Groundwater Monitoring System Certification

Lewis & Clark Station

Prepared for
Montana-Dakota Utilities Co.

October 2017

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Certifications

I hereby certify that the groundwater monitoring system has been designed and constructed to meet the requirements of 40 CFR §257.91 and that I am a duly Licensed Professional Engineer under the laws of the state of Montana.

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PE #: 12805PE

October 17, 2017
Date

Revision	Date	Summary of Revisions
0	October 17, 2017	Groundwater Monitoring System Certification

1.0 Introduction

This report was prepared by Barr Engineering Co. (Barr) for Montana-Dakota Utilities Co. (MDU) to summarize the groundwater monitoring system at Lewis & Clark Station (Site) located in Sidney, Montana. The purpose of the groundwater monitoring certification report is to comply with the federal Coal Combustion Residuals (CCR) Rule (40 CFR Part 257), which went into effect on October 19, 2015.

Section 257.91 of the CCR Rule outlines the requirements of the groundwater monitoring system, including performance standards. This Certification is intended to support that the groundwater monitoring system installed at the Site is in compliance with the Rule.

1.1 System Certification Requirement Summary

The table below is a detailed discussion of the system certification requirements outlined in §257.91 of the CCR Rule and this Site's compliance with the rule.

CCR Rule Requirements (§257.91)	Compliance with CCR Rule
Performance Standard (a): 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: a. Hydrogeologic conditions do not allow the owner or operator of the CCR Unit to determine what wells are hydraulically upgradient; or b. Sampling at other wells will provide an indication of background groundwater quality that is 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 contamination must be monitored.	Yes, see Section 3.0 (Monitoring Wells) of this Certification.
Well Spacing and Site Specific Information (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, 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, thickness, stratigraphy, lithology, hydraulic conductivities, porosities, and effective porosities.	Yes, see Section 2.0 (Site Setting) and Section 3.0 (Monitoring Wells) of this Certification and in the Groundwater Monitoring System Documentation (Barr, 2017).

CCR Rule Requirements (§257.91)	Compliance with CCR Rule
Number of Monitoring Wells (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 are 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, see Section 3.0 (Monitoring Wells) of this Certification.
Multiunit Groundwater Systems (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.	Yes, see Section 2.0 (Site Setting) and Section 3.0 (Monitoring Wells) of this Certification.
Monitoring Well Construction (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 contaminating 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 measurements, 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 measurements, 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, see Section 3.0 (Monitoring Wells) of this Certification. Supporting document in Section 3.0 of the Groundwater Monitoring System Documentation (Barr, 2017).
Certification (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, see Section 4.0 (System Certification) and Certifications page.

2.0 Site Setting

The Lewis & Clark Station is a 50-megawatt, coal-fired electric generating plant located along the north bank of the Yellowstone River. Two CCR surface impoundments and a CCR pile, as defined by 40 CFR 257.53, are situated at the Site features.

The CCR surface impoundments are a single multi-unit CCR unit that are located near the plant. The surface impoundments are named the East and West Scrubber Ponds. The Scrubber Ponds are used to store sluiced flue-gas desulfurization (FGD) solids. Each Scrubber Pond is approximately 1.33 acres in size.

The CCR pile is located on a temporary storage pad (TSP) where FGD solids (excavated from the Scrubber Ponds) are stored and allowed to dry prior to loading and hauling for disposal.

2.1 Site Geology

Lithologic logs for the Site indicate that the uppermost subsurface materials are unconsolidated alluvial deposits of clays, silts, sands, and gravels. These deposits are typically coarsest and have the greatest permeability near their basal erosional contacts with the underlying consolidated bedrock unit (Smith et al., 2000). The bedrock is a dark gray claystone or siltstone that is interbedded with thin layers of coal. The bedrock unit is interpreted to be the Fort Union Formation, which was deposited by easterly-flowing streams that drained ancestral ranges of the northern Rocky Mountains between 55 and 65 million years ago (Smith et al., 2000).

2.2 Site Hydrogeology

Groundwater is generally found at 8 to 10 feet below ground surface (bgs) depending on surface and groundwater elevations, with estimated groundwater elevations ranging from 1915 to 1918 feet above mean sea level (MSL) within the fine- and coarse-grained alluvial deposits. Groundwater flow is generally from the west toward the CCR units and then radially outward to the north, south, and east toward Richland County Drainage Ditch #12 and the Yellowstone River. The more permeable unconsolidated alluvial deposits allow for the movement of groundwater more readily compared to the less permeable underlying consolidated Fort Union Formation at the Site. There is no demonstrated need for monitoring the Fort Union Formation since the hydraulic conductivity and/or permeability of the unconsolidated alluvial deposits are greater than the underlying Fort Union Formation, and any groundwater in the Fort Union formation would not be considered the uppermost aquifer.

Detailed information on Site hydrogeologic conditions can be found in the Groundwater Monitoring System Documentation (Barr, 2017).

3.0 Monitoring Wells

The monitoring system includes wells that are screened in the uppermost aquifer (unconsolidated alluvial aquifer).

3.1 Monitoring System

The monitoring well system around the CCR unit consists of three upgradient wells (MW-103, MW-110, and MW-119) and four downgradient wells (MW-102, MW-111, MW-117, and MW-118). The upgradient monitoring wells are hydraulically upgradient of the CCR units and accurately represent background groundwater quality. The downgradient monitoring wells are located hydraulically downgradient of the CCR units along the waste boundary and are spaced approximately 500 feet (or less) apart. The downgradient wells are positioned to detect contaminants from a hypothetical release from the CCR units. The number, spacing, and hydraulic positions of the monitoring wells comply with requirements outlined in §257.91 (a)-(c) of the CCR Rule.

3.2 Monitoring Well Construction and Performance

Based on our understanding of the Site geology, all of the monitoring wells at the Site are screened within the uppermost aquifer. Additionally, they were constructed in a manner that complies with CCR Rule §257.91 (e). All the monitoring wells on the Site were developed to improve clarity of the water and reduce suspended solids prior to initial baseline sampling.

Based on observations during sampling and well-development activities, the upgradient and downgradient monitoring wells included in the monitoring system provide representative groundwater samples.

4.0 System Certification

This report is signed and stamped by a qualified professional engineer that attests that the groundwater monitoring system is adequate and conforms to the system certification requirements outlined in §257.91 of the CCR Rule.

5.0 References

Barr, 2017. Groundwater Monitoring System Documentation. Lewis & Clark Station, Sidney Montana. Prepared for Montana Dakota Utilities Company, October 2017.

Smith, Larry N., LaFave, John I., Patton, Thomas W., Rose, James C., and McKenna, Dennis P, 2000. Ground-Water Resources of the Lower Yellowstone River Area: Dawson, Fallon, Prairie, Richland, and Wibaux Counties, Montana, Part A—Descriptive Overview and Basic Data. Montana Ground-Water Assessment Atlas No. 1. Montana Bureau of Mines and Geology. [online] http://www.mbmg.mtech.edu/pdf/groundwateratlas1.pdf