



ACTIVE COAL COMBUSTION RESIDUALS LANDFILL GROUNDWATER MONITORING SYSTEM CERTIFICATION

Escalante Generating Station

Prewitt, New Mexico

REPORT

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1.0 INTRODUCTION

Golder Associates Inc. (Golder) has prepared this report to certify that the groundwater monitoring system that has been designed and constructed for the active coal combustion residuals (CCR) landfill at Escalante Generating Station (the site), which is owned and operated by Tri-State Generation and Transmission Association, Inc. (Tri-State), meets the requirements of 40 CFR 257.91.



2.0 FACILITY INFORMATION

Escalante Generating Station is a 273-megawatt coal-fired electric generation facility located near Prewitt, New Mexico. The active CCR landfill at the site contains fly ash, bottom ash, and flue gas desulfurization solids (scrubber solids).

2.1 Geology and Hydrogeology

Near-surface geology at the site is generally characterized by Quaternary Alluvium (Qal) underlain by Triassic Chinle Formation, Petrified Forest Member bedrock. Within the Chinle Formation is the Correo Sandstone bed (TRcpc), which is confined on the top and bottom by Chinle claystone, upper part (TRcpu). The uppermost aquifer at the site is within the Correo Sandstone bed. Groundwater in the Correo Sandstone bed is under artesian pressure, as indicated by the static groundwater levels in the monitoring wells installed at the site.

The Correo Sandstone bed is approximately 50 feet thick in the vicinity of the active CCR landfill at the site. The surficial Quaternary Alluvium ranges from approximately 10 to 25 feet thick and the Chinle claystone overlying the Correo Sandstone bed ranges from approximately 100 to 200 feet thick in the vicinity of the active CCR landfill. The Chinle claystone underlying the Correo Sandstone bed is several hundred feet thick in the vicinity of the active CCR landfill. The groundwater flow direction in the Correo Sandstone bed in the vicinity of the active CCR landfill is generally from west to east, with possible minor northerly or southerly components, as indicated by static groundwater levels in the monitoring wells installed at the site.



3.0 GROUNDWATER MONITORING SYSTEM

The groundwater monitoring system for the active CCR landfill at Escalante Generating Station consists of six monitoring wells, as shown on Figure 1. The two upgradient monitoring wells are TRcpc-1 and TRcpc-2. The four downgradient monitoring wells are TRcpc-15, TRcpc-16, TRcpc-17, and TRcpc-18.

3.1 Information Reviewed

Golder reviewed information from the operating record documenting the design, installation, and development of the monitoring wells and/or describing hydrogeologic conditions at the site to help assess the adequacy of the groundwater monitoring system. The information reviewed included:

Golder Associates Inc. (2016). Drilling and Monitoring Well Installation Summary at the Escalante Generating Station in Prewitt, New Mexico. Technical memorandum prepared for Tri-State Generation and Transmission Association, Inc. Project 1533418GW. August 19, 2016.

Metric Corporation (1983). Ground-water Monitoring Plan for the Plains Escalante Generating Station No. 1. Report prepared for Plains Electric Generation and Transmission Cooperative, Inc.

New Mexico Environment Department (2015). Ground Water Discharge Permit Renewal and Modification, Escalante Generating Station, DP-206. February 10, 2015.

3.2 Number, Locations, and Depths of Monitoring Wells

40 CFR 257.91 includes the following requirements for the number, locations, and depths of monitoring wells:

- The groundwater monitoring well system must yield sufficient groundwater samples from the uppermost aquifer to accurately represent background water quality
- The groundwater monitoring system must yield sufficient groundwater samples from the uppermost aquifer to accurately represent the quality of groundwater passing the waste boundary
- The number, spacing, and depths of monitoring wells must be based on characterization of the uppermost aquifer and overlying materials
- The groundwater monitoring system must include at least one upgradient monitoring well and at least three downgradient monitoring wells

Two upgradient monitoring wells are included in the groundwater monitoring system to appropriately represent the background water quality, including potential variability. Four monitoring wells were installed downgradient of the active CCR landfill, based on the groundwater flow direction (generally from west to east, with possible minor northerly or southerly components), to enable detection of impacts to groundwater from the active CCR landfill and represent the quality of groundwater passing the waste boundary. The number and spacing of downgradient monitoring wells were selected based on the hydrogeologic conditions at the site, the aerial extent of the active CCR landfill, and possible minor northerly or southerly components to the groundwater flow direction, such that impacts to groundwater quality in the uppermost aquifer can be



detected along potential flow pathways if they occur. The depths of the monitoring wells were selected such that the monitoring wells are screened in the Correo Sandstone bed to yield groundwater samples that are representative of water quality in the uppermost aquifer. The number of monitoring wells included in the groundwater monitoring system for the active CCR landfill exceeds the minimum number of monitoring wells required under 40 CFR 257(c)(1); correspondingly, the information provided in this report is sufficient to meet the requirements of 40 CFR 257.91.

3.3 Monitoring Well Casing

40 CFR 257.91(e) includes the following requirements for monitoring well construction:

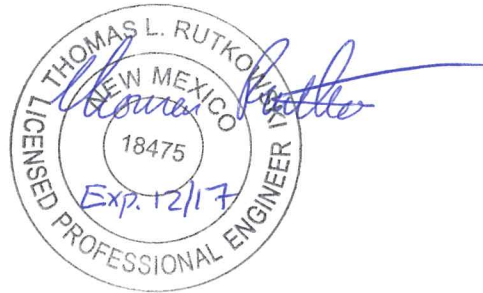
- Monitoring wells must be cased to maintain borehole integrity
- The casing must be screened or perforated and packed with sand or gravel to enable collection of groundwater samples
- The annular space above the sampling depth must be sealed to prevent impacts to groundwater

The monitoring wells at the site have polyvinyl chloride (PVC) casings to maintain the integrity of the monitoring well boreholes. The casings are screened within the uppermost aquifer and packed with sand to enable collection of groundwater samples from the uppermost aquifer. The annular space above the screened interval in each monitoring well is sealed with a cement or bentonite grout seal.



4.0 CERTIFICATION

Based upon the review described in this report, the undersigned Professional Engineer registered in New Mexico certifies that the groundwater monitoring system for the active CCR landfill at Escalante Generating Station has been designed and constructed to meet the requirements of 40 CFR 257.91.



FIGURE



LEGEND

	TRcpc-1	UPGRADIENT MONITORING WELL
	TRcpc-18	DOWNGRADIENT MONITORING WELL
	6860	GROUND SURFACE ELEVATION
	6860	GROUNDWATER ELEVATION (MAY 2017)
	6860	BOTTOM OF MONITORING WELL ELEVATION



CLIENT



CONSULTANT



YYYY-MM-DD 2017-10-11

DESIGNED DVS

PREPARED DVS

REVIEWED JEO

APPROVED RRJ

PROJECT

ESCALANTE GENERATING STATION
ACTIVE COAL COMBUSTION RESIDUALS LANDFILL
GROUNDWATER MONITORING SYSTEM CERTIFICATION

TITLE

MONITORING WELL LOCATIONS

PROJECT NO.
1783358

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FIGURE
1

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