



Department of Energy
Savannah River Operations Office
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SEP 13 2022

Ms. Susan B. Fulmer, P.G., Manager
Federal Remediation Section
Division of Site Assessment, Remediation and Revitalization
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Mr. Jon Richards
Savannah River Site Remedial Project Manager
Superfund Division
U. S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303

Dear Ms. Fulmer and Mr. Richards:

SUBJECT: Savannah River Site's Responses to the Regulatory Comments on the Treatability Study Data Report for Groundwater Injection and Discharge Canal Neutralization at the D-Area Groundwater Operable Unit (OU) 2021 Data and Information (U) (SRNS-TR-2022-00026, Revision 0, January 2022) SEMS Number: 63

In accordance with the terms of the Federal Facility Agreement, the U. S. Department of Energy (DOE) is submitting the enclosed responses to the regulatory comments on the *Treatability Study Data Report for Groundwater Injection and Discharge Canal Neutralization at the D-Area Groundwater (OU) (U)* (SRNS-TR-2021-00005, Revision 0, January 2021) for your review. The South Carolina Department of Health and Environmental Control (SCDHEC) and the U. S. Environmental Protection Agency (EPA) provided comments on the report on May 6, 2022 and June 16, 2022, respectively. This report will not be revised; however, all comment responses will be addressed in the next report, as applicable. Please review the responses and provide your approval within thirty (30) days of receipt.

The effort and time that the SCDHEC and the EPA have provided on this operable unit are greatly appreciated. Questions from you or your staff may be directed to me at (803) 952-8365.

Sincerely,

Brian T. Hennessey Digitally signed by Brian T. Hennessey
Date: 2022.09.12 11:38:00 -04'00'

Brian T. Hennessey
SRS Remedial Project Manager
Infrastructure and Area Completion Division

IACD-22-178

SEP 13 2022

Ms. Susan Fulmer
Mr. Jon Richards

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Enclosures:

1. SRS Responses to SCDHEC Comments on the Treatability Study Data Report for Groundwater Injection and Discharge Canal Neutralization at the D-Area Groundwater Operable Unit (OU) 2021 Data and Information (U) (SRNS-TR-2022-00026, Revision 0, January 2022) SEMS Number: 63
2. SRS Responses to U. S. Environmental Protection Agency Comments on the Treatability Study Data Report for Groundwater Injection and Discharge Canal Neutralization at the D-Area Groundwater Operable Unit (OU) 2021 Data and Information (U) (SRNS-TR-2022-00026, Revision 0, January 2022) SEMS Number: 63

cc w/o encl:

J. Blalock, SCDHEC-Columbia
S. French, SCDHEC-Columbia
M. Reece, SCDHEC-Columbia
G. K. Taylor, SCDHEC-Columbia
G. Stewart, SCDHEC-Columbia
T. R. Fuss, SCDHEC-Aiken Environmental Affairs Office
G. O'Quinn, SCDHEC-Aiken Environmental Affairs Office
B. A. Cameron, SCDHEC-Aiken Environmental Affairs Office
K. L. Beatty, SCDHEC-Aiken Environmental Affairs Office
H. L. Herlong, SCDHEC-Aiken Environmental Affairs Office
R. H. Pope, EPA-Atlanta

cc w/encl:

D. Lloyd, EPA-Atlanta
M. McRae, TechLaw, Inc.

EPA GENERAL COMMENTS:

1. It is unclear if installation of the ten injection wells at a depth greater than planned and into the deeper, mid to lower zone of the Upper Three Runs Aquifer (UTRA) are sufficiently placed to meet the neutralization of acidic condition goals.
 - a. For example, the text in Section 2.0 (Project Description) states, “Based on aqueous chemical equilibrium modeling software, a total of 10 pore space volumes of injected potable groundwater could significantly displace and raise the pH levels in the upper water table within a three-year study period.” However, the text also indicates that the lower vadose zone is not expected to be neutralized or have much change in pH as a result of the groundwater injection treatability study. As such, it is unclear how the increased depth of the injection well installations may impact the modeling software calculated number of pore volumes in the upper water table that were based on shallower well installation depth. Please include a discussion of the number of pore volumes of groundwater and timeframe that would be needed to raise the pH levels in the upper water table since the monitor wells were installed at a depth greater than planned and revise Section 2.0 to clarify how the installation of the ten injection wells in the deeper mid to lower zone of the UTRA will sufficiently meet the neutralization of acidic condition objective goals and raise the pH levels in the vadose zone and describe any potential issues or deviations that could occur due to the deeper screened intervals.

Response: Clarification.

The injection wells were installed deeper than anticipated due to the abundance of clays, sandy clays and silty sands in the upper aquifer zone. Further clarification of the possible longer-term effects to meet the objective goals, including displacement of lower pH upper aquifer zone groundwater, will not be realized for some time as continuous groundwater injections began in late March 2022. For that reason, the current strategy is to maintain flows as dictated by the engineering design authorities with input from the project technical team. Data collected (water elevations, field parameters including pH, and metal analyses) as outlined in Table 1. *D-Area Treatability Study Monitoring Network and Sampling Schedule* of the 2022 Treatability Study Data report will further provide information on the possible influence to the upper and lower water table and a review of the modeling calculations will be evaluated and presented in the next Treatability Study Data Report to be submitted in January 2023. No changes to the January 2022 report are proposed.

2. The Data Report includes Figure 4 (D-Area Treatability Study Injection Wells, Reactive Structure, and Projected Water Table Elevation); however, there is no reference to this figure in the text and additional discussion and significance of this figure is not presented. Please revise the Data Report to include a reference and discussion of the significance of Figure 4 in the text.
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Response: Agree/Clarification.

Figure 4 shows the general schematic of the treatability study and should have been referenced in Sections 2.0. The figure will be properly referenced in future reports. No changes to the January 2022 report are proposed.

EPA SPECIFIC COMMENTS:

1. **Section 5.1, Injection Well Installation, Page 7 of 42:** It is unclear when development of the injection wells took place or what data was collected during well development. Please revise Section 5.1 to include a reference to where the field data collected for well development can be located and if not included in this report. Please revise the report to include this information.

Response: Agree/Clarification.

The wells were developed after their installation by the drilling contractor and Technical Oversight. The same well development information is collected as when monitoring wells are installed (i.e., development method, final yield [gallons per minute], date, time, pH, conductivity, turbidity, temperature, and any comments). This information was provided in the well installation reports that SRS is required to submit to SCDHEC and is also copied to EPA personnel on the specific project (SRNS Submittal of the Monitoring Well Installation Reports, Soil Boring Installation Reports, and Field Geologic Logs for D-Area Groundwater Monitoring Wells and Rotasonic Soil Borings (Q-HGPP-D-00003), SRNS-J2000-2022-00549, August 23, 2022).

Additionally, injection wells DGI007 and DGI010 which displayed slow injection rates during the initial slug test were robustly redeveloped by pumping, swabbing, and surging which improved the subsequent slug test. This redevelopment was described in section 4.2 of the January 2021 Treatability Study Data Report. A reference to the submittal of the well installation reports/well development data field parameters will be provided in future data reports. No changes to the January 2022 report are proposed.

2. **Section 5.2, CaCO₃ Reactive Structures, Page 8 of 42:** It is unclear if the maintenance of the sediment buildup and leaf drop litter will be coordinated to occur before, during, and/or after heavy or prolonged rain events. For example, the text states, "Maintenance to address this debris is being evaluated and it will be removed as practical;" however, it is unclear if the maintenance activity will be coordinated with the occurrence of major weather events (e.g., heavy or prolonged rain events). Please revise Section 5.2 to include the type of evaluations taking place to monitor the sediment and leaf drop litter buildup for the two reactive structure and when maintenance activities will occur and if activities will be coordinated with major weather events.
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Response: Clarification.

Most of the sediment buildup and leaf drop litter occurs in the fall/early winter timeframe, although there is a continuous feed from conifers and other vegetation through the rest of the year. The maintenance, when further defined, will be more of a matter of leaf litter and detritus removal at peak periods rather than major weather events and may include remixing of the marble chips as well as a filtering device to help prevent build up on the structures. The reactive structures themselves were designed to allow excess flow over and around them to prevent wash outs of the structures themselves. Collaboration with onsite construction personnel is planned for the fall of 2022 and a maintenance action is currently expected to take place during the winter of 2022/2023. When details of what maintenance action are to take place, this information will be included in the subsequent Treatability Study Data Report. No changes to the January 2022 report are proposed.

SCDHEC General Comment

1. Several figures depicting the groundwater monitoring well network for the DAGW OU treatability study show monitoring wells DCB 21A, 21B, 21C, 22A, 23B and 23C as piezometers solely (Figures 2, 3, 11 and 14). Please correct.

Response: Agree/Clarification.

Figures will be updated in the next Treatability Study Data Report that is to be submitted in January 2023 to highlight that these wells, originally installed as piezometers, are being sampled for monitoring the groundwater. No change to the January 2022 report is proposed.

SCDHEC Specific Comment

1. Section 2.0, Project Description, Injection of Production Well Water, page 2. Please clarify if the production wells have been evaluated for any MCL exceedances and all other screening criteria as appropriate,

Response: Clarification.

The production wells were sampled and evaluated for contaminants in December 2018 and results were provided in the first Treatability Study Data Report submitted in January 2021 in Table 2. *D-Area Production Wells Sample Results - December 6, 2018*. The production wells were sampled for metals, VOCs, and tritium that are normally sampled as part of the DAG OU monitoring, and results were shown to have no exceedances of any contaminants as compared to the MCLs, RSLs, or NSDWS as are listed in the data table in Appendix B of the January 2021 report. Field measurements were also collected at the production wells and supplied in Table 2 of the January 2021 Treatability Study Data Report.
