



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

March 17, 2023

ENVIRONMENTAL COMPLIANCE &

MAR 17 2023

Mr. Brian T. Hennessey
SRS Remedial Project Manager
Infrastructure and Area Completion Division
U.S. Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29802

AREA COMPLETION PROJECTS

EPA Comments for the SIXTH FIVE-YEAR REMEDY REVIEW REPORT FOR SAVANNAH RIVER SITE OPERABLE UNITS WITH OPERATING EQUIPMENT (U), REVISION 0, DECEMBER 2022 (SRNS-RP-2022-00468), SEMS Number: 00

Dear Mr. Hennessey,

The U.S. Environmental Protection Agency, Region 4 (EPA), has reviewed the Sixth Five-Year Review Remedy R0 for Operable Units with Operating Equipment (U), dated Dec 20, 2022. EPA has the attached comments. Note the attorney and EPA HQ comments are identified at the end to help in your responses, that may or may not be similar to the others.

If you have any questions or require additional information, please contact me at (404) 562-8648.

Sincerely,

Richards, Jon

Digitally signed by
Richards, Jon
Date: 2023.03.17 14:01:55
-04'00'

Jon Richards
FFA RPM
Superfund & Emergency Management
Division

ec: C.L. Bergren, SRNS-ACP
Susan Fulmer, SCDHEC

GENERAL COMMENTS

- 1) The FYR Report does not include sufficient data from the last five years at several operable units (OUs) to support the determinations of whether the remedies are functioning as designed to achieve remedial action objectives (RAOs). While all of the monitoring data is not required, sufficient data should be provided (e.g., in tables or figures) to support the conclusions made in the text. The following examples should be addressed:
 - a. Appendix K (M-Area Inactive Process Sewer Lines OU [081-M]; MIPSL) states that soil results collected in 2019 showed that remedial goals in soil were achieved, but a table showing the recent data and figure of the sampling locations is not provided.
 - b. The recent groundwater and surface water sampling data and a figure showing the current groundwater plume configuration are not provided for the C-Area Burning/Rubble Pit (131-C) and Old Burning/Rubble Pit (No Building Number [NBN]) (CBRP) OU (Appendix F). Therefore, it is unclear how the groundwater remedy is progressing towards cleanup and if monitored natural attenuation (MNA) is successfully reducing constituent of concern (COC) concentrations. For example, the text states that concentrations are decreasing across most of the plume (i.e., except wells CRW 10C and CRW010CU) but trend graphs are not provided. It is also unclear if the plume is migrating. In addition, since data for the natural attenuation parameters are not discussed and provided, it is unclear if conditions are favorable for biodegradation to occur across the entire plume or if other attenuation processes are likely to reduce COCs.
 - c. Information for the current tritium plume configurations at F-Area Groundwater OU and H-Area Groundwater OU (Appendices H and I) is not provided. Although tritium concentrations have decreased at the seepines of both sites, the current status of the plumes at each site is unclear (e.g., if any plume migration or expansion has occurred causing portions of the tritium plume to bypass the barriers/gate system). The recent tritium concentrations at the site should be provided (i.e., on a plume map) to demonstrate that the remedy is progressing as expected and future compliance can be expected without additional action.
 - d. Current data for the pH of site groundwater is not provided for the F-Area Groundwater OU and H-Area Groundwater OU (Appendices H and I). The groundwater pH in the target zone at H-Area is noted to have stabilized (see Section IV, Remedial Actions, Page I-6 of I-36); however, pH data for the site is not provided and the target zone is not defined or shown on a figure. Because the pH must be addressed to have success in reaching the RAOs and RCRA permit renewal requirements, pH data should be provided to support the technical assessment of the remedy.
 - e. Maximum detections in groundwater are provided in Table H-5 (Summary of Constituents from the F-Area Groundwater OU Seepine Groundwater Detected Above Standards) and Table I-6 (Summary of Constituents from the H-Area Groundwater OU Seepine Detected Above Standards) for wells located along the seepines and are noted to demonstrate decreasing concentrations; however, it is unclear if concentrations at all seepine locations are decreasing. For example,

although maximum concentrations at the seep lines are decreasing, it is unclear if seep line locations along the edges of the site may show steady or increasing trends.

- f. The iodine data for the most recent injection of silver chloride at the central gate of F-Area (Appendix H) should be provided to support the statement that the injections were demonstrated to be effective at sequestering iodine-129 in situ. This includes data for monitoring points closest to the injection that show the greatest reduction in concentration and includes wells further away that show less of an impact.

Please revise the FYR Report to include the recent data that supports the assessments of the site remedies and conclusions of protectiveness.

- 2) The Site Chronologies as presented in the site-specific appendices do not include the initial discovery of the contamination at the OUs and initial response actions prior to the Records of Decision (RODs). As indicated in Appendix E (Five-Year Review Report Template) of the Comprehensive Five-Year Review Guidance, EPA 540-R-01-007, dated June 2001 (FYR Guidance), the site chronologies should include all important site events. For example, Appendix G, Table G-1 (Chronology of OU Events) should include the initial response actions taken at the D-Area Asbestos Pit (080-20G), including when it was closed and backfilled with soil to cover the waste (i.e., in 1975) and the maintenance action in 2011 that removed woody material and implemented land use controls (LUCs). Also, the excavation performed at site 489-D CPRB in 2000 should be noted on the Site Chronology in Appendix G. *Please revise the Site Chronologies to include the initial actions that were performed at each of the OUs.*
- 3) The operations and maintenance (O&M) activities discussed in the FYR Report do not always address the soil vapor extraction (SVE) systems. The O&M requirements (e.g., inspections, monitoring, etc.) for all systems should be provided, as noted in the FYR Guidance. For example, Appendix E, Section IV (Remedial Actions, System Operation/Operation and Maintenance) of the FYR Report does not discuss the O&M activities for the passive SVE system that operated between June 14, 2017 and April 30, 2021. According to the Five-Year Review Site Inspection Checklist (i.e., Attachment E-1, Page E-38), the O&M procedures adequately maintained the integrity of the SVE system, but it is unclear what procedures were implemented. *Please revise discussions of the O&M activities at each OU to include the required maintenance activities performed for SVE systems.*
- 4) The protectiveness statements in Section X (Protectiveness Statement[s]) of the OU-specific appendices do not always include the current status of the remedies at each OU that are being used to control unacceptable risks. The current remedies that are operating at each OU should be provided as supporting rationale for the protectiveness determination. The following examples should be addressed:
 - a. **Appendix E, Page E-12 of E-38:** The protectiveness statement identifies the SVE system and LUCs that will prevent exposure to or ingestion of contaminated media; however, the passive SVE system was removed in 2021. Also, this statement does not include the soil cover installed at the Trenches subunit. *Please revise the protectiveness statement to remove references to the SVE system to control unacceptable risks and to include the soil cover.*
 - b. **Appendix F, Page F-13 of F-38:** The protectiveness statement indicates that a soil cover and LUCs are used to control exposure pathways, but it is unclear why MNA of

the groundwater is not included. *Please revise the protectiveness statements to include the MNA used at this OU to meet the RAOs.*

- c. **Appendix K, Page K-10 of K-32:** The protectiveness statement notes that threats to the contaminated vadose zone at MIPS L OU are being addressed through SVE systems; however, the SVE system was removed in 2020. *Please revise the protectiveness statement to remove references to the SVE systems to control unacceptable risks.*

SPECIFIC COMMENTS

1. **Section III, Progress Since Last Review, Page 10 of 40; Appendix E, Section V, Progress Since Last Review, Page E-8 of E-38; Appendix G, Section V, Progress Since Last Review, Page G-17 of G-60:** Section III identifies two recommendations from the Fifth Five-Year Remedy Review Report for the A-Area Miscellaneous Rubble Pile (731-6A) OU and D-Area OU, respectively; however, the status of the recommended actions and the results of any implemented actions are not discussed. In addition, the site-specific discussions in Appendix E (A-Area Miscellaneous Rubble Pile [731-6A] OU) and Appendix G (D-Area Operable Unit) do not include these recommendations from the previous five-year review. For example, Appendix E states that there were no recommendations or follow-up actions from the last five-year review for A-Area Miscellaneous Rubble Pile (731-6A) OU. Please revise Section III to include the status of the recommendations from the previous five-year remedy review, the follow-up actions taken, and if these actions were successful and achieved the intended effect (e.g., as presented in Table 3, Actions Taken Since the Last Five-Year Review, in Appendix E of the FYR Guidance). *Please also revise Appendices E and G to be consistent with the recommendations noted in Section III.*
2. **Appendix C, Section IV, Remedial Actions, Page C-7 of C-58, and Table C-2, Summary of Remedial Action Objectives and Remedial Goals for Soil, Page C-46 of C-58:** The RAOs listed in Section IV are inconsistent with the RAOs specified in Table C-2. For example, the text does not identify the RAO for the prevention of migration of trichloroethene (TCE) and tetrachloroethene (PCE) to groundwater in the Miscellaneous Chemical Basin (MCB) Vadose Zone, which is listed in Table C-2. Instead, the text identifies the RAO for the MCB/MBP Surface and Vadose Zone Soils as preventing direct contact with contaminated surface/subsurface soils. However, this RAO is not included in Table C-2. In addition, Table C-2 does not include the A-Area Rubble Pit (731-2A) or MBP surface soil RAOs. *Please revise Appendix C to consistently define the RAOs.*
3. **Appendix C, Section IV, Remedial Actions, MCB/MBP Surface Soil (completed during the interim action phase), Page C-10 of C-58:** The discussion of the remedial actions implemented does not discuss excavation of the soil contaminated with Octachlorodibenzo-p-dioxin (OCDD) at MCB and the aluminum contaminated soil at MBP to meet the RAO identified in the beginning of this section (i.e., prevent direct contact with aluminum, OCDD, Aroclor 1254, and Aroclor 1260 contaminated surface/subsurface soils; Page C-7). In addition, a maintenance program for 1.45 acres of native soil cover is listed for these areas, but this is not identified as a LUC component of the selected remedial actions bulleted on Pages C-8 and C-9. As such, it is unclear if OCDD and aluminum soil contamination was excavated from MCB/MBP as planned. *Please revise Section IV to discuss if the OCDD and aluminum contamination was excavated from MCB/MBP Surface Soil and clarify the purpose of the soil cover maintenance program.*

4. **Appendix C, Section IV, Remedial Actions, Remedy Implementation, MCB Vadose Zone (completed during the interim action phase), Pages C-10 to C-11 of C-58:** The last bullet point on Page C-10 states that the active SVE was discontinued in 2004 at MCB Vadose Zone and active SVE wells were transitioned to passive SVE wells; however, the next bullet point on Page C-11 states that additional passive SVE wells were installed to supplement the active SVE system. As such, it is unclear if active SVE at the MCB Vadose Zone was completely discontinued in 2004. *Please revise the text to clarify when the active SVE system was discontinued relative to the installation of the additional passive SVE wells.*
5. **Appendix C, Section VI, Five-Year Review Process, Summary of Inspections and Interviews, Page C-15 of C-58:** The text states, “Since the MBP [Metals Burning Pit (731-5A)] and SRA 4 subunits are outside of the established LUC boundary and no further problems warranting action exist in the MBP surface soil subunit and SRA 4 (WSRC 2008), inspections were discontinued in 2022;” however, the location of soil removal area (SRA) 4 is not provided (e.g., on Figure C-3, ABRP/MCB/MBP OU Subunits Layout). In addition, Section IV (Remedial Actions) identifies the remedy for MBP Surface and Subsurface Soil as excavation and LUCs, so it is unclear why it is noted that this area falls outside the LUCs boundary. *Please revise the FYR Report to clarify the remedy for MBP, including if LUCs are necessary at this area. Please also provide the location of SRA 4.*
6. **Appendix D, Section IV, Remedial Actions, Pages D-5 and D-9 of D-50 and Figure D-2, A/M Area Groundwater OU Plume and Treatment Systems Locations, Page D-32 of D-50:** The text indicates the locations and spatial relationship of the areas covered by each of the three interim record of decisions (IRODs) are illustrated on Figure D-2; however, this figure shows the boundaries of several groundwater sectors (e.g., Central Sector) that are not discussed in the text and it is unclear which IROD and remedy apply to each sector. For example, the Remedy Implementation portion of Section IV discusses a Western Sector Treatment System, but Figure D-2 does not show a treatment system in the Western Sector. Please also note that the plume extent in the Western Sector is cut off by the Legend in Figure D-2. *Please revise Section IV and Figure D-2 to clarify the sectors addressed by each IROD and the locations of the selected and implemented remedies. Please also include a figure that shows the full extent of the groundwater plumes.*
7. **Appendix D, Section IV, Remedial Actions, Remedy Implementation, A/M-Area Groundwater OU, Page D-8 of D-50:** The text identifies a greater than 1,000 µg/L TCE plume that falls outside the A-2 Air Stripper capture zone and states that additional corrective actions may be needed to address this plume; however, it is unclear if the RAO to prevent plume migration will be met if this plume is not addressed. In addition, the text states that this TCE plume extends southwest toward the Savannah River National Laboratory (SRNL); however, the location of the plume (e.g., monitoring wells ASB 8C and MSB113B and recovery well RWM 14C) and the SRNL are not included on a site figure. *Please revise the FYR to clarify the location of this TCE plume, relevant monitoring wells and SRNL on a figure and include a discussion justifying why this issue was not identified in Section VIII (Issues) of Appendix D.*
8. **Appendix D, Section IV, Remedial Actions, Remedy Implementation, A/M-Area Groundwater OU, Page D-9 of D-50:** The first complete sentence on this page states the A-2 Air Stripper was permanently shut down on December 15, 2021; however, according to Table D-3 (Summary of Remediation Performance form 2018-2022 [lbs of VOCs Removed]), 12 pounds (lbs) of volatile organic compounds (VOCs) were removed by the A-

2 Air Stripper in 2022. *Please revise Appendix D to clarify when the A-2 Air Stripper was permanently removed and if this system was operated in 2022.*

9. **Appendix D, Section IV, Remedial Actions, Page D-9 of D-50:** Additional technologies that complement the groundwater recovery well systems selected in the IROD are discussed, but it is unclear if these remedies are or will be included in a separate decision document (e.g., Final ROD). For example, SVE systems are used to address known source areas in the vadose zone, thermal heating using the Dynamic Underground Stripping (DUS) process to address dense non-aqueous phase liquid (DNAPL), and in-situ chemical oxidation (ISCO) was used at the Western plume, but these remedies are not included in the IRODs. *Please revise Section IV to discuss if the additional technologies that are not in the IRODs will be documented in a CERCLA decision document (e.g., Final ROD).*
10. **Appendix D, Section VII, Technical Assessment, Page D-22 of D-50:** The assessment of the MCB/MBP Subunit notes that the airlift recirculation wells (ARWs) were shut down in 2011 and abandoned in 2019; however, it is unclear if RAOs were met by the implemented actions. As noted in Section IV (Remedial Actions), the RAOs in the 1999 IROD were to treat contaminated groundwater to prevent further VOC plume growth, to demonstrate the effectiveness of in-situ air stripping wells, and to determine a final remedial goal. It is unclear if these RAOs were met and the in-situ air stripping wells (i.e., ARWs) were effective or if additional action is necessary to achieve these goals. Since the remedy at the MCB/MBP Subunit is no longer operating as specified in the IROD, *please revise the assessment of the MCB/MBP Subunit to discuss if the RAOs in the IROD were met and provide any supporting groundwater performance or monitoring data.*
11. **Appendix D, Section VIII, Issues, Page D-24 of D-50:** No issues related to current site conditions are identified in this section; however, according to the text in Section VI (Technical Assessment, ABRP Subunit), additional characterization is needed to define the distal portion of the 1,4-dioxane plume and delineate the source of high concentration at ARP 1A. In addition, Section X (Protectiveness Statement[s]) notes that the remedies at the A/M-Area Groundwater OU are protective in the short-term, because the M-1 Air Stripper recovery system is not able to capture all of the high concentration plume. *Please revise Section VIII to note these issues of plume containment that may impact long-term protectiveness.*
12. **Appendix E, Section VI, Five-Year Review Process, Pages E-8 to E-9 of E-38:** The third bullet point notes that the review includes a technical assessment of whether the SVE system is functioning as intended by the ROD and the shutdown criteria have been achieved, but this assessment is not sufficiently detailed. As noted on the next page, “a favorable modeling effort” determined there was no longer a threat to groundwater; however, it is unclear what this modeling effort included. For example, the concentrations of PCE and TCE in fill material were predicted to impact groundwater above maximum contaminant levels (MCLs) in 504 and 226 years, respectively (i.e., see Section III, Background, of Appendix E), but it is unclear if confirmation sampling of the fill has been performed to ensure groundwater will not be impacted. *Please revise Section VI to discuss the shutdown criteria that were achieved and how it was determined that groundwater would not be impacted by TCE and PCE in fill material.*
13. **Appendix E, Section VI, Five-Year Review Process, Data Review, Page E-9 of E-38:** Two monitoring wells, AOB 1 and MSB 31C, are noted to be sampled after shutdown of the passive SVE system; however, it is unclear why these two wells were selected, particularly

since MSB 31C is impacted by the groundwater contaminant plume associated with the discharges to the A-014 Outfall. It is also unclear if groundwater monitoring has been added as a remedy component for soil at the A-Area Miscellaneous Rubble Pile (731-6A) (AMRP) OU. The FYR should discuss this change in the remedy and if an Explanation of Significant Differences (ESD) is necessary. *Please revise Section VI to discuss the purpose and rationale for the two wells selected for monitoring and clarify if this monitoring is a significant change to the soil remedy at AMRP OU.*

- 14. Appendix F, Section IV, Remedial Actions, System Operations/Operations and Maintenance, Page F-8 of F-38:** The text states that the actual O&M costs exceeded the costs estimated in the 2008 ROD due to the increased cost associated with MNA monitoring and reporting; however, it is unclear why costs were higher than what was estimated for MNA in the ROD. Based on Table F-3 (Actual versus Estimated O&M Costs), actual costs exceeded the estimated costs by more than 200 to 400 percent (%) every year. *Please revise this section to specify the costs for MNA that resulted in these increases compared to what was estimated in the ROD.*
- 15. Appendix F, Section VI, Five-Year Review Process, Data Review, Page F-10 of F-38:** The text states, “The MNA wells and surface water sampling show decreasing contaminants over time except for two wells (CRW 10C and CRW010CU), and CRW010CU displays concentrations exceeding the TCE trigger level;” however, the trends at these two wells are not discussed (i.e., if TCE shows steady or increasing concentrations). Further, since TCE concentrations exceed the trigger level at well CRW010CU, it is unclear if any actions are necessary to ensure protectiveness. *Please revise Section VI to discuss the trends in concentrations at CRW 10C and CRW010CU, including if any actions are necessary at these wells to ensure the groundwater plume at this location meets RAOs.*
- 16. Appendix F, Section VII, Technical Assessment, Page F-11 of F-38:** The second bullet point notes that concentrations of TCE in groundwater and surface water are decreasing, but the previous section (i.e., Data Review) states that TCE concentrations are not decreasing at two wells (i.e., wells CRW 10C and CRW010CU). The Technical Assessment should discuss the efficacy of the MNA remedial action at these two wells and if cleanup levels will be achieved. *Please revise Section VII to discuss the wells where TCE concentrations are not decreasing and if the MNA remedy is progressing as expected.*
- 17. Appendix G, Table G-4, Summary of Confirmatory Sampling for On-Site Thermal Detritiation Treatment of Soils and Concrete associated with the Moderator Processing Subunit (SRNS 2011d), Page G-35 of G-60:** The remedial goal (RG) for soil is noted to be 120 picoCuries per gram (pCi/g) for tritium (see Section VI, Five-Year Review Process, Page G-18 of G-60); however, maximum concentrations for two sampling events (DAOU-HR-TS4 and DAOU-HR-TS9) exceed this RG (i.e., 133 and 142 pCi/g, respectively). It is unclear how the data for the maximum concentrations were used and if additional treatment was performed after these confirmation samples were collected. *Please revise Table G-4 to clarify what actions were taken for the treatment cells with maximum tritium soil concentrations that exceeded the 120 pCi/g soil RG.*
- 18. Appendix H, Section IV, Remedial Actions, Remedy Selection, Page H-4 of H-36:** The Phase 2a objective of reducing the concentration of the remaining Appendix IVB-A constituents in Fourmile Branch (except tritium and iodine-129) to levels that are less than groundwater protection standards (GWPS) is stated to be met; however, it is unclear what constituents are included in Appendix IVB-A. Based on Table H-4 (Summary of

Constituents from the F-Area Groundwater OU Surface Waters of Fourmile Branch Detected Above Standards), two constituents in addition to tritium and iodine-129 exceed their GWPS or MCLs (i.e., carbon-14 and cobalt). *Please revise the text to identify the Appendix IVB-A constituents and to clarify which constituents are currently less than the GWPS in Fourmile Branch.*

- 19. Appendix H, Section VI, Five-Year Review Process, Data Review, Page H-11 of H-36:** The text states that except for iodine-129, constituent concentrations in Fourmile Branch surface water are decreasing or are below the GWPS and/or MCL based on Table H-4; however, this table reports maximum concentrations of cobalt as increasing from 1.22 ug/L in the 4th Remedy Review period (2007–2011) to 12 ug/L in the current 6th Remedy Review period (2017-2021). *Please revise the text to discuss this increase in cobalt concentrations.*
- 20. Appendix H, Section VI, Five-Year Review Process, Data Review, Pages H-10 to H-11 of H-36 and Appendix I, Section, Five-Year Review Process, Data Review, Page I-9 of I-36:** The identifications of the surface water stations used in the data review for evaluating impacts to Fourmile Branch in each appendix do not correlate to the surface water stations at the sites, and it is unclear why site-specific surface water data were not reviewed. In Appendix H, the surface water data are provided for four stations (i.e., FMC002H, FMC002HD, FM2BD, and FMC002F) but these stations do not appear to be shown on Figure H-2 (F-Area Groundwater OU Treatment Systems Locations; note that the low resolution of Figure H-2 makes it difficult to determine the sample identifications). In Appendix I, data from ten surface water locations are discussed, but Figure I-3 (Treatment Systems for the H-Area Groundwater OU) identifies five different surface water stations. *Please revise Appendix H and Appendix I to show the locations of the surface water stations used for the data review, and to include site-specific surface water data if available.*
- 21. Appendix I, Section IV, Remedial Actions, Remedy Selection, Page I-4 of I-36:** The Phase 2a objective of reducing the concentration of the remaining Appendix IVC-A constituents in Fourmile Branch (except tritium and iodine-129) to levels that are less than GWPS is stated to be met; however, it is unclear what constituents are included in Appendix IVC-A. Based on Table I-5 (Summary of Constituents from the H-Area Groundwater OU Surface Waters of Fourmile Branch Detected Above Standards), several constituents in addition to tritium and iodine-129 exceed their GWPS or MCLs (i.e., arsenic, carbon-14, strontium-90, thallium, and vanadium). *Please revise the text to identify the Appendix IVC-A constituents and to clarify which constituents are currently less than the GWPS in Fourmile Branch.*
- 22. Appendix I, Section VI, Five-Year Review Process, Groundwater and Surface Water Data, Page I-10 of I-36:** The text states “Of the three constituents identified in the ecological studies as potential threats to wildlife, only mercury was detected above standard with concentrations decreasing to below the GWPS during the fifth five-year review cycle;” however, it is unclear if current mercury concentrations were compared to ecological screening values for surface water. *Please revise the text to discuss if comparison of the current mercury data to the GWPS was performed for an evaluation of ecological risk.*
- 23. Appendix I, Section VIII, Issues, and Section IX, Recommendations and Follow-up Actions, Page I-13 of I-36:** Section VIII (Issues) does not identify any issues related to current site operations, conditions or activities that currently prevent the remedy from being protective; however, Section VI (Five-Year Review Process, Page I-10 of I-36) notes that iodine-129 will not be treated by the base injection system and other approaches to remediate

iodine-129 are being investigated. Since the current groundwater remedy does not address iodine-129 and iodine-129 is still being discharged to the Fourmile Branch at elevated levels (i.e., see reported exceedances in Table I-5, Summary of Constituents from the H-Area Groundwater OU Surface Waters of Fourmile Branch Detected Above Standards and Table I-6, Summary of Constituents from the H-Area Groundwater OU Seepage Detected Above Standards), this issue should be identified in Section VIII. In addition, Section IX (Recommendations and Follow-up Actions) should provide recommendations for how the iodine-129 will be addressed. *Please revise Section VIII to note that iodine-129 will not be treated by the base injection system and revise Section IX to include recommendations for how iodine-129 will be addressed to ensure future protectiveness.*

- 24. Appendix L, Section IV, Remedial Actions, System Operations/Operation and Maintenance, Page L-7 of L-36:** The text states that groundwater sampling will continue until MCLs have been attained for three consecutive years; however, it is unclear if three years of sampling is sufficient to ensure the groundwater will continue to meet the contaminant cleanup level for each COC in the future. As noted in EPA's *Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions*, dated November 2013, and the *Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well and the Groundwater Statistics Tool*, dated August 11, 2014, a minimum of eight data points is recommended for the attainment monitoring phase to support the statistical test used to make the final attainment determination. Therefore, the performance metrics from the previous planning documents for this OU should be updated in accordance with the 2013 and 2014 EPA guidance for determining when the attainment of cleanup levels has been achieved. *Please revise the FYR Report to indicate that eight rounds of groundwater monitoring will be used to determine when attainment of the cleanup levels has been achieved in accordance with the 2013 and 2014 EPA guidance.*
- 25. Appendix L, Section V, Progress Since Last Review, Page L-8 of L-36 and Section VI, Five-Year Review Process, Page L-9 of L-36:** Section V indicates there is uncertainty in the extent of 1,4-dioxane contamination and additional surface-water sampling is necessary; however, this data gap is not further discussed in Appendix L. For example, Section VI does not discuss the 1,4-dioxane data or provide the time-series graph (e.g., in the Data Review) so it is unclear if concentrations of 1,4-dioxane are increasing similar to TCE. In addition, Section VII (Technical Assessment) states that groundwater monitoring continues to be effective in assessing groundwater contamination beneath the PBRP OU. Furthermore, Section VIII (Issues) does not identify the uncertainty in the extent of 1,4-dioxane contamination as an issue at the site. *Please revise Appendix L to discuss any trends in the data for 1,4-dioxane and include the uncertainty in the extent of 1,4-dioxane contamination in all applicable sections.*
- 26. Appendix L, Section VIII, Issues, Page L-12 of L-36:** It is unclear why the increasing concentrations of COCs are not identified as an issue at PBRP OU. The Technical Assessment attributed the elevated concentrations of COCs in groundwater to increased water levels mobilizing residual contamination within the capillary fringe of the water table. However, according to Figure L-8 (Time-series plots of 1,1-DCE and TCE at wells PRP 5, PRP 6, and PRP 7), concentrations of TCE in well PRP 6 during 2020 and 2021 were the highest reported since monitoring began in 2001. Therefore, it is unclear if these unexpected concentrations could be an early indicator of potential remedy problems. *Please revise Section VIII to identify the elevated concentrations of COCs in groundwater as an issue.*

27. Appendix L, Figure L-7, 2022 PBRP OU Optimized Monitoring Network, Page L-21 of L-36: This figure shows upper aquifer zone (UAZ) potentiometric surface contour lines; however, the groundwater elevations that the contour lines represent are not defined. In addition, the groundwater elevations used to generate these contours are not provided and it is unclear when the groundwater elevation data were collected. *Please revise Figure L-7 to include the UAZ potentiometric surface contour elevations, the groundwater elevations measured at the wells depicted, and note in the Legend when the data were collected.*

28. Appendix M, Section VII, Technical Assessment, Page M-15 of M-44: The third bullet point mentions a detached plume that is present downgradient of the treatment area (i.e., at wells TNX 28D and TRW 2), but the text does not indicate how this plume is being addressed. It is unclear if additional treatment may be necessary for the detached plume (e.g., if edible oil injections or SVE should be considered in this area) to address plume migration. *Please revise Section VII to discuss how the detached plume will be addressed to ensure RAOs are met.*

Attorney Comments

GENERAL COMMENT:

1. There are several places in the document where the phrase “institutional controls (i.e. LUCs)” is used when not necessary. Excessive use of this phrase creates confusion considering the explanation on Page A-2: “LUCs involve institutional controls (i.e., administrative controls) and engineering controls and can include monitoring, maintenance, reporting, access restrictions, signage, fencing, and land use restrictions. In older SRS remedy documents, the term ‘institutional controls’ was often used in place of the broader LUC term.”
 - a. Therefore, the phrase “institutional controls (i.e. LUCs)” is only necessary when specifically referencing use of the term “institutional control” from an older SRS remedy document. For example, on Page J-6: “As stated in the ROD (WSRC 2008a), the remedial action selected to meet the RAOs for the MAOU is as follows: Passive Soil Vapor Extraction (SVE) and Institutional Controls (i.e., LUCs).”
 - b. However, it is not necessary to continue using that phrase when discussing current actions or conditions. For example, the protectiveness statements on pages E-12, F-13, K-11, L-12 could be revised to state: “Exposure pathways that could result in unacceptable risks are being controlled by...~~institutional controls (i.e., LUCs)~~ to prevent exposure....” The protectiveness statement on page J-12 is currently worded consistent with this recommendation.

SPECIFIC COMMENTS:

1. **Page 14 of 40, Response to Question B:** Currently the text reads: “An evaluation of changes in chemical and radiological standards that were in place when the last five-year remedy review was initiated in 2012 to the standards applicable in 2017 was conducted to determine if there were any changes that would affect the protectiveness of the selected remedies.” *Please revise to indicate that federal and state promulgated standards, i.e., chemical-specific ARARs were reviewed.*

2. **Page 16 of 40, Section VII, 3rd paragraph:** As was done in the Fifth FYR, in lieu of summarizing LUC types in this section, *recommend* cross referencing the section of the OU-specific appendices that discusses the type of LUCs and implementation and reference to the OU-specific LUCIPs.
3. **Appendix A, Page A-2 of A-30, 3rd paragraph under *Phase I*:** The following statement in the LUC discussion is inconsistent with the NCP and should be revised: “LUCs may be implemented as a stand-alone remedy or combined with other remedial actions.” *Recommend* using language from 40 CFR 300.430(a), e.g. “LUCs may be implemented as a stand-alone remedy *when active measures are determined not to be practicable*, or combined with other remedial actions.”
4. **Appendix C, Section IV, Page C-7 of C-58, Remedial Actions:** In addition to issues noted in TechLaw Specific Comment #2, “Treat or Remove TCE to the extent practical” is not listed as an RAO for the A-Area Trench Subunit in the ABRP/MCB/MBP OU ROD (WSRC 2007b) (see p. 26 of 80 in ROD). This was also not included as an RAO in the 5th FYR. *Please review RAOs from appropriate decision documents and revise App. C as needed to ensure accuracy.*
5. **Appendix G, Page G-10 of G-60:** The following RAO for the 488-4D Ash Landfill, from the Second EAROD, is *missing from the RAO list*: “Maintain the engineered cover system to prevent migration of contaminants to groundwater that could exceed groundwater protection standards.”

EPA HQ Comments:

1	25	Table 1: The date of Site inspections are shown as July 2022 - November 2022. Note that this should not be a range of time, but should list the specific date(s) of the inspection(s).	Triggers and Inspections
2	25	Table 1: The due date (five years after triggering Action Date) is identified as January 21, 2024 (includes all 5 phases). Does this mean that this date is based on the original statutory due date from when FYRs began at SRS? Is the Region saying that during these 5 phases of rolling FYRs, that they may come it on varying dates but need to be completed for the Due Date? Please clarify.	Triggers and Inspections
3	3	The text states "The trigger date for submittal of the next five-year remedy review report to the regulatory agencies is based on the USEPA signature date of the previous report." Does this language consider the event of a FYR being provided late (after the previously defined due date) and how that may push out the time between FYRs for a set of remedies beyond 5	Triggers and Inspections

		years? Should the date be set based on when the first of the rolling FYRs for that grouping was issued?	
4	13	The statements for each remedy made under Question A of the Technical Assessment and a statement on LUCs where used should be added to Table 1 to succinctly explain why a protective status has been selected without having to send the reader to the main text.	Protectiveness Statement
5	ES-1-ES 2	In the Executive Summary, paragraph 2, should it state that this five-year review report covers the fifth phase, operating equipment?	General
6	39	Table 8, it would be helpful under each of the protectiveness statements to describe the elements of the remedy that protective human health and the environment. The statement can be cut and paste from the document.	Protectiveness Statement
7	A-10	For Table A.2, for the operating equipment are the issuance year and submittal date correct?	Triggers and Inspections