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

ENVIRONMENTAL COMPLIANCE &

November 19, 2021

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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

RE: **EPA Comments on the BIENNIAL EFFECTIVENESS MONITORING REPORT (EMR) FOR MONITORED NATURAL ATTENUATION (MNA) AT THE C-AREA BURNING/RUBBLE PIT (131-C) AND OLD C-AREA BURNING/RUBBLE PIT (NBN) OPERABLE UNIT JANUARY 2019 THROUGH DECEMBER 2020 SEMS NUMBER: 31, SRNS-RP-2021-~~003749~~, REVISION 0, DATED JUNE 2021, Savannah River Site, South Carolina** 03749 11/19/2021

Dear Mr. Hennessey,

The U.S. Environmental Protection Agency, Region 4 (EPA), has reviewed the Biennial Effectiveness Monitoring Report (EMR) for MNA at the C-Area BRP Operable Unit Removal Action (U) – January 2019 through December 2020, SEMS Number: 31, SRNS-RP-2021-003749, Revision 0, June 2021). EPA comments are attached.

If you have any questions or require additional information, please contact me at (404) 562-8513.

Sincerely,

JON RICHARDS Digitally signed by JON RICHARDS Date: 2021.11.19 07:10:04 -05'00'

Jon Richards
FFA Remedial Project Manager
Superfund & Emergency Managment Division

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

GENERAL COMMENTS

1. It is unclear how the groundwater and surface water trichloroethylene (TCE) trigger levels presented in Table 3 (Groundwater and Surface Water TCE Trigger Levels), are adequate to meet the groundwater remedial action objective (RAO) of preventing discharge of contaminated groundwater to surface water resulting in concentrations exceeding their maximum contaminant levels (MCLs). For example, Table 3 lists the TCE trigger level for monitored natural attenuation (MNA) point of compliance (POC) surface water station TL 04 as >5 micrograms per liter (µg/L). However, it is noted if TCE is detected at station TL 04 equal to or greater than the 5 µg/L trigger value, the RAO was not met and the MNA remedy was not adequate to prevent discharge of contaminated groundwater to surface water at concentrations exceeding the MCL. As such, lowering the TL 04 trigger level to a value less than the MCL would be appropriate to ensure the TCE concentrations in surface water do not exceed the MCL trigger level. Alternatively, it may be appropriate to develop trigger levels for MNA monitoring wells (i.e., CRP 50A, CRP 50B, CRP 51A, and CRP 51B) installed in the middle aquifer zone (MAZ) where TCE contaminated groundwater is also discharging into the wetlands of Fourmile Branch (FMB). Currently, TCE trigger levels have not been established for MNA monitoring wells installed within the MAZ located near FMB. *Please revise the EMR for MNA at the C-Area Burning/Rubble Pit (131-C) and Old C-Area Burning/Rubble Pit (CBRP) (NBN) (Biennial Report) to discuss the need to decrease the surface water station TL 04 TCE trigger level or to establish new trigger levels for the MNA MAZ wells at appropriate concentrations to ensure TCE concentrations in the MAZ will not discharge to the surface water at levels exceeding the MCL of 5 µg/L.*

2. It is unclear if biodegradation and complete reductive dechlorination of chlorinated volatile organic compounds (cVOCs) is being inhibited by the relatively low pH levels and high oxidation reduction potential (ORP) results associated with MNA monitoring wells. According to the second paragraph in Section 4.2 (Groundwater Monitoring Well Network), Page 6 of 34, very little biodegradation occurs during transport from the CBRP OU to the points of discharge, and biodegradation is considered to occur only at the wetland areas along Twin Lakes and FMB. In Table A-1 CBRP OU Monitoring Results, 2019 and 2020, the field data collected in 2019 and 2020 indicate the pH levels measured in MNA monitoring wells ranged from 3.9 to 6.9, and ORP ranged from negative (-) 89 to 455 millivolts (mV). The minimum optimal pH level of 6 and an ORP range that is highly negative (e.g., -mV) is needed to ensure biodegradation and complete reductive dechlorination cVOCs. *Please revise the Biennial Report to discuss whether low groundwater pH and/or elevated ORP measured in MNA monitoring wells is inhibiting biodegradation and impacting the efficacy of MNA.*

3. Dissolved oxygen (DO) data is not collected as part of the CBRP OU MNA groundwater monitoring. DO concentrations less than 0.5 milligrams per liter (5 mg/L) in groundwater are considered optimal for microbial degradation and complete reductive dechlorination. As such, it is unclear if biodegradation is being negatively impacted due to elevated DO concentrations in groundwater. *Please revise the Biennial Report to explain why DO concentrations in groundwater are not being monitored and discuss how the evaluation of the efficacy of MNA remedy is being conducted in a justifiable manner without groundwater DO data.*

SPECIFIC COMMENTS

1. **Section 3.2 Hydrogeologic Setting, Page 5 of 34:** It is unclear why the informal nomenclature and sequence of the aquifer zones discussed in this section are not consistent with the aquifer nomenclature and sequence depicted in the cross-section A-A' figures (i.e., Figure 5 [CBRP Plume Cross Section, Fourth Quarter 2000], Figure 6 [CBRP Plume Cross Section, Fourth Quarter 2012] and Figure 7 [CBRP Plume Cross Section, Fourth Quarter 2020]. For example, the cross-sections in Figures 5 through 7 illustrate stratigraphic layers designated as "A-Horizon, AA-Horizon, and Transmissive Zone (TZ)" that are not discussed in this section. Additionally, it is unclear why the MAZ is discussed in the section as one of the three aquifer zones but is not depicted in Figures 5 through 7. *Please revise the Biennial Report to provide discussion of how the A-Horizon, AA-Horizon, and TZ relate to the hydrogeologic setting discussed in this section and why the MAZ is not depicted on cross-sections on Figures 5 through 7.*

2. **Section 4.3 Groundwater Elevation Measurements and Groundwater Flow Direction, Page 7 of 34:** There are several nested monitoring well clusters (e.g., CRW 10, CRP 18, CRP 20, CRP 22 and CRP 51) installed at the CBRP OU; however, the directions of the vertical groundwater gradients observed between the aquifer units (i.e., UAZ, MAZ, LAZ and GA) are not discussed in this section. *Please revise this section to include a discussion of the upward and/or downward directions of vertical gradients observed at nested monitoring well clusters.*

3. **Section 4.6.1 Trichloroethylene, Lower Aquifer Zone, Page, Page 13 of 34:** The statement in the last paragraph that contamination in CRW010CU (and CRW 10C) originates with the C-Area Groundwater Operable Unit (CAGW OU) plume and not the CBRP OU is not supported by the water table elevation data and TCE results in well CRW 8D. For example, the text indicates it is very unlikely that a flow path exists connecting CRW010CU with a source at the CBRP OU based on the 2003 water table contours. The text also discusses the TCE result of 1.24 µg/L in 2003 in monitoring well CRP 8D. Well CRP 8D is located between the CBRP OU and CRW 010CU; however, it is noted wells CRW010CU and CRW 10C are designated as LAZ wells, and well CRW 8D is designated as an UAZ well. Therefore, it appears the UAZ water table elevations and TCE concentrations in well CRW 8D are not comparable with the LAZ water table elevations and TCE concentrations in CRW010CU and CRW 10C. *Please revise this section to address the potential data gap that exists with the groundwater flow direction and TCE concentrations in the LAZ between the CRW 10 well cluster and the CBRP OU source area.*

4. **Figure 5 CBRP Plume Cross Section, Fourth Quarter 2000, Page 27 of 34; Figure 6 CBRP Plume Cross Section, Fourth Quarter 2012, Page 28 of 34; Figure 7 CBRP Plume Cross Section, Fourth Quarter 2020, Page 29 of 34:** The figures include well cluster CRP 51 as the western-most well cluster depicted on the cross section figures (i.e. Figures 5 through 7); however, Figure 3 (CBRP OU LUC Boundary), Page 25 of 35, indicates the western-most well cluster on the A'-A cross section line is CRP 50 (i.e., CRP 50A/B) and not well cluster CRP 51 (i.e., CRP51A/B). A similar issue is noted with the figures in Appendix D (TCE Plume Maps) and Appendix E (Potentiometric Maps) where well cluster CRP 50 (i.e., CRP 50A/B) is depicted as the western-most well located along the A'-A cross section line. *Please revise all the noted figures, as appropriate, to address the discrepancy in which wells are depicted on the cross sections shown on Figures 5 through 7.*

5. **Appendix E, Figure E-4. 2020 Potentiometric Contours for the Middle Aquifer Zone (MAZ) and Lower Aquifer Zone (UAZ) of the Upper Three Runs Aquifer (UTRA), Page E-**

6 of E-8: The Lower Aquifer Zone is incorrectly abbreviated as UAZ in the figure title. *Please revise the figure title to state the correct abbreviation of the Lower Aquifer Zone which is LAZ.*