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

ARF-024116

MAR 15 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 and Emergency Management 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 488-4D Ash Landfill Annual Groundwater Monitoring Report - 2021 Data (SRNS-RP-2022-00559, Revision 0, July 2022) SEMS Number 63

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) and the U. S. Environmental Protection Agency (EPA) comments on the report were received on November 21, 2022, and December 16, 2022, respectively. 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: 2023.03.14 14:04:13 -04'00'

Brian T. Hennessey
SRS Remedial Project Manager
Remediation and Deactivation & Decommissioning Division

IACD-23-134

Enclosures:
1. SRS Responses to the United States Environmental Protection Agency Comments on the 488-4D Ash Landfill Annual Groundwater Monitoring Report - 2021 Data (SRNS-RP-2022-00559, Revision 0, July 2022) SEMS Number 63
2. SRS Responses to the SCDHEC Comments on the 488-4D Ash Landfill Annual Groundwater Monitoring Report - 2021 Data (SRNS-RP-2022-00559, Revision 0, July 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

cc w/encl:
D. Lloyd, EPA-Atlanta
M. McRae, TechLaw, Inc.

SRS Responses to the USEPA Comments on the
488-4D Ash Landfill Annual Groundwater Monitoring Report - 2021 Data,
SEMS # 63, (SRNS-RP-2022-00559, Revision 0, July 2022)
Comments Received December 16, 2022

EPA COMMENTS:

1. **Section 3.1, Results Above Regulatory Threshold Limits, Page 3 of 14:** The text states metals contamination is sourced from the D-Area Coal Pile Storage Area (DCSA) and the coal pile runoff basin (CPRB); however, it is noted that:
   a. Figure 2 (Beryllium Concentrations at the 488-4D Ash Landfill, Second Quarter 2021) shows a separate beryllium plume northwest of the 488-4D Ash Landfill that is not discussed in the Annual Report.
   b. Additionally, Figure 1 (Monitoring Well Locations at the 488-4D Ash Landfill and 2Q2021 Water Level Elevations) depicts a waste site area located upgradient of separate beryllium plume that is not discussed in the Annual Report.

   Please provide additional information and discussion for each a. and b. notes above to ensure clarity if the waste site area is the source of the secondary beryllium plume or another alternative? Please revise the Annual Report to further discuss the nature of the secondary beryllium plume.

   Response: Agree with Clarification

   In June 2022, the Core Team (USDOE, USEPA and SCDHEC) agreed the 488-4D Ash Landfill Annual Groundwater Report (SRNS-RP-2022-00559) would be a data report with minimal discussion, and the D-Area Groundwater OU annual report would be expanded to include additional data, discussion, figures and tables. The D-Area Groundwater OU report, due 4/1/2023, will contain additional discussion on the beryllium plumes, as well as figures of the beryllium plume from OUs within D-Area. No changes are proposed to the 2021 488-4D Ash Landfill Annual Groundwater Report. However, future 488-4D Ash Landfill Annual Groundwater Reports will include expanded discussions and figures of the beryllium plumes within D-Area.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

2. **Section 3.1, Results Above Regulatory Threshold Limits, Page 3 of 14**: The text indicates that tritium and volatile organic compounds (VOC) contaminants are not associated with the 488-4D Ash Landfill and are from upgradient sources within D-Area; however, a figure showing the location of these upgradient sources relative to 488-4D Ash Landfill was not included in the Annual Report. Please revise the Annual Report to include a figure showing the location of the upgradient sources of VOCs and tritium relative to the 488-4D Ash Landfill.

   Response: Agree with Clarification

   In June 2022, the Core Team (USDOE, USEPA and SCDHEC) agreed the 488-4D Ash Landfill Annual Groundwater Report (SRNS-RP-2022-00559) would be a data report with minimal discussion, and the D-Area Groundwater OU annual report would be expanded to include additional data, discussion, figures and tables. The D-Area Groundwater OU report, due 4/1/2023, will contain additional discussion on the tritium and VOC plumes, as well as figures of the two plumes from upgradient OUs within D-Area. No changes are proposed to the 2021 488-

4D Ash Landfill Annual Groundwater Report. However, future 488-4D Ash Landfill Annual Groundwater Reports will contain additional discussion on the tritium and VOC plumes, as well as figures of the two plumes from upgradient OUs within D-Area.

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

3. **Table 3. 488-4D Ash Landfill Groundwater Monitoring Data, Page 13 of 14:** The table indicates the analytical estimated quantitation limit (EQL) for beryllium in well DCB 8 was 5 micrograms per liter (µg/L); however, the EQL of 5 µg/L is greater than the beryllium maximum contaminant level (MCL) of 4 µg/L. This text does not discuss the beryllium data usability at DCB 8 and how this impacts the evaluation of beryllium contamination in groundwater. Please revise the text to address this issue and please ensure the lab MCLs are met in the future.

   Response: Agree with Clarification

   As shown in the digital version of Table 3, Microsoft Excel file cell notes, the sample method detection limit (MDL) for the beryllium analysis for the DCB 8 sample collected on May 5, 2021 was 1.0 µg/L which is below the MCL of 4.0 µg/L; however, the sample quantitation limit (EQL) was 5.0 µg/L above the beryllium MCL. SRS requests that laboratory results have MDLs that are lower than MCLs or other regulatory limits (e.g., Secondary Drinking Water Standards or USEPA Regional Screening Levels); however, EQLs may be above those limits at times. Conservatively, non-detects are shown at the EQL value in the data tables, maps, and time-series plots. The DCB 8 historical data (Figure 3) indicates beryllium is always below detection at this well, even at much lower EQLs, so it is unlikely the May 5, 2021 sample is above the MCL. SRS has requested subsequent sample events to have lower EQLs for beryllium. As an example, the 11/1/2022 DCB 8 beryllium analysis had an MDL of 0.2 µg/L and an EQL of 0.5 µg/L, and the result was below the MDL. No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

4. **Table 2. Monitored Constituents for the 488-4D, Page 12 of 14**: It is unclear why Table 2 does not include dissolved oxygen (DO) in the list of field parameters, as Table 3 includes DO results for the monitoring wells sampled. Please revise Table 2 to include DO as a field parameter.

   Response: Agree

   Dissolved oxygen was inadvertently left out of Table 2 and will be included in all future 488-4D Ash Landfill Annual Groundwater Reports. No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

SRS Responses to the SCDHEC Comments on the
488-4D Ash Landfill Annual Groundwater Monitoring Report – 2021 Data,
SEMS Number: 63 (SRNS-RP-2022-00559, Revision 0, July 2022)
Comments Received November 18, 2022.

Specific Comments

1. Table of Contents, List of Figures, page iii. Please add a figure showing where the unit is located at SRS.

   Response: Agree with Clarification

   The D-Area Groundwater OU report, due 4/1/2023, will contain a figure on the location of D-Area within SRS, as well as figures of the various OUs within D-Area. Future 488-4D Ash Landfill Annual Groundwater Reports will include figures depicting the location of D-Area within SRS and the location of 488-4D within D-Area. These figures can also be found in the previous D-Area Groundwater OU report that was submitted in July 2021 (SRNS-RP-2021-03748). No changes are proposed to the 2021 488-4D Ash Landfill Annual Groundwater Report.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

2. Section 1.0, Site Description and Background, page 1. The document provides little background on the geology/hydrology at the unit, aside from discussions of groundwater elevations, analytical results, and contaminant plumes. Please add a new section to the document that briefly describes observed hydrology at the unit, including but not limited to the aquifer of concern at the unit (e.g., the Upper Three Runs Aquifer [UTRA]), relevant aquifer zones at the unit (e.g., the upper aquifer zone [UAZ] of the UTRA), the types of soils and materials found in the aquifer (e.g., sands, silts, clay layers), and any confining units present.

   Response: Agree with Clarification

   In June 2022, the Core Team (USDOE, USEPA and SCDHEC) agreed the 488-4D Ash Landfill Annual Groundwater Report (SRNS-RP-2022-00559) would be a data report with minimal discussion, and the D-Area Groundwater OU annual report would be expanded to include additional data, discussion, figures and tables. The upcoming D-Area Groundwater OU report, due 4/1/2023, will contain figures and discussion on the geology and hydrogeology in D-Area, similar to the 2020 D-Area Groundwater Report (SRNS-RP-2021-03748). Future 488-4D Ash Landfill Annual Groundwater Reports will contain figures and discussion on the geology and hydrogeology in D-Area, as appropriate. No changes are proposed to the 2021 488-4D Ash Landfill Annual Groundwater Report.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

3. Section 2.0, Groundwater Monitoring, page 1. The document states that monitoring wells DCB078, DCB079, and DCB080 are located downgradient of the landfill. Based on the well locations presented in Figure 1, this statement is partially incorrect. If the entire area outlined in red on Figure 1 is the 488-4D landfill, DCB078 and DCB079 are located on the southeastern edge of the landfill, while observed groundwater flow is towards the southwest. These two wells are cross-gradient from the landfill. Please correct this statement.

   Response: Agree with Clarification

   Monitoring wells DCB078, DCB079 and DCB080 were selected and approved as monitoring locations for the 488-4D Ash Landfill. Monitoring wells DCB078 and DCB079 are both down-gradient and side-gradient to the 488-4D Ash Landfill, but are down-gradient of the D-Area Coal Storage Area (484-17D), which is a primary source of metals contamination in the groundwater. This clarification will be included in future 488-4D Ash Landfill reports. No changes are proposed to the 2021 488-4D Ash Landfill Annual Groundwater Report.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

4. Section 2.1, Groundwater Flow, page 2. The term "water table" refers to the top of the saturated zone (i.e., the boundary that defines the bottom of the unsaturated zone and the top of the saturated zone). The statement in the document that "The water table…flows toward the southwest" does not make sense. Please correct this statement to state that groundwater flows toward the southwest.

   Response: Agree with Clarification

   SRS agrees it is the shallow groundwater in the Upper Three Runs Aquifer (UTRA) that flows to the southwest, rather than the water table itself. In future 488-4D Ash Landfill Groundwater Reports this sentence will be revised similar to the following:

   "The water table near the 488-4D Ash Landfill is approximately 20 to 25 feet bgs and the shallow groundwater in the Upper Three Runs Aquifer (UTRA) flows toward the southwest."

   No changes are proposed to the 2021 488-4D Ash Landfill Annual Groundwater Report.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

5. Section 2.1, Groundwater Flow, page 2. It is unclear what is meant by the description of groundwater elevations over the last four years as "fairly stable," as there were significant seasonal fluctuations between May 2021 and November/December 2021 according to Table 3. For example, depth to groundwater in DCB 8 increased from 11.7 feet in May 2021 to 14.44 feet in December 2021, a difference of nearly three feet. While these seasonal fluctuations are not uncommon in South Carolina, the description of groundwater levels as fairly stable is somewhat misleading. Please address this.

   Response: Agree

   SRS proposes changing "… fairly stable over the last four years." to a numeric range in the next 488-4D Ash Landfill report similar to the following:

   "Water elevations ~~have been fairly stable~~ ranged from 101 feet above mean sea level (ft-amsl) to 118 ft-amsl near the 488-4D Ash Landfill over the last four years."

   No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

6. Section 2.1, Groundwater Flow, page 2. Please add hydrographs for the five 488-4D wells so that long-term changes in groundwater elevations can be evaluated.

   Response: Clarification

   The upcoming D-Area Groundwater OU report, due 4/1/2023, will contain hydrographs for all of the monitoring wells in D-Area. Future 488-4D Ash Landfill Annual Groundwater Reports will include hydrographs for all of the monitoring wells in the report. No changes are proposed to the 2021 488-4D Ash Landfill Annual Groundwater Report.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

7. Section 2.2, Groundwater Constituents and Parameters, page 2. Please change the wording of the first sentence from, "The five (5) wells are monitored…" to, "The five (5) 488-4D Ash Landfill wells are monitored…"

Response: Agree

In future 488-4D Ash Landfill Annual Groundwater Reports, SRS will change "The five (5) wells are monitored…" to the following: "The five (5) 488-4D Ash Landfill wells are monitored…"

No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

8. Section 3.0, Results, page 2. Section 3.0 indicates that groundwater analytical samples were collected in May 2021, and groundwater elevation measurements were collected in November/December 2021. Please edit the section to indicate that groundwater elevation measurements were also collected in May 2021, as indicated in Section 2.1 and Table 3.

Response: Agree

In future 488-4D Ash Landfill Annual Groundwater Reports, SRS will ensure Section 2.1 and Section 3.0 are consistent with the dates groundwater measurements were conducted. No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

9. Section 3.1, Results Above Regulatory Threshold Limits, page 3. Tritium is listed as a constituent with estimated concentrations of 63.2, 31.2 and 33 pCi/mL (all above MCL of 20 pCi/mL) presented in Table 3. Using this same logic, lead should also be included in this section as Table 3 shows an estimated concentration of 29.6 µg/L (above MCL of 15 µg/L).

Response: Agree

In future 488-4D Ash Landfill Annual Groundwater Reports, SRS will include all estimated (J qualified) results for all constituents that exceed MCLs. No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

10. Figure 2, Beryllium Concentrations at the 488-4D Ash Landfill, Second Quarter 2021, page 7. The beryllium plume > 4 µg/L is drawn on the figure to include surface water station DSWM-4A, but the figure indicates DSWM-4A was designated non decision data with an estimated value of 2.01 µg/L during the most recent sampling event. Please address whether this interpretation of the current extent of the plume is correct and update the figure if appropriate.

    Response: Clarification

    Surface water stations DSWM-4 and DSWM-4A receive groundwater discharge from the upper aquifer zone (UAZ) of the Upper Three Runs Aquifer (UTRA). The lower aquifer zone (LAZ) within the UTRA does not discharge to these surface water locations. The LAZ is contaminated with beryllium above MCLs. Because this contamination is still within the UTRA, it is shown as such on the plume map coverage. No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

    Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

11. Table 3, 488-4D Ash Landfill Groundwater Monitoring Data, unnumbered page. The data for DCB078 indicate that 24 gallons of groundwater were purged from the well prior to sampling in May 2021, while only 2 gallons were purged in November 2021. Please clarify why the volume purged was drastically different between the two sampling events when depth to groundwater in the well was relatively similar.

    Response: Clarification

    Well DCB078 originally had no pump installed and a portable variable speed pump was used for sample collection. In 2021, a permanent low flow bladder pump was installed in this well which requires a much less purge volume due to the pump configuration and smaller tubing used for sample collection. This is the reason for differing purge volumes. No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

    Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

12. Table 3, 488-4D Ash Landfill Groundwater Monitoring Data, unnumbered page. The depth to water column is missing values in several cells, while the associated groundwater elevation cells have values. Please add the missing depth to water values for these cells since depth to water measurements are typically used to calculate groundwater elevations.

Response: Agree

In the next 488-4D Ash Landfill Annual Groundwater Report, all water elevation fields will have a corresponding depth-to-water measurement. The applicable section of Table 3 is attached as an example. No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

13. Table 3, 488-4D Ash Landfill Groundwater Monitoring Data, unnumbered page. Table 3 indicates that a "lab duplicate" sample was analyzed from DCB080. Appendix B of the 2020 GWMR for D-Area was reviewed but additional information on duplicate sampling procedures was not available. Please address the following questions regarding the lab duplicate.

    a. Was the duplicate sample for DCB080 collected on the same date as the other sample (i.e., 5/12/21)? If so, please add this date to Table 3.

    Response: Clarification

    Lab duplicate samples are created by the laboratory from the parent sample for their Quality Assurance (QA)/Quality Control (QC) purposes. For clarity, SRS will not include laboratory QA/QC samples in the data tables in future reports. No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

    Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

    b. Why was the duplicate sample only analyzed for sulfate and tritium and not the metals analyzed for in the other wells?

    Response: Clarification

    Lab duplicate samples receive the same analyses as the parent sample. In this case, the lab only decided to do duplicate analyses for their own QA/QC purposes on the sulfate and tritium analyses. No changes are proposed for the 2021 488-4D Ash Landfill Annual Groundwater Report.

    Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

Table 3. 488-4D Ash Landfill Groundwater Monitoring Data			SAMPLE COLLECTION DATE	WATER LEVEL MEASUREMENT DATE	SYNCHRONOUS WATER ELEVATION	DEPTH TO WATER
Station	**Well Use**	**Aquifer Zone**	day-month-year	day-month-year	ft	ft
DCB 8	Monitoring Well	UTRA	05-May-2021	03-May-2021	125.5	11.7
DCB 8	Monitoring Well	UTRA	13-Dec-2021	13-Dec-2021	122.76	14.44
DCB077	Monitoring Well	UTRA	11-May-2021	03-May-2021	110.77	19.97
DCB077	Monitoring Well	UTRA		11-Nov-2021	110.14	20.6
DCB078	Monitoring Well	UTRA	12-May-2021	03-May-2021	105.29	21.54
DCB078	Monitoring Well	UTRA	17-Dec-2021	17-Dec-2021	104.33	22.23
DCB079	Monitoring Well	UTRA	12-May-2021	03-May-2021	103.32	24.56
DCB079	Monitoring Well	UTRA		11-Nov-2021	101.76	26.12
DCB080	Monitoring Well	UTRA	12-May-2021	03-May-2021	102.81	16.44
DCB080	Monitoring Well	UTRA		03-May-2021	102.81	16.44
DCB080	Monitoring Well	UTRA		11-Nov-2021	101.24	18.01