Department of Energy
Savannah River Operations Office
P.O. Box A
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JUL 23 2026

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 Environmental Services
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: Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis for the D-Area Groundwater Operable Unit Per- and Polyfluoroalkyl Substances Plume (U) (SRNS-RP-2025-01764, Revision 1, June 2026) (Clean Copy and Redline), Savannah River Site Responses to Regulatory Comments on the Revision 0 Document, and Draft Action Memorandum, SEMS Number: 63

In accordance with the terms of the Federal Facility Agreement (FFA), the U. S. Department of Energy (DOE) is submitting the subject Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for your concurrence. The Revision 0 RSER/EE/CA was submitted to the South Carolina Department of Environmental Services (SCDES) and the U. S. Environmental Protection Agency (EPA) for review on February 12, 2026. The SCDES and EPA provided comments on the Revision 0 document on April 27, 2026, and April 30, 2026, respectively. The Savannah River Site (SRS) emailed draft responses to the regulatory comments on June 16, 2026. EPA and SCDES replied via email on June 26, 2026, and June 29, 2026, respectively, that the draft responses were acceptable. The final SRS' responses to the regulatory comments, which are included with this submittal, were incorporated into Revision 1 RSER/EE/CA.

This submittal also includes a draft Action Memorandum and Responsiveness Summary for the Non-Time Critical Removal Action for the D-Area Groundwater Operable Unit for your review and comment. Please review and provide your comments and/or concurrence within thirty (30) days of receipt. The effort and time that the SCDES and the EPA have provided on this operable unit are greatly appreciated.

JUL 23 2026

Ms. Susan Fulmer
Mr. Jon Richards 2

Comments or questions from you or your staff may be directed to me at (803) 522-6427.

Sincerely,

MATTHEW BAKER Digitally signed by MATTHEW BAKER Date: 2026.07.22 11:28:29 -04'00'

Matthew R. Baker
Acting FFA Remedial Project Manager
DOE-Savannah River Operations Office
Remediation, Deactivation, and Decommissioning Division

RDDD-26-159

Enclosures:
1. Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis for the D-Area Groundwater Operable Unit Per- and Polyfluoroalkyl Substances Plume (U) (SRNS-RP-2025-01764, Revision 1, June 2026) (Clean Copy and Redline) SEMS Number: 63
2. SRS Responses to SCDES Comments on the Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis for the D-Area Groundwater Operable Unit Per- and Polyfluoroalkyl Substances Plume (U) (SRNS-RP-2025-01764, Revision 0, January 2026)
3. SRS Responses to EPA Comments on the Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis for the D-Area Groundwater Operable Unit Per- and Polyfluoroalkyl Substances Plume (U) (SRNS-RP-2025-01764, Revision 0, January 2026)
4. Draft Action Memorandum and Responsiveness Summary for the D-Area Groundwater Operable Unit (U)

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c w/o encl:
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SRS Responses to SCDES Comments on the Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis for the D-Area Groundwater Operable Unit Per- and Polyfluoroalkyl Substances Plume (U), SEMS Number: 63, SRNS-RP-2025-01764, Revision 0, January 2026
Savannah River Site, Aiken, South Carolina

Comments Received: April 27, 2026

GENERAL COMMENTS

1. While the "Recommended Removal Action Alternative" of Alternative 2a: In-Situ PAB (CAC Injections) presented in the RSER/EE/CA is explained to have been extensively studied and deployed in the field to reduce PFAS mobility in the subsurface, there still remains an uncertainty regarding the long-term fate of the injected media in the subsurface and the potential for breakdown of the CAC media which could lead to breakthrough of the contamination. It is understood that as the CAC adsorption sites become saturated, additional adsorptive material may be applied. However, it is also understood that Alternatives 2a and 2b only sequester the PFAS contamination but do not destroy it. From what is understood, these Alternatives can generate PFAS management and reduce risk exposure, but PFAS is not completely removed from the subsurface; it is just immobilized.

    a. A more thorough explanation is needed to clarify whether there are any aging effects of the CAC Injected media which would cause reduction in longevity leading to the breakthrough of the PFAS contamination immobilized within. SCDES has concerns regarding the uncertainty of the long-term fate of the PFAS-contaminated media, specifically with Alternative 2a: In-Situ PAB (CAC Injections). Will the contaminated media remain in the subsurface indefinitely, or will it be removed and properly disposed of at some point in the future? See specific comment #5 below for a request for additional information on the ultimate fate of the PFAS-contaminated media at the end of the PAB's useful life.

    b. Additionally, based on the current understanding, subsurface PFAS treatment technologies are largely limited to the immobilization of PFAS contamination. In the future, PFAS destruction technologies may become available and be a potentially viable option for the Site. Does the Recommended Removal Action Alternative, In-Situ PAB (CAC Injections), allow for SRNS to implement any potential destructive treatment technologies developed in the future? For instance, will the CAC Injections maintain the current permeability of the formation such that a potential PFAS-destruction injectate can be injected in the future? Please clarify.

Response: Clarification

There are no long-term studies of CAC degradation or aging over time in the subsurface environment and how this affects PFAS treatment, but from what has been observed thus far, CAC is effective within the currently observed time scales and will likely be for much longer. The first known full-scale application of colloidal activated carbon for treatment of PFAS was roughly 10 years ago in Ontario, Canada (McGregor 2018). Baseline concentrations at this site were similar to those observed currently in D Area groundwater although for different PFAS constituents (3,260 ng/L PFOA and 1,450 ng/L PFOS). According to the latest update (8 years after application), the CAC is still

achieving below detection limit reductions in PFAS (Regenesis 2025). Regarding this specific site, "A three-dimensional reactive transport model (ISR-MT3DMS) was used to indicate that the CAC remedy implemented at the site is likely to be effective for PFOS remediation for decades." (Carey et al. 2019). Additional modeling suggests that CAC barriers may not see breakthrough for several decades depending on the barrier design and environment conditions (Carey et al. 2022).

Although long-term field studies of CAC degradation and the effects on PFAS treatments are unavailable, many types of activated carbon are commonly used for groundwater remediation and drinking water treatment. The mechanisms that degrade activated carbon are understood. Some of the most common are biological aging (biofilm formation), natural organic matter fouling, and iron/manganese oxide coating. To study the effects of physical and chemical aging of CAC on PFAS adsorption, researchers used four accelerated aging treatments (wet-dry cycling, hydrogen peroxide, Fenton's reagent, and mineral acid) and found that the treatments reduced the adsorption capacity of CAC by varying degrees for all the tested PFAS with the exception of PFOS (Liu J. et al. 2025). While aging effects can reduce the adsorption capacity of the injected CAC media, these effects will be accounted for in the conservative design of the PAB to ensure the targeted longevity is achieved.

The subcontractor tasked with design and implementation of Alternative 2a will be instructed to construct a PAB able to sustain a minimum of 30 years effectiveness at meeting the removal action objective. The subcontractor will be provided with all data needed to successfully meet their design criteria, including D Area groundwater geochemical parameters that contribute to CAC degradation and aging as it is currently understood. The barrier will be monitored and evaluated during operation to verify it is functioning as intended. Eventually this data will be used to address the potential for replacement, removal, and/or treatment of the PFAS-contaminated soil and media as a part of the final remedial decision for the DAG OU. This is further discussed in the response to SCDES specific comment #5.

The recommended removal action (Alternative 2a) is expected to allow SRS to implement any potential destructive treatment techniques developed in the future. In fact, it would improve the implementability of such an action by greatly reducing the spread of PFAS contamination thus decreasing the potential treatment area. The subcontractor tasked with designing this barrier will be instructed not to decrease the permeability of the formation they are injecting into. Groundwater flow will not be impeded, and an injectate could be injected upgradient or into the PAB treatment zone and be able to contact the adsorbed PFAS. It should be noted that the way destructive reactions vary for PFAS in the sorbed phase is largely not understood. For trichloroethylene (TCE), it is understood that carbon adsorption influences microbial, thermal, and chemical transformations; although, the effect can be negative or positive depending on the scenario. It is expected

that this is the same for PFAS adsorption to CAC. Regardless of the selected final action to address PFAS contamination in the DAG OU, the recommended alternative is expected to greatly reduce the downgradient transport of PFAS.

Additional details on the treatment media, physical implementation and longevity expectations will be provided as part of the Removal Action Design Report and Underground Injection Permit after award of the subcontract and receipt of subcontractor design.

No change to the RSER/EE/CA for the DAG OU PFAS Plume is proposed.

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

2. Since the PFAS constituent plumes overlap several other DAG OU plumes, would any other of these contaminants, such as TCE, affect the adsorption effectiveness and reduce the media longevity of either the CAC or GAC Alternatives. If so, please include a statement better explaining this concept and note that this factor will also be considered in the design of the selected Alternative.

Response: Agree

The TCE plume overlaps the future footprint of the presented treatment alternatives and will be considered in the design of the selected alternative; although, it is not expected to affect the adsorption effectiveness or longevity of the CAC or GAC alternatives. The subcontractor will be provided with sufficient data to design the barrier to meet 90% reduction in concentrations for a certain number of years regardless of co-contaminants. Additionally, TCE concentrations are generally relatively low (<50 ug/L) in the areas around the potential location of the recommended alternative, which will limit the additional media required to account for TCE adsorption.

The tritium plume may overlap portions of the potential location of the recommended alternative, but will not affect the adsorption effectiveness due to tritium simply being radioactive hydrogen bound in water molecules. The low pH and metals plume is not observed in the areas around the potential location of the recommended alternative.

It is noted that overlapping plumes will need to be considered in the selection and design of a treatment in the first paragraph of Section 2.6 (under Characterization Efforts).

No change to the RSER/EE/CA for the DAG OU PFAS Plume is proposed.

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

3. As per the *RFI/RI Second Work Plan Addendum for the DAG OU (D-Area Upgradient Sources) (SRNS 2026*), there is additional work planned in four potential PFAS source areas to further characterize the PFAS groundwater plume. Would this additional planned work to investigate these sources areas affect the arrangement of the recommended Alternative, specifically the investigative work in the "Potential Grass Fire" area? Based on maps, the "Potential Grass Fire" area is located just south/southeast of the higher concentration portion of the PFAS plume.

   Response: Agree

   Several 0-1 ft soil borings have already been collected at the "Potential Grass Fire" area. Results from the 0-1 ft borings indicate that the "Potential Grass Fire" area is likely not a major source of PFAS contamination when compared to the 402-D Tank Farm or Fire-Fighting Training Area. Groundwater monitoring in D Area, including the ISOFlow sampling event in 1Q2025, indicates that the highest groundwater PFAS concentrations are located around the FFTA and downgradient of the 402-D Tank Farm. The ISOFlow results showed greater PFAS concentrations at the northwestern locations and lower concentrations at the southwestern locations which are immediately downgradient of the "Potential Grass Fire" area. Based on these observations, the concentrations present in the vadose zone underneath the "Potential Grass Fire" area are likely much less than those at the 402-D Tank Farm or Fire-Fighting Training Area.

   In addition, the "Potential Grass Fire" area is also directly downgradient of the FFTA and will be upgradient of the recommended alternative; therefore, potential groundwater contamination resulting from the "Potential Grass Fire" area will be captured. The subcontractor tasked with designing the recommended alternative will be provided with upgradient soil data and groundwater concentrations, and the subcontractor will design the downgradient treatment to account for the observed concentrations.

   No change to the RSER/EE/CA for the DAG OU PFAS Plume is proposed.

   Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

SPECIFIC COMMENTS

1. List of Acronyms and Abbreviations, page v. The acronyms for "removal action objective" (RAO) and "permeable reactive barriers" (PRB) are not included on the list. Please include.

   Response: Agree

   The acronyms for "removal action objective" (RAO) and "permeable reactive barriers" (PRB) were added to the List of Acronyms and Abbreviations.

   Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

2. Section 2.6, Nature and Extent of Contamination, page 9. This section summarizes the efforts to characterize the nature and extent of the PFAS contamination within the DAG OU. However, this section does not mention the planned additional work as proposed in the *RFI/RI Second Work Plan Addendum for the DAG OU (D-Area Upgradient Sources) (SRNS 2026)*. As per the *RFI/RI Work Plan Addendum,* the purpose of the additional work is to perform the characterization investigation to delineate four additional potential PFAS source areas as well as further characterize the overall PFAS plume in the DAG OU. Please include a description of the planned work in this section since further characterization of the PFAS plume is ongoing.

   Response: Agree

   A description of the previous 0-1 ft borings collected in August 2025 and the planned 2026 characterization as described in the *RFI/RI Second Work Plan Addendum for the DAG OU (D-Area Upgradient Sources) (SRNS 2026)* will be added to the next to last paragraph in Section 2.6 as follows:

   "…presented in Appendix C.

   A total of thirty 0-1 ft soil samples were collected at four newly identified potential source areas in August 2025. These four potential source areas were: 1) A concrete structure (402-D Tank Farm remnants) upgradient of the 715-D Former Gas Station used for AFFF training; 2) the site of a previous VOC phytoremediation study that used water sourced from an unknowingly PFAS-contaminated D-Area groundwater well; 3) an area where a grass fire may have been extinguished using AFFF; and 4) a stormwater/process sewer discharge to the D-Area Effluent Discharge Canal tributary (Figure 23). The highest PFAS concentrations were observed at the 402-D Tank Farm remnants and the stormwater/process sewer discharge. The results from these 0-1 ft soil samples will be used to focus a secondary characterization effort scheduled for the second quarter of 2026. As a part of the 2026 characterization, 23 soil borings, 3 sediment borings, and 6 concrete locations will be sampled for PFAS constituents, and seven additional

groundwater wells will be installed to further characterize PFAS groundwater contamination (Figure 24) (SRNS 2026).

Characterization efforts within…"

The additional figures (Figure 23. 2025 0-1 ft Soil Sample Locations at Four Potential PFAS Source Area, and Figure 24. 2026 Additional D Area PFAS Characterization Locations) is included at the end of these responses. Subsequent figure numbering will be adjusted, as appropriate.

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

3. Section 2.6, Nature and Extent of Contamination, Subsection – Characterization Efforts, pages 10 and 11. This section discusses the distribution and concentrations of the PFAS constituents detected in the UTRA. However, this section does not discuss those PFAS constituents detected in the GA, nor are the associated GA plume maps provided. Please include discussion on the extent of PFAS constituent contamination into the GA as well as the associated plume maps.

Response: Agree

Only PFNA and PFOA exceeded MCLs in the GA, and PFNA exceeded at three wells compared to PFOA in two of those same wells. Only the PFNA plume map for the GA was added because it covers all PFAS exceedances (Figure 12).

Discussion of PFAS exceedances in the GA will be added to the Characterization subsection of Section 2.6 as follows:

"… Widespread PFAS contamination above MCLs in the UTRA was seen during this sampling event. PFAS contamination above MCLs in the GA was observed in a small subset of wells. PFAS concentrations exceeded MCLs in 49 groundwater monitoring wells – , all 46 of which are screened in the UTRA and three screened in the GA (DCB-026-D, DCB-033-D, and DRW-001-D). The 2024 individual PFAS constituents' groundwater plume …

… depicted in Figure 7 through Figure 10. Exceedances in the GA were limited to PFNA and PFOA. The PFNA plume map of the GA is shown in Figure 12. It is apparent that these PFAS …"

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

4. Section 3.0, Removal Action Scope and Objectives, page 12. The last sentence of this section states that an effectiveness monitoring plan for the DAGW OU PFAS Plume RA will be developed. Please indicate which document this plan will be included in, or if it will be a stand-alone document, and include it in the project schedule in Section 8.

   Response: Agree

   The effectiveness monitoring plan will be included within the Removal Action Design Plan. The end of Section 3.0 was updated to include the following:

   "… removal action on the groundwater. This plan will be included within the Removal Action Design Plan document."

   The schedule in Section 8 includes the Removal Action Design Plan, so no change to Section 8 is proposed.

   Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

5. Sections 4.2 and 4.3, Alternatives 2a and 2b, pages 13-15. Please include the potential ultimate fate(s) of the PFAS-contaminated soil and media at the end of each permeable adsorptive barrier's useful life for these two alternatives, similar to the discussion of the ultimate fate of GAC filter vessels provided in Section 4.4 for Alternative 3.

   Response: Clarification

   The alternatives described in this RSER/EE/CA are intended to reduce contaminant migration and exposure risks related to further migration of the high concentration portion of the PFAS plume not to propose final management of the contaminated treatment media. Additionally, the need for a disposition path for alternatives 2a and 2b is unknown. Alternative 3 covers contaminated media disposal because it is necessary for operation and maintenance of a pump and treat system.

   Data collection and evaluations will be routinely conducted during operation of either barrier alternative. This information, along with results from similar sites and scientific advancements, will be used to address the potential for replacement, removal, and/or treatment of the PFAS-contaminated soil and media as a part of the final remedial decision under the DAG OU ROD. Additionally, as mentioned in the response to SCDES general comment #1, the installation of an adsorptive barrier would improve the implementability of a future destructive treatment by concentrating PFAS on adsorptive media thus reducing the treatment area. The same could be said regarding removal of the PFAS contaminated soil and media.

No change to the RSER/EE/CA for the DAG OU PFAS Plume is proposed.

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

6. Section 5.1, Effectiveness: Alternatives 2a and 2b, pages 17 and 18. The short- and long-term effectiveness discussion for these two alternatives include the statement that "source elimination will extend the barrier lifetime." Please include some discussion of any possible source elimination and/or reduction methods for these two alternatives, and revise Section 4 as necessary to include these potential remedial enhancements.

   Response: Clarification

   Source elimination is discussed in Section 5.1 as a way to extend the lifespans of the barriers presented in Alternatives 2a and 2b. Potential source areas are currently being investigated in D Area. Once characterization is complete for the PFAS sources in soil, source areas will be evaluated, and specific source elimination and/or reduction methods will be considered, likely as part of the final D-Area Operable Unit ROD.

   No change to the RSER/EE/CA for the DAG OU PFAS Plume is proposed.

   Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

7. Figure 6, Sampling Locations, page 40. Surface water stations DSWM-1A and –3A appear to be missing labels.

   Response: Agree

   Figure 6 will be updated to provide the labels for surface water stations DSWM-1A and DSWM-3A.

   Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

8. Appendix B, Cost Estimates, page B-7. For the cost estimate of "Alternative 2b, PAB – GAC Trench", the Fifteen Year Cost Section contains the cost estimate labeled "Barrier Maintenance – Reinjection of CAC" with the note "50% of total capital cost of CAC barrier." Since this is the cost estimate for the GAC Trench, please correct these for the appropriate alternative. Additionally, since this Fifteen Year Cost Estimate is the same for both Alternative 2a and 2b, please clarify if this estimate cost is correct.

   Response: Clarification

It is unlikely that a second trench adjacent to the original be constructed. It is more likely that a maintenance action consisting of injection of adsorptive material (e.g., CAC) be conducted directly into specific portions of the trench. The trench will likely be conducive to injections as it will be relatively homogeneous and potentially more permeable than surrounding sediment. Additionally, injections within the footprint of the trench will help reduce potential interferences as they are abundant in D Area.

The following text will be added before the last sentence in Section 4.3 to explain how reapplication of adsorptive material would likely be conducted for Alternative 2b:

"Over time, as the GAC adsorption sites become saturated, it may be necessary to add or replace adsorptive material. This will likely consist of injecting adsorptive material (e.g., CAC) into specific portions of the trenched barrier instead of constructing a second trench. The trench will likely be conducive to injections as it will be relatively homogeneous and potentially more permeable than surrounding sediment. Additionally, injecting within the footprint of the trench will reduce interferences. A generic… "

This was captured accurately in the cost estimate for Alternative 2b; therefore, no change to the cost estimates is proposed.

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

References for Response to General Comment #1:

Carey et al., 2019. Evaluating the longevity of a PFAS in situ colloidal activated carbon remedy. Remediation, 29, 17 – 31.

Carey et al., 2022. Longevity of colloidal activated carbon for in situ PFAS remediation at AFFF-contaminated airport sites. Remediation, 33, 3 – 23. https://doi.org/10.1002/rem.21741

McGregor, 2018. In Situ treatment of PFAS impacted groundwater using colloidal activated carbon. Remediation, 28, 33 – 41. https://doi.org/10.1002/rem.21558

Liu J. et al., 2025. Effects of Physical and Chemical Aging of Colloidal Activated Carbon on the Adsorption of Per- and Polyfluoroalkyl Substances. Environmental, 59, 3691 – 3702. https://doi.org/10.1021/acs.est.4c07958

Regenesis, 2025. PlumeStop Cost-Efficiently Eliminates PFAS Long-Term. https://regenesis.com/case-study/plumestop-cost-efficiently-eliminates-pfas-long-term/

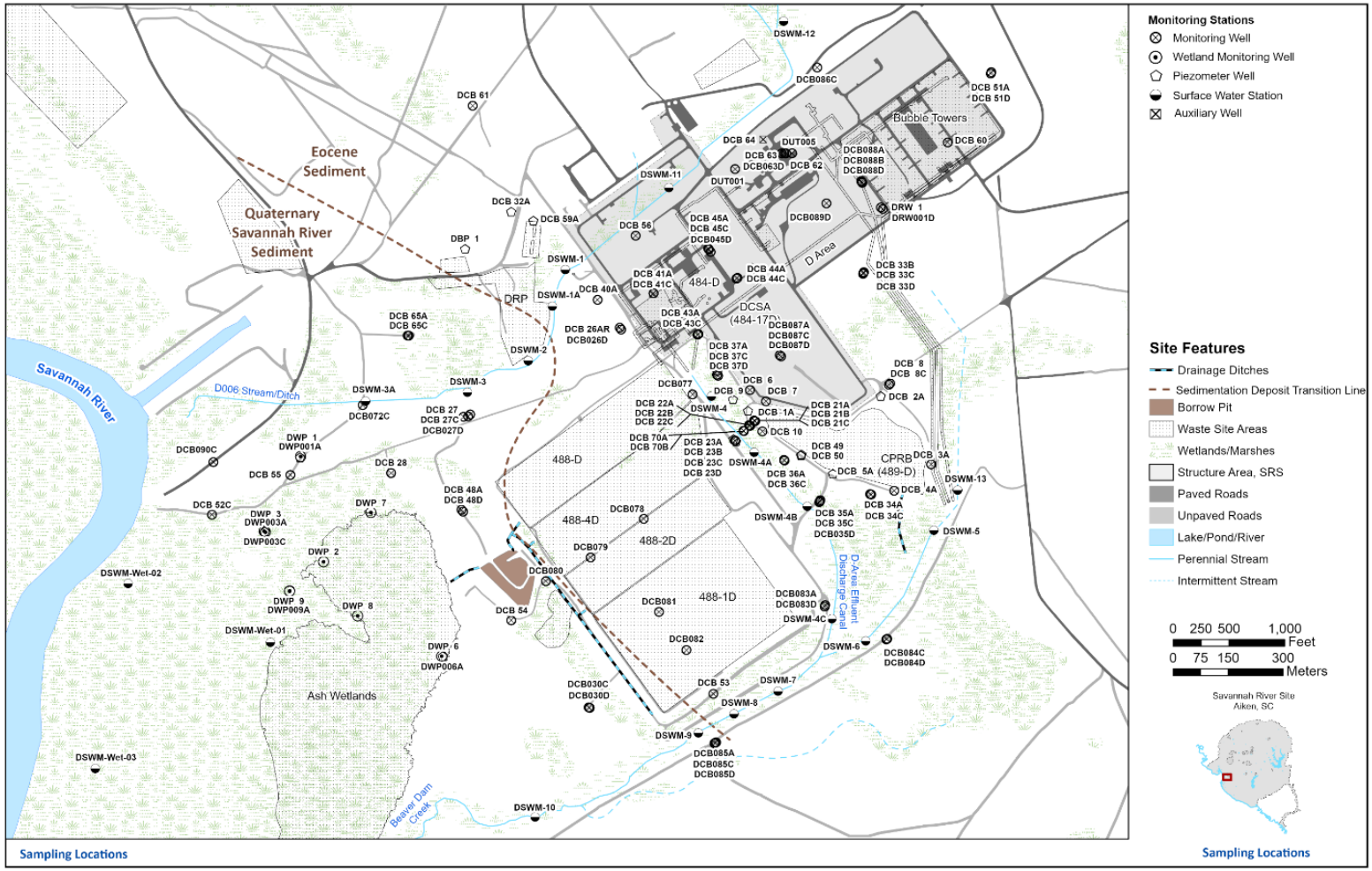


Figure 6. Sampling Locations



Figure 12. 4Q2024 DAG OU PFNA Plume Map of the Gordon Aquifer

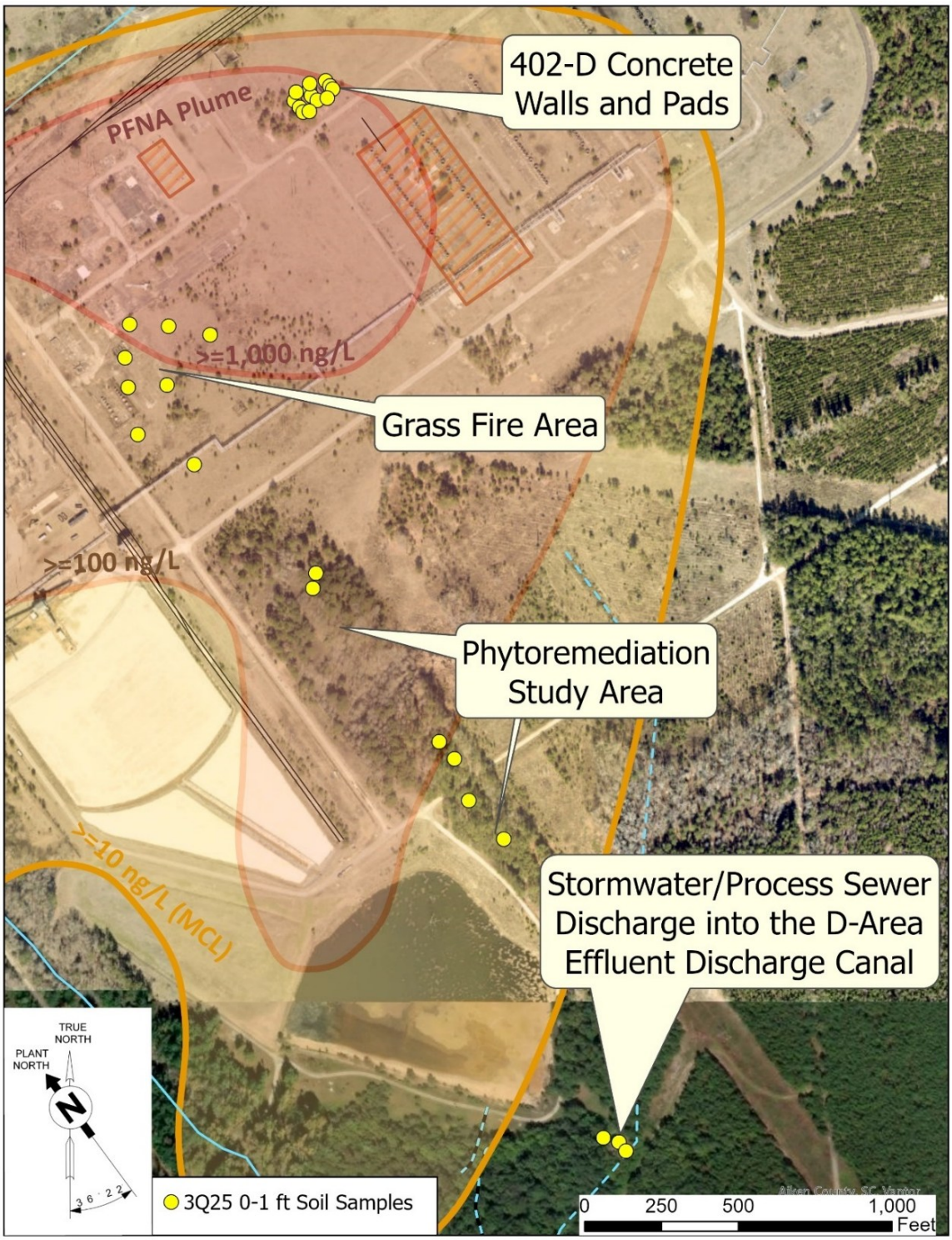


Figure 23. 2025 0-1 ft Soil Sample Locations at Four Potential PFAS Source Area

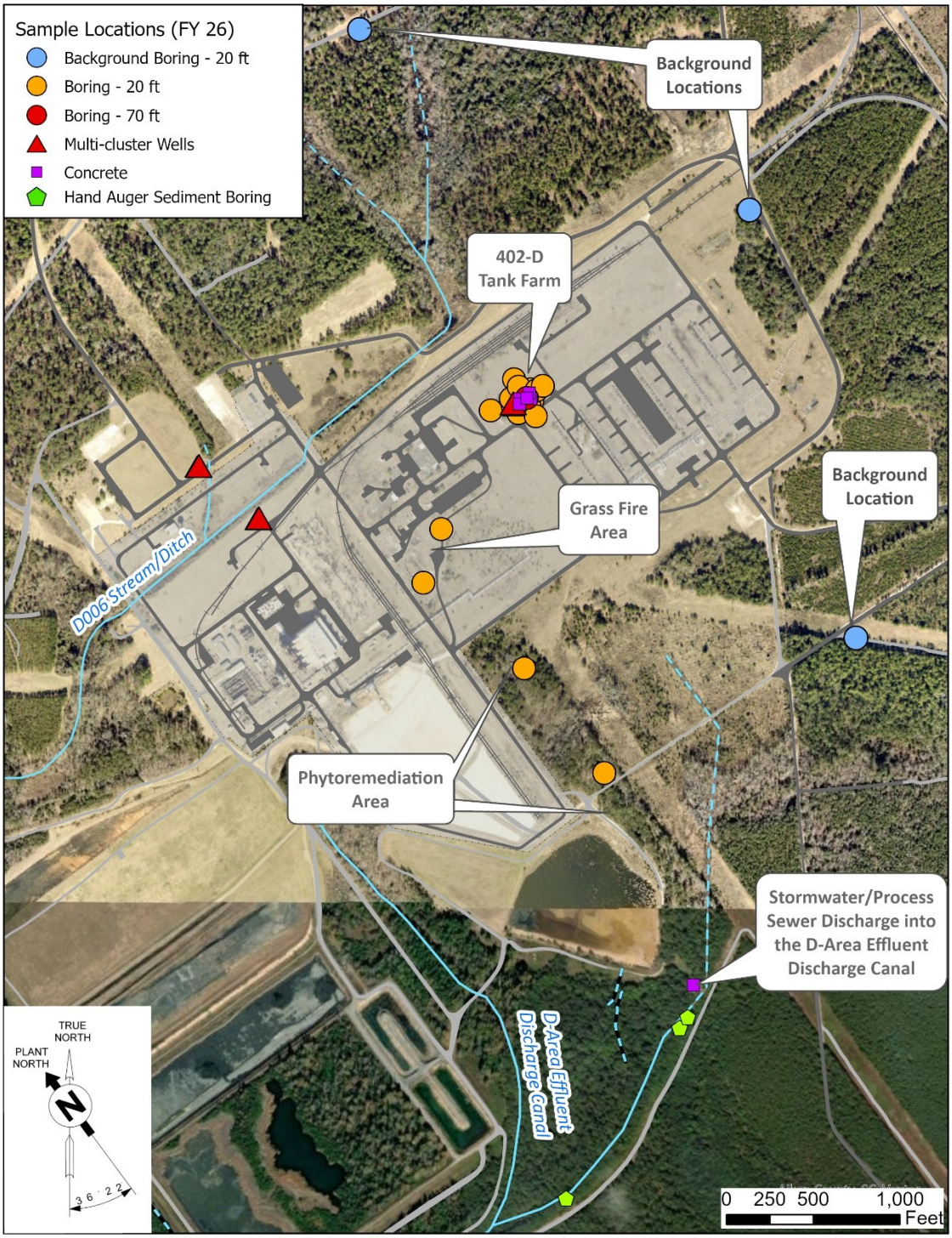


Figure 24. 2026 Additional D Area PFAS Characterization Locations

SRS Responses to USEPA Comments on the Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis for the D-Area Groundwater Operable Unit Per- and Polyfluoroalkyl Substances Plume (U), SEMS Number: 63, SRNS-RP-2025-01764, Revision 0, January 2026
Savannah River Site, Aiken, South Carolina

Comments Received: May 4, 2026

GENERAL COMMENTS

1. The EPA Tap Water regional screening levels (RSLs) listed in Table 1 (USEPA Standards for Six PFAS [Per- and Polyfluoroalkyl Substances] and Removal Action Cleanup Levels) (except for perfluorooctanoic acid (PFOA)) are based on a hazard quotient (HQ) equal to 1.0; however, since there are multiple PFAS detected at the site, the RSLs should be set at a HQ equal to 0.1 so the exceedance of RSLs and risks can be fully assessed. For example, the Report indicates that perfluorobutanesulfonic acid (PFBS) did not exceed the RSL of 6,000 nanograms per liter (ng/L) set to a HQ of 1.0; however, the maximum concentration observed for PFBS is 600 ng/L, which is equal to the RSL at a HQ of 0.1 and less than the 6,000 ng/L RSL listed in Table 1. Please revise Table 1 to present the RSLs based on a HQ equal to 0.1, and revise the Report as necessary based on the updated RSLs.

   Response: Clarification

   A presentation of preliminary remediation goals which would include a range of HQ values was not performed as part of this RSER/EE/CA, as MCLs/RSLs were used to define the problem warranting action and are not the basis for the removal action. The removal action objective is to "Reduce regulated PFAS (those with MCLs) concentrations in monitoring wells within or immediately downgradient of the treatment zone by 90% compared to upgradient monitoring wells." The future remedial documentation for the DAG OU will include preliminary remedial goals and ultimately cleanup levels agreed to by the core team.

   The title of Table 1 was updated as seen below to remove discrepancies:

   "USEPA Standards for Six PFAS and Maximum DAG OU Concentrations ~~Removal Action Cleanup Levels~~"

   No change to RSLs nor discussion regarding the RSLs in the RSER/EE/CA for the DAG OU PFAS Plume is proposed.

   Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

2. It is unclear why the Report presents depths in meters below ground surface (bgs), while the figures and tables report depths in feet bgs. Related information conveyed between the text, tables and figures should be consistently presented. Please revise the text to report depths in feet bgs.

   Response: Agree

   All distances in the report will be changed to present values in feet (ft) to match the Tables

and Figures.

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

SPECIFIC COMMENTS

1. Section 2.1, Site Description and Background, Operable Unit Description, Page 3 of 66; and Figure 3, D Area Waste Units and Facilities, Page 36 of 66: This section describes multiple waste units and facilities in D Area; however, several waste units and facilities shown on Figure 3 are not discussed in this section. For example, the Maintenance Shop (717-D), 488-4D Ash Landfill, 288-2D Ash Basin, 488-1D Ash Basin, 484-D Powerhouse, and D-Area Ash Basin Wetlands waste units are shown on Figure 3 but are not discussed in Section 2.1. Please revise the text to include descriptions for all applicable waste units and facilities shown on Figure 3.

   Response: Clarification

   The discussion in Section 2.1 is limited to surface waste units and facilities that contributed to contamination in the DAG OU. The remaining surface waste units and facilities have no known current or historical impact to D Area groundwater and were therefore excluded from the discussion. Figure 3 shows all major surface waste units and facilities including those not related to contamination in the DAG OU.

   No change to the RSER/EE/CA for the DAG OU PFAS Plume is proposed.

   Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

2. Section 2.1, Site Description and Background, Operable Unit Description, Page 3 of 66; and Figure 3, D Area Waste Units and Facilities, Page 36 of 66: The sixth bullet point on Page 3 of Section 2.1 identifies 421-2D as "Moderator Handling and Storage Building;" however, Figure 3 identifies 421-2D as "Drum Storage Facility." Additionally, the Report appears to use interchangeably both "Drum Storage Facility" and "Moderator Handling and Storage Building" terminology when discussing 421-2D. Please revise the report to use consistent terminology when discussing the 421-2D facility.

   Response: Agree

   Building 421-2D is the Moderator Handling and Storage Building (also known as the Drum Storage Facility). For consistency the facility will be called the Moderator Handling and Storage Building. The label in Figure 3 will be updated to accurately reflect this and the text in Section 2.1 Site Description and Background, page 4, second paragraph, fourth paragraph will be edited as follows:

"… contaminated heavy water drums. The ~~Drum Storage Facility~~421-2D Moderator Handling and Storage Building stored drums of degraded moderator water until 1988. … "

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

3. Section 2.5, Geology and Hydrogeology, Page 8 of 66; and Figure 4, Lithostratigraphic and Hydrostratigraphic Units at SRS, Page 37 of 66: The first paragraph indicates that the Fourmile Branch Formation constitutes the main portion of the Gordon Aquifer (GA); however, Figure 4 shows the Congaree Formation as the main unit of the GA, with the Fourmile Branch Formation at the base of the GA and top of the Couch Branch Confining Unit. Please revise the report to resolve this apparent discrepancy.

   Response: Clarification

   Section 2.5 states:

   "The laterally continuous clayey sands to clays in the Warley Hill and in the uppermost part of the underlying Congaree Formation constitute the Gordon Confining Unit (GCU) (Figure 4).

   The Congaree often consists of clayey sands and clays, and the upper portion of the formation is often included in the GCU. The underlying Fourmile Branch Formation generally consists of moderately-sorted sands that constitute the main portion of the Gordon Aquifer (GA)."

   This text accurately describes the GCU and the GA in D Area; however, Figure 4 generically represents all of SRS. Since the lithostratigraphy and hydrostatigraphy vary in different areas of SRS, the graphical representation of these in Figure 4 do not perfectly represent D Area geology.

   No change to the RSER/EE/CA for the DAG OU PFAS Plume is proposed.

   Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

4. Section 5.1, Effectiveness, Alternative 2b, In-situ PAB [Permeable Adsorptive Barrier] (GAC [Granulated Activated Carbon] Trench), Page 18 of 66: It is unclear if a new trench barrier will be installed for the reapplication of GAC and how this affects the long-term effectiveness of Alternative 2b. The second paragraph states, "reapplication of absorptive material can extend the barrier lifetime for ongoing effectiveness;" however, the GAC barrier will be installed via trenching, and reapplication of the GAC would require additional trenching potentially along the entire treatment length to extend its lifetime and potentially impact long-

term effectiveness. Please revise the text to clarify whether reapplication of GAC would require the installation of a new trench barrier rather than recharging the original barrier and discuss how reapplication affects the long-term effectiveness of Alternative 2b.

Response: Agree

It is unlikely that a second trench adjacent to the original be constructed. It is more likely that a maintenance action consisting of injection of adsorptive material (e.g., CAC) be conducted directly into specific portions of the trench. The trench will likely be conducive to injections as it will be relatively homogeneous and potentially more permeable than surrounding sediment. Additionally, injections within the footprint of the trench will help reduce potential interferences as they are abundant in D Area. Adding adsorptive material as the barrier ages will increase the adsorption capacity and extend the lifetime of the removal action.

The following text will be added to the end of Section 4.3 to explain how reapplication of adsorptive material would likely be conducted for Alternative 2b:

"… Over time, as the GAC adsorption sites become saturated, it may be necessary to add or replace adsorptive material. This will likely consist of injecting adsorptive material (e.g., CAC) into specific portions of the trenched barrier instead of constructing a second trench. The trench will likely be conducive to injections as it will be relatively homogeneous and potentially more permeable than surrounding sediment. Additionally, injecting within the footprint of the trench will reduce interferences. A generic… "

The following sentence in Section 5.1 (Effectiveness for Alternative 2a and Alternative 2b), page 18, last paragraph, will be updated to better explain how reapplication would impact long-term effectiveness as seen below:

"… conditions (Carey et al. 2022; McGregor 2018). The potential r~~R~~eapplication of adsorptive material ~~can extend the barrier lifetime for ongoing~~ ensures long-term effectiveness by extending the barrier lifetime, if needed; likewise…"

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5. Section 5.2, Implementability, Alternative 2a, In-Situ PAB (CAC [Colloidal Activated Carbon] Injections), Page 22 of 66; and Section 5.2, Implementability, Alternative 2b, In-Situ PAB (GAC Trench), Page 22 of 66: : These section state that Alternative 2a and Alternative 2b "could be implemented with one-time material placement;" however, Section 5.1 (Effectiveness) indicates that reapplication may be used to extend the barrier lifetime, and the potential for reapplication should be discussed in Section 5.2. Please revise Section 5.2 to discuss the potential for CAC and GAC reapplication.

Response: Clarification

Implementability covers initial planning, construction, and establishment of operational capabilities. Reapplication or replacement of adsorptive media would be an eventual maintenance action, several years after the barrier is constructed, and would not affect implementability; similar to the continual replacement of GAC filter media in alternative 3. Discussion in Section 5.2 regarding GAC disposal for Alternative 3 is regarding the initial permitting and waste disposal pathways that will need to be established initially to establish operation of an ex-situ treatment facility. Alternative 2a and 2b do not require these to begin treating the PFAS plume.

The following text will be added to Section 5.2 to clarify that implementability does not consider operation or maintenance activities:

"Operation or maintenance activities (e.g., addition or reapplication of adsorptive material for Alternative 2a and 2b, replacement and disposal of GAC for Alternative 3, etc.) are not considered in implementability scores as they only occur once the Alternatives are operational (i.e., have already been implemented)."

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6. Section 5.4, Comparison of Removal Action Alternatives, Page 25 of 66: The second paragraph states, "Alternative 2a and Alternative 2b can be implemented with one-time material placement;" however, Section 5.1 (Effectiveness) indicates that reapplication may be used to extend the barrier lifetime and it is unclear how this affects the relative effectiveness ranking. Appendix B (Cost Estimate) also includes reapplication of carbon material. Please revise the text to account for the potential for reapplication and relative effectiveness ranking, as appropriate.

Response: Clarification

Implementability of Alternative 2a and 2b does not account for addition or reapplication of adsorptive material as described in the response to USEPA specific comment #5; therefore, the text "Alternative 2a and Alternative 2b can be implemented with one-time material placement;" is accurate.

Regarding the effectiveness of Alternative 2a and 2b, the addition or reapplication of adsorptive material may be used eventually to address decreases in effectiveness in the years following implementation. The reapplication does impact the effectiveness rating as reapplication can increase effectiveness as the barrier degrades over time. However, it must also be considered that reapplication is likely to be an infrequent event. It is much

more difficult to replace media once it is in-situ compared to when the media is in an ex-situ treatment. This leads to operators of in-situ barriers generally having less control compared to ex-situ treatment systems like Alternative 3.

No change to the effectiveness score of Alternative 2a and 2b is proposed, and to clarify the reasoning behind the effectiveness score, the following text in Section 5.4, second paragraph, will be updated:

"Both Alternative 2a and Alternative 2b were qualitatively given an effectiveness score of medium because, while the PAB wall technology has been proven effective in the field as discussed in the previous sections, in general in-situ technologies have greater uncertainty in getting contact between the contaminants and the treatment media. Additionally, the effectiveness of the barrier decreases over time. It also may require which may necessitate addition or replacement of adsorbent material as the effectiveness of the barrier decreases over time, and compared to Alternative 3, maintenance activities for in-situ treatments can be more difficult, although more infrequent, meaning there is less control over the barrier effectiveness."

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

7. Appendix B, Cost Estimates, Page B-7 of B-10: The cost estimate for Alternative 2b includes a line item for "Barrier Maintenance - Reinjection of CAC;" however, Alternative 2b involves the installation of a GAC trench, not CAC injections. Please revise this cost estimate to include the barrier maintenance of a GAC trench.

Response: Clarification

As described in the response to USEPA specific comment #4, it is unlikely that a second trench adjacent to the original be constructed. It is more likely that a maintenance action consisting of injection of adsorptive material directly into the trench be conducted. This was captured accurately in the cost estimate for Alternative 2b.

No change to the RSER/EE/CA for the DAG OU PFAS Plume is proposed.

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

MINOR COMMENT

1. Section 2.1, Site Description and Background, Operable Unit Description, Page 3; and Figure 3, D Area Waste Units and Facilities, Page 36 of 66: The Second bullet point describes the D-Area heavy water facility as containing units 411-D, 411-1D, 412-D, 412-1D, 413-D, and 413-1D; however, Figure 3 identifies the D-Area Heavy Water Facility as "411-D, 412-D, 412-1D,

and 413-D" and does not include 411-1D or 413-1D. Please revise the report as necessary to resolve this apparent discrepancy.

Response: Agree

The D-Area heavy water facility contains units 411-D, 411-1D, 412-D, 412-1D, 413-D, and 413-1D. Figure 3 will be updated to identify the correct building numbers for the D-Area Heavy Water Facility.

Responsible Party: Jacob Mullins, (803) 952-6298, jacob.mullins@srs.gov

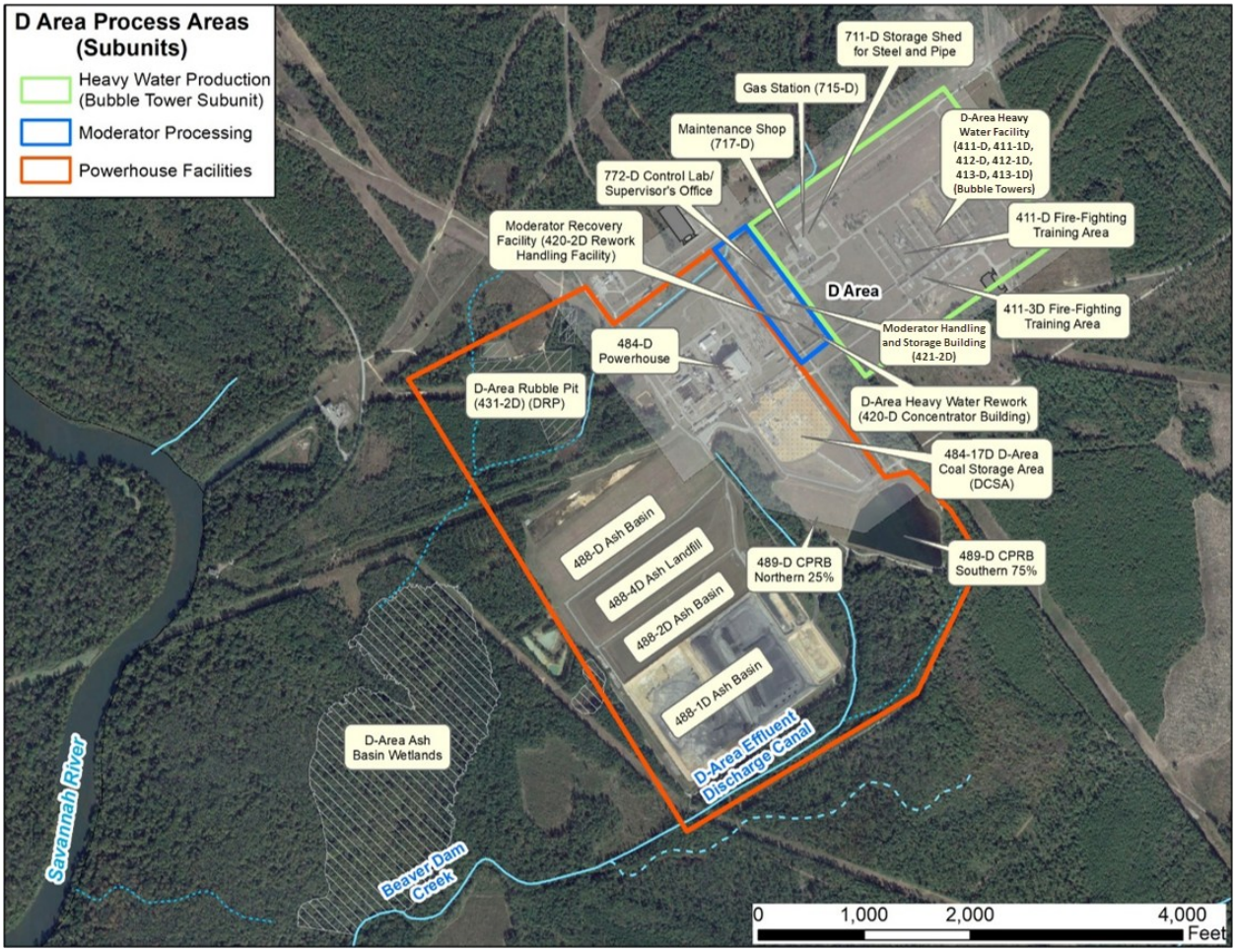


Figure 3. D Area Waste Units and Facilities

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Dear Ms. Fulmer and Mr. Richards:

SUBJECT: Action Memorandum and Responsiveness Summary for the Non-Time Critical Removal Action for the D-Area Groundwater Operable Unit (U) SEMS Number: 63

Pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan [40 Code of Federal Regulations (CFR) Section 300.415(b)(2)(i)] that states removal actions shall be considered when "*Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants*.", the United States Department of Energy (USDOE) prepared a Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) for the D-Area Groundwater (DAG) Operable Unit (OU) (SRNS-RP-2025-01764, Revision 1, July 2026) SEMS Number: 63. Elevated concentrations of per- and polyfluoroalkyl substance (PFAS) contamination in the DAG OU meet the criteria specified in 40 CFR Section 300.415(b)(2)(i).

The USDOE, United States Environmental Protection Agency (USEPA), and South Carolina Department of Environmental Services (SCDES) reached agreement in 2025 that a Non-Time Critical (NTC) removal action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is an appropriate regulatory mechanism to address PFAS presence and migration in groundwater. The regulatory review of the Revision 0 RSER/EE/CA occurred from February 2026 to May 2026.

The SRS received comments on the Revision 0 RSER/EE/CA from the SCDES and USEPA on April 27, 2026 and May 4, 2026, respectively. SRS' responses to the USEPA's and SCDES' comments were incorporated into the Revision 1 RSER/EE/CA, and the document was made available for public review and comment from MMMM xx, 2026 to MMMM xx, 2026. Comments received on the Revision 1 RSER/EE/CA during the public comment period are addressed in the enclosed Responsiveness Summary, which will be made part of the Administrative Record. A notice will be filed in an Environmental Bulletin within two (2) weeks of issuance of the Action Memorandum and Responsiveness Summary and will be made part of the Administrative Record File/Information Repository File (ARF/IRF).

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D Area is located within the southwest quadrant of SRS approximately 3,000 feet (915 meters) east of the Savannah River. D Area consists of a closed coal fire powerhouse, decommissioned and demolished heavy water production facilities, and several support facilities, some of which functioned as the SRS firefighting training area (FFTA) for several years after the facilities were closed. Characterization identified sources of soil and groundwater contamination resulting from operation of these facilities between the 1950s and the early 2000s. The DAG OU encompasses all the groundwater below D Area, west and southwest toward the Savannah River, and east and south toward Beaver Dam Creek and the D-Area Discharge Canal. The DAG OU includes a trichloroethylene (TCE) plume, a minor tritium plume, a low-pH and metals plume, and a PFAS plume; additionally, these plumes partially overlap and comingle. The TCE, tritium, and metals groundwater plumes will be addressed in a separate, future decision and are not addressed as part of this removal action; although, the effects of TCE on this selected removal action alternative will be considered and accounted for in the final design of this action. The leading edge of the high concentration portion of the PFAS plume will be the focus of this removal action. The full vertical extent of PFAS contamination in the uppermost aquifer along an optimal transect through the PFAS plume roughly perpendicular to groundwater flow direction will be targeted.

The general distribution of the PFAS plumes (defined by concentrations greater than maximum contaminant levels [MCLs]) tend to be from just northeast of the FFTA to the floodplains close to the Savannah River; however, high PFAS concentrations in the groundwater (>1000 parts per trillion [ppt] perfluorononanoic acid [PFNA]) are primarily located in the vicinity and slightly downgradient of the FFTA. The maximum PFAS concentration observed in 2024 was 2600 ppt PFNA. Maximum observed concentrations of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) (MCL = 4 ppt) were 440 ppt and 150 ppt respectively, both within the elevated PFNA footprint.

The removal action objective is to reduce regulated PFAS (those with MCLs) concentrations in monitoring wells within or immediately downgradient of the treatment zone by 90% compared to upgradient monitoring wells.

The four alternative actions that were evaluated in the RSER/EE/CA were: Alternative 1) No Action; Alternative 2a) In-situ Permeable Adsorptive Barrier (Colloidal Activated Carbon (CAC) Injections); Alternative 2b) In-situ Permeable Adsorptive Barrier (Granular Activated Carbon Trench); and Alternative 3) Pump and Treat. The alternatives were evaluated based on effectiveness, implementability, and cost, and considered likely public and regulator acceptance. The table below summarizes this evaluation. Based on the evaluation in the RSER/EE/CA, the selected removal action for the DAG OU is Alternative 2a, In-situ Permeable Adsorptive Barrier (CAC Injections). Alternative 2a will require very little management over the lifetime of the barrier because it is a passive system which does not create any waste, unlike Alternative 3. Compared to Alternative 2b, Alterative 2a will generate minimal waste during construction and CAC injections are much more widely utilized than the trenching approach. Alternative 2a will be easier to implement than both Alterative 2b and Alternative 3 because of the relative ease of injections and very limited waste disposal. Although the evaluation in the RSER/EE/CA assumed CAC as the adsorptive material for Alternative 2a, future procurement and technology selection will be left open to consider all adsorptive materials.

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	Effectiveness	Implementability	Cost*	Acceptance
Alternative 1 No Action	Low	High	$0	Low
Alternative 2a In-situ PAB (CAC Injections)	Medium	High	$15.59M	High
Alternative 2b In-situ PAB (GAC Trench)	Medium	Medium	$40.17M	High
Alternative 3 Pump and Treat	High	Medium	$24.27M	High

Note: Range is Low to High, where Low = worst and High = best.
PAB – permeable adsorptive barrier; CAC – colloidal activated carbon; GAC – granular activated carbon
*Million (M)

Injections of an adsorptive material with an affinity for PFAS compounds (e.g., colloidal activated carbon) will be conducted downgradient of the high concentration portion of the PFAS plume in a line roughly perpendicular to groundwater flow. Injected material will create an adsorptive barrier that functions as an underground filter and will not need operation or maintenance. PFAS molecules will be readily adsorbed and immobilized within the barrier preventing the higher concentration portion of the PFAS plume from migrating downgradient and potentially impacting wetlands or surface water. Additional monitoring wells will be constructed to assess treatment effectiveness and monitor the processes/trends occurring within and around the treatment zone.

Effectiveness criteria will be met by intercepting and sequestering PFAS contamination in the subsurface as it encounters the injected adsorptive material thus reducing the migration of PFAS. By sequestering instead of removing PFAS from the subsurface, Alternative 2a limits potential human exposure related to removing and treating/disposing of PFAS contaminated waste. Alternative 2a will not preclude any additional remediation of the DAG OU and is expected to be consistent with the final remedial action at the DAG OU. The selected alternative will comply with the Applicable or Relevant and Appropriate Requirements (ARARs) identified by the USDOE and USEPA Region 4 in the RSER/EE/CA, Appendix A – Potential ARARs and To Be Considered (TBC) Criteria.

Removal activities are scheduled to commence in 2027. Upon conclusion of the NTC removal action, a Removal Action Report that summarizes the work and describes the end-state condition will be prepared and submitted to SCDES and USEPA to document the completion of the removal action and placed in the SRS ARF/IRF.

DRAFT

Comments or questions from you or your staff may be directed to me (803)-952-6930 or Matthew Baker, Acting FFA Remedial Project Manager, at (803) 522-6427.

Sincerely,

Edwin R. Deshong, III
Manager
DOE-Savannah River Operations Office

RDDD-26-xxx

DRAFT

Ms. Susan Fulmer
Mr. Jon Richards 5

Enclosure:
Responsiveness Summary for the Non-Time Critical Removal Action for the D-Area Groundwater Operable Unit (U) (SRNS-RP-2026-xxxx, Revision 0, MM 2026) SEMS Number: 63

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