Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29802

DEC 16 2021

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
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 R-Area Groundwater (NBN) Biennial Effectiveness Monitoring Report in Support of R Area Operable Unit (U) January 2019 through December 2020 (SRNS-RP-2021-03617, Revision 0, June 2021) SEMS Number: 95

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 U.S. Environmental Protection Agency's (EPA) comments were received on August 2, 2021 and the South Carolina Department of Health and Environmental Control's (SCDHEC) approval was received on October 12, 2021. This report will not be revised; however, all comment responses will be included in the next report, as applicable. The next report submittal will be on or before June 30, 2023. Please review these responses and provide your approval thirty (30) days from receipt. The effort and time that the SCDHEC and the EPA have given on the subject operable unit are greatly appreciated.

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

Sincerely,

Brian T. Hennessey Digitally signed by Brian T. Hennessey
Date: 2021.12.15 11:16:15 -05'00'

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

IACD-22-115

Enclosure:
SRS Responses to EPA comments on the R-Area Groundwater (NBN) Biennial Effectiveness Monitoring Report in Support of R Area Operable Unit (U) January 2019 through December 2020 (SRNS-RP-2021-03617, Revision 0, June 2021) SEMS Number: 95

cc w/o encl:
J. Blalock, SCDHEC-Columbia
S. French, SCDHEC-Columbia
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H. Herlong, SCDHEC-Aiken Environmental Affairs Office
R. H. Pope, EPA-Atlanta

cc w/ encl:
M. McRae, TechLaw, Inc.

Comments Received August 2, 2021

TECHNICAL REVIEW COMMENTS

1. **Section 3.1, RAGW Monitoring, Page 2 of 40:** The text states that there are twenty-eight wells in the monitoring network, four seepline locations, and nine surface water locations. However, only seven surface water locations are shown on Figure 3 (RAGW [R-Area Groundwater] Monitoring Station and 2020 Groundwater Plumes). *Revise the text or Figure 3 of the R-Area Groundwater (NBN) Biennial Effectiveness Monitoring Report in Support of R-Area Operable Unit (OU) January 2019 through December 2020, SEMS Number: 95, SRNS-RP-2021-03617, Revision 0, June 2021 (the EMR) as appropriate to include all surface water sample locations.*

   Response: Agree.

   As discussed in Section 4.1.4 Northern Tritium Plume, two surface water stations (PASL-01 and PASL-02) were frequently dry and they were replaced by two monitoring wells (RSP 5DL and RAG13) as Plume Boundary Wells in 2019 and 2020 with Core Team approval. The text will be revised in the next EMR to correct the number of service water locations as follows:

   "The groundwater monitoring network currently includes twenty-eight wells, four seepline locations, and seven surface water locations (Figure 3) (Table 1)".

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

2. Section 3.3, Groundwater Flow Directions, Page 5 of 40: The text states that the groundwater flow in the Transmissive Zone (TZ) is radial. The text also states that the groundwater flows south towards Pond 4; however, Figure E-3 (R-Area LAZ Well Water Elevations 2020) is missing an arrow indicating flow towards Pond 4 to the south. Revise the EMR to add a flow direction arrow on Figure E-3, Page E-3 of E-8.

   Response: Agree with Clarification.

   Figure E-1 in the next EMR will include a groundwater flow path arrow towards Pond 4, as indicated in the attached revised Figure E-1. In the LAZ, groundwater flow is not as radial as in the TZ, so a groundwater flow path is not warranted in Figure E-3 for the LAZ.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

3. **Section 4.1.1, Eastern VOC Plume, Page 8 of 40:** The text states that well RAG008B reflects the increasing trend in trichloroethylene (TCE) since 2010; however, an explanation as to why RAG008B may have an increasing TCE trend is not discussed in

the text. It is noted that the observed increasing TCE trend in RAG008B could indicate vertical plume migration, especially considering its proximity to RAG008DL which has a decreasing trend. *Revise the EMR to provide an explanation for the increasing TCE trend in well RAG008.*

Response: Agree with Clarification.

In 2010, wells (e.g., RPS004C and RWT003C) closer to the R-Reactor Building (105-R) had higher concentrations of VOCs but have since decreased as this plume has moved eastward. SRS believes this portion of the plume is now impacting well RAG008B. In the next EMR, the following text will be added to Section 4.1.1:

"The elevated TCE concentrations detected at well RAG008B are likely due to a higher concentration portions of the groundwater plume migrating from the R-Reactor Building (105-R) toward Joyce Branch."

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

4. **Section 4.1.4, Northern Tritium Plume, Page 11 of 40:** The text states that the 2020 Northern Tritium Plume has decreased in size and concentration as seen on Figure 3 (RAGW Monitoring Station and 2020 Groundwater Plumes) and Figure 7 (RAGW Tritium Plumes 2010 Data); however, the northern tritium plume is not depicted on Figure 3, so no comparison is possible. *Revise Figure 3 to include the Northern Tritium Plume.*

   Response: Agree with Clarification.

   The Northern Tritium Plume is not depicted in Figure 3 because none of the wells monitoring the Northern Tritium Plume were equal to or greater than the MCL (20 pCi/mL) in 2020, which is the criteria for drawing the tritium plume. A note is posted on the map to indicate all wells monitoring the Northern Tritium Plume are less than 20 pCi/mL, essentially 0.0 m^2 in area in 2020, which is meant to be the comparison to the 2010 plume, approximately 142,000 m^2 with a maximum tritium concentration of 53.7 pCi/mL. It is certainly possible groundwater concentrations at one or more wells in the Northern Tritium Plume will exceed 20 pCi/mL in the future due to natural variation in the system. If so, the Northern Tritium Plume will be depicted on the appropriate figure, and the text will describe areal extent of the plume.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

5. **Section 5.1.1, Eastern VOC Plume, Page 13 of 40:** The text states, "Based on the 2019 and 2020 monitoring data, monitored natural attenuation (MNA) continues to be an effective remedy for the RAGW Eastern VOC Plume. The key source area well RWT003C and all plume definition wells except for RAG008B show decreasing VOC trends." It is noted the vertical extent of dissolved TCE contamination within the Eastern VOC Plume is not defined at lower aquifer zone (LAZ) well RAG008B. The most recent TCE concentration in RAG008B is 22.1 micrograms per liter (µg/L). Additionally, the TCE concentrations in RAG008B indicate an increasing TCE trend, as illustrated in Figure 13 (RAGW Easter VOC Plume Wells). Currently, it is not clear if the increasing TCE trend indicates the MNA remedy is not effective in controlling the vertical migration. *Revise the EMR to address this issue to demonstrate whether MNA is effectively mitigating vertical TCE plume migration considering the vertical extent of TCE contamination is not defined in the Eastern VOC Plume at RAG008B.*

   Response: Agree with Clarification.

   Well RAG008BL was installed in July 2021, and the initial sample indicated TCE was below the detection limit. Well RAG008BL is co-located with well RAG008B, and well RAG008BL was screened in a higher permeability layer below the RAG008B screen zone. Another sample is expected from RAG008BL before the end of the calendar year (2021), which will help determine if TCE is migrating below the screen zone of well RAG008B. The vertical migration of TCE at wells RAG008B and RAG008BL, and the effectiveness of the MNA remedy will be discussed in the next EMR.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

6. **Section 5.2, ISD Conclusions, Page 14 of 40:** The text states the 2017 and 2020 increase in tritium and carbon-14 at well RDB 3D may be due to mobilization of a small shallow legacy spill near the disassembly basin, related to the recent high-water table levels. The EMR also notes that greater than average rainfall was measured at the Savannah River Site during 2020. As such, it is unclear if the annual monitoring event is scheduled during the rainy season when high water table conditions exists to ensure representative groundwater samples are collected to monitor potential source mobilization near the disassembly basin. *Revise the EMR to state whether the in-situ decommissioning (ISD) monitoring is being conducted during the rainy season.*

   Response: Clarification.

   The SRNL Meteorological Monitoring Program at the Savannah River Site (SRNL-TR-2020-00197) indicates rainfall is fairly well distributed throughout the year, though slightly lower in the fall. The long-term averages indicate this rainfall

distribution, but the maximum monthly rainfall measurements indicate the high degree of variability from month to month. The high degree of variability for each month from year to year makes it difficult to time groundwater sampling with maximum rainfall events/periods. Table 2-2 (attached) from the SRNL report shows the average, maximum, and minimum rainfall for SRS through 2019. This variability is also indicated in the water table fluctuations in the RDB wells near the R-Reactor (figure attached). No change in monitoring frequency is planned for the RAOU groundwater.

Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

7. **Figure 5, Annual ISD Monitoring Wells (2018 through 2022), Page 23 of 40:** Several "Site Features" defined in the legend are not shown on the figure. For example; the land use control (LUC) Boundary, the R-Area Concrete Lakes, Lake/Pond Perennial and Perennial Stream are defined in the figure legend but not shown on the figure. *Revise the legend on Figure 5 as appropriate to address this.*

   Response: Agree.

   The features not present in Figure 5 will be removed from the legend in the next RAOU EMR.

   Responsible Party: Terry Killeen, (803) 952-6850, terry.killeen@srs.gov

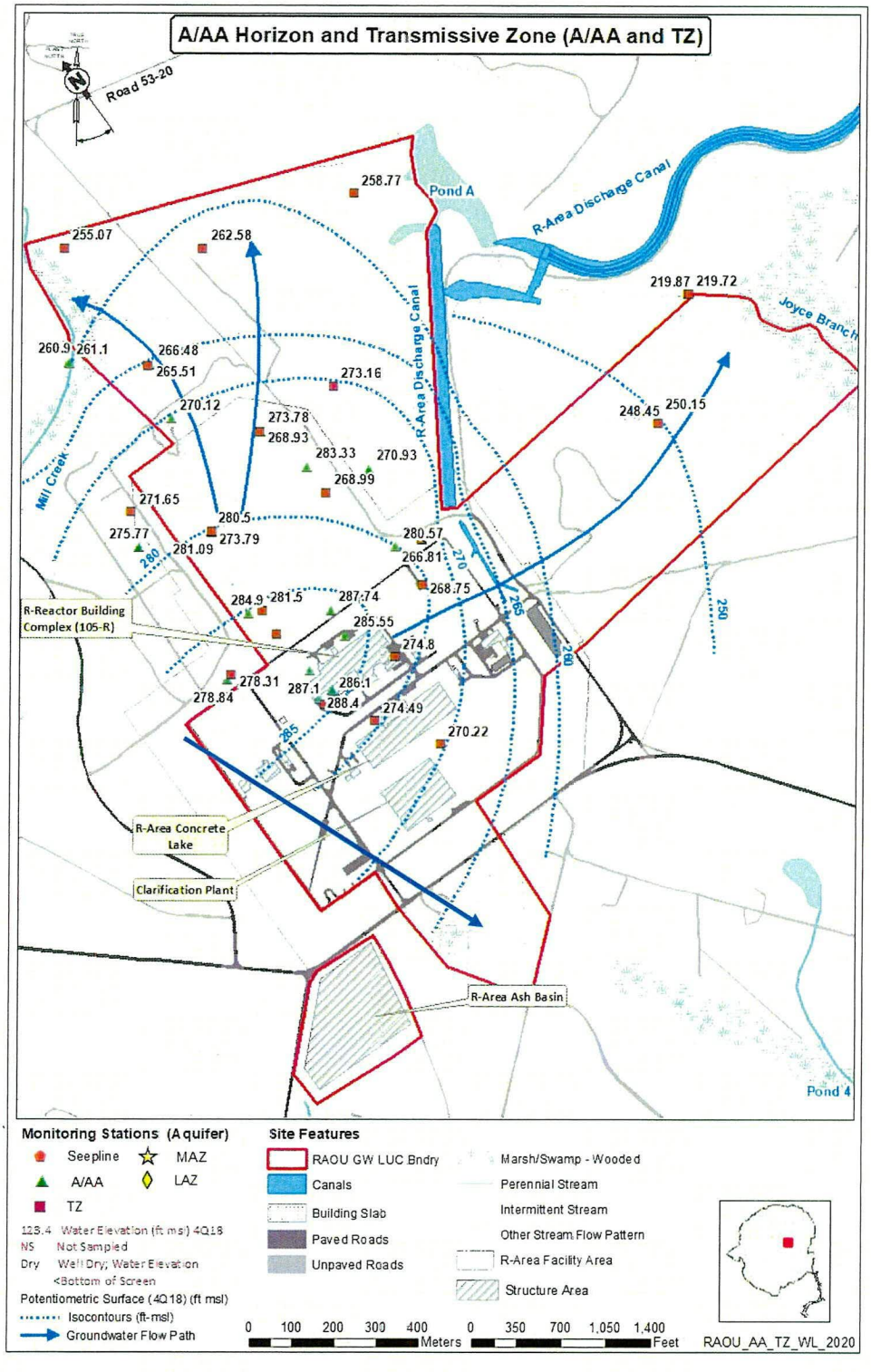
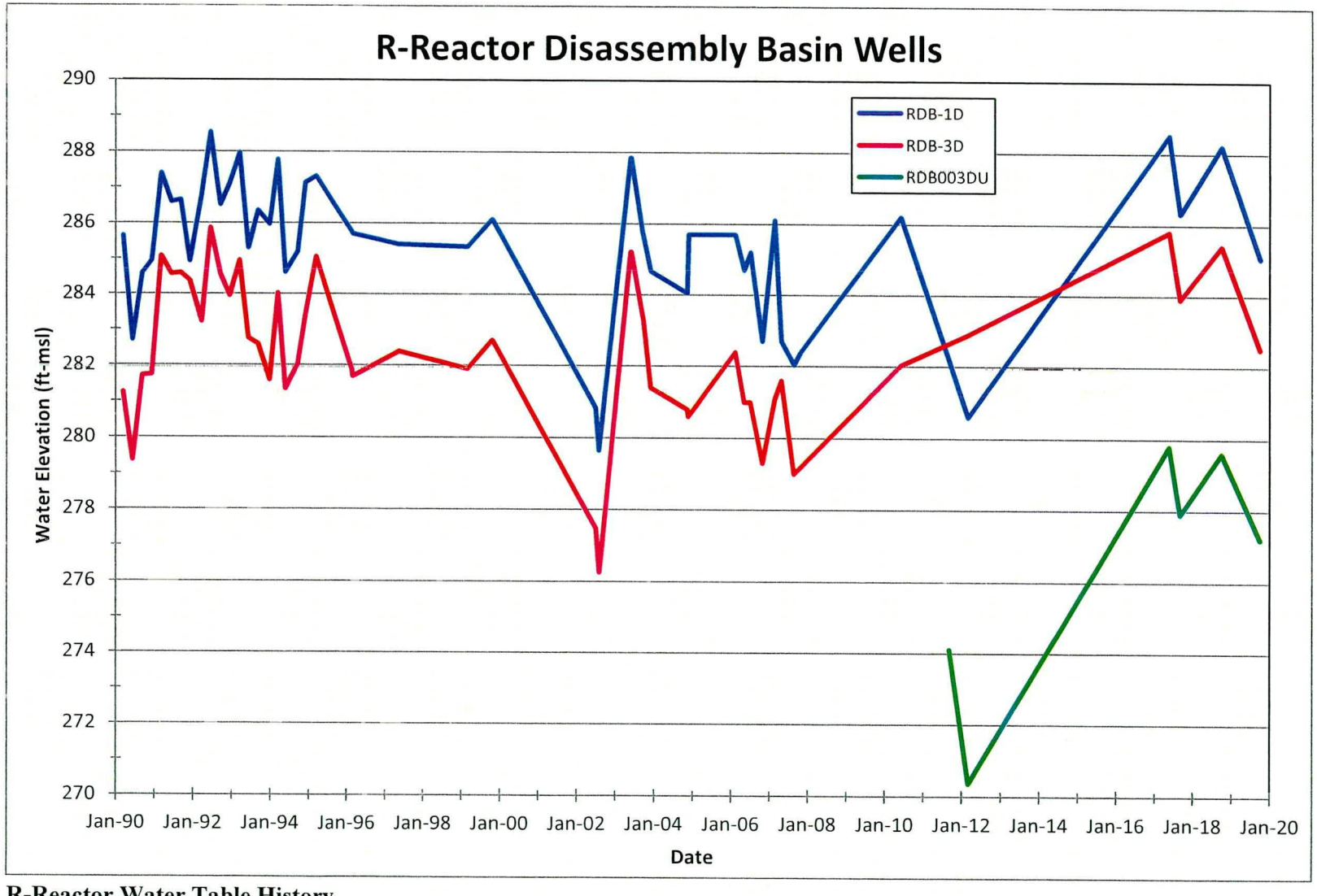


Figure E-1. R-Area TZ Well Water Elevations 2020

Table 2-2. Maximum, Minimum, and Monthly Average Rainfall at SRS (SRNL-TR-2020-00197)

Month	Average	Maximum	Year	Minimum	Year
January	3.62	10.02	1978	0.77	2013
February	3.92	10.11	2013	0.73	2000
March	3.92	10.96	1980	0.81	2004
April	3.40	8.43	2003	0.60	1972
May	3.31	10.90	1976	0.87	2015
June	4.92	12.97	1973	0.89	1990
July	5.35	13.71	1971	0.90	1980
August	4.03	12.34	1964	1.22	2015
September	3.85	10.26	2004	0.19	2005
October	2.21	19.62	1990	0.02	2000
November	2.80	7.78	1992	0.40	1969
December	4.31	10.24	2009	0.54	2001
Annual	**45.63**	**73.06**	**1964**	**33.24**	**2011**

Note: Units are in inches. The period of record for rainfall averages is 1996 through 2019 using Central Climatology. The period of record for the rainfall maximums and minimums is 1964 through 2019 taken from the annual report (Rivera-Giboyeaux 2019)



R-Reactor Water Table History