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

APR - 4 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 Calendar Year 2020 D-Area Oil Seepage Basin Operable Unit (631-G) Groundwater Mixing Zone Letter Report, SEMS Number: 27

In accordance with the terms of the Federal Facility Agreement, the U. S. Department of Energy (DOE) is submitting the subject comment responses for your review. The South Carolina Department of Health and Environmental Control (SCDHEC) approved the report on November 10, 2021 and the U. S. Environmental Protection Agency (EPA) provided comments on the report on January 05, 2022. The report will not be revised; however, all comment responses will be included and/or addressed in the next report, as applicable. Please review these responses and provide your approval thirty (30) days from receipt. The time and effort that the SCDHEC and the EPA have given on the subject operable unit are greatly appreciated.

Comments or questions from your staff may be directed to me at (803) 952-8365 or the DOE Federal Project Director, Ms. Karen Adams, at (803) 952-7871.

Sincerely,

Brian T. Hennessey

Digitally signed by Brian T. Hennessey
Date: 2022.03.30 16:06:31 -04'00'

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

IACD-22-137

APR - 4 2022

Enclosure:
SRS Responses to the United States Environmental Protection Agency Comments on the 2020 D-Area Oil Seepage Basin Operable Unit (631-G) Groundwater Mixing Zone Letter Report, SEMS Number: 27 (IACD-21-149, dated July 19, 2021)

cc w/o encl:
J. Blalock, SCDHEC-Columbia
S. French, SCDHEC-Columbia
M. Reece, SCDHEC-Columbia
G. K. Taylor, 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

SRS Responses to the United States Environmental Protection Agency
Comments on the
2020 D-Area Oil Seepage Basin Operable Unit (631-G) Groundwater Mixing Zone Letter Report,
(IACD-21-149, dated July 19, 2021) SEMS NUMBER: 27
Savannah River Site, Aiken, South Carolina
Comments received February 5, 2022

EPA GENERAL COMMENTS:

1. Based on the orientation of the trichloroethylene (TCE), cis-1,2-dichloroethylene (cDCE), and vinyl chloride (VC) plume maps, it appears that groundwater flow at the site is in a south-southeasterly direction. However, a discussion of groundwater flow direction is not included in the Report. Please provide a discussion of groundwater flow in the Report to provide the reader context for proper evaluation of the plume maps and contaminant transport.

   Response: Agree

   To ensure the flow direction for each of the aquifer units is clearly understood and documented, a figure with potentiometric surfaces will be added to future letter reports submitted during odd-numbered years. A discussion of groundwater flow rates and direction are included in the biennial mixing zone report submitted during even-numbered years. No changes are proposed for the 2020 letter report.

   Contact: Kevin Boerstler, (803) 952-6766, kevin.boerstler@srs.gov

2. The text states that based on the lack of bio-degradation at the site, and consistent detections of tetrachloroethylene (PCE), TCE, cDCE, and VC above Environmental Protection Agency (EPA) Maximum Concentration Levels (MCLs), it appears that cleanup standards will not be reached that were established in the original modeled time-frame (2027), which is only six years away. An evaluation should be made to determine if additional remedial actions are feasible to reach the initial remedial goal timeframe. However, at a minimum, the model for cleanup at the site should be updated since the current model is inaccurate. Please revise the Report to address this issue.

   Response: Disagree

   Although the cleanup standards may not be met by 2027, these constituents do not exceed their respective MZCLs. Additionally, data from downgradient boundary compliance wells and surface water concentrations continue to be below MCLs or remain non-detect; therefore, these values in the low permeable zones do not present a viable threat to surface water. Compliance with the MZCLs throughout the aquifer and MCLs at the compliance boundary is consistent with the terms of the approved GWMZ.

   The areas of the site (wells DOB 15, DOL 2 and DOB 16) where these constituents are exceeding their MCLs, are located within or below clayey zones that appear to be acting as a secondary VOC source, thereby prolonging the physical attenuation process (dispersion) as well as slowing the transport vertically. The amount of aerobic and physical degradation of VC in the plume is at least equal to the release from low permeability secondary source areas, as downgradient well locations (DOB 19, DOB 19A and DOB 23) have never exceeded MCLs. With the residual contamination being located in low permeable zones acting as a secondary source, it makes the

problem difficult to remediate because most of the in situ remedial technologies proven to be effective require sufficient pathways for contaminant remediation.

The current GWMZ boundaries are adequate, with no significant increases in plume concentrations. Should concentrations continue to exceed MCLs by the original modeled timeframe of 2027, SRS will consider updating the model to get a better estimate for the remedial timeframe. No changes are proposed for the 2020 letter report.

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3. PCE was detected above the MCL in monitoring well DOB 15; however, there is no plume map for PCE. Please include a plume map showing the extent of PCE at the site.

Response: Clarification

PCE only exceeded the MCL in one well, therefore a plume map was not deemed necessary. When PCE is detected above the MCL in multiple wells at the DOSB, a plume map showing the extent of PCE contamination greater than the MCL will be included. No changes are proposed for the 2020 letter report.

Contact: Kevin Boerstler, (803) 952-6766, kevin.boerstler@srs.gov

EPA SPECIFIC COMMENTS:

1. **Introduction, Page 3:** The text in the third paragraph, sixth sentence states that background wells are sampled every two years; however, the text indicates these wells are sampled bi-annually, which is twice a year. Please revise the text to reflect that background wells are sampled biennially.

Response: Agree

In future submittals of the letter report, the text will be adjusted in to read "The background wells are sampled <u>biennially</u> ~~bi-annually~~ (i.e., second quarter CY during even years) while the plume compliance wells, boundary compliance wells, and additional monitoring wells are sampled annually during the second quarter of the CY." No changes are proposed for the 2020 letter report.

Contact: Kevin Boerstler, (803) 952-6766, kevin.boerstler@srs.gov

2. **2020 Data Analyses, Page 4:** The text in the second paragraph, sixth sentence states that two horizontal flow rates for the two aquifers at the site are presented; however, it is unclear how the flow rates were calculated or obtained. Please provide more detail on how the flow rates were calculated or provide a reference.

   Response: Agree

   A discussion of calculated groundwater flow rates and direction are included in the biennial mixing zone report submitted during even-numbered years. No changes are proposed for the 2020 letter report.

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3. **2020 Data Analyses, Page 4:** The text in the last paragraph, third sentence incorrectly states that the Mixing Zone Concentration Limit (MZCL) for benzene is 1.35 microgram per liter(ug/L); however, the correct MZCL for benzene is 5 ug/L. Please update the text to reflect the correct MZCL for benzene.

   Response: Agree

   In future submittals of the letter report, the text will be adjusted to read "The GWMZ constituents that were detected do not exceed their respective MZCLs (1,1-DCE [7 µg/L], benzene [~~1.35~~ 5 µg/L], VC [147 µg/L], cDCE [1,164 µg/L], PCE [78 µg/L], and TCE [200 µg/L]) at the "additional" monitoring wells." No changes are proposed for the 2020 letter report.

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4. **2020 Data Analyses, Page 6:** The text in the first paragraph, second sentence appears to be in the wrong tense or is inaccurate, as it states, "Modeling has indicated that an increase in VC may occur around 2016;..." Please revise this sentence to reflect the correct tense indicating an increase in VC has occurred or indicate an increase in VC did not occur in 2016 as the model predicted.

   Response: Agree

   In future submittals of the letter report, the text will be adjusted to read "Modeling performed in 2007 indicated that an increase in VC could ~~may~~ occur around 2016; however, the trends shown at well DOB 15 show that an increase in VC has not occurred and contaminant transport has more retardation than modeling indicated." No changes are proposed for the 2020 letter report.

Contact: Kevin Boerstler, (803) 952-6766, kevin.boerstler@srs.gov

5. **Table 1, 2020 DOSB OU Groundwater Mixing Zone Monitoring Results, Page 18:** The abbreviations/acronyms included on Table 1 are not defined. For example, MCL, PCE, and MZCL are not defined. Please define all acronyms presented in the Table in a notes section at the bottom of the table.

   Response: Agree

   In future submittals of the letter report, abbreviations/acronyms included on Table 1 will be either written out, defined within the table or in a notes section at the bottom of the table. No changes are proposed for the 2020 letter report.

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6. **Table 1, 2020 DOSB OU Groundwater Mixing Zone Monitoring Results, Page 18:** The note with an asterisk below the table states that no MPV exists for cDCE (cis-1,2-DCE); however, it is unclear what MPV is referring to. Please update the text as appropriate.

   Response: Agree

   The MCL should be the comparison value used in the table. The current MCL for cDCE is 70 µg/L and is the value used in the table. The note with an asterisk will be removed from the table in future submittals of the letter report. No changes are proposed for the 2020 letter report.

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7. **Table 2, 2020 DOSB OU Natural Attenuation Field Parameters, Page 19:** The units of measurement are not defined in Table 1. For example, millivolt (mV), and milligram per liter (mg/L) are not defined. Please define all units of measurement in the bottom on the table.

   Response: Agree

   In future submittals of the letter report, a list of "Abbreviations" will be included at the bottom of the table to define the units of measurement used in the table. No changes are proposed for the 2020 letter report.

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8. **Table 2, 2020 DOSB OU Natural Attenuation Field Parameters, Page 19:** For monitored natural attenuation parameters (pH, oxidation reduction potential [ORP], dissolved oxygen and alkalinity) there is no explanation for what range of results indicate volatile organic compound (VOC) degradation. For example, dissolved oxygen concentration less than 0.5 mg/L is indicative of groundwater conditions that would most likely support chlorinated VOC degradation. Please include the VOC degradation ranges for pH, ORP dissolved oxygen and alkalinity.

Response: Clarification

The ranges for pH, ORP, DO and alkalinity that are indicative of reductive dechlorination are included on page 7 in paragraphs 2, 3, 4, and 5, respectively, of the letter report. However, those values are not included on Table 2 in the letter report. In future submittals of the letter report, the ranges for each parameter that are indicative of reductive dechlorination will be added to table 2 to make comparison between aquifer conditions and conditions indicative of reductive dechlorination easier. No changes are proposed for the 2020 letter report.

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