Groundwater Monitoring System Certification

for Compliance with the Coal Combustion Residuals (CCR) Rule

Erickson Power Station

Lansing Board of Water & Light

May 4, 2020

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Table of Abbreviations and Acronyms

Abbreviation	Definition
AMSL	above mean sea level
BGS	below ground surface
BTV	background threshold values
BWL	Board of Water & Light
CCR	Coal Combustion Residuals
COI	constituent of interest
CWP	Clear Water Pond
EPA	U.S. Environmental Protection Agency
Erickson	Erickson Power Station
TDS	total dissolved solids
TOC	top of casing
TSS	total suspended solids

Certification

Groundwater Monitoring System for Compliance with the Coal Combustion Residuals Rule

Lansing Board of Water and Light

Erickson Power Station, Delta Township, Michigan

I hereby certify that the groundwater monitoring system at Erickson Station is designed to meet the performance standard in Sections §257.91 of the Federal Coal Combustion Residuals Rule, and that the groundwater monitoring system has been designed and constructed to ensure that the groundwater monitoring will meet this performance standard for the CCR units located at Erickson Power Station.

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Michigan PE License 6201065363

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1.0 Introduction

The U.S. Environmental Protection Agency's (EPA) final Coal Combustion Residuals (CCR) Rule establishes a comprehensive set of requirements for the management and disposal of CCR (or coal ash) in landfills and surface impoundments by electric utilities. Erickson Power Station ("Erickson" or "Site"), located in Delta Township, Eaton County, Michigan (Figure 1), is owned and operated by Lansing Board of Water and Light (BWL) and contains a single coal-fired generator capable of producing 165 megawatts of electricity. The CCR generated at Erickson is stored in dewatering tanks (hydro-bins) and three active CCR impoundments: the Forebay, Retention Basin, and Clear Water Pond (CWP). A 33-acre impoundment was physically closed by removal of CCR in 2014 is now referred to as the Former Impoundment (Figure 2). The three active impoundments are subject to the CCR Rule.

This document supports compliance with the CCR Rule by demonstrating that the groundwater monitoring system at Erickson Station meets the requirements outlined in Section §257.91 of the Rule. Specifically, this document satisfies requirements outlined in Section §257.91 of the Rule, which states:

- Section §257.91(f): *'The owner or operator must obtain a certification from a qualified professional engineer stating that the groundwater monitoring system has been designed and constructed to meet requirements of this section* [§257.91]. *If the groundwater monitoring system includes the minimum number of monitoring wells specified in paragraph (c)(1) of this section* [Section § 257.91], *the certification must document the basis supporting this determination*.'

Table 1 summarizes components required by groundwater monitoring systems, per the CCR Rule and the professional engineer's certification of compliance with these requirements. The remainder of this document provides information to support certification for the multiunit groundwater monitoring system.

Table 1. Summary of 40 CFR Section §257.91 Groundwater Monitoring System Requirements and Site-Specific Compliance	
Groundwater Monitoring System Requirements	**Compliance with Requirement**
(a) *Performance standard.* The owner or operator of a CCR unit must install a groundwater monitoring system that consists of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the uppermost aquifer that: (1) Accurately represent the quality of background groundwater that has not been affected by leakage from a CCR unit. A determination of background quality may include sampling of wells that are not hydraulically upgradient of the CCR management area where: (i) Hydrogeologic conditions do not allow the owner or operator of the CCR unit to determine what wells are hydraulically upgradient; or (ii) Sampling at other wells will provide an indication of background groundwater quality that is as representative or more representative than that provided by the upgradient wells; and (2) Accurately represent the quality of groundwater passing the waste boundary of the CCR unit. The downgradient monitoring system must be installed at the waste boundary that ensures detection of groundwater contamination in the uppermost aquifer. All potential contaminant pathways must be monitored.	**Yes.** The direction of groundwater flow has been determined at the Site; the groundwater monitoring system includes the minimum number of wells at appropriate locations and depths to yield groundwater samples necessary to meet performance standards (a)(1) and (a)(2). See Sections 3.0 and 4.0.
(b) The number, spacing, and depths of monitoring systems shall be determined based upon site-specific technical information that must include thorough characterization of: (1) Aquifer thickness, groundwater flow rate, groundwater flow direction including seasonal and temporal fluctuations in groundwater flow; and (2) Saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the uppermost aquifer, including, but not limited to, thicknesses, stratigraphy, lithology, hydraulic conductivities, porosities and effective porosities.	**Yes.** The monitoring system was designed based on results of technical, site-specific data, including (b)(1) and (b)(2). See Sections 3.0 and 4.0.
(c) The groundwater monitoring system must include the minimum number of monitoring wells necessary to meet the performance standards specified in paragraph (a) of this section, based on the site-specific information specified in paragraph (b) of this section. The groundwater monitoring system must contain: (1) A minimum of one upgradient and three downgradient monitoring wells; and (2) Additional monitoring wells as necessary to accurately represent the quality of background groundwater that has not been affected by leakage from the CCR unit and the quality of groundwater passing the waste boundary of the CCR unit.	**Yes.** Two background and three downgradient wells at the boundary of the area containing the Forebay, Retention Basin, CWP, and former impoundment that meet the performance standards are being monitored in compliance with the CCR Rule. See Section 4.0.

Table 1. Summary of 40 CFR Section §257.91 Groundwater Monitoring System Requirements and Site-Specific Compliance	
Groundwater Monitoring System Requirements	**Compliance with Requirement**
(d) The owner or operator of multiple CCR units may install a multiunit groundwater monitoring system instead of separate groundwater monitoring systems for each CCR unit. (1) The multiunit groundwater monitoring system must be equally as capable of detecting monitored constituents at the waste boundary of the CCR unit as the individual groundwater monitoring system specified in paragraphs (a) through (c) of this section for each CCR unit based on the following factors:(i) Number, spacing, and orientation of each CCR unit; (ii) Hydrogeologic setting; (iii) Site history; and (iv) Engineering design of the CCR unit. (2) If the owner or operator elects to install a multiunit groundwater monitoring system, and if the multiunit system includes at least one existing unlined CCR surface impoundment as determined by §257.71(a), and if at any time after October 19, 2015 the owner or operator determines in any sampling event that the concentrations of one or more constituents listed in appendix IV to this part are detected at statistically significant levels above the groundwater protection standard established under §257.95(h) for the multiunit system, then all unlined CCR surface impoundments comprising the multiunit groundwater monitoring system are subject to the closure requirements under §257.101(a) to retrofit or close.	**Yes.** A multiunit system capable of detecting monitored constituents per (d)(1) was installed for the three active CCR units. See Sections 2.0 and 4.0. There are unlined active CCR units included in the multiunit system, requirements per (d)(2) do apply.
(e) Monitoring wells must be cased in a manner that maintains the integrity of the monitoring well borehole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. The annular space (*i.e.,* the space between the borehole and well casing) above the sampling depth must be sealed to prevent contamination of samples and the groundwater. (1) The owner or operator of the CCR unit must document and include in the operating record the design, installation, development, and decommissioning of any monitoring wells, piezometers and other measurement, sampling, and analytical devices. The qualified professional engineer must be given access to this documentation when completing the groundwater monitoring system certification required under paragraph (f) of this section. (2) The monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to the design specifications throughout the life of the monitoring program.	**Yes.** Well design meets requirements (e). See Section 4.0. Groundwater monitoring system will be operated and maintained per (e)(2).
(f) The owner or operator must obtain a certification from a qualified professional engineer stating that the groundwater monitoring system has been designed and constructed to meet the requirements of this section. If the groundwater monitoring system includes the minimum number of monitoring wells specified in paragraph (c)(1) of this section, the certification must document the basis supporting this determination.	**Yes.** System designed and constructed to meet the requirements of Section §257.91. Technical information to support certification and number of wells, per (c)(1). See Sections 2.0, 3.0 and 4.0.

Figure 1. Vicinity Map for Erickson Power Station

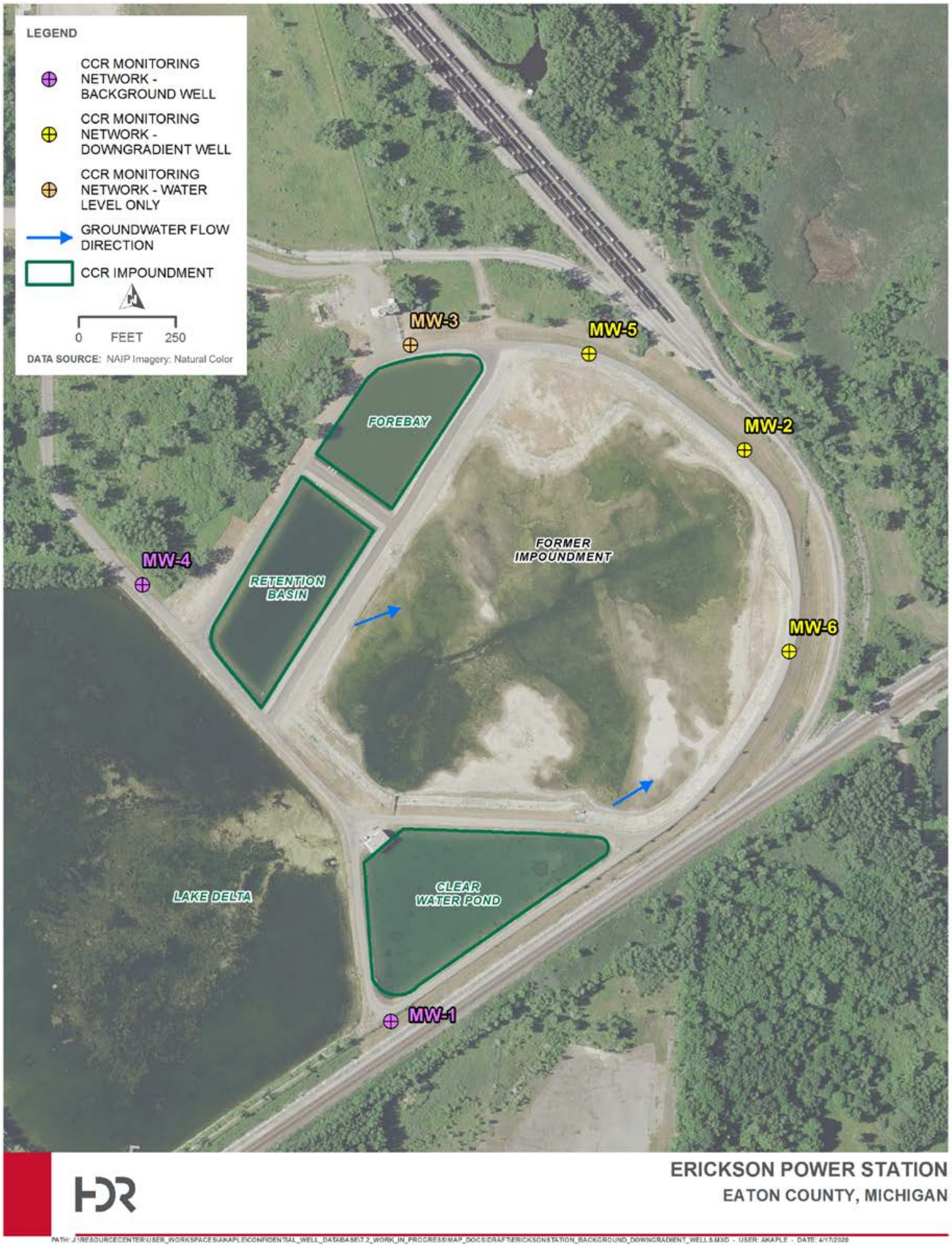

Figure 2. Erickson Power Station – CCR Units and Monitoring Well Location Map

2.0 Facility Description

Erickson Power Station is located in Delta Township, Eaton County, Michigan (Figure 1). The Erickson Power Station coal-fired generation unit went into service in 1970. The station generates up to 165 megawatts of electric power from one coal-fired boiler, designated as Unit 1. Historically, fly ash and bottom ash were sluiced from the plant to the 33-acre impoundment system (now physically closed). From the impoundment, the water then flowed hydraulically to the Clear Water Pond (CWP). Water from CWP was sent back to the plant for use. From 2009 through 2014, the ash was removed from the 33-acre impoundment, and a new system was installed within the footprint of the previous impoundment. It now consists of the Forebay, Retention Basin, and CWP which are currently in use.

The Forebay, Retention Basin, and CWP are subject to CCR Rule. Currently, bottom ash from the coal-fired boiler is sluiced from the plant to dewatering tanks (hydro-bins). The dewatered bottom ash is trucked to a sanitary landfill and the decant water is hydraulically fed through the current impoundment system, which consists of a series of three impoundments: the Forebay, Retention Basin, and CWP. The Forebay and Retention Basin were constructed in 2014 (the CWP was constructed in 1970). Water in the CWP is sent back to the plant. Figure 2 depicts the current impoundment system. There are no regulated outfalls associated with the system.

2.1 CCR Forebay

The decant water from the hydro-bins is hydraulically fed through the impoundment system, beginning with the Forebay. Additionally, the plant sump and coal pile stormwater retention pond is pumped to the Forebay as needed. As stated above, the Forebay and Retention Basin were constructed in 2014 and encompass less than 5 acres between them. The interior embankments and floor of the Forebay is lined with a layer of geosynthetic clay overlain with a 40-millimeter-thick flexible polyvinylchloride membrane liner (FML). The FML is protected with geofabric and a 6- to 12-inch layer of sand. The tops of the embankments that are subject to wave action are protected with an additional layer of geofabric and 6 to 12 inches of stone rip-rap. The base grade elevation of the Forebay is 871.5 feet above mean sea level (ft. amsl).

2.2 CCR Retention Basin

The Retention Basin is adjacent to and receives flow from the Forebay. The Retention Basin is constructed similar to the Forebay, with the interior embankments and floor lined with a layer of geosynthetic clay overlain with a 40-millimeter-thick flexible polyvinylchloride membrane liner (FML). The FML is protected with geofabric and a 6- to 12-inch layer of sand. The tops of the embankments that are subject to wave action are protected with an additional layer of geofabric and 6 to 12 inches of stone rip-rap. The base grade elevation of the Retention Basin is 871.5 ft. amsl. Flow in the Retention Basin discharges primarily to the CWP, and to the Former Impoundment when Retention Basin water levels exceed the Former Impoundment culvert invert. The former impoundment is mentioned because of it is part of the multiunit groundwater monitoring system described in Section 4.0 below.

2.3 CCR Clear Water Pond

The CWP was constructed in 1970 and is located south southeast of the Forebay and Retention Basin and is directly south of the Former Impoundment. Water in the CWP is pumped back to the plant for reuse. The CWP is lined with compacted clay. The base grades of the CWP range from 871 to 874 ft. amsl. The tops of the interior embankments of the CWP are protected with approximately 6 inches of stone rip-rap.

2.4 Former Impoundment (Non-CCR)

The former impoundment was constructed in 1970 and was lined with compacted clay. Historically, it was used to store fly ash and bottom ash from the plant. The current base grade of the Former Impoundment is estimated to be 871 ft. amsl. From 2009 through 2014, the ash was removed from the impoundment and was physically closed in 2014. Therefore, the Former Impoundment is not subject to the CCR Rule.

3.0 Site Hydrogeology/Geology

Prior hydrogeologic and geotechnical investigations have been conducted at and near the Erickson Site, as documented in the following reports and summarized in the text below.

- Monitoring Well Installation Report (HDR, 2020b)
- Hydrogeologic Characterization Report (HDR, 2019)
- Geotechnical borings described in the Locations Restrictions - Compliance with 40 CFR 257 (MD&E, 2018)
- Test pits and geotechnical borings from Dames & Moore (1969) that were provided in MD&E (2018)
- Geotechnical borings completed north of the impoundments and south of the plant described in SME (2018)
- Summary of Hydrogeologic Conditions by County for the State of Michigan (Apple and Reeves, 2007)
- Water-supply development and management alternatives for Clinton, Eaton, and Ingham County, Michigan (Vanlier, Wood, and Brunett, 1973)

The Tri-County region, where Erickson is located, is underlain by unconsolidated clay, silt, sand, and gravel of glacial origin that rest upon about 10,000 feet of consolidated bedrock sediments deposited in ancient seas. The glacial deposits are at the ground surface and range in thickness from 0 to over 300 feet (Apple and Reeves, 2007). The consolidated bedrock below glacial deposits are composed of limestone, shale, siltstone, sandstone, salt, and gypsum. According to Vanlier and others (1973) the principal aquifers in northeastern Eaton County, where Erickson is located, are in the glacial deposits and the Saginaw Formation bedrock below the glacial deposits. According to the Michigan Wellogic Database, approximately 18 percent of the wells in Eaton County are completed in the glacial deposits, and 69 percent in the bedrock units (Apple and Reeves, 2007).

According to studies of the area, groundwater flow in the glacial deposits is generally from south to north, away from topographic divides and towards surface water bodies (Holtschlag and others, 1996). Most groundwater flow in the bedrock Saginaw aquifer is from south to north, although a small amount is toward local pumping centers (Holtschlag and others, 1996). These flow directions are consistent with the topography and surface water flow direction of the Grand River watershed.

According to the Public Water Supply database, the estimated transmissivity for glacial aquifer wells in Eaton County ranges from approximately 615 to 127,000 feet squared per day (ft2/d) (Apple and Reeves, 2007). Holtschlag and others (1996) performed significant spatial correlations to compute hydraulic conductivity estimates of the glacial deposits. Initial estimates of horizontal hydraulic conductivity range from 7.06 to 27.5 ft./d. Horizontal hydraulic conductivity is highest in the west-central part of the Tri-state area and lowest in the north and south parts of the Tri-county area.

According to the Michigan Wellogic Database, two wells have been drilled on the Erickson property, one to 380 and one to 420 feet below surface. In well boring logs, the top 36 to 79 feet of subsurface was logged as clay and gravely clay, representing the glacial deposits, overlying sandstone and shale bedrock down to 420 feet below grade, representing the Saginaw Formation. Both on-site wells are screened in the bedrock Saginaw Formation. According to the Erickson water withdrawal file from 2010, the wells were set with 94 and 80 gallon per minute pumps and were used intermittently for operations but have not been pumped since before 2010. Static water levels were recorded as 21 and 26 feet below grade on the logs.

Wells in the welllogic database within a two-mile radius of Erickson all have geologic logs very similar to those on the property, indicating glacial deposits (clay, sand, and gravel) from 30 to 100 feet below grade overlying shale and sandstone bedrock (HDR 2019). Wells vary in depth between 85 and 460 feet. Of the 141 wells in the vicinity of Erickson, only two are completed in the glacial aquifer (HDR 2019). The remainder of wells are screened in the shale and sandstone of the Saginaw aquifer. Static water levels recorded in the State wellogic database indicate water level between 7 feet below grade near the Grand River to 70 feet below grade; however, these water levels are only for wells screened in the Saginaw aquifer and may be snapshots immediately after drilling that are not representative of static conditions. The two wells completed in the glacial aquifer do not provide static depths in the State wellogic database.

Geotechnical test pits excavated, and geotechnical and well borings drilled at Erickson reveal shallow subsurface lithology is composed of glacial deposits, sandy clay, silt, clayey sand, sand, and sand with gravel to a depth of 36 to 61 feet below ground surface (HDR 2019). The glacial deposits on Site lie above the sandstone and shale bedrock of the Saginaw Formation.

Three wells were drilled in October 2019 around the impoundments at Erickson to serve multiple purposes:

- Determine the depth of the uppermost aquifer under the impoundments (glacial deposits or the deeper bedrock aquifer);

- Determine groundwater flow direction; and
- Potentially serve as monitoring wells for the CCR Rule compliance groundwater monitoring network of the impoundments depending on groundwater flow direction at the site.

Figure 2 displays MW-1, MW-2, and MW-3 well locations. Monitoring wells were surveyed, and water level data was collected. After three months of water level monitoring (collected monthly), the groundwater flow direction was confirmed as northeast under the CCR impoundments, and additional monitoring wells MW-4, MW-5, and MW-6 were installed in January 2020 to serve as additional upgradient and downgradient monitoring wells for the CCR multiunit at Erickson. The wells are further described below. The depth of the uppermost aquifer under the impoundments was determined to be approximately 14 to 20 feet below surface. The groundwater flow direction was determined to be northeast under the impoundments, as depicted in Figure 3.

4.0 Monitoring Wells

The CCR Rule requires, at a minimum, one upgradient and three downgradient monitoring wells per CCR unit to be completed in the uppermost aquifer. Section §257.91 of the Rule states that the operator: "*…may install a multiunit groundwater monitoring system instead of separate groundwater monitoring systems for each CCR unit."* In addition, the CCR Rule states that downgradient monitoring wells should be installed to: *"accurately represent the quality of groundwater passing the waste boundary of the CCR unit. The downgradient monitoring system must be installed at the waste boundary that ensures detection of groundwater contamination in the uppermost aquifer."*

The Forebay, Retention Basin, and CWP are separated from the Former Impoundment by embankments. The BWL determined monitoring wells would not be installed in the embankments of active impoundments to maintain active embankment structural integrity. Additionally, monitoring wells would not be located within the footprint of the Former Impoundment because it remains a depression that impounds stormwater that falls within it and overflows from the Retention Basin. Based on the CCR requirements, hydrogeological data, site visits, and the embankments separating impoundments, three wells were originally sited to confirm the uppermost aquifer under the impoundments and determine the groundwater flow direction under the Site. These three wells (MW-1, MW-2, and MW-3) were sited to triangulate water table elevations to calculate the groundwater flow direction and gradient. The three wells were installed in October 2019 around the outside of the impoundments to evaluate groundwater conditions at the Site in order to advance CCR compliance. Based on the first few months of groundwater level data from wells MW-1, MW-2, and MW-3, it was confirmed that the groundwater flow direction is northeast and MW-1 is upgradient of the impoundments and MW-2 is downgradient. Due to the configuration of the impoundments relative to the northeastern groundwater flow direction, the closest location for installation of downgradient wells for monitoring the three active CCR impoundments is on the downgradient side of the Former Impoundment (Figure 2).

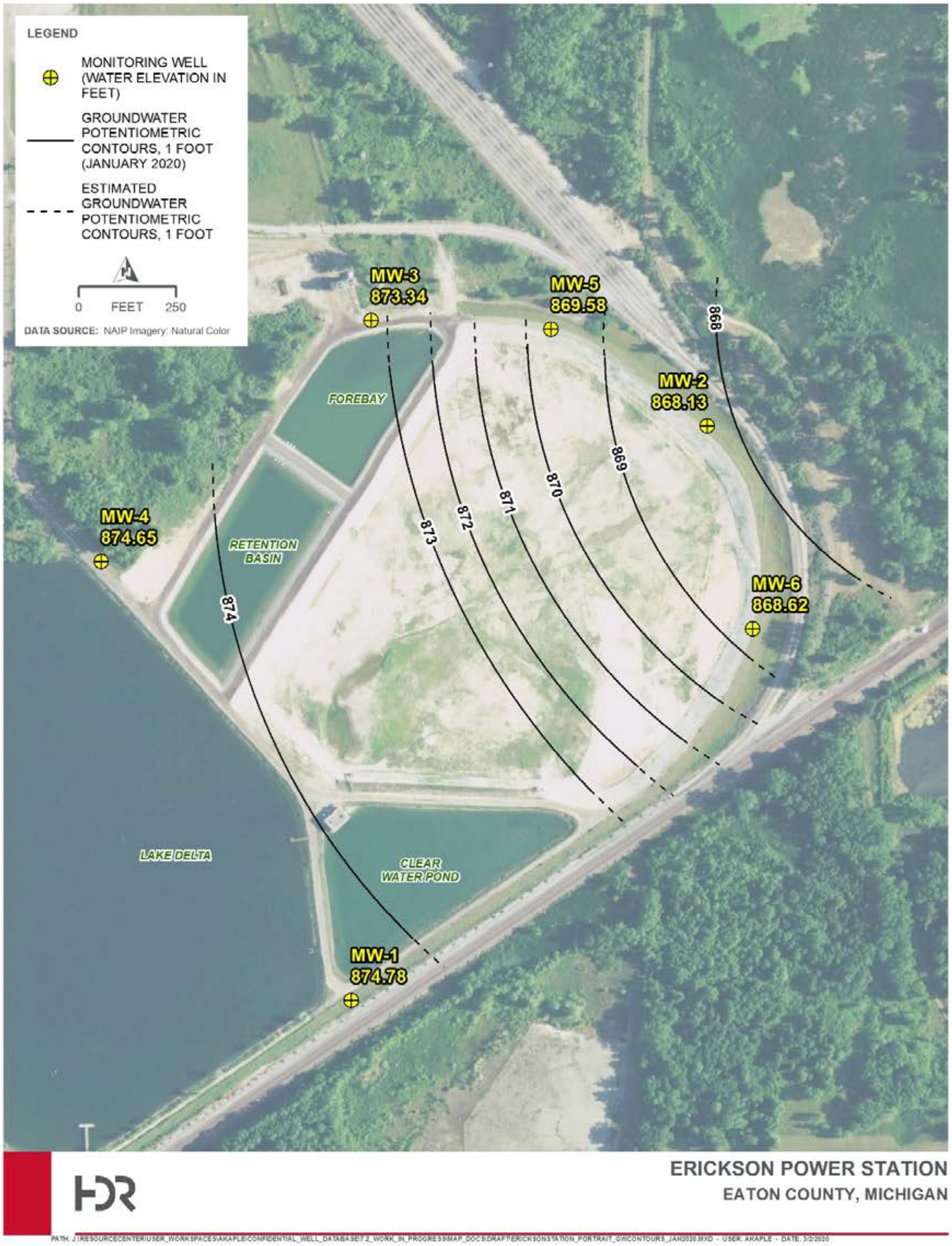

Figure 3. Groundwater potentiometric surface in January 2020 displaying northeast groundwater flow of the uppermost aquifer under the CCR multiunit

Three new wells were installed in January 2020 (MW-4, MW-5, and MW-6) to comprise a single multiunit monitoring network along the perimeter of the impoundments. The multiunit includes the three CCR impoundments, Forebay, Retention Basin, and CWP, and the non-CCR Former Impoundment. Wells MW-1 and MW-4 serve as upgradient wells and MW-2, MW-5, and MW-6 serve as downgradient wells for the multiunit. Wells are located to ensure the groundwater quality from these wells will detect CCR constituents in groundwater from all three of the CCR impoundments, if present. The sixth well, MW-3 is cross gradient to the impoundments and will be monitored only for water levels.

4.1 Background/Upgradient Monitoring Well at the CCR Impoundments

The upgradient wells for the impoundments will be MW-1 and MW-4. Well MW-1 is located directly south of the CWP and MW-4 is west of the Retention Basin (Figure 2). The groundwater flow direction beneath the impoundments is northeast, as confirmed by the water level data collected by BWL October 2019 through March 2020 (Figure 3 represents January 2020). MW-1 and MW-4 will capture background water quality before passing under the impoundments and reaching the downgradient wells.

4.2 Downgradient Monitoring Wells at the CCR Impoundments

A multiunit monitoring network was installed, consisting of three wells (MW-2, MW-5, and MW-6), along the northeastern perimeter of the Former Impoundment to serve as downgradient wells (Figure 2). Each downgradient well was sited as close to the waste boundary of the CCR impoundments as possible. As a result, the Former Impoundment is included within the multiunit area, although the Former impoundment is not a CCR Impoundment. The downgradient well locations will detect constituents of interest from the CCR units, if present, as well as constituents of interest from the Former Impoundment.

The first few months of water level monitoring revealed that MW-3 is more cross-gradient to the CCR impoundments, so it is included in the monitoring network for collection of water levels. The remaining three downgradient wells are sufficient to represent the quality of groundwater passing the CCR impoundment boundaries.

4.3 Well Construction

All of the CCR monitoring wells were drilled by a licensed well driller using a nominal 8-inch diameter hollow-stem auger drilling method. Well construction details for all CCR wells are summarized in Table 2. Boreholes were drilled to a depth of approximately 10 to 15 feet below the uppermost saturated zone to accommodate 10 feet of saturated screen in each well, to total depths of 28 to 34 feet below ground surface. Each monitoring well was constructed with 2-inch diameter, Schedule 40 PVC casing and screen with 0.010-inch screen slots. A 10-20 washed silica sand was used for the filter pack and placed approximately 2 to 3 feet above the well screen. An annular seal of bentonite grout was placed to above the top of the filter pack and hydrated for 12 hours after placement. Wells MW-1 and MW-4 were finished with 2-foot-by-2-foot concrete pads and locking stick-up well monuments. MW-2, MW-3, MW-5, and MW-6 were completed with circular, flush-mounted well pads of approximately 2-foot diameter. Three bollards were installed to protect wells MW-3 and MW-4, while MW-1 is protected by two bollards. Wells were developed according to the Monitoring Well Installation Report (HDR, 2020b).

Table 2. Monitoring Well Construction									
Well I.D.	**Northing**	**Easting**	**Elevation Top of Casing (ft. AMSL)**	**Well Total Depth (ft. bgs)**	**Screen Interval (ft. bgs)**	**Well Stickup (ft.)**	**Well Type**	**Static Groundwater Elevation (ft. AMSL) January 2020**	**Purpose**
MW-1	13045806.541	431808.209	888.74	30.5	20-30	2.79	2-inch Sch. 40 PVC	874.78	Background Well
MW-2	13046719.984	433282.326	885.97	34.5	24-34	-0.17	2-inch Sch. 40 PVC	868.13	Downgradient Well
MW-3	13045857.629	433553.031	884.81	34.5	24-34	-0.31	2-inch Sch. 40 PVC	873.34	Water Level Only
MW-4	13045090.91	432991.23	889.15	28	18-28	3.92	2-inch Sch. 40 PVC	874.65	Background Well
MW-5	13046389.871	433515.653	885.50	29.5	19-29	-0.31	2-inch Sch. 40 PVC	869.58	Downgradient Well
MW-6	13046831.843	432685.738	885.53	29	18-28	-0.33	2-inch Sch. 40 PVC	868.62	Downgradient Well

NAD 1983 State Plane Michigan South FIPS 2113 ft. bgs = below ground surface AMSL = above mean sea level Sch. 40 PVC = Schedule 40 polyvinyl chloride

5.0 Groundwater Quality Sampling

5.1 Schedule

Sampling is conducted at a frequency compliant with CCR Part §257.94. Eight rounds of upgradient and downgradient monitoring well sampling will be completed in 2020 to represent background water quality and establish background threshold values (BTVs) for each constituent of interest (COI) in Table 3. Groundwater quality sampling will be conducted in all upgradient and downgradient monitoring wells and samples will be analyzed for the parameters in Appendix III and IV of Part §257, plus TSS, as described below. Groundwater monitoring will continue as appropriate based upon the results of sampling.

After eight rounds of sampling to establish background water quality, semi-annual (twice per year) groundwater detection monitoring will be initiated. Groundwater quality sampling will be conducted in all upgradient and downgradient monitoring wells and samples will be analyzed for the parameters in Appendix III of Part §257, plus TSS, as described below.

Samples are collected following the protocol in the Groundwater Monitoring Plan for Compliance with the Coal Combustion Residuals (CCR) Rule at Erickson Power Station (HDR, 2020a). Groundwater quality sampling is conducted in all upgradient and downgradient monitoring wells unless wells are dry. In accordance with the CCR Rule, groundwater samples are not field filtered. The field parameters of turbidity, pH, ORP, and temperature are measured using a YSI Professional Plus (or an equivalent) portable water quality instrument that has been calibrated prior to use.

5.2 Analytical testing

Analytical testing of groundwater samples will be performed by an EPA certified laboratory. For the initial eight background sample events, samples are analyzed for the constituents shown on Table 3, which include all of the constituents in Appendices III and IV of Part §257, plus Total Suspended Solids (TSS). For detection monitoring, the constituents listed in Appendix III will be analyzed. Subsequent sampling events will be analyzed for the constituents listed in Appendix III or IV as appropriate, based upon the results of previous sampling and statistical evaluation of results. For quality control, one field duplicate sample and one field equipment blank sample will be collected for each sample event. The laboratory will analyze matrix spike/matrix spike duplicates at a rate of 5 percent, per laboratory quality control standards.

6.0 Reporting

The CCR Part §297.90(e) identifies the reporting requirements for the groundwater monitoring program for the CCR units. The first annual reporting document was completed by January 31, 2020 and annually thereafter. The annual reports are placed in the Erickson operating record. The statistical methods used to analyze each specified constituent in each monitoring well is described in a separate Statistical Methods Certification document.

Table 3. Groundwater Quality Constituents
Appendix III Constituents for Detection Monitoring
Boron
Calcium
Chloride
Fluoride
pH
Sulfate
Total Dissolved Solids (TDS)
Appendix IV Constituents for Assessment Monitoring
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228 combined
Additional Parameters
Total Suspended Solids (TSS)

Annual reports will summarize key monitoring actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For CCR compliance, the BWL will file the report in the operating record.

The BWL will comply with the CCR Rule recordkeeping requirements specified in §257.105(h), notification requirements specified in §257.106(h), and internet requirements specified in §257.107(h).

7.0 References

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HDR, 2019. Hydrogeologic Characterization Report. October 4, 2019.

HDR, 2019a. Groundwater Level Monitoring Standard Operating Procedure (SOP). November 18, 2019.

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