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

January 5, 2022

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

RE: EPA Comments on the **EFFECTIVENESS MONITORING REPORT (EMR)** for the P-Area Groundwater (PAGW) **ZERO VALENT IRON PERMEABLE REACTIVE BARRIER (ZVI-PRB) REMOVAL ACTION** Operable Unit (OU)(U), March 2019 through March 2021 Data, SEMS Number: 81, SRNS-RP-2021-00016, Revision 0, Sept 2021, Savannah River Site, Aiken, South Carolina

Dear Mr. Hennessey,

The U.S. Environmental Protection Agency, Region 4 (EPA), has reviewed the EMR for the P-Area Groundwater (PAGW) Operable Unit (OU)(U), March 2019 through March 2021 Data, SEMS Number: 81, SRNS-RP-2021-00016, Revision 0, Sept 2021. EPA comments are attached.

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

Sincerely,

JON RICHARDS
Digitally signed by JON RICHARDS
Date: 2022.01.05 08:29:31 -05'00'

Jon Richards
FFA Remedial Project Manager
Superfund & Emergency Management Division

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

GENERAL COMMENTS

1. The Effectiveness Monitoring Report (EMR) for the P–Area Groundwater (PAGW) Operable Unit (OU) Zero Valent Iron Permeable Reactive Barrier (ZVI-PRB) Removal Action (U), March 2019 through March 2021, SEMS Number: 81, SRNS-RP-2021-00016, Revision 0, dated September 2021 (the Report), does not discuss the methane concentrations that were measured during the monitoring events. As such, it is uncertain how high concentrations of methane may impede reductive dechlorination, primarily due to microbial competition for nutrients. *Please revise the Report to include a discussion of methane generation and how high concentrations negatively impact the reductive dechlorination pathway.*

2. Based on the data presented in the Report, it is uncertain whether the current monitoring well network established for the upper aquifer zone (UAZ) and lower aquifer zone (LAZ) are adequate. For example, the plume maps prepared for the contaminant plumes in the UAZ and LAZ do not include associated monitoring well contaminant data. As such, an assessment of horizontal extents of the plume(s) could not be completed. Additionally, no cross-section maps were prepared demonstrating no data gaps exist in the vertical extent of contamination. *Please revise the Report to include this information to support adequate delineation of the vertical and horizontal extents of contamination in the UAZ and LAZ has been completed.*

3. It is unclear whether the large amount of grout used to complete the injection wells for the ZVI-PRB construction is negatively impacting groundwater pH in addition to elevating calcium concentrations in groundwater. Elevated pH levels have been recorded in groundwater since the implementation of the ZVI-PRB. Since the grout cement is likely to continue to leach to groundwater over time, increased pH levels could remain in groundwater for an extended period of time due to presence of grout. *Please revise the Report to discuss the impacts of leaching cement grout into the groundwater over time and how this impacts groundwater pH levels.*

SPECIFIC COMMENTS

1. **Section 4.2, ZVI-PRB cVOC Degradation, Page 16 of 46, Paragraph 3:** The Report states for PRW004DU, the parent and daughter products of reductive dechlorination are plotted over time in Figure 17 (CVOC Degradation at PRW004DU), Page 42 of 46; however, no indication is presented as to why PRW004DU was chosen for this example. *Please revise the text to add a sentence explaining why well PRW004DU was chosen over the other monitoring wells.*

2. **Figure 4. Trichloroethylene Plume Map for the Upper Aquifer Zone of the Upper Three Runs Aquifer (2018 Data), Page 29 of 46, and Figure 5. Trichloroethylene Plume Map for the Lower Aquifer Zone of the Upper Thee Runs Aquifer (2018 Data), Page 30 of 46:** Figure 4 and Figure 5 depict three sample location symbols that are not defined in the legend, and it is unclear what type of samples are collected or their significance. Additionally, the ZVI-PRB orientation depicted as a blue line in the neck area of the figure has not been defined in the legends. *Please revise the figures to define the three sample symbols and provide the definition of the ZVI-PRB orientation in the legends.*

3. **Figure 6. TCE Plume Cross-Section with ZVI-PRB Injection Wells, Page 31 of 46:** The figure does not depict or reference a map showing the plan view of the cross-section line provided on the figure. It is uncertain whether the cross-section line is equivalent to the ZVI PRB orientation line. *Please revise the Report to explain in the text and on a figure the location of the cross-section line presented on Figure 6.*

4. **Figure 7. Effectiveness Monitoring Plan Locations, Page 32 of 46:** The small red box symbol used for PRW006C is not defined in the legend. *Please revise the legend in Figure 7 to include all symbols and definitions.*

5. **Figure 12. Time-Series Plot for TCE at Monitoring Wells Immediately West of ZVI-PRB, Page 37 of 46:** Several wells "immediately west" of the ZVI-PRB are missing from the figure and the justification is not clearly understood. For example, PRW007DU and PRW005DU are immediately west of the ZVI-PRB, but time-series plots are not presented on Figure 12. *Please revise Figure 12 to include all wells "immediately west" of the ZVI-PRB, or provide an explanation why time-series plots were not prepared for all wells immediately west of the ZVI-PRB.*

6. **Table 1. Maximum Concentrations of PCE, TCE, and cis-DCE in the Three Plume Areas, Page 43 of 46:** Based on the information in Table 1, it is unclear if maximum concentrations for the neck and distal areas in the LAZ were measured prior to the ZVI-PRB installation, while those in the source area were measured post-ZVI-PRB installation. Additionally, it is unclear if the maximum concentrations for tetrachloroethylene (PCE) in the UAZ for the distal area and cis-DCE concentration in the neck area were also measured prior to ZVI-PRB installation. *Please revise the table to clarify this issue.*