April 15, 2019
File No. 27218357.00

Mr. Brian Trower
Assistant Director – Electric Services
Ames Municipal Electric System
502 Carroll Avenue
Ames, Iowa 50010

Subject: Groundwater Monitoring System Certification for Inactive CCR Surface Impoundment

Dear Mr. Trower:

SCS Engineers has prepared this Groundwater Monitoring System Certification for the City of Ames Steam Electric Plant in accordance with the requirements set forth in §257.91(b) and (c) of the CCR Rule (40 CFR 257.50-107).

If you have any questions regarding this document, please contact the undersigned.

Sincerely,

Christine L. Collier, P.E.
Project Manager
SCS Engineers
(515) 631-6161
ccollier@scsengineers.com

John R. Rockhold, R.G.
Project Director
SCS Engineers
(913) 749-0721
jrockhold@scsengineers.com

GROUNDWATER MONITORING SYSTEM CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER
40 CFR 257.91(f)

City of Ames Steam Electric Plant – 200 E. 5th Street, Ames, IA 50010
Inactive Coal Combustion Residuals (CCR) Surface Impoundment

40 CFR 257.91 REQUIREMENTS	
40 CFR 257.91(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.	✓
(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.	✓
40 CFR 257.91(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.	✓
40 CFR 257.91(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.	✓

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40 CFR 257.91 REQUIREMENTS (Cont.)	
40 CFR 257.91(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.	Not Applicable
(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.	Not Applicable
(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.	Not Applicable
40 CFR 257.91(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.	✓
40 CFR 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 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.	✓

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40 CFR 257.91(f)

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40 CFR 257.91 REQUIREMENTS (Cont.)

NARRATIVE DESCRIPTION OF GROUNDWATER MONITORING SYSTEM

The groundwater monitoring system for the Inactive CCR Surface Impoundment at the City of Ames Steam Electric Plant is designed and constructed to meet the requirements of 40 CFR 257.91. Hydrogeologic data and design and construction information was reviewed as part of the certification process. Specifically, the following information regarding the groundwater monitoring system, followed by the pertinent regulatory section being addressed, formed the basis for this certification.

- The monitoring system consists of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the uppermost aquifer to accurately represent the quality of upgradient background groundwater that has not been affected by leakage from a CCR Unit and groundwater passing the waste boundary. The groundwater monitoring system consists of monitoring wells MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-107, and MW-108. (40 CFR 257.91(a))
- The number, spacing, and depths of wells was determined based on site specific technical information that includes the characterizations required. (40 CFR 257.91 (b))
- The monitoring system includes three upgradient monitoring wells (MW-101, MW-102, and MW-103) and five downgradient monitoring wells (MW-104, MW-105, MW-106, MW-107, and MW-108) and meets the Performance Standards in 40 CFR 257.91(a); therefore, it meets the requirement. (40 CFR 257.91(c))
- The groundwater monitoring system for the Inactive CCR Surface Impoundment is not a multiunit system. (40 CFR 257.91(d))
- Based on the installation documentation, the monitoring wells were cased in a manner that will maintain the integrity of the monitoring well borehole and were constructed in accordance with the requirements. (40 CFR 257.91(e))

LIMITATIONS

SCS Engineers has been retained by the City of Ames Steam Electric Plant 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 her knowledge, information, and belief in the exercise of her professional judgement in accordance with the standard of practice, it is her professional opinion that the aforementioned information is accurate as of the date of such signature. Any opinion or decisions by her are made on the basis of her experience, qualifications, and professional judgement and are not to be construed as warranties or guaranties. 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.

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40 CFR 257.91 REQUIREMENTS (Cont.)

QUALIFIED PROFESSIONAL ENGINEER'S CERTIFICATION

I, Christine L. Collier, hereby certify that that the groundwater monitoring system for the Inactive CCR Surface Impoundment at the City of Ames Steam Electric Plant 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 the City of Ames Steam Electric Plant and documentation 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 Iowa.