UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
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December 12, 2022

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

TECHNICAL REVIEW OF THE 2021 ANNUAL COMPREHENSIVE TNX AREA GROUNDWATER MONITORING AND REMEDIAL ACTION EFFECTIVENESS INTERIM REPORT (U) SEMS: 21, 29, SRNS-RP-2022-00627 REVISION 0 DATED AUGUST 2022

Dear Mr. Hennessey:

The U.S. Environmental Protection Agency (EPA) has reviewed the 2021 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action Effectiveness Interim Report (SEMS #21, 29), Revision 0, dated August 2022. EPA's comments are attached.

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

Sincerely,

JON RICHARDS Digitally signed by JON RICHARDS Date: 2022.12.12 09:47:53 -05'00'

Jon Richards, FFA RPM
Restoration & Site Evaluation Branch
Superfund and Emergency Management Division

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

GENERAL COMMENTS

1. The Annual Report does not discuss the overall increasing trend in trichloroethylene (TCE) and uranium concentrations at monitoring well TNX 28D and what this means regarding plume migration and expansion. As noted in Section 6.3 (VOC Constituents (i.e., PCE, TCE, Cis-1,2-DCE, VC, Ethylene, and CCl_4), concentrations of TCE were elevated from 2016 to 2018, but review of Appendix E (Time Series Plots) shows that concentrations of TCE have been increasing at this well since the edible oil (EO) injections began (see pdf page 499). Concentrations of uranium also appear to be increasing (see pdf page 527). These trends and potential plume migration should be discussed in the Annual Report, and Section 8.0 (Summary/Recommendations) should indicate whether additional treatment may be necessary for the groundwater plume at TNX 28D and TRW 2 that is detached from the source (e.g., if EO injections should be considered). Additionally, these trends support the need for an additional well between TNX 28D and the TNX 72 well cluster. *Please revise the Annual Report to discuss the increasing trends in TCE and uranium concentrations and potential plume migration at monitoring well TNX 28D.*

2. The current locations of the five Microblowers™ are not identified on Figure A-9 (Location of TNX Area SVE [Soil Vapor Extraction] Monitoring Well System; pdf page 94) and the rationale for the placement of the Microblowers™ is not discussed. The text in Section 3.2 (Soil Vapor Extraction) states that five Microblowers™ are rotated between the SVE wells and references Figure A-9 for the current SVE well network, but it is unclear how the five current locations were selected. Based on Section 7.1 (Soil Vapor Extraction Operations), during 2021, the Microblowers™ were connected to wells TVM 1V, TVM 3V, TVM 4U, TVX 4U (identified as "TVX004 U" on Figure A-9), and TVX 7U (identified as "TVX007 U" on Figure A-9); however, it is unclear if these locations will change in the next year. *Please revise the Annual Report to identify the five current locations of the Microblowers™ on Figure A-9 and to discuss the rationale for selecting these locations, including when these locations will be changed.*

3. The exceedances of the combined radium maximum contaminant level (MCL; 5 picocuries per liter [pCi/L]) are not consistently presented in the Annual Report. Section 5.4 (Analytical Results) notes that the combined radium concentrations exceeded the MCL at wells TNX 5D and TIR 1U; however, Figure A-21 (TNX Area Combined Ra-226/228 Activity in Groundwater, 4Q2021) does not show a plume at the location of TNX 5D. Additionally, Table B-2 (Groundwater Monitoring Results for TNX Area Wells, Fourth Quarter, 2021) does not indicate that the combined radium results at wells TNX 5D and TIR 1U (i.e., 8.2 pCi/L and 7.539 pCi/L, respectively) exceed the MCL. Figure A-21 notes that the result is "NDD" defined as Not Decision Data in the figure legend, and Table B-2 indicates the value is estimated. However, according to Appendix C, (Data Review Key, page C-7 of C-12) the NDD result is still useable even if it is an estimated value. *Please revise Figure A-21 and Table B-2 to note these exceedances of the combined radium MCL at wells TNX 5D and TIR 1U.*

SPECIFIC COMMENTS

1. **Section 3.2, Soil Vapor Extraction, Page 10 of 64:** The second paragraph mentions "V" and "U" screen horizons, but these horizons are not defined in the text. Also, several wells on Figure A-9 (Location of TNX Area SVE Monitoring Well System) have "L" in the identifications, but it is unclear what these letters signify. *Please revise the text to define all the letters and screen horizons used in the SVE wells nomenclature.*

2. **Section 3.5, Radiologically Contaminated Groundwater, Pages 12-13 of 64:** The text notes that there are two localized areas in the wetlands where the groundwater monitoring wells exceed the MCLs, but only one monitoring well (i.e., TCM 5) is identified in the text. According to Section 5.4 (Analytical Results), groundwater exceedances were noted for adjusted gross alpha at well TNX 72D and for combined radium at wells TIR 1M/U, TNX 5D, and TNX 8D. *Please revise the text to clarify the locations within the wetlands where radiological exceedances can be found.*

3. **Section 4.1.1, Sampling Issues, Page 18 of 64:** The first bullet point notes that there is a history of TNX 72S being dry due to the shallow screen depth but does not discuss if a data gap exists from this missing sample and result. *Please revise this section to state whether a data gap exists due to the missing sample result at TNX 72S and if additional actions are necessary.*

4. **Table 4-1, TNX Monitoring Well Network, Page 21 of 64**: The text in Section 4.1 (Sampling Events) notes there are 43 wells in the monitoring well network, but this table lists 44 wells. It appears well TVR 1A is listed twice with two separate screen depth intervals, but the results in Appendix B (Groundwater Monitoring Results [Matrix Tables]) only list one result for well TVR 1A. *Please revise this table to clarify why TVR 1A is listed twice and note which screen depth interval was sampled in 2021.*

5. **Section 5.4, Analytical Results, Combined Radium, Page 26 of 64:** The text in the second paragraph incorrectly references 2Q2020 and not 2Q2021 as the date the combined radium activity did not exceed the MCL. *Please revise the text to reference the 2021 date for the discussion of the current combined radium data.*

6. **Section 5.4, Analytical Results, Edible Oil Parameters, Pages 29-30 of 64:** Oxygen Reduction Potential (ORP) is discussed as decreasing after EO injections with sustained low concentrations at three wells (i.e., TBG 4, TBG 5, TNX 3D) through 2021; however, the bullet point for well TBG 4 notes an increase in ORP in 2021 and the bullet point for well TNX 3D states that ORP in this well has steadily increased since 2009. *Please revise the initial statement that describes ORP in these three wells to be consistent with the trends discussed in the bullet points.*

7. **Section 6.3, VOC Constituents (i.e., PCE, TCE, Cis-1,2-DCE, VC, Ethylene, and CCl_4), Page 39 of 64:** The text states that variable TCE concentrations at well TRW 2 are likely due to treated groundwater flowing from upgradient sources based on the changing EO parameters and references decreasing dissolved oxygen [DO], decreasing ORP, increasing methane, and denitrification; however, some of the trends shown in Appendix E do not support this statement. The Time Series Plots for Station TRW 2 show increasing DO concentrations (pdf page 369) and decreasing methane concentrations (pdf page 394) since 2015. It is also noted in Section 5.4 that ORP concentrations at TRW 2 have been variable from 2018 to 2021. *Please revise the discussion of the EO parameters at TRW 2 in Section 6.3 to be consistent with the recent data presented in the Annual Report.*

8. **Section 6.4, Edible Oil Parameters, Page 42 of 64:** The text states, "ORP results at injection wells (i.e., TBG 4, TBG 5, TNX 3D, TRW 3, TRW 4R, and TVM 1M) decreased to values of < -100 mV [millivolts] after each injection of EO;" however, based on the time series plots in Appendix E, injection well TRW 3 (pdf page 434) did not have ORP less than

-100 mV after each injection of EO. *Please revise Section 6.4 to indicate that well TRW 3 did not reach ORP values less than -100mV after each of the EO injections.*

9. **Appendix B, Groundwater Monitoring Results (Matrix Tables), Pages B-3 and B-4:** There are five results listed for total organic carbon (TOC) at each well, but it is unclear why these multiple results are reported. *Please revise this table to note why five results are listed for TOC at each well and clarify which result is used in the Annual Report text and figures (e.g., Appendix E, Time Series Plots).*

10. **Appendix D, Hydrographs, and Appendix E, Time Series Plots:** Some of the graphs show vertical lines marking when the different remedial actions were taken, but the color coding does not always match the colors in the key. For example, in Appendix D the red line in the hydrographs appears to mark the SVE start date of 2002, but this line does not appear red in the key. In Appendix E, the green vertical lines in the time series graphs appear to represent when the EO injection occurred, but the EO injections are also labeled as black lines in the key. *Please revise the graphs in these appendices to show the correct color coding for the lines or provide a key for both appendices to clarify the dates noted on the hydrographs and time series graphs.*