



Department of Energy
 Savannah River Operations Office
 P.O. Box A
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MAR 31 2020

Ms. Susan B. Fulmer, P.G., Manager
 Federal Remediation Section
 Division of Site Assessment, Remediation and Revitalization
 Bureau of Land and Waste Management
 South Carolina Department of Health and Environmental Control
 2600 Bull Street
 Columbia, South Carolina 29201

Mr. Jon Richards
 Acting Savannah River Site Remedial Project Manager
 Superfund Division
 U. S. Environmental Protection Agency, Region 4
 61 Forsyth Street, SW
 Atlanta, Georgia 30303

Dear Ms. Fulmer and Mr. Richards:

SUBJECT: Savannah River Site's Responses to the Regulatory Comments on the 2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action Effectiveness Interim Report (U) (SRNS-RP-2019-00391, Revision 0, June 2019) SEMS Numbers: 21, 29

In accordance with the terms of the Federal Facility Agreement, the U. S. Department of Energy (DOE) is submitting the subject comment responses for your review. The South Carolina Department of Health and Environmental Control (SCDHEC) and the U. S. Environmental Protection Agency (EPA) provided comments on the report on October 23, 2019 and January 10, 2020, respectively. The report will not be revised; however, all comment responses will be included and/or addressed in the next report, as applicable. Please review these responses and provide your approval thirty (30) days from receipt. The time and effort that the SCDHEC and the EPA have given on the subject operable unit are greatly appreciated.

Questions from you or your staff may be directed to me at (803) 952-8365, or the DOE Program Manager, Mr. Philip Prater, at (803) 952-9333.

Sincerely,

BRIAN HENNESSEY

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 HENNESSEY
 Date: 2020.03.31 10:47:20 -04'00'

Brian T. Hennessey
 SRS Remedial Project Manager
 Infrastructure and Area Completion Division

IACD-20-139

MAR 31 2020

Ms. Susan Fulmer
Mr. Jon Richards

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Enclosures:

1. SRS Responses to the EPA Comments on the 2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action Effectiveness Interim Report (U) (SRNS-RP-2019-00391, Revision 0, June 2019) SEMS Numbers: 21, 29
2. SRS Responses to the SCDHEC Comments on the 2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action Effectiveness Interim Report (U) (SRNS-RP-2019-00391, Revision 0, June 2019) SEMS Numbers: 21, 29

cc w/o encl:

D. Scaturo, SCDHEC-Columbia
S. French, SCDHEC-Columbia
M. Reece, SCDHEC-Columbia
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**SRS Responses to EPA Comments on the
2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action
Effectiveness Interim Report (U), SEMS Number 21, 29, SRNS-RP-2019-00391, Revision 0, Dated
June 2019, Savannah River Site, Aiken, South Carolina**

Page 1 of 8

Comments Received 1/9/2020

EPA COMMENTS:

1. In the List of Figures, Page ii of iv, Figure ES-2 is listed as TNX Area Trichloroethylene (TCE) Concentration in Groundwater, 4Q2017 with >500 µg/L TCE Plume from 4Q1996 Superimposed. Additionally, Figure ES-3 is listed as Comparison of Trichloroethylene Concentration in the Treatment Zone in 2007 and 2017. The figures should reference 4Q2018 and 2018, respectively. For clarity, revise the 2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action Effectiveness Interim Report (U), SEMS Numbers: 21, 29, SRNS-RP-2019-00391, Revision 0, dated June 2019 (2018 Annual Report) to address this discrepancy.

Response: Agree with Clarification. The 2018 data was used in developing these two figures, but the correct year was not updated on the figures. Future reports will include the proper dates on the legends and titles. No change to the document is proposed.

Responsible Party: Branden Kramer, (803) 952-6378, branden.kramer@srs.gov

2. Section 1.2.3, New TNX Seepage Basin (NTSB), Page 3 of 54 states, “During periods of unusually high discharge, the seepage section of the basin overflowed to Outfall X-013A which in turn discharged to a local surface depression.” Outfall X-013A and a local depression near NTSB are not depicted on Figure A-3; therefore, it is not clear where overflow from the NTSB would flow. Revise the 2018 Annual Report to address this issue.

Response: Clarification. The local surface depression is shown on Figure A-3 as an irregular shape located adjacent to the southeast corner of the New TNX Seepage Basin (NTSB). The X-013A Outfall is not depicted on any figure in the annual report, but it was an underground process sewer line that exited the southeast corner of the NTSB and discharged to the local surface depression. Figure A-12 further illustrates the local depression and depicts a topographic low at the southeastern corner of the NTSB. The text in Section 1.2.3 will be edited in the 2019 annual report to state, “During periods of unusually high discharge, the seepage section of the basin overflowed to Outfall X-013A, located on the southeast corner of the NTSB, which in turn discharged to a local surface depression.

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3. The first complete paragraph of Section 2.0, Site Hydrogeology, Page 7 of 54, includes a discussion of the hydraulic conditions of the Floridian aquifer system in the TNX Area. The text states, “This is evident by looking at average values for water level data collected between first quarter 1995 and fourth quarter 2017 from wells P 26A, P 26B, and P26D.” It is unclear if the water level data collected during the 2Q2018 and 4Q2018 were evaluated for this discussion. Additionally, the paragraph includes further discussion of the static well head pressure at location P 26. In the paragraph, sentence four states, “The average hydraulic head measured in the LAZ of the UTRAU at P 26D is 35.1 m (115.3 ft) amsl which is 2.8 m (9.2 ft) less than the average hydraulic head measured in the semi-confined GAU.” Based on the data provided in the text, the referenced semi-confined unit of the GAU is location P 26B. However, the previous sentence referred to location P 26B as “the unconfined

**SRS Responses to EPA Comments on the
2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action
Effectiveness Interim Report (U), SEMS Number 21, 29, SRNS-RP-2019-00391, Revision 0, Dated
June 2019, Savannah River Site, Aiken, South Carolina**

Page 2 of 8

Comments Received 1/9/2020

GAU,” and the fifth sentence refers to the GAU unit as confined. Finally, the discussion references Appendix D, Hydrograph for Station 26; however, the data within the text is not clearly presented on the referenced hydrograph for Station 26. Revise the 2018 Annual Report to address this issue.

Response: Clarification. Water elevation data from fourth quarter 2018 was used in the discussion but was not properly referenced. Future reports will include the correct dates within the text.

The monitoring well P 26 has three screens; the shallowest screen, P 26D, is located in the LAZ of the UTRAU (LAZ_UTRAU); the middle screen, P 26B, is located in the upper GAU; and the lowest screen, P 26A, is located in the lower GAU. The lower GAU is not depicted on Figures 4, 5, 16, and 17. At the P 26 well cluster, the water table aquifer is the LAZ_UTRAU, the upper GAU is considered semi-confined based on the leaky nature of the overlying GCU, and the lower GAU is also considered a semi-confined aquifer based on the leaky nature of the low permeability silt to silty clay beds separating the upper and the lower GAU. Moving west toward the Savannah River, the water table declines in elevation below the LAZ_UTRAU and GCU making the upper GAU an unconfined aquifer underneath the T-Area OU cap and TNX swamp. The lower GAU continues to be a semi-confined aquifer underneath the T-Area OU cap and TNX swamp. The text in Section 2.0 of the 2019 annual report will be revised to include a similar description of the difference between the three aquifers underneath the TNX Area. The GAU label on Figures A-4, A-5, A-16, and A-17 will be revised to state, “Upper Gordon Aquifer,” to properly identify which section of the GAU is being depicted on these cross sections.

The paragraph describing the downward vertical gradient from the LAZ_UTRAU to the upper GAU and the upward vertical gradient from the lower GAU to the upper GAU will also be revised to match the new nomenclature (upper GAU and lower GAU) described above. The reference to the hydrograph for monitoring well cluster, P 26 in Appendix D, illustrates that the water elevations measured in P 26A and P26D are both greater than the water elevation observed in P 26B.

Responsible Party: Branden Kramer, (803) 952-6378, branden.kramer@srs.gov

4. The screened zone of P 26A is not depicted on Figure A-4 (Appendix A, Page A-9), although the P 26 location is included in the TNX Area Cross Section A-A’. For completeness, update the 2018 Annual Report to address this issue.

Response: Clarification. The screen zone at P 26A is located in the lower GAU and is included in the annual report to identify the presence of an upward gradient from the lower GAU to the upper GAU. The purpose of Figure A-4 is to show the wells screened in the upper GAU where the contaminated groundwater associated with the TNX OU is located. With the exception of well P26, no other monitoring wells at the TNX OU have screens in the lower GAU. No change to the document is proposed.

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**SRS Responses to EPA Comments on the
2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action
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June 2019, Savannah River Site, Aiken, South Carolina**

Page 3 of 8

Comments Received 1/9/2020

5. The first complete paragraph of Section 3.3, Edible Oil Treatment, Page 10 of 52 states, “The EO treatments have significantly reduced VOC concentrations in the groundwater.” However, the text does not reference data (Figure A-38) to support this statement. Revise the text to reference supporting data.

Response: Agree with Clarification. References to Figures A-27, A-31, and A-38 will be included at the end of the identified sentence in the 2019 annual report.

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6. Section 5.2, Water-Level Measurements, Page 19 of 54 states a water table map was constructed showing current conditions from water-level measurements collected during the 4Q2018 and calculated horizontal flow rates in the unconfined portion of the UTRAU/GAU range for the same period. Review of Appendix E (Time Series Graphs) shows that many constituent concentrations fluctuate seasonally between the 2Q and 4Q sampling events, which is likely due to seasonal variation in groundwater levels. For completeness, revise the 2018 Report to include a water table map for both 2Q2018 and 4Q2018 and calculate horizontal flow rates.

Response: Clarification. The fourth quarter water table map is used to show a yearly estimate. While it is true that seasonal variations within sampling events fluctuate, the horizontal flow rate for the fourth quarter is an appropriate fixed point of reference that can be used for a long-term, year by year comparison. The slight variability of flow rates would not change the general trends shown in the long-term. No change to the document is proposed.

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7. The text in Section 5.4 Analytical Results, Pages 20 & 21 of 54 states, “TRW 2 and TCM 5 have a history of exceeding the Maximum Contaminant Level (MCL) (5 µg/L) for TCE. TNX 28D has a history of detectable concentrations of TCE that periodically exceed the MCL since 2016.” However, TCE was also detected in TIR 1 during 4Q2018 and the time series plot of TCE in TIR 1 (Appendix E, page E-243 of E276) shows a history of detectable TCE above MCLs. Additionally, the time series plot of TCE in TNX 28D (Appendix E, page E-258 of E-276) indicates that TCE concentrations are generally increasing. Revise the text to include TNX 28D in the summary narrative.

Response: Agree with Clarification. Future reports will include a discussion of all wells that have exceeded the MCL over time with a general description of trends. No change to this document is proposed.

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8. The text in Section 5.4 Analytical Results, Page 21 of 54 states, “Gross alpha was detected in eight monitoring wells during 2Q2018. The gross alpha activity at TCM 5 (23 pCi/L) was the only well to exceed the MCL (15 pCi/L).” Similar results are reported for gross alpha in 4Q2018. However, during both monitoring events, the sample-specific estimated quantitation limit is above the MCL of 15 pCi/L

**SRS Responses to EPA Comments on the
2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action
Effectiveness Interim Report (U), SEMS Number 21, 29, SRNS-RP-2019-00391, Revision 0, Dated
June 2019, Savannah River Site, Aiken, South Carolina**

Page 4 of 8

Comments Received 1/9/2020

for TBG 4. As such, it is unclear if gross alpha MCL exceedances also occurred at TBG 4. Revise the 2018 Annual Report to address this issue.

Response: Clarification. The estimated quantitation limit (EQL) for TBG 4 did exceed the maximum concentration limit (MCL) of 15 pCi/L for gross alpha during the second and fourth quarter 2018. However, both results were qualified as non-detect by the laboratory because the values were less than the method detection limit (MDL). The gross alpha data for TBG 4 will be monitored in future sampling events to determine if the EQL continues to exceed the MCL, and the results discussed in the 2019 annual report as appropriate. No change to this document is proposed.

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9. The text in Section 6.2 (pH), Page 31 of 54, paragraph 2 states “During the 4Q2018, there were no wells with a pH of less than 5 (Figure A-14). However, the text in Section 5.3 (pH) states that “During the 4Q2018, two monitoring wells (i.e. TIR 1U and TNX 16D) had a pH less than 5 (A-14). Additionally, Figure A-14 only depicts one well location (TNX 16D) with a pH less than 5; the second location (TIR 1) with a pH of less than 5 during 4Q2018 shows the pH value at well location TIR 1L rather than well TIR 1U. For clarity revise the 2018 Annual Report to address this issue.

Response: Agree with Clarification. The text in Section 5.3 stating that two monitoring wells (i.e., TIR 1U and TNX 16D) had a pH less than 5 was correct. The text in Section 6.2 and Figure A-14 were not correct. TIR 1U had a pH of 4.7 recorded during the fourth quarter 2018 and should have been on the figure as such. Future reports will include correct information in the text and figures. No change to this document is proposed.

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10. The text in Section 6.2, pH, Page 31 of 54, third paragraph states, “After the 2008 and 2010 injections, elevated pH was observed in three of the injection wells, TBG 4, TBG 5, and TNX 3D. A basic solution was also added during the 2015 EO injections; however, it does not appear to have buffered the aquifer as much as the 2008 and 2010 injections.” There are, however, no data included in the 2018 Annual Report to support this statement. Revise the 2018 Annual Report to include and reference data that support this statement.

Response: Clarification. Previous annual reports were more specific on the data that supported this statement. In order to show only current status and data, the historical information was not included in the 2018 annual report. In future reports, the range of pH results from the six monitoring wells (i.e., TBG 3, TBG 4, TBG 5, TRW 3, TRW 4R, and TVM 1M) used in the 2015 EO injection will be provided. This will support the statement that pH is lower after the 2008 and 2010 injections. No change to the document is proposed.

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**SRS Responses to EPA Comments on the
2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action
Effectiveness Interim Report (U), SEMS Number 21, 29, SRNS-RP-2019-00391, Revision 0, Dated
June 2019, Savannah River Site, Aiken, South Carolina**

Page 5 of 8

Comments Received 1/9/2020

11. The text in Section 6.4, Edible Oil Parameters, Pages 35 & 36 of 54, paragraph 2 states, “In 2018, ORP results increased during the 4Q2018.... At this time, it is not apparently clear why ORP results increased at these wells.” It is unclear if these statements refer to ORP within site-wide wells or specific wells within the emulsified oil (EO) treatment area. For clarity, revise the text to address this issue.

Response: Clarification. The text was referring to the EO treatment area. Future annual reports will be more specific when referring to the EO treatment area or specific wells. No change to the document is proposed.

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12. The text in Section, 6.4 Edible Oil Parameters, Page 36 of 54, second complete paragraph states, “VFA concentrations have also been detected in the monitoring wells (i.e. TRW 1, TRW 2, and TVR 1A) suggesting that EO has been distributed out into the aquifer.” The time series plots for Total VFA in these wells shows that total VFAs detections in these wells have fluctuated, and VFAs have not been detected in these wells since 2Q2017. Revise the text of the 2018 Annual Report to address this issue.

Response: Agree with Clarification. The text in future annual reports will be revised to reflect that monitoring wells (i.e. TRW 1, TRW 2, and TVR 1A) did show volatile fatty acids (VFAs) in 2016 and 2017 but are non-detect for VFAs since late 2017. No change to the document is proposed.

Responsible Party: Branden Kramer, (803) 952-6378, branden.kramer@srs.gov

13. The text in the last paragraph of Section 6.5 Combined Radium, Uranium, Gross Alpha and Adjusted Gross Alpha, Page 38 of 54, states, “At TBG 3, gross alpha and combined radium exceedances appear to be directly related. At TBG 4, the gross alpha concentrations appear to correlate with combined radium concentrations before 2010 and correlate to uranium concentrations after 2010.” References to data to support this comparison are not provided. It is noted that time series graphs with both gross alpha and the related radionuclide would better support the analysis. Revise the 2018 Annual Report to address this issue.

Response: Agree with Clarification. Future annual reports will include and provide a reference to time series graphs to support these statements. The time series graphs for TBG3 and TBG4 are provided in Attachments 1 and 2 to the comment responses. No change to the document is proposed.

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14. The text in Section 8.1 Summary, Page 49 of 54, last paragraph states, “There does not appear to be a discernible and consistent groundwater plume with respect to 1,4-dioxane at TNX. The detections of 1,4-dioxane appear to be localized to TBG 5 with only sporadic detections at the other monitoring wells.” Detections of 1,4-dioxane at TBG 5 and the other monitoring wells are greater than the respective regional screening level for drinking water of 0.46 micrograms per liter (µg/L), which

**SRS Responses to EPA Comments on the
2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action
Effectiveness Interim Report (U), SEMS Number 21, 29, SRNS-RP-2019-00391, Revision 0, Dated
June 2019, Savannah River Site, Aiken, South Carolina**

Page 6 of 8

Comments Received 1/9/2020

should be noted. Additionally, the uncertainty of the lack of detections due to elevated estimated quantitation limits for 1,4-dioxane at all wells should be noted. It is recommended that the text be revised to recognize the above noted issue and identify the uncertainty with the 1, 4-dioxane analytical results.

Response: Clarification. The second paragraph of Section 6.7 states the uncertainty with the 1,4-dioxane analytical method (i.e., EPA 8260BSIM) and the RSL for drinking water (0.46 µg/L).

In 2019, SRS sampled for the 1,4-dioxane using two analytical methods, EPA 8260BSIM and EPA 522. Analytical method EPA 522 can achieve detection limits that are less than the RSL. The analytical method EPA 522 is not certified by the South Carolina Department of Health and Environmental Control; therefore, the analytical method EPA 8260BSIM, which is certified, is still required. Both sets of results will be presented and discussed in the 2019 annual report and subsequent annual reports. No change to the document is proposed.

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- a) EPA maintains a 1,4 dioxane fact sheet that outlines some analytical options that may be useful: https://www.epa.gov/sites/production/files/2014-03/documents/ffiro_factsheet_contaminant_14-dioxane_january2014_final.pdf.

Response: Agree.

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- b) EPA suggests that lower detection limits for 1,4 dioxane would provide additional clarity and information if the sampling quantitation limits met the RSL potentially enabling better plume delineation for 1,4 dioxane.

Response: Agree with Clarification. See response to comment 14.

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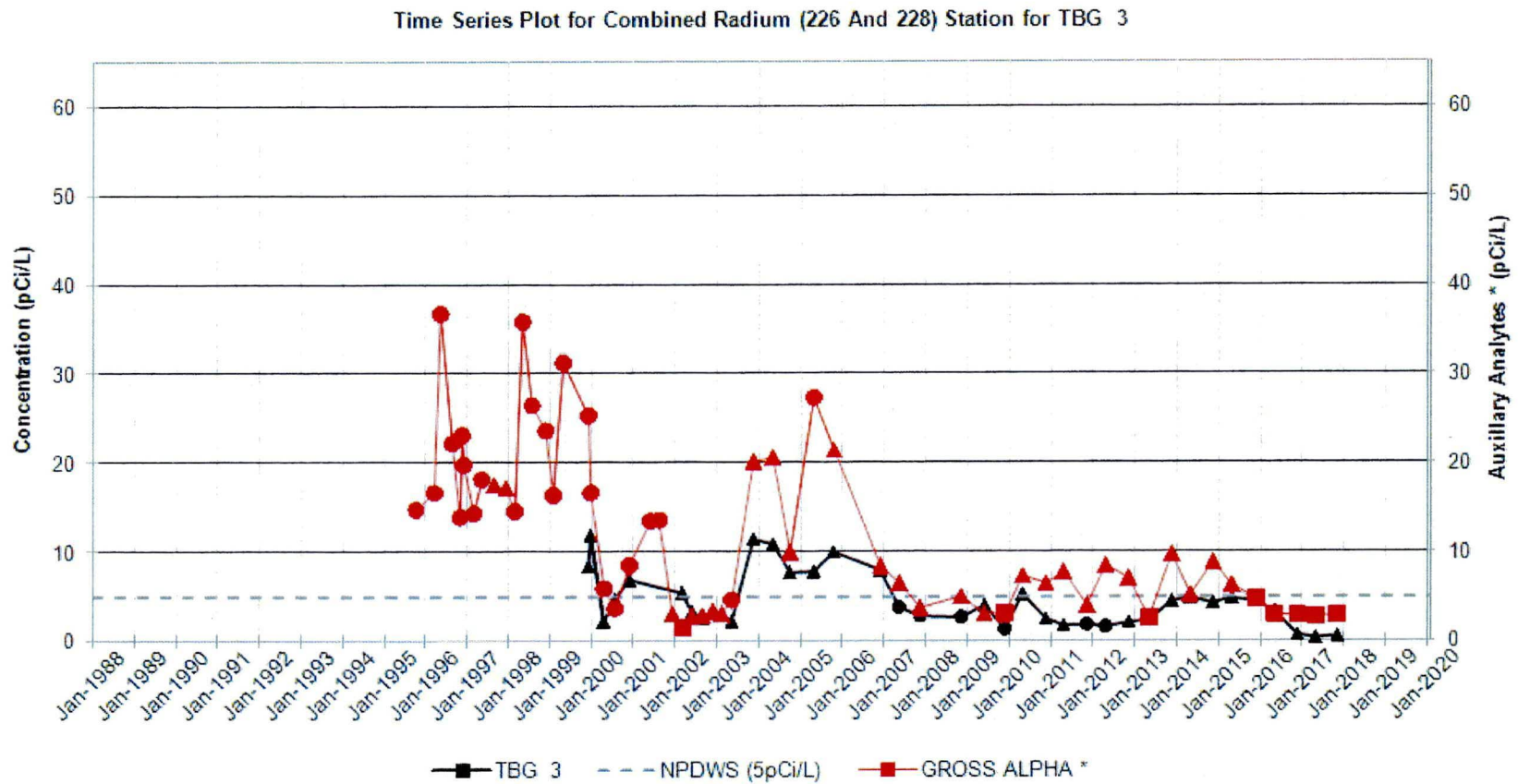
15. The data comparison presented in Appendix A, Figure A-40, Page A-45 of A-46, Comparison of Vinyl Chloride Concentration in the Treatment Zone in 2010 and 2018 is unclear. All wells in July/August 2010 are shown as being 0 µg/L, while data for December 2018 are non-detect. Revise the 2018 Annual Report to address this issue.

Response: Clarification. The concentrations shown as 0 µg/L on Figures A-39 and A-40 represent non-detect results. A footnote identifying these results as non-detect will be added to the legend of figures in the 2019 annual report as appropriate. No change to the document is proposed.

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SRS Responses to EPA Comments on the
2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action Effectiveness Interim Report (U), SEMS
Number 21, 29, SRNS-RP-2019-00391, Revision 0, Dated June 2019, Savannah River Site, Aiken, South Carolina

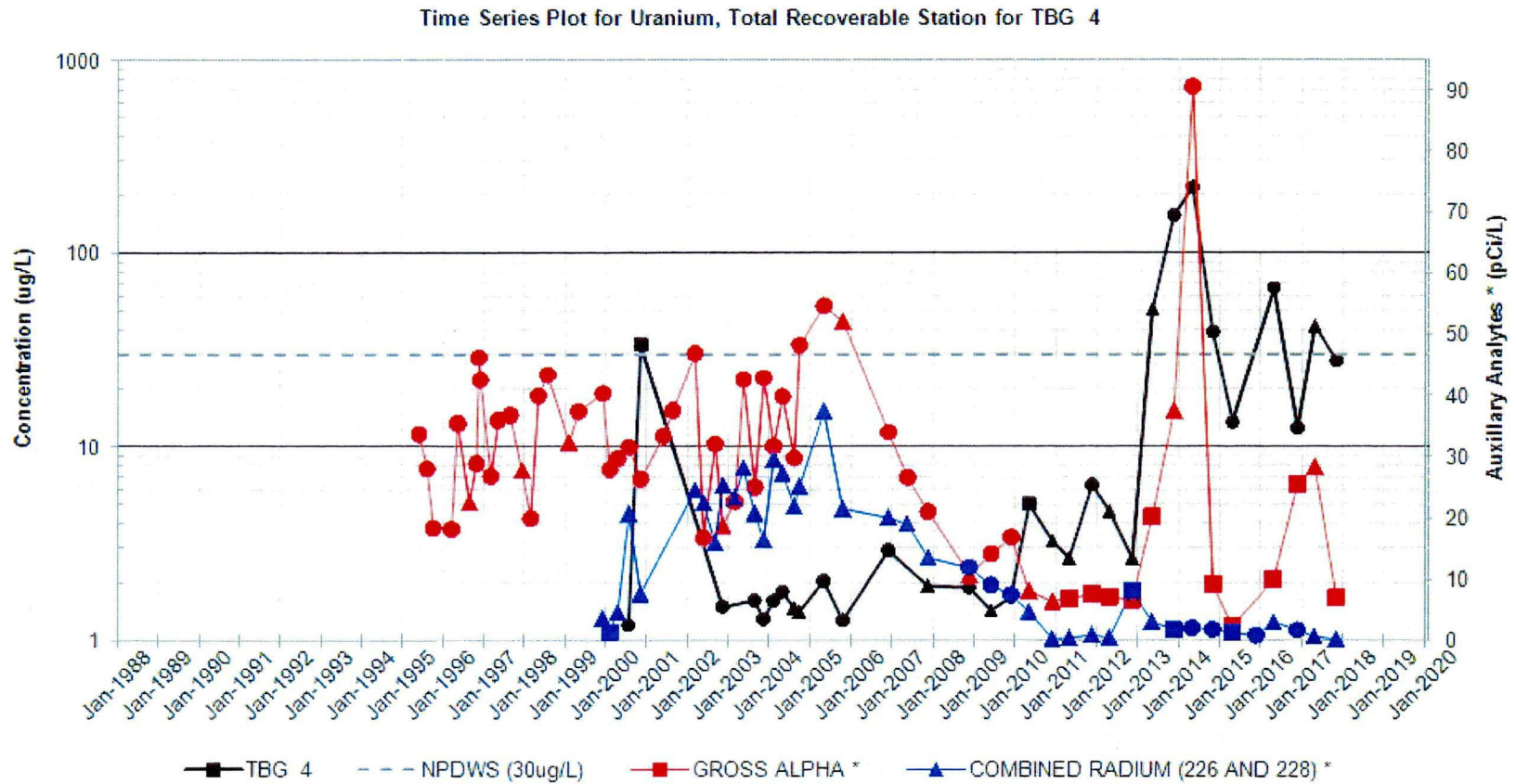
Comments Received 1/9/2020



Attachment 1. Time Series Plot of Combined Radium and Gross Alpha Concentrations at TBG 3.

**SRS Responses to EPA Comments on the
2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action Effectiveness Interim Report (U), SEMS
Number 21, 29, SRNS-RP-2019-00391, Revision 0, Dated June 2019, Savannah River Site, Aiken, South Carolina**

Comments Received 1/9/2020



Attachment 2. Time Series Plot of Uranium, Gross Alpha, and Combined Radium Concentrations at TBG 4.

**SRS Responses to SCDHEC Comments on the
2018 Annual Comprehensive TNX Area Groundwater Monitoring and Remedial Action
Effectiveness Interim Report (U), SEMS Number 21, 29, SRNS-RP-2019-00391, Revision 0,
Dated June 2019, Savannah River Site, Aiken, South Carolina**

Page 1 of 1

Comments Received 10/23/2019

SPECIFIC COMMENT

1. Section 6.2, pH, page 31. The first sentence of the second paragraph of this section states: "During the 4Q2018, there were no wells with a pH of less than 5 (Figure A-14)." Section 5.3 states that during 4Q2018 two monitoring wells, TIR 1U and TNX 16D, had a pH less than 5. Each of these statements also refers to Figure A-14, which indicates only one well (TNX 16D) with a pH less than 5. Please correct these discrepancies.

Response: Agree with Clarification. The text in Section 5.3 stating that two monitoring wells (i.e., TIR 1U and TNX 16D) had a pH less than 5 was correct. The text in Section 6.2 and figure A-14 were not correct. TIR 1U had a pH of 4.7 recorded during the fourth quarter 2018 and should have been on the figure as such. Future reports will include correct information in the text and figures. No change to the document is proposed.

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