



Department of Energy
Savannah River Operations Office
P O Box A
Aiken, South Carolina 29802

AUG 21 2023

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) 2022 Data and Information (U) (SRNS-TR-2023-00009, Revision 0, January 2023) SEMS Number: 63

In accordance with the terms of the Federal Facility Agreement (FFA), the U.S. Department of Energy (DOE) is submitting the enclosed responses to the regulatory comments for your review. The U.S. Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) provided comments on the report on April 13, 2023, and May 31, 2023, 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: 2023.08.17 16:31:26 -04'00'

Brian T. Hennessey
FFA Project Manager, DOE-Savannah River
Remediation and Deactivation & Decommissioning Division

RDDD-23-024

AUG 21 2023

Ms. Susan Fulmer
Mr. Jon Richards

2

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) 2022 Data and Information (U) (SRNS-TR-2023-00009, Revision 0, January 2023) 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) 2022 Data and Information (U) (SRNS-TR-2023-00009, Revision 0, January 2023) 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. R. 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

cc w/encl:

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

Responses to the United States 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) (U) 2022 Data and Information,
SEMS Number: 63, (SRNS-TR-2023-00009, Revision 0, January 2023)
Comments received April 13, 2023.

Page 1 of 2

EPA GENERAL COMMENTS:

1. A figure of the second quarter (2Q) 2022 potentiometric surface map of the upper three runs aquifer (UTRA) and a figure presenting the pre-injection water elevation map from 2Q 2020 are provided for comparison of changes in water levels; however, similar figures comparing the pre-injection pH levels, beryllium and sulfate concentrations are not presented for comparative purposes for evaluation of the changes. Please revise the Treatability Study Data Report for Groundwater Injection and Discharge Canal Neutralization at the D-Area Groundwater Operable Unit (OU) (U), 2022 Data and Information, SEMS Number: 63, SRNS-TR-2022-00009, Revision 0, dated January 2023 (the Data Report) to present figures depicting the pre-injection pH levels, beryllium and sulfate concentrations to provide for a comparison of the results with current data.

Response: Agree.

Comparison figures with pre- and post-injection plumes and concentrations of pH, beryllium, and sulfate will be included in future data reports as requested. No changes to the January 2023 report are proposed.

Responsible Party: Ashley Shull, ashlev.shull@srs.gov, 803-952-7090

EPA SPECIFIC COMMENTS:

1. **Section 5.0, Treatability Study Progress and Data, Page 7 of 54:** The text states that due to the abundance of clays, sandy clays, and silty sands the injection wells originally planned to be screened from approximately 12 – 32 feet below ground surface (ft bgs) were installed deeper within the mid to lower zone of the UTRA; however, the text does not present the final installation depths in ft bgs of the injection well screens. Please revise the text to include the final installation depths in ft bgs of the injection well screens.

Response: Agree/Clarification.

Table 2. D-Area Well Screen Zone Depths, referenced at the end of this sentence includes the screen zone depths of each injection well. Depths were not originally included in the text as the final depths varied per injection well. In future reports, the text will include the range of final installation depths in ft bgs similar to the following:

“... the wells were installed deeper within the mid to lower zone of the UTRA with screen zone depths between the range of approximately 6.4 – 17.1 m (21 – 56 ft) bgs (Table 2).”

No changes to the January 2023 report are proposed.

Responsible Party: Ashley Shull, ashlev.shull@srs.gov, 803-952-7090

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Comments received April 13, 2023.

Page 2 of 2

2. **Figure 12, D-Area Treatability Study Monitoring Locations, Page 41 of 54:** The figure depicts all the D-Area injection wells; however, it is noted only 10 of the proposed 20 injection wells have been installed and the figure does not identify which injection wells are currently installed and which wells have not been installed. Please revise the figure to identify which 10 wells are installed.

Response: Agree/Clarification.

Figures 7 and 8 depict which injection wells have been installed. Future data reports will identify the injection wells that have been installed and are in operation on Figure 12. It should be noted that the target injection rate is close to being achieved with the currently installed wells. No changes to the January 2023 report are proposed.

Responsible Party: Ashley Shull, ashley.shull@srs.gov, 803-952-7090

Responses to the South Carolina Department of Health and Environmental Control
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(SRNS-TR-2023-00009, Revision 0, January 2023)
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Page 1 of 3

SCDHEC General Comment

1. According to Section 5.1, the conceptual design for the treatability study was revisited and the possibility of an underestimation of the total volume of water required to raise the water level in the injection field 5 feet was discussed. The potential revised volume, 75 million gallons as opposed to the original estimated volume of 19 million gallons, would take approximately a year to a year and a half to accomplish with the target injection rate of 120 gpm and longer with the current rate of 85 gpm. Based on information presented on page 3 in Section 2.0, a total of 10 pore space volumes could significantly displace and raise the pH levels in the upper water table within a three-year study period. This was based on the 19 million gallon estimated pore space volume; and if the actual pore space volume is closer to 75 million gallons, it would take approximately 12 years to accomplish this water displacement with the target injection rate of 120 gpm.

Based on this information, the Department concurs with the recommendation in Section 7.0 (Summary) that the conceptual model be revisited and that a detailed hydrogeologic reevaluation of the site be conducted, with the understanding that the results of this reevaluation will be presented in the next report.

Response: Agree.

Findings/Results of the evaluation will be provided in future Data Reports. No change to the January 2023 report is proposed.

Responsible Party: Ashley Shull, ashley.shull@srs.gov, 803-952-7090

2. The calculations used to estimate the volume of water needed to raise the water table 5 feet in the D-Area Coal Storage Area (DCSA) appear to be oversimplified and do not account for several factors influencing the hydrogeology of the OU. In the report, the volume of water needed to create a groundwater mound of 5 feet across the DCSA was calculated by multiplying the area of the DCSA by the water table rise of 5 feet and a porosity of 30%, yielding an estimated required volume of 19 million gallons. Although the estimated volume was revised to 75 gallons, this equation omits other hydrologic factors that are likely to influence the results of groundwater injections, including the following: the presence of downward vertical gradients at the OU; the depth of the screened interval and permeability of the material where the injection wells are screened; movement of injected groundwater through preferential flow pathways due to the heterogeneity of the aquifer materials; movement of groundwater downgradient as groundwater is injected upgradient; and groundwater recharge from rainfall. As part of the hydrogeologic reevaluation of the treatability study discussed

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2022 Data and Information, SEMS Number: 63
(SRNS-TR-2023-00009, Revision 0, January 2023)
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Page 2 of 3

in Section 7.0, the Department recommends the use of a groundwater model that accounts for additional factors that are influencing the effectiveness of the groundwater injections.

Response: Agree/Clarification.

The conceptual model will be revisited and revised to reflect the conditions more accurately in the OU. A numerical model might also be developed to simulate the present and predicted future conditions in the OU. No change to the January 2023 report is proposed.

Responsible Party: Rohit Goswami, rohit.goswami@srs.gov, 803-989-5383

3. The document references quarterly sampling for metals at select locations and monthly stream flow measurements, but past data for these measurements is not included in the report. In future reports, please include historical stream flow measurements, as well as time-series plots of analytical results for metals, for comparison between pre-injection and post-injection conditions.

Response: Agree/Clarification.

Tabular and/or graphical depiction of stream flows, including past measurements to pre-injection will be provided in future data reports. Additionally, time-series plots of select metal analytes such as aluminum and iron which have higher solubility/precipitation properties will be included in future data reports. A data table from pre-injection 2Q2020 can be found in the first DAG OU Treatability Study Report (SRNS-TR-2021-00005) that was submitted in January 2021. This table will also be included in future reports for comparison and convenience. No change to the January 2023 report is proposed.

Responsible Party: Ashley Shull, ashlev.shull@srs.gov, 803-952-7090

SCDHEC Specific Comment

1. Table 1, D-Area Treatability Study Monitoring Network and Sampling Schedule, page 17. The table presents total depth of wells in feet below ground surface (bgs) and screened interval in feet above mean sea level (amsl). In future reports, please revise Table 1 to include screened intervals in feet bgs.

Responses to the South Carolina Department of Health and Environmental Control
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2022 Data and Information, SEMS Number: 63
(SRNS-TR-2023-00009, Revision 0, January 2023)
Comments received May 31, 2023.

Page 3 of 3

Response: Agree.

Future reports will include the screened intervals of wells additionally in feet bgs. No change to the January 2023 report is proposed.

Responsible Party: Ashley Shull, ashley.shull@srs.gov, 803-952-7090

2. Section 2.0, Project Description, pages 2 and 3. The section states that injected groundwater will “create a hydraulic head,” but the meaning of this is unclear since hydraulic head is always present at any particular point throughout an aquifer. In context this was interpreted to mean, “increase the hydraulic head,” (i.e., raise the elevation of the water table). Please confirm this interpretation is correct.

Response: Agree/Clarification.

The interpretation to raise the elevation of the water table is correct. Future reports will rephrase the explanation for clarity. No change to the January 2023 report is proposed.

Responsible Party: Ashley Shull, ashley.shull@srs.gov, 803-952-7090