



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

March 10, 2023

ENVIRONMENTAL COMPLIANCE &

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

MAR 10 2023

AREA COMPLETION PROJECTS

RE: EPA Comments on **EFFECTIVENESS MONITORING REPORT (EMR) FOR THE P-AREA GROUNDWATER (PAGW) OPERABLE UNIT (OU) ZERO VALENT IRON PERMEABLE REACTIVE BARRIER (ZVI-PRB) REMOVAL ACTION (U) REVISION (0) APRIL 2021 THROUGH MARCH 2022**, SRNS-RP-2022-00565, Revision 0, Oct 2022, 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 2022 through March 2021 Data, SEMS Number: 81 Oct 2022, dated 11/10/22. EPA comments are attached.

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

Sincerely,

Richards,
Jon

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Richards, Jon
Date: 2023.03.10
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Jon Richards
FFA Remedial Project Manager
Superfund & Emergency Management
Division

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

GENERAL COMMENTS

1. The EMR Report does not provide essential historical and current analytical tables to verify statements in the text. Examples include:
 - a) The EMR Report does not provide a table with all of the historical and current volatile organic compounds (VOC) data (i.e., starting with the baseline data), and the hydrographs presented in Appendix B (PAGW OU RA EMR Hydrographs) do not depict specific concentrations. As a result, it is not possible to verify statements in the text regarding concentration changes based on the data. For example, the text in Section 3.2.2 (Chlorinated Volatile Organic Compounds) indicates that trichloroethylene (TCE) concentrations for PRW007DL have increased from 6.62 micrograms per Liter ($\mu\text{g/L}$) in July 2020 to 31.6 $\mu\text{g/L}$ in February 2022; however, the hydrograph presented in Appendix C does not show these concentrations and can only be read in increments of 10 $\mu\text{g/L}$.
 - b) The EMR Report does not provide a separate table with current and historical field parameter data. For example, the text in Section 4.4 (SVI-PRB Reducing Environment) states, “Within the ZVI-PRB [zero-valent iron permeable reactive barrier], reducing conditions are evidenced by high negative ORP [oxygen reduction potential] values between -350 and -406 mV [millivolts] in 1Q22;” however, Table A (PAGW RA EMR Analytical Data 2021-2022) EMR Monitoring Well Data, 2Q21-1Q22) in Appendix A does not include the ORP parameters for wells PIW01, PIW02, PIW03, or PIW04. Please revise the EMR Report to provide a separate table with the current and historical field parameter data including ORP, dissolved oxygen (DO), turbidity, specific conductivity (SC), and pH.
 - c) The EMR Report does not provide a table with current and historical analyses for several compounds (e.g., calcium, sulfur, chloride, metals, ethylene, ethane, methane) to verify statements that are included in the text. For example, the text in Section 3.2.3 (Geochemical Analyses) states, “Methane concentrations remained elevated in the UAZ [Upper Aquifer Zone] between 2Q21 and 1Q22. The maximum methane concentration in the baseline sampling was 2,400 $\mu\text{g/L}$ and the 1Q22 background monitoring well results (P003U and P003L) were below the MDL [method detection limit] of 10 $\mu\text{g/L}$,” however, these concentrations cannot be verified because there is no summary table that includes the data.

Please revise the EMR Report to provide tables with all historical and current VOC data; a separate table with all current and historical field parameter data; and, a separate table with all historical analytes (e.g., calcium, sulfur, chloride, metals, ethylene, ethane, methane, etc.) to substantiate the statements regarding the data in the text.

SPECIFIC COMMENTS

1. **Section 4.4, ZVI-PRB Reducing Environment, Page 22 of 54 and Appendix A, PAGW RA EMR Analytical Data 2021-2022, Pages A-2 through A-4:** The text indicates that the wells inside the ZVI-PRB (PIW01, PIW02, PIW03, and PIW04) show reducing conditions that are evidenced by high, negative oxygen reduction potential (ORP) values between -350 and -406 mV in 1Q22. However, Table A (PAGW RA EMR Analytical Data 2021-2022) EMR Monitoring Well Data, 2Q21-1Q22) in Appendix A does not include data for wells

PIW01, PIW02, PIW03, or PIW04. *Please revise Table A in Appendix A to include the appropriate water quality parameter data for the wells within the ZVI-PRB to substantiate that these wells show high, negative ORP values between -350 and -406 mV.*

2. **Section 5.0, Summary and Recommendations, Page 25 of 54:** The text states that recent 1Q22 results west of the zero-valent iron permeable reactive barrier (ZVI-PRB) indicate a greater than 80% reduction in trichloroethylene (TCE) concentration compared to baseline, and that this reduction is being achieved in all monitoring wells except for PRW007DU. However, it should be noted that there were 1Q22 TCE concentration increases for Lower Aquifer Zone (LAZ) monitoring well PRW006C and Upper Aquifer Zone (UAZ) monitoring well PRW007DL, and the baseline TCE concentrations for PRW006C and PRW007DL wells are not included or depicted in the EMR Report. Section 3.3.2 (Chlorinated Volatile Organic Compounds) indicates that the TCE concentrations in PRW006C have increased, from 24.3 µg/L in July 2020 to 110 µg/L in February 2022. In addition, Section 3.2.2 (Chlorinated Volatile Organic Compounds) TCE concentrations in PRW007DL have increased from 6.62 µg/L in July 2020 to 31.6 µg/L in February 2022. It should also be noted that Figure C.39 (Time Series Plot for Trichloroethylene (TCE) at PRW006 Series Monitoring Wells) and Figure C.40 (Time Series Plot for Trichloroethylene (TCE) at PRW007 Series Monitoring Wells) depict a higher TCE concentration in 2022 than the initial TCE concentration presented in 2020 for wells PRW006C and PRW007DL. Therefore, it is unclear why PRW006C and PRW007DL are not discussed as exceptions to the reported reductions in TCE concentration compared to baseline. *Please revise Section 5.0 to include PRW006 and PRW007DL as exceptions.*

3. **Table 4, Baseline Concentration Comparison with Most Recent Results for UAZ (1Q22), Page 52 of 54 and Figure 11, TCE Results for ZVI-PRB UAZ Monitoring Wells Sampled in 1Q22, Page 40 of 54:** It is unclear why there are baseline concentration comparisons presented in Table 4 that include these wells, but Figure 11 indicates that these wells were installed post-PRB and have no baseline concentration values. Table 4 includes a baseline concentration comparison for well clusters west of the ZVI-PRB, including wells PRW007DU and PRW00DL; however, the Notes Section on Figure 11 states that there are no baseline reported results for PRW007DU and PRW007DL, and indicates that these wells were installed post-PRB. *Please revise the EMR to clarify if wells PRW007DU and PRW007DL have baseline concentrations, and if the date of the baseline sampling for these wells differs from other wells, provide a footnote to explain how the baseline event was established.*

4. **Table 5, Baseline Concentration Comparison with Most Recent Results for LAZ (1Q22), Page 53 of 54:** Table 5 does not include baseline concentrations for comparison with the most recent results for ZVI-PRB monitoring wells PRW006DU, PRW006C, and PRW006DL. It is understood that these wells were constructed after the PRB was installed, which may suggest that the initial sampling event in these wells could be considered as the baseline event. *Please revise Table 5 to include the baseline data for comparison with most recent results for monitoring wells PRW006DU, PRW006C, and PRW006DL. If the date of the baseline sampling for these wells differs from other wells, please provide a footnote to explain how the baseline event was established.*

MINOR COMMENT

1. It should be noted that the titles for Tables 4 (Baseline Concentration Comparison with Most Recent Results for UAZ (1Q22)) and Table 5 (Baseline Concentration Comparison with

Most Recent Results for LAZ (1Q22)) occur at the bottom of the previous page. *Please revise the EMR Report to address these formatting issues.*