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

OCT 18 2018

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: Removal Action Design Plan with Effectiveness Monitoring Plan for the C-Area Groundwater Operable Unit (U) (SRNS-RP-2018-00807, Revision 1, October 2018) (Redline and Clean Copies) and the Savannah River Site's Responses to the Regulatory Comments on the Revision 0 Document, SEMS Number: 82

In accordance with the C-Area Groundwater (CAGW) Operable Unit (OU) removal action implementation schedule, the U.S. Department of Energy (DOE) is submitting the enclosed document and comment responses for your review. The South Carolina Department of Health and Environmental Control (SCDHEC) provided comments on the Revision 0 document on September 19, 2018 and the U.S. Environmental Protection Agency (EPA) provided approval of the Revision 0 document on September 21, 2018. Please review the enclosures and provide your comments or approval within thirty (30) days of receipt.

The effort and time 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, Ms. Karen Adams, at (803) 952-7871.

Sincerely,

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

IACD-19-103

Enclosures:
1. Removal Action Design Plan with Effectiveness Monitoring Plan for the C-Area Groundwater Operable Unit (U) (SRNS-RP-2018-00807, Revision 1, October 2018) (Redline and Clean Copies) SEMS Number: 82
2. SRS Responses to South Carolina Department of Health and Environmental Control Comments on the Removal Action Design Plan with Effectiveness Monitoring Plan for the C-Area Groundwater Operable Unit (U), SEMS Number: 82 (SRNS-RP-2018-00807, Revision 0, August 2018)

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

cc w/encl:
J. Tufts, EPA-Atlanta
M. McRae, TechLaw, Inc.

Comments Received 09/19/18

Specific Comments

1. Section 2.1, Design Overview, pages 4 and 5. At the end of the second paragraph in this section, it states, "the emulsified oil is not anticipated to migrate far from the injection points, and the treatment barrier is estimated to enhance TCE biodegradation for three to five year." Please elaborate what conditions exist that inhibit the migration of the oil and cause it to remain in place for the period of treatment.

   Response. Agree.

   As discussed in the *Protocol for In Situ Bioremediation of Chlorinated Solvents Using Edible Oil (USAF 2007),* edible oil is expected to remain in place if properly prepared and injected due to sorption or entrapment within the aquifer matrix. The edible oil process is primarily designed to generate anaerobic conditions necessary for microbial reductive dechlorination of chlorinated solvents. Under certain conditions, hydrophobic (lipophilic) chlorinated solvents will also partition into the edible oil, substantially reducing aqueous phase concentrations and/or contaminant mobility. In this process, known as sequestration, the edible oil can act as a "sponge" to quickly reduce concentrations of chlorinated solvents in groundwater. As chlorinated solvents in the aqueous phase are degraded, additional chlorinated solvent mass will be released from the edible oil due to equilibrium partitioning. Over time, continued degradation of chlorinated aliphatic hydrocarbons in the aqueous phase will lower the amount of mass that resides in the oil phase. In addition, the mass of chlorinated aliphatic hydrocarbons that is in the oil phase will also be reduced as the mass of oil is degraded. Therefore, sequestration of chlorinated solvents due to partitioning is ultimately a temporal phenomena if biodegradation of solvents in groundwater can be stimulated and sustained.

   For clarity, Section 2.1, second paragraph will be revised as follows:

   "~~However~~ <u>If properly prepared and injected</u>, the emulsified oil is not anticipated to migrate far from the injection points <u>due to sorption or entrapment within the aquifer matrix</u>.~~, and t~~<u>The</u> treatment barrier is estimated to enhance TCE biodegradation for 3 to 5 years (<u>USAF 2007</u> and USDOD 2010).

Comments Received 09/19/18

Please note that the reference citation for the *Protocol for In Situ Bioremediation of Chlorinated Solvents Using Edible Oil* will be corrected from USAF 2010 to USAF 2007 in Section 2.0 Removal Action Design and Section 6.0 References.

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