

MEMORANDUM**Revision 1: December 4, 2023****Original: October 12, 2017****La Cygne Generating Station
25166 East 2200 Road
La Cygne, Kansas 66040
Eversource Energy, Inc.****SUBJECT: Groundwater Monitoring System Certification
 CCR Landfill, Lower AQC Impoundment, & Upper AQC Impoundment**

Eversource Energy, Inc. (Eversource) operates the La Cygne Generating Station near La Cygne, Kansas. The CCR Landfill (CCR LF), Lower AQC Impoundment (LAQC), and Upper AQC Impoundment (UAQC) at the station are classified as coal combustion residual (CCR) units under the Coal Combustion Residuals Rule (Rule) published by the United States Environmental Protection Agency (US EPA) on April 17, 2015 (US EPA, 2015, 40 CFR Part 257 Subpart D) effective October 19, 2015, and subsequent revisions.

This document addresses the requirements of 40 CFR 257.91 Groundwater Monitoring Systems, specifically 257.91(f) of the Rule, requiring certification from a qualified professional engineer stating that the groundwater monitoring system is designed and constructed to meet the requirements of 40 CFR 257.91. As defined with this rule, the CCR units must have 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 accurately represent the quality of upgradient/background groundwater that has not been affected by leakage from a CCR unit; and that accurately represents the quality of groundwater passing the waste boundary of the CCR unit(s).

The original groundwater monitoring systems certifications were broken into two monitoring systems. A multi-unit monitoring system for the CCR LF and LAQC and a single-unit monitoring system for the UAQC. Eversource and SCS Engineers have determined that a multi-unit groundwater monitoring system to include all three CCR units as allowed pursuant to 257.91(d) is preferred for the La Cygne Generating Station.

On October 27, 2023, Eversource submitted a revised sampling and analysis plan, which included the groundwater monitoring system design and construction information for the revised multi-unit monitoring well network, to the Kansas Department of Health and Environment (KDHE) for review under Kansas solid waste rules. Finding that the monitoring systems and associated sampling plan were adequate to monitor the groundwater associated with these units, KDHE approved the updated sampling and analysis plan on December 4, 2023. The monitoring wells and their gradient designations for the multi-unit groundwater monitoring system, as certified herein, are summarized below. This certification has been prepared based on information available in the facility Operating Record pursuant to § 257.91(e)(1).

CCR LF/LAQC/UAQC Groundwater Monitoring System

Multi-unit Groundwater Monitoring System	Upgradient Monitoring Wells		Downgradient Monitoring Wells	
CCR Landfill Lower AQC Impoundment Upper AQC Impoundment	MW-13 MW-14R MW-601 MW-602	MW-701 MW-702 MW-703 MW-704	MW-6 MW-7 MW-15 MW-705 MW-706 MW-707B MW-708	MW-801 MW-802 MW-803 MW-804 MW-805 TW-1

Note: In addition to water level measurements and sampling of the above monitoring wells, water level measurements only will be collected from monitoring wells MW-10 and MW-11.

A multiunit groundwater monitoring system consisting of eight upgradient wells and thirteen downgradient wells was installed to monitor the CCR LF, LAQC, and UAQC as a whole. The number, spacing, and depths of monitoring wells in the groundwater monitoring system are based on site-specific technical information provided in the “*Detailed Hydrogeologic Site Characterization Report, CCR Landfill and Lower AQC Impoundment, La Cygne Generating Station*” (AECOM, 2017) and “*Detailed Hydrogeologic Site Characterization Report, Upper AQC Impoundment, La Cygne Generating Station*” (AECOM, 2017). The reports identified and characterized the overlying geologic units, the uppermost aquifer, and the confining unit defining the lower boundary of the uppermost aquifer.

The uppermost aquifer beneath the three CCR units consists of select saturated zones within the heterogeneous shale bedrock that have relatively higher permeability than the shale above and below it. It is probable that the relatively higher permeability zones are the calcareous and sandy zones or undifferentiated limestone or sandstone interbeds. It is believed that these zones are the primary groundwater-bearing strata and the uppermost aquifer. These zones were identified through drilling observations and the installation and testing of piezometer clusters at multiple locations. Although all the piezometers were low-yielding, the piezometers that intercepted the higher-yielding productive zones were selected as most closely satisfying the definition of the uppermost aquifer below the CCR units.

The uppermost aquifer is a confined and/or locally semi-confined aquifer believed to be roughly 5- to 10-ft thick. The hydraulic conductivity of the aquifer was measured by conducting hydraulic slug tests, which indicated an estimated hydraulic conductivity range of 6.3×10^{-05} cm/sec to 1.0×10^{-04} cm/sec. However, these values are higher than would be expected based on the overall low-yield nature of the aquifer and the hydraulic conductivity could be less than reported. The porosity and effective porosity of the aquifer have been estimated, and evidence indicates it is greater than the overlying and underlying shale and likely greater than the overlying clay. Based on the water level measurements in the monitoring wells, the groundwater flow direction is predominantly west-toward La Cygne Lake with some northwest and southwest components. The estimated groundwater flow velocity based on the above hydraulic conductivity range, a hydraulic gradient range of 0.01 ft/ft to 0.005 ft/ft, and an estimated effective porosity of 5 percent, ranges from approximately 6.3×10^{-06} to 2.0×10^{-05} cm/sec (7 to 21 ft/yr).

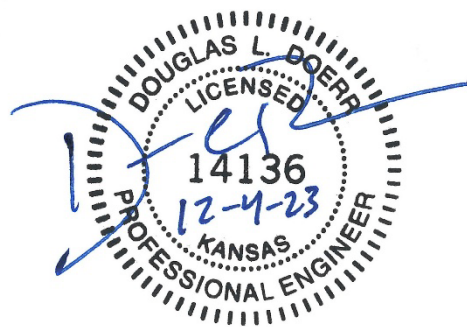
Based on the typical groundwater flow direction, the eight upgradient monitoring wells are located to represent the quality of upgradient background groundwater that has not been affected by potential leakage from the CCR units. The thirteen downgradient monitoring wells are located at or as close as feasible to the waste boundary and screened in the uppermost aquifer to accurately represent the quality of groundwater passing the downgradient waste boundary of the CCR units combined.

Limitations

SCS Engineers has been retained by Evergy Metro, Inc. to assess if the groundwater monitoring system meets the requirements of 40 CFR 257.91. The signature of the authorized representative on this document represents that to the best of his knowledge, information, and belief in the exercise of his professional judgment in accordance with the standard of practice, it is his professional opinion that the aforementioned information is accurate as of the date of such signature. Any opinions or decisions by him are made based on his experience, qualifications, and professional judgment and are not to be construed as warranties or guarantees. In addition, opinions relating to regulatory, environmental, geologic, and geotechnical conditions, interpretations, or other estimates are based on available data, and actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

Qualified Professional Engineer's Certification

I, Douglas L. Doerr, hereby certify that the multi-unit groundwater monitoring system for the CCR LF, LAQC, and UAQC at the La Cygne Generating Station has been designed and constructed to meet the requirements of 40 CFR 257.91. This certification is based on my review of documentation provided by Evergy and documentation in the CCR operating record regarding the design, installation, and development of the groundwater monitoring system components and the standard of practice for waste management unit groundwater monitoring. I am a duly licensed Professional Engineer under the laws of the State of Kansas.



Douglas L. Doerr, P.E.
SCS Engineers

Geologist's Certification

I, John R. Rockhold, hereby certify that the multi-unit groundwater monitoring system for the CCR LF, LAQC, and UAQC at the La Cygne Generating Station has been designed and constructed to meet the requirements of 40 CFR 257.91. This certification is based on my review of documentation provided by KCP&L and documentation in the CCR operating record regarding the design, installation, and development of the groundwater monitoring system components and the standard of practice for waste management unit groundwater monitoring. I am a duly licensed Professional Geologist under the laws of the State of Kansas.



John R. Rockhold, P.G.
 SCS Engineers

Revision Number	Revision Date	Summary of Revisions
0	October 12, 2017	Original
1	December 4, 2023	Revised the groundwater monitoring systems to a multi-unit monitoring system to include the CCR LF, LAQC, and UAQC. Provided additional supporting hydrogeological information.