UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Sherri R. Ross
U. S. Department of Energy - Savannah River Site
AMWDP Bldg 704-S
P.O. Box A
Aiken, SC 29802

SUBJ: EPA Comments on **Draft Basis for Section 3116 Determination for Closure of F-Tank Farm at the Savannah River Site (Draft Basis Document), DOE/SRS-WD-2010-001, Revision 0 dated September 30, 2010**

Dear Ms. Ross:

The U.S. Environmental Protection Agency (EPA) has completed its review and provides the following comments on the Draft Basis Document. The purpose of the review was to determine the extent to which information presented is sufficient for demonstrating compliance with the requirements of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA). The Draft Basis Document generally provides a sufficient level of explanation to substantiate the conclusion that the stabilized residuals in the F-Tank Farm (FTF) meet the requirements of the NDAA. However, one major potential deficiency remains in the information presented related to the Performance Assessment modeling and NDAA compliance which was discussed during a December 14, 2010 teleconference call that SRS hosted for the Nuclear Regulatory Commission (NRC). The NRC raised the concern that review of reference document WSRC-TR-2007-00283 revealed information pertaining to the presence of voids in the subsurface at the FTF, known as Calcareous Zones, which may exist in the lower zone of the Upper Three Runs (UTR) Aquifer. Presence of voids in the subsurface could lead to preferential flow pathways for movement of contaminants in the subsurface, which could potentially and significantly impact the conclusions of the current performance assessment (PA) modeling. It is unclear if the PA modeling considered the scenario of void volumes and preferential pathways in the subsurface. Since the results of risk assessments and dose projections are based on the PA modeling, uncertainty regarding the risk assessment conclusions impacts the conclusions reached in the Draft Basis Document regarding the evaluation of removal of Highly Radioactive Radionuclides (HRRs) to the maximum extent possible (MEP) as a condition of NDAA compliance. The Draft Basis Document will need to be revised to state whether Calcareous

Zones and the potential for preferential flow pathways was considered in the PA modeling before any conclusions can be drawn about the sufficiency of the information provided with respect to exhibiting compliance with NDAA requirements. Additional comments have been provided to promote consistency and clarity in the Draft Basis Document.

If you have any questions, please contact me at 404-562-8533.

Sincerely,

Martha Berry, Senior RPM
NC/SC/GA Federal Oversight Section
Federal Facilities Branch
Superfund Division

Enclosure

cc: M.A. Flora, SRNS-ACP (Signed Original)
Brian Hennessey, DOE
Van Keisler, SCDHEC-Columbia
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EPA COMMENTS ON THE DRAFT BASIS FOR SECTION 3116 DETERMINATION FOR CLOSURE OF F-TANK FARM AT THE SAVANNAH RIVER SITE DOE/SRS-WD-2010-001, REVISION 0 SEPTEMBER 30, 2010

SAVANNAH RIVER SITE AIKEN, SOUTH CAROLINA

The Draft Basis for Section 3116 Determination for Closure of F-Tank Farm at the Savannah River Site, DOE/SRS-WD-2010-001, Revision 0 dated September 30, 2010 (Draft Basis Document) was reviewed to determine the extent to which information presented therein was sufficient for demonstrating compliance with the requirements of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA).

I. GENERAL COMMENT

1. The text in Section 2.4, Radionuclide Inventory in F-Tank Farm Facility Systems, Structures and Components, of the Draft Basis Document discusses the methodology for adjusting the radionuclide inventory for modeling purposes. However, the explanation of how radionuclides with inventories of less than one curie (Ci) are adjusted requires clarification. The text in the last paragraph on Page 2-68 states "For a majority of the radionuclides with an adjusted inventory less than one curie, the inventories were adjusted to either one curie or the analytical detection limit (1.0E-03 Ci). This allows more efficient and cost effective means of confirming concentrations within residual materials for radionuclides with a limited potential impact to dose. For those radionuclides that have been observed (through previous analyses or scoping studies) to have greater potential impact on the overall dose, the inventory was adjusted to the analytical detection limit." It is unclear why radionuclides which have a greater potential impact on dose would be adjusted to the analytical detection limit of 0.001 Ci, rather than the higher concentration of one Ci. The text in Section 2.4 does not state why it was decided to adjust radionuclide concentrations for isotopes that have the greater impact to dose to the detection limit, while other radionuclide concentrations were adjusted to one Ci. Additionally, since current laboratory radioanalytical methods are capable of detecting individual radionuclides at much smaller quantities than 0.001 Ci, it is unclear what instrumentation was used to quantitate the radionuclide concentrations referenced in this section of the text, or how the 0.001 Ci analytical detection limit was derived. Provide a response, and as appropriate, revise the Draft Basis Document to provide additional explanation regarding how the referenced analytical detection limits were obtained and why the inventory adjustments were made as described in the text.

II. SPECIFIC COMMENTS

1. Table 2:1-5, Summary of Maximum Groundwater Monitoring Results for Major Areas that Outcrop to Fourmile Branch, 2007-2007, Page 2-28: As gross alpha and beta should only to be used for screening, the specific alpha and beta radionuclides need to be provided. Once either individual radionuclides are known to exist or the Safe Drinking Water Standards are exceeded (15 pCi/L, gross alpha, & 50 pCi/L) then specific radionuclides are to be analyzed for, and compared against, either individual Maximum Contaminant Levels (MCLs) or, if no MCLs exist, risk-based levels.

2. Section 2.1.8, Natural and Background Radiation, Page 2-28: The overall chemical background exposure (e.g. from Table 2.1.3) should be provided if the overall radiation background is given. Just showing how SRS radiation releases compare to the overall radiation background doses is not sufficient (although common and convenient due to known general background sources of radiation). To give perspective, this should also be done for metals and chemicals.

3. Section 2.4, Radionuclide Inventory in F-Tank Farm Facility Systems, Structures, and Components, Page 2-65: Can analysis from previous leaks be used to help provide source types, or % or types of particular radionuclides in a given tank?

4. Section 2.4.1, Residual Inventory for Tank Annuli, Inside Failed Cooling Coils and Internal Tank Surfaces, Page 2-69: The text in Section 2.4.1 states that cooling coils with the potential for residual waste holdup will be evaluated and flushed appropriately. However, the text does not state how cooling coils that are not well positioned for access or flushing, or that have been bent or broken due to cleaning activities, have been evaluated to determine if these coils still contain residual waste. Additionally, the text does not discuss whether the cooling coils may contain void volume that cannot be eliminated with grouting. Provide a response, and as appropriate, revise the Draft Basis Document to state how or whether cooling coils that are bent or broken were evaluated to determine whether they contain waste or void volume.

5. Section 2.5, Residual Waste Stabilization, Page 2-71: Section 2.5 states that cooling coils will be grouted to minimize void spaces, to minimize fast flow pathways, and to provide stability. However, this section does not state how cooling coils that were bent or broken due to cleaning activities can be assured to be filled with grout in order to eliminate void volumes that may serve to function as fast flow pathways for water movement or contaminant migration. Revise Section 2.5 to state how damaged cooling coil voids will be minimized or eliminated and/or if void volumes in cooling coils were modeled in the F-Tank Farm Performance Assessment (PA).

6. Section 5.1.3, Highly Radioactive Radionuclides Based on 100-Meter Groundwater Analysis (For Member of the Public Following Closure), Page 5-4: The third paragraph in Section 5.1.3 states that those radionuclides with an aggregate contribution to dose of less than or equal to 1.25 millirems per year (mrem/year) were eliminated from the Highly Radioactive Radionuclide (HRR) list. This screening for a member of the public assumes peak doses were appropriately

modeled. In light of concerns raised regarding the presence of Calcareous Zones in the lower zone of the Upper Three Runs aquifer (UTR) as discussed during the December 14, 2010 teleconference hosted by the Savannah River Site (SRS) with the Nuclear Regulatory Commission (NRC) regarding the Draft Basis Document, uncertainty exists as to the robustness of the modeling for contaminant migration in the PA modeling because it is unclear whether these Calcareous Zones were appropriately accounted for in the model(s). Therefore, it is unclear if open conduits may exist or may develop along the projected contaminant migration pathways which would alter the migration rate of radionuclides and would alter the human health risk assessment conclusions regarding public exposure at the 100 meter compliance point. Provide a response to address the concern that Calcareous Zones may not have been accounted for in the PA Modeling which may affect the results of the contaminant migration modeling and projected dose to a member of the public at the 100 meter compliance point. Additional information is requested in order to demonstrate that current PA modeling and risk assessment conclusions are sufficiently justified as support for the Draft Basis Document conclusion. Additional text is needed discussing that the screening of radionuclides for designation as HRRs is adequate for the purposes of showing compliance with the NDAA requirement that HRRs have been removed to the maximum extent possible.

7. Section 5.1.3, Highly Radioactive Radionuclides Based on 100-Meter Groundwater Analysis (for Member of the Public Following Closure), Page 5-4, [& also Section 5.2, Page 5-9]: Instead of using 1.25 mrem/yr as the lower limit, should MCLs be considered (i.e. the equivalent pCi/L to the 'old' 4 mrem/yr dose nomenclature - may in many cases be now equivalent to approx. 1 mrem/yr or so [e.g. Tc99: 900 pCi/L MCL is ~ 1 mrem/yr using today's conversion factors])? Additionally, EPA considers the 25 mrem/yr "all pathways dose limit" as being above the CERCLA risk range, 10-6 to 10-4, and thus not protective under CERCLA (obviously, if the risk range is achieved, then DOE's dose will be met as well).

8. Section 5.1.4, Highly Radioactive Radionuclides Based on Air Pathway Analysis (For Member of the Public Following Closure), Page 5-5: The air pathway evaluation for HRRs is based on information obtained from the F-Tank Farm PA modeling for radionuclide release and migration, which concludes the aggregate concentration of radionuclides in air media at the 100-meter compliance point, will not result in a dose greater than 0.2 mrem/yr. As such, the text in Section 5.1.4 states that this pathway was eliminated from consideration as one which includes HRRs. In light of concerns raised in the December 14, 2010 SRS/NRC teleconference regarding the presence of Calcareous Zones in the UTR aquifer, additional information which supports that current PA modeling adequately accounts for the potential voids created by Calcareous Zones should be provided. This information is required to provide adequate support to statements that HRR screening for the air pathway is sufficiently justifiable, in accordance with the NDAA Section 3116 requirements.

9. Section 5.1.5, Highly Radioactive Radionuclides Based on Intruder Pathway Analysis, Page 5-5: Section 5.1.5 states that radionuclides shown to result in a dose contribution to the inadvertent intruder which in aggregate, contributed a dose of less than or equal to 25 mrem/yr, were screened from the HRR list. In light of concerns regarding the presence of Calcareous

Zones in the UTR aquifer, additional information supporting that current PA modeling adequately accounts for the potential voids created by Calcareous Zones should be provided. This information is required to provide additional support to statements that HRR screening for the Intruder pathway is sufficiently accurate, in accordance with the NDAA Section 3116 requirements.

10. Section 5.1.5, Highly Radioactive Radionuclides Based on Intruder Pathway Analysis, Page 5-5: The text in Section 5.1.5 does not describe the exposure scenario assumed for the intruder Pathway analysis. Therefore, the conclusions are not well supported by statements provided regarding the screening of HRRs. For clarity in understanding the process that supports conclusions regarding HRRs for the Intruder scenario, revise this section of the Draft Basis Document to qualitatively describe what intruder exposure assumptions were considered in determining which radionuclides were determined to not contribute to dose greater than 25 mrem/yr (i.e., ingestion, direct exposure). Alternatively, include text that refers the reader to Section 7, The Waste will be Disposed of in Accordance with the Performance Objectives Set Out in 10 CFR 61, Subpart C, which describes the exposure scenarios.

11. Section 5.1.5, Highly Radioactive Radionuclides Based on Intruder Pathway Analysis, Page 5-6, last paragraph: Has the 500 mrem/yr peak intruder dose been approved by SC and EPA? Is 100 yrs after closure long enough to exclude CERCLA's risk range?

12. Section 5.2.2, Waste Removal Technologies, Page 5-10: Section 5.2.2 references use of a systematic process to identify, evaluate, and select equipment for waste removal for previously cleaned tanks and that the process is documented in a "Systems Engineering Evaluation." While it appears that a formal process was used to implement the best available technology during previous waste removal activities, it is not clearly stated what specific processes will be implemented to address alternative waste removal techniques in future actions. For example, what selection process will be used for Type I tanks where it has been determined that existing technologies used in Type IV tanks will not be deployable? Additional information should be provided in the Draft Basis Document addressing the process that will be used for technology screening and selection.

13. Section 5.2, Removal of Highly Radioactive Radionuclides to the Maximum Extent Practical (MEP), Page 5-9: Section 5.2 and its subsections discuss the removal of highly radioactive radionuclides (HRRs) and Section 5.3 discusses removal of HRR to the Maximum Extent Practical (MEP). These sections discus selection, deployment, and evaluation of existing technologies to remove HRR to the MEP, with a particular focus on previous removal actions in Type IV tanks. It is noted on page 5-12 that Type I tanks represent: "…the most challenging tank for waste removal activities due, in part, to a limited number of access points compared to a Type III/IIIA tank, the presence of roof support columns in the Type I tanks, and horizontal [coiling] coil runs at the bottom of the waste tank including stacked horizontal runs (often referred to as "fences")…" While the information provided in the Draft Basis Document is quite detailed on the selection and deployment of heel removal technologies for Type IV tanks, there is relatively little information regarding planned or contemplated technologies for removal of

HRRs in the more challenging Type I and III/IIIA tanks. Additional information on anticipated methods for HRR removal to the MEP in Type I and III/IIIA tanks should be provided.

14. Section 5.3, Removal of Highly Radioactive Radionuclides to the Maximum Extent Practical, Pages 5-17 and 5-18: Neither the text in Section 5.3, nor the graphs in Figure 5.3-1, Tank 18 Waste Removal and Figure 5.3-2, Tank 19 Waste Removal, state what the specific volume of waste remaining in the tanks is estimated at the completion of the Phase Four heel removal. In order to better understand the amount of material left in the tanks in relation to the estimated inventories of radionuclides, it is recommended the volume of material estimated to be left in each of the waste tanks 18 and 19 be provided in the text in Section 5.3. Additionally, consider revising the figures for tanks 18 and 19 to include volume amounts of material on the graph.

15. Section 5.4, Conclusion, Page 5-19: The Conclusion, states: "Removal of HRRs to the MEP in FTF waste tanks and ancillary structures occurs through a systematic progression of waste removal and cleaning activities using proven technologies to a point where further removal of HRRs is not sensible or useful in light of the overall benefit to human health, safety and the environment." It is not clear what specific decision processes will be used to establish when HRRs have been removed to the MEP. The Draft Basis Document should provide more specific information on how this determination will be made. It would seem appropriate to include more specific descriptions, or acceptance criteria, regarding how DOE will establish that "further removal of HRRs is not sensible or useful."

16. Section 6.3.2, Site Specific FTF Waste Concentration Calculation Averaging Expressions, Page 6-5: Section 6.3.2 states: "The impact of drilling into a waste tank was also considered in the FTF PA with respect to the acute intruder, the well driller. Since the likelihood of a well driller penetrating a waste tank is very remote based on local drilling practices that would terminate the drilling once significant resistance is encountered, a chronic intruder was not assessed." Section 6.3.2.3 states: "The FTF PA probabilistic model was utilized to determine the dose to the chronic intruder assuming the 1-meter well contaminated source and one of the three drill cutting sources including a 3-inch diameter transfer line, a 4-inch diameter transfer line or waste tank." The reviewer could not identify probabilistic dose assessment results for the chronic tank intruder in the FTF PA. It is possible that such an analysis could predict significant dose to the chronic tank intruder, potentially in excess of the scenarios involving breach of a transfer line. If DOE performed this assessment, the results should be provided and discussed. If this assessment was not performed, it would seem appropriate to consider this potential future scenario.

17. Section 6.4, Waste Concentration Calculation, Page 6-10: Section 6.4 and its subsections provide calculations of radionuclide concentrations and compare the concentrations to the Class C concentration limits in 10 CFR 61.55. Section 6.4.1 states that "...the best estimate residual radionuclide inventory and residual volume for Tank 18 based on actual final characterization results is used..." to represent radionuclide concentrations in FTF tanks because "...Tank 18 is the primary contributor to the peak dose in the FTF." Additional information should be provided to justify the applicability of Tank 18 residual concentrations as a representative or conservative

waste classification basis for all tanks in FTF. For example, it is possible that Type I tank residuals will be greater than Tank 18 due to the challenges associated with heel removal in Type I tanks. Alternatively, it may be appropriate to classify tanks individually or by type based on anticipated post-cleaning residual radionuclide inventories.

18. Section 6.4, Waste Concentration Calculation, Page 6-10: Section 6.4 and its subsections provide calculations of radionuclide concentrations and compare the concentrations to the Class C concentration limits in 10 CFR 61.55. Waste classification calculations are provided in for waste tanks and transfer lines in Sections 6.4.1 and 6.4.2, respectively. Waste classification calculations are not provided for ancillary structures. The reviewer did not identify an appropriate justification for exclusion of these structures. Waste classification calculations should be performed to address ancillary structures or an appropriate justification for their exclusion should be provided.

19. Section 6.0 and Section 7.0 (complete): Section 6.0 and its subsections establish that FTF stabilized residuals at closure will meet the concentration limits for Class C low-level waste. Section 7.0 and its subsections establish that the stabilized residuals at closure will be disposed of in compliance with the performance objectives for land disposal of low-level waste (10 CFR 61, Subpart C). Determinations in each of these sections are, in part, based on results of past waste removal actions and anticipated results of future removal actions. It is possible that future waste removal actions may not be as effective as anticipated. The reviewer could not identify how, or if, the actual results of future waste removal actions will be evaluated against the assessments in the Draft Basis Document. Will final post-removal characterization data be used to confirm that the stabilized residuals meet the Class C waste concentration limits and that they are suitable for shallow land disposal? If so, the Document should specifically state this.