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

FEB 28 2019

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 Effectiveness Monitoring Report for the Monitored Natural Attenuation (MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U) March 2017 through March 2018 (SRNS-RP-2018-00397, Revision 0, June 2018) SEMS Number: 24

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) approved the report on October 15, 2018 and the U. S. Environmental Protection Agency (EPA) provided comments on the report on December 3, 2018. 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 Federal Project Director, Karen Adams, at (803) 952-7871.

Sincerely,

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

IACD-19-130

Enclosure:
SRS Responses to EPA Comments on the Effectiveness Monitoring Report for the Monitored Natural Attenuation (MNA) at the Chemicals, Metals, and Pesticides (CMP) Pits Operable Unit (OU) (U) March 2017 through March 2018 (SRNS-RP-2018-00397, Revision 0, June 2018) SEMS Number: 24

cc w/o encl:
D. Scaturo, SCDHEC-Columbia
S. French, SCDHEC-Columbia
M. Reece, SCDHEC-Columbia
G. K. Taylor, SCDHEC-Columbia
G. O'Quinn, SCDHEC–Aiken Environmental Affairs Office
R. H. Pope, EPA-Atlanta

cc w/ encl:
D. Lloyd, EPA-Atlanta
M. McRae, TechLaw, Inc.

SRS Responses to EPA Comments on the Effectiveness Monitoring Report
For the Monitored Natural Attenuation (MNA) at the Chemical, Metals, and Pesticides (CMP)
Pits Operable Unit (OU) (U) March 2017 – March 2018
SEMS NUMBER: 24
SRNS-RP-2018-00397; Revision 0, June 2018
Comments received December 3, 2018

EPA COMMENTS:

1. EPA provided conditional approval in a letter dated April 17, 2018 for the previous CMP reporting effort with the understanding that 1,4-Dioxane sample quantitation limits would meet the RSL of 0.46 µg/L in future sampling events.
    a. EPA notes again in this reporting event: 1,4-Dioxane sample quantitation limits are still above the regional screening level (RSL) for 1,4-Dioxane of 0.46 µg/L. Please provide assurance that this RSL will be met in future CMP sampling events.

    Response: Clarification

    As stated in the EMR in Section 2.2.6, there is no South Carolina (SC) certified lab that has detection limits for 1,4-dioxane that can meet the USEPA tap water RSL (0.46 µg/L). SRS confirmed with the SC certified labs that a detected limit below 1 µg/L was not achievable. SRS will continue to look for and work with the labs to try to achieve the lowest possible detection limits. Future reports will continue to explain the detection limit and/or sample quantitation limit with respect to the SC certified lab capabilities if applicable.

    SRS is aware of method EPA522 that can achieve detection limits that are less than the RSL. SRS is in the contractual process of acquiring a laboratory that can use method EPA522; however, that process will be finalized sometime during 2019. The analytical method, when available, will not be a SC certified laboratory method.

    Contact: Ashley Shull (803) 952-7090 (ashley.shull@srs.gov)

2. EPA also provided conditional approval in a letter dated April 17, 2018 for the previous CMP reporting effort with the understanding that future core team discussions may be required to discuss efficacy for the chosen MNA remedy at CMP. It has been noted in the previous reporting effort and in this reporting effort that the chosen MNA remedy is not consistent with MNA guidance noted below (please see comment # 3 below and previous comments in the April 17, 2018 comment letter).

    Response: Agree

    A Core Team discussion can occur if requested by any of the Core Team parties. SRS proposes to have a Core Team discussion in the August 2019 timeframe to allow Core Team review of the most recent data to be presented in the next EMR due in June 2019. In addition, refer to the response to comment #3 below.

    Contact: Ashley Shull (803) 952-7090 (ashley.shull@srs.gov)

3. The updated groundwater model predictions and results presented in the Effectiveness Monitoring Report for the MNA at the CMP Pits OU are inconsistent with the EPA guidance *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*, OSWER Directive Number 9200.4-17P, dated April 21, 1999 (MNA Guidance). For example, the EMR states the following modeling predictions and results:

- Unstable and/or expanding plume behavior, vertical and horizontal migration;
- Chlorinated Volatile Organic Compounds (CVOCs) Plume(s) discharges above maximum contaminant levels (MCLs) to a surface water body (e.g., Pen Branch);
- Advection and dispersion are the dominant attenuation mechanisms; minor degradation and destruction of contaminants;
- Unreasonable cleanup timeframes as compared to active remediation, 91 years for tetrachloroethylene (PCE) and 48 years for trichloroethylene (TCE) to reach MCLs.

Currently, the EMR monitoring data indicate the MNA remedy is not occurring at a rate that prevents cross-media transfer of contaminants discharging from the middle aquifer zone (MAZ) and lower aquifer zone (LAZ) to surface waters of Pen Branch. Please revise the EMR to address this issue to ensure the appropriateness of the MNA remedy in attaining remedial goals within a reasonable timeframe as compared with active remediation.

Response: Clarification

The approved ROD (WSRC 2004) selected MNA for groundwater following completion of the bulk source remedial action via ERH/SVE for VOCs. Although the VOC plumes at CMP Pits do not exhibit all of the potential characteristics of a MNA remedy, plume behavior is consistent with conditions documented during the ROD remedy selection process (e.g., some plume expansion including LAZ increases in concentration, discharges above MCLs, no contaminant buildup downstream in Pen Branch, etc.). As discussed in the 2002 modeling report and ROD, Pen Branch surface water was expected to be impacted by groundwater discharges in excess of MCLs. Throughout the entire monitoring history, only one surface water sample (CMP-SW-08 during 4Q2015) has exceeded the MCL (i.e., for PCE). As indicated by the South Carolina State University (SCSU) data, contaminants are present above MCLs upgradient of surface water station CMP-SW-08 at locations prior to discharge to surface water. However, concentrations drop to non-detect in surface water and there is no discernable buildup of contaminants downstream. The SCSU studies of surface water, groundwater, and vegetation further indicate that VOC degradation in the wetlands is occurring. Degradation should be acknowledged as preventing contaminants from discharging to Pen Branch above MCLs.

The 2017 modeling results indicated that the cleanup timeframe for PCE is approximately 91 years. This is within the 50 – 130 year range of the 2002 model (adjusted to 33 to 113 years to account for the difference in the time the models were created). Based on the original 2002 model, the ROD also considered additional active groundwater remedial actions; however, the cleanup timeframe was not greatly improved or were considered cost prohibitive. The revised model results (SRNS 2017) did not significantly change the conclusions of the 2002 model and continues to support a MNA remedy when compared to active remediation. No change to the 2018 CMP Pits EMR is proposed.

Contact: Ashley Shull (803) 952-7090 (ashley.shull@srs.gov)

4. The text in the first paragraph in Section Gordon Aquifer, Page 14 of 104 states "The GA screened wells are in place to confirm contamination has not migrated farther downward than expected as described in the EMP (WSRC 2006b)." Currently, only 4 monitoring wells are screened within the Gordon Aquifer (GA) to monitor plume migration. As seen in Figure 7, 2017 Potentiometric Surface for the LAZ and GA, Page 39 of 104, no GA wells are installed north of CMP 12A and west of CMP 8A and this concern could represent a potential data gap(s) in the GA monitoring well network. For example, the text in Section Lower Aquifer Zone, Page 13 of 104 is summarized as follows:
   - PCE and TCE both increased at well CMP 32C;
   - Concentrations at seven wells (CMP 8B, CMP 10B, CMP 13B, CMP 32C, CMP 52BU, CMP 54C, and CMP058B) display increasing trends over the last nine years;
   - The majority of these wells are located in the upper portion of the LAZ;
   - Contamination in the LAZ is limited to the upper half portion of the aquifer.

   As such, based on the LAZ data, it is uncertain whether the current GA monitoring well network is adequate to monitor potential plume migration occurring in the GA north of CMP 12A and west of CMP 8A. Revise the EMR and suggest future actions as appropriate to ensure the GA is adequately monitored to detect potential plume migration.

   Response: Clarification

   SRS proposes to install two new Gordon Aquifer wells during 2019. One at the CMP 55 series location and the other at the CMP 10 series location. Future EMRs will discuss drilling activities as appropriate. No changes to the 2018 CMP Pits EMR are proposed.

   Contact: Ashley Shull (803) 952-7090 (ashley.shull@srs.gov)

5. In Section 2.2.4, Additional Data from Independent Analysis, Page 20 of 104, the text states the South Carolina State University (SCSU) reported that PCE and TCE were detected in groundwater samples at a maximum concentration of 91 micrograms per liter (µg/L) and 55 µg/L, respectively. As seen in Figure 32, Independent Pen Brach Sampling Area and Summary of 2017 Results for PCE, Page 89 of 104, the SCSU sample locations where PCE was detected exceeding the MCL are 5D1B and 5DB. As such, it is recommended that the CMP Pits surface water monitoring station CMP-SW-07 currently located downstream be relocated upstream in the general area of SCSU locations 5D1B and 5DB to ensure representative surface water samples are collected near these "hot spot" areas of Pen Branch.

   Response: Agree/Clarification

   A surface water station (CMP-SW-22) will be added 150 ft upstream of surface water station CMP-SW-07. This location will be directly downgradient of SCSU sample location 5D1B and 5DB. Surface water monitoring will continue at CMP-SW-07. SRS proposes to discontinue sampling at CMP-SW-21 (located farthest east in the Pen Branch tributary). Monitoring will

continue at the other tributary location CMP-SW-20. No changes to the 2018 CMP Pits EMR are proposed.

Contact: Ashley Shull (803) 952-7090 (ashley.shull@srs.gov)

6. The text in Section 3.0, Updated Groundwater Model, Page 22 of 104 indicates Lindane and 1,4-dioxane were modeled and are not expected to exceed maximum contaminant levels (MCLs) or regional screening levels (RSLs) at discharge locations. However, a cleanup timeframe estimate for Lindane and 1,4-dioxane contamination to be reduced to below respective MCLs or RSLs was not presented in the EMR. To ensure the cleanup of the Lindane and 1,4-dioxane contamination is progressing in a timely manner and will achieve MCLs or RSLs within a reasonable timeframe, revise the text to address this issue.

   Response: Clarification

   The 2017 updated groundwater model did not calculate a timeframe for these two contaminants in groundwater to be reduced below MCLs or RSLs. Both the 2002 model and the updated 2017 model calculated the mass in the aquifer, maximum discharge concentrations, and mass flux to discharge locations over time. As stated in the ROD, the time until the mass in the aquifer is predicted to go to zero is used as a bounding condition to estimate when the MCL is reached throughout the plume. Since 1,4-dioxane and lindane contain much less mass (approximately 4 and 5 orders of magnitude, respectively) their cleanup timeframe will be within the PCE and TCE remedial timeframes. Also see response to comment # 3. No changes are proposed for the 2018 CMP Pits EMR.

   Contact: Ashley Shull (803) 952-7090 (ashley.shull@srs.gov)

7. The potentiometric surface of the LAZ depicted in Figure 7, 2017 Potentiometric Surface for the LAZ and GA, Page 39 of 104, appears to be contoured incorrectly. As such, the flow directions depicted in the figure are uncertain based on the current interpretation of the LAZ potentiometric surface. For example, as seen in Figure 7 the 194.0 feet (ft) mean sea level (msl) iso-contour drawn around the CMP Pits waste units produces a LAZ flow direction generally from east to west. However, the monitoring wells with groundwater elevations greater than 194.0 ft msl [i.e., CMP058B (195.4 ft msl), CMP52BL (195.33 ft msl), CMP 52BU (194.98 ft msl), CMP 33D (195.19 ft msl) and CMP 54C (194.71 ft msl), were not used to construct the LAZ potentiometric surface map. The groundwater elevations in wells not used to construct the LAZ potentiometric map indicate a radial flow direction at the CMP Pits waste units. A northerly component of LAZ groundwater flow direction explains the current geometry of the PCE and TCE plumes located in the LAZ. Revise the figure to address this issue to ensure certainty in the LAZ groundwater flow direction(s).

   Response: Clarification

The LAZ is a very thick aquifer (up to 100 ft) and honoring all LAZ wells regardless of their screen zone elevation creates a potentiometric surface map with greater uncertainty. As noted by the footnote in the bottom left of Figure 7, the LAZ potentiometric surface is drawn using wells with screens that are within the range of 130 to 150 ft msl. The wells that overlap the range of 130 to 150 ft msl are mid-LAZ screened wells. These mid-LAZ screened wells are the most numerous and are spread out over the largest area including to the north of Pen Branch. The wells listed above in the comment are not screened in the mid-LAZ and are either screened in the very upper portion of the LAZ directly below the TCLC or are screened at the bottom of the LAZ. It is likely that the majority of VOC contaminants are diffusing out of the TCLC into the LAZ where horizontal flow velocities are much lower than the MAZ and TZ. In future reports the LAZ wells used in contouring will be identified on Figure 7. No changes are proposed for the 2018 CMP Pits EMR.

Contact: Ashley Shull (803) 952-7090 (ashley.shull@srs.gov)

8. In Figure 7, 2017 Potentiometric Surface for the LAZ and GA, Page 39 of 104 three groundwater flow paths are depicted in the figure. In the figure one flow path arrow is bounded by the letters A - A' the second is bounded by letters B - B' and the third is bounded by letter C – C'. However, the figure legend does not define or explain the use of the A – A', B – B' or C- C' notations. For clarity, revise the figure to address this issue.

Response: Agree/Clarification

The different groundwater flow paths shown on in the LAZ map of Figure 7, as well as the TZ and MAZ maps in Figure 6, are named differently to correspond to the calculations for groundwater flow velocities listed in Table 2. No changes to Figure 6 or Figure 7 are proposed. However, the flow paths will be referenced in Section 1.4, *Observed Hydrology at the CMP Pits OU* in future EMRs. No changes are proposed for the 2018 CMP Pits EMR.

Contact: Ashley Shull (803) 952-7090 (ashley.shull@srs.gov)