0.095**	mg/L	0.32	0.095	1		05/10/22 20:53	16984-48-8	
Sulfate	**6.3**	mg/L	2.0	0.44	1		05/10/22 20:53	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

QC Batch: 414489
QC Batch Method: EPA 3010A
Analysis Method: EPA 6020B
Analysis Description: 6020B MET
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40244038001, 40244038002, 40244038003, 40244038004, 40244038005, 40244038006, 40244038007, 40244038008, 40244038009

METHOD BLANK: 2386892 Matrix: Water
Associated Lab Samples: 40244038001, 40244038002, 40244038003, 40244038004, 40244038005, 40244038006, 40244038007, 40244038008, 40244038009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	ug/L	<3.0	10.0	05/09/22 17:21	
Calcium	ug/L	<76.2	254	05/11/22 02:55	

LABORATORY CONTROL SAMPLE: 2386893

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	250	235	94	80-120	
Calcium	ug/L	10000	11400	114	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2386894 2386895

Parameter	Units	40244027001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	1100	250	250	1360	1350	100	99	75-125	0	20	
Calcium	ug/L	143000	10000	10000	156000	160000	129	163	75-125	2	20	P6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

QC Batch: 414376 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40244038001, 40244038002, 40244038003, 40244038004, 40244038005, 40244038006, 40244038007, 40244038008, 40244038009

METHOD BLANK: 2385834 Matrix: Water
Associated Lab Samples: 40244038001, 40244038002, 40244038003, 40244038004, 40244038005, 40244038006, 40244038007, 40244038008, 40244038009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<8.7	20.0	04/28/22 15:20	

LABORATORY CONTROL SAMPLE: 2385835

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	555	546	98	80-120	

SAMPLE DUPLICATE: 2385836

Parameter	Units	40244039001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	294	284	3	10	

SAMPLE DUPLICATE: 2385837

Parameter	Units	40244039002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	300	318	6	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

QC Batch: 414369
QC Batch Method: EPA 9040
Analysis Method: EPA 9040
Analysis Description: 9040 pH
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40244038001, 40244038002, 40244038003, 40244038004

SAMPLE DUPLICATE: 2385790

Parameter	Units	40243933001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.5	7.5	0	20	H6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

QC Batch: 414440
QC Batch Method: EPA 9040
Analysis Method: EPA 9040
Analysis Description: 9040 pH
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40244038005, 40244038006, 40244038007, 40244038008, 40244038009

SAMPLE DUPLICATE: 2385789

Parameter	Units	40243975001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.9	8.0	0	20	H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

QC Batch: 414946
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40244038009

METHOD BLANK: 2389209 Matrix: Water
Associated Lab Samples: 40244038009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	05/10/22 20:23	
Fluoride	mg/L	<0.095	0.32	05/10/22 20:23	
Sulfate	mg/L	<0.44	2.0	05/10/22 20:23	

LABORATORY CONTROL SAMPLE: 2389210

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.1	106	90-110	
Fluoride	mg/L	2	2.1	107	90-110	
Sulfate	mg/L	20	21.4	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2389211 2389212

Parameter	Units	40243482001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.2	20	20	25.3	25.6	101	102	90-110	1	15	
Fluoride	mg/L	<0.095	2	2	2.1	2.2	106	108	90-110	2	15	
Sulfate	mg/L	1.4J	20	20	23.7	24.0	111	113	90-110	1	15	M0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

QC Batch: 415066
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40244038001, 40244038002, 40244038003, 40244038004, 40244038005

METHOD BLANK: 2389806 Matrix: Water
Associated Lab Samples: 40244038001, 40244038002, 40244038003, 40244038004, 40244038005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	05/10/22 16:11	
Fluoride	mg/L	<0.095	0.32	05/10/22 16:11	
Sulfate	mg/L	<0.44	2.0	05/10/22 16:11	

LABORATORY CONTROL SAMPLE: 2389807

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.1	106	90-110	
Fluoride	mg/L	2	2.1	104	90-110	
Sulfate	mg/L	20	21.4	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2389808 2389809

Parameter	Units	40243486002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	0.82J	20	20	22.6	22.6	109	109	90-110	0	15	
Fluoride	mg/L	<0.095	2	2	2.1	2.1	107	107	90-110	0	15	
Sulfate	mg/L	9.4	20	20	31.9	32.0	113	113	90-110	0	15	M0

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

QC Batch: 415072
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 40244038006, 40244038007, 40244038008

METHOD BLANK: 2389899 Matrix: Water
Associated Lab Samples: 40244038006, 40244038007, 40244038008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<0.43	2.0	05/09/22 21:52	
Fluoride	mg/L	<0.095	0.32	05/09/22 21:52	
Sulfate	mg/L	<0.44	2.0	05/09/22 21:52	

LABORATORY CONTROL SAMPLE: 2389900

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	20	21.1	106	90-110	
Fluoride	mg/L	2	2.1	104	90-110	
Sulfate	mg/L	20	21.4	107	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2389901 2389902

Parameter	Units	40244038006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	45.3	100	100	155	154	110	109	90-110	1	15	
Fluoride	mg/L	<0.48	10	10	11.5	11.5	115	115	90-110	0	15	M0
Sulfate	mg/L	34.2	20	20	56.1	56.3	109	110	90-110	0	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor, percent moisture, initial weight and final volume.

LOQ - Limit of Quantitation adjusted for dilution factor, percent moisture, initial weight and final volume.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
H6	Analysis initiated outside of the 15 minute EPA required holding time.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

Pace Analytical Services, LLC
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(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CCR RULE ALLIANT NELSON DEWEY
Pace Project No.: 40244038

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40244038001	**FIELD BLANK**	EPA 3010A	414489	EPA 6020B	414596
40244038002	**B-7R**	EPA 3010A	414489	EPA 6020B	414596
40244038003	**B-11R**	EPA 3010A	414489	EPA 6020B	414596
40244038004	**B-11A**	EPA 3010A	414489	EPA 6020B	414596
40244038005	**B11-B**	EPA 3010A	414489	EPA 6020B	414596
40244038006	**B-26**	EPA 3010A	414489	EPA 6020B	414596
40244038007	**B-31R**	EPA 3010A	414489	EPA 6020B	414596
40244038008	**B-31A**	EPA 3010A	414489	EPA 6020B	414596
40244038009	**B-39**	EPA 3010A	414489	EPA 6020B	414596
40244038002	**B-7R**				
40244038003	**B-11R**				
40244038004	**B-11A**				
40244038005	**B11-B**				
40244038006	**B-26**				
40244038007	**B-31R**				
40244038008	**B-31A**				
40244038009	**B-39**				
40244038001	**FIELD BLANK**	SM 2540C	414376		
40244038002	**B-7R**	SM 2540C	414376		
40244038003	**B-11R**	SM 2540C	414376		
40244038004	**B-11A**	SM 2540C	414376		
40244038005	**B11-B**	SM 2540C	414376		
40244038006	**B-26**	SM 2540C	414376		
40244038007	**B-31R**	SM 2540C	414376		
40244038008	**B-31A**	SM 2540C	414376		
40244038009	**B-39**	SM 2540C	414376		
40244038001	**FIELD BLANK**	EPA 9040	414369		
40244038002	**B-7R**	EPA 9040	414369		
40244038003	**B-11R**	EPA 9040	414369		
40244038004	**B-11A**	EPA 9040	414369		
40244038005	**B11-B**	EPA 9040	414440		
40244038006	**B-26**	EPA 9040	414440		
40244038007	**B-31R**	EPA 9040	414440		
40244038008	**B-31A**	EPA 9040	414440		
40244038009	**B-39**	EPA 9040	414440		
40244038001	**FIELD BLANK**	EPA 300.0	415066		
40244038002	**B-7R**	EPA 300.0	415066		
40244038003	**B-11R**	EPA 300.0	415066		
40244038004	**B-11A**	EPA 300.0	415066		
40244038005	**B11-B**	EPA 300.0	415066		
40244038006	**B-26**	EPA 300.0	415072		
40244038007	**B-31R**	EPA 300.0	415072		
40244038008	**B-31A**	EPA 300.0	415072		
40244038009	**B-39**	EPA 300.0	414946		

REPORT OF LABORATORY ANALYSIS

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document

402444038

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	SCS ENGINEERS	Report To:	Meghan Blodgett	Attention:	
Address:	2830 Dairy Drive	Copy To:		Company Name:	
Madison, WI 53718				Address:	Regulatory Agency
Email:	mblodgett@scsengineers.com	Purchase Order #:		Pace Quote:	
Phone:	608-216-7362 Fax:	Project Name:	CCR Rule Alliant Nelson Dewey (25219071)	Pace Project Manager:	dan.milewsky@pacelabs.com, State / Location
Requested Due Date:		Project #:		Pace Profile #:	3946-13

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analysis Filtered (Y/N) Y/N	Analyses Test: Boron/Calcium	TDS, Cl, F, SO4	pH	Residual Chlorine (Y/N)	
	MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS																	N	N	N	N		
1	FIELD BLANK	WT		4/25	1500				3	X		X							X	X	X		001
2	B-7R	WT		4/26	1035														X	X	X		002
3	B-11R	WT		4/26	1315														X	X	X		003
4	B-11A	WT		4/26	1315														X	X	X		004
5	B11-B	WT		4/26	1215														X	X	X		005
6	B-26	WT		4/25	1565														X	X	X		006
7	B-31R	WT		4/25	1700														X	X	X		007
8	B-31A	WT		4/26	1450														X	X	X		008
9	B-39	WT		4/25	1308														X	X	X		009
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	SCS	4/27/22	1200							
	CS Logistics	4/29/22	0920	pace	4/29/22	0920	2.0	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Matzuk

SIGNATURE of SAMPLER: [signature] DATE Signed: 4/27/22

4024403B

Table 2. Sampling Points and Parameters - CCR Rule Sampling Program Detection Monitoring
Groundwater Monitoring - Nelson Dewey Generating Station / SCS Engineers Project #25221071

	Parameter	B7R	B11R	B11A	B11B	B26	B31R	B31A	B39	Field Blank	TOTAL
Appendix III Parameters	Boron	x	x	x	x	x	x	x	x	x	9
	Calcium	x	x	x	x	x	x	x	x	x	9
	Chloride	x	x	x	x	x	x	x	x	x	9
	Fluoride	x	x	x	x	x	x	x	x	x	9
	pH	x	x	x	x	x	x	x	x	x	9
	Sulfate	x	x	x	x	x	x	x	x	x	9
	TDS	x	x	x	x	x	x	x	x	x	9
Appendix IV Parameters	Antimony										0
	Arsenic										0
	Barium										0
	Beryllium										0
	Cadmium										0
	Chromium										0
	Cobalt										0
	Fluoride										0
	Lead										0
	Lithium										0
	Mercury										0
	Molybdenum										0
	Selenium										0
	Thallium										0
	Radium										0
Field Parameters	Groundwater Elevation	x	x	x	x	x	x	x	x		8
	Well Depth	x	x	x	x	x	x	x	x		8
	pH (field)	x	x	x	x	x	x	x	x		8
	Specific Conductance	x	x	x	x	x	x	x	x		8
	Dissolved Oxygen	x	x	x	x	x	x	x	x		8
	ORP	x	x	x	x	x	x	x	x		8
	Temperature	x	x	x	x	x	x	x	x		8
	Turbidity	x	x	x	x	x	x	x	x		8
	Color	x	x	x	x	x	x	x	x		8
	Odor	x	x	x	x	x	x	x	x		8

Notes:

I:\25221071.00\Data and Calculations\Field Work Requests\[WPL_ND_CCR_Rule_Sampling_Detection Monitorin

Sample Preservation Receipt Form

Client Name: SCS Engineers Project # 402444038

All containers needing preservation have been checked and noted below: ☑Yes ☐No ☐N/A Initial when completed: TP Date/ Time:

Lab Lot# of pH paper: 10038112 Lab Std #ID of preservation (if pH adjusted):

	Glass								Plastic					Vials						Jars				General							
Pace Lab #	AG1U	BG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	VG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN	VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001										2		1																		X		2.5 / 5 / 10
002										2		1																		X		2.5 / 5 / 10
003										2		1																		X		2.5 / 5 / 10
004										2		1																		X		2.5 / 5 / 10
005										2		1																		X		2.5 / 5 / 10
006										2		1																		X		2.5 / 5 / 10
007										2		1																		X		2.5 / 5 / 10
008										2		1																		X		2.5 / 5 / 10
009										2		1																		X		2.5 / 5 / 10
010																																2.5 / 5 / 10
011																																2.5 / 5 / 10
012																																2.5 / 5 / 10
013																																2.5 / 5 / 10
014																					TP 4/20/22											2.5 / 5 / 10
015																																2.5 / 5 / 10
016																																2.5 / 5 / 10
017																																2.5 / 5 / 10
018																																2.5 / 5 / 10
019																																2.5 / 5 / 10
020																																2.5 / 5 / 10

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: _____ Headspace in VOA Vials (>6mm): ☐Yes ☐No ☑N/A ***If yes look in headspace column**

AG1U	1 liter amber glass
BG1U	1 liter clear glass
AG1H	1 liter amber glass HCL
AG4S	125 mL amber glass H2SO4
AG4U	120 mL amber glass unpres
AG5U	100 mL amber glass unpres
AG2S	500 mL amber glass H2SO4
BG3U	250 mL clear glass unpres

BP1U	1 liter plastic unpres
BP3U	250 mL plastic unpres
BP3B	250 mL plastic NaOH
BP3N	250 mL plastic HNO3
BP3S	250 mL plastic H2SO4

VG9A	40 mL clear ascorbic
DG9T	40 mL amber Na Thio
VG9U	40 mL clear vial unpres
VG9H	40 mL clear vial HCL
VG9M	40 mL clear vial MeOH
VG9D	40 mL clear vial DI

JGFU	4 oz amber jar unpres
JG9U	9 oz amber jar unpres
WGFU	4 oz clear jar unpres
WPFU	4 oz plastic jar unpres
SP5T	120 mL plastic Na Thiosulfate
ZPLC	ziploc bag
GN	

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40244038

40244038

Client Name: SCS Engineers

Courier: ☑ CS Logistics ☐ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco
☐ Client ☐ Pace Other: _____

Tracking #: _____

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other _____

Thermometer Used SR - 117 **Type of Ice:** (Wet) Blue Dry None ☑ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 1.5 /Corr: 2.0

Temp Blank Present: ☑ yes ☐ no **Biological Tissue is Frozen:** ☐ yes ☐ no

Person examining contents: Date: 4/28/22 Initials: TP

Labeled By Initials: MH

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No	6.
Rush Turn Around Time Requested:	☐Yes ☑No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD:	☑Yes ☑No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: W	☑Yes ☐No ☐N/A	12.
Trip Blank Present:	☐Yes ☐No ☑N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased): _____		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample login

Appendix D

Historical Monitoring Results

Single Location

Name: WPL - Nelson Dewey

Location ID: B-7R
Number of Sampling Dates: 18

Parameter Name	Units	12/9/2015	4/13/2016	7/18/2016	10/19/2016	1/12/2017	4/17/2017	6/7/2017	8/1/2017	10/19/2017	4/2/2018	10/9/2018	4/22/2019	10/14/2019	4/13/2020	10/13/2020	4/20/2021	10/7/2021	4/26/2022
Boron	ug/L	110	115	164	154	159	129	110	129	159	121	73	93.5	139	96	145	104	--	98.1
Calcium	ug/L	31700	42300	44400	56600	56700	61400	51600	50400	56200	49200	38500	59400	57700	58700	41900	56100	--	59200
Chloride	mg/L	45.2	4.6	7.1	22	19.7	13.1	12.8	8.1	12	10.1	1.9	10.9	11.5	14.3	6.7	9.5	--	12
Fluoride	mg/L	<1	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.1	<0.5	<0.5	<0.1	<0.5	<0.5	<0.48	<0.48	<0.48	--	<0.48
Field pH	Std. Units	6.74	6.8	6.29	6.55	7.43	6.6	6.65	6.28	6.88	6.57	6.23	6.63	6.62	6.6	6.35	6.54	--	6.43
Sulfate	mg/L	17	2.5	2.4	<5	<5	<5	<5	3.7	<5	<5	3.2	<5	<5	7.5	<2.2	<2.2	--	3.7
Total Dissolved Solids	mg/L	198	218	220	288	240	278	240	220	242	220	186	254	208	306	208	248	--	318
Antimony	ug/L	0.28	<0.073	0.25	0.086	0.2	0.18	<0.15	0.33	--	<0.15	--	--	--	--	--	--	--	--
Arsenic	ug/L	5	2	1.8	5.7	6.6	3.5	2.6	2	--	2.6	--	--	--	--	--	--	--	--
Barium	ug/L	77.8	67.8	54.5	78.8	98.4	83.3	65.8	54.2	--	89.3	--	--	--	--	--	--	--	--
Beryllium	ug/L	<0.13	<0.13	<0.13	<0.13	0.16	<0.13	<0.18	<0.18	--	<0.18	--	--	--	--	--	--	--	--
Cadmium	ug/L	0.17	<0.089	<0.089	0.13	0.16	0.11	<0.081	0.23	--	<0.081	--	--	--	--	--	--	--	--
Chromium	ug/L	0.5	<0.39	<0.39	<0.39	0.62	0.41	<1	<1	--	<1	--	--	--	--	--	--	--	--
Cobalt	ug/L	1.3	0.88	0.69	1.8	1.5	1.4	1.1	1.3	--	0.42	--	--	--	--	--	--	--	--
Lead	ug/L	0.21	0.16	0.078	0.14	0.42	0.26	<0.2	0.29	--	<0.2	--	--	--	--	--	--	--	--
Lithium	ug/L	0.45	0.14	0.18	0.23	0.35	0.26	<0.14	0.41	--	0.22	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.1	<0.18	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	--	--	--	--	--	--	--
Molybdenum	ug/L	9.6	1.4	1.4	4.3	3.3	2.1	2.8	1.9	--	0.84	--	--	--	--	--	--	--	--
Selenium	ug/L	0.44	0.24	0.26	0.23	0.47	0.39	<0.32	0.56	--	<0.32	--	--	--	--	--	--	--	--
Thallium	ug/L	0.2	<0.14	<0.14	<0.14	<0.14	0.22	<0.14	0.36	--	<0.14	--	--	--	--	--	--	--	--
Total Radium	pCi/L	0.933	1.18	0.598	0.118	0.828	0.747	0.181	0.967	--	0.339	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.341	0.436	-0.089	-0.243	-0.253	0.345	0.181	0.379	--	0.339	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.592	0.746	0.598	0.118	0.828	0.402	-0.057	0.588	--	-0.032	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	367.8	410.9	422.3	583.4	1054	532	303	411.8	480.9	342.5	336	603.7	576.6	623.8	414.4	535	--	614.1
Oxygen, Dissolved	mg/L	4.88	1.29	0.55	0.37	0.1	0.1	0.22	0.47	0.31	0.3	1.24	0.17	0.11	2.18	1.68	0.19	--	0.82
Field Oxidation Potential	mV	-48.2	-46.1	-26.6	137.3	-122.2	-83.3	-12.6	-3	112.8	-74.1	54.5	-100.9	-132.2	-124	142.1	-23.4	--	-86.1
Groundwater Elevation	feet	606.69	609.32	606.54	608.59	604.94	609.08	610.74	607.02	609.6	604.82	610.76	615.28	613.43	614.12	605.09	608.83	604.05	609.84
Temperature	deg C	13.9	11.7	15.1	16	11.7	10.9	13.5	16.5	16	9.2	16.3	10.5	15.2	8.2	13.7	9.3	--	8.5
Turbidity	NTU	--	4.8	4.3	2.22	2.69	3.53	3.28	1.31	3	4.17	29.56	17.05	4.25	8.2	54.78	0.99	--	3.56
pH at 25 Degrees C	Std. Units	6.3	6.5	6.4	7.1	6.6	6.8	7.7	6.6	6.6	6.8	6.6	6.6	6.9	6.6	6.4	6.6	--	6.6

Single Location

Name: WPL - Nelson Dewey

Location ID: B-11A
Number of Sampling Dates: 18

Parameter Name	Units	12/9/2015	4/13/2016	7/19/2016	10/19/2016	1/12/2017	4/17/2017	6/8/2017	8/1/2017	10/19/2017	4/2/2018	10/9/2018	4/22/2019	10/14/2019	4/13/2020	10/12/2020	4/19/2021	10/7/2021	4/26/2022
Boron	ug/L	124	116	104	112	106	100	102	105	116	91	94.2	93.9	80.7	86.3	99.3	88.1	85.4	88.6
Calcium	ug/L	58800	60100	54000	54600	54500	54800	57800	54500	55000	53300	48600	60400	56600	57500	55600	50600	51400	51600
Chloride	mg/L	40.4	43	46.6	46.5	46.6	45.4	46.9	46.7	49.9	54.7	57.8	83.6	96.6	93.7	65.3	59.1	58.8	58.3
Fluoride	mg/L	0.3	0.38	0.35	0.36	0.43	0.36	0.37	0.37	0.32	0.24	0.29	0.29	0.26	0.27	0.28	0.23	0.22	<0.095
Field pH	Std. Units	7.7	7.75	7.42	7.47	7.89	7.38	7.78	7.67	7.96	8.04	7.43	7.62	7.66	7.75	7.74	7.65	7.57	7.53
Sulfate	mg/L	3.2	3.8	2.7	3	2.3	<1	1.4	2.4	5.1	12.3	6	1.9	<1	1.4	1	2.9	7	8.5
Total Dissolved Solids	mg/L	338	362	336	340	322	326	338	326	322	336	332	386	348	394	364	366	356	350
Antimony	ug/L	0.42	0.14	0.17	0.44	0.22	0.51	<0.15	0.27	--	<0.15	--	--	--	--	--	--	--	--
Arsenic	ug/L	0.27	0.19	0.18	0.51	0.19	0.4	<0.28	<0.28	--	<0.28	--	--	--	--	--	--	--	--
Barium	ug/L	202	206	171	181	187	192	194	184	--	170	--	--	--	--	--	--	--	--
Beryllium	ug/L	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.18	<0.18	--	<0.18	--	--	--	--	--	--	--	--
Cadmium	ug/L	<0.089	<0.089	<0.089	0.26	<0.089	0.24	<0.081	<0.081	--	<0.081	--	--	--	--	--	--	--	--
Chromium	ug/L	<0.39	<0.39	<0.39	<0.39	0.46	0.52	<1	<1	--	<1	--	--	--	--	--	--	--	--
Cobalt	ug/L	1.3	1.4	0.97	1.3	1.2	1.4	1.1	1.3	--	1.1	--	--	--	--	--	--	--	--
Lead	ug/L	0.083	<0.04	<0.04	0.34	<0.04	0.33	<0.2	<0.2	--	<0.2	--	--	--	--	--	--	--	--
Lithium	ug/L	5.9	6.1	5.8	5.9	5.9	5.9	6.1	4.9	--	5.1	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.1	<0.18	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	--	--	--	--	--	--	--
Molybdenum	ug/L	22.7	24.1	22.5	21.8	21.8	22.4	22.2	20	--	18.2	--	--	--	--	--	--	--	--
Selenium	ug/L	<0.21	<0.21	<0.21	0.27	<0.21	0.36	<0.32	<0.32	--	<0.32	--	--	--	--	--	--	--	--
Thallium	ug/L	0.14	<0.14	<0.14	0.5	<0.14	0.46	<0.14	0.15	--	<0.14	--	--	--	--	--	--	--	--
Total Radium	pCi/L	1.08	1.48	0.937	0.95	0.845	1.4	1.88	0.917	--	0.848	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.579	0.148	0.179	0.172	0	0.948	0.454	0.0728	--	0.405	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.503	1.33	0.758	0.778	0.845	0.447	1.43	0.844	--	0.443	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	660	658	598.1	631	1049	583.3	407.9	588.8	519.1	481.9	654	721	708	720	674	638	621	633.7
Oxygen, Dissolved	mg/L	0.49	0.03	0.08	0.37	0.19	0.11	0.23	0.1	0.51	0.12	0.08	0.07	0.14	0.19	0.09	0.21	1.27	0.15
Field Oxidation Potential	mV	9.8	-31.2	84.2	-76.8	-88.3	-103.6	31.4	-44.1	112.1	-42.1	-47.9	218.3	-59	-31	55.1	135.4	61.4	0.3
Groundwater Elevation	feet	606.3	608.71	606.76	608.21	604.36	609.05	609.81	605.57	609.58	606.63	610.28	615.29	613.29	613.88	604.54	608.72	603.79	610
Temperature	deg C	14.8	14.8	14.8	14.9	14.2	14.4	14.3	14.7	14.9	13.9	15	13.8	14.3	13.4	14.2	13.4	13.9	13
Turbidity	NTU	--	0.23	0.01	0.15	0.21	0.51	0.39	0.12	0.78	0.5	3.15	0	2.58	0	0	0	0	0
pH at 25 Degrees C	Std. Units	7.4	7.5	7.5	7.9	7.7	7.7	7.7	7.7	7.6	7.8	7.7	7.7	7.8	7.6	7.7	7.7	8	7.7

Single Location

Name: WPL - Nelson Dewey

Location ID: B-11B
Number of Sampling Dates: 19

Parameter Name	Units	12/9/2015	4/13/2016	7/19/2016	10/20/2016	1/12/2017	4/17/2017	6/8/2017	8/1/2017	10/19/2017	4/2/2018	10/9/2018	11/12/2018	4/22/2019	10/14/2019	4/13/2020	10/12/2020	4/19/2021	10/7/2021	4/26/2022
Boron	ug/L	1140	1360	1210	1460	1540	1760	1880	1800	1500	2020	3620	--	6830	4630	5380	3350	4440	2480	2590
Calcium	ug/L	64100	65400	59000	59100	63900	67400	68200	61400	52400	59000	66300	--	83300	91400	115000	91200	93400	100000	97100
Chloride	mg/L	31.2	32.7	33.6	34.3	36.1	36.3	33.9	35.9	36.1	31.3	21.9	--	28.4	32.3	30.9	33.4	28.3	39.6	36.5
Fluoride	mg/L	0.44	0.49	0.45	0.53	0.52	0.58	0.59	0.6	0.59	0.65	0.61	--	0.64	0.62	<0.95	<0.095	0.36	<0.95	<0.48
Field pH	Std. Units	8.06	8.14	7.77	7.91	8.18	7.83	8.07	7.77	7.77	8.42	7.74	8.05	7.91	7.92	7.89	7.8	8.07	7.81	7.63
Sulfate	mg/L	134	148	165	178	182	181	191	179	175	200	197	--	303	339	378	388	379	466	513
Total Dissolved Solids	mg/L	494	512	520	496	488	502	516	498	510	550	602	594	742	728	872	906	910	884	1000
Antimony	ug/L	0.32	<0.073	0.097	0.21	0.12	0.098	<0.15	<0.15	--	<0.15	--	--	--	--	--	--	--	--	--
Arsenic	ug/L	0.67	0.38	0.36	0.52	0.4	0.47	<0.28	<0.28	--	0.29	--	--	--	--	--	--	--	--	--
Barium	ug/L	147	153	128	130	145	151	151	132	--	128	--	--	--	--	--	--	--	--	--
Beryllium	ug/L	<0.13	<0.13	<0.13	<0.25	<0.13	<0.13	<0.18	<0.18	--	<0.18	--	--	--	--	--	--	--	--	--
Cadmium	ug/L	0.23	<0.089	<0.089	0.18	<0.089	<0.089	<0.081	<0.081	--	<0.081	--	--	--	--	--	--	--	--	--
Chromium	ug/L	0.7	0.74	<0.39	<0.39	<0.39	0.45	<1	<1	--	<1	--	--	--	--	--	--	--	--	--
Cobalt	ug/L	0.44	0.23	0.21	0.38	0.3	0.29	0.26	0.2	--	0.17	--	--	--	--	--	--	--	--	--
Lead	ug/L	0.45	<0.04	<0.04	0.36	0.083	0.061	<0.2	<0.2	--	<0.2	--	--	--	--	--	--	--	--	--
Lithium	ug/L	21.7	21.3	18.4	19.8	20	19.5	19.4	17	--	15.4	--	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.1	<0.18	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	--	--	--	--	--	--	--	--
Molybdenum	ug/L	46.2	51.7	48.7	48.1	52.6	53.8	55.1	55.9	--	77.7	--	--	--	--	--	--	--	--	--
Selenium	ug/L	0.46	<0.21	<0.21	0.28	<0.21	<0.21	<0.32	<0.32	--	<0.32	--	--	--	--	--	--	--	--	--
Thallium	ug/L	0.35	<0.14	<0.14	0.32	<0.14	<0.14	0.16	<0.14	--	0.16	--	--	--	--	--	--	--	--	--
Total Radium	pCi/L	0.862	1.69	0.977	0.534	0.787	0.643	1.05	2.21	--	1.02	--	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.733	0.0581	0.284	-0.487	-0.434	0.193	0.389	0.766	--	0.518	--	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.129	1.63	0.693	0.534	0.787	0.45	0.661	1.44	--	0.505	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	631	808	785	807	1342	799	534.3	776	709	671	954	863	1129	1132	1280	1348	1286	1337	1432
Oxygen, Dissolved	mg/L	0.84	0.04	0.08	0.3	0.16	0.09	0.28	0.13	0.22	0.59	0.13	0.16	0.09	0.19	0.24	0.22	0.13	1.29	0.22
Field Oxidation Potential	mV	-50.9	-66.9	-69	-114.5	-135.7	-121.3	36.2	-81.1	93.7	116.3	13.2	45.8	207.8	-48.9	-57.9	225	44.7	46.9	45.4
Groundwater Elevation	feet	606.26	608.68	606.74	608.19	604.32	608.99	610.08	605.5	609.65	606.55	610.24	609.14	615.28	613.18	613.86	604.44	608.67	603.74	609.98
Temperature	deg C	14.4	14.3	14.6	14.6	14.1	14.2	14.1	14.5	14.8	13.5	14.8	14.1	13.6	14.3	13.5	14.3	13.4	14	13
Turbidity	NTU	--	0.21	0.01	0.33	0.38	0.36	0.7	0.07	1.01	0.78	2.98	2.65	0	1.5	0	0	0	0	0
pH at 25 Degrees C	Std. Units	7.7	7.8	7.8	8	7.9	7.9	8.1	7.9	7.7	8.1	7.9	--	7.9	7.8	7.8	7.9	8	8	7.8

Single Location

Name: WPL - Nelson Dewey

Location ID: B-11R
Number of Sampling Dates: 18

Parameter Name	Units	12/9/2015	4/13/2016	7/19/2016	10/20/2016	1/12/2017	4/17/2017	6/7/2017	8/1/2017	10/19/2017	4/2/2018	10/9/2018	4/22/2019	10/14/2019	4/13/2020	10/12/2020	4/19/2021	10/7/2021	4/26/2022
Boron	ug/L	4170	3410	3530	4120	3530	3520	3420	2040	3120	3180	576	1360	1440	2140	2870	3010	2940	2330
Calcium	ug/L	126000	141000	130000	128000	126000	123000	128000	139000	117000	124000	49900	82400	66000	117000	120000	115000	119000	114000
Chloride	mg/L	39.2	7	38.9	39.1	42.3	40.2	42	24.7	38.8	36.8	5.9	12.6	13.1	22.5	20.7	27.2	23.1	18
Fluoride	mg/L	<1	<0.2	0.22	<0.5	<0.5	<0.5	<0.5	0.25	<0.5	<0.5	0.15	0.2	0.26	<0.48	<0.48	<0.48	<0.48	<0.48
Field pH	Std. Units	7.07	6.78	6.69	6.77	6.98	7.11	6.8	6.7	7.22	7.14	6.55	6.82	6.83	6.8	6.83	7.11	6.86	7.01
Sulfate	mg/L	75.4	18.4	115	118	108	108	98.2	126	97.7	88.1	15.1	34.6	40.7	41.9	22.8	61.2	61.8	58.1
Total Dissolved Solids	mg/L	616	682	698	660	616	620	630	738	586	638	266	406	310	570	600	578	576	560
Antimony	ug/L	<0.073	<0.073	<0.073	0.22	<0.073	<0.073	<0.15	0.42	--	<0.15	--	--	--	--	--	--	--	--
Arsenic	ug/L	14.8	7	10.6	7.4	7.1	6.9	6.1	7.5	--	9.3	--	--	--	--	--	--	--	--
Barium	ug/L	204	169	187	159	144	149	152	168	--	144	--	--	--	--	--	--	--	--
Beryllium	ug/L	<0.13	<0.13	<0.13	0.36	<0.13	<0.13	<0.18	<0.18	--	<0.18	--	--	--	--	--	--	--	--
Cadmium	ug/L	<0.089	<0.089	<0.089	0.15	<0.089	<0.089	<0.081	0.32	--	<0.081	--	--	--	--	--	--	--	--
Chromium	ug/L	<0.39	<0.39	<0.39	<0.39	<0.39	<0.39	<1	<1	--	<1	--	--	--	--	--	--	--	--
Cobalt	ug/L	0.36	0.54	0.68	1	1.2	1.3	1.5	1.4	--	0.94	--	--	--	--	--	--	--	--
Lead	ug/L	0.21	<0.04	0.13	0.19	<0.04	0.12	<0.2	0.39	--	<0.2	--	--	--	--	--	--	--	--
Lithium	ug/L	2.3	1.5	1.6	2	1.4	1.4	1.3	2	--	1.6	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.1	<0.18	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	--	--	--	--	--	--	--
Molybdenum	ug/L	15.1	23.2	34.9	43.8	42.8	57.2	53.8	22.7	--	35.6	--	--	--	--	--	--	--	--
Selenium	ug/L	1.2	5	<0.21	0.3	<0.21	<0.21	<0.32	0.78	--	<0.32	--	--	--	--	--	--	--	--
Thallium	ug/L	<0.14	<0.14	<0.14	0.5	<0.14	<0.14	<0.14	0.47	--	<0.14	--	--	--	--	--	--	--	--
Total Radium	pCi/L	1.45	1.62	0.953	1.51	0.345	1.45	2.1	1.43	--	0.749	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.797	0.863	0.19	0.516	0	0.719	0.272	0.602	--	0.254	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.653	0.757	0.763	0.997	0.345	0.732	1.83	0.826	--	0.495	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	931	1172	1160	1139	1876	1020	721	1192	870	839	463.2	737	612	993	1125	1003	1029	934
Oxygen, Dissolved	mg/L	2.47	0.03	0.08	0.34	0.14	0.11	0.21	0.1	0.19	0.09	0.34	0.37	0.1	0.22	0.14	0.1	1.57	0.07
Field Oxidation Potential	mV	-114.2	-91	-94.7	-113.2	-72.9	-53.3	-26.8	-41.3	133.4	-128.6	-49.5	-20.9	-4.7	-75.8	-139.8	-64.5	-42.6	-41.5
Groundwater Elevation	feet	606.71	609.32	606.14	608.35	604.57	608.34	610.42	606.73	609.42	606.27	610.67	615.28	613.06	614.39	604.57	608.57	603.85	609.75
Temperature	deg C	14.5	10.9	14	15.5	12.7	11.7	11.9	14.4	15.1	11.1	16.2	10	14.5	10.1	14.3	10.6	14.6	10.4
Turbidity	NTU	--	3.18	2.11	1.66	2.51	3.85	1.72	1.04	2.5	3.58	10.05	8.88	7.5	8.97	6.58	8.4	10.81	6.7
pH at 25 Degrees C	Std. Units	6.9	6.8	6.8	7.3	6.9	7.2	7.1	6.9	6.8	7	6.9	6.9	7	6.8	7	7	7.3	6.9

Single Location

Name: WPL - Nelson Dewey

Location ID: B-26
Number of Sampling Dates: 18

Parameter Name	Units	12/9/2015	4/12/2016	7/19/2016	10/20/2016	1/12/2017	4/17/2017	6/7/2017	8/2/2017	10/19/2017	4/3/2018	10/8/2018	4/23/2019	10/15/2019	4/14/2020	10/13/2020	4/21/2021	10/8/2021	4/25/2022
Boron	ug/L	29.6	33.7	28.6	33	35.2	50.1	45.8	54.6	47.4	48	53.4	41.6	<3	66.1	63.6	63.6	48.4	52.5
Calcium	ug/L	81300	86200	82400	82700	89400	89000	105000	98100	102000	88100	78700	75300	<76.2	88500	76500	78700	84900	75900
Chloride	mg/L	45.5	51.3	55.6	52.8	54.5	56	59.6	52.6	79.3	54.4	33.2	40.8	30.5	54.9	35.3	42.6	39.1	45.3
Fluoride	mg/L	<0.2	<0.2	<0.2	0.13	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	<0.095	<0.095	<0.095	<0.48
Field pH	Std. Units	7.35	7.43	7.14	7.19	7.57	7.54	7.22	7.21	7.5	7.64	7.2	7.1	7.24	7.27	7.34	7.27	7.18	7.19
Sulfate	mg/L	37.1	38	36.2	35	35	32.4	31	28.5	25.3	19.1	25.1	26.7	36	30.2	37	35.3	43.8	34.2
Total Dissolved Solids	mg/L	424	456	504	466	446	468	538	496	542	464	450	458	404	464	448	470	440	470
Antimony	ug/L	0.075	<0.073	0.16	0.2	0.24	0.087	<0.15	<0.15	--	<0.15	--	--	--	--	--	--	--	--
Arsenic	ug/L	0.49	0.54	0.49	0.59	0.6	0.5	0.39	0.5	--	0.36	--	--	--	--	--	--	--	--
Barium	ug/L	73.7	81.8	77.8	81.2	89.2	91	107	100	--	91.5	--	--	--	--	--	--	--	--
Beryllium	ug/L	<0.13	<0.13	<0.13	<0.13	0.13	<0.13	<0.18	<0.18	--	<0.18	--	--	--	--	--	--	--	--
Cadmium	ug/L	<0.089	<0.089	<0.089	0.13	0.15	<0.089	<0.081	<0.081	--	0.085	--	--	--	--	--	--	--	--
Chromium	ug/L	0.94	4.1	1.1	0.83	1	1.1	<1	<1	--	<1	--	--	--	--	--	--	--	--
Cobalt	ug/L	0.17	0.13	0.086	0.21	0.25	0.13	<0.085	0.13	--	<0.085	--	--	--	--	--	--	--	--
Lead	ug/L	0.057	<0.04	<0.04	0.15	0.2	0.079	<0.2	<0.2	--	0.3	--	--	--	--	--	--	--	--
Lithium	ug/L	2.1	2.1	1.9	2.2	2.5	2.1	2.2	2	--	2.1	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.1	<0.18	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	--	--	--	--	--	--	--
Molybdenum	ug/L	0.19	0.5	0.15	0.39	0.34	0.2	<0.44	<0.44	--	<0.44	--	--	--	--	--	--	--	--
Selenium	ug/L	0.69	0.67	0.98	1.1	0.99	1.5	1.5	1.4	--	1.4	--	--	--	--	--	--	--	--
Thallium	ug/L	<0.14	<0.14	<0.14	0.27	0.16	<0.14	<0.14	<0.14	--	<0.14	--	--	--	--	--	--	--	--
Total Radium	pCi/L	1.22	0.773	0.416	0.713	0.672	0.867	0.646	0.681	--	0.449	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.404	-0.058	-0.089	0.353	0	0.398	0.124	0.224	--	0.261	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.82	0.773	0.416	0.36	0.672	0.469	0.522	0.457	--	0.188	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	567	783	788	823	1394	800	575.9	836	786	655.2	661.9	815	753	852	782	778	788	826
Oxygen, Dissolved	mg/L	5.88	5.3	4.41	6.25	5.58	7.79	2.92	6.8	8.49	2.68	5.98	8.73	12.17	8.43	7.2	8.74	9.4	10.44
Field Oxidation Potential	mV	14.3	130.2	63.2	68.9	59.1	148.4	53.4	155.9	215.6	69.7	109.2	259.9	175.8	160.4	242.6	105.8	122.1	252.4
Groundwater Elevation	feet	606.8	609.81	606.09	608.84	604.52	608.59	611.25	607.39	608.84	606.49	610.34	615.49	613.1	613.76	604.92	608.55	604.21	610.12
Temperature	deg C	11.1	10.9	10.7	11.3	11.5	11.1	10.9	11.3	11.7	11.3	12	11.4	11.6	11.3	11.9	11	11.4	11
Turbidity	NTU	--	0.27	0.27	0.37	0.14	0.56	0.44	0.15	0.89	0.99	3.44	0	1.5	0	0	0	0	0.3
pH at 25 Degrees C	Std. Units	7.2	7.4	7.2	7.7	7.6	7.5	7.5	7.3	7.4	7.3	7.3	7.4	7.4	7.2	7.4	7.4	7.7	7.4

Single Location

Name: WPL - Nelson Dewey

Location ID: B-31A
Number of Sampling Dates: 18

Parameter Name	Units	12/9/2015	4/13/2016	7/19/2016	10/20/2016	1/12/2017	4/17/2017	6/8/2017	8/1/2017	10/19/2017	4/2/2018	10/9/2018	4/22/2019	10/14/2019	4/13/2020	10/12/2020	4/19/2021	10/7/2021	4/26/2022
Boron	ug/L	59	79.2	67.2	63.7	76.4	69.9	58.5	56.3	63.9	74.8	71.8	86.2	98.5	132	127	172	178	198
Calcium	ug/L	48400	51900	48900	45800	46600	46900	49400	46000	49600	49300	46600	48200	52200	50900	47700	52100	53500	55300
Chloride	mg/L	35.3	35.8	36.4	39	39.9	40.3	40.9	40.8	40.8	42.7	40.2	40.8	47.1	51	57.9	64.8	60.3	56
Fluoride	mg/L	<0.2	0.22	<0.2	0.18	0.22	0.19	0.18	0.2	0.16	0.13	0.17	0.22	0.22	0.19	0.18	0.14	0.15	0.22
Field pH	Std. Units	7.65	7.63	7.25	7.54	7.82	7.83	7.74	7.56	7.92	8	7.48	7.61	7.69	7.71	7.78	7.9	7.44	7.82
Sulfate	mg/L	26.2	22.6	24.2	27.2	29.8	31	31.2	26.6	26.1	27.4	24.8	21.6	22.3	16.6	16.8	15.8	14.9	15.4
Total Dissolved Solids	mg/L	274	302	280	292	284	318	296	284	290	282	278	284	272	298	300	330	294	316
Antimony	ug/L	<0.073	<0.073	0.14	0.084	<0.073	<0.073	<0.15	<0.15	--	<0.15	--	--	--	--	--	--	--	--
Arsenic	ug/L	1.6	1.6	1.4	1.5	1.5	1.3	1.3	1.2	--	1.3	--	--	--	--	--	--	--	--
Barium	ug/L	132	147	130	128	146	146	150	133	--	139	--	--	--	--	--	--	--	--
Beryllium	ug/L	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.18	<0.18	--	<0.18	--	--	--	--	--	--	--	--
Cadmium	ug/L	<0.089	<0.089	<0.089	<0.089	<0.089	<0.089	<0.081	<0.081	--	<0.081	--	--	--	--	--	--	--	--
Chromium	ug/L	<0.39	<0.39	<0.39	<0.39	<0.39	<0.39	9.4	<1	--	<1	--	--	--	--	--	--	--	--
Cobalt	ug/L	2.2	2.3	1.8	1.8	2	1.9	2.2	1.8	--	1.8	--	--	--	--	--	--	--	--
Lead	ug/L	0.08	<0.04	<0.04	0.05	<0.04	0.36	<0.2	<0.2	--	<0.2	--	--	--	--	--	--	--	--
Lithium	ug/L	0.83	0.91	0.77	0.97	0.98	0.97	0.94	0.93	--	0.86	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.1	<0.18	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	--	--	--	--	--	--	--
Molybdenum	ug/L	25.3	29.8	23.4	22.6	23.9	23.8	22.9	22.9	--	24.8	--	--	--	--	--	--	--	--
Selenium	ug/L	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	<0.32	<0.32	--	<0.32	--	--	--	--	--	--	--	--
Thallium	ug/L	<0.14	<0.14	<0.14	0.2	<0.14	<0.14	<0.14	<0.14	--	<0.14	--	--	--	--	--	--	--	--
Total Radium	pCi/L	1.47	0.387	0.492	0.331	0.407	1.18	1.34	1.15	--	0.289	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.484	-0.152	-0.097	0	0	0.482	0.594	0.163	--	0.132	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.985	0.387	0.492	0.331	0.407	0.696	0.746	0.982	--	0.157	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	405	505.8	487.2	509.7	858	486	334.2	479.5	433.5	398.9	503.8	517	514	556	557.3	563	553	556
Oxygen, Dissolved	mg/L	0.88	0.04	0.18	0.34	0.13	0.14	0.25	0.12	0.23	0.14	0.1	0.13	0.12	0.24	0.19	0.18	1.35	0.17
Field Oxidation Potential	mV	-84.7	-106.2	-71.1	-113	-98.4	-55.2	-19.8	-77.3	97.1	-111.6	-75.8	-4.5	-60.5	-68.2	-55.9	79.6	23.5	59.6
Groundwater Elevation	feet	606.39	609.01	606.73	608.2	607.84	608.98	609.63	605.69	609.43	606.46	610.27	615.33	613.2	613.79	604.54	608.63	603.84	609.95
Temperature	deg C	15.1	15.4	15.3	15	14.6	14.8	14.7	14.9	14.9	14.4	15	13.9	14.2	13.6	13.9	13.5	13.5	13.2
Turbidity	NTU	--	0.36	0.63	0.38	0.21	0.37	0.66	0.17	1.25	0.42	2.83	0	2.66	0.75	1.11	0	0	0
pH at 25 Degrees C	Std. Units	7.4	7.3	7.6	7.8	7.3	7.7	7.8	7.6	7.5	7.7	7.7	7.6	7.7	7.7	7.7	7.8	7.9	7.6

Single Location

Name: WPL - Nelson Dewey

Location ID: B-31R
Number of Sampling Dates: 19

Parameter Name	Units	12/9/2015	4/13/2016	7/19/2016	10/20/2016	1/12/2017	4/17/2017	6/8/2017	8/1/2017	10/19/2017	4/2/2018	10/9/2018	11/12/2018	4/22/2019	10/14/2019	4/13/2020	10/12/2020	4/19/2021	10/7/2021	4/25/2022
Boron	ug/L	851	838	641	1020	749	929	895	1550	645	540	1430	--	906	915	730	702	621	353	454
Calcium	ug/L	77400	84900	76100	84200	73900	85600	90700	93400	75700	72900	125000	--	105000	110000	93800	95700	91400	79000	81100
Chloride	mg/L	29.9	17.6	30.3	16.4	26	20.4	20.7	3.6	29	32.6	19.7	--	17.8	26	29.9	24.4	23.3	36.5	36
Fluoride	mg/L	<0.2	<0.2	<0.2	0.17	0.26	0.12	0.13	0.16	0.14	<0.1	<0.1	--	0.16	0.25	0.28	<0.48	0.19	0.22	<0.095
Field pH	Std. Units	6.79	6.76	6.44	6.53	6.8	6.8	6.67	6.56	7.19	6.76	6.41	6.59	6.62	6.72	6.79	6.89	6.91	6.63	6.77
Sulfate	mg/L	28.8	34.1	38.5	49.7	34.9	43	41.1	55.6	19.2	22	186	162	121	146	89.4	49.4	45.3	24.9	60
Total Dissolved Solids	mg/L	374	404	406	452	380	416	426	432	358	374	668	596	516	480	464	462	454	372	428
Antimony	ug/L	0.47	0.15	0.21	0.24	0.18	0.22	<0.15	0.18	--	0.15	--	--	--	--	--	--	--	--	--
Arsenic	ug/L	0.47	0.24	0.37	0.37	0.22	0.29	<0.28	<0.28	--	<0.28	--	--	--	--	--	--	--	--	--
Barium	ug/L	86.2	93.5	85.3	92.6	86.7	91.1	93.9	97.4	--	72.1	--	--	--	--	--	--	--	--	--
Beryllium	ug/L	<0.13	<0.13	<0.13	<0.25	<0.13	<0.13	<0.18	<0.18	--	<0.18	--	--	--	--	--	--	--	--	--
Cadmium	ug/L	2.5	2.5	2	3	2.2	3	2.9	3.1	--	2	--	--	--	--	--	--	--	--	--
Chromium	ug/L	0.43	0.4	<0.39	<0.39	0.41	<0.39	<1	<1	--	<1	--	--	--	--	--	--	--	--	--
Cobalt	ug/L	3	3.5	5.4	5.2	6.6	3.1	2.3	4.4	--	3.3	--	--	--	--	--	--	--	--	--
Lead	ug/L	1.8	0.53	0.14	0.37	0.047	0.57	<0.2	<0.2	--	<0.2	--	--	--	--	--	--	--	--	--
Lithium	ug/L	18.6	18	18.1	22.3	21.4	21.7	21.4	22	--	16.2	--	--	--	--	--	--	--	--	--
Mercury	ug/L	<0.1	<0.18	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	--	<0.13	--	--	--	--	--	--	--	--	--
Molybdenum	ug/L	31.4	27.2	23.9	24.4	27.1	26.8	25.4	21.6	--	31.9	--	--	--	--	--	--	--	--	--
Selenium	ug/L	0.69	0.48	<0.21	0.29	0.63	0.96	<0.32	1.4	--	0.93	--	--	--	--	--	--	--	--	--
Thallium	ug/L	2.2	1.9	2	2.3	2.1	2.2	2.2	2	--	1.8	--	--	--	--	--	--	--	--	--
Total Radium	pCi/L	1.34	1.22	1.16	1.3	1.23	0.613	1.36	1.31	--	0.676	--	--	--	--	--	--	--	--	--
Radium-226	pCi/L	0.575	0.661	0.513	0.583	0.92	0.38	0.534	0.612	--	0.132	--	--	--	--	--	--	--	--	--
Radium-228	pCi/L	0.769	0.559	0.649	0.717	0.31	0.233	0.827	0.698	--	0.544	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	543	674	660	742	1100	637	465.4	697	519.6	476.8	1016	858	827	837	763	826	747	649	728
Oxygen, Dissolved	mg/L	2.36	0.07	0.09	0.33	0.21	0.16	0.21	0.27	0.21	0.45	0.12	0.19	0.1	0.1	0.14	0.22	0.12	1.81	0.38
Field Oxidation Potential	mV	77.6	36.2	-11	5.8	12.3	676	64.7	2.9	153	28	-0.5	1	94.2	20.7	7.3	-60.7	16.3	16.7	-25.3
Groundwater Elevation	feet	607.4	609.34	606.55	608.51	608.37	607.2	610.5	606.84	609.47	604.44	610.39	609.11	615.01	612.5	613.8	604.66	608.66	603.98	610.27
Temperature	deg C	15.8	15	15.1	15.2	14.5	13.8	13.6	14.8	15	13.8	15.9	15	11.8	14.2	12	14	12.1	13.8	11.3
Turbidity	NTU	--	1.01	1.5	0.7	0.72	0.62	0.92	1.18	1.53	1.29	3.94	3.83	0	2.81	0.01	0	11.39	0	3.68
pH at 25 Degrees C	Std. Units	6.7	6.8	6.6	7.1	6.8	6.8	6.8	6.8	6.8	6.8	6.8	--	6.8	7	6.8	7.1	6.9	7.3	6.9

Appendix E

Alternative Source Demonstration Reports

E1 Alternative Source Demonstration, October 2021 Detection Monitoring

Alternative Source Demonstration
October 2021 Detection Monitoring

Slag Pond
Nelson Dewey Generating Station
Cassville, Wisconsin

Prepared for:

Alliant Energy

SCS ENGINEERS

25222071.00 | April 18, 2022

2830 Dairy Drive
Madison, WI 53718-6751
608-224-2830

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PE CERTIFICATION

I, Sherren Clark, hereby certify that that the information in this alternative source demonstration is accurate and meets the requirements of 40 CFR 257.94(e)(2). This certification is based on my review of the groundwater data and related site information available for the Nelson Dewey Generating Station Slag Pond facility. I am a duly licensed Professional Engineer under the laws of the State of Wisconsin.

SL Clark 4-12-2022

(signature) (date)

Sherren Clark

(printed or typed name)

License number E-29863

My license renewal date is July 31, 2022.

Pages or sheets covered by this seal:

Alternative Source Demonstration, October 2021
Detection Monitoring – Slag Pond
Nelson Dewey Generating Station, Cassville
(Entire Document)

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1.0 INTRODUCTION

This Alternative Source Demonstration (ASD) was prepared to support compliance with the groundwater monitoring requirements of the "Coal Combustion Residuals (CCR) Final Rule" published by the U.S. Environmental Protection Agency (U.S. EPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule*, dated April 17, 2015 (U.S. EPA, 2015), and subsequent amendments. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.94(e)(2). The applicable sections of the Rule are provided below in *italics*.

1.1 §257.94(E)(2) ALTERNATIVE SOURCE DEMONSTRATION REQUIREMENTS

The owner and operator may demonstrate that a source other than the CCR Unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels.

An ASD is completed when there are exceedances of one or more benchmarks established within the groundwater monitoring program. The ASD is completed to determine if any other sources are likely causes of the identified exceedance(s) of established benchmark(s) at the site. This ASD was performed in response to results indicating a statistically significant increase (SSI) over background levels during detection monitoring under the CCR Rule.

This ASD report is evaluating the SSIs observed in the statistical evaluation of the October 2021 detection monitoring event at the Nelson Dewey Generating Station (NED). The first ASD was prepared for this facility evaluating the SSIs observed in the statistical evaluation of the October 2017 detection monitoring event (SCS Engineers [SCS], 2018). The October 2017 ASD and subsequent semiannual updates have concluded that several lines of evidence demonstrate that SSIs reported for Appendix III parameters in the downgradient monitoring wells were likely due to man-made sources other than the slag pond CCR Unit and/or naturally occurring constituents in the alluvial aquifer. The conclusions of this ASD are consistent with previous ASDs.

1.2 SITE INFORMATION AND MAP

The NED site is located along the east bank of the Mississippi River, north of the Village of Cassville, in Grant County, Wisconsin (**Figure 1**). The facility includes a decommissioned coal-fired generating plant, a CCR landfill that was closed in 2001, a closed Slag Pond, and a closed wastewater treatment pond. The layout of the site on an aerial photograph base is shown on **Figure 2**. The closed landfill at the NED facility was permitted under Wisconsin Department of Natural Resources (WDNR) License #02525.

The existing CCR Unit evaluated for this ASD is:

- Slag Pond (existing surface impoundment – closed January 2018)

A map showing the CCR Unit and all background (or upgradient) and downgradient monitoring wells with identification numbers for the CCR groundwater monitoring program and the state monitoring program is provided as **Figure 3**.

Operations at the facility began in the late 1950s, and a CCR impoundment that included what is now the Slag Pond closure area was commissioned at that time. The CCR landfill was initially licensed in 1976 and received fly ash from NED until it was closed in phases between 1996 and 2001. The CCR landfill was initially operated as a fly ash sluice basin, then transitioned to dry ash placement prior to closure. The wastewater ponds, now closed, were constructed in 1976 for the purpose of settling CCR from the NED process wastewater streams and sediment from storm water runoff prior to discharge. Both NED generating units were retired on December 31, 2015, and have since been decommissioned. The generating station was demolished in 2017. Closure of the slag pond was completed in January 2018.

1.3 STATISTICALLY SIGNIFICANT INCREASES IDENTIFIED

The statistical evaluation was completed in accordance with 40 CFR 257.93(f)(3) using a prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper prediction limit (UPL). The initial evaluation was based on an interwell comparison. The UPLs were calculated based on a 1-of-2 resampling approach. The UPLs and the analytical results for the October 2021 monitoring event are summarized in the attached **Table 1**.

The initial evaluation indicated that the October 2021 monitoring event results represent an SSI over background for the following parameters and wells:

- Boron: B-11A, B-11B, B-11R, B-31A, B-31R
- Calcium: B-11R
- Field pH: B-11B
- Sulfate: B-11B, B-11R
- Total Dissolved Solids (TDS): B-11B, B-11R

The SSIs are consistent with SSIs identified in previous detection monitoring results. Although the UPLs were calculated based on a 1-of-2 resampling approach, optional retesting for the October 2021 event was not conducted, and the determination of SSIs is based solely on the October results.

1.4 OVERVIEW OF ALTERNATIVE SOURCE DEMONSTRATION APPROACH

This ASD report includes:

- Background information (**Section 2.0**).
- Evaluation of potential that SSIs are due to methodology or analysis (**Section 3.0**).
- Evaluation of potential that SSIs are due to natural sources or man-made sources other than the CCR Units (**Section 4.0**).
- ASD conclusions (**Section 5.0**).
- Monitoring recommendations (**Section 6.0**).

Historical monitoring results from background and compliance sampling for the CCR Rule constituents with SSIs are provided in **Table 2**. The laboratory report for the October 2021 event was included in the 2021 Annual Groundwater Monitoring and Corrective Action report completed in January 2022. Complete laboratory reports for the background monitoring events and previous detection monitoring events were included in the previous annual groundwater monitoring and corrective action reports.

2.0 BACKGROUND

To provide context for the ASD evaluation, the following background information is provided in this section of the report, prior to the ASD evaluation sections:

- Geologic and hydrogeologic setting
- CCR Rule monitoring system
- Other monitoring wells

A more detailed discussion of the background information for the site is provided in the ASD for the October 2017 event (SCS, 2018).

2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

2.1.1 Regional Information

The uppermost geologic formation beneath the NED site is the surficial alluvial aquifer. The alluvial aquifer consists of Mississippi River valley sand and gravel deposits, and is the uppermost aquifer as defined in section 257.53 of the CCR Rule. This deposit is prevalent along the edges of the entire Mississippi River valley in southwestern Wisconsin.

The alluvial aquifer is underlain by dolomitic bedrock of the Prairie du Chien Group. The dolomite bedrock is also an aquifer and is likely hydraulically connected to the alluvial aquifer above.

Regionally, groundwater flow is generally to the southwest and discharges to the Mississippi River.

Additional details on the regional geology were provided in the October 2017 ASD (SCS, 2018).

2.1.2 Site Information

The thickness of the alluvium in the immediate vicinity of the site is over 125 feet, as evidenced by local water supply well logs (SCS, 2018). These logs are also evidence that the alluvial aquifer yields useable quantities of groundwater for supply wells in the area. Soil boring logs for monitoring wells installed at the site also generally indicate sand and gravel soils within the monitored depths.

The groundwater flow direction in the vicinity of the plant is generally southwest toward the Mississippi River. Historically, infiltration at the former Slag Pond, former fly ash basin, and the former Wisconsin Pollutant Discharge Elimination System (WPDES) ponds caused groundwater mounding to be present around these features; however, these ponds have now all been closed and are no longer sources of infiltration.

Site water level measurements generally indicate that groundwater flow is to the southwest, discharging to the Mississippi River. However, during periods of high river water levels, the flow temporarily reverses and the river discharges to the shallow sand and gravel aquifer. The groundwater flow direction during the October 2021 detection monitoring event was toward the Mississippi River with flow generally moving south to southeast (**Figure 4**). The groundwater elevations are provided in **Table 3**.

2.2 COAL COMBUSTION RESIDUALS RULE MONITORING SYSTEM

The groundwater monitoring system established in accordance with the CCR Rule consists of one upgradient (background) monitoring well and six downgradient monitoring wells. The background well is B-26. The downgradient wells include B-7R, B-11A, B-11B, B-11R, B-31A, and B-31R. The CCR Rule wells are installed within the surficial alluvium aquifer. Well depths range from approximately 23 to 114 feet, measured from the top of the well casing.

2.3 OTHER MONITORING WELLS

There are several additional groundwater monitoring wells at the NED facility that are part of the monitoring system developed for the state monitoring program. All of the wells included in the CCR monitoring well network were already in use for the state monitoring program. The well locations are shown on Figure 3. The state program monitoring wells and two private wells are used to monitor groundwater conditions at the site under WDNR License Number 2525, which includes the closed CCR landfill and the closed Slag Pond. Monitoring wells for the state monitoring program are installed in the surficial sand and gravel aquifer, which is the uppermost aquifer as defined under 40 CFR 257.53.

3.0 METHODOLOGY AND ANALYSIS REVIEW

To evaluate the potential that an SSI is due to a source other than the regulated CCR Unit, SCS used a two-step evaluation process. First, the sample collection, field and laboratory analysis, and statistical evaluation were reviewed to identify any potential error or analysis that led to an exceedance of the benchmark. Second, potential alternative sources, including natural variation and man-made sources other than the CCR Unit, were evaluated. This section of the report provides the findings of the methodology and analysis review. Section 4.0 of the report addresses the potential alternative sources.

3.1 SAMPLING AND FIELD ANALYSIS REVIEW

Field notes and sampling results were reviewed to determine if any sampling error may have caused or contributed to the observed SSIs. Potential field sampling errors or issues could include mislabeling of samples, improper sample handling, missed holding times, cross contamination during sampling, or other field error. Field blank sample results were also reviewed for any indication of potential contamination from sampling equipment or containers. Based on the review of the field notes and results, SCS did not identify any indication that the SSIs were due to a sampling error.

SCS did not identify any issues with the field sampling for field analysis based on review of the data and field notes. Because boron, calcium, total dissolved solids (TDS), and sulfate are laboratory parameters, there is little potential for a field analysis error to contribute to an SSI.

Historically, an SSI for boron at B-7R has been identified. During the semiannual sampling event on October 7, 2021, there was not a sufficient amount of water present at this well to conduct sampling. A resampling of this well was attempted on October 28, 2021, but there was still not a sufficient amount of water at this well on this date.

3.2 LABORATORY ANALYSIS REVIEW

The laboratory reports for the October 2021 detection monitoring events were reviewed to evaluate whether any laboratory analysis error or issue may have caused or contributed to the observed SSIs. The laboratory report review included reviewing the laboratory quality control flags and narrative, verifying that correct methods were used and desired detection limits were achieved, and checking

the field and laboratory blank sample results. Laboratory reports for the background monitoring events were reviewed for the October 2017 ASD. Laboratory reports for subsequent detection monitoring events were reviewed as part of the ASD preparation for each event.

Based on the review of the laboratory reports, SCS did not identify any indication that any SSI was due to a laboratory analysis error. There were no laboratory quality control flags or issues identified in the laboratory reports that affect the usability of the data for detection monitoring. Chloride was detected in the field blank at a low concentration below the laboratory's limit of quantitation. The detected level was much lower than levels reported for the monitoring well samples; therefore, the usability of the groundwater data is not affected by the field blank detection.

Time series plots of the SSI constituent analytical data were also reviewed for any anomalous results that might indicate a possible sampling or laboratory error (e.g., dilution error or incorrect sample labeling). The time series plots are provided in **Appendix A**. None of the time series plots included anomalous results that appeared to indicate a sampling or laboratory error. At B-11B, an increased sulfate trend is observed which begin in April 2018. For more details on sulfate concentrations and the man-made sources other than the slag pond CCR unit, see **Section 4**.

3.3 STATISTICAL EVALUATION REVIEW

The review of the statistical results and methods included a quality control check of the following:

- Input analytical data vs. laboratory analytical reports
- Statistical method and process for each SSI

Based on the review of the statistical evaluation, SCS did not identify any errors or issues in the statistical evaluation that caused or contributed to the determination of interwell SSIs for boron, calcium, field pH, sulfate, and TDS at the downgradient monitoring wells.

3.4 SUMMARY OF METHODOLOGY AND ANALYSIS REVIEW FINDINGS

In summary, there were no changes to the SSI determinations for the October 2021 detection monitoring events based on the methodology and analysis review. No errors or issues causing or contributing to the reported SSIs were identified.

4.0 ALTERNATIVE SOURCES

This section of the report discusses the potential alternative sources for the SSI constituents at the downgradient wells, identifies the most likely alternative source(s), and presents the lines of evidence indicating that an alternative source is the most likely cause of the observed SSIs.

4.1 POTENTIAL CAUSES OF STATISTICALLY SIGNIFICANT INCREASES

4.1.1 Natural Variation

The statistical analysis was completed using an interwell approach, comparing the October 2021 detection monitoring results to the UPLs calculated based on sampling of the background well (B-26). If concentrations of a constituent that is naturally present in the aquifer vary spatially, then the potential exists that the downgradient concentrations may be higher than upgradient concentrations due to natural variation.

Although natural variation is present in the shallow aquifer, it does not appear likely that natural variation is the primary source causing the boron, field pH, sulfate, and TDS SSIs. These parameters were detected at higher concentrations than would likely be present naturally.

Natural variation may have caused or contributed to the SSI for calcium at B-11R. As discussed in Section 2.1.1, the alluvial aquifer is underlain by dolomitic bedrock of the Prairie du Chien Group. The dolomite aquifer is also present in the bluffs northeast of the site and groundwater from the dolomite likely discharges to the alluvial aquifer. Calcium is a typical constituent of groundwater in dolomite aquifers. The calcium concentrations in upgradient well B-26 have exceeded those in at least three of the downgradient wells, suggesting that natural variability may contribute to the calcium concentrations observed in the downgradient monitoring wells.

4.1.2 Man-Made Alternative Sources

Man-made alternative sources that could potentially contribute to the boron, calcium, field pH, sulfate, and TDS SSIs could include the closed CCR landfill, the coal storage area, or other plant operations. Based on the groundwater flow directions and on previous investigations at the site, the closed landfill appears to be the most likely man-made cause of the SSIs for the downgradient wells B-11A, B-11B, B-11R, B-31A, and B-31R.

4.2 LINES OF EVIDENCE

The lines of evidence indicating that the SSIs for boron, calcium, field pH, sulfate, and TDS in one or more compliance wells relative to the background well are more likely due to the closed landfill and prior fly ash sluicing than to the Slag Pond include:

1. A previous Environmental Contamination Assessment completed for the ash disposal facility indicated that the fly ash sluicing and landfill were the primary source of the groundwater impacts in the area, based on multiple lines of evidence.

2. Sampling performed in preparation for the Slag Pond closure indicated that the slag and the Slag Pond sediment had little potential to cause the SSIs for boron, sulfate, and TDS.

3. Past and current groundwater monitoring performed under the state monitoring program shows that groundwater quality has improved since the 1990s in response to termination of fly ash sluicing and closure, and capping of the ash landfill. Recent concentration increases at some wells in the state monitoring program appear to be attributable to the closed CCR landfill source and to changes in groundwater flow at the site in response to closure of the Slag Pond.

The data supporting these lines of evidence are discussed below. Most of these lines of evidence and the supporting data were discussed in detail in the ASD for the October 2017 detection monitoring event (SCS, 2018), with the exception of the TDS SSI concentrations. For lines of evidence included in previous ASDs, the discussion focuses on any updated information collected since the previous ASD, with references to the previous ASD for additional details.

4.2.1 Previous CCR Pond and Landfill Study

A previous investigation titled *Environmental Contamination Assessment: Nelson Dewey Generating Station Ash Disposal Facility*, completed by RMT in 1994, found that groundwater impacts were associated with disposal of fly ash in the now-closed CCR landfill located immediately north of the Slag Pond (Figure 3). The purpose of the 1994 Environmental Contamination Assessment (ECA) was to investigate the impacts to groundwater at the NED landfill. The ECA was used to evaluate

feasibility of possible remedial alternatives. The remedial alternative that was ultimately selected was to convert the plant to dry fly ash handling.

The primary lines of evidence from the 1994 report that support the current ASD for boron, field pH, sulfate, and TDS include:

- Water leaching tests for ash and slag indicated that boron and sulfate concentrations in the slag leachate were orders of magnitude lower than in the fly ash leachate (**Appendix B**, **Table 5**). Higher pH values were also reported for leach samples of Western coal fly ash in 1990 to 1992 than for the slag samples.

- Surface water samples from the then active fly ash sluice pond and the Slag Pond indicated that boron and sulfate concentrations in the Slag Pond were one or more orders of magnitude lower than in the ash sluice pond. The surface water pH measurement was also higher in the ash sluice pond. The surface water boron and sulfate concentrations in the Slag Pond were higher than leach test results, which was attributed to infiltration of ash sluice pond water through the berm between the ponds into the Slag Pond (**Appendix B**, **Table 6**).

- Groundwater sampling at monitoring wells B-38 and B-38A (now abandoned), which were installed through and screened below the ash disposal area (now closed landfill), indicated that groundwater affected by ash sluicing was characterized by high pH and elevated concentrations of boron, sulfate, and TDS (**Appendix B**, **Site Map** and **Table 8**).

Although calcium was not included in the historical state groundwater monitoring program or evaluated in the 1994 report, hardness was monitored and provides an indication of relative calcium concentrations. Surface water samples from the then active ash sluice pond and the Slag Pond indicated that hardness in the Slag Pond was lower than in the ash sluice pond (**Appendix B**, **Table 6**). These results suggest that if the calcium SSI is not solely due to natural variation, then the closed CCR landfill is the most likely man-made source of calcium.

The results of the 1994 ECA were reported to WDNR on November 1994. The ECA investigation was then used for a feasibility study to determine appropriate ash disposal operation on site. Following the ECA, the plant converted to a dry ash handling system. Dry ash was placed in the CCR landfill through the 1990s, and the landfill was capped and closed in phases in 1996 through 2001. After that time, fly ash was not disposed of at the facility.

4.2.2 Slag Pond Closure Sampling Results

Results of leaching test analysis performed for slag, ash, soil, and sediment were submitted as part of a Low Hazard Exemption Request to the WDNR in March 2017 (SCS, 2017). The Exemption Request was submitted as part of the Closure Plan for the site and requested WDNR approval to consolidate materials from decommissioning activities in the Slag Pond and Slag Handling Area, which would then be capped with a composite final cover system. The sediment and soil samples were collected to characterize the materials that would remain on site under the Closure Plan. Leaching tests were performed using ASTM water leach test methods. The leaching test analytical results for parameters with SSIs that were included in the leaching test program (boron, sulfate, and TDS) are summarized in **Appendix C**.

The sampling results in the Exemption Request indicated that the materials to be consolidated and capped were not likely to cause groundwater standard exceedances for boron, sulfate, or TDS. The

leach test results for slag, Slag Pond sediment, and soil in the Slag Handling Area were below the state groundwater standards for boron, and sulfate. The parameter TDS does not currently have a state standard but the leach test results for slag, Slag Pond sediment, and soil in the Slag Handling Area were all below the calculated TDS UPL for the site (**Table 1** and **Appendix C**). The boron, sulfate, and TDS results were also below the concentrations of in the downgradient CCR wells with SSIs, and well below the historical results for former well B-38, which was located within the CCR landfill area, upgradient from the Slag Pond (**Appendix B**, **Table 8**).

The Low Hazard Exemption was granted by the WDNR based on the sampling results and other information presented.

4.2.3 State Program Groundwater Monitoring Results

Past and current groundwater monitoring performed under the state monitoring program shows that groundwater quality has improved substantially since the 1990s in response to termination of fly ash sluicing, and closure and capping of the ash landfill (SCS, 2018). The long-term trends show that concentrations of boron and sulfate in groundwater have decreased or stabilized since termination of fly ash sluicing and closure of the landfill, in some cases by an order of magnitude or more. The results suggest that current pH levels and boron, sulfate, and TDS concentrations likely represent residual contamination from historical ash disposal in the CCR landfill area. Increases in boron and sulfate concentrations at B-11B beginning in 2018 appear to be attributable to the closed CCR landfill and to changes in groundwater flow at the site, related to a decrease in the volume of water discharged to the Slag Pond and subsequent closure of the Slag Pond. Concentrations of boron in samples from B-11B transitioned to a decreasing trend as of October 2019. A summary of state analytical groundwater results is provided in **Table 4**.

5.0 ALTERNATIVE SOURCE DEMONSTRATION CONCLUSIONS

The lines of evidence discussed above regarding the SSIs reported for boron, calcium, field pH, sulfate, and TDS results in downgradient monitoring wells demonstrate that the SSIs are likely primarily due to sources other than the closed Slag Pond. The SSIs for boron, calcium, field pH, sulfate, and TDS appear to be due to historical ash disposal in the closed CCR landfill, which is not subject to the requirements of 40 CFR 257.50-107. The landfill is regulated by the WDNR under the solid waste program (License 02525). Natural variation in groundwater quality in the aquifer may also contribute to the SSI for calcium.

6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS

In accordance with section 257.94(e)(2) of the CCR Rule, the NED Slag Pond site may continue with detection monitoring based on this ASD. The ASD report will be included in the 2021 Annual Report due January 31, 2022.

7.0 REFERENCES

RMT, 1994, Environmental Contamination Assessment: Nelson Dewey Generating Station Ash Disposal Facility, November 1994.

SCS Engineers, 2017, Low Hazard Exemption Request, Nelson Dewey Generating Station, Cassville, WI, March 2017.

SCS Engineers, 2018, 2017 Alternative Source Demonstration, October 2017 Monitoring Event, Nelson Dewey Generating Station, April 2018.

U.S. Environmental Protection Agency (U.S. EPA), 2015, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, April 2015.

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Tables

Table 1. Groundwater Analytical Results Summary
Nelson Dewey Slag Pond, Cassville, WI / SCS Engineers Project #25221071.00

		Background Well	Compliance Wells					
Parameter Name	**UPL**	**B-26**	**B-7R***	**B-11A**	**B-11B**	**B-11R**	**B-31A**	**B-31R**
		10/8/2021	10/7/2021	10/7/2021	10/7/2021	10/7/2021	10/7/2021	10/7/2021
Appendix III								
Boron, ug/L	72.3	48.4	--	85.4	2,480	2,940	178	353
Calcium, ug/L	108,000	84,900	--	51,400	100,000	119,000	53,500	79,000
Chloride, mg/L	77.6	39.1	--	58.8	39.6	23.1	60.3	36.5
Fluoride, mg/L	0.2	<0.095	--	0.22 J	<0.95 D3	<0.48 D3	0.15 J	0.22 J
Field pH, Std. Units	7.71	7.18	--	7.57	7.81	6.86	7.44	6.63
Sulfate, mg/L	44.0	43.8	--	7.0	466	61.8	14.9	24.9
Total Dissolved Solids, mg/L	553	440	--	356	884	576	294	372

7.81 Blue shaded cell indicates the compliance well result exceeds the UPL (background) and the Limit of Quantitation (LOQ).

Abbreviations:
UPL = Upper Prediction Limit
SSI = Statistically Significant Increase
-- = Not Analyzed
LOQ = Limit of Quantitation
LOD = Limit of Detection
ug/L = micrograms per liter
mg/L = milligrams per liter

Lab Notes:
J = Estimated concentration at or above the LOD and below the LOQ.
D3 = Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

Notes:
1. An individual result above the UPL may not constitute an SSI above background. See the accompanying letter text for identification of statistically significant results.
2. Interwell UPLs calculated based on results from background well B-26. UPLs are based on a 1-of-2 retesting approach.
3. Interwell UPLs updated January 2021 based on background well results from December 2015 through October 2020.
*: Sufficient water for sample collection was not present in B-7R on October 7, 2021 or during a second sampling attempt on October 28, 2021.

Created by:	NDK	Date:	10/25/2021
Last revision by:	JSN	Date:	10/26/2021
Checked by:	NDK	Date:	10/27/2021
Proj Mgr QA/QC/Scientist:	TK	Date:	12/27/2021

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Table 2. Historical Analytical Results for Parameters with SSIs
Nelson Dewey Generating Station - Cassville, Wisconsin / SCS Engineers Project #25221071.00

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (mg/L)	Field pH (Std. Units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
Background	B-26	12/9/2015	29.6	81,300	7.35	37.1	424
		4/12/2016	33.7	86,200	7.43	38.0	456
		7/19/2016	28.6	82,400	7.14	36.2	504
		10/20/2016	33.0	82,700	7.19	35.0	466
		1/12/2017	35.2	89,400	7.57	35.0	446
		4/17/2017	50.1	89,000	7.54	32.4	468
		6/7/2017	45.8	105,000	7.22	31.0	538
		8/2/2017	54.6	98,100	7.21	28.5	496
		10/19/2017	47.4	102,000	7.50	25.3	542
		4/2/2018	48.0	88,100	7.64	19.1	464
		10/8/2018	53.4	78,700	7.20	25.1	450
		4/22/2019	41.6	75,300	7.10	26.7	458
		10/15/2019	<3.00 U	<76.2	7.24	36.0	404
		4/14/2020	66.1	88,500	7.27	30.2	464
		10/13/2020	63.6	76,500	7.34	37.0	448
		4/21/2021	63.6	78,700	7.27	35.3	470
		10/8/2021	48.4	84,900	7.18	43.8	440
Compliance	B-11A	12/9/2015	124	58,800	7.70	3.20 J	338
		4/13/2016	116	60,100	7.75	3.80 J	362
		7/19/2016	104	54,000	7.42	2.70 J	336
		10/19/2016	112	54,600	7.47	3.00 J	340
		1/12/2017	106	54,500	7.89	2.30 J	322
		4/17/2017	100	54,800	7.38	<1.00	326
		6/8/2017	102	57,800	7.78	1.40 J	338
		8/1/2017	105	54,500	7.67	2.40 J	326
		10/19/2017	116	55,000	7.96	5.10	322
		4/2/2018	91.0	53,300	8.04	12.3 M0	336
		10/9/2018	94.2	48,600	7.43	6.00	332
		4/22/2019	93.9	60,400	7.62	1.90 J	386
		10/14/2019	80.7	56,600	7.66	<1.00	348
		4/13/2020	86.3	57,500	7.75	1.40 J	394
		10/12/2020	99.3	55,600	7.74	1.00 J	364
		4/19/2021	88.1	50,600	7.65	2.9	366
		10/8/2021	85.4	51,400	7.57	7.0	356
	B-11B	12/9/2015	1,140	64,100	8.06	134	494
		4/13/2016	1,360	65,400	8.14	148	512
		7/19/2016	1,210	59,000	7.77	165	520
		10/20/2016	1,460	59,100	7.91	178	496
		1/12/2017	1,540	63,900	8.18	182	488
		4/17/2017	1,760	67,400	7.83	181	502
		6/8/2017	1,880	68,200	8.07	191	516
		8/1/2017	1,800	61,400	7.77	179	498
		10/19/2017	1,500	52,400	7.77	175	510
		4/2/2018	2,020	59,000	8.42	200	550
		10/9/2018	3,620	66,300	7.74	197	602
		11/12/2018	--	--	8.05	--	594
		4/22/2019	6,830	83,300	7.91	303	742
		10/14/2019	4,630	91,400	7.92	339	728
		4/13/2020	5,380	115,000	7.89	378	872
		10/12/2020	3,350	91,200	7.80	388	906
		4/19/2021	4,440	93,400	8.07	379 M0	910
		10/8/2021	2,480	100,000	7.81	466	884
	B-11R	12/9/2015	4,170	126,000	7.07	75.4	616
		4/13/2016	3,410	141,000	6.78	18.4	682
		7/19/2016	3,530	130,000	6.69	115	698
		10/20/2016	4,120	128,000	6.77	118	660
		1/12/2017	3,530	126,000	6.98	108	616
		4/17/2017	3,520	123,000	7.11	108	620
		6/7/2017	3,420	128,000	6.80	98.2	630
		8/1/2017	2,040	139,000	6.70	126	738
		10/19/2017	3,120	117,000	7.22	97.7	586
		4/2/2018	3,180	124,000	7.14	88.1	638
		10/9/2018	576	49,900	6.55	15.1	266
		4/22/2019	1,360	82,400	6.82	34.6	406
		10/14/2019	1,440	66,000	6.83	40.7	310
		4/13/2020	2,140	117,000	6.80	41.9	570
		10/12/2020	2,870	120,000	6.83	22.8	600
		4/19/2021	3,010	115,000	7.11	61.2	578
		10/8/2021	2,940	119,000	6.86	61.8	576

Table 2. Historical Analytical Results for Parameters with SSIs
Nelson Dewey Generating Station - Cassville, Wisconsin / SCS Engineers Project #25221071.00

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (mg/L)	Field pH (Std. Units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
Compliance	B-31A	12/9/2015	59.0	48,400	7.65	26.2	274
		4/13/2016	79.2	51,900	7.63	22.6	302
		7/19/2016	67.2	48,900	7.25	24.2	280
		10/20/2016	63.7	45,800	7.54	27.2	292
		1/12/2017	76.4	46,600	7.82	29.8	284
		4/17/2017	69.9	46,900	7.83	31.0	318
		6/8/2017	58.5	49,400	7.74	31.2	296
		8/1/2017	56.3	46,000	7.56	26.6	284
		10/19/2017	63.9	49,600	7.92	26.1	290
		4/2/2018	74.8	49,300	8.00	27.4	282
		10/9/2018	71.8	46,600	7.48	24.8	278
		4/22/2019	86.2	48,200	7.61	21.6	284
		10/14/2019	98.5	52,200	7.69	22.3	272
		4/13/2020	132	50,900	7.71	16.6	298
		10/13/2020	127	47,700	7.78	16.8	300
		4/19/2021	172	52,100	7.90	15.8	330
		10/8/2021	178	53,500	7.44	14.9	294
	B-31R	12/9/2015	851	77,400	6.79	28.8	374
		4/13/2016	838	84,900	6.76	34.1	404
		7/19/2016	641	76,100	6.44	38.5	406
		10/20/2016	1,020	84,200	6.53	49.7	452
		1/12/2017	749	73,900	6.80	34.9	380
		4/17/2017	929	85,600	6.80	43.0	416
		6/8/2017	895	90,700	6.67	41.1	426
		8/1/2017	1,550	93,400	6.56	55.6	432
		10/19/2017	645	75,700	7.19	19.2	358
		4/2/2018	540	72,900	6.76	22.0	374
		10/9/2018	1,430	125,000	6.41	186	668
		11/12/2018	--	--	6.59	162	596
		4/22/2019	906	105,000	6.62	121	516
		10/14/2019	915	110,000	6.72	146	480
		4/13/2020	730	93,800	6.79	89.4	464
		10/12/2020	702	95,700	6.89	49.4	462
		4/19/2021	621	91,400	6.91	45.3	454
		10/8/2021	353	79,000	6.63	24.9	372
	B-7R	12/9/2015	110	31,700	6.74	17.0 J	198
		4/13/2016	115	42,300	6.80	2.50 J	218
		7/18/2016	164	44,400	6.29	2.40 J	220
		10/19/2016	154	56,600	6.55	<5.00	288
		1/12/2017	159	56,700	7.43	<5.00	240
		4/17/2017	129	61,400	6.60	<5.00	278
		6/7/2017	110	51,600	6.65	<5.00	240
		8/1/2017	129	50,400	6.28	3.70	220
		10/19/2017	159	56,200	6.88	<5.00 , D3	242
		4/2/2018	121	49,200	6.57	<5.00 , D3	220
		10/9/2018	73.0	38,500	6.23	3.20	186
		4/22/2019	93.5	59,400	6.63	<5.00 , D3	254
		10/14/2019	139	57,700	6.62	<5.00 , D3	208
		4/13/2020	96.0	58,700	6.60	7.50 J, D3	306
		10/13/2020	145	41,900	6.35	<2.20	208
		4/20/2021	104	56,100	6.54	<2.2 D3	248
		10/8/2021 (1)	--	--	--	--	--

Abbreviations:
µg/L = micrograms per liter or parts per billion (ppb)
mg/L = milligrams per liter or parts per million (ppm)
Std. Units = Standard Units

Flags:
J = Estimated concentration at or above the LOD and below the LOQ.
D3 = Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
M0 = Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
-- = Not applicable.

Notes:
(1) B-7R could not be sampled on 10/8/2021 or during an attempted resampling event on 10/28/2021 due to low water levels.

Created by:	NDK	Date:	3/8/2018
Last revision by:	RM	Date:	2/8/2022
Checked by:	JR	Date:	3/18/2022

I:\25221071.00\Deliverables\2021 October ASD NED\Tables\[Table 2_Analytical Results - App III.xlsx]2. Analytical Results

Table 3. Groundwater Elevation Summary
Nelson Dewey Closed Ash Disposal Facility / SCS Engineers Project #25221071.00

Groundwater Elevation in feet above mean sea level (amsl)																								
Well Number	**B-7R**	**B-8R**	**B-11R**	**B-11A**	**B-11B**	**B-21R**	**B-26**	**B-26A**	**B-28**	**B-30R**	**B-30AR**	**B-31R**	**B-31A**	**B-32**	**B-32A**	**B-35**	**B-35A**	**B-36**	**B-36A**	**B-37**	**B-37A**	**B-39**	**MW-301**	**MW-302**	**MW-303**
Top of Casing Elevation (feet amsl)	623.35	627.51	622.62	622.12	621.89	623.31	626.40	626.40	616.81	621.81	622.4	622.42	622.69	614.18	614.4	620.78	621.09	621.11	621.33	614.85	614.85	626.48	619.09	619.21	618.49
Screen Length (ft)	10	10	10	5	5	10	10	5	10	10	5	10	5	10	5	10	5			10	5	10	10	10	10
Total Depth (ft from top of casing)	23.05	27.25	24.15	52.00	113.90	22.78	31.67	45.78	16.70	22.20	46.90	22.82	35.52	14.79	52.00	16.60	47.00			19.95	48.20	26.90	21.11	21.27	20.15
Top of Well Screen Elevation (ft)	610.30	610.26	608.47	575.12	512.99	610.53	604.73	585.62	610.11	609.61	580.50	609.60	592.17	609.39	567.40	614.18	579.20			604.90	571.65	609.58	607.98	607.94	608.34
Measurement Date																		--	--				--	--	--
October 5-6, 2011	604.94	606.29	604.57	604.36	604.32	604.43	604.52	604.55	604.61	604.37	605.21	608.37	604.42	604.88	604.82	604.87	604.81	--	--	604.37	604.39		--	--	--
April 25-26, 2012	606.58	606.30	606.07	606.30	606.28	--	605.89	605.91	--	--	--	608.65	606.31	604.33	--	606.29	621.20	--	--	606.16	606.17	606.17	--	--	--
October 17, 2012	604.39	604.16	604.10	603.98	603.98	604.08	604.12	604.14	604.31	603.97	603.98	607.32	604.07	604.33	604.35	--	621.20	--	--	603.93	603.93	603.93	--	--	--
April 2, 2013	607.04	608.01	606.15	607.20	607.17	606.30	605.60	605.64	605.90	605.91	605.93	607.13	607.13	606.11	606.14	606.13	606.25	--	--	606.99	607.02		--	--	--
October 16-17, 2013	604.51	605.89	604.17	603.90	603.87	604.11	604.31	604.32	604.36	604.08	604.06	604.87	604.00	604.53	604.56	604.46	604.44	--	--	604.05	604.04		--	--	--
April 10, 2014	607.42	608.97	607.45	607.28	607.26	--	607.22	607.23	--	--	--	607.37	607.28	--	--	607.46	607.39	--	--	607.25	607.26		--	--	--
October 14-15, 2014	605.67	606.82	605.17	604.90	604.91	614.92	605.00	605.01	605.13	604.92	604.92	606.36	605.54	605.41	605.45	605.36	605.33	--	--	604.94	604.99		--	--	--
April 16, 2015	607.26	608.50	607.11	607.15	607.05	--	606.40	606.41	--	--	--	607.37	607.09	--	--	606.73	606.78	--	--	606.99	606.88		--	--	--
October 1-2, 2015	605.14	604.66	604.53	604.42	604.38	604.36	604.43	604.50	604.54	604.34	604.32	605.13	604.38	604.76	604.82	604.76	604.75	--	--	604.30	604.39		--	--	--
December 8, 2015	606.69	--	606.71	606.30	606.26	--	606.80	--	--	--	--	607.40	606.39	--	--	--	--	--	--	--	--	607.54	--	--	--
April 12, 2016	609.32	609.36	609.32	608.71	608.68	--	609.81	609.72	--	--	--	609.34	609.01	--	--	609.73	609.65	--	--	608.79	608.79	610.23	--	--	--
July 18-19, 2016	606.54	--	606.14	606.76	606.74	--	606.09	--	--	--	--	606.55	606.73	--	--	--	--	--	--	--	--	606.28	--	--	--
October 19-20, 2016	608.59	608.46	608.35	608.21	608.19	608.37	608.84	608.76	608.63	608.45	608.46	608.51	608.20	608.69	608.73	608.78	608.74	--	--	608.20	608.18	609.09	--	--	--
January 11-12, 2017	608.02		607.96	607.83	607.78		608.56					607.90	607.84					--	--			608.92	--	--	--
April 17, 2017	609.08	608.82	608.34	609.05	608.99	NM	608.59	608.54	609.94	608.57	608.64	607.20	608.98	608.96	608.98	609.00	609.02	--	--	609.02	609.02	610.23	--	--	--
June 8, 2017	610.74	--	610.42	609.81	610.08	--	611.25	--	--	--	--	609.63	610.50	--	--	--	--	--	--	--	--	611.53	--	--	--
August 1-2, 2017	607.02	--	606.73	605.57	605.50	--	607.39	--	--	--	--	606.84	605.69	--	--	--	--	--	--	--	--	608.71	--	--	--
October 9-10, 2017	606.93	606.51	606.25	607.01	606.94	--	606.22	606.13	606.33	606.44	606.45	606.68	606.93	606.57	606.61	606.65	606.71	--	--	--	--	--	--	--	--
October 19, 2017	609.60	--	609.42	609.58	609.65	--	608.84	--	--	--	--	609.47	609.43	--	--	--	--	--	--	609.40	609.40	608.55	--	--	--
November 17, 2017	--	--	--	--	--	606.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December 19, 2017	--	--	--	--	--	604.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February 7, 2018	605.37	--	605.33	604.96	604.92	--	--	--	616.81	--	--	605.31	605.01	--	--	--	--	--	--	--	--	606.19	605.08	605.05	605.00
March 16, 2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	604.64	604.6	604.56
April 2-3, 2018 **	604.82	606.61	606.27	606.63	606.55	606.52	606.49	606.37	606.39	606.46	606.43	604.44	606.46	606.58	606.66	606.68	606.70	--	--	606.77	606.83	606.19	--	--	--
May 23, 2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	610.68	610.78	610.61
October 8-10, 2018	610.76	610.68	610.67	610.28	610.24	610.02	610.34	610.28	610.83	610.09	610.05	610.39	610.27	611.05	610.94	610.72	610.54	--	--	--	--	611.44	--	--	--
November 11, 2018	--	--	--	--	609.14	--	--	--	--	--	--	609.11	--	--	--	--	--	--	--	--	--	--	--	--	--
April 22-23, 2019	615.28	615.66	615.28	615.29	615.28	614.98	615.49	615.31	615.40	615.36	615.35	615.01	615.33	--	--	615.87	615.98	--	--	--	--	615.40	--	--	--
October 14-16, 2019	613.43	613.11	613.06	613.29	613.18	612.47	613.10	613.10	612.71	612.83	612.78	612.50	613.20	613.10	613.00	613.10	613.15	--	--	--	--	613.35	--	--	--
April 13-14, 2020	614.12	613.76	614.39	613.88	613.86	613.22	613.76	613.73	613.68	613.60	613.56	613.80	613.79	--	--	614.04	614.00	--	--	--	--	613.71	--	--	--
October 12-13, 2020	605.09	604.88	604.57	604.54	604.44	604.28	604.92	604.83	604.86	604.72	604.72	604.66	604.54	605.07	605.06	605.00	605.08	--	--	--	--	605.06	--	--	--
April 19-21, 2021	608.83	608.66	608.57	608.72	608.67	607.93	608.55	608.49	608.27	608.38	608.35	608.66	608.63	608.68	608.74	608.86	608.85	608.40	608.39	608.74	608.75	608.48	--	--	--
October 6-8, 2021	604.05	604.04	603.85	603.79	603.74	603.56	604.21	604.13	604.11	604.00	603.97	603.98	603.84	604.32	604.38	604.35	604.34	603.93	603.92	--	--	604.23	--	--	--
Bottom of Well Elevation (ft)	600.30	600.26	598.47	570.12	507.99	600.53	594.73	580.62	600.11	599.61	575.50	599.60	587.17	599.39	562.40	604.18	574.20	600.60	--	594.90	566.65	599.58	597.98	597.94	598.34

Notes:
-- = not measured
*The PVC casing at B-35A was cut down on June 28, 2018 to allow the protective cover to close. Groundwater elevations prior to 6/28/18 are calculated using the old top of casing (TOC) elevation of 621.20 ft amsl. Groundwater elevations after 6/28/18 are calculated using the new TOC elevation (621.09 ft amsl).
** The PVC casing at B-21R was extended in 2018 following well rehabilitation. The well was resurveyed on April 22, 2019. The old top of casing elevation was 621.03 ft. The new TOC elevation is 623.31 ft.

Created by: MDB Date: 4/1/2013
Last revision by: JAO Date: 12/20/2021
Checked by: RM Date: 12/27/2021

I:\25221071.00\Deliverables\2021 October ASD NED\Tables\[Table 3 - 2021 Groundwater Elevation Summary.xls]levels

Table 4. Analytical Results - State Monitoring Program
Nelson Dewey Generating Station
Cassville, Wisconsin / SCS Engineers Project #25221071.00

WELL ID	SAMPLE MONTH	BORON, DISSOLVED (UG/L)	FLUORIDE, DISSOLVED (MG/L)	SULFATE, DISSOLVED (MG/L)	PH, FIELD (STANDARD UNITS)
B-7R	2016-Apr	110	<0.20	7.40	6.80
	2016-Oct	147	<2.00	<20.0	6.55
	2017-Apr	127	<0.50	<5.00	6.60
	2017-Oct	159	<0.50	<5.00	6.61
	2018-Apr	115	<0.50 D3	<5.00 D3	6.57
	2018-Oct	89.8	<0.10	3.40	6.23
	2019-Apr	95.7	<0.50 D3	<5.00 D3	6.63
	2019-Oct	140	<0.50 D3, M0	<5.00 D3	6.62
	2020-Apr	90.8	<0.48 D3	5.20 J, D3	6.60
	2020-Oct	145	<0.48	<2.20 D3	6.35
	2021-Apr	121	<0.48 D3	<2.20 D3	6.54
	2021-Oct	--	--	--	--
B-8R	2016-Apr	2,250	0.26 J	30.0	6.64
	2016-Oct	2,130	0.21 J	47.0	6.38
	2017-Apr	1,970	0.16 J	30.5	6.83
	2017-Oct	2,490	0.30 J	32.5	6.87
	2018-Apr	1,700	0.14 J	28.7	7.02
	2018-Oct	1,500	0.25 J	30.6	6.18
	2019-Apr	1,560	0.24 J	39.8	6.65
	2019-Oct	1,110	0.49	23.6	6.85
	2020-Apr	1,340	0.27 J	20.9	6.61
	2020-Oct	1,600	0.36	63.9	6.60
	2021-Apr	1,310	0.28 J	25.0	6.54
	2021-Oct	1,730	0.19 J	42.3	6.48
B-11A	2016-Apr	110	0.37 J	3.80 J	7.75
	2016-Oct	111	0.28 J	2.80 J	7.47
	2017-Apr	106	0.35	<1.00	7.38
	2017-Oct	97.7	0.34	8.30	7.91
	2018-Apr	89.4	0.30 J	12.70	8.04
	2018-Oct	142	0.16 J	5.30	7.43
	2019-Apr	94.0	0.29 J	1.90 J	7.62
	2019-Oct	82.3	0.27 J	<1.00	7.66
	2020-Apr	83.3	0.17 J	1.50 J	7.75
	2020-Oct	94.3	0.30 J	1.0 J	7.74
	2021-Apr	92.9	0.23 J	3.5	7.65
	2021-Oct	97.6	0.24 J	7.3	7.49
B-11B	2016-Apr	1,240	0.53	153	8.14
	2016-Oct	1,410	0.54	181	7.91
	2017-Apr	1,720	0.56	186	7.83
	2017-Oct	1,900	0.65	169	7.80
	2018-Apr	2,020	0.68	195	8.42
	2018-Oct	3,910	0.41	195	7.74
	2019-Apr	6,670	0.60	289	7.91
	2019-Oct	4,860	0.64	335	7.92
	2020-Apr	5,080	<0.095	362	7.89
	2020-Oct	3,190	<0.095	422	7.80
	2021-Apr	4,590	<0.095	389	8.07
	2021-Oct	2,480	0.49	468	7.72
B-11R	2016-Apr	3,290	<1.00	93.9	6.98
	2016-Oct	4,070	<0.50	115	6.77
	2017-Apr	3,710	<0.50	111	7.11
	2017-Oct	3,400	<0.50	94.0	6.75
	2018-Apr	2,790	<0.50 D3	78.6	7.14
	2018-Oct	635	0.14 J	15.6	6.55
	2019-Apr	1,310	0.19 J	34.5	6.82
	2019-Oct	1,500	0.28 J	39.2	6.83
	2020-Apr	2,250	<0.48 D3	39.8	6.80
	2020-Oct	2,690	<0.48	23.0	6.83
	2021-Apr	2,890	<0.48 D3	59.9	7.11
	2021-Oct	3050	<0.48 D3	61.6	6.86
B-26	2016-Apr	37.0	<0.20	40.1	7.43
	2016-Oct	48.7	0.12 J	34.4	7.19
	2017-Apr	37.3	<0.10	32.3	7.54
	2017-Oct	44.5	<0.10	25.0	7.35
	2018-Apr	46.8	<0.10	19.2	7.64
	2018-Oct	55.2	<0.10	24.9	7.20
	2019-Apr	41.8	<0.10	26.4	7.10
	2019-Oct	50.8	0.11 J	37.0	7.24
	2020-Apr	49.2	<0.095	29.1	7.27
	2020-Oct	61.4	<0.095	37.1	7.34
	2021-Apr	67.1	<0.095	35.5	7.27
	2021-Oct	56.0	<0.095	43.0	7.18

Table 4. Analytical Results - State Monitoring Program
Nelson Dewey Generating Station
Cassville, Wisconsin / SCS Engineers Project #25221071.00

WELL ID	SAMPLE MONTH	BORON, DISSOLVED (UG/L)	FLUORIDE, DISSOLVED (MG/L)	SULFATE, DISSOLVED (MG/L)	PH, FIELD (STANDARD UNITS)
B-26A	2016-Apr	33.1	<0.20	40.1	7.06
	2016-Oct	30.5	0.14 J	39.9	7.26
	2017-Apr	52.6	0.47	42.3	7.96
	2017-Oct	28.4	<0.10	38.4	7.44
	2018-Apr	27.6	<0.10	37.0	7.47
	2018-Oct	18.4	<0.10	33.3	7.38
	2019-Apr	27.6	0.11 J	27.0	7.35
	2019-Oct	47.0	0.14 J	35.6	7.31
	2020-Apr	37.7	<0.095	39.2 M0	7.38
	2020-Oct	33.5	<0.095	44.7	7.51
	2021-Apr	42.7	<0.095	45.5	7.26
	2021-Oct	36.4	<0.095	49.7	7.45
B-31A	2016-Apr	69.4	0.22 J	22.8	7.63
	2016-Oct	81.0	0.18 J	27.9	7.54
	2017-Apr	80.3	0.19 J	30.8	7.83
	2017-Oct	61.5	0.21 J	26.2	7.60
	2018-Apr	69.3	0.17 J	28.1	8.00
	2018-Oct	103	0.14 J	26.2	7.48
	2019-Apr	86.0	0.22 J	21.6	7.61
	2019-Oct	112	0.23 J	22.5	7.69
	2020-Apr	121	0.15 J	17.7	7.71
	2020-Oct	146	0.18 J	16.8	7.78
	2021-Apr	168	0.14 J	17.1	7.90
	2021-Oct	188	0.17 J	15.0	7.58
B-31R	2016-Apr	759	<0.20	34.3	6.76
	2016-Oct	956	0.16 J	48.5	6.53
	2017-Apr	910	0.12 J	42.9	6.80
	2017-Oct	618	0.20 J	23.2	6.78
	2018-Apr	520	0.11 J	23.3	6.76
	2018-Oct	1,530	<1.00 D3	179	6.41
	2019-Apr	892	0.17 J, D3	114	6.62
	2019-Oct	1,000	0.26 J	145	6.72
	2020-Apr	765	0.28 J, M0	97.6 M0	6.79
	2020-Oct	696	0.28 J	50.8	6.89
	2021-Apr	597	0.19 J	44.9	6.91
	2021-Oct	356	<0.48	25.1	6.83
B-35	2016-Apr	38.7	<0.20	8.10	6.89
	2016-Oct	46.4	0.10 J	6.50	6.86
	2017-Apr	54.4	0.15 J	7.70	6.68
	2017-Oct	40.8	0.18 J	3.80	7.65
	2018-Apr	28.9	<0.10 M0	4.80 M0	7.01
	2018-Oct	40.0	0.13 J	3.60	6.58
	2019-Apr	33.6	<0.10	4.90	7.26
	2019-Oct	41.0	0.12 J	5.60	7.07
	2020-Apr	27.0	<0.095	4.20	6.87
	2020-Oct	28.1	0.097 J	5.60	6.85
	2021-Apr	23.8	0.12 J	5.90	6.89
	2021-Oct	--	--	--	--
B-35A	2016-Apr	21.7	<0.20	26.2	6.96
	2016-Oct	23.4	0.16 J	27.4	7.17
	2017-Apr	29.9	<0.10	25.4	7.27
	2017-Oct	51.4	0.26 J	4.00	7.44
	2018-Apr	28.9	<0.10 M0	23.1	7.45
	2018-Oct	59.8	<0.50 D3	6.00 J, D3	6.95
	2019-Apr	30.3	0.12 J	16.7	7.30
	2019-Oct	33.7	0.13 J	18.9	7.30
	2020-Apr	32.1	0.12 J	20.2	7.29
	2020-Oct	70.7	<0.095	17.8	7.39
	2021-Apr	46.8	<0.095	18.9	7.26
	2021-Oct	52.7	<0.095	18.7	7.27
B-36	2021-Oct	24.7	0.13 J	2.80	7.34
B-36A	2021-Oct	20.7	<0.095	17.6	7.43

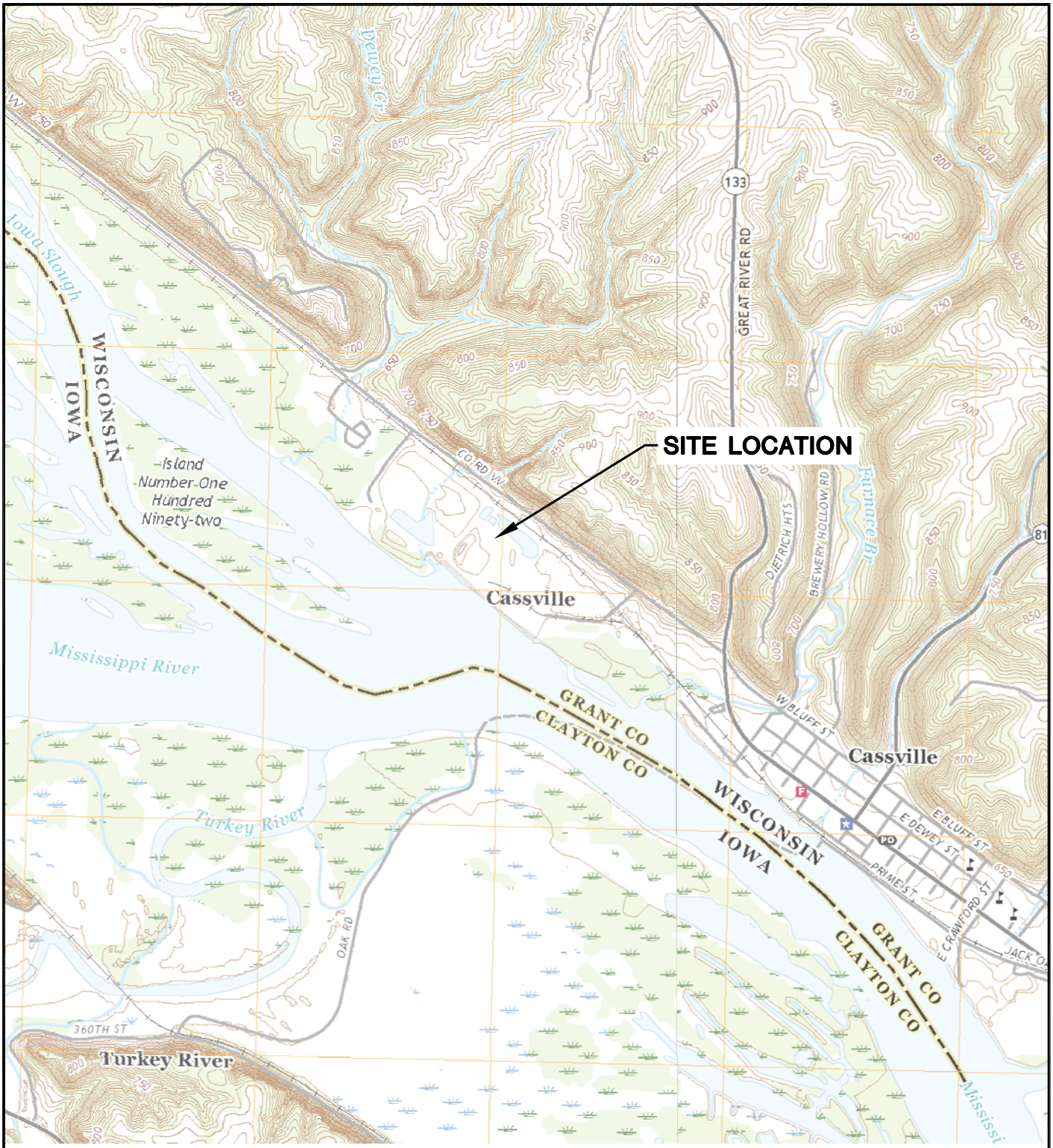
Abbreviations:
J: Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

Notes:
(1) B-7R and B-35 were dry during October sampling event.
(2) B-37 and B-37A were abandoned 12/6/2022. B-36 and B-36A were added prior to the October 2021 Sampling event.

Created by: JSN Date: 12/29/2017
Last revision by: RM/NDK Date: 2/8/2022/3/17/2022
Checked by: JAO Date: 3/18/2022

I:\25221071.00\Deliverables\2021 October ASD NED\Tables\[Table 4_Analytical Results - State Monitoring NED.xlsx]4. State Analytical

Figures



N

CASSVILLE AND TURKEY RIVER QUADRANGLES
WISCONSIN–IOWA
7.5 MINUTE SERIES (TOPOGRAPHIC)
2018
SCALE: 1" = 2,000'

CLIENT	ALLIANT ENERGY 4902 N. BILTMORE LANE, #1000 MADISON, WI 53718	SITE	ALLIANT ENERGY NELSON DEWEY GENERATING STATION CASSVILLE, WISCONSIN

SITE LOCATION MAP

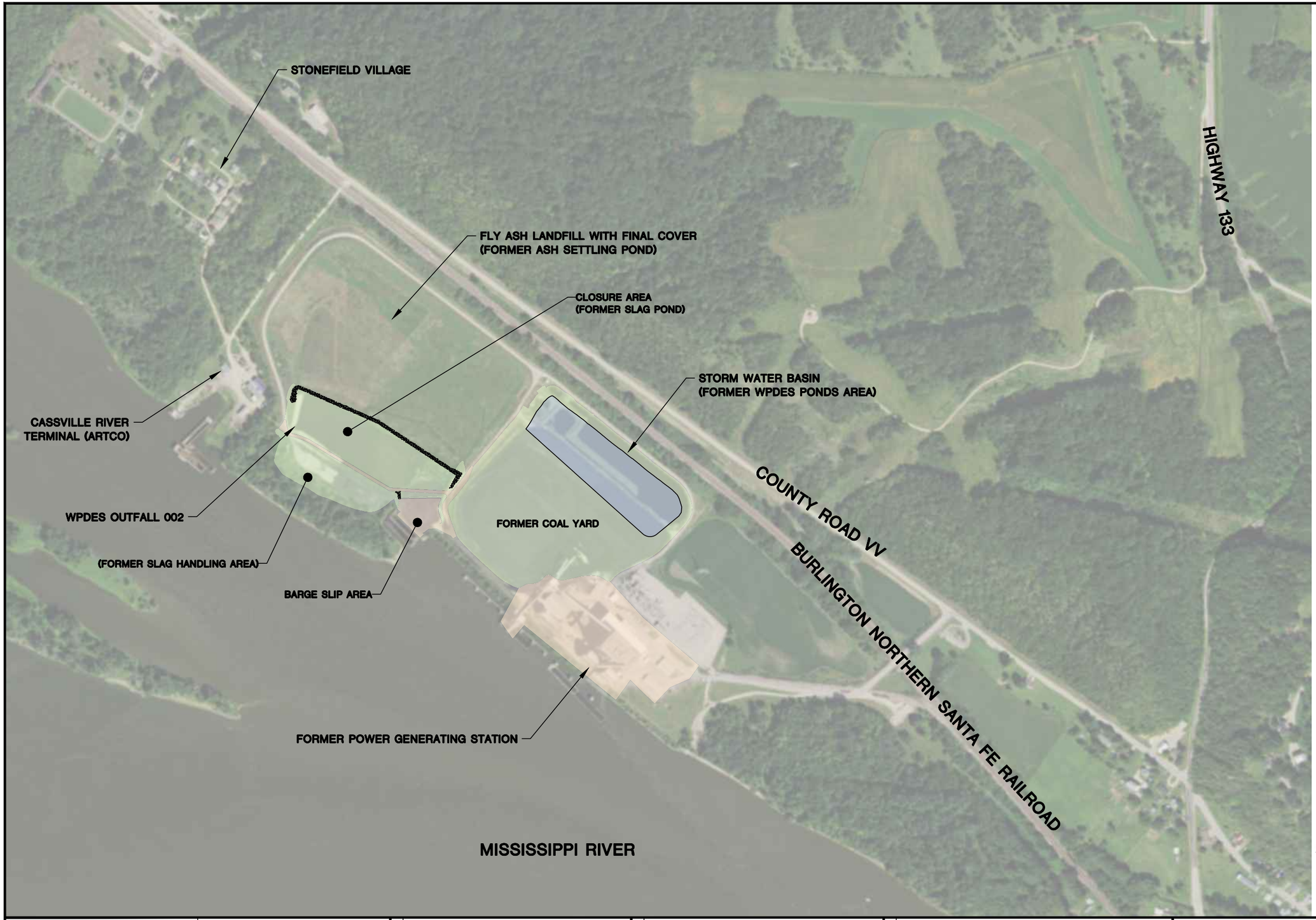
PROJECT NO.	25220071.00	DRAWN BY:	BSS
DRAWN:	11/27/2019	CHECKED BY:	MDB
REVISED:	01/14/2020	APPROVED BY:	TK 04/10/2020

ENGINEER

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

FIGURE
1

I:\25220071.00\Drawings\ASD\Site Location Map.dwg, 4/12/2020 7:11:31 PM



N

NOTES:

1. AERIAL PHOTOGRAPH FROM THE NATIONAL AGRICULTURE IMAGERY PROGRAM AND PUBLISHED BY THE USDA FSA AERIAL PHOTOGRAPHY FIELD OFFICE. DATE OF IMAGE IS AUGUST 24, 2015.

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25220071.00	DRAWN BY:	BJM
DRAWN:	12/18/13	CHECKED BY:	KAK
REVISED:	01/22/20	APPROVED BY:	TK 04/10/2020

ENGINEER: SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

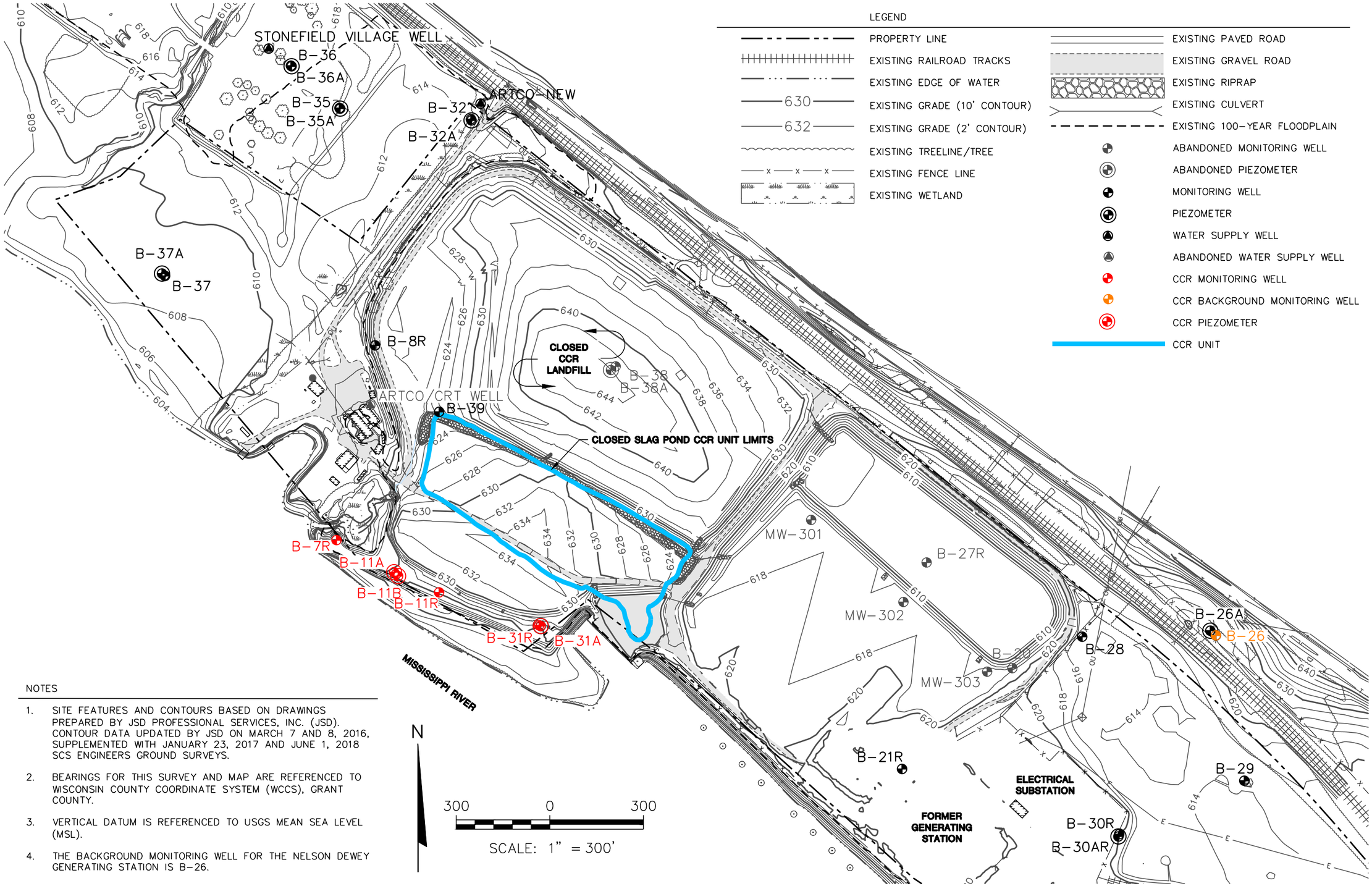
CLIENT: WISCONSIN POWER AND LIGHT CO.
NELSON DEWEY GENERATING STATION
11999 COUNTY HIGHWAY VV
CASSVILLE WI, 53806

SITE: WISCONSIN POWER AND LIGHT
NELSON DEWEY GENERATING STATION
CASSVILLE WISCONSIN

AERIAL VIEW

FIGURE 2

I:\25220071.00\Drawings\ASD\Site Aerial.dwg, 4/12/2020 7:18:26 PM



NOTES

1. SITE FEATURES AND CONTOURS BASED ON DRAWINGS PREPARED BY JSD PROFESSIONAL SERVICES, INC. (JSD). CONTOUR DATA UPDATED BY JSD ON MARCH 7 AND 8, 2016, SUPPLEMENTED WITH JANUARY 23, 2017 AND JUNE 1, 2018 SCS ENGINEERS GROUND SURVEYS.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO WISCONSIN COUNTY COORDINATE SYSTEM (WCCS), GRANT COUNTY.
3. VERTICAL DATUM IS REFERENCED TO USGS MEAN SEA LEVEL (MSL).
4. THE BACKGROUND MONITORING WELL FOR THE NELSON DEWEY GENERATING STATION IS B-26.

SITE

SITE PLAN AND MONITORING WELL LOCATIONS

ALLIANT ENERGY
NELSON DEWEY GENERATING STATION
CASSVILLE, WISCONSIN

CLIENT

ALLIANT ENERGY
4902 N. BILTMORE LANE, #1000
MADISON, WI 53718

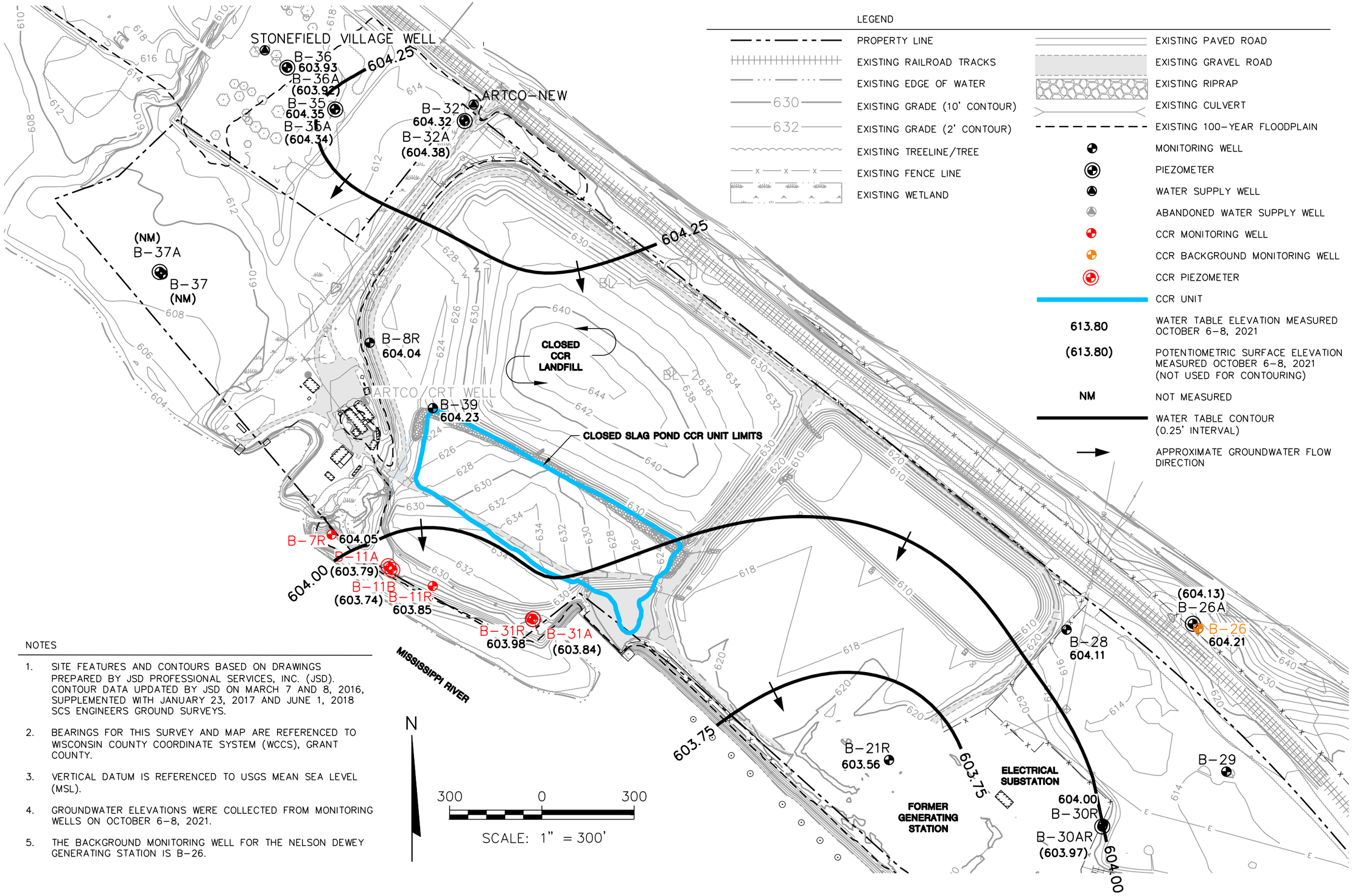
ENGINEER

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

PROJECT NO.	25221071.00
DRAWN:	11/27/2019
REVISED:	01/11/2022
DRAWN BY:	BSS
CHECKED BY:	MDB
APPROVED BY:	TK 3/23/2022

FIGURE 3

I:\25221071.00\Drawings\Site Plan and Monitoring Well Locations.dwg, 1/11/2022 11:10:49 AM



LEGEND

- PROPERTY LINE
- EXISTING RAILROAD TRACKS
- EXISTING EDGE OF WATER
- EXISTING GRADE (10' CONTOUR)
- EXISTING GRADE (2' CONTOUR)
- EXISTING TREELINE/TREE
- EXISTING FENCE LINE
- EXISTING WETLAND
- EXISTING PAVED ROAD
- EXISTING GRAVEL ROAD
- EXISTING RIPRAP
- EXISTING CULVERT
- EXISTING 100-YEAR FLOODPLAIN
- MONITORING WELL
- PIEZOMETER
- WATER SUPPLY WELL
- ABANDONED WATER SUPPLY WELL
- CCR MONITORING WELL
- CCR BACKGROUND MONITORING WELL
- CCR PIEZOMETER
- CCR UNIT
- 613.80 — WATER TABLE ELEVATION MEASURED OCTOBER 6-8, 2021
- (613.80) — POTENTIOMETRIC SURFACE ELEVATION MEASURED OCTOBER 6-8, 2021 (NOT USED FOR CONTOURING)
- NM — NOT MEASURED
- WATER TABLE CONTOUR (0.25' INTERVAL)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES

1. SITE FEATURES AND CONTOURS BASED ON DRAWINGS PREPARED BY JSD PROFESSIONAL SERVICES, INC. (JSD). CONTOUR DATA UPDATED BY JSD ON MARCH 7 AND 8, 2016, SUPPLEMENTED WITH JANUARY 23, 2017 AND JUNE 1, 2018 SCS ENGINEERS GROUND SURVEYS.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO WISCONSIN COUNTY COORDINATE SYSTEM (WCCS), GRANT COUNTY.
3. VERTICAL DATUM IS REFERENCED TO USGS MEAN SEA LEVEL (MSL).
4. GROUNDWATER ELEVATIONS WERE COLLECTED FROM MONITORING WELLS ON OCTOBER 6-8, 2021.
5. THE BACKGROUND MONITORING WELL FOR THE NELSON DEWEY GENERATING STATION IS B-26.

WATER TABLE FLOW MAP
OCTOBER 2021

SITE
ALLIANT ENERGY
NELSON DEWEY GENERATING STATION
CASSVILLE, WISCONSIN

CLIENT
ALLIANT ENERGY
4902 N. BILTMORE LANE, #1000
MADISON, WI 53718

FIGURE 4

ENGINEER
SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

PROJECT NO.	25221071.00
DRAWN:	10/14/2021
REVISED:	01/11/2022
DRAWN BY:	KP
CHECKED BY:	NDK
APPROVED BY:	TK 3/23/2022

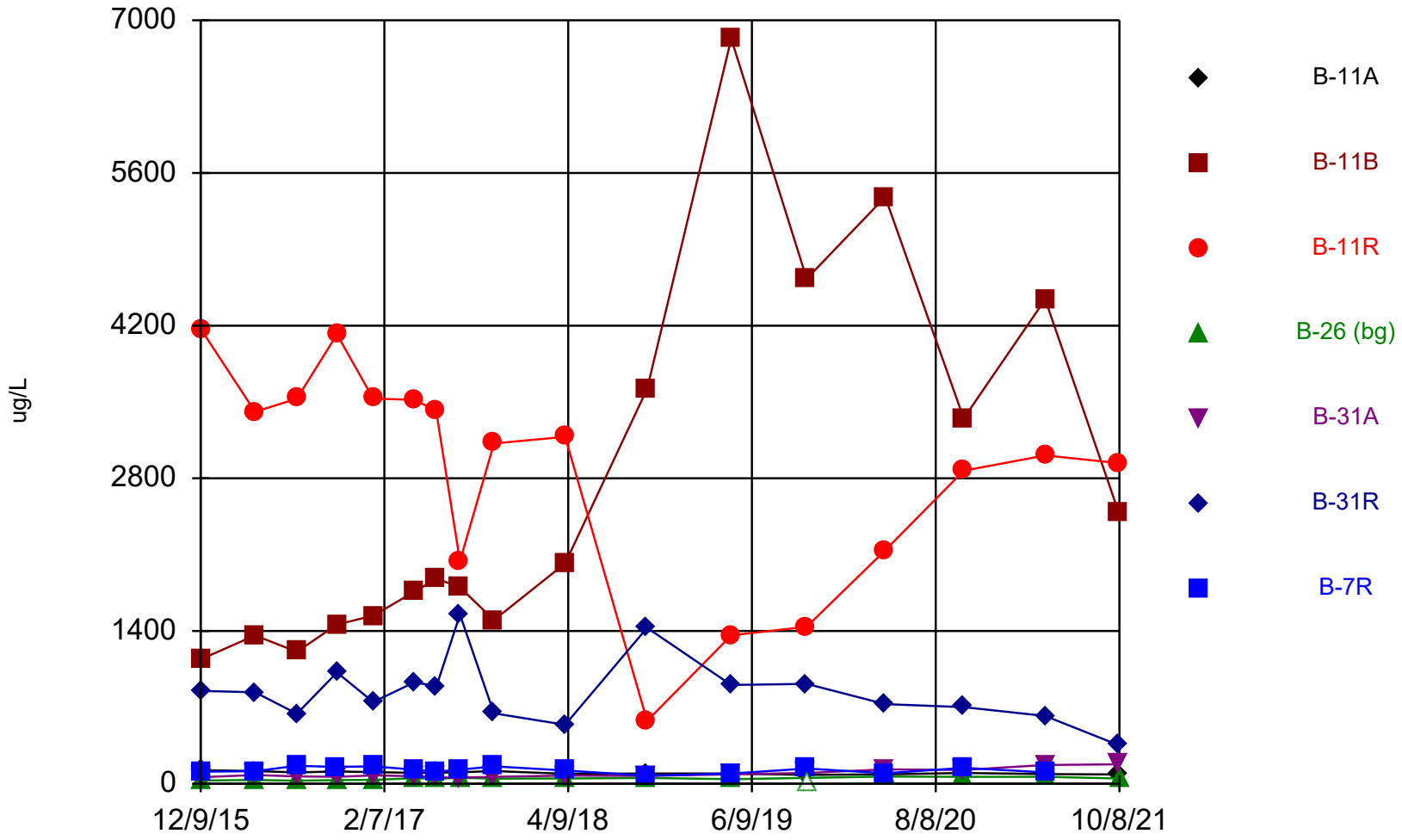
I:\25221071.00\Drawings\WTBL.dwg, 1/11/2022 11:09:00 AM

Appendix A

CCR Well Trend Plots

Hollow symbols indicate censored values.

Boron



Time Series Analysis Run 2/8/2022 1:00 PM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

Time Series

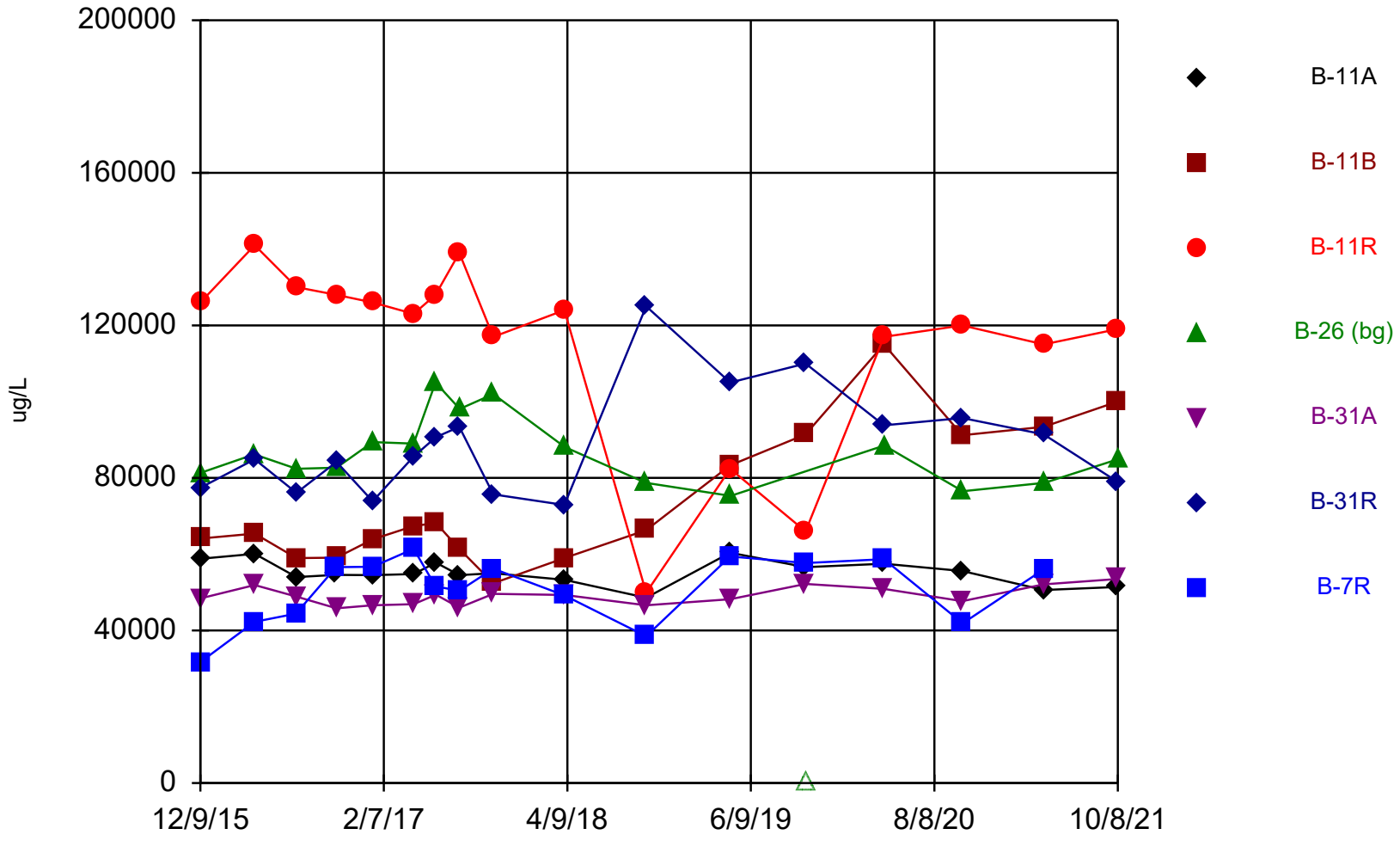
Constituent: Boron (ug/L) Analysis Run 2/8/2022 1:02 PM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

	B-11A	B-11B	B-11R	B-26 (bg)	B-31A	B-31R	B-7R
12/9/2015	124	1140	4170	29.6	59	851	110
4/12/2016				33.7			
4/13/2016	116	1360	3410		79.2	838	115
7/18/2016							164
7/19/2016	104	1210	3530	28.6	67.2	641	
10/19/2016	112						154
10/20/2016		1460	4120	33	63.7	1020	
1/12/2017	106	1540	3530	35.2	76.4	749	159
4/17/2017	100	1760	3520	50.1	69.9	929	129
6/7/2017			3420	45.8			110
6/8/2017	102	1880			58.5	895	
8/1/2017	105	1800	2040		56.3	1550	129
8/2/2017				54.6			
10/19/2017	116	1500	3120	47.4	63.9	645	159
4/2/2018	91	2020	3180		74.8	540	121
4/3/2018				48			
10/8/2018				53.4			
10/9/2018	94.2	3620	576		71.8	1430	73
4/22/2019	93.9	6830	1360		86.2	906	93.5
4/23/2019				41.6			
10/14/2019	80.7	4630	1440		98.5	915	139
10/15/2019				<3 (UX)			
4/13/2020	86.3	5380	2140		132	730	96
4/14/2020				66.1			
10/12/2020	99.3	3350	2870		127	702	
10/13/2020				63.6			145
4/19/2021	88.1	4440	3010		172	621	
4/20/2021							104
4/21/2021				63.6			
10/7/2021	85.4	2480	2940		178	353	
10/8/2021				48.4			

Sanitas™ v.9.6.32 Software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Calcium



Time Series Analysis Run 2/8/2022 1:00 PM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

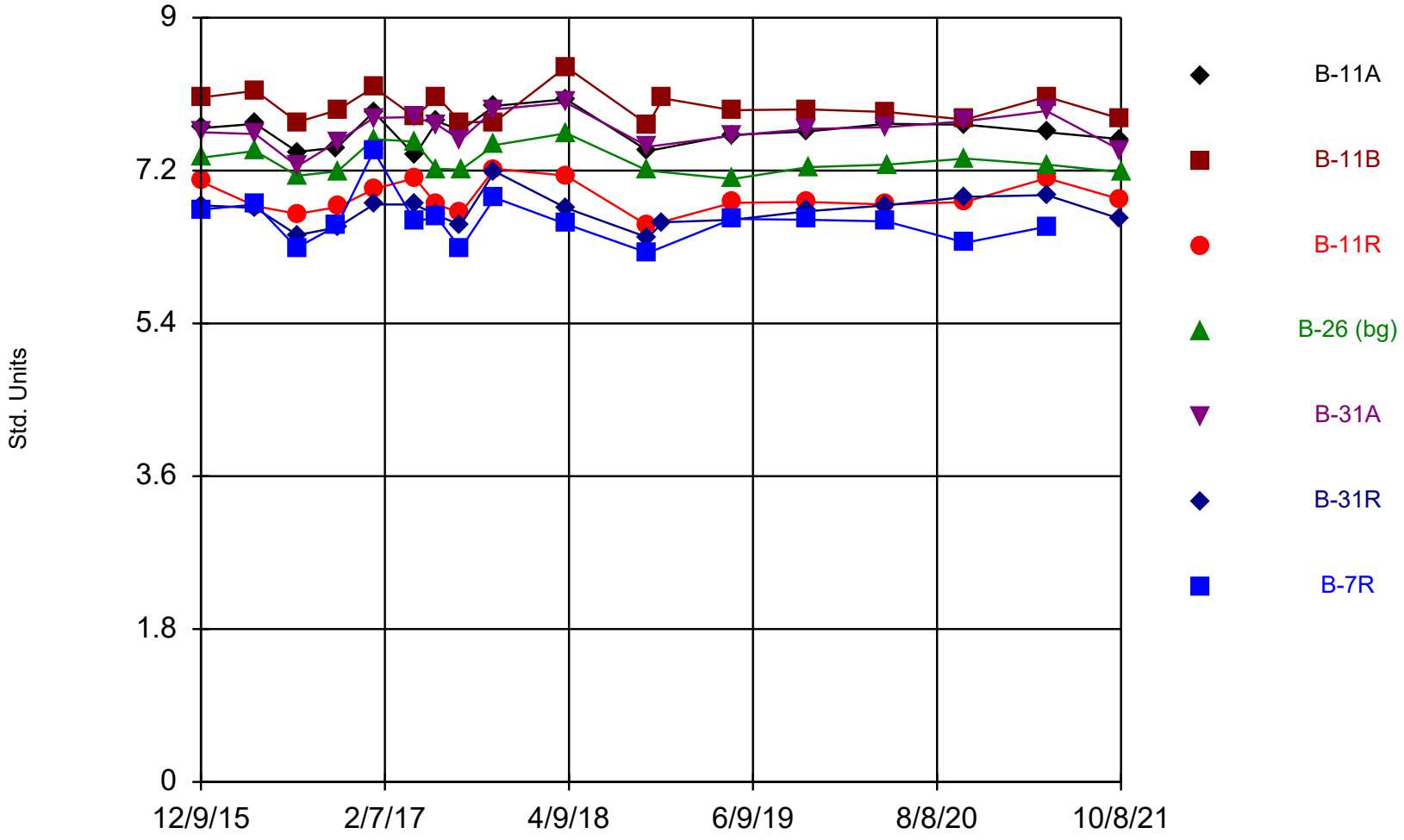
Time Series

Constituent: Calcium (ug/L) Analysis Run 2/8/2022 1:02 PM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

	B-11A	B-11B	B-11R	B-26 (bg)	B-31A	B-31R	B-7R
12/9/2015	58800	64100	126000	81300	48400	77400	31700
4/12/2016				86200			
4/13/2016	60100	65400	141000		51900	84900	42300
7/18/2016							44400
7/19/2016	54000	59000	130000	82400	48900	76100	
10/19/2016	54600						56600
10/20/2016		59100	128000	82700	45800	84200	
1/12/2017	54500	63900	126000	89400	46600	73900	56700
4/17/2017	54800	67400	123000	89000	46900	85600	61400
6/7/2017			128000	105000			51600
6/8/2017	57800	68200			49400	90700	
8/1/2017	54500	61400	139000		46000	93400	50400
8/2/2017				98100			
10/19/2017	55000	52400	117000	102000	49600	75700	56200
4/2/2018	53300	59000	124000		49300	72900	49200
4/3/2018				88100			
10/8/2018				78700			
10/9/2018	48600	66300	49900		46600	125000	38500
4/22/2019	60400	83300	82400		48200	105000	59400
4/23/2019				75300			
10/14/2019	56600	91400	66000		52200	110000	57700
10/15/2019				<76.2 (UX)			
4/13/2020	57500	115000	117000		50900	93800	58700
4/14/2020				88500			
10/12/2020	55600	91200	120000		47700	95700	
10/13/2020				76500			41900
4/19/2021	50600	93400	115000		52100	91400	
4/20/2021							56100
4/21/2021				78700			
10/7/2021	51400	100000	119000		53500	79000	
10/8/2021				84900			

Field pH



Time Series Analysis Run 2/8/2022 1:00 PM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

Time Series

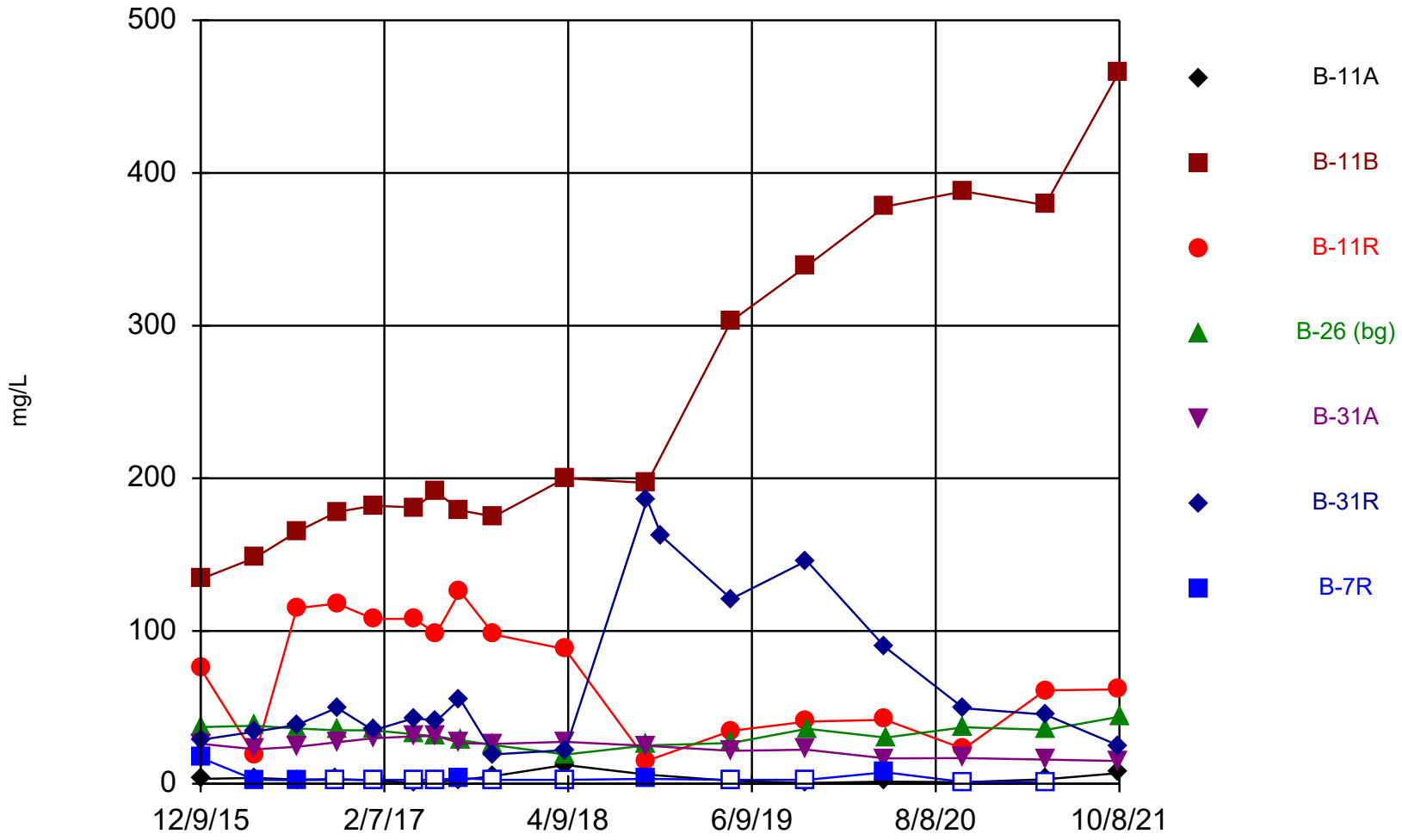
Constituent: Field pH (Std. Units) Analysis Run 2/8/2022 1:02 PM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

	B-11A	B-11B	B-11R	B-26 (bg)	B-31A	B-31R	B-7R
12/9/2015	7.7	8.06	7.07	7.35	7.65	6.79	6.74
4/12/2016				7.43			
4/13/2016	7.75	8.14	6.78		7.63	6.76	6.8
7/18/2016							6.29
7/19/2016	7.42	7.77	6.69	7.14	7.25	6.44	
10/19/2016	7.47						6.55
10/20/2016		7.91	6.77	7.19	7.54	6.53	
1/12/2017	7.89	8.18	6.98	7.57	7.82	6.8	7.43
4/17/2017	7.38	7.83	7.11	7.54	7.83	6.8	6.6
6/7/2017			6.8	7.22			6.65
6/8/2017	7.78	8.07			7.74	6.67	
8/1/2017	7.67	7.77	6.7		7.56	6.56	6.28
8/2/2017				7.21			
10/19/2017	7.96	7.77	7.22	7.5	7.92	7.19	6.88
4/2/2018	8.04	8.42	7.14		8	6.76	6.57
4/3/2018				7.64			
10/8/2018				7.2			
10/9/2018	7.43	7.74	6.55		7.48	6.41	6.23
11/12/2018		8.05				6.59	
4/22/2019	7.62	7.91	6.82		7.61	6.62	6.63
4/23/2019				7.1			
10/14/2019	7.66	7.92	6.83		7.69	6.72	6.62
10/15/2019				7.24			
4/13/2020	7.75	7.89	6.8		7.71	6.79	6.6
4/14/2020				7.27			
10/12/2020	7.74	7.8	6.83		7.78	6.89	
10/13/2020				7.34			6.35
4/19/2021	7.65	8.07	7.11		7.9	6.91	
4/20/2021							6.54
4/21/2021				7.27			
10/7/2021	7.57	7.81	6.86		7.44	6.63	
10/8/2021				7.18			

Hollow symbols indicate censored values.

Sulfate



Time Series Analysis Run 2/8/2022 1:00 PM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

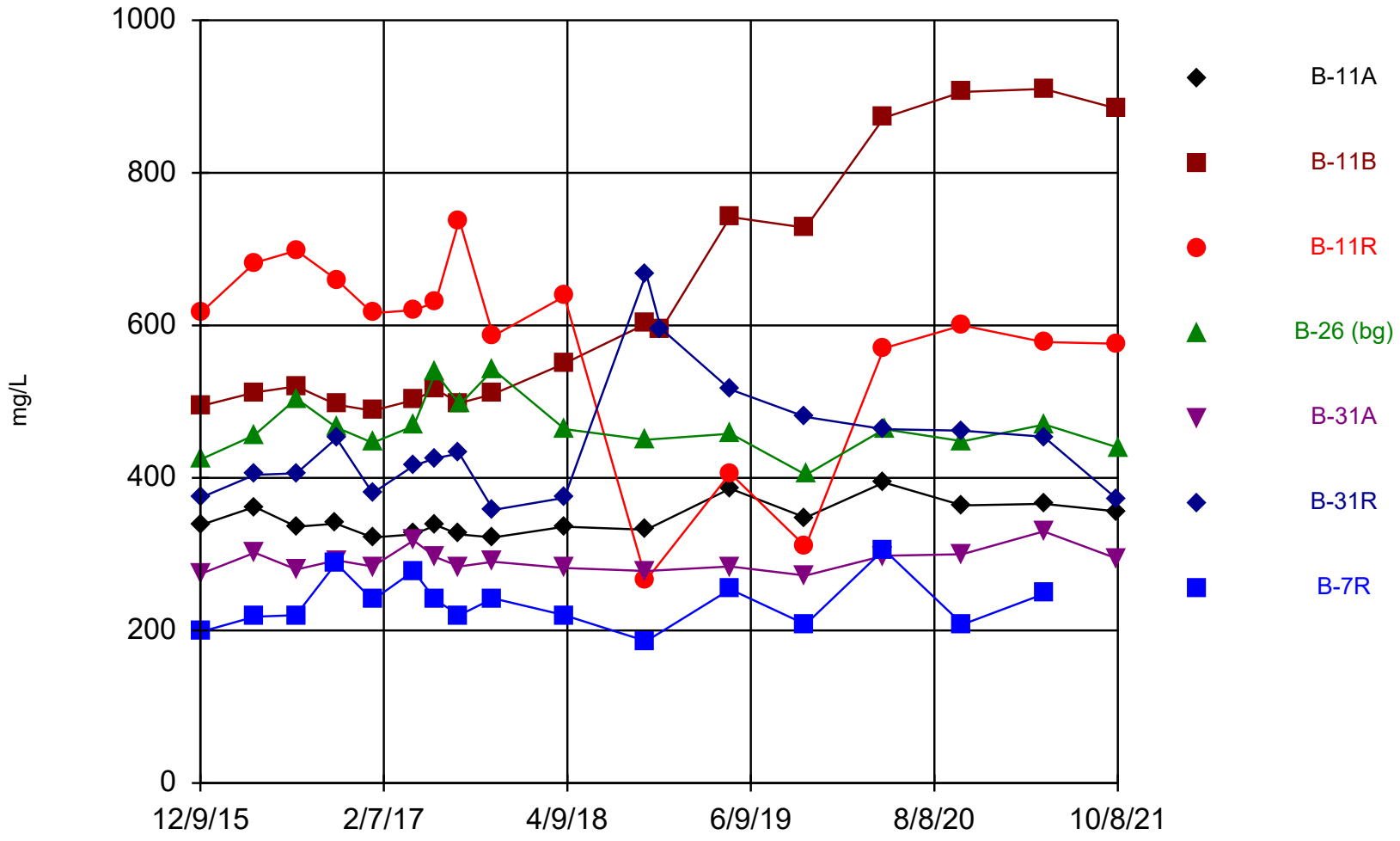
Time Series

Constituent: Sulfate (mg/L) Analysis Run 2/8/2022 1:02 PM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

	B-11A	B-11B	B-11R	B-26 (bg)	B-31A	B-31R	B-7R
12/9/2015	3.2 (J)	134	75.4	37.1	26.2	28.8	17 (J)
4/12/2016				38			
4/13/2016	3.8 (J)	148	18.4		22.6	34.1	2.5 (J)
7/18/2016							2.4 (J)
7/19/2016	2.7 (J)	165	115	36.2	24.2	38.5	
10/19/2016	3 (J)						<5 (U)
10/20/2016		178	118	35	27.2	49.7	
1/12/2017	2.3 (J)	182	108	35	29.8	34.9	<5 (U)
4/17/2017	<1 (U)	181	108	32.4	31	43	<5 (U)
6/7/2017			98.2	31			<5 (U)
6/8/2017	1.4 (J)	191			31.2	41.1	
8/1/2017	2.4 (J)	179	126		26.6	55.6	3.7
8/2/2017				28.5			
10/19/2017	5.1	175	97.7	25.3	26.1	19.2	<5 (U)
4/2/2018	12.3	200	88.1		27.4	22	<5 (U)
4/3/2018				19.1			
10/8/2018				25.1			
10/9/2018	6	197	15.1		24.8	186	3.2
11/12/2018						162	
4/22/2019	1.9 (J)	303	34.6		21.6	121	<5 (U)
4/23/2019				26.7			
10/14/2019	<1 (U)	339	40.7		22.3	146	<5 (U)
10/15/2019				36			
4/13/2020	1.4 (J)	378	41.9		16.6	89.4	7.5 (J)
4/14/2020				30.2			
10/12/2020	1 (J)	388	22.8		16.8	49.4	
10/13/2020				37			<2.2 (U)
4/19/2021	2.9	379	61.2		15.8	45.3	
4/20/2021							<2.2
4/21/2021				35.3			
10/7/2021	7	466	61.8		14.9	24.9	
10/8/2021				43.8			

Total Dissolved Solids



Time Series Analysis Run 2/8/2022 1:00 PM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

Time Series

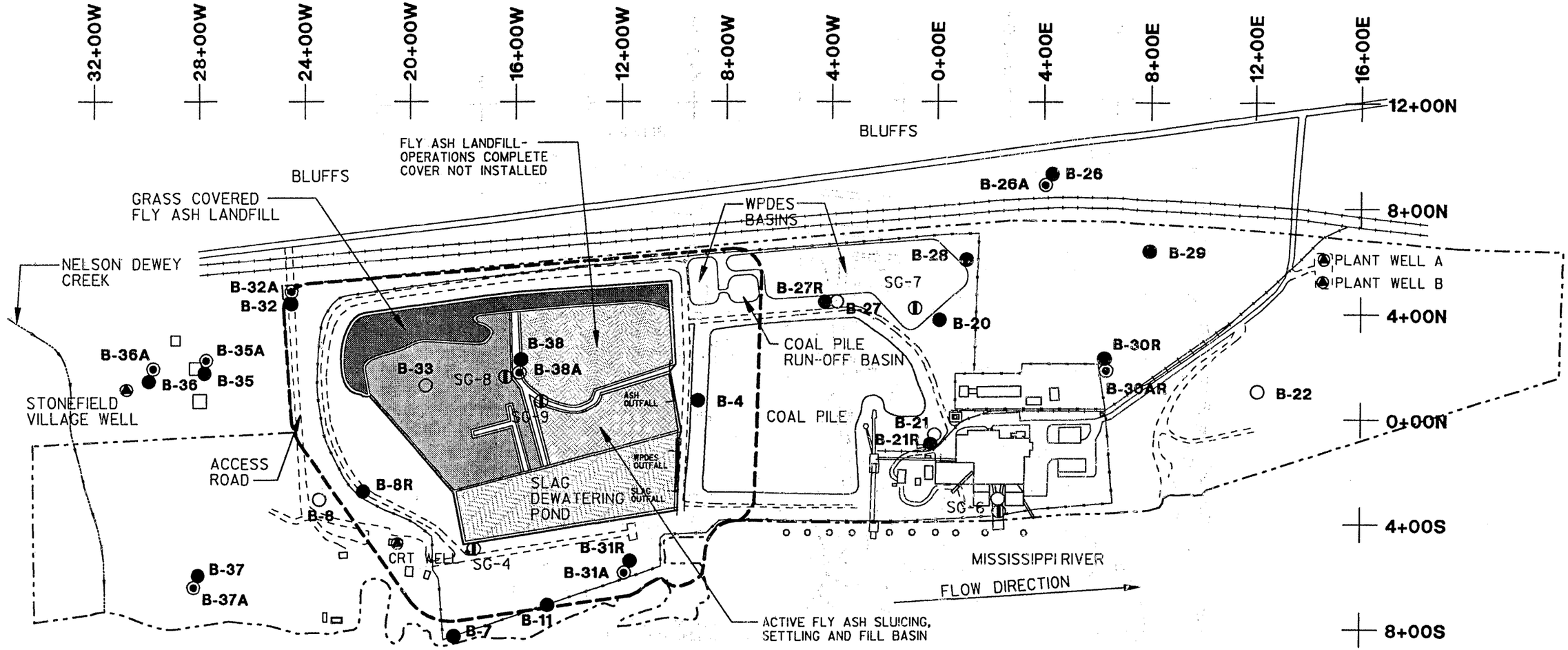
Constituent: Total Dissolved Solids (mg/L) Analysis Run 2/8/2022 1:02 PM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

	B-11A	B-11B	B-11R	B-26 (bg)	B-31A	B-31R	B-7R
12/9/2015	338	494	616	424	274	374	198
4/12/2016				456			
4/13/2016	362	512	682		302	404	218
7/18/2016							220
7/19/2016	336	520	698	504	280	406	
10/19/2016	340						288
10/20/2016		496	660	466	292	452	
1/12/2017	322	488	616	446	284	380	240
4/17/2017	326	502	620	468	318	416	278
6/7/2017			630	538			240
6/8/2017	338	516			296	426	
8/1/2017	326	498	738		284	432	220
8/2/2017				496			
10/19/2017	322	510	586	542	290	358	242
4/2/2018	336	550	638		282	374	220
4/3/2018				464			
10/8/2018				450			
10/9/2018	332	602	266		278	668	186
11/12/2018		594				596	
4/22/2019	386	742	406		284	516	254
4/23/2019				458			
10/14/2019	348	728	310		272	480	208
10/15/2019				404			
4/13/2020	394	872	570		298	464	306
4/14/2020				464			
10/12/2020	364	906	600		300	462	
10/13/2020				448			208
4/19/2021	366	910	578		330	454	
4/20/2021							248
4/21/2021				470			
10/7/2021	356	884	576		294	372	
10/8/2021				440			

Appendix B

1994 RMT Environmental Contamination Assessment Information



LEGEND

● B-28	WATER TABLE OBSERVATION WELL
◉ B-28A	PIEZOMETER
○ B-33	ABANDONED WELL
▲ CRT WELL	WATER SUPPLY WELL
◐ SG-4	STAFF GAUGE
———	APPROXIMATE LIMITS OF LICENSED LANDFILL
——+——+——	RAILROAD TRACK
====	ROAD
— - — - —	PROPERTY LINE
— — — —	DESIGN MANAGEMENT ZONE
+ 0+00S	LOCAL GRID
□	BUILDINGS
o	PILINGS

NOTES

1. BASE MAP WELLHEAD LOCATIONS SURVEYED BY SCHMITT ENGINEERING IN OCTOBER 1993.
2. OTHER SITE INFORMATION PROVIDED BY WP&L.

TRUE

0 400 800

SCALE: 1"=400'

WISCONSIN POWER & LIGHT
NELSON DEWEY GENERATING STATION
EXISTING CONDITIONS
OCTOBER 1993

RMT, INC.

Dwn.By:	CDH
Approved By:	ELM
Date:	OCTOBER 1994
Proj.#:	2767.03
File #:	2767030LDGN

Plot File = P:\MSPC\2767030\DGN\2767030LDGN
Plot Date = Fri Oct 21 08:28:28 1994
Pen Table =DEFAULT.TBL

OCT 31 1994

FIGURE 4

TABLE 5

SUMMARY OF LEACHING TEST RESULTS

	Fly Ash		Slag
Year	1983	1990 to 1992	1987 to 1992
Coal Type	Eastern (and Western)	Western (and Eastern)	Western (and Eastern) [1]
Water:Solid Ratio	2:1	4:1	4:1
Extraction Time	24 hours	48 hours	48 hours
Number of Samples	1	3	6
Arsenic (mg/L)	< 0.001	0.05 to 2.02	< 0.002 to 0.081
Selenium (mg/L)	NA	0.42 to 160	< 0.002 to 0.045
Boron (mg/L)	420	4.63 to 37.34	< 0.010 to 1.05
Iron (mg/L)	NA	NA	< 0.02 to 0.98
Sulfate (mg/L)	13,070	2,000 to 16,700	2.0 to < 5.0
pH (SU)	6.6	10.3 to 12.5	5.6 to 9.9

NOTES:

1. 1983 fly ash leaching data from RMT (1984); remaining leaching data provided by WP&L.
2. NA = Not Analyzed.

PROJECT NUMBER: 1831.28
BEGINNING DATE: 01-JUN-93
ENDING DATE: 07-SEP-93

TABLE 6
SLAG AND ASH BASIN CHEMISTRY

PARAMETER	UNITS	FLY ASH BASIN 07-SEP-93 3302-011		SLAG BASIN 07-SEP-93 3302-010	
COLOR, FIELD		CLEAR		CLEAR	
CONDUCTANCE, SPECIFIC	UMHOS/CM	5190		400	
ODOR, FIELD		NONE		NONE	
PH, FIELD	SU	8.1		7.4	
TEMPERATURE	DEG C	17		18	
TURBIDITY, FIELD		SLIGHT		SLIGHT	
ALKALINITY AS CACO3	MG/L	230		160	
HARDNESS AS CACO3	MG/L	930		200	
SOLIDS, TOTAL DISSOLVED	MG/L	410		300	
SULFATE	MG/L	3300		50	
ARSENIC, TOTAL	UG/L	60		8.0	
BARIUM, TOTAL	UG/L	270		150	
BORON, TOTAL	UG/L	2300		210	
CADMIUM, TOTAL	UG/L	5.4		< 0.30	
CHROMIUM, TOTAL	UG/L	11		< 10	
IRON, TOTAL	UG/L	1600		2000	
LEAD, TOTAL	UG/L	< 3.0		< 3.0	
MERCURY, TOTAL	UG/L	< 0.20		< 0.20	
SELENIUM, TOTAL	UG/L	36	I	2.1	L
SILVER, TOTAL	UG/L	< 1.0		< 1.0	

18-OCT-94

wpvalid:SWI.BJC

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TABLE 8
GROUNDWATER CHEMISTRY

PARAMETER	UNITS	B-04 01-JUN-93 1670-015	B-04 07-SEP-93 3293-010	B-07 ND 01-JUN-93 1670-020	B-07 ND 07-SEP-93 3302-004	B-08 01-JUN-93 1670-001	B-08R 07-SEP-93 3293-009
COLOR, FIELD		CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	1160	1240	460	550	670	1160
DEPTH TO WATER	FEET	9.90	12.75	12.83	16.12	5.68	20.13
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	7.3	7.5	7.0	6.9	7.1	6.8
TEMPERATURE	DEG C	15	10	14	12	15	7
TURBIDITY, FIELD		NONE	SLIGHT	NONE	SLIGHT	NONE	MODERATE
WATER ELEVATION	FEET	610.68	607.83	610.97	607.68	610.51	
ALKALINITY AS CACO3	MG/L	72	92	160	190	220	440
CHLORIDE	MG/L	18	23	17	15	9.4	2.8
COD	MG/L						
FLUORIDE	MG/L	0.58	5.5	0.26	0.32	< 0.10	0.12
HARDNESS AS CACO3	MG/L	220	120	210	250	370	620
NITROGEN, NITRATE + NITRITE	MG/L	0.15	0.33	< 0.050	< 0.050	< 0.050	4.2
SOLIDS, TOTAL DISSOLVED	MG/L	900	940	300	360	460	770
SULFATE	MG/L	500	560	74	100	180	180
ARSENIC, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
BARIUM, DISSOLVED	UG/L	68	< 50	61	73	63	50
BORON, DISSOLVED	UG/L	1900	4200	230	< 200	2200	9400
CADMIUM, DISSOLVED	UG/L	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	0.38
CHROMIUM, DISSOLVED	UG/L	< 10	< 10	< 10	< 10	< 10	< 10
COPPER, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	< 20
IRON, DISSOLVED	UG/L	720	890	2800	4100	< 100	< 100
LEAD, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L	1200	720	970	1500	17	3400
MERCURY, DISSOLVED	UG/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L	6.9	3.2	< 1.0 L	< 1.0 L	< 1.0 L	34
SILVER, DISSOLVED	UG/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L	1000	100	22	< 20	220	< 20

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TABLE 8
GROUNDWATER CHEMISTRY

PARAMETER	UNITS	B-11 07-SEP-93 X0001	B-11 29-OCT-93 3485-001	B-20 07-SEP-93 X0002	B-26 01-JUN-93 1670-022	B-26 07-SEP-93 3302-005	B-26A 01-JUN-93 1670-023
COLOR, FIELD					CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	1500		310	610	670	660
DEPTH TO WATER	FEET	15.91		10.81	16.22	18.85	16.20
ODOR, FIELD					NONE	NONE	NONE
PH, FIELD	SU				7.1	7.2	7.0
TEMPERATURE	DEG C	13	13	14	14	11	15
TURBIDITY, FIELD					NONE	SLIGHT	NONE
WATER ELEVATION	FEET				610.18	607.55	610.19
ALKALINITY AS CACO3	MG/L		470		320	300	340
CHLORIDE	MG/L				21	43	33
COD	MG/L						
FLUORIDE	MG/L				< 0.10	0.15	< 0.10
HARDNESS AS CACO3	MG/L		810		390	410	400
NITROGEN, NITRATE + NITRITE	MG/L				2.6	4.9	2.0
SOLIDS, TOTAL DISSOLVED	MG/L		520		440	450	450
SULFATE	MG/L		360		34	34	33
ARSENIC, DISSOLVED	UG/L		8.4		< 3.0	< 3.0	< 3.0
BARIUM, DISSOLVED	UG/L		100		62	68	96
BORON, DISSOLVED	UG/L		5100		< 200	< 200	< 200
CADMIUM, DISSOLVED	UG/L		< 0.30		< 0.30	< 0.30	< 0.30
CHROMIUM, DISSOLVED	UG/L		< 10		< 10	< 10	< 10
COPPER, DISSOLVED	UG/L				< 20	< 20	< 20
IRON, DISSOLVED	UG/L		55000		< 100	< 100	< 100
LEAD, DISSOLVED	UG/L		< 3.0		< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L				< 5.0	< 5.0	< 5.0
MERCURY, DISSOLVED	UG/L		< 0.20		< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L		< 1.0 LNP		< 1.0 L	< 1.0 L	< 1.0 L
SILVER, DISSOLVED	UG/L		< 10		< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L				< 20	< 20	< 20

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TABLE 8
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PARAMETER	UNITS	B-26A 07-SEP-93 3302-006	B-27R 07-SEP-93 X0003	B-28 01-JUN-93 1670-014	B-28 07-SEP-93 3302-003	B-29 07-SEP-93 X0004	B-30AR 01-JUN-93 1670-013
COLOR, FIELD		CLEAR		CLEAR	CLEAR		CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	440	370	190	230	360	220
DEPTH TO WATER	FEET	18.84	14.67	6.40	9.08	9.57	12.33
ODOR, FIELD		NONE		NONE	NONE		NONE
PH, FIELD	SU	7.2		6.1	6.0		7.2
TEMPERATURE	DEG C	11	14	17	15	15	17
TURBIDITY, FIELD		NONE		SLIGHT	MODERATE		NONE
WATER ELEVATION	FEET	607.55		610.46	607.74	607.26	610.11
ALKALINITY AS CACO3	MG/L	340		26	54		200
CHLORIDE	MG/L	25		4.6	11		13
COD	MG/L						7.3
FLUORIDE	MG/L	0.15		< 0.10	< 0.10		0.10
HARDNESS AS CACO3	MG/L	410		82	110		220
NITROGEN, NITRATE + NITRITE	MG/L	1.8		2.7	0.60		< 0.050
SOLIDS, TOTAL DISSOLVED	MG/L	440		140	160		280
SULFATE	MG/L	38		45	42		27
ARSENIC, DISSOLVED	UG/L	< 3.0		< 3.0	< 3.0		< 3.0
BARIUM, DISSOLVED	UG/L	86		< 50	52		< 50
BORON, DISSOLVED	UG/L	< 200		< 200	< 200		< 200
CADMIUM, DISSOLVED	UG/L	< 0.30		< 0.30	< 0.30		< 0.30
CHROMIUM, DISSOLVED	UG/L	< 10		< 10	< 10		< 10
COPPER, DISSOLVED	UG/L	< 20		< 20	< 20		< 20
IRON, DISSOLVED	UG/L	< 100		210	< 100		< 100
LEAD, DISSOLVED	UG/L	< 3.0		< 3.0	< 3.0		< 3.0
MANGANESE, DISSOLVED	UG/L	< 5.0		8.6	< 5.0		< 5.0
MERCURY, DISSOLVED	UG/L	< 0.20		< 0.20	< 0.20		< 0.20
SELENIUM, DISSOLVED	UG/L	< 1.0 LN		< 1.0 L	< 1.0 L		< 1.0 L
SILVER, DISSOLVED	UG/L	< 1.0		< 1.0	< 1.0		< 1.0
ZINC, DISSOLVED	UG/L	< 20		< 20	< 20		< 20

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PARAMETER	UNITS	B-30AR 07-SEP-93 3302-002	B-30R 01-JUN-93 1670-012	B-30R 07-SEP-93 3302-001	B-31A 01-JUN-93 1670-019	B-31A 07-SEP-93 3293-011	B-31R 01-JUN-93 1670-018
COLOR, FIELD		CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	410	420	360	700	800	640
DEPTH TO WATER	FEET	15.37	12.25	15.17	12.21	15.93	11.56
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	7.3	7.0	6.8	6.9	7.3	6.8
TEMPERATURE	DEG C	12	16	14	17	14	17
TURBIDITY, FIELD		NONE	MODERATE	MODERATE	NONE	SLIGHT	SLIGHT
WATER ELEVATION	FEET	607.07	610.10	607.18	610.46	606.74	610.85
ALKALINITY AS CACO3	MG/L	190	160	140	170	160	240
CHLORIDE	MG/L	14	13	6.6	16	17	11
COD	MG/L		9.7				
FLUORIDE	MG/L	0.16	< 0.10	< 0.10	0.39	0.43	< 0.10
HARDNESS AS CACO3	MG/L	230	210	210	120	160	330
NITROGEN, NITRATE + NITRITE	MG/L	< 0.050	8.5	8.8	< 0.050	< 0.050	< 0.050
SOLIDS, TOTAL DISSOLVED	MG/L	280	280	230	510	570	510
SULFATE	MG/L	25	25	26	250	250	150
ARSENIC, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
BARIUM, DISSOLVED	UG/L	< 50	< 50	< 50	54	66	110
BORON, DISSOLVED	UG/L	< 200	< 200	< 200	2900	2100	2900
CADMIUM, DISSOLVED	UG/L	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	2.7
CHROMIUM, DISSOLVED	UG/L	< 10	< 10	< 10	< 10	< 10	< 10
COPPER, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	110
IRON, DISSOLVED	UG/L	< 100	< 100	< 100	210	300	450
LEAD, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L	< 5.0	< 5.0	< 5.0	4600	6000	440
MERCURY, DISSOLVED	UG/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L	< 1.0 L	1.3 L	3.2	< 1.0 L	< 1.0 L	1.2 L
SILVER, DISSOLVED	UG/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	27

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PARAMETER	UNITS	B-31R 07-SEP-93 3293-012	B-32 01-JUN-93 1670-002	B-32 07-SEP-93 3293-016	B-32A 01-JUN-93 1670-003	B-32A 07-SEP-93 3293-017	B-35 01-JUN-93 1670-004
COLOR, FIELD		CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	L YLW/BN
CONDUCTANCE, SPECIFIC	UMHOS/CM	480	300	330	610	1320	1070
DEPTH TO WATER	FEET	14.44	3.37	6.22	3.59	6.46	10.10
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	7.0	6.3	5.6	7.0	6.8	6.3
TEMPERATURE	DEG C	15	13	14	13	14	12
TURBIDITY, FIELD		MODERATE	SLIGHT	MODERATE	NONE	SLIGHT	SLIGHT
WATER ELEVATION	FEET	607.97	610.80	607.95	610.81	607.94	610.66
ALKALINITY AS CACO3	MG/L	190	140	140	330	320	190
CHLORIDE	MG/L	11	6.7	6.9	7.0	7.6	110
COD	MG/L						
FLUORIDE	MG/L	0.18	< 0.10	0.12	0.12	0.19	< 0.10
HARDNESS AS CACO3	MG/L	240	160	180	350	390	260
NITROGEN, NITRATE + NITRITE	MG/L	< 0.050	0.68	1.2	1.1	1.3	36
SOLIDS, TOTAL DISSOLVED	MG/L	340	200	240	380	420	800
SULFATE	MG/L	71	11	16	29	30	35
ARSENIC, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	7.4
BARIUM, DISSOLVED	UG/L	81	100	120	98	91	100
BORON, DISSOLVED	UG/L	1100	< 200	< 200	< 200	< 200	210
CADMIUM, DISSOLVED	UG/L	1.1	< 0.30	0.38	< 0.30	0.35	< 0.30
CHROMIUM, DISSOLVED	UG/L	< 10	< 10	< 10	< 10	< 10	< 10
COPPER, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	21
IRON, DISSOLVED	UG/L	210	< 100	< 100	< 100	< 100	< 100
LEAD, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L	360	< 5.0	280	6.9	33	< 5.0
MERCURY, DISSOLVED	UG/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L	< 1.0 L	< 1.0 L	< 1.0 L	< 1.0 L	< 1.0 L	< 1.0 L
SILVER, DISSOLVED	UG/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	< 20

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PARAMETER	UNITS	B-35 07-SEP-93 3293-002	B-35A 01-JUN-93 1670-005	B-35A 07-SEP-93 3293-003	B-36 01-JUN-93 1670-007	B-36 07-SEP-93 3293-004	B-36A 01-JUN-93 1670-006
COLOR, FIELD		YELLOW	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	1050	620	680	430	500	620
DEPTH TO WATER	FEET	13.13	10.55	13.57	10.86	13.97	11.11
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	6.8	7.0	7.1	6.3	7.0	7.1
TEMPERATURE	DEG C	14	13	12	12	13	13
TURBIDITY, FIELD		SLIGHT	NONE	NONE	SLIGHT	MODERATE	NONE
WATER ELEVATION	FEET	607.63	610.63	607.61	610.60	607.49	610.35
ALKALINITY AS CACO3	MG/L	210	330	320	230	210	330
CHLORIDE	MG/L	80	26	24	4.4	25	12
COD	MG/L						
FLUORIDE	MG/L	0.19	< 0.10	0.13	< 0.10	0.14	< 0.10
HARDNESS AS CACO3	MG/L	290	380	400	240	280	350
NITROGEN, NITRATE + NITRITE	MG/L	39	1.7	2.0	< 0.050	1.4	0.83
SOLIDS, TOTAL DISSOLVED	MG/L	770	480	460	280	350	400
SULFATE	MG/L	43	33	37	15	18	36
ARSENIC, DISSOLVED	UG/L	3.6	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
BARIUM, DISSOLVED	UG/L	120	< 50	54	110	120	68
BORON, DISSOLVED	UG/L	220	< 200	< 200	< 200	< 200	< 200
CADMIUM, DISSOLVED	UG/L	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
CHROMIUM, DISSOLVED	UG/L	< 10	< 10	< 10	< 10	< 10	< 10
COPPER, DISSOLVED	UG/L	24	< 20	< 20	< 20	< 20	< 20
IRON, DISSOLVED	UG/L	< 100	< 100	< 100	< 100	< 100	< 100
LEAD, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L	< 5.0	< 5.0	< 5.0	< 5.0	55	< 5.0
MERCURY, DISSOLVED	UG/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L	< 1.0 L	< 1.0 L	< 1.0 L	1.0 L	2.6 L	< 1.0 L
SILVER, DISSOLVED	UG/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	< 20

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TABLE 8
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PARAMETER	UNITS	B-36A 07-SEP-93 3293-005	B-37 07-SEP-93 3302-007	B-37A 07-SEP-93 3302-008	B-38 01-JUN-93 1670-016	B-38 07-SEP-93 3293-006	B-38A 01-JUN-93 1670-017
COLOR, FIELD		CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	620	510	770	3630	2830	2760
DEPTH TO WATER	FEET	14.18	8.13	8.14	18.53	20.19	24.87
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	7.1	7.3	7.3	8.3	9.9	7.7
TEMPERATURE	DEG C	11	13	11	20	20	15
TURBIDITY, FIELD		NONE	SLIGHT	NONE	NONE	SLIGHT	NONE
WATER ELEVATION	FEET	607.51	606.69	606.69	617.29	615.63	610.96
ALKALINITY AS CACO3	MG/L	330	200	190	100	420	80
CHLORIDE	MG/L	13	6.8	11	26	24	23
COD	MG/L						
FLUORIDE	MG/L	0.14	< 0.10	< 0.10	1.8	2.6	1.1
HARDNESS AS CACO3	MG/L	390	290	410	620	21	500
NITROGEN, NITRATE + NITRITE	MG/L	0.85	1.2	< 0.050	1.7	0.29	1.6
SOLIDS, TOTAL DISSOLVED	MG/L	420	380	590	3000	2200	2300
SULFATE	MG/L	36	100	240	2600	1200	2000
ARSENIC, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	180	90	38
BARIUM, DISSOLVED	UG/L	68	< 50	< 50	110	< 50	58
BORON, DISSOLVED	UG/L	< 200	3100	7400	2500	2600	2200
CADMIUM, DISSOLVED	UG/L	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
CHROMIUM, DISSOLVED	UG/L	< 10	< 10	< 10	68	< 10	52
COPPER, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	< 20
IRON, DISSOLVED	UG/L	< 100	< 100	< 100	< 100	< 100	< 100
LEAD, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L	< 5.0	< 5.0	55	< 5.0	< 5.0	< 5.0
MERCURY, DISSOLVED	UG/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L	< 1.0 L	< 1.0 L	< 1.0 L	57	320	22
SILVER, DISSOLVED	UG/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	< 20

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TABLE 8
GROUNDWATER CHEMISTRY

PARAMETER	UNITS		B-38A 07-SEP-93 3293-007
COLOR, FIELD			CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM		3280
DEPTH TO WATER	FEET		27.59
ODOR, FIELD			NONE
PH, FIELD	SU		9.0
TEMPERATURE	DEG C		16
TURBIDITY, FIELD			NONE
WATER ELEVATION	FEET		608.24
ALKALINITY AS CACO3	MG/L		90
CHLORIDE	MG/L		21
COD	MG/L		
FLUORIDE	MG/L		3.4
HARDNESS AS CACO3	MG/L		390
NITROGEN, NITRATE + NITRITE	MG/L		0.59
SOLIDS, TOTAL DISSOLVED	MG/L		2600
SULFATE	MG/L		1800
ARSENIC, DISSOLVED	UG/L		51
BARIUM, DISSOLVED	UG/L		54
BORON, DISSOLVED	UG/L		3300
CADMIUM, DISSOLVED	UG/L	<	0.30
CHROMIUM, DISSOLVED	UG/L		11
COPPER, DISSOLVED	UG/L	<	20
IRON, DISSOLVED	UG/L	<	100
LEAD, DISSOLVED	UG/L	<	3.0
MANGANESE, DISSOLVED	UG/L	<	5.0
MERCURY, DISSOLVED	UG/L	<	0.20
SELENIUM, DISSOLVED	UG/L		57
SILVER, DISSOLVED	UG/L	<	1.0
ZINC, DISSOLVED	UG/L	<	20

Appendix C

2016 Low-Hazard Waste Exemption Leaching Test Results – Slag and Ash

Sediment and Soil Analytical Results - Water Leach Test Results
WPL Nelson Dewey

Sample	Date	Depth (feet)	Material Type	Lab Notes	Boron (ug/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	TDS (mg/L)
WPDES POND									
SED-1	8/3/2016	0-1.3	Fly Ash	--	240	4.3	<1.0	4.4	54
SED-2	8/3/2016	0-1.0	Fly Ash	--	200	4.3	<1.0	11.5	60
QC-3 (SED-2)	8/3/2016	0-1	Fly Ash	--	240	3.5 J	<1.0	6.1	52
SED-3	7/20/2016	0-4.5	Slag	--	130	2.7 J	<1.0	5	28
	7/20/2016	4.5-5.5	SP	--	<50	2.5 J	<0.20	<2.0	14 J
SED-4	7/19/2016	0-4.8	ML	--	510	10.5 J	<10.0	11.9 J	86
	7/19/2016	4.8-5.5		--	74 J	NA	NA	NA	NA
GP-19	8/4/2016	8-12	SM	--	62 J	2.4 J	<1.0	2 J	16 J
SLAG POND									
SED-5	7/20/2016	0-1.6	ML-OL	--	54 J	3.2 J	<1.0	33.3	90
SED-6	7/20/2016	0-1.0	ML	--	60 J	3.7 J	0.36 J	59.1	130
SED-7	8/4/2016	0-3.0	Fly Ash	--	88 J	4	<1.0	10.5	76
SED-8	8/4/2016	1.0-1.5	Fly Ash	--	82 J	3.7 J	<1.0	12.1	74
COAL YARD									
TP-CY-1	7/19/2016	0-0.5	Coal	--	140	<20.0	<2.0	<20.0	32
	7/19/2016	3.0-3.5	SM	--	100 J	2.8 J	<1.0	<2.0	20
TP-CY-3	7/20/2016	1.9-2.1	GM	--	<50	3.9 J	<0.20	2.8 J	50
	7/20/2016	4.8-5.5	SM	--	NA	NA	NA	NA	NA
TP-CY-4	7/19/2016	0-2.8	Coal	--	190	<20.0	<2.0	<20.0	38
	7/19/2016	2.8-3.2	GP & SM	--	<50	<10.0	<1.0	<10.0	34
	7/19/2016	3.6-4.8	Slag	--	<50	<20.0	<2.0	<20.0	10 J
	7/19/2016	4.8-5.0		--	NA	NA	NA	NA	NA
TP-CY-6	7/19/2016	0-0.5	Coal	--	190	<20.0	<2.0	<20.0	54
	7/19/2016	0.7-1.0	SP	--	<50	2.5 J	<0.20	2.3 J	30
TP-CY-10	7/19/2016	0-0.5	Coal	--	120	2.4 J	<1.0	11.6	48
	7/19/2016	1.0-2.0	SM	--	<50	2.2 J	<1.0	2.3 J	28
TP-CY-12	7/20/2016	0-0.3	Coal	--	160	<20.0	<2.0	<20.0	44
	7/20/2016	0.3-2.0	SP	--	<50	2.2 J	<0.20	2.2 J	24
	7/20/2016	2.0-2.7	SP	--	<50	2.3 J	<0.20	27.5	50
QC-1 (TP-CY-12)	7/20/2016	0.3-2.0	SP	--	<50	2.6 J	<0.20	2.5 J	24
SLAG HANDLING AREA									
GP-5	8/3/2016	12.5-15	Fly Ash	--	100	<2.0	<1.0	3.0 J	22
	8/3/2016	18-24	ML & SM	--	99 J	3.3 J	<1.0	<2.0	24
GP-7	8/3/2016	7.5-18	Slag	--	<50	2.2 J	<1.0	<2.0	<8.7
QC-2 (GP-7)	8/3/2016	7.5-18	Slag	--	<50	2.2 J	<1.0	<2.0	10 J
GP-14	8/4/2016	12.5-15	Fly Ash	--	120	<2.0	<1.0	13.4	96
SLAG SAMPLES[1]									
Slag 01 [2]	6/3/2013	--	Slag	--	NA	NA	NA	NA	NA
Slag 01	12/23/2013	--	Slag	--	12.5 AB	0.277 B	NA	0.218	NA
NED Slag Composite 2014	7/1/2014	--	Slag	--	11.7 AB*^	< 0.142	NA	0.457 B	98 H
Slag Sample	4/14/2015	--	Slag	--	< 1020 A	0.751	NA	0.427	NA

Sediment and Soil Analytical Results - Water Leach Test Results
WPL Nelson Dewey

Sample	Date	Depth (feet)	Material Type	Lab Notes	Boron (ug/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	TDS (mg/L)
FLY ASH SAMPLES[1]									
NED Flyash Composite [2]	2/14/2014	--	Fly Ash	--	NA	NA	NA	6,530 B	NA
Week of 062815 [2]	7/3/2015	--	Fly Ash	--	NA	NA	NA	6,260	NA
Week of 010916	1/4/2016	--	Fly Ash	--	NA	NA	NA	NA	NA
NR 140 Preventative Action Limits (PALs)					200	125	0.8	125	NE
NR 140 Enforcement Standards (ESs)					1000	250	4	250	NE
40 CFR Part 141.62 Maximum Contaminant Levels (MCL)					NE	NE	4	NE	NE
NR 538 Table 1A Standards					190	125	0.8	125	NE
NR 538 Table 2A Standards					1900	1,250	8	1,250	NE

Abbreviations:
mg/L = micrograms per liter
NE = No Standard Established
NA = Not Analyzed
GM = Silty Gravel
ML = Silt
ML-CL = Silty Clay
SM = Silty Sand
GP = Poorly Graded Gravel
ML-OL = Silty Organic Clay
SP = Poorly Graded Sand
ML-OL = Silty Organic Clay
TDS = Total Dissolved Solids

Notes:
1. Slag and Fly Ash samples were collected by the plant as part of permit requirements.
2. Sample was analyzed using the SPLP Leach Method rather than the ASTM Water Leach Method for tested parameters except for Sulfate.
NR 140 ESs - Wisconsin Administrative Code (WAC), Chapter NR 140.10 Table 1 - Public Health Groundwater Quality Standards from July 2015 and WAC, Chapter NR 140.12 Table 2 - Public Welfare Groundwater Quality Standards from July 2015.
NR 140 PALs - WAC, Chapter NR 140.10 Table 1 - Public Health Groundwater Quality Standards from July 2015 and WAC, Chapter NR 140.12 Table 2 - Public Welfare Groundwater Quality Standards from July 2015.

Laboratory Notes/Qualifiers:
J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
A = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B = Compound was found in the blank and sample.
F1 = MS and/or MSD Recovery is outside acceptance limits.
H = Sample was prepped or analyzed beyond the specified holding time.
^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
* = LCS or LCSD is outside acceptance limits.

Created by: RJG Date: 3/14/2016
Last revision by: RJG Date: 10/24/2016
Checked by: BSS Date: 10/24/2016
Original table prepared for Slag Pond Closure Low Hazard Waste Exemption Request (SCS Project #25216054.00).
Reformatted for the Alternative Source Demonstration to include only the parameters with SSIs that were included in the leach testing by NDK, 9/14/2020; SCC 10/1/2021.

I:\25221071.00\Deliverables\2021 April ASD NED\Appendix C 2016 leachate results slag and ash\[Table 4. Sediment_Soil_Water Leach Results-Updated.xlsx]Leach Test - SSI Parameters

E2 Alternative Source Demonstration, April 2022 Detection Monitoring

Alternative Source Demonstration
April 2022 Detection Monitoring

Slag Pond
Nelson Dewey Generating Station
Cassville, Wisconsin

Prepared for:

Alliant Energy

SCS ENGINEERS

25222071.00 | October 13, 2022

2830 Dairy Drive
Madison, WI 53718-6751
608-224-2830

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PE CERTIFICATION

I, Sherren Clark, hereby certify that that the information in this alternative source demonstration is accurate and meets the requirements of 40 CFR 257.94(e)(2). This certification is based on my review of the groundwater data and related site information available for the Nelson Dewey Generating Station Slag Pond facility. I am a duly licensed Professional Engineer under the laws of the State of Wisconsin.

SL Clark 10-13-2022

(signature) (date)

Sherren Clark

(printed or typed name)

License number E-29863

My license renewal date is July 31, 2024.

Pages or sheets covered by this seal:

Alternative Source Demonstration, April 2022
Detection Monitoring – Slag Pond
Nelson Dewey Generating Station, Cassville
(Entire Document)

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1.0 INTRODUCTION

This Alternative Source Demonstration (ASD) was prepared to support compliance with the groundwater monitoring requirements of the "Coal Combustion Residuals (CCR) Final Rule" published by the U.S. Environmental Protection Agency (U.S. EPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule*, dated April 17, 2015 (U.S. EPA, 2015), and subsequent amendments. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.94(e)(2). The applicable sections of the Rule are provided below in *italics*.

1.1 §257.94(E)(2) ALTERNATIVE SOURCE DEMONSTRATION REQUIREMENTS

The owner and operator may demonstrate that a source other than the CCR Unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels.

An ASD is completed when there are exceedances of one or more benchmarks established within the groundwater monitoring program to determine if any other sources are likely causes of the identified exceedance(s) of established benchmark(s) at the site. This ASD was performed in response to results indicating a statistically significant increase (SSI) over background levels during detection monitoring under the CCR Rule.

This ASD report evaluates the SSIs observed in the statistical evaluation of the April 2022 detection monitoring event at the Nelson Dewey Generating Station (NED). The first ASD prepared for this facility evaluated the SSIs observed in the statistical evaluation of the October 2017 detection monitoring event (SCS Engineers [SCS], 2018). The October 2017 ASD and subsequent semiannual updates have included several lines of evidence demonstrating that SSIs reported for Appendix III parameters in the downgradient monitoring wells were likely due to man-made sources other than the slag pond CCR Unit and/or naturally occurring constituents in the alluvial aquifer. The conclusions of this ASD are consistent with previous ASDs.

1.2 SITE INFORMATION AND MAP

The NED site is located along the east bank of the Mississippi River, north of the Village of Cassville, in Grant County, Wisconsin (**Figure 1**). The facility includes a decommissioned coal-fired generating plant, a CCR landfill that was closed in 2001, a closed Slag Pond, and a closed wastewater treatment pond. The layout of the site on an aerial photograph base is shown on **Figure 2**. The closed landfill at the NED facility was permitted under Wisconsin Department of Natural Resources (WDNR) License #02525.

The existing CCR Unit evaluated for this ASD is:

- Slag Pond (existing surface impoundment – closed January 2018)

A map showing the CCR Unit and all background (or upgradient) and downgradient monitoring wells with identification numbers for the CCR groundwater monitoring program and the state monitoring program is provided as **Figure 3**.

Operations at the facility began in the late 1950s, and a CCR impoundment that included what is now the Slag Pond closure area was commissioned at that time. The CCR landfill was initially licensed in 1976 and received fly ash from NED until it was closed in phases between 1996 and 2001. The CCR landfill was initially operated as a fly ash sluice basin, then transitioned to dry ash placement prior to closure. The wastewater ponds, now closed, were constructed in 1976 for the purpose of settling CCR from the NED process wastewater streams and sediment from storm water runoff prior to discharge. Both NED generating units were retired on December 31, 2015, and have since been decommissioned. The generating station was demolished in 2017. Closure of the slag pond was completed in January 2018.

1.3 STATISTICALLY SIGNIFICANT INCREASES IDENTIFIED

The statistical evaluation was completed in accordance with 40 CFR 257.93(f)(3) using a prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper prediction limit (UPL). The initial evaluation was based on an interwell comparison. The UPLs were calculated based on a 1-of-2 resampling approach. The UPLs and the analytical results for the April 2022 monitoring event are summarized in the attached **Table 1**.

The initial evaluation indicated that the April 2022 monitoring event results represent an SSI over background for the following parameters and wells:

- Boron: B-7R, B-11A, B-11B, B-11R, B-31A, B-31R
- Calcium: B-11R
- Field pH: B-31A
- Sulfate: B-11B, B-11R, B-31R
- Total Dissolved Solids (TDS): B-11B, B-11R

The SSIs are consistent with SSIs identified in previous detection monitoring results.

1.4 OVERVIEW OF ALTERNATIVE SOURCE DEMONSTRATION APPROACH

This ASD report includes:

- Background information (**Section 2.0**).
- Evaluation of potential that SSIs are due to methodology or analysis (**Section 3.0**).
- Evaluation of potential that SSIs are due to natural sources or man-made sources other than the CCR Units (**Section 4.0**).
- ASD conclusions (**Section 5.0**).
- Monitoring recommendations (**Section 6.0**).

Historical monitoring results from background and compliance sampling for the CCR Rule constituents with SSIs are provided in **Table 2**. The laboratory report for the April 2022 event will be included in the 2022 Annual Groundwater Monitoring and Corrective Action report to be completed in January 2023. Complete laboratory reports for the background monitoring events and previous detection monitoring events were included in the previous annual groundwater monitoring and corrective action reports.

2.0 BACKGROUND

To provide context for the ASD evaluation, the following background information is provided in this section of the report, prior to the ASD evaluation sections:

- Geologic and hydrogeologic setting
- CCR Rule monitoring system
- Other monitoring wells

A more detailed discussion of the background information for the site is provided in the ASD for the October 2017 event (SCS, 2018).

2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

2.1.1 Regional Information

The uppermost geologic formation beneath the NED site is the surficial alluvial aquifer. The alluvial aquifer consists of Mississippi River valley sand and gravel deposits, and is the uppermost aquifer as defined in section 257.53 of the CCR Rule. This deposit is prevalent along the edges of the entire Mississippi River valley in southwestern Wisconsin.

The alluvial aquifer is underlain by dolomitic bedrock of the Prairie du Chien Group. The dolomite bedrock is also an aquifer and is likely hydraulically connected to the alluvial aquifer above.

Regionally, groundwater flow is generally to the southwest and discharges to the Mississippi River.

Additional details on the regional geology were provided in the October 2017 ASD (SCS, 2018).

2.1.2 Site Information

The thickness of the alluvium in the immediate vicinity of the site is over 125 feet, as evidenced by local water supply well logs (SCS, 2018). These logs are also evidence that the alluvial aquifer yields useable quantities of groundwater for supply wells in the area. Soil boring logs for monitoring wells installed at the site also generally indicate sand and gravel soils within the monitored depths.

The groundwater flow direction in the vicinity of the plant is generally southwest toward the Mississippi River. Historically, infiltration at the former Slag Pond, former fly ash basin, and the former Wisconsin Pollutant Discharge Elimination System (WPDES) ponds caused groundwater mounding to be present around these features; however, these ponds have now all been closed and are no longer sources of infiltration.

Site water level measurements generally indicate that groundwater flow is to the southwest, discharging to the Mississippi River. However, during periods of high river water levels, the flow temporarily reverses and the river discharges to the shallow sand and gravel aquifer. The groundwater flow direction during the April 2022 detection monitoring event was generally to the southwest toward the Mississippi River (**Figure 4**). The groundwater elevations are provided in **Table 3**.

2.2 COAL COMBUSTION RESIDUALS RULE MONITORING SYSTEM

The groundwater monitoring system established in accordance with the CCR Rule consists of one upgradient (background) monitoring well and six downgradient monitoring wells. The background well is B-26. The downgradient wells include B-7R, B-11A, B-11B, B-11R, B-31A, and B-31R. The CCR Rule wells are installed within the surficial alluvium aquifer. Well depths range from approximately 23 to 114 feet, measured from the top of the well casing.

2.3 OTHER MONITORING WELLS

There are several additional groundwater monitoring wells at the NED facility that are part of the monitoring system developed for the state monitoring program. All of the wells included in the CCR monitoring well network were already in use for the state monitoring program. The well locations are shown on Figure 3. The state program monitoring wells and two private wells are used to monitor groundwater conditions at the site under WDNR License Number 2525, which includes the closed CCR landfill and the closed Slag Pond. Monitoring wells for the state monitoring program are installed in the surficial sand and gravel aquifer, which is the uppermost aquifer as defined under 40 CFR 257.53.

3.0 METHODOLOGY AND ANALYSIS REVIEW

To evaluate the potential that an SSI is due to a source other than the regulated CCR Unit, SCS used a two-step evaluation process. First, the sample collection, field and laboratory analysis, and statistical evaluation were reviewed to identify any potential error or analysis that led to an exceedance of the benchmark. Second, potential alternative sources, including natural variation and man-made sources other than the CCR Unit, were evaluated. This section of the report provides the findings of the methodology and analysis review. Section 4.0 of the report addresses the potential alternative sources.

3.1 SAMPLING AND FIELD ANALYSIS REVIEW

Field notes and sampling results were reviewed to determine if any sampling error may have caused or contributed to the observed SSIs. Potential field sampling errors or issues could include mislabeling of samples, improper sample handling, missed holding times, cross contamination during sampling, or other field error. Field blank sample results were also reviewed for any indication of potential contamination from sampling equipment or containers. Based on the review of the field notes and results, SCS did not identify any indication that the SSIs were due to a sampling error.

SCS did not identify any issues with the field sampling for field analysis based on review of the data and field notes. Because boron, calcium, TDS, and sulfate are laboratory parameters, there is little potential for a field analysis error to contribute to an SSI.

3.2 LABORATORY ANALYSIS REVIEW

The laboratory reports for the April 2022 detection monitoring events were reviewed to evaluate whether any laboratory analysis error or issue may have caused or contributed to the observed SSIs. The laboratory report review included reviewing the laboratory quality control flags and narrative, verifying that correct methods were used and desired detection limits were achieved, and checking the field and laboratory blank sample results. Laboratory reports for the background monitoring events were reviewed for the October 2017 ASD. Laboratory reports for subsequent detection monitoring events were reviewed as part of the ASD preparation for each event.

Based on the review of the laboratory reports, SCS did not identify any indication that any SSI was due to a laboratory analysis error. There were no laboratory quality control flags or issues identified in the laboratory reports that affect the usability of the data for detection monitoring. Because field pH is a field parameter, there is little potential for a laboratory error to contribute to an SSI.

Time series plots of the SSI constituent analytical data were also reviewed for any anomalous results that might indicate a possible sampling or laboratory error (e.g., dilution error or incorrect sample labeling). The time series plots are provided in Appendix A. None of the time series plots included anomalous results that appeared to indicate a sampling or laboratory error.

3.3 STATISTICAL EVALUATION REVIEW

The review of the statistical results and methods included a quality control check of the following:

- Input analytical data vs. laboratory analytical reports
- Statistical method and process for each SSI

Based on the review of the statistical evaluation, SCS did not identify any errors or issues in the statistical evaluation that caused or contributed to the determination of interwell SSIs for boron, calcium, field pH, sulfate, and TDS at the downgradient monitoring wells.

3.4 SUMMARY OF METHODOLOGY AND ANALYSIS REVIEW FINDINGS

In summary, there were no changes to the SSI determinations for the April 2022 detection monitoring events based on the methodology and analysis review. No errors or issues causing or contributing to the reported SSIs were identified.

4.0 ALTERNATIVE SOURCES

This section of the report discusses the potential alternative sources for the SSI constituents at the downgradient wells, identifies the most likely alternative source(s), and presents the lines of evidence indicating that an alternative source is the most likely cause of the observed SSIs.

4.1 POTENTIAL CAUSES OF STATISTICALLY SIGNIFICANT INCREASES

4.1.1 Natural Variation

The statistical analysis was completed using an interwell approach, comparing the April 2022 detection monitoring results to the UPLs calculated based on sampling of the background well (B-26). If concentrations of a constituent that is naturally present in the aquifer vary spatially, then the potential exists that the downgradient concentrations may be higher than upgradient concentrations due to natural variation.

Although natural variation is present in the shallow aquifer, it does not appear likely that natural variation is the primary source causing the boron, field pH, sulfate, and TDS SSIs. These parameters were detected at higher concentrations than would likely be present naturally.

Natural variation may have caused or contributed to the SSI for calcium at B-11R. As discussed in Section 2.1.1, the alluvial aquifer is underlain by dolomitic bedrock of the Prairie du Chien Group. The dolomite aquifer is also present in the bluffs northeast of the site and groundwater from the

dolomite likely discharges to the alluvial aquifer. Calcium is a typical constituent of groundwater in dolomite aquifers. The calcium concentrations in upgradient well B-26 have exceeded those in at least three of the downgradient wells, suggesting that natural variability may contribute to the calcium concentrations observed in the downgradient monitoring wells.

4.1.2 Man-Made Alternative Sources

Man-made alternative sources that could potentially contribute to the boron, calcium, field pH, sulfate, and TDS SSIs could include the closed CCR landfill, the coal storage area, or other plant operations. Based on the groundwater flow directions and on previous investigations at the site, the closed landfill appears to be the most likely man-made cause of the SSIs for the downgradient wells B-7R, B-11A, B-11B, B-11R, B-31A, and B-31R.

4.2 LINES OF EVIDENCE

The lines of evidence indicating that the SSIs for boron, calcium, field pH, sulfate, and TDS in one or more compliance wells relative to the background well are more likely due to the closed landfill and prior fly ash sluicing than to the Slag Pond include:

1. A previous Environmental Contamination Assessment completed for the ash disposal facility indicated that the fly ash sluicing and landfill were the primary source of the groundwater impacts in the area, based on multiple lines of evidence.

2. Sampling performed in preparation for the Slag Pond closure indicated that the slag and the Slag Pond sediment had little potential to cause the SSIs for boron, sulfate, and TDS.

3. Past and current groundwater monitoring performed under the state monitoring program shows that groundwater quality has improved since the 1990s in response to termination of fly ash sluicing and closure and capping of the ash landfill. Recent concentration increases at some wells in the state monitoring program appear to be attributable to the closed CCR landfill source and to changes in groundwater flow at the site in response to closure of the Slag Pond.

The data supporting these lines of evidence are discussed below. Most of these lines of evidence and the supporting data were discussed in detail in the ASD for the October 2017 detection monitoring event (SCS, 2018), with the exception of the TDS SSI concentrations. For lines of evidence included in previous ASDs, the discussion focuses on any updated information collected since the previous ASD, with references to the previous ASD for additional details.

4.2.1 Previous CCR Pond and Landfill Study

A previous investigation titled *Environmental Contamination Assessment: Nelson Dewey Generating Station Ash Disposal Facility*, completed by RMT in 1994, found that groundwater impacts were associated with disposal of fly ash in the now-closed CCR landfill located immediately north of the Slag Pond (**Figure 3**). The purpose of the 1994 Environmental Contamination Assessment (ECA) was to investigate the impacts to groundwater at the NED landfill. The ECA was used to evaluate the feasibility of possible remedial alternatives. The remedial alternative that was ultimately selected was to convert the plant to dry fly ash handling.

The primary lines of evidence from the 1994 report that support the current ASD for boron, field pH, sulfate, and TDS include:

- Water leaching tests for ash and slag indicated that boron and sulfate concentrations in the slag leachate were orders of magnitude lower than in the fly ash leachate (**Appendix B**, **Table 5**). Higher pH values were also reported for leach samples of Western coal fly ash in 1990 to 1992 than for the slag samples.

- Surface water samples from the then active fly ash sluice pond and the Slag Pond indicated that boron and sulfate concentrations in the Slag Pond were one or more orders of magnitude lower than in the ash sluice pond. The surface water pH measurement was also higher in the ash sluice pond. The surface water boron and sulfate concentrations in the Slag Pond were higher than leach test results, which was attributed to infiltration of ash sluice pond water through the berm between the ponds into the Slag Pond (**Appendix B**, **Table 6**).

- Groundwater sampling at monitoring wells B-38 and B-38A (now abandoned), which were installed through and screened below the ash disposal area (now closed landfill), indicated that groundwater affected by ash sluicing was characterized by high pH and elevated concentrations of boron, sulfate, and TDS (**Appendix B**, **Site Map** and **Table 8**).

Although calcium was not included in the historical state groundwater monitoring program or evaluated in the 1994 report, hardness was monitored and provides an indication of relative calcium concentrations. Surface water samples from the then active ash sluice pond and the Slag Pond indicated that hardness in the Slag Pond was lower than in the ash sluice pond (**Appendix B**, **Table 6**). These results suggest that if the calcium SSI is not solely due to natural variation, then the closed CCR landfill is the most likely man-made source of calcium.

The results of the 1994 ECA were reported to WDNR on November 1994. The ECA investigation was then used for a feasibility study to determine appropriate ash disposal operation on site. Following the ECA, the plant converted to a dry ash handling system. Dry ash was placed in the CCR landfill through the 1990s, and the landfill was capped and closed in phases in 1996 through 2001. After that time, fly ash was not disposed of at the facility.

4.2.2 Slag Pond Closure Sampling Results

Results of leaching test analysis performed for slag, ash, soil, and sediment were submitted as part of a Low Hazard Exemption Request to the WDNR in March 2017 (SCS, 2017). The Exemption Request was submitted as part of the Closure Plan for the site and requested WDNR approval to consolidate materials from decommissioning activities in the Slag Pond and Slag Handling Area, which would then be capped with a composite final cover system. The sediment and soil samples were collected to characterize the materials that would remain on site under the Closure Plan. Leaching tests were performed using ASTM water leach test methods. The leaching test analytical results for parameters with SSIs that were included in the leaching test program (boron, sulfate, and TDS) are summarized in **Appendix C**.

The sampling results in the Exemption Request indicated that the materials to be consolidated and capped were not likely to cause groundwater standard exceedances for boron, sulfate, or TDS. The leach test results for slag, Slag Pond sediment, and soil in the Slag Handling Area were below the state groundwater standards for boron and sulfate. The parameter TDS does not currently have a state standard but the leach test results for slag, Slag Pond sediment, and soil in the Slag Handling Area were all below the calculated TDS UPL for the site (**Table 1** and **Appendix C**). The boron, sulfate, and TDS results were also below the concentrations in the downgradient CCR wells with SSIs, and

well below the historical results for former well B-38, which was located within the CCR landfill area, upgradient from the Slag Pond (**Appendix B**, **Table 8**).

The Low Hazard Exemption was granted by the WDNR based on the sampling results and other information presented.

4.2.3 State Program Groundwater Monitoring Results

Past and current groundwater monitoring performed under the state monitoring program shows that groundwater quality has improved substantially since the 1990s in response to termination of fly ash sluicing, and closure and capping of the ash landfill (SCS, 2018). The long-term trends show that concentrations of boron and sulfate in groundwater have decreased or stabilized since termination of fly ash sluicing and closure of the landfill, in some cases by an order of magnitude or more. The results suggest that current pH levels and boron, sulfate, and TDS concentrations likely represent residual contamination from historical ash disposal in the CCR landfill area. Increases in boron, sulfate, and TDS concentrations at B-11B beginning in 2018 appear to be attributable to the closed CCR landfill and to changes in groundwater flow at the site, related to a decrease in the volume of water discharged to the Slag Pond and subsequent closure of the Slag Pond. Concentrations of boron in samples from B-11B transitioned to a decreasing trend as of October 2019. A summary of state analytical groundwater results is provided in **Table 4**.

5.0 ALTERNATIVE SOURCE DEMONSTRATION CONCLUSIONS

The lines of evidence discussed above regarding the SSIs reported for boron, calcium, field pH, sulfate, and TDS results in downgradient monitoring wells demonstrate that the SSIs are likely primarily due to sources other than the closed Slag Pond. The SSIs for boron, calcium, field pH, sulfate, and TDS appear to be due to historical ash disposal in the closed CCR landfill, which is not subject to the requirements of 40 CFR 257.50-107. The landfill is regulated by the WDNR under the solid waste program (License 02525). Natural variation in groundwater quality in the aquifer may also contribute to the SSI for calcium.

6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS

In accordance with section 257.94(e)(2) of the CCR Rule, the NED Slag Pond site may continue with detection monitoring based on this ASD. The ASD report will be included in the 2022 Annual Report due January 31, 2023.

7.0 REFERENCES

RMT, 1994, Environmental Contamination Assessment: Nelson Dewey Generating Station Ash Disposal Facility, November 1994.

SCS Engineers, 2017, Low Hazard Exemption Request, Nelson Dewey Generating Station, Cassville, WI, March 2017.

SCS Engineers, 2018, 2017 Alternative Source Demonstration, October 2017 Monitoring Event, Nelson Dewey Generating Station, April 2018.

U.S. Environmental Protection Agency (U.S. EPA), 2015, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, April 2015.

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Tables

Table 1. Groundwater Analytical Results Summary
Nelson Dewey Slag Pond, Cassville, WI / SCS Engineers Project #25222071.00

Parameter Name	UPL	Background Well	Compliance Wells					
		B-26	**B-7R**	**B-11A**	**B-11B**	**B-11R**	**B-31A**	**B-31R**
		4/25/2022	4/26/2022	4/26/2022	4/26/2022	4/26/2022	4/26/2022	4/25/2022
Appendix III								
Boron, ug/L	72.3	52.5	98.1	88.6	2,590	2,330	198	454
Calcium, ug/L	108,000	75,900	59,200	51,600	97,100	114,000	55,300	81,100
Chloride, mg/L	77.6	45.3	12.0	58.3	36.5	18.0	56.0	36.0
Fluoride, mg/L	0.2	<0.48 D3, M0	<0.48 D3	<0.095	<0.48	<0.48 D3	0.22 J	<0.095
Field pH, Std. Units	7.71	7.19	6.43	7.53	7.63	7.01	7.82	6.77
Sulfate, mg/L	44.0	34.2	3.7 J, D3	8.5	513	58.1	15.4	60.0
Total Dissolved Solids, mg/L	553	470	318	350	1,000	560	316	428

7.81 Blue shaded cell indicates the compliance well result exceeds the UPL (background) and the Limit of Quantitation (LOQ).

Abbreviations:

UPL = Upper Prediction Limit
SSI = Statistically Significant Increase
ug/L = micrograms per liter
mg/L = milligrams per liter
LOQ = Limit of Quantitation

Lab Notes:

J = Estimated concentration at or above the LOD and below the LOQ.
D3 = Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
M0 = Matrix Spike recovery and/or matric spike duplicate recovery was outside laboratory control limits.

Notes:

1. An individual result above the UPL may not constitute an SSI above background. See the accompanying letter text for identification of statistically significant results.
2. Interwell UPLs calculated based on results from background well B-26. UPLs are based on a 1-of-2 retesting approach.
3. Interwell UPLs updated January 2021 based on background well results from December 2015 through October 2020.

Created by:	NDK	Date:	5/17/2022
Last revision by:	RM	Date:	5/23/2022
Checked by:	JAO	Date:	6/10/2022
Proj Mgr QA/QC/Scientist:	TK	Date:	6/27/2022

I:\25222071.00\Deliverables\2022 NED April CCR Results Letter\Table\[Table 1_2204-NED - CCR GW Screening Summary.xlsx]Current Event - Updated UPL

Table 2. Historical Analytical Results for Parameters with SSIs
Nelson Dewey Generating Station - Cassville, Wisconsin / SCS Engineers Project #25222071.00

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (mg/L)	Field pH (Std. Units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
Background	B-26	12/9/2015	29.6	81,300	7.35	37.1	424
		4/12/2016	33.7	86,200	7.43	38.0	456
		7/19/2016	28.6	82,400	7.14	36.2	504
		10/20/2016	33.0	82,700	7.19	35.0	466
		1/12/2017	35.2	89,400	7.57	35.0	446
		4/17/2017	50.1	89,000	7.54	32.4	468
		6/7/2017	45.8	105,000	7.22	31.0	538
		8/2/2017	54.6	98,100	7.21	28.5	496
		10/19/2017	47.4	102,000	7.50	25.3	542
		4/2/2018	48.0	88,100	7.64	19.1	464
		10/8/2018	53.4	78,700	7.20	25.1	450
		4/22/2019	41.6	75,300	7.10	26.7	458
		10/15/2019	<3.00 U	<76.2	7.24	36.0	404
		4/14/2020	66.1	88,500	7.27	30.2	464
		10/13/2020	63.6	76,500	7.34	37.0	448
		4/21/2021	63.6	78,700	7.27	35.3	470
		10/8/2021	48.4	84,900	7.18	43.8	440
		4/25/2022	52.5	75,900	7.19	34.2	470
Compliance	B-11A	12/9/2015	124	58,800	7.70	3.20 J	338
		4/13/2016	116	60,100	7.75	3.80 J	362
		7/19/2016	104	54,000	7.42	2.70 J	336
		10/19/2016	112	54,600	7.47	3.00 J	340
		1/12/2017	106	54,500	7.89	2.30 J	322
		4/17/2017	100	54,800	7.38	<1.00	326
		6/8/2017	102	57,800	7.78	1.40 J	338
		8/1/2017	105	54,500	7.67	2.40 J	326
		10/19/2017	116	55,000	7.96	5.10	322
		4/2/2018	91.0	53,300	8.04	12.3 M0	336
		10/9/2018	94.2	48,600	7.43	6.00	332
		4/22/2019	93.9	60,400	7.62	1.90 J	386
		10/14/2019	80.7	56,600	7.66	<1.00	348
		4/13/2020	86.3	57,500	7.75	1.40 J	394
		10/12/2020	99.3	55,600	7.74	1.00 J	364
		4/19/2021	88.1	50,600	7.65	2.9	366
		10/8/2021	85.4	51,400	7.57	7.0	356
		4/26/2022	88.6	51,600	7.53	8.5	350
	B-11B	12/9/2015	1,140	64,100	8.06	134	494
		4/13/2016	1,360	65,400	8.14	148	512
		7/19/2016	1,210	59,000	7.77	165	520
		10/20/2016	1,460	59,100	7.91	178	496
		1/12/2017	1,540	63,900	8.18	182	488
		4/17/2017	1,760	67,400	7.83	181	502
		6/8/2017	1,880	68,200	8.07	191	516
		8/1/2017	1,800	61,400	7.77	179	498
		10/19/2017	1,500	52,400	7.77	175	510
		4/2/2018	2,020	59,000	8.42	200	550
		10/9/2018	3,620	66,300	7.74	197	602
		11/12/2018	--	--	8.05	--	594
		4/22/2019	6,830	83,300	7.91	303	742
		10/14/2019	4,630	91,400	7.92	339	728
		4/13/2020	5,380	115,000	7.89	378	872
		10/12/2020	3,350	91,200	7.80	388	906
		4/19/2021	4,440	93,400	8.07	379 M0	910
		10/8/2021	2,480	100,000	7.81	466	884
		4/26/2022	2,590	97,100	7.63	513	1000

Table 2. Historical Analytical Results for Parameters with SSIs
Nelson Dewey Generating Station - Cassville, Wisconsin / SCS Engineers Project #25222071.00

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (mg/L)	Field pH (Std. Units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
Compliance	B-11R	12/9/2015	4,170	126,000	7.07	75.4	616
		4/13/2016	3,410	141,000	6.78	18.4	682
		7/19/2016	3,530	130,000	6.69	115	698
		10/20/2016	4,120	128,000	6.77	118	660
		1/12/2017	3,530	126,000	6.98	108	616
		4/17/2017	3,520	123,000	7.11	108	620
		6/7/2017	3,420	128,000	6.80	98.2	630
		8/1/2017	2,040	139,000	6.70	126	738
		10/19/2017	3,120	117,000	7.22	97.7	586
		4/2/2018	3,180	124,000	7.14	88.1	638
		10/9/2018	576	49,900	6.55	15.1	266
		4/22/2019	1,360	82,400	6.82	34.6	406
		10/14/2019	1,440	66,000	6.83	40.7	310
		4/13/2020	2,140	117,000	6.80	41.9	570
		10/12/2020	2,870	120,000	6.83	22.8	600
		4/19/2021	3,010	115,000	7.11	61.2	578
		10/8/2021	2,940	119,000	6.86	61.8	576
		4/26/2022	2,330	114,000	7.01	58.1	560
	B-31A	12/9/2015	59.0	48,400	7.65	26.2	274
		4/13/2016	79.2	51,900	7.63	22.6	302
		7/19/2016	67.2	48,900	7.25	24.2	280
		10/20/2016	63.7	45,800	7.54	27.2	292
		1/12/2017	76.4	46,600	7.82	29.8	284
		4/17/2017	69.9	46,900	7.83	31.0	318
		6/8/2017	58.5	49,400	7.74	31.2	296
		8/1/2017	56.3	46,000	7.56	26.6	284
		10/19/2017	63.9	49,600	7.92	26.1	290
		4/2/2018	74.8	49,300	8.00	27.4	282
		10/9/2018	71.8	46,600	7.48	24.8	278
		4/22/2019	86.2	48,200	7.61	21.6	284
		10/14/2019	98.5	52,200	7.69	22.3	272
		4/13/2020	132	50,900	7.71	16.6	298
		10/13/2020	127	47,700	7.78	16.8	300
		4/19/2021	172	52,100	7.90	15.8	330
		10/8/2021	178	53,500	7.44	14.9	294
		4/26/2022	198	55,300	7.82	15.4	316
	B-31R	12/9/2015	851	77,400	6.79	28.8	374
		4/13/2016	838	84,900	6.76	34.1	404
		7/19/2016	641	76,100	6.44	38.5	406
		10/20/2016	1,020	84,200	6.53	49.7	452
		1/12/2017	749	73,900	6.80	34.9	380
		4/17/2017	929	85,600	6.80	43.0	416
		6/8/2017	895	90,700	6.67	41.1	426
		8/1/2017	1,550	93,400	6.56	55.6	432
		10/19/2017	645	75,700	7.19	19.2	358
		4/2/2018	540	72,900	6.76	22.0	374
		10/9/2018	1,430	125,000	6.41	186	668
		11/12/2018	--	--	6.59	162	596
		4/22/2019	906	105,000	6.62	121	516
		10/14/2019	915	110,000	6.72	146	480
		4/13/2020	730	93,800	6.79	89.4	464
		10/12/2020	702	95,700	6.89	49.4	462
		4/19/2021	621	91,400	6.91	45.3	454
		10/8/2021	353	79,000	6.63	24.9	372
		4/25/2022	454	81,100	6.77	60.0	428

Table 2. Historical Analytical Results for Parameters with SSIs
Nelson Dewey Generating Station - Cassville, Wisconsin / SCS Engineers Project #25222071.00

Well Group	Well	Collection Date	Boron (µg/L)	Calcium (mg/L)	Field pH (Std. Units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
Compliance	B-7R	12/9/2015	110	31,700	6.74	17.0 J	198
		4/13/2016	115	42,300	6.80	2.50 J	218
		7/18/2016	164	44,400	6.29	2.40 J	220
		10/19/2016	154	56,600	6.55	<5.00	288
		1/12/2017	159	56,700	7.43	<5.00	240
		4/17/2017	129	61,400	6.60	<5.00	278
		6/7/2017	110	51,600	6.65	<5.00	240
		8/1/2017	129	50,400	6.28	3.70	220
		10/19/2017	159	56,200	6.88	<5.00 , D3	242
		4/2/2018	121	49,200	6.57	<5.00 , D3	220
		10/9/2018	73.0	38,500	6.23	3.20	186
		4/22/2019	93.5	59,400	6.63	<5.00 , D3	254
		10/14/2019	139	57,700	6.62	<5.00 , D3	208
		4/13/2020	96.0	58,700	6.60	7.50 J, D3	306
		10/13/2020	145	41,900	6.35	<2.20	208
		4/20/2021	104	56,100	6.54	<2.2 D3	248
		10/8/2021[(1)]	--	--	--	--	--
		4/26/2022	98.1	59200	6.43	3.7 J, D3	318

Abbreviations:
µg/L = micrograms per liter or parts per billion (ppb)
mg/L = milligrams per liter or parts per million (ppm)
Std. Units = Standard Units

Flags:
J = Estimated concentration at or above the LOD and below the LOQ.
D3 = Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
M0 = Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
-- = Not applicable.

Notes:
(1) B-7R could not be sampled on 10/8/2021 or during an attempted resampling event on 10/28/2021 due to low water levels.

Created by:	NDK	Date:	3/8/2018
Last revision by:	RM	Date:	7/27/2022
Checked by:	JJK	Date:	8/3/2022

Table 3. Groundwater Elevation Summary
Nelson Dewey Closed Ash Disposal Facility / SCS Engineers Project #25222071.00

	Ground Water Elevation in feet above mean sea level (amsl)																								
Well Number	**B-7R**	**B-8R**	**B-11R**	**B-11A**	**B-11B**	**B-21R**	**B-26**	**B-26A**	**B-28**	**B-30R**	**B-30AR**	**B-31R**	**B-31A**	**B-32**	**B-32A**	**B-35**	**B-35A**	**B-36**	**B-36A**	**B-37**	**B-37A**	**B-39**	**MW-301**	**MW-302**	**MW-303**	**Barge Gauge (SG-12)**	**Pond Gauge (SG-13)**
Top of Casing Elevation (feet amsl)	623.35	627.51	622.62	622.12	621.89	623.31	626.40	626.40	616.81	621.81	622.4	622.42	622.69	614.18	614.4	620.78	621.09	621.11	621.33	614.85	614.85	626.48	619.09	619.21	618.49	616.60	See notes
Screen Length (ft)	10	10	10	5	5	10	10	5	10	10	5	10	5	10	5	10	5	9	4.5	10	5	10	10	10	10		
Total Depth (ft from top of casing)	23.05	27.25	24.15	52.00	113.90	22.78	31.67	45.78	16.70	22.20	46.90	22.82	35.52	14.79	52.00	16.60	47.00			19.95	48.20	26.90	21.11	21.27	20.15		
Top of Well Screen Elevation (ft)	610.30	610.26	608.47	575.12	512.99	610.53	604.73	585.62	610.11	609.61	580.50	609.60	592.17	609.39	567.40	614.18	579.20	609.60	575.50	604.90	571.65	609.58	607.98	607.94	608.34		
Measurement Date																		--	--								
October 5-6, 2011	604.94	606.29	604.57	604.36	604.32	604.43	604.52	604.55	604.61	604.37	605.21	608.37	604.42	604.88	604.82	604.87	604.81	--	--	604.37	604.39		--	--	--	--	--
April 25-26, 2012	606.58	606.30	606.07	606.30	606.28	--	605.89	605.91	--	--	--	608.65	606.31	604.33	--	606.29	#REF!	--	--	606.16	606.17	606.17	--	--	--	--	--
October 17, 2012	604.39	604.16	604.10	603.98	603.98	604.08	604.12	604.14	604.31	603.97	603.98	607.32	604.07	604.33	604.35	--	#REF!	--	--	603.93	603.93	603.93	--	--	--	--	--
April 2, 2013	607.04	608.01	606.15	607.20	607.17	606.30	605.60	605.64	605.90	605.91	605.93	607.13	607.13	606.11	606.14	606.13	606.25	--	--	606.99	607.02		--	--	--	--	--
October 16-17, 2013	604.51	605.89	604.17	603.90	603.87	604.11	604.31	604.32	604.36	604.08	604.06	604.87	604.00	604.53	604.56	604.46	604.44	--	--	604.05	604.04		--	--	--	--	--
April 10, 2014	607.42	608.97	607.45	607.28	607.26	--	607.22	607.23	--	--	--	607.37	607.28	--	--	607.46	607.39	--	--	607.25	607.26		--	--	--	--	--
October 14-15, 2014	605.67	606.82	605.17	604.90	604.91	614.92	605.00	605.01	605.13	604.92	604.92	606.36	605.54	605.41	605.45	605.36	605.33	--	--	604.94	604.99		--	--	--	--	--
April 16, 2015	607.26	608.50	607.11	607.15	607.05	--	606.40	606.41	--	--	--	607.37	607.09	--	--	606.73	606.78	--	--	606.99	606.88		--	--	--	--	--
October 1-2, 2015	605.14	604.66	604.53	604.42	604.38	604.36	604.43	604.50	604.54	604.34	604.32	605.13	604.38	604.76	604.82	604.76	604.75	--	--	604.30	604.39		--	--	--	--	--
December 8, 2015	606.69	--	606.71	606.30	606.26	--	606.80	--	--	--	--	607.40	606.39	--	--	--	--	--	--	--	--	607.54	--	--	--	--	--
April 12, 2016	609.32	609.36	609.32	608.71	608.68	--	609.81	609.72	--	--	--	609.34	609.01	--	--	609.73	609.65	--	--	608.79	608.79	610.23	--	--	--	--	--
July 18-19, 2016	606.54	--	606.14	606.76	606.74	--	606.09	--	--	--	--	606.55	606.73	--	--	--	--	--	--	--	--	606.28	--	--	--	--	--
October 19-20, 2016	608.59	608.46	608.35	608.21	608.19	608.37	608.84	608.76	608.63	608.45	608.46	608.51	608.20	608.69	608.73	608.78	608.74	--	--	608.20	608.18	609.09	--	--	--	--	--
January 11-12, 2017	608.02		607.96	607.83	607.78		608.56					607.90	607.84					--	--			608.92	--	--	--	--	--
April 17, 2017	609.08	608.82	608.34	609.05	608.99	NM	608.59	608.54	609.94	608.57	608.64	607.20	608.98	608.96	608.98	609.00	609.02	--	--	609.02	609.02	610.23	--	--	--	--	--
June 8, 2017	610.74	--	610.42	609.81	610.08	--	611.25	--	--	--	--	609.63	610.50	--	--	--	--	--	--	--	--	611.53	--	--	--	--	--
August 1-2, 2017	607.02	--	606.73	605.57	605.50	--	607.39	--	--	--	--	606.84	605.69	--	--	--	--	--	--	--	--	608.71	--	--	--	--	--
October 9-10, 2017	606.93	606.51	606.25	607.01	606.94	--	606.22	606.13	606.33	606.44	606.45	606.68	606.93	606.57	606.61	606.65	606.71	--	--	--	--	--	--	--	--	--	--
October 19, 2017	609.60	--	609.42	609.58	609.65	--	608.84	--	--	--	--	609.47	609.43	--	--	--	--	--	--	609.40	609.40	608.55	--	--	--	--	--
November 17, 2017	--	--	--	--	--	606.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December 19, 2017	--	--	--	--	--	604.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February 7, 2018	605.37	--	605.33	604.96	604.92	--	--	--	616.81	--	--	605.31	605.01	--	--	--	--	--	--	--	--	606.19	605.08	605.05	605.00	--	--
March 16, 2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	604.64	604.6	604.56	--	--
April 203, 2018 **	604.82	606.61	606.27	606.63	606.55	606.52	606.49	606.37	606.39	606.46	606.43	604.44	606.46	606.58	606.66	606.68	606.70	--	--	606.77	606.83	606.19	--	--	--	--	--
May 23, 2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	610.68	610.78	610.61	--	--
October 8-10, 2018	610.76	610.68	610.67	610.28	610.24	610.02	610.34	610.28	610.83	610.09	610.05	610.39	610.27	611.05	610.94	610.72	610.54	--	--	--	--	611.44	--	--	--	--	--
November 11, 2018	--	--	--	--	609.14	--	--	--	--	--	--	609.11	--	--	--	--	--	--	--	--	--	--	--	--	--	608.40	
April 22-23, 2019	615.28	615.66	615.28	615.29	615.28	614.98	615.49	615.31	615.40	615.36	615.35	615.01	615.33	--	--	615.87	615.98	--	--	--	--	615.40	--	--	--	615.17	<615.06
October 14-16, 2019	613.43	613.11	613.06	613.29	613.18	612.47	613.10	613.10	612.71	612.83	612.78	612.50	613.20	613.10	613.00	613.10	613.15	--	--	--	--	613.35	--	--	--	612.33	<615.06
April 13-14, 2020	614.12	613.76	614.39	613.88	613.86	613.22	613.76	613.73	613.68	613.60	613.56	613.80	613.79	--	--	614.04	614.00	--	--	--	--	613.71	--	--	--	612.89	613.10
October 12-13, 2020	605.09	604.88	604.57	604.54	604.44	604.28	604.92	604.83	604.86	604.72	604.72	604.66	604.54	605.07	605.06	605.00	605.08	--	--	--	--	605.06	--	--	--	603.89	DRY
April 19-21, 2021	608.83	608.66	608.57	608.72	608.67	607.93	608.55	608.49	608.27	608.38	608.35	608.66	608.63	608.68	608.74	608.86	608.85	608.40	608.39	608.74	608.75	608.48	--	--	--	608.15	<609.00
October 6-8, 2021	604.05	604.04	603.85	603.79	603.74	603.56	604.21	604.13	604.11	604.00	603.97	603.98	603.84	604.32	604.38	604.35	604.34	603.93	603.92	NM	NM	604.23	--	--	--	602.90	<609.00
April 25-26, 2022	609.84	610.25	609.75	610.00	609.98	609.70	610.12	610.08	609.99	610.11	610.09	610.27	609.95	610.26	610.40	610.44	610.32	609.94	609.90	AB	AB	610.22	--	--	--	NM	609.25
Bottom of Well Elevation (ft)	600.30	600.26	598.47	570.12	507.99	600.53	594.73	580.62	600.11	599.61	575.50	599.60	587.17	599.39	562.40	604.18	574.20	600.6	571	594.90	566.65	599.58	597.98	597.94	598.34		

Notes:
-- = not measured
*The PVC casing at B-35A was cut down on June 28, 2018 to allow the protective cover to close. Groundwater elevations prior to 6/28/18 are calculated using the old top of casing (TOC) elevation of 621.20 ft amsl. Groundwater elevations after 6/28/18 are calculated using the new TOC elevation (621.09 ft amsl).
** The PVC casing at B-21R was extended in 2018 following well rehabilitation. The well was resurveyed on April 22, 2019. The old top of casing elevation was 621.03 ft. The new TOC elevation is 623.31 ft.
^ One pond staff gauge was installed on April 22, 2019. The base of the gauge (0 reading) is at 615.056 ft amsl. Two additional gauges were installed on March 24, 2020. These gauge bases are at 609' and 612' amsl.

Created by: MDB Date: 4/1/2013
Last revision by: RM Date: 5/3/2022
Checked by: JJK Date: 5/6/2022

I:\25222071.00\Deliverables\2022 April ASD NED\Tables\[Table 3 - Groundwater Elevation Summary.xls]levels

Table 4. Analytical Results - State Monitoring Program
Nelson Dewey Generating Station
Cassville, Wisconsin / SCS Engineers Project #25222071.00

WELL ID	SAMPLE MONTH	BORON, DISSOLVED (UG/L)	FLUORIDE, DISSOLVED (MG/L)	SULFATE, DISSOLVED (MG/L)	PH, FIELD (STANDARD UNITS)
B-7R	2016-Apr	110	<0.20	7.40	6.80
	2016-Oct	147	<2.00	<20.0	6.55
	2017-Apr	127	<0.50	<5.00	6.60
	2017-Oct	159	<0.50	<5.00	6.61
	2018-Apr	115	<0.50 D3	<5.00 D3	6.57
	2018-Oct	89.8	<0.10	3.40	6.23
	2019-Apr	95.7	<0.50 D3	<5.00 D3	6.63
	2019-Oct	140	<0.50 D3, M0	<5.00 D3	6.62
	2020-Apr	90.8	<0.48 D3	5.20 J, D3	6.60
	2020-Oct	145	<0.48	<2.20 D3	6.35
	2021-Apr	121	<0.48 D3	<2.20 D3	6.54
	2021-Oct	--	--	--	--
	2022-Apr	93.1	<0.48 D3, M0	5.0 J, D3	6.43
B-8R	2016-Apr	2,250	0.26 J	30.0	6.64
	2016-Oct	2,130	0.21 J	47.0	6.38
	2017-Apr	1,970	0.16 J	30.5	6.83
	2017-Oct	2,490	0.30 J	32.5	6.87
	2018-Apr	1,700	0.14 J	28.7	7.02
	2018-Oct	1,500	0.25 J	30.6	6.18
	2019-Apr	1,560	0.24 J	39.8	6.65
	2019-Oct	1,110	0.49	23.6	6.85
	2020-Apr	1,340	0.27 J	20.9	6.61
	2020-Oct	1,600	0.36	63.9	6.60
	2021-Apr	1,310	0.28 J	25.0	6.54
	2021-Oct	1,730	0.19 J	42.3	6.48
	2022-Apr	1,320	0.24 J	23.8	6.52
B-11A	2016-Apr	110	0.37 J	3.80 J	7.75
	2016-Oct	111	0.28 J	2.80 J	7.47
	2017-Apr	106	0.35	<1.00	7.38
	2017-Oct	97.7	0.34	8.30	7.91
	2018-Apr	89.4	0.30 J	12.70	8.04
	2018-Oct	142	0.16 J	5.30	7.43
	2019-Apr	94.0	0.29 J	1.90 J	7.62
	2019-Oct	82.3	0.27 J	<1.00	7.66
	2020-Apr	83.3	0.17 J	1.50 J	7.75
	2020-Oct	94.3	0.30 J	1.0 J	7.74
	2021-Apr	92.9	0.23 J	3.5	7.65
	2021-Oct	97.6	0.24 J	7.3	7.49
	2022-Apr	87.0	0.23 J	9.1	7.53
B-11B	2016-Apr	1,240	0.53	153	8.14
	2016-Oct	1,410	0.54	181	7.91
	2017-Apr	1,720	0.56	186	7.83
	2017-Oct	1,900	0.65	169	7.80
	2018-Apr	2,020	0.68	195	8.42
	2018-Oct	3,910	0.41	195	7.74
	2019-Apr	6,670	0.60	289	7.91
	2019-Oct	4,860	0.64	335	7.92
	2020-Apr	5,080	<0.095	362	7.89
	2020-Oct	3,190	<0.095	422	7.80
	2021-Apr	4,590	<0.095	389	8.07
	2021-Oct	2,480	0.49	468	7.72
	2022-Apr	2,690	0.44	494	7.63
B-11R	2016-Apr	3,290	<1.00	93.9	6.98
	2016-Oct	4,070	<0.50	115	6.77
	2017-Apr	3,710	<0.50	111	7.11
	2017-Oct	3,400	<0.50	94.0	6.75
	2018-Apr	2,790	<0.50 D3	78.6	7.14
	2018-Oct	635	0.14 J	15.6	6.55
	2019-Apr	1,310	0.19 J	34.5	6.82
	2019-Oct	1,500	0.28 J	39.2	6.83
	2020-Apr	2,250	<0.48 D3	39.8	6.80
	2020-Oct	2,690	<0.48	23.0	6.83
	2021-Apr	2,890	<0.48 D3	59.9	7.11
	2021-Oct	3,050	<0.48 D3	61.6	6.86
	2022-Apr	2,330	<0.48 D3	58.1	7.01
B-26	2016-Apr	37.0	<0.20	40.1	7.43
	2016-Oct	48.7	0.12 J	34.4	7.19
	2017-Apr	37.3	<0.10	32.3	7.54
	2017-Oct	44.5	<0.10	25.0	7.35
	2018-Apr	46.8	<0.10	19.2	7.64
	2018-Oct	55.2	<0.10	24.9	7.20
	2019-Apr	41.8	<0.10	26.4	7.10
	2019-Oct	50.8	0.11 J	37.0	7.24
	2020-Apr	49.2	<0.095	29.1	7.27
	2020-Oct	61.4	<0.095	37.1	7.34
	2021-Apr	67.1	<0.095	35.5	7.27
	2021-Oct	56.0	<0.095	43.0	7.18
	2022-Apr	50.3	0.098 J	33.5	7.19

Table 4. Analytical Results - State Monitoring Program
Nelson Dewey Generating Station
Cassville, Wisconsin / SCS Engineers Project #25222071.00

WELL ID	SAMPLE MONTH	BORON, DISSOLVED (UG/L)	FLUORIDE, DISSOLVED (MG/L)	SULFATE, DISSOLVED (MG/L)	PH, FIELD (STANDARD UNITS)
B-26A	2016-Apr	33.1	<0.20	40.1	7.06
	2016-Oct	30.5	0.14 J	39.9	7.26
	2017-Apr	52.6	0.47	42.3	7.96
	2017-Oct	28.4	<0.10	38.4	7.44
	2018-Apr	27.6	<0.10	37.0	7.47
	2018-Oct	18.4	<0.10	33.3	7.38
	2019-Apr	27.6	0.11 J	27.0	7.35
	2019-Oct	47.0	0.14 J	35.6	7.31
	2020-Apr	37.7	<0.095	39.2 M0	7.38
	2020-Oct	33.5	<0.095	44.7	7.51
	2021-Apr	42.7	<0.095	45.5	7.26
	2021-Oct	36.4	<0.095	49.7	7.45
	2022-Apr	29.8	0.11 J	53.2	7.39
B-31A	2016-Apr	69.4	0.22 J	22.8	7.63
	2016-Oct	81.0	0.18 J	27.9	7.54
	2017-Apr	80.3	0.19 J	30.8	7.83
	2017-Oct	61.5	0.21 J	26.2	7.60
	2018-Apr	69.3	0.17 J	28.1	8.00
	2018-Oct	103	0.14 J	26.2	7.48
	2019-Apr	86.0	0.22 J	21.6	7.61
	2019-Oct	112	0.23 J	22.5	7.69
	2020-Apr	121	0.15 J	17.7	7.71
	2020-Oct	146	0.18 J	16.8	7.78
	2021-Apr	168	0.14 J	17.1	7.90
	2021-Oct	188	0.17 J	15.0	7.58
	2022-Apr	179	0.18 J	15.3	7.82
B-31R	2016-Apr	759	<0.20	34.3	6.76
	2016-Oct	956	0.16 J	48.5	6.53
	2017-Apr	910	0.12 J	42.9	6.80
	2017-Oct	618	0.20 J	23.2	6.78
	2018-Apr	520	0.11 J	23.3	6.76
	2018-Oct	1,530	<1.00 D3	179	6.41
	2019-Apr	892	0.17 J, D3	114	6.62
	2019-Oct	1,000	0.26 J	145	6.72
	2020-Apr	765	0.28 J, M0	97.6 M0	6.79
	2020-Oct	696	0.28 J	50.8	6.89
	2021-Apr	597	0.19 J	44.9	6.91
	2021-Oct	356	<0.48	25.1	6.83
	2022-Apr	425	0.24 J	57.4	6.77
B-35	2016-Apr	38.7	<0.20	8.10	6.89
	2016-Oct	46.4	0.10 J	6.50	6.86
	2017-Apr	54.4	0.15 J	7.70	6.68
	2017-Oct	40.8	0.18 J	3.80	7.65
	2018-Apr	28.9	<0.10 M0	4.80 M0	7.01
	2018-Oct	40.0	0.13 J	3.60	6.58
	2019-Apr	33.6	<0.10	4.90	7.26
	2019-Oct	41.0	0.12 J	5.60	7.07
	2020-Apr	27.0	<0.095	4.20	6.87
	2020-Oct	28.1	0.097 J	5.60	6.85
	2021-Apr	23.8	0.12 J	5.90	6.89
	2021-Oct	--	--	--	--
	2022-Apr	22.7	<0.095	7.7	6.95
B-35A	2016-Apr	21.7	<0.20	26.2	6.96
	2016-Oct	23.4	0.16 J	27.4	7.17
	2017-Apr	29.9	<0.10	25.4	7.27
	2017-Oct	51.4	0.26 J	4.00	7.44
	2018-Apr	28.9	<0.10 M0	23.1	7.45
	2018-Oct	59.8	<0.50 D3	6.00 J, D3	6.95
	2019-Apr	30.3	0.12 J	16.7	7.30
	2019-Oct	33.7	0.13 J	18.9	7.30
	2020-Apr	32.1	0.12 J	20.2	7.29
	2020-Oct	70.7	<0.095	17.8	7.39
	2021-Apr	46.8	<0.095	18.9	7.26
	2021-Oct	52.7	<0.095	18.7	7.27
	2022-Apr	46.5	0.11 J, M0	16.2	7.13
B-36	2021-Oct	24.7	0.13 J	2.80	7.34
	2022-Apr	27.2	0.14 J	3.2	7.23
B-36A	2021-Oct	20.7	<0.095	17.6	7.43
	2022-Apr	29.5	0.13 J	13.7	7.26

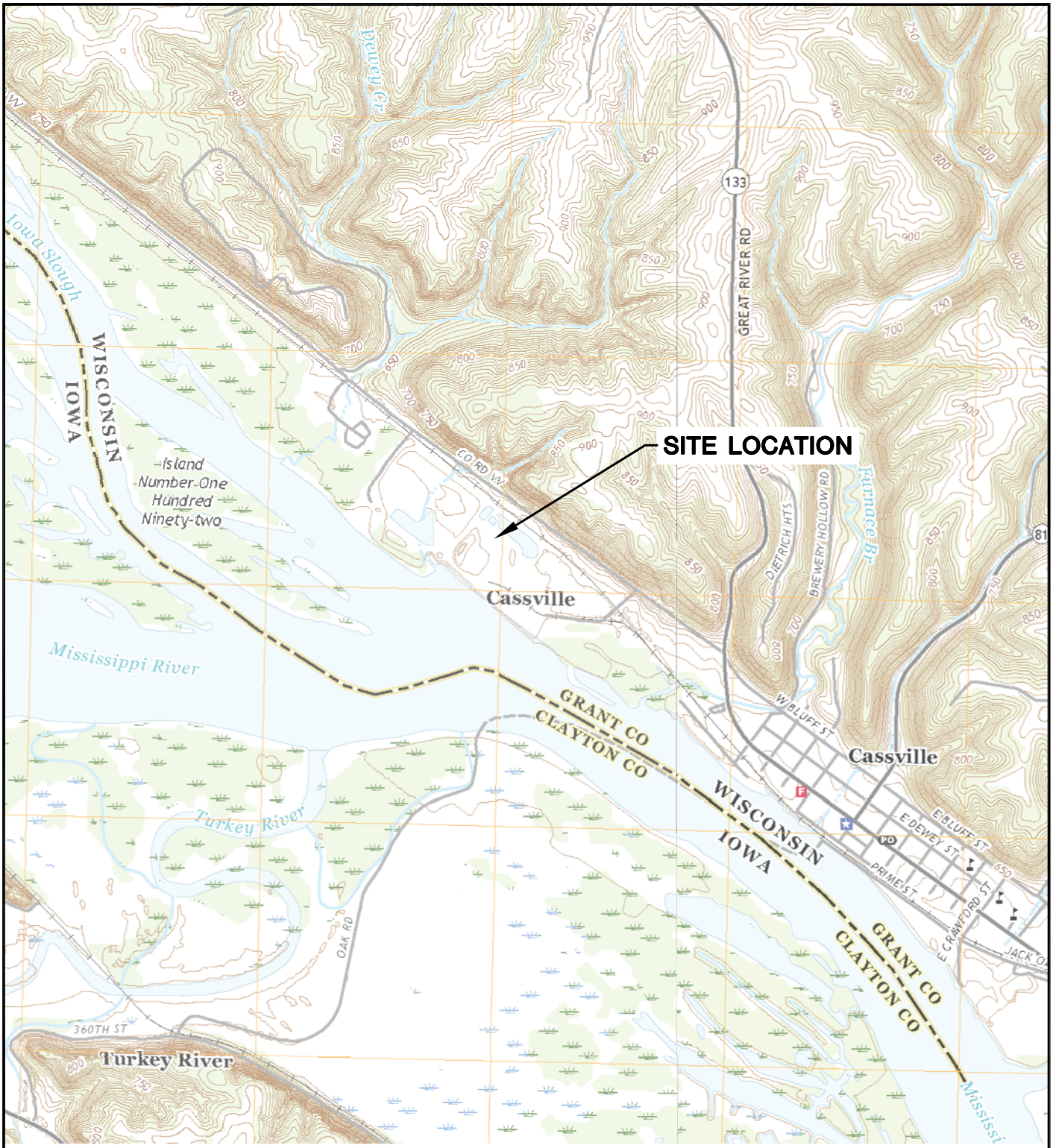
Abbreviations:
J: Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

Notes:
(1) B-7R and B-35 were dry during October sampling event.
(2) B-37 and B-37A were abandoned 12/6/2022. B-36 and B-36A were added prior to the October 2021 Sampling event.

Created by: JSN Date: 12/29/2017
Last revision by: RM Date: 7/27/2022
Checked by: JJK Date: 8/3/2022

I:\25222071.00\Deliverables\2022 April ASD NED\Tables\[Table 4 - Analytical Results - State Monitoring NED.xlsx]4. State Analytical

Figures



N

CASSVILLE AND TURKEY RIVER QUADRANGLES
WISCONSIN–IOWA
7.5 MINUTE SERIES (TOPOGRAPHIC)
2018
SCALE: 1" = 2,000'

CLIENT	ALLIANT ENERGY 4902 N. BILTMORE LANE, #1000 MADISON, WI 53718	SITE	ALLIANT ENERGY NELSON DEWEY GENERATING STATION CASSVILLE, WISCONSIN

SITE LOCATION MAP

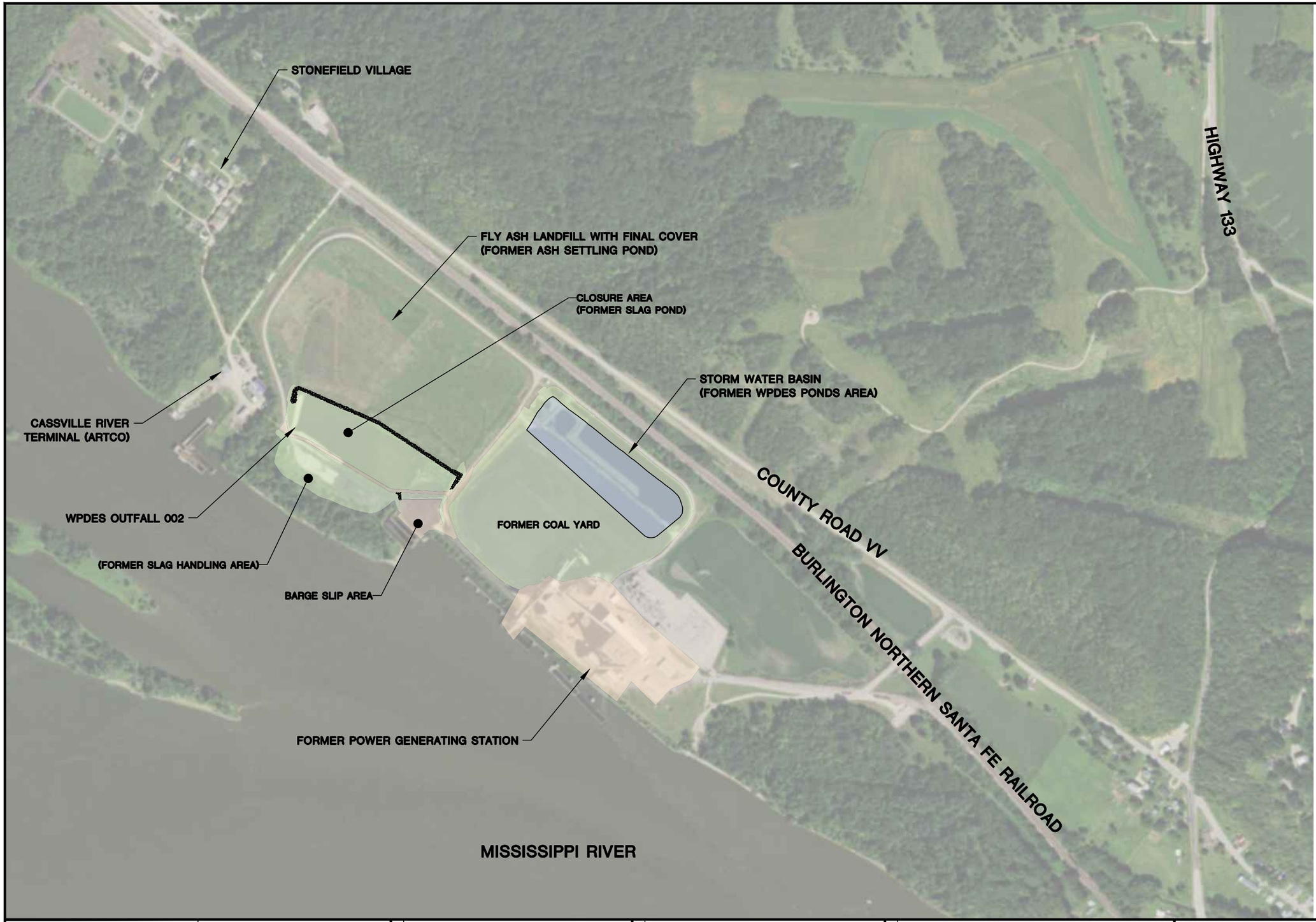
PROJECT NO.	25220071.00	DRAWN BY:	BSS
DRAWN:	11/27/2019	CHECKED BY:	MDB
REVISED:	01/14/2020	APPROVED BY:	TK 04/10/2020

ENGINEER

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

FIGURE
1

I:\25220071.00\Drawings\ASD\Site Location Map.dwg, 4/12/2020 7:11:31 PM



N

NOTES:

1. AERIAL PHOTOGRAPH FROM THE NATIONAL AGRICULTURE IMAGERY PROGRAM AND PUBLISHED BY THE USDA FSA AERIAL PHOTOGRAPHY FIELD OFFICE. DATE OF IMAGE IS AUGUST 24, 2015.

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25220071.00	DRAWN BY:	BJM
DRAWN:	12/18/13	CHECKED BY:	KAK
REVISED:	01/22/20	APPROVED BY:	TK 04/10/2020

ENGINEER: SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

CLIENT: WISCONSIN POWER AND LIGHT CO.
NELSON DEWEY GENERATING STATION
11999 COUNTY HIGHWAY VV
CASSVILLE WI, 53806

SITE: WISCONSIN POWER AND LIGHT
NELSON DEWEY GENERATING STATION
CASSVILLE WISCONSIN

AERIAL VIEW

FIGURE 2

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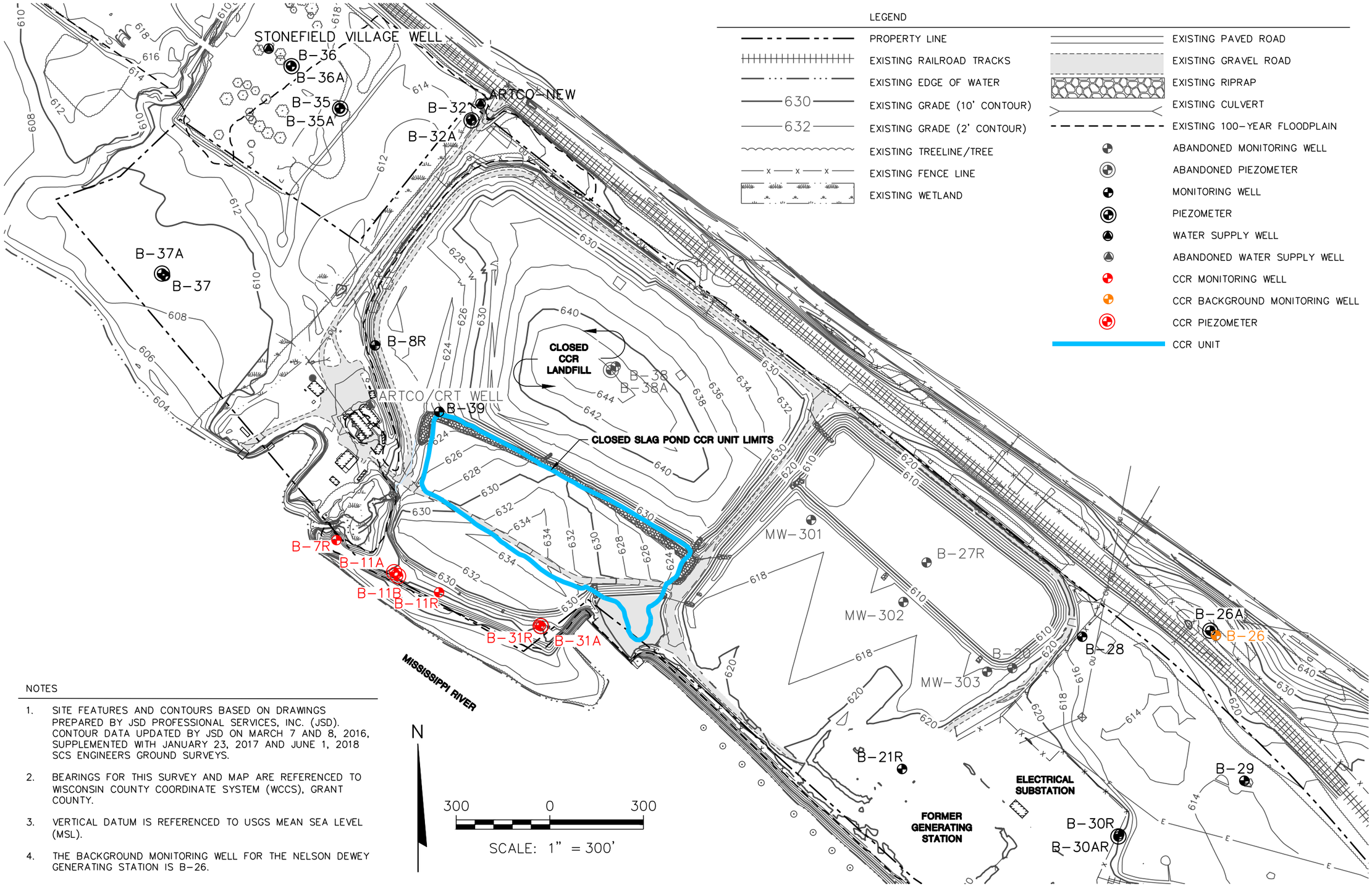


NOTES

1. SITE FEATURES AND CONTOURS BASED ON DRAWINGS PREPARED BY JSD PROFESSIONAL SERVICES, INC. (JSD). CONTOUR DATA UPDATED BY JSD ON MARCH 7 AND 8, 2016, SUPPLEMENTED WITH JANUARY 23, 2017 AND JUNE 1, 2018 SCS ENGINEERS GROUND SURVEYS.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO WISCONSIN COUNTY COORDINATE SYSTEM (WCCS), GRANT COUNTY.
3. VERTICAL DATUM IS REFERENCED TO USGS MEAN SEA LEVEL (MSL).
4. THE BACKGROUND MONITORING WELL FOR THE NELSON DEWEY GENERATING STATION IS B-26.

SITE
SITE PLAN AND MONITORING WELL LOCATIONS

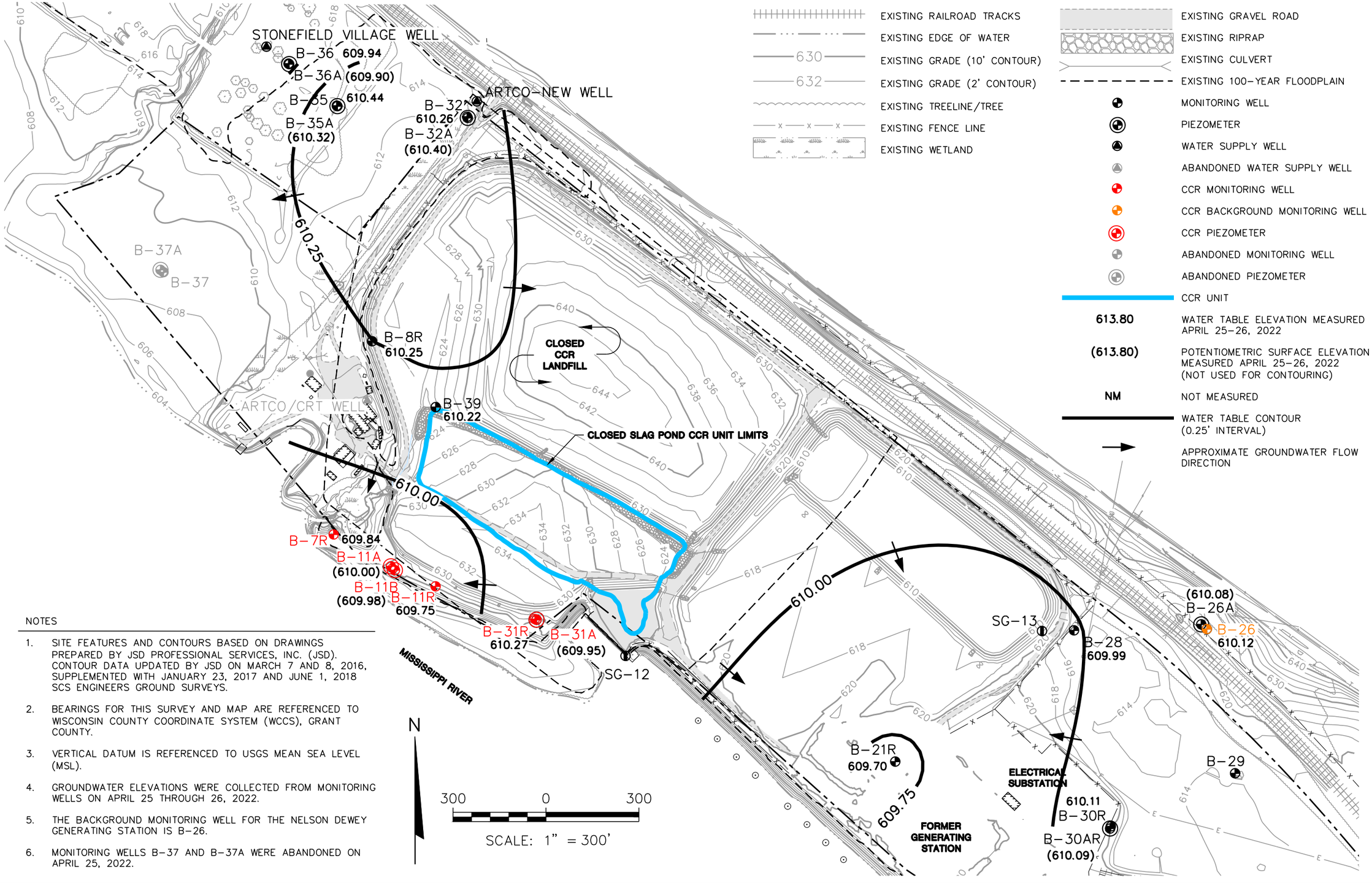
CLIENT
ALLIANT ENERGY
NELSON DEWEY GENERATING STATION
CASSVILLE, WISCONSIN

ENGINEER
SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

PROJECT NO.	25221071.00
DRAWN:	11/27/2019
REVISED:	01/11/2022
DRAWN BY:	BSS
CHECKED BY:	MDB
APPROVED BY:	TK 3/23/22

FIGURE 3

I:\25221071.00\Drawings\Site Plan and Monitoring Well Locations.dwg, 1/11/2022 11:10:49 AM



LEGEND

- PROPERTY LINE
- EXISTING RAILROAD TRACKS
- EXISTING EDGE OF WATER
- 630 EXISTING GRADE (10' CONTOUR)
- 632 EXISTING GRADE (2' CONTOUR)
- EXISTING TREELINE/TREE
- EXISTING FENCE LINE
- EXISTING WETLAND
- EXISTING PAVED ROAD
- EXISTING GRAVEL ROAD
- EXISTING RIPRAP
- EXISTING CULVERT
- EXISTING 100-YEAR FLOODPLAIN
- MONITORING WELL
- PIEZOMETER
- WATER SUPPLY WELL
- ABANDONED WATER SUPPLY WELL
- CCR MONITORING WELL
- CCR BACKGROUND MONITORING WELL
- CCR PIEZOMETER
- ABANDONED MONITORING WELL
- ABANDONED PIEZOMETER
- CCR UNIT
- 613.80 WATER TABLE ELEVATION MEASURED APRIL 25-26, 2022
- (613.80) POTENTIOMETRIC SURFACE ELEVATION MEASURED APRIL 25-26, 2022 (NOT USED FOR CONTOURING)
- NM NOT MEASURED
- WATER TABLE CONTOUR (0.25' INTERVAL)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES

1. SITE FEATURES AND CONTOURS BASED ON DRAWINGS PREPARED BY JSD PROFESSIONAL SERVICES, INC. (JSD). CONTOUR DATA UPDATED BY JSD ON MARCH 7 AND 8, 2016, SUPPLEMENTED WITH JANUARY 23, 2017 AND JUNE 1, 2018 SCS ENGINEERS GROUND SURVEYS.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO WISCONSIN COUNTY COORDINATE SYSTEM (WCCS), GRANT COUNTY.
3. VERTICAL DATUM IS REFERENCED TO USGS MEAN SEA LEVEL (MSL).
4. GROUNDWATER ELEVATIONS WERE COLLECTED FROM MONITORING WELLS ON APRIL 25 THROUGH 26, 2022.
5. THE BACKGROUND MONITORING WELL FOR THE NELSON DEWEY GENERATING STATION IS B-26.
6. MONITORING WELLS B-37 AND B-37A WERE ABANDONED ON APRIL 25, 2022.

WATER TABLE FLOW MAP
APRIL 2022

SITE
ALLIANT ENERGY
NELSON DEWEY GENERATING STATION
CASSVILLE, WISCONSIN

CLIENT
ALLIANT ENERGY
4902 N. BILTMORE LANE, #1000
MADISON, WI 53718

FIGURE 4

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

ENGINEER

PROJECT NO.	25222071.00
DRAWN:	05/12/2021
REVISED:	09/29/2022
DRAWN BY:	KP
CHECKED BY:	RM
APPROVED BY:	TK, 9/29/2022

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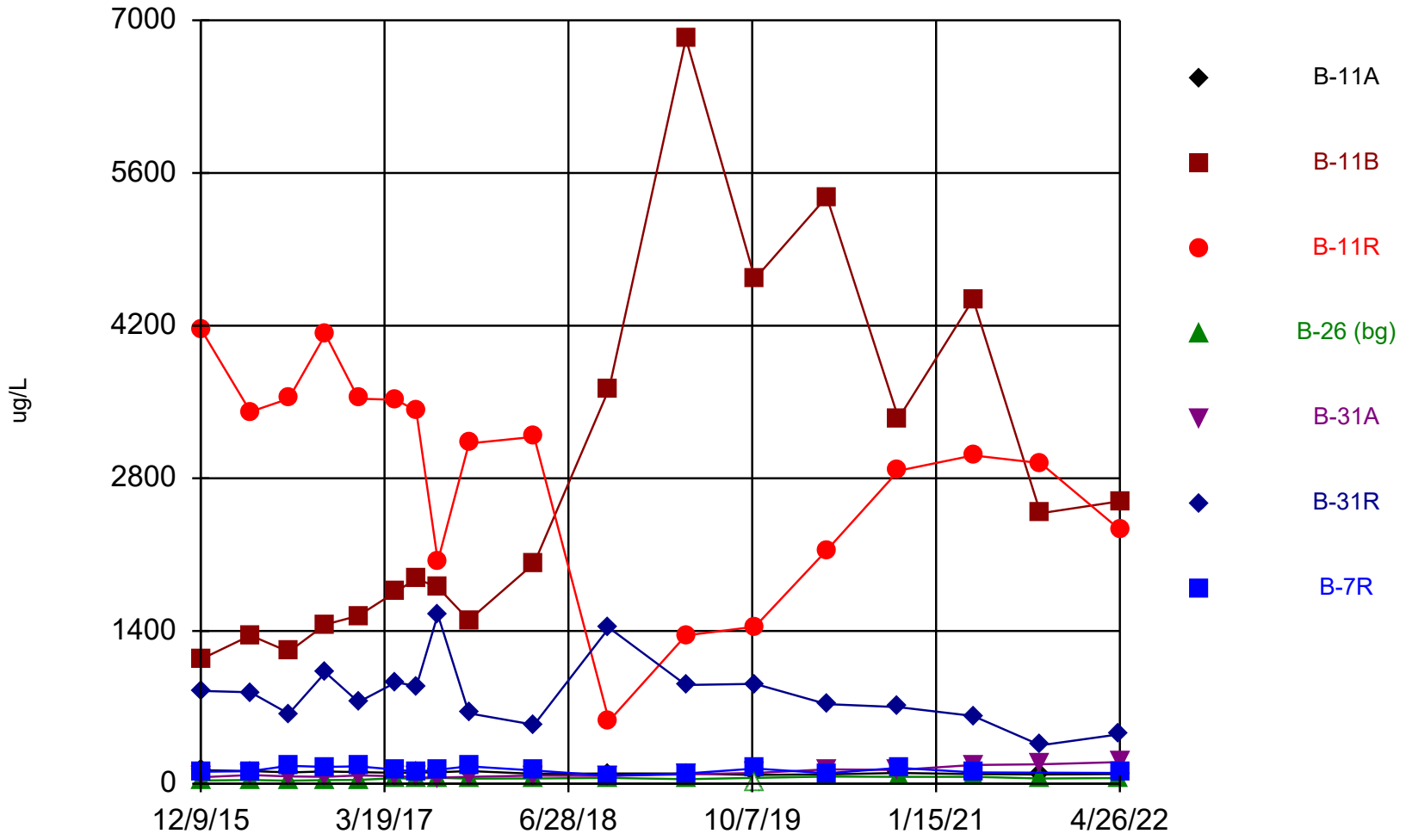
Appendix A

CCR Well Trend Plots

Hollow symbols indicate censored values.

Boron



Time Series Analysis Run 7/27/2022 8:59 AM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

Time Series

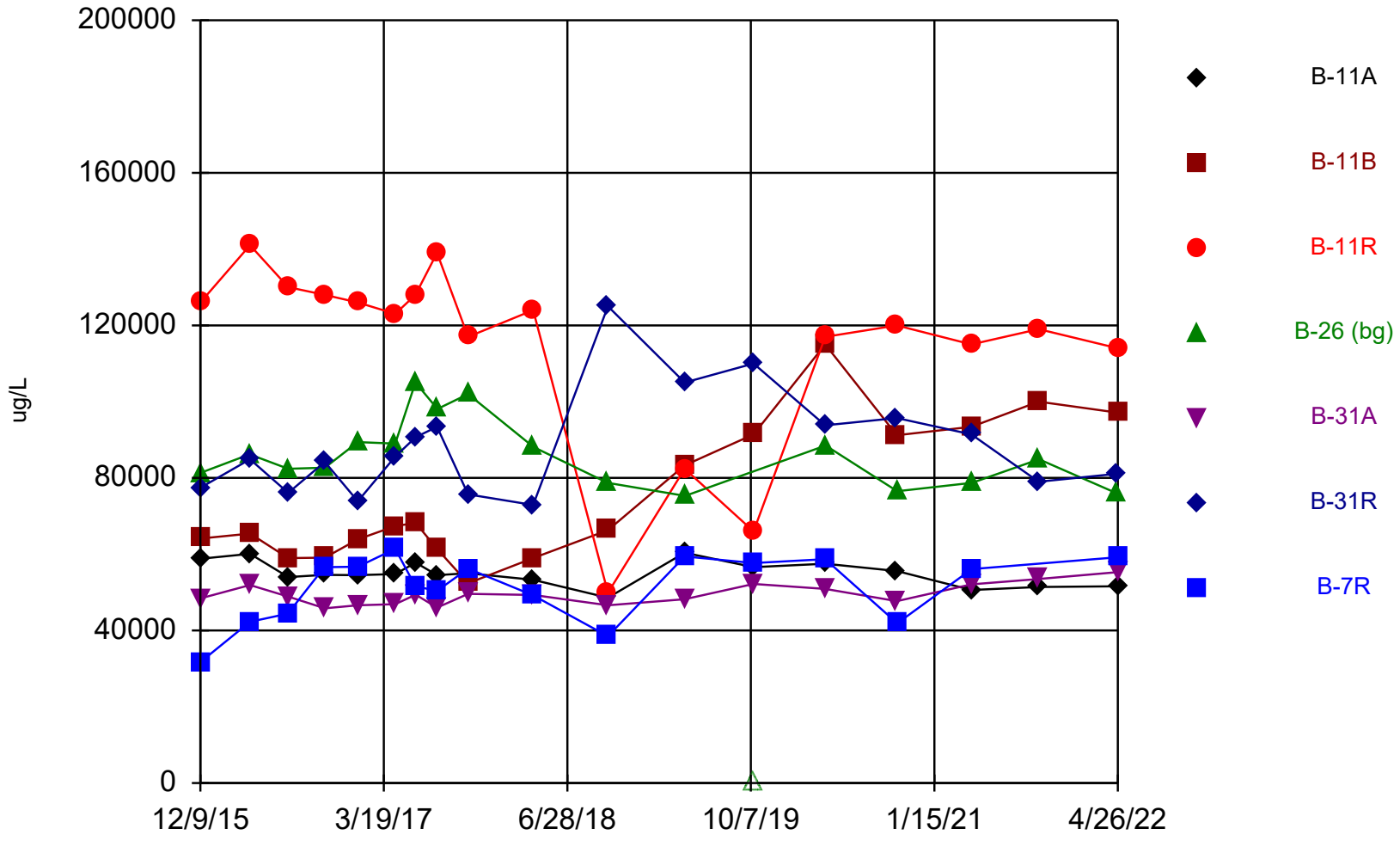
Constituent: Boron (ug/L) Analysis Run 7/27/2022 9:00 AM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

	B-11A	B-11B	B-11R	B-26 (bg)	B-31A	B-31R	B-7R
12/9/2015	124	1140	4170	29.6	59	851	110
4/12/2016				33.7			
4/13/2016	116	1360	3410		79.2	838	115
7/18/2016							164
7/19/2016	104	1210	3530	28.6	67.2	641	
10/19/2016	112						154
10/20/2016		1460	4120	33	63.7	1020	
1/12/2017	106	1540	3530	35.2	76.4	749	159
4/17/2017	100	1760	3520	50.1	69.9	929	129
6/7/2017			3420	45.8			110
6/8/2017	102	1880			58.5	895	
8/1/2017	105	1800	2040		56.3	1550	129
8/2/2017				54.6			
10/19/2017	116	1500	3120	47.4	63.9	645	159
4/2/2018	91	2020	3180		74.8	540	121
4/3/2018				48			
10/8/2018				53.4			
10/9/2018	94.2	3620	576		71.8	1430	73
4/22/2019	93.9	6830	1360		86.2	906	93.5
4/23/2019				41.6			
10/14/2019	80.7	4630	1440		98.5	915	139
10/15/2019				<3 (UX)			
4/13/2020	86.3	5380	2140		132	730	96
4/14/2020				66.1			
10/12/2020	99.3	3350	2870		127	702	
10/13/2020				63.6			145
4/19/2021	88.1	4440	3010		172	621	
4/20/2021							104
4/21/2021				63.6			
10/7/2021	85.4	2480	2940		178	353	
10/8/2021				48.4			
4/25/2022				52.5		454	
4/26/2022	88.6	2590	2330		198		98.1

Hollow symbols indicate censored values.

Calcium



Time Series Analysis Run 7/27/2022 8:59 AM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

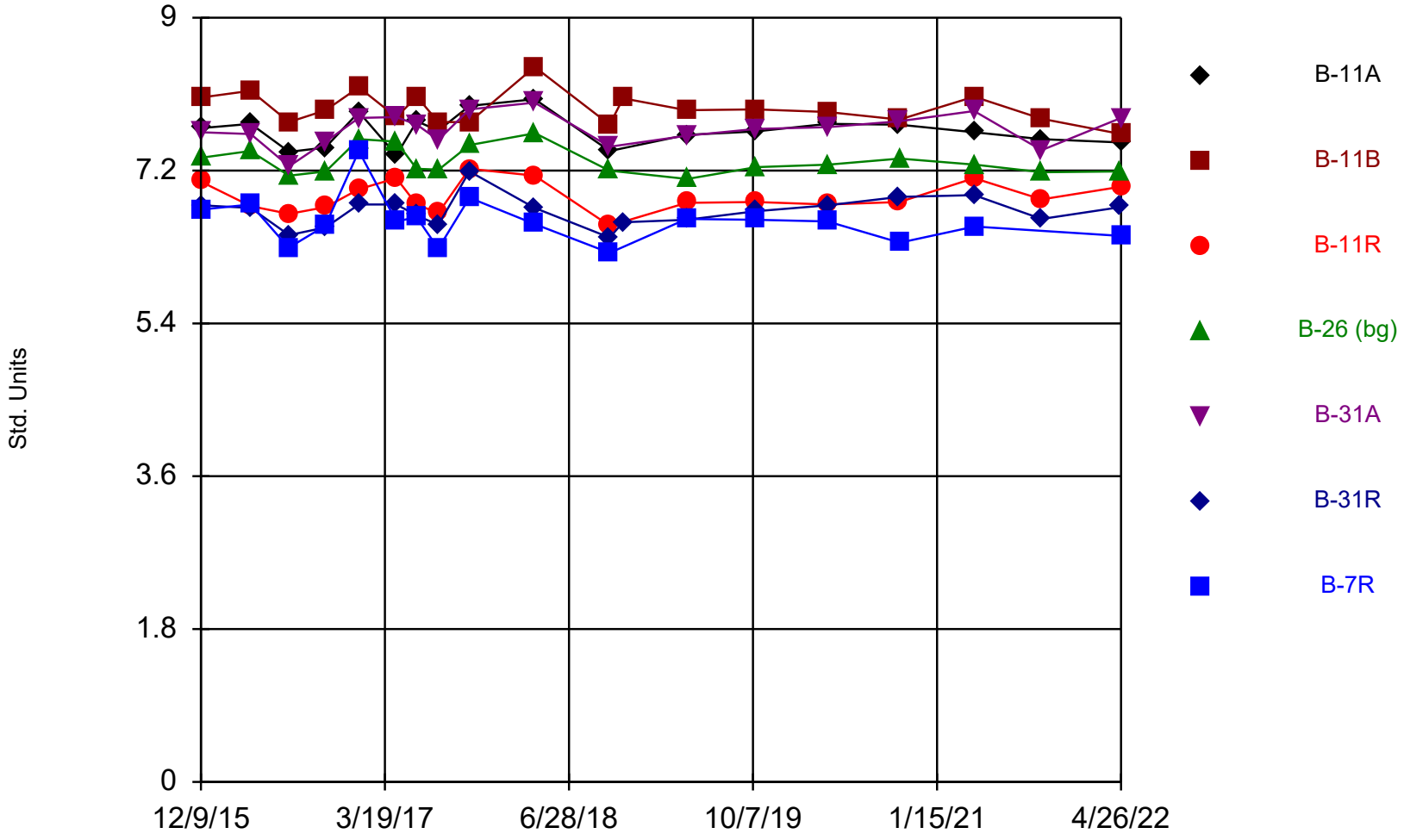
Time Series

Constituent: Calcium (ug/L) Analysis Run 7/27/2022 9:00 AM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

	B-11A	B-11B	B-11R	B-26 (bg)	B-31A	B-31R	B-7R
12/9/2015	58800	64100	126000	81300	48400	77400	31700
4/12/2016				86200			
4/13/2016	60100	65400	141000		51900	84900	42300
7/18/2016							44400
7/19/2016	54000	59000	130000	82400	48900	76100	
10/19/2016	54600						56600
10/20/2016		59100	128000	82700	45800	84200	
1/12/2017	54500	63900	126000	89400	46600	73900	56700
4/17/2017	54800	67400	123000	89000	46900	85600	61400
6/7/2017			128000	105000			51600
6/8/2017	57800	68200			49400	90700	
8/1/2017	54500	61400	139000		46000	93400	50400
8/2/2017				98100			
10/19/2017	55000	52400	117000	102000	49600	75700	56200
4/2/2018	53300	59000	124000		49300	72900	49200
4/3/2018				88100			
10/8/2018				78700			
10/9/2018	48600	66300	49900		46600	125000	38500
4/22/2019	60400	83300	82400		48200	105000	59400
4/23/2019				75300			
10/14/2019	56600	91400	66000		52200	110000	57700
10/15/2019				<76.2 (UX)			
4/13/2020	57500	115000	117000		50900	93800	58700
4/14/2020				88500			
10/12/2020	55600	91200	120000		47700	95700	
10/13/2020				76500			41900
4/19/2021	50600	93400	115000		52100	91400	
4/20/2021							56100
4/21/2021				78700			
10/7/2021	51400	100000	119000		53500	79000	
10/8/2021				84900			
4/25/2022				75900		81100	
4/26/2022	51600	97100	114000		55300		59200

Field pH



Time Series Analysis Run 7/27/2022 8:59 AM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

Time Series

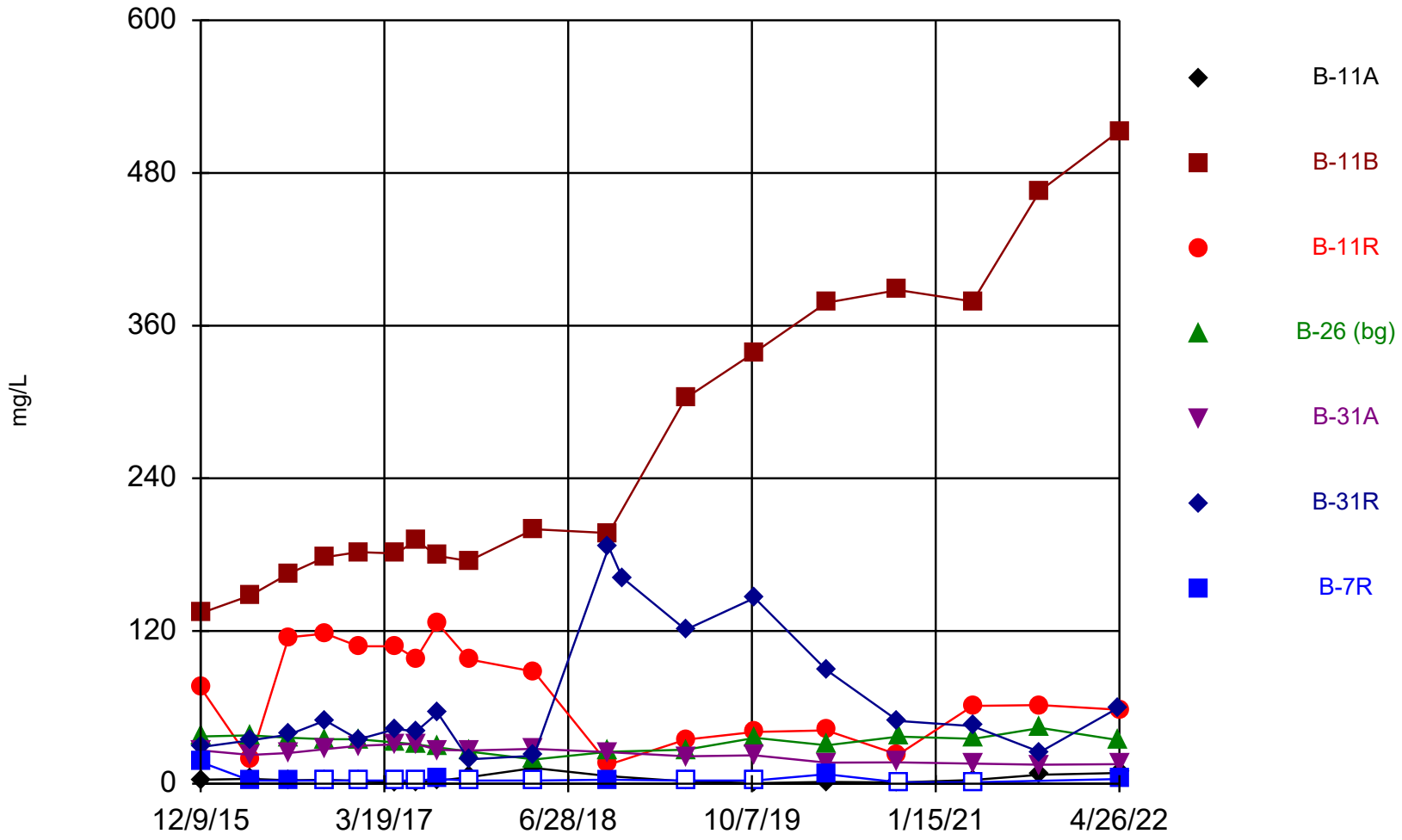
Constituent: Field pH (Std. Units) Analysis Run 7/27/2022 9:00 AM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

	B-11A	B-11B	B-11R	B-26 (bg)	B-31A	B-31R	B-7R
12/9/2015	7.7	8.06	7.07	7.35	7.65	6.79	6.74
4/12/2016				7.43			
4/13/2016	7.75	8.14	6.78		7.63	6.76	6.8
7/18/2016							6.29
7/19/2016	7.42	7.77	6.69	7.14	7.25	6.44	
10/19/2016	7.47						6.55
10/20/2016		7.91	6.77	7.19	7.54	6.53	
1/12/2017	7.89	8.18	6.98	7.57	7.82	6.8	7.43
4/17/2017	7.38	7.83	7.11	7.54	7.83	6.8	6.6
6/7/2017			6.8	7.22			6.65
6/8/2017	7.78	8.07			7.74	6.67	
8/1/2017	7.67	7.77	6.7		7.56	6.56	6.28
8/2/2017				7.21			
10/19/2017	7.96	7.77	7.22	7.5	7.92	7.19	6.88
4/2/2018	8.04	8.42	7.14		8	6.76	6.57
4/3/2018				7.64			
10/8/2018				7.2			
10/9/2018	7.43	7.74	6.55		7.48	6.41	6.23
11/12/2018		8.05				6.59	
4/22/2019	7.62	7.91	6.82		7.61	6.62	6.63
4/23/2019				7.1			
10/14/2019	7.66	7.92	6.83		7.69	6.72	6.62
10/15/2019				7.24			
4/13/2020	7.75	7.89	6.8		7.71	6.79	6.6
4/14/2020				7.27			
10/12/2020	7.74	7.8	6.83		7.78	6.89	
10/13/2020				7.34			6.35
4/19/2021	7.65	8.07	7.11		7.9	6.91	
4/20/2021							6.54
4/21/2021				7.27			
10/7/2021	7.57	7.81	6.86		7.44	6.63	
10/8/2021				7.18			
4/25/2022				7.19		6.77	
4/26/2022	7.53	7.63	7.01		7.82		6.43

Hollow symbols indicate censored values.

Sulfate



Time Series Analysis Run 7/27/2022 8:59 AM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

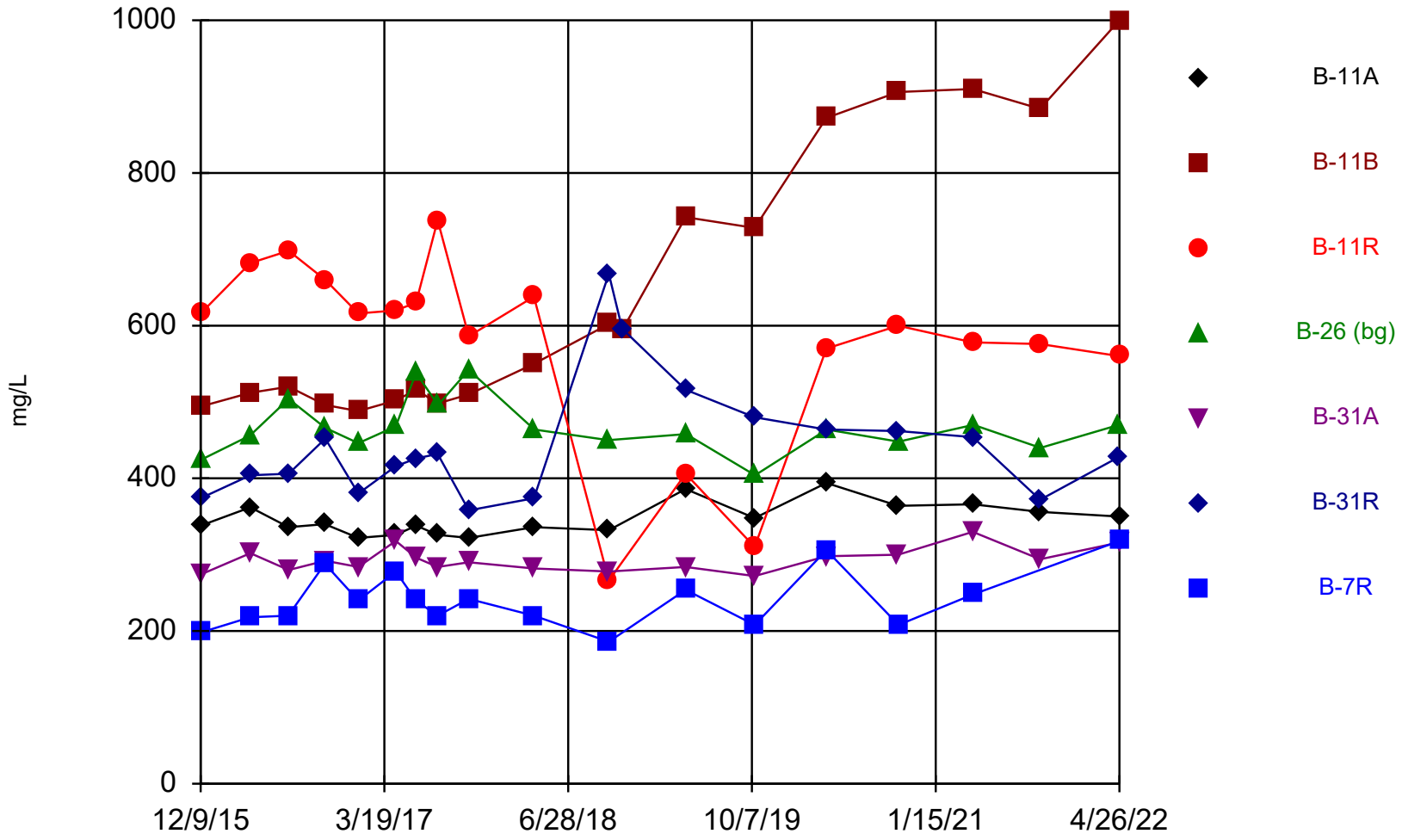
Time Series

Constituent: Sulfate (mg/L) Analysis Run 7/27/2022 9:00 AM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

	B-11A	B-11B	B-11R	B-26 (bg)	B-31A	B-31R	B-7R
12/9/2015	3.2 (J)	134	75.4	37.1	26.2	28.8	17 (J)
4/12/2016				38			
4/13/2016	3.8 (J)	148	18.4		22.6	34.1	2.5 (J)
7/18/2016							2.4 (J)
7/19/2016	2.7 (J)	165	115	36.2	24.2	38.5	
10/19/2016	3 (J)						<5 (U)
10/20/2016		178	118	35	27.2	49.7	
1/12/2017	2.3 (J)	182	108	35	29.8	34.9	<5 (U)
4/17/2017	<1 (U)	181	108	32.4	31	43	<5 (U)
6/7/2017			98.2	31			<5 (U)
6/8/2017	1.4 (J)	191			31.2	41.1	
8/1/2017	2.4 (J)	179	126		26.6	55.6	3.7
8/2/2017				28.5			
10/19/2017	5.1	175	97.7	25.3	26.1	19.2	<5 (U)
4/2/2018	12.3	200	88.1		27.4	22	<5 (U)
4/3/2018				19.1			
10/8/2018				25.1			
10/9/2018	6	197	15.1		24.8	186	3.2
11/12/2018						162	
4/22/2019	1.9 (J)	303	34.6		21.6	121	<5 (U)
4/23/2019				26.7			
10/14/2019	<1 (U)	339	40.7		22.3	146	<5 (U)
10/15/2019				36			
4/13/2020	1.4 (J)	378	41.9		16.6	89.4	7.5 (J)
4/14/2020				30.2			
10/12/2020	1 (J)	388	22.8		16.8	49.4	
10/13/2020				37			<2.2 (U)
4/19/2021	2.9	379	61.2		15.8	45.3	
4/20/2021							<2.2
4/21/2021				35.3			
10/7/2021	7	466	61.8		14.9	24.9	
10/8/2021				43.8			
4/25/2022				34.2		60	
4/26/2022	8.5	513	58.1		15.4		3.7 (J)

Total Dissolved Solids



Time Series Analysis Run 7/27/2022 8:59 AM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

Time Series

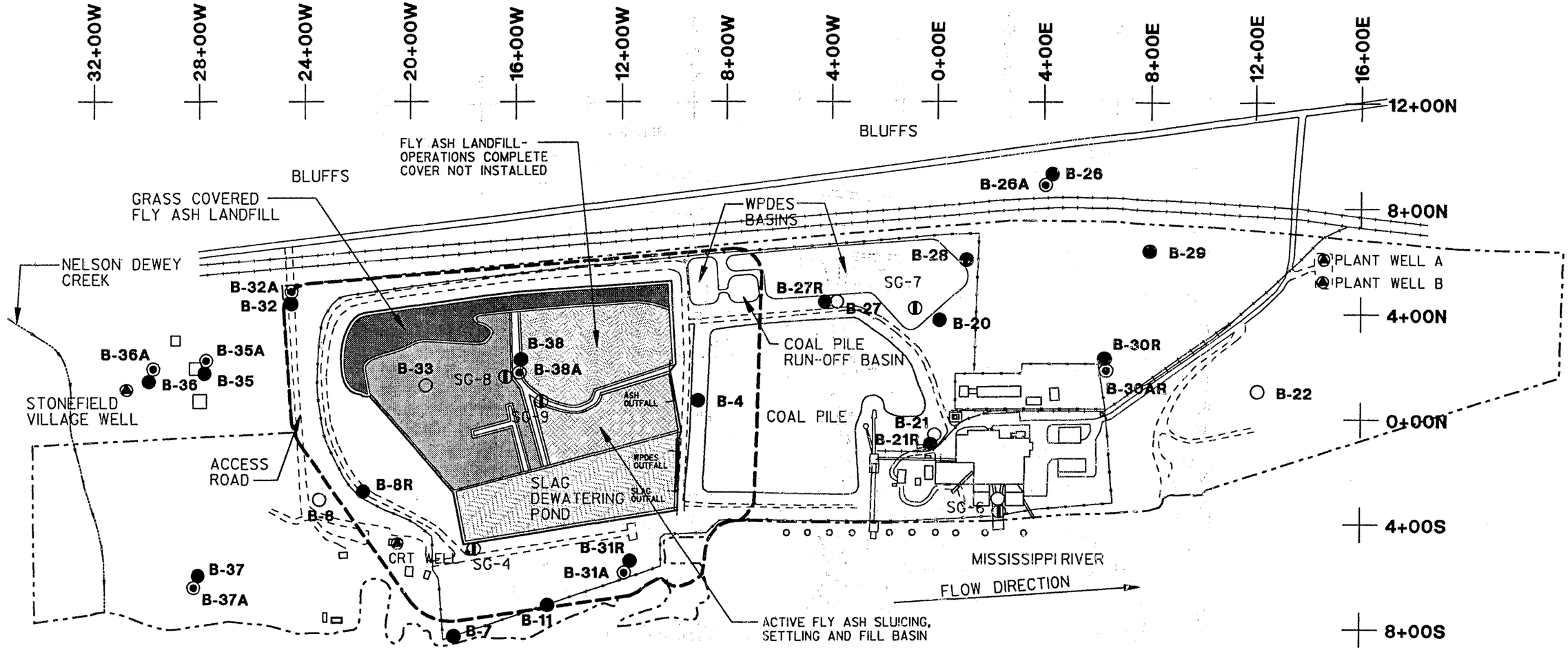
Constituent: Total Dissolved Solids (mg/L) Analysis Run 7/27/2022 9:00 AM

Nelson Dewey Generating Station Client: SCS Engineers Data: NED - Chempoint- export-Dec2020

	B-11A	B-11B	B-11R	B-26 (bg)	B-31A	B-31R	B-7R
12/9/2015	338	494	616	424	274	374	198
4/12/2016				456			
4/13/2016	362	512	682		302	404	218
7/18/2016							220
7/19/2016	336	520	698	504	280	406	
10/19/2016	340						288
10/20/2016		496	660	466	292	452	
1/12/2017	322	488	616	446	284	380	240
4/17/2017	326	502	620	468	318	416	278
6/7/2017			630	538			240
6/8/2017	338	516			296	426	
8/1/2017	326	498	738		284	432	220
8/2/2017				496			
10/19/2017	322	510	586	542	290	358	242
4/2/2018	336	550	638		282	374	220
4/3/2018				464			
10/8/2018				450			
10/9/2018	332	602	266		278	668	186
11/12/2018		594				596	
4/22/2019	386	742	406		284	516	254
4/23/2019				458			
10/14/2019	348	728	310		272	480	208
10/15/2019				404			
4/13/2020	394	872	570		298	464	306
4/14/2020				464			
10/12/2020	364	906	600		300	462	
10/13/2020				448			208
4/19/2021	366	910	578		330	454	
4/20/2021							248
4/21/2021				470			
10/7/2021	356	884	576		294	372	
10/8/2021				440			
4/25/2022				470		428	
4/26/2022	350	1000	560		316		318

Appendix B

1994 RMT Environmental Contamination Assessment Information



LEGEND

● B-28	WATER TABLE OBSERVATION WELL
◉ B-28A	PIEZOMETER
○ B-33	ABANDONED WELL
▲ CRT WELL	WATER SUPPLY WELL
◐ SG-4	STAFF GAUGE
———	APPROXIMATE LIMITS OF LICENSED LANDFILL
——+——+——	RAILROAD TRACK
====	ROAD
— - — - —	PROPERTY LINE
— — — —	DESIGN MANAGEMENT ZONE
+ 0+00S	LOCAL GRID
□	BUILDINGS
o	PILINGS

NOTES

1. BASE MAP WELLHEAD LOCATIONS SURVEYED BY SCHMITT ENGINEERING IN OCTOBER 1993.
2. OTHER SITE INFORMATION PROVIDED BY WP&L.

TRUE

0 400 800

SCALE: 1"=400'

WISCONSIN POWER & LIGHT
NELSON DEWEY GENERATING STATION
EXISTING CONDITIONS
OCTOBER 1993

RMT, INC.

Dwn.By:	CDH
Approved By:	ELM
Date:	OCTOBER 1994
Proj.#:	2767.03
File #:	2767030LDGN

Plot File = P:\MSPC\2767030\DGN\2767030LDGN
Plot Date = Fri Oct 21 08:28:28 1994
Pen Table =DEFAULT.TBL

OCT 31 1994

FIGURE 4

TABLE 5

SUMMARY OF LEACHING TEST RESULTS

	Fly Ash		Slag
Year	1983	1990 to 1992	1987 to 1992
Coal Type	Eastern (and Western)	Western (and Eastern)	Western (and Eastern) [1]
Water:Solid Ratio	2:1	4:1	4:1
Extraction Time	24 hours	48 hours	48 hours
Number of Samples	1	3	6
Arsenic (mg/L)	< 0.001	0.05 to 2.02	< 0.002 to 0.081
Selenium (mg/L)	NA	0.42 to 160	< 0.002 to 0.045
Boron (mg/L)	420	4.63 to 37.34	< 0.010 to 1.05
Iron (mg/L)	NA	NA	< 0.02 to 0.98
Sulfate (mg/L)	13,070	2,000 to 16,700	2.0 to < 5.0
pH (SU)	6.6	10.3 to 12.5	5.6 to 9.9

NOTES:

1. 1983 fly ash leaching data from RMT (1984); remaining leaching data provided by WP&L.
2. NA = Not Analyzed.

PROJECT NUMBER: 1831.28
BEGINNING DATE: 01-JUN-93
ENDING DATE: 07-SEP-93

TABLE 6
SLAG AND ASH BASIN CHEMISTRY

PARAMETER	UNITS	FLY ASH BASIN 07-SEP-93 3302-011		SLAG BASIN 07-SEP-93 3302-010	
COLOR, FIELD		CLEAR		CLEAR	
CONDUCTANCE, SPECIFIC	UMHOS/CM	5190		400	
ODOR, FIELD		NONE		NONE	
PH, FIELD	SU	8.1		7.4	
TEMPERATURE	DEG C	17		18	
TURBIDITY, FIELD		SLIGHT		SLIGHT	
ALKALINITY AS CACO3	MG/L	230		160	
HARDNESS AS CACO3	MG/L	930		200	
SOLIDS, TOTAL DISSOLVED	MG/L	410		300	
SULFATE	MG/L	3300		50	
ARSENIC, TOTAL	UG/L	60		8.0	
BARIUM, TOTAL	UG/L	270		150	
BORON, TOTAL	UG/L	2300		210	
CADMIUM, TOTAL	UG/L	5.4		< 0.30	
CHROMIUM, TOTAL	UG/L	11		< 10	
IRON, TOTAL	UG/L	1600		2000	
LEAD, TOTAL	UG/L	< 3.0		< 3.0	
MERCURY, TOTAL	UG/L	< 0.20		< 0.20	
SELENIUM, TOTAL	UG/L	36	I	2.1	L
SILVER, TOTAL	UG/L	< 1.0		< 1.0	

18-OCT-94

wpvalid:SWI.BJC

PROJECT NUMBER: 1831.28
BEGINNING DATE: 01-JUN-93
ENDING DATE: 29-OCT-93

TABLE 8
GROUNDWATER CHEMISTRY

PARAMETER	UNITS	B-04 01-JUN-93 1670-015	B-04 07-SEP-93 3293-010	B-07 ND 01-JUN-93 1670-020	B-07 ND 07-SEP-93 3302-004	B-08 01-JUN-93 1670-001	B-08R 07-SEP-93 3293-009
COLOR, FIELD		CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	1160	1240	460	550	670	1160
DEPTH TO WATER	FEET	9.90	12.75	12.83	16.12	5.68	20.13
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	7.3	7.5	7.0	6.9	7.1	6.8
TEMPERATURE	DEG C	15	10	14	12	15	7
TURBIDITY, FIELD		NONE	SLIGHT	NONE	SLIGHT	NONE	MODERATE
WATER ELEVATION	FEET	610.68	607.83	610.97	607.68	610.51	
ALKALINITY AS CACO3	MG/L	72	92	160	190	220	440
CHLORIDE	MG/L	18	23	17	15	9.4	2.8
COD	MG/L						
FLUORIDE	MG/L	0.58	5.5	0.26	0.32	< 0.10	0.12
HARDNESS AS CACO3	MG/L	220	120	210	250	370	620
NITROGEN, NITRATE + NITRITE	MG/L	0.15	0.33	< 0.050	< 0.050	< 0.050	4.2
SOLIDS, TOTAL DISSOLVED	MG/L	900	940	300	360	460	770
SULFATE	MG/L	500	560	74	100	180	180
ARSENIC, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
BARIUM, DISSOLVED	UG/L	68	< 50	61	73	63	50
BORON, DISSOLVED	UG/L	1900	4200	230	< 200	2200	9400
CADMIUM, DISSOLVED	UG/L	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	0.38
CHROMIUM, DISSOLVED	UG/L	< 10	< 10	< 10	< 10	< 10	< 10
COPPER, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	< 20
IRON, DISSOLVED	UG/L	720	890	2800	4100	< 100	< 100
LEAD, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L	1200	720	970	1500	17	3400
MERCURY, DISSOLVED	UG/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L	6.9	3.2	< 1.0 L	< 1.0 L	< 1.0 L	34
SILVER, DISSOLVED	UG/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L	1000	100	22	< 20	220	< 20

PROJECT NUMBER: 1831.28
BEGINNING DATE: 01-JUN-93
ENDING DATE: 29-OCT-93

TABLE 8
GROUNDWATER CHEMISTRY

PARAMETER	UNITS	B-11 07-SEP-93 X0001	B-11 29-OCT-93 3485-001	B-20 07-SEP-93 X0002	B-26 01-JUN-93 1670-022	B-26 07-SEP-93 3302-005	B-26A 01-JUN-93 1670-023
COLOR, FIELD					CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	1500		310	610	670	660
DEPTH TO WATER	FEET	15.91		10.81	16.22	18.85	16.20
ODOR, FIELD					NONE	NONE	NONE
PH, FIELD	SU				7.1	7.2	7.0
TEMPERATURE	DEG C	13	13	14	14	11	15
TURBIDITY, FIELD					NONE	SLIGHT	NONE
WATER ELEVATION	FEET				610.18	607.55	610.19
ALKALINITY AS CACO3	MG/L		470		320	300	340
CHLORIDE	MG/L				21	43	33
COD	MG/L						
FLUORIDE	MG/L				< 0.10	0.15	< 0.10
HARDNESS AS CACO3	MG/L		810		390	410	400
NITROGEN, NITRATE + NITRITE	MG/L				2.6	4.9	2.0
SOLIDS, TOTAL DISSOLVED	MG/L		520		440	450	450
SULFATE	MG/L		360		34	34	33
ARSENIC, DISSOLVED	UG/L		8.4		< 3.0	< 3.0	< 3.0
BARIUM, DISSOLVED	UG/L		100		62	68	96
BORON, DISSOLVED	UG/L		5100		< 200	< 200	< 200
CADMIUM, DISSOLVED	UG/L		< 0.30		< 0.30	< 0.30	< 0.30
CHROMIUM, DISSOLVED	UG/L		< 10		< 10	< 10	< 10
COPPER, DISSOLVED	UG/L				< 20	< 20	< 20
IRON, DISSOLVED	UG/L		55000		< 100	< 100	< 100
LEAD, DISSOLVED	UG/L		< 3.0		< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L				< 5.0	< 5.0	< 5.0
MERCURY, DISSOLVED	UG/L		< 0.20		< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L		< 1.0 LNP		< 1.0 L	< 1.0 L	< 1.0 L
SILVER, DISSOLVED	UG/L		< 10		< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L				< 20	< 20	< 20

PROJECT NUMBER: 1831.28
BEGINNING DATE: 01-JUN-93
ENDING DATE: 29-OCT-93

TABLE 8
GROUNDWATER CHEMISTRY

PARAMETER	UNITS	B-26A 07-SEP-93 3302-006	B-27R 07-SEP-93 X0003	B-28 01-JUN-93 1670-014	B-28 07-SEP-93 3302-003	B-29 07-SEP-93 X0004	B-30AR 01-JUN-93 1670-013
COLOR, FIELD		CLEAR		CLEAR	CLEAR		CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	440	370	190	230	360	220
DEPTH TO WATER	FEET	18.84	14.67	6.40	9.08	9.57	12.33
ODOR, FIELD		NONE		NONE	NONE		NONE
PH, FIELD	SU	7.2		6.1	6.0		7.2
TEMPERATURE	DEG C	11	14	17	15	15	17
TURBIDITY, FIELD		NONE		SLIGHT	MODERATE		NONE
WATER ELEVATION	FEET	607.55		610.46	607.74	607.26	610.11
ALKALINITY AS CACO3	MG/L	340		26	54		200
CHLORIDE	MG/L	25		4.6	11		13
COD	MG/L						7.3
FLUORIDE	MG/L	0.15		< 0.10	< 0.10		0.10
HARDNESS AS CACO3	MG/L	410		82	110		220
NITROGEN, NITRATE + NITRITE	MG/L	1.8		2.7	0.60		< 0.050
SOLIDS, TOTAL DISSOLVED	MG/L	440		140	160		280
SULFATE	MG/L	38		45	42		27
ARSENIC, DISSOLVED	UG/L	< 3.0		< 3.0	< 3.0		< 3.0
BARIUM, DISSOLVED	UG/L	86		< 50	52		< 50
BORON, DISSOLVED	UG/L	< 200		< 200	< 200		< 200
CADMIUM, DISSOLVED	UG/L	< 0.30		< 0.30	< 0.30		< 0.30
CHROMIUM, DISSOLVED	UG/L	< 10		< 10	< 10		< 10
COPPER, DISSOLVED	UG/L	< 20		< 20	< 20		< 20
IRON, DISSOLVED	UG/L	< 100		210	< 100		< 100
LEAD, DISSOLVED	UG/L	< 3.0		< 3.0	< 3.0		< 3.0
MANGANESE, DISSOLVED	UG/L	< 5.0		8.6	< 5.0		< 5.0
MERCURY, DISSOLVED	UG/L	< 0.20		< 0.20	< 0.20		< 0.20
SELENIUM, DISSOLVED	UG/L	< 1.0 LN		< 1.0 L	< 1.0 L		< 1.0 L
SILVER, DISSOLVED	UG/L	< 1.0		< 1.0	< 1.0		< 1.0
ZINC, DISSOLVED	UG/L	< 20		< 20	< 20		< 20

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TABLE 8
GROUNDWATER CHEMISTRY

PARAMETER	UNITS	B-30AR 07-SEP-93 3302-002	B-30R 01-JUN-93 1670-012	B-30R 07-SEP-93 3302-001	B-31A 01-JUN-93 1670-019	B-31A 07-SEP-93 3293-011	B-31R 01-JUN-93 1670-018
COLOR, FIELD		CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	410	420	360	700	800	640
DEPTH TO WATER	FEET	15.37	12.25	15.17	12.21	15.93	11.56
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	7.3	7.0	6.8	6.9	7.3	6.8
TEMPERATURE	DEG C	12	16	14	17	14	17
TURBIDITY, FIELD		NONE	MODERATE	MODERATE	NONE	SLIGHT	SLIGHT
WATER ELEVATION	FEET	607.07	610.10	607.18	610.46	606.74	610.85
ALKALINITY AS CACO3	MG/L	190	160	140	170	160	240
CHLORIDE	MG/L	14	13	6.6	16	17	11
COD	MG/L		9.7				
FLUORIDE	MG/L	0.16	< 0.10	< 0.10	0.39	0.43	< 0.10
HARDNESS AS CACO3	MG/L	230	210	210	120	160	330
NITROGEN, NITRATE + NITRITE	MG/L	< 0.050	8.5	8.8	< 0.050	< 0.050	< 0.050
SOLIDS, TOTAL DISSOLVED	MG/L	280	280	230	510	570	510
SULFATE	MG/L	25	25	26	250	250	150
ARSENIC, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
BARIUM, DISSOLVED	UG/L	< 50	< 50	< 50	54	66	110
BORON, DISSOLVED	UG/L	< 200	< 200	< 200	2900	2100	2900
CADMIUM, DISSOLVED	UG/L	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	2.7
CHROMIUM, DISSOLVED	UG/L	< 10	< 10	< 10	< 10	< 10	< 10
COPPER, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	110
IRON, DISSOLVED	UG/L	< 100	< 100	< 100	210	300	450
LEAD, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L	< 5.0	< 5.0	< 5.0	4600	6000	440
MERCURY, DISSOLVED	UG/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L	< 1.0 L	1.3 L	3.2	< 1.0 L	< 1.0 L	1.2 L
SILVER, DISSOLVED	UG/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	27

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TABLE 8
GROUNDWATER CHEMISTRY

PARAMETER	UNITS	B-31R 07-SEP-93 3293-012	B-32 01-JUN-93 1670-002	B-32 07-SEP-93 3293-016	B-32A 01-JUN-93 1670-003	B-32A 07-SEP-93 3293-017	B-35 01-JUN-93 1670-004
COLOR, FIELD		CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	L YLW/BN
CONDUCTANCE, SPECIFIC	UMHOS/CM	480	300	330	610	1320	1070
DEPTH TO WATER	FEET	14.44	3.37	6.22	3.59	6.46	10.10
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	7.0	6.3	5.6	7.0	6.8	6.3
TEMPERATURE	DEG C	15	13	14	13	14	12
TURBIDITY, FIELD		MODERATE	SLIGHT	MODERATE	NONE	SLIGHT	SLIGHT
WATER ELEVATION	FEET	607.97	610.80	607.95	610.81	607.94	610.66
ALKALINITY AS CACO3	MG/L	190	140	140	330	320	190
CHLORIDE	MG/L	11	6.7	6.9	7.0	7.6	110
COD	MG/L						
FLUORIDE	MG/L	0.18	< 0.10	0.12	0.12	0.19	< 0.10
HARDNESS AS CACO3	MG/L	240	160	180	350	390	260
NITROGEN, NITRATE + NITRITE	MG/L	< 0.050	0.68	1.2	1.1	1.3	36
SOLIDS, TOTAL DISSOLVED	MG/L	340	200	240	380	420	800
SULFATE	MG/L	71	11	16	29	30	35
ARSENIC, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	7.4
BARIUM, DISSOLVED	UG/L	81	100	120	98	91	100
BORON, DISSOLVED	UG/L	1100	< 200	< 200	< 200	< 200	210
CADMIUM, DISSOLVED	UG/L	1.1	< 0.30	0.38	< 0.30	0.35	< 0.30
CHROMIUM, DISSOLVED	UG/L	< 10	< 10	< 10	< 10	< 10	< 10
COPPER, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	21
IRON, DISSOLVED	UG/L	210	< 100	< 100	< 100	< 100	< 100
LEAD, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L	360	< 5.0	280	6.9	33	< 5.0
MERCURY, DISSOLVED	UG/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L	< 1.0 L	< 1.0 L	< 1.0 L	< 1.0 L	< 1.0 L	< 1.0 L
SILVER, DISSOLVED	UG/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	< 20

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TABLE 8
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PARAMETER	UNITS	B-35 07-SEP-93 3293-002	B-35A 01-JUN-93 1670-005	B-35A 07-SEP-93 3293-003	B-36 01-JUN-93 1670-007	B-36 07-SEP-93 3293-004	B-36A 01-JUN-93 1670-006
COLOR, FIELD		YELLOW	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	1050	620	680	430	500	620
DEPTH TO WATER	FEET	13.13	10.55	13.57	10.86	13.97	11.11
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	6.8	7.0	7.1	6.3	7.0	7.1
TEMPERATURE	DEG C	14	13	12	12	13	13
TURBIDITY, FIELD		SLIGHT	NONE	NONE	SLIGHT	MODERATE	NONE
WATER ELEVATION	FEET	607.63	610.63	607.61	610.60	607.49	610.35
ALKALINITY AS CACO3	MG/L	210	330	320	230	210	330
CHLORIDE	MG/L	80	26	24	4.4	25	12
COD	MG/L						
FLUORIDE	MG/L	0.19	< 0.10	0.13	< 0.10	0.14	< 0.10
HARDNESS AS CACO3	MG/L	290	380	400	240	280	350
NITROGEN, NITRATE + NITRITE	MG/L	39	1.7	2.0	< 0.050	1.4	0.83
SOLIDS, TOTAL DISSOLVED	MG/L	770	480	460	280	350	400
SULFATE	MG/L	43	33	37	15	18	36
ARSENIC, DISSOLVED	UG/L	3.6	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
BARIUM, DISSOLVED	UG/L	120	< 50	54	110	120	68
BORON, DISSOLVED	UG/L	220	< 200	< 200	< 200	< 200	< 200
CADMIUM, DISSOLVED	UG/L	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
CHROMIUM, DISSOLVED	UG/L	< 10	< 10	< 10	< 10	< 10	< 10
COPPER, DISSOLVED	UG/L	24	< 20	< 20	< 20	< 20	< 20
IRON, DISSOLVED	UG/L	< 100	< 100	< 100	< 100	< 100	< 100
LEAD, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L	< 5.0	< 5.0	< 5.0	< 5.0	55	< 5.0
MERCURY, DISSOLVED	UG/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L	< 1.0 L	< 1.0 L	< 1.0 L	1.0 L	2.6 L	< 1.0 L
SILVER, DISSOLVED	UG/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	< 20

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TABLE 8
GROUNDWATER CHEMISTRY

PARAMETER	UNITS	B-36A 07-SEP-93 3293-005	B-37 07-SEP-93 3302-007	B-37A 07-SEP-93 3302-008	B-38 01-JUN-93 1670-016	B-38 07-SEP-93 3293-006	B-38A 01-JUN-93 1670-017
COLOR, FIELD		CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	620	510	770	3630	2830	2760
DEPTH TO WATER	FEET	14.18	8.13	8.14	18.53	20.19	24.87
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	7.1	7.3	7.3	8.3	9.9	7.7
TEMPERATURE	DEG C	11	13	11	20	20	15
TURBIDITY, FIELD		NONE	SLIGHT	NONE	NONE	SLIGHT	NONE
WATER ELEVATION	FEET	607.51	606.69	606.69	617.29	615.63	610.96
ALKALINITY AS CACO3	MG/L	330	200	190	100	420	80
CHLORIDE	MG/L	13	6.8	11	26	24	23
COD	MG/L						
FLUORIDE	MG/L	0.14	< 0.10	< 0.10	1.8	2.6	1.1
HARDNESS AS CACO3	MG/L	390	290	410	620	21	500
NITROGEN, NITRATE + NITRITE	MG/L	0.85	1.2	< 0.050	1.7	0.29	1.6
SOLIDS, TOTAL DISSOLVED	MG/L	420	380	590	3000	2200	2300
SULFATE	MG/L	36	100	240	2600	1200	2000
ARSENIC, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	180	90	38
BARIUM, DISSOLVED	UG/L	68	< 50	< 50	110	< 50	58
BORON, DISSOLVED	UG/L	< 200	3100	7400	2500	2600	2200
CADMIUM, DISSOLVED	UG/L	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
CHROMIUM, DISSOLVED	UG/L	< 10	< 10	< 10	68	< 10	52
COPPER, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	< 20
IRON, DISSOLVED	UG/L	< 100	< 100	< 100	< 100	< 100	< 100
LEAD, DISSOLVED	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
MANGANESE, DISSOLVED	UG/L	< 5.0	< 5.0	55	< 5.0	< 5.0	< 5.0
MERCURY, DISSOLVED	UG/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
SELENIUM, DISSOLVED	UG/L	< 1.0 L	< 1.0 L	< 1.0 L	57	320	22
SILVER, DISSOLVED	UG/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ZINC, DISSOLVED	UG/L	< 20	< 20	< 20	< 20	< 20	< 20

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TABLE 8
GROUNDWATER CHEMISTRY

PARAMETER	UNITS		B-38A 07-SEP-93 3293-007
COLOR, FIELD			CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM		3280
DEPTH TO WATER	FEET		27.59
ODOR, FIELD			NONE
PH, FIELD	SU		9.0
TEMPERATURE	DEG C		16
TURBIDITY, FIELD			NONE
WATER ELEVATION	FEET		608.24
ALKALINITY AS CACO3	MG/L		90
CHLORIDE	MG/L		21
COD	MG/L		
FLUORIDE	MG/L		3.4
HARDNESS AS CACO3	MG/L		390
NITROGEN, NITRATE + NITRITE	MG/L		0.59
SOLIDS, TOTAL DISSOLVED	MG/L		2600
SULFATE	MG/L		1800
ARSENIC, DISSOLVED	UG/L		51
BARIUM, DISSOLVED	UG/L		54
BORON, DISSOLVED	UG/L		3300
CADMIUM, DISSOLVED	UG/L	<	0.30
CHROMIUM, DISSOLVED	UG/L		11
COPPER, DISSOLVED	UG/L	<	20
IRON, DISSOLVED	UG/L	<	100
LEAD, DISSOLVED	UG/L	<	3.0
MANGANESE, DISSOLVED	UG/L	<	5.0
MERCURY, DISSOLVED	UG/L	<	0.20
SELENIUM, DISSOLVED	UG/L		57
SILVER, DISSOLVED	UG/L	<	1.0
ZINC, DISSOLVED	UG/L	<	20

Appendix C

2016 Low-Hazard Waste Exemption Leaching Test Results – Slag and Ash

Sediment and Soil Analytical Results - Water Leach Test Results
WPL Nelson Dewey

Sample	Date	Depth (feet)	Material Type	Lab Notes	Boron (ug/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	TDS (mg/L)
WPDES POND									
SED-1	8/3/2016	0-1.3	Fly Ash	--	240	4.3	<1.0	4.4	54
SED-2	8/3/2016	0-1.0	Fly Ash	--	200	4.3	<1.0	11.5	60
QC-3 (SED-2)	8/3/2016	0-1	Fly Ash	--	240	3.5 J	<1.0	6.1	52
SED-3	7/20/2016	0-4.5	Slag	--	130	2.7 J	<1.0	5	28
	7/20/2016	4.5-5.5	SP	--	<50	2.5 J	<0.20	<2.0	14 J
SED-4	7/19/2016	0-4.8	ML	--	510	10.5 J	<10.0	11.9 J	86
	7/19/2016	4.8-5.5		--	74 J	NA	NA	NA	NA
GP-19	8/4/2016	8-12	SM	--	62 J	2.4 J	<1.0	2 J	16 J
SLAG POND									
SED-5	7/20/2016	0-1.6	ML-OL	--	54 J	3.2 J	<1.0	33.3	90
SED-6	7/20/2016	0-1.0	ML	--	60 J	3.7 J	0.36 J	59.1	130
SED-7	8/4/2016	0-3.0	Fly Ash	--	88 J	4	<1.0	10.5	76
SED-8	8/4/2016	1.0-1.5	Fly Ash	--	82 J	3.7 J	<1.0	12.1	74
COAL YARD									
TP-CY-1	7/19/2016	0-0.5	Coal	--	140	<20.0	<2.0	<20.0	32
	7/19/2016	3.0-3.5	SM	--	100 J	2.8 J	<1.0	<2.0	20
TP-CY-3	7/20/2016	1.9-2.1	GM	--	<50	3.9 J	<0.20	2.8 J	50
	7/20/2016	4.8-5.5	SM	--	NA	NA	NA	NA	NA
TP-CY-4	7/19/2016	0-2.8	Coal	--	190	<20.0	<2.0	<20.0	38
	7/19/2016	2.8-3.2	GP & SM	--	<50	<10.0	<1.0	<10.0	34
	7/19/2016	3.6-4.8	Slag	--	<50	<20.0	<2.0	<20.0	10 J
	7/19/2016	4.8-5.0		--	NA	NA	NA	NA	NA
TP-CY-6	7/19/2016	0-0.5	Coal	--	190	<20.0	<2.0	<20.0	54
	7/19/2016	0.7-1.0	SP	--	<50	2.5 J	<0.20	2.3 J	30
TP-CY-10	7/19/2016	0-0.5	Coal	--	120	2.4 J	<1.0	11.6	48
	7/19/2016	1.0-2.0	SM	--	<50	2.2 J	<1.0	2.3 J	28
TP-CY-12	7/20/2016	0-0.3	Coal	--	160	<20.0	<2.0	<20.0	44
	7/20/2016	0.3-2.0	SP	--	<50	2.2 J	<0.20	2.2 J	24
	7/20/2016	2.0-2.7	SP	--	<50	2.3 J	<0.20	27.5	50
QC-1 (TP-CY-12)	7/20/2016	0.3-2.0	SP	--	<50	2.6 J	<0.20	2.5 J	24
SLAG HANDLING AREA									
GP-5	8/3/2016	12.5-15	Fly Ash	--	100	<2.0	<1.0	3.0 J	22
	8/3/2016	18-24	ML & SM	--	99 J	3.3 J	<1.0	<2.0	24
GP-7	8/3/2016	7.5-18	Slag	--	<50	2.2 J	<1.0	<2.0	<8.7
QC-2 (GP-7)	8/3/2016	7.5-18	Slag	--	<50	2.2 J	<1.0	<2.0	10 J
GP-14	8/4/2016	12.5-15	Fly Ash	--	120	<2.0	<1.0	13.4	96
SLAG SAMPLES[1]									
Slag 01 [2]	6/3/2013	--	Slag	--	NA	NA	NA	NA	NA
Slag 01	12/23/2013	--	Slag	--	12.5 AB	0.277 B	NA	0.218	NA
NED Slag Composite 2014	7/1/2014	--	Slag	--	11.7 AB*^	< 0.142	NA	0.457 B	98 H
Slag Sample	4/14/2015	--	Slag	--	< 1020 A	0.751	NA	0.427	NA

Sediment and Soil Analytical Results - Water Leach Test Results
WPL Nelson Dewey

Sample	Date	Depth (feet)	Material Type	Lab Notes	Boron (ug/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	TDS (mg/L)
FLY ASH SAMPLES[1]									
NED Flyash Composite [2]	2/14/2014	--	Fly Ash	--	NA	NA	NA	6,530 B	NA
Week of 062815 [2]	7/3/2015	--	Fly Ash	--	NA	NA	NA	6,260	NA
Week of 010916	1/4/2016	--	Fly Ash	--	NA	NA	NA	NA	NA
NR 140 Preventative Action Limits (PALs)					200	125	0.8	125	NE
NR 140 Enforcement Standards (ESs)					1000	250	4	250	NE
40 CFR Part 141.62 Maximum Contaminant Levels (MCL)					NE	NE	4	NE	NE
NR 538 Table 1A Standards					190	125	0.8	125	NE
NR 538 Table 2A Standards					1900	1,250	8	1,250	NE

Abbreviations:
mg/L = micrograms per liter
NE = No Standard Established
NA = Not Analyzed
GM = Silty Gravel
ML = Silt
ML-CL = Silty Clay
SM = Silty Sand
GP = Poorly Graded Gravel
ML-OL = Silty Organic Clay
SP = Poorly Graded Sand
ML-OL = Silty Organic Clay
TDS = Total Dissolved Solids

Notes:
1. Slag and Fly Ash samples were collected by the plant as part of permit requirements.
2. Sample was analyzed using the SPLP Leach Method rather than the ASTM Water Leach Method for tested parameters except for Sulfate.
NR 140 ESs - Wisconsin Administrative Code (WAC), Chapter NR 140.10 Table 1 - Public Health Groundwater Quality Standards from July 2015 and WAC, Chapter NR 140.12 Table 2 - Public Welfare Groundwater Quality Standards from July 2015.
NR 140 PALs - WAC, Chapter NR 140.10 Table 1 - Public Health Groundwater Quality Standards from July 2015 and WAC, Chapter NR 140.12 Table 2 - Public Welfare Groundwater Quality Standards from July 2015.

Laboratory Notes/Qualifiers:
J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
A = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B = Compound was found in the blank and sample.
F1 = MS and/or MSD Recovery is outside acceptance limits.
H = Sample was prepped or analyzed beyond the specified holding time.
^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
* = LCS or LCSD is outside acceptance limits.

Created by: RJG Date: 3/14/2016
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Checked by: BSS Date: 10/24/2016
Original table prepared for Slag Pond Closure Low Hazard Waste Exemption Request (SCS Project #25216054.00).
Reformatted for the Alternative Source Demonstration to include only the parameters with SSIs that were included in the leach testing by NDK, 9/14/2020; SCC 10/1/2021.

I:\25221071.00\Deliverables\2021 April ASD NED\Appendix C 2016 leachate results slag and ash\[Table 4. Sediment_Soil_Water Leach Results-Updated.xlsx]Leach Test - SSI Parameters