Department of Energy
Savannah River Operations Office
P.O. Box A
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JAN 2 8 2026

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 Environmental Services
2600 Bull Street
Columbia, South Carolina 29201

Mr. Jon Richards
Savannah River Site Remedial Project Manager
Superfund and Emergency Management 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 Effectiveness Monitoring Report for the Monitored Natural Attenuation (MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U) April 2024 through March 2025 (SRNS-RP-2025-00708, Revision 0, June 2025) SEMS Number: 24

In accordance with the terms of the Federal Facility Agreement (FFA), the U.S. Department of Energy (DOE) is submitting the subject comment responses for your review. The U.S. Environmental Protection Agency's (EPA) and South Carolina Department of Environmental Services' (SCDES) comments were received on September 8, 2025, and October 9, 2025, respectively. This report will not be revised; however, all comment responses will be included in the next report, as applicable. Please review the enclosures and provide your approval within thirty (30) days of receipt. The effort and time that the EPA and the SCDES have provided on this operable unit are greatly appreciated.

Questions from you or your staff may be directed to me at (803) 522-6427, or the DOE Operable Unit Manager, April Coffman, at (803) 952-7244.

Sincerely,

MATTHEW BAKER

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Date: 2026.01.27 16:23:26 -05'00'

Matthew R. Baker
Acting FFA Remedial Project Manager
DOE-Savannah River Operations Office
Remediation, Deactivation, and Decommissioning Division

RDDD-26-123

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Ms. Susan Fulmer
Mr. Jon Richards 2

Enclosures:
1. SRS Responses to the South Carolina Department of Environmental Services' Comments on the Effectiveness Monitoring Report for the Monitored Natural Attenuation (MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U) April 2024 through March 2025 (SRNS-RP-2025-00708, Revision 0, June 2025) SEMS Number: 24
2. SRS Responses to the U.S. Environmental Protection Agency's Comments on the Effectiveness Monitoring Report for the Monitored Natural Attenuation (MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U) April 2024 through March 2025 (SRNS-RP-2025-00708, Revision 0, June 2025) SEMS Number: 24

c w/o encl:
M. Reece, SCDES-Columbia
H. J. Porter, SCDES-Columbia
J. Blalock, SCDES-Columbia
S. French, SCDES-Columbia
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H. H. Cathcart, SCDES-Columbia
M. McRae, TechLaw, Inc.

SRS Responses to South Carolina Department of Environmental Services Comments on the Effectiveness Monitoring Report for the Monitored Natural Attenuation (MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U), April 2024 through March 2025, SEMS Number: 24, (SRNS-RP-2025-00708, Revision 0, June 2025)

Comments received October 9, 2025

Specific Comments

1. Section 2.2.1, Groundwater Aquifers, page 11. There are a couple of discrepancies between the total number of monitoring wells and their associated aquifer units discussed in the second paragraph of this section, Table 1 and Table 3. First, the third sentence of this paragraph states that the Pen Branch monitoring wells are not identified to a specific aquifer; however, three of these wells (CMP-PB-005D2, -006D1 and -006D2) are listed as MAZ and LAZ wells respectively in Table 1, whereas Table 3 lists aquifer-specific designations for all of the CMB-PB wells. Also, this section states there are 27 MAZ wells and 29 LAZ wells. The number of MAZ wells appears to include Pen Branch well CMP-PB-005D2 according to the number of MAZ wells listed in Table 1; yet Table 1 lists a total of 32 LAZ wells (including the two Pen Branch wells listed with LAZ aquifer units), which contradicts the number stated in Section 2.2.1 (29). The assignment of aquifers to the Pen Branch wells in Tables 1 and 3, contradictory to the statement made in Section 2.2.1, confuses the actual number of wells specific to each aquifer-type. Please clarify the discrepancies between this discussion in Section 2.2.1 and Tables 1 and 3, as well as other applicable sections, if necessary.

   Response: Clarification

   Table 1 and Table 3 correctly list the number of wells in each aquifer as follows: TZ (13 wells), MAZ (26 wells), LAZ (30 wells), and GA (7 wells). The text on page 11 incorrectly lists 27 MAZ wells and 29 LAZ wells. For clarity, future reports will not identify aquifers for the Pen Branch wells in Table 1 or Table 3, and the number of wells listed in the text will be consistent with the number listed in Table 1 and Table 3. No changes to the June 2025 EMR are proposed.

   Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

2. Section 2.2.2, Groundwater Sampling Results, page 12. For future reports, please indicate the actual number of samples that were collected for each analyte (VOCs, 1,4-dioxane and lindane) alongside the included required numbers. Also, Sections 2.2.2.7 and 2.2.2.13 indicate samples were mistakenly not collected for 1,4-dioxane at CMP062D, CMP062C and CMP062B or for lindane at CMP035B in 2Q2024. This explanation should also be included in this section as well, consistent with providing reasoning for sampling changes at the other wells listed here.

   Response: Clarification

   Future reports will indicate the number of samples that were collected for each analyte in addition to the required number of samples. Additionally, the reasons for any additional sampling or omissions will be provided.

   Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

3. Section 2.2.2.7, 1,4-Dioxane, page 23. Two sampling methods for 1,4 Dioxane are described in the first paragraph (USEPA SIM Method and USEPA 522); but when the maximum

concentrations of 1,4 Dioxane are discussed for well CMP 35D in the third paragraph, the sampling method is not mentioned. Please clarify which sampling method is used for this concentration reading and if values increased relative to the same acquisition method in 2023. Please also state which sampling technique was used for well CMP 12A values.

Response: Agree

All 1,4-dioxane samples were run with two analytical methods, and both results are shown in Table 3 for comparison purposes. Results in Section 2.2.2.7, *1,4-Dioxane* state the maximum result per station. In future reports, results for 1,4-dioxane provided in the text will also include the analytical method. For example, the maximum result for CMP 35D was 472 µg/L using analytical method 8260BSIM, and the maximum result for CMP 12A was 0.534 using analytical method EPA8270ESIM. No changes to the June 2025 EMR are proposed.

Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

SRS Responses to United States Environmental Protection Agency Comments on the Effectiveness Monitoring Report for the Monitored Natural Attenuation (MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U), April 2024 through March 2025, SEMS Number: 24, (SRNS-RP-2025-00708, Revision 0, June 2025)

Comments received September 8, 2025

GENERAL COMMENTS

1. The EMR Section 2.2.2.2, PCE and TCE, Gordon Aquifer, states that the modeling did not predict contamination would reach the Gordon Aquifer (GA) above maximum contaminant levels (MCLs); however, it is unclear how reliable this prediction is when the Green Clay Confining Zone (GCCZ) and GA were not included as modeled layers in the Groundwater Model Update for the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U), SEMS Number: 24, SRNS-RP-2024-01410, Revision 0, dated June 17, 2025 (the Model Update Report). Recently, detections of volatile organic compounds (VOCs) were observed in one GA well, CMP 12A in the second quarter 2024 (2Q2024) with tetrachloroethylene (PCE) at 2.6 micrograms per liter (µg/L) and trichloroethylene (TCE) at 1.1 µg/L. The maximum 1,4-dioxane concentration, exceeding the regional screening level (RSL) of 0.46 µg/L, was detected in well CMP 12A at 0.53 µg/L in 2Q2024. It is noted that PCE, TCE and 1,4-dioxane have historically exceeded respective maximum contaminant levels (MCLs) and regional screening levels (RSLs) in the GA on several occasions during the past twenty years. Please revise the EMR to discuss the uncertainty and reliability in the modeled contaminant mass and estimated cleanup time predictions since the GCCU and GA were not included as layers in the Model Update Report.

   Response: Clarification

   None of the CMP Pits groundwater flow and transport model efforts have included the GCCZ or the GA due to the lack of sufficient and widespread data within these zones and that fact that contamination was overwhelmingly limited to the UTRA. However, in more recent years, three GA wells (CMP 8A, CMP 12A, and CMP010AR) have displayed either occasional or consistent detections of VOCs (primarily PCE and TCE), although all concentrations have been below MCLs. Prior concentrations seen in GA well CMP010A were determined to be caused by a well casing joint fracture that was allowing contaminated groundwater from the UTRA to seep inside the GA well. Preliminary aquifer testing in the vicinity of CMP010A has indicated that average horizontal conductivity values there are in the range of 15 ft/d which is significantly less than the average horizontal conductivity values in the upper LAZ (30 ft/d) where the fracture was located. Previous EMR reports (i.e., 2020, 2021, 2022) indicate that detections in the well CMP010A (for VOCs) were at similar levels as the closest well in the upper LAZ, well CMP 10C. Compromised well CMP010A has been abandoned and replaced with well CMP010AR which remains non-detect or below MCLs. 1,4-Dioxane has been detected in a few GA wells occasionally above the RSL of 0.46 µg/L, most often at well CMP 12A.

   SRS has been investigating the GA more over the last six years, including the VOC soil sampling near the source area that extends into the GA, the installation of additional GA wells (CMP011A, CMP055A, and CMP010AR), and recent (2025) GA aquifer pump testing conducted at well CMP011A. The data collected with these efforts will allow the inclusion of the GCCZ and GA in future modeling efforts at the CMP Pits.

The EMR references the model update report in its entirety and the last two paragraphs in Section 5.0 of the model update report discuss inherent uncertainties in the model. Furthermore, the model is calibrated to be conservative (higher estimated impact) in estimating contaminant flux migration. Please refer to response to Model Comment #4 for further clarification.

Due to detections of contaminants currently below MCLs, but occasionally above RSLs within the GA, as well as some increasing trends in lower UTRA wells, the statement that "modeling did not predict contamination would reach the GA above MCLs" will be omitted from future EMRs. No changes to the June 2025 EMR are proposed.

Responsible Party: Ashley Shull, (803) 952-7090, ashley.shull@srs.gov

2. The EMR states that the effectiveness monitoring data collected through March 2025 indicates that the monitored natural attenuation (MNA) remedy is working as predicted, i.e., the cleanup timeframe for PCE was calculated at 104 years (CY 2126); however, the modeling prediction of a 104 year cleanup timeframe for PCE may not be reasonable and the MNA remedy may not be effective in restoring contaminated groundwater to beneficial use within a *reasonable timeframe*. The EMR states that based on the evaluation of monitoring data, advection and dispersion are the main MNA processes occurring along transport pathways from the source to the wetlands at the CMP Pits; however, according to the EPA MNA Guidance, biologically mediated reductive dechlorination is the primary mechanism for effective chlorinated solvent attenuation. Since biodegradation is not the primary mechanism for attenuation, MNA may not be occurring based on the chlorinated solvent concentrations being attenuated via advection and dispersion, which is not a groundwater remedy per the EPA MNA Guidance. The EMR should discuss that the next Five-Year Review prepared for the CMP Pits OU may need to identify the issue concerning potential ineffectiveness of the MNA remedy by not appearing to restoring contaminated groundwater to beneficial use within a *reasonable timeframe* per the EPA MNA Guidance, with recommendations and follow up actions to address residual contaminant mass and reduce cleanup times. *Please revise the EMR to discuss that the potential ineffectiveness of MNA may be identified as an issue in next Five-Year Review and will be addressed accordingly.*

Response: Clarification

The updated CMP Pits groundwater model's cleanup timeframe is within the original 2002 model timeframe in which the MNA remedy was selected for the ROD. It was understood at that time that biodegradation was not widely occurring at the CMP Pits OU during the selection of the remedial action for the CMP Pits groundwater OU. The EMR report discusses that some degree of biodegradation attenuation is occurring in groundwater at the wetlands and around Pen Branch as indicated by contaminant results from monitoring wells in the wetland area, the newly installed shallow Pen Branch monitoring wells, and independent results from South Carolina State University studies. SRS will be further investigating the natural processes that are occurring at the CMP Pits over the next few years. Results will be included in subsequent EMRs.

Additionally, The most recent 5-Year Remedy Review Report for SRS OUs with Groundwater Remedies included a review of the CMP Pits OU (*Seventh Five-Year Remedy Review Report for Savannah River Site Operable Units with Groundwater Remedies (U)*, SRNS-RP-2024-00934, June 2025, Rev 1, Savannah River Nuclear Solutions, LLC, Aiken SC). Although the 5-Year Remedy Review Report did not discuss cleanup timeframes for the OU, contaminant concentrations and trends were discussed and all recent CMP Pits EMRs were reviewed. Overall, LUCs were effective in preventing exposure to groundwater, the extent of groundwater plumes have decreased over time, many higher concentration areas of the plumes continue to decline, and there continues to be no impact to surface water above MCLs in Pen Branch. A similar evaluation of the MNA remedy effectiveness will be conducted for the next 5-Year Remedy Review for Groundwater Units including CMP Pits due in December 2029.

No changes to the June 2025 EMR are proposed.

Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

3. The EMR should discuss the how the modeled contaminant mass and estimated cleanup time predictions could be underestimated due the uncertainty of how much contaminant mass remains at the CMP Pits OU. The EMR states that SRS used the 2021 soil sampling data, as well as recent groundwater data, to update the source term (and plumes) in the 2017 model used to update simulated cleanup timeframes; however, the mass of residual contamination trapped within clay horizons and/or pore space in the vadose zone, in or out of the electrical resistance heating/soil vapor extraction (ERH/SVE) zone, which is a secondary source for groundwater contamination, is unknown. The EMR states that contaminants are partitioning onto clay particles and/or diffusing into less permeable layers, not only near the original source area at the CMP Pits, but also throughout the aquifer system, acting as secondary sources of contamination to groundwater. Increasing VOC concentrations in all aquifer zones, i.e., the transmissive zone (TZ), middle aquifer zone (MAZ), lower aquifer zone (LAZ) and GA) suggest potential back diffusion/desorption from the less permeable confining units, i.e., tan clay confining zone (TCCZ), tan clay lower clay (TCLC) and GCCZ. According to the EMR the confining zones are not considered thick competent confining clays, but are hummocky, vary in thickness, and can be almost non-existent or leaky in areas allowing some degree of flow between aquifers. *Please revise the EMR to discuss how the modeled contaminant mass and estimated cleanup time predictions could be underestimated due the uncertainty of how much contaminant mass remains at the CMP Pits OU and matrix diffusion.*

Response: Clarification

The last two paragraphs of the Groundwater Model Update for CMP Pits OU (SRNS-RP-2024-0140, Rev.), June 2025) discuss the uncertainties inherent in predictive capabilities of the model including quantification of the process of sorption which includes potential back diffusion. Sorption processes control how much mass flux migrates between the soil and the solution. To the extent that mass remaining in the vadose zone could be characterized, it was included in the solution phase in the transport model using the equilibrium transfer coefficient (Kd). As noted in the response to EPA General Comment #7 on the June 2025 Groundwater Model Update,

future model updates will be conducted to better simulate the remaining mass, sorption, and the back diffusion processes by using recently introduced modeling capabilities. No changes to the June 2025 EMR or Groundwater Model Update are proposed.

Responsible Party: Rohit Goswami, (803)989-5383, rohit.goswami@srs.gov

4. The EMR should discuss whether any preliminary investigation into the use of per- and polyfluoroalkyl substances (PFAS) has been conducted at the CMP Pits OU. Per the Historical and current usage of per- and polyfluoroalkyl substances (PFAS): A literature review, Linda G. T. Gaines, May 2022 (https://onlinelibrary.wiley.com/doi/10.1002/ajim.23362), PFAS have been used as an active and inert (or inactive) pesticide ingredient, and may also have been a component of other chemicals that were disposed in the CMP Pits OU. Also, at Department of Energy (DOE) sites uranium enrichment and plutonium production process areas including equipment/lubricants serve as PFAS sources since PFAS was used on an industrial scale in uranium separation activities during Manhattan Project and Cold War era operations. It is noted that restoration of contaminated groundwater to beneficial use will not be considered complete until all potential sources of groundwater contamination are sufficiently investigated. *Please revise the EMR to discuss whether any preliminary investigation into PFAS presence at the site has been conducted and if not, recommend sampling for PFAS be conducted prior to the next Five Year Review to ensure protectiveness.*

Response: Clarification

SRS previously provided PFAS data results from CMP Pits in response to EPA's General Comment #3 on the July 2024 CMP EMR and also in the most recent 5-Year Remedy Review Report for CMP Pits OU (*Seventh Five-Year Remedy Review Report for SRS Ous with Groundwater Remedies (U) – Appendix D*, SRNS-RP-2024-00934, June 2025, Rev. 1, Savannah River Nuclear Solutions, LLC, Savannah River Site, Aiken SC).

There were no disposal or excavation records that indicated that per- and polyfluoroalkyl substances (PFAS) containing chemicals or materials were disposed of at the CMP Pits. However, due to the various types of waste that were disposed of at the pits, SRS acknowledges that older chemicals could have contained these compounds. In 4Q2023, three samples were collected at two groundwater wells near the CMP Pits trenches (downgradient well Transmissive Zone well CMP 35D and upgradient Gordon Aquifer well CMP011A). Results were non-detect or of low indicated that PFAS is not a constituent of concern at the CMP Pits OU and no additional PFAS sampling at the CMP Pits OU is planned. No changes to the June 2025 EMR are proposed.

Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

SRS Responses to United States Environmental Protection Agency Comments on the Effectiveness Monitoring Report for the Monitored Natural Attenuation (MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U), April 2024 through March 2025, SEMS Number: 24, (SRNS-RP-2025-00708, Revision 0, June 2025)

SPECIFIC COMMENTS

1. **Section 1.4, Observed Hydrology at the CMP Pits OU, Page 6 of 124:** The text should explain why only a select number of wells screened in the LAZ were used to draw the potentiometric surface. For example, it is unclear why the text box on Figure 8 (2024 Potentiometric Surface for the LAZ and GA) indicates that only well screens between 130 and 150 feet above mean sea level (ft amsl) were used to generate the LAZ potentiometric surface when the cross-sections in Figures 12-14 indicate that the LAZ is present from about 95 to 190 ft amsl. *Please revise the text to explain why the LAZ potentiometric surface was drawn using only wells screens within the range of 130 to 150 ft amsl.*

   Response: Clarification

   Since the LAZ spans nearly 100 ft in thickness and has a lower flow gradient than the overlying TZ and MAZ, wells screened within differing portions of the LAZ may have varying elevations that are not representative of an equal elevation (i.e., wells CMP 10C and CMP 10B). Wells with screen zones between ~130-150 ft amsl were chosen for contouring purposes due to their abundance and widespread spatial distribution across the CMP Pits area. No changes to the June 2025 EMR are proposed.

   Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

2. **Section 1.4, Observed Hydrology at the CMP Pits OU, Page 6 of 124:** Measurements show that groundwater in the vicinity of Pen Branch flows south towards Pen Branch on the northern side of the stream, further supporting that contaminants originating from CMP Pits are not flowing underneath Pen Branch towards the north. However, historically constituents of concern (COCs) have been detected in wells located north of Pen Branch including PCE and TCE. More recently at CMP066B, dichloromethane (DCM) was detected at a low estimated value of 1.1 µg/L in second quarter 2024 (2Q2024) and 1,4-dioxane was detected at low estimated concentration of 0.0542 µg/L in fourth quarter 2024 (4Q2024). The contaminant detections in wells located north of Pen Branch suggest that under certain conditions contaminated groundwater flows to the north underneath Pen Branch. *Please revise the text to acknowledge this flow path.*

   Response: Clarification

   Although the potentiometric surface of the LAZ suggests there is a south/southwest groundwater flow north of Pen Branch, contaminants can migrate within the floodplain of Pen Branch under certain conditions. For example, COCs have been observed in wells CMP066B and CMP067B located north of the Pen Branch channel at the edge of the floodplain, potentially due to the high surface topography gradient on the southern side of Pen Branch (as shown in Figure 2 of the EMR) and/or due to subsurface turbulent flow as groundwater interacts with and discharges to Pen Branch. Future EMRs will include a discussion of potential LAZ flow patterns around and north of Pen Branch. No changes to the June 2025 EMR are proposed.

Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

3. **Table 1, CMP Pits OU MNA Monitoring Network, Page 113 of 124, and Figure 13, Cross Section B – B' at the CMP Pits OU Area with 2024 PCE Plume and Results, Page 63 of 124:** The figure shows that well CMP 15B is screened in the LAZ; however, Table 1 (CMP Pits OU MNA Monitoring Network) lists CMP 15B as a MAZ well. Also, CMP 15B is shown on Figure 7 (Potentiometric Surface for the TZ and MAZ) and in Table 3 (CMP Pits OU Annual MNA Results, April 2024 through March 2025) as a MAZ well. It is noted the CMP 15B groundwater elevation of 203.3 ft amsl is within the MAZ elevations of approximately 187 to 212 ft amsl; however, based on the CMP 15B screen elevation of 145.1 – 155.1 ft amsl, the well is screened within the middle LAZ. Also, CMP 15B is identified as a MAZ well on Figure C-2 (2024 Cation/Anion Stiff Diagrams); however, based on the cation/anion signature, CMP 15B more closely resembles the LAZ cation/anion stiff diagrams. *Please revise the EMR to address this discrepancy.*

   Response: Agree

   Well CMP 15B is a LAZ well. Well CMP 15B will be listed as a LAZ well in Table 1 and Table 3 and included in LAZ planar figures in future reports. No changes to the June 2025 EMR are proposed.

   Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

4. **Section 2.2.2.2, PCE and TCE, Lower Aquifer Zone, Page 19 of 124:** The text states, "Concentrations on the western edge of the plume (well CMP 33D) have also been decreasing since 2007 indicating the LAZ plume is contracting to the west within the LAZ," but based on a comparison of the plume configurations in the LAZ on Figure 16 (PCE Plume Comparison from 2008 and 2024 in the LAZ and GA), it appears that contamination was migrating in a westerly direction in 2008, but is now migrating to the north-northeast. It appears that (but is unclear) if the groundwater flow direction has changed. *Please revise the text to discuss changes in flow direction in the LAZ since 2008 based on the 2024 PCE plume configuration.*

   Response: Clarification

   Groundwater in the LAZ continues to migrate in a westerly direction. The difference in the PCE plumes for the LAZ in Figure 16 between 2008 and 2024 are of the result of the addition of new data from monitoring wells CMP064BU, CMP064B, and CMP065B installed in 2016. In the next EMR, a description will be added to Section 2.2.2.2 Groundwater Sampling Results, PCE and TCE describing the changes in PCE plume concentrations over time. No changes are proposed to the June 2025 report.

   Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

SRS Responses to United States Environmental Protection Agency Comments on the Effectiveness Monitoring Report for the Monitored Natural Attenuation (MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U), April 2024 through March 2025, SEMS Number: 24, (SRNS-RP-2025-00708, Revision 0, June 2025)

MINOR COMMENTS

1. **Table of Contents, Page iii of viii:** The subsections in Section 2.2.2 (Groundwater Sampling Results) are mis-numbered within the text. According to the table of contents (TOC), Section 2.2.2 contains subsections 2.2.2.1 through 2.2.2.12; however, within the body of the text, Section 2.2.2 begins with subsection 2.2.2.2 and ends with subsection 2.2.2.13. *Please revise the EMR to address this discrepancy.*

   Response: Agree

   The Table of Contents mistakenly omitted subsection 2.2.2.13. *Lindane*. Future reports will ensure the Table of Contents is populated completely. No changes to the June 2025 EMR are proposed.

   Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

2. **Section 2.2.2.2, PCE and TCE, Lower Aquifer Zone, Page 18 of 124:** The text should discuss the 2024 concentrations, not the 2023 concentrations (i.e., it appears the values are correct, but the year is wrong). *Please revise the text to state that 2024 concentrations are discussed.*

   Response: Agree

   The text correctly includes 2024 concentrations, but the text incorrectly describes the concentrations as 2023 data. Future reports will ensure the correct description is presented. No changes to the June 2025 EMR are proposed.

   Responsible Party: Ashley Shull, (803)952-7090, ashley.shull@srs.gov

GROUNDWATER MODEL UPDATE
GENERAL COMMENTS

1. The Model Update Report indicates that modeling did not predict contamination to reach the Gordon Aquifer (GA) above maximum contaminant levels (MCLs); however, it is unclear how reliable this prediction is when the Gordon Confining Unit (GCU) and GA were not included as modeled layers in the groundwater model update. It is noted that there were detections of volatile organic compounds (VOCs) tetrachloroethylene (PCE), trichloroethylene (TCE) and 1,4-dioxane in the GA wells CMP 12A, occasionally in CMP 8A and in the recently abandoned CMP 010A. The maximum detections of VOCs were observed in one well, CMP 12A in the second quarter 2024 (2Q2024) with PCE at 2.6 micrograms per liter (µg/L) and TCE at 1.1 µg/L. The maximum 1,4-dioxane concentration exceeding the RSL of 0.257 µg/L was detected in well CMP 12A at 0.53 µg/L in 2Q2024. It is noted that PCE, TCE and 1,4-dioxane have historically exceeded respective MCLs and RSLs on several occasions during the past twenty years. According to Figure 3 (Hydrogeologic Conceptual Model for the CMP Pits Site (after GeoTrans 2002a)) the GCU and GA are included in the hydrogeologic conceptual model (HCM) developed for the CMP Pits OU; however, the GCU

and GA were not discussed in Section 2.0 (Hydrogeological Conceptual Site Model). The current model predictions do not match with the current detections of contaminants in the GA, suggesting the modeled contaminant mass and estimated cleanup times are underestimated. *Please revise the Model Update Report to discuss the uncertainty and reliability in the modeled contaminant mass and estimated cleanup time predictions since the GCU and GA were not included as layers in the model update.*

Response: Clarification

The model update report does not mention any predictions about contamination reaching the Gordon Aquifer. It is acknowledged that the GCU and GA are included in Figure 3 of the model update report. However, these units were not included in the model due to lack of sufficient data. Recently, aquifer data has been acquired in the area including aquifer tests which would allow these units to be included in the next model update, potentially in FY 2027-28. The last two paragraphs in Section 5.0 discuss inherent uncertainties in the model, Furthermore, the model is calibrated to be conservative (higher estimated impact) in estimating contaminant flux migration. Please refer to response to Model Comment #4 for further clarification. No changes to the 2025 Model Update Report are proposed.

Responsible Party: Rohit Goswami, (803)989-5383, rohit.goswami@srs.gov

2. The confining units shown on Figure 3 (Hydrogeologic Conceptual Model for the CMP Pits Site (after GeoTrans 2002a)) are not depicted as being discontinuous and/or leaking in areas (Section 2.0, Hydrogeological Conceptual Model) and it is unclear whether this hydrogeological conceptual model figure is outdated based on the dated reference citation "GeoTrans 2002a." The Model Update Report states that the aquifer properties such as storage and transmissivity are employed differently for confined and unconfined layers in the model update. As such, assuming that the confining units are aquicludes that do not transmit water, are continuous and not leaky is not a realistic assumption in the model, particularly since the GCU and GA were not included as layers. The discontinuous and/or leaky confining units appear to be realistic assumptions based on detection of constituents of concern (COCs) in all the aquifers, the Transmissive Zone (TZ), Middle Aquifer Zone (MAZ), Lower Aquifer Zone (LAZ) and GA. *Please revise the Model Update Report to discuss the uncertainty and reliability of the model predictions regarding the estimated contaminant mass and cleanup time if the confining units were assumed to be aquicludes that do not transmit water.*

Response: Clarification

It is acknowledged that Figure 3 of the model update report does appear to indicate that the confining units might not be discontinuous. The CSM figure provided in the CMP Pits EMR is more appropriate in depicting the discontinuous and leaky nature of the GCU. However, paragraph 3 in Section 2.0 of the model update report states, "*Semi-continuous clay layers divide the UTRA into three different aquifer zones referred to as (from top) the transmissive zone (TZ), the middle aquifer zone (MAZ), and the lower aquifer zone (LAZ). The tan clay confining zone (TCCZ) and tan clay lower clay (TCLC) separate these aquifer zones. The confining zones, (TCCZ*

***and TCLC) are hummocky, vary in thickness, and discontinuous or leaky in areas (SRNS 2017).*" Also, Table 2 of the model update report clearly shows that the horizontal hydraulic conductivity (K_x) values (in feet/day) had variations within the TCCZ ranging from 0.21 to 0.58 and within the TCLC ranging from 0.0003 to 0.22. The vertical hydraulic conductivity (K_z) values (in feet/day) were fixed at 1/100th of the K_x in the confining zones. Therefore, the K_z values were also varied in the confining zones. The variations in both K_x and K_z values in the confining zones indicate that these zones were not modeled as continuous but as discontinuous and leaking units. Care will be taken to more accurately represent the confining units in the conceptual model figures in future model update reports. The last two paragraphs in Section 5.0 discuss inherent uncertainties in the model including simplified representation of heterogenous field conditions. No changes to the 2025 Model Update Report are proposed.**

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3. The Model Update Report states that Table 2 (Model Parameters (Post-Calibration)) lists the initial parameter values used in the current groundwater flow model; however, the table lists the post-calibration values and not the initial input values. Also, any input values that are neither site-specific values *nor* reference values must be verified to be conservative. Please revise the Model Update *Report to include a table of all initial parameter values and their source/justification as well as final parameter values, including parameter ranges and ensure a complete explanation of the input values used is included.*

   Response: Clarification

   There is a typographical error stating that Table 2 contains initial values. Table 2 contains the post-calibration values. The initial values used in the current model update were taken from the final values from the previous model update (Teta Tech, 2017). Therefore, the initial values used were site-specific and verified values. No changes to the 2025 Model Update Report are proposed.

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4. Section 3 states, "In addition, the head residuals are randomly distributed geospatially, indicating minimal spatial bias," but Figure 9 (Potentiometric Surface and Head Residuals in the MAZ) and Figure 10 (Potentiometric Surface and Head Residuals in the LAZ) indicate that the head residuals are skewed in the MAZ and LAZ since the greatest negative head residual is in the south (-5.4), while the north only includes positive head residuals. The area in the middle appears to have both, but the magnitude of the negative head residual is more than twice the highest positive head residual in the south, so the model is not spatially calibrated. The gradient appears to be skewed with lower than expected heads in the south, and higher than expected heads in the north. This means that the gradient in the model is likely higher than it actually is and predicted impacts to surface water in Pen Branch over the MCL and predicted plume cleanup times are underestimated. *Please revise the text to acknowledge the uncertainty with the calibration of head residuals and how the model predictions are impacted by the higher gradient.*

Response: Clarification

The residual is calculated as observed – simulated. There is a typographical error in Section 3 (Page 7 of 52) of the model report where it is incorrectly stated that the residual is computed by subtracting observed from simulated head. This typographical error will be revised in the future model update reports. However, based on the residual calculations a negative residual indicated a higher simulated head and vice versa. It is acknowledged that the highest negative residual (-5.4) does lie in the south and that a statistical test was not conducted to check for spatial randomness. The statement in the model update report is a subjective opinion based on an observation of distribution of the residuals. Barring the highest negative (-5.4) and positive (2.3) values in the spatial distribution, all other values appear to cluster randomly in the middle.

The gradient is actually skewed with higher simulated heads in the south and lower simulated heads in the north. Therefore, the modeled impact to surface water would be higher than observed in contaminant flux terms. Future modeling updates will conduct further statistical checks on the geospatial distribution of the residuals. The last two paragraphs in Section 5.0 discuss inherent uncertainties in the model including boundary conditions (specified head/flux) which might lead to discrepancies in the simulated gradient. No changes to the 2025 Model Update Report are proposed.

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5. Figure 9 (Potentiometric Surface and Head Residuals in the MAZ) and Figure 10 (Potentiometric Surface and Head Residuals in the LAZ) appear to be identical. It appears that both figures are the MAZ head residuals based on Figure 11 (Comparison of Modeled vs Observed Heads and Head Residuals vs Observed Heads). For example, in Figure 11 the location with the highest difference in residual head is red, indicating MAZ. This is confirmed in Table 4 (Head Residual post-Calibration Simulation) where the residual is -5.4 in CMP-063-C. Also, the LAZ figure is missing; according to Table 4 there should be a positive head residual of 5.44 in CMP-015-B, but that does not appear on either figure. *Please revise the figures as appropriate to address these issues.*

Response: Agree

Figure 10 is repeated from Figure 9 in error. The correct Figure 10 is attached (CR-Figure 10). No changes to the 2025 Model Update Report are proposed.

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6. Only one piezometric surface is plotted on Figures 8-10 and it is not clear if this is the observed or simulated piezometric surface (ideally, both would be plotted in different colors). Further, the figures lack legends. *Please revise Figures 8-10 as appropriate to clarify if the piezometric surface is simulated or observed, consider including both the simulated and observed piezometric surface, and include figure legends.*

Response: Clarification

Only the simulated potentiometric surface and model head residuals are plotted on Figures 8 -10. Because the model residuals provide an indication of the difference between observed and simulated heads, presenting a potentiometric surface developed from field observed heads is not needed. For clarity, the potentiometric source and head residuals will be further described as "Simulated Potentiometric and Model Head Residuals" in future reports as appropriate. No changes to the 2025 Model Update Report are proposed.

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7. The Model Update Report discusses that the quantification of the process of sorption is uncertain and affects the longevity of the plume and a reason the 2017 modeling effort factored in continuing sources from residual contamination/desorption from low permeable zones located beneath the CMP Pits knoll. It is noted that a new, powerful MODFLOW-USG/MDT model (Panday et al. 2017, Falta et al., 2023) is available to analyze the existing chemical data before and after remediation, which will delineate the mass diffusion (MD) parameter distributions and their uncertainties and further improve the estimated K-distribution and reduce uncertainty. *Please revise the Model Update Report to recommend the use of the MODFLOW-USG/MDT model for future CMP OU Pits groundwater fate and transport modeling.*

Response: Agree

The MODFLOW modeling platform is undergoing significant changes with various new modules and capabilities being added along with different branches of the models diverting off. Future updates to the model will strongly consider the recommendation stated in the comment to carefully select the modeling platform along with other considerations such as model technical support and compute time requirements. No changes to the 2025 Model Update Report are proposed.

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GROUNDWATER MODEL UPDATE
SPECIFIC COMMENTS

1. **Section 2.0, Hydrogeological Conceptual Model, Pages 2 and 3 of 50:** The text does not discuss the vertical gradients between the TZ, MAZ, LAZ and GA zones. Vertical gradients can influence how water moves between aquifers and how contaminants might spread. *Please revise the text to discuss the vertical gradients and impacts on contaminant transport between the aquifer zones.*

Response: Clarification

It is acknowledged that the vertical gradient is not explicitly discussed in the text. However, the text states that "*There is a significant downward component to flow from the TZ to the MAZ*

***through the TCCZ; and from the MAZ to the LAZ through the TCLC.*". Similarly, horizontal gradient is also not explicitly discussed in the text but it does state that "*... flow direction is to the north-northwest in the MAZ and towards the northwest in LAZ. All three aquifer zones discharge to Pen Branch or the unnamed tributary feeding Pen Branch from the southeast including the wetlands.*" Subsequent text describes the use of water levels as targets to calibrate the model. The model is well-calibrated and closely matches both the horizontal and the vertical flow velocities and therefore, the simulated contaminant transport. No changes to the 2025 Model Update Report are proposed.**

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2. **Section 2.0, Hydrogeological Conceptual Model, Page 2 of 50:** The text discusses that the tan clay confining zone (TCCZ) and the tan clay lower clay (TCLC) are incompetent clay units that may be hummocky, discontinuous, and/or leaky in some areas; however, the text should also discuss that the Gordon confining unit (GCU) overlying the GA (see Figure 3, Hydrogeological Conceptual Model for the CMP Pits Site (after GeoTrans 2002)) is also characterized as being discontinuous and/or leaking in areas (*Effectiveness Monitoring Report for the Monitored Natural o MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits, April 2024 through March 2025*, Revision 0, June 2025). *Please revise the text to discuss the GCU as a discontinuous and leaky unit.*

   Response: Clarification

   It is acknowledged that the GCU overlying the GA is also characterized as being discontinuous and/or leaking in areas. However, the current model update does not simulate either the GCU or the GA as aquifer layers. Future model updates are planned to include both GCU and GA as simulated aquifer layers, and the future model update report will include characterizations of the modeled units. No changes to the 2025 Model Update Report are proposed.

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3. **Figure 3, Hydrogeologic Conceptual Model for the CMP Pits Site (after GeoTrans 2002a), Page 21 of 50:** The confining units TCCZ, TCLC and the GCU are not depicted in the figure as being hummocky, discontinuous, and/or leaky in some areas as discussed in Section 2.0 (Hydrogeological Conceptual Model). *Please revise the figure to depict the confining units as described in the text.*

   Response: Clarification

   The CSM figure provided in the CMP Pits EMR (Figure 3) is more appropriate in depicting the discontinuous and leaky nature of the confining units. No changes to the 2025 Model Update Report are proposed.

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SRS Responses to United States Environmental Protection Agency Comments on the Effectiveness Monitoring Report for the Monitored Natural Attenuation (MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U), April 2024 through March 2025, SEMS Number: 24, (SRNS-RP-2025-00708, Revision 0, June 2025)

GROUNDWATER MODEL UPDATE
MINOR COMMENT

1. **Section 4.5, 1.4-Dioxane Transport, Page 14 of 20:** The text cites Figure 20 (Initial Lindane Plume for All Aquifers (end of 2022)) for 1,4-dioxane, but should cite Figure 21 (Initial 1,4-Dioxane Plume for All Aquifers (end of 2022)). *Please revise the text to cite Figure 21 for 1,4-Dioxane.*

   Response: Agree

   The text in Section 4.5, 1,4-Dioxane Transport should cite Figure 21 Initial 1,4-Dioxane Plume for All Aquifers (end of 2022). SRS will ensure that the correct figure is referenced in future reports. No changes to the 2025 Model Update Report are proposed.

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CR-Figure 10. Potentiometric Surface and Head Residuals in the LAZ

