

February 23, 2011

NOTE TO: File PROJ0734

FROM: James Shaffner, Project Manager **/RA/**
Low-Level Waste Branch
Environmental Protection
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Division of Waste management
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Office of Federal and State Materials
and Environmental Management Program

SUBJECT: SUMMARY OF TELECONFERENCE BETWEEN U.S. NUCLEAR
REGULATORY COMMISSION STAFF AND U.S DEPARTMENT OF ENERGY
REPRESENTATIVES CONCERNING REQUESTS FOR ADDITIONAL
INFORMATION PERTAINING TO THE DRAFT WASTE DETERMINATION AND
RELATED PERFORMANCE ASSESSMENT RELATED TO THE CLOSURE OF
THE F AREA TANK FARM AT THE SAVANNAH RIVER SITE

On January 27, 2011, the U.S. Nuclear Regulatory Commission (NRC) staff convened a meeting between the U.S. Department of Energy (DOE) technical staff and contractors to afford DOE an opportunity to better understand the bases for NRC requests for additional information related to the draft basis document and related performance assessment in support of the closure of F Area Tank Farm at the Savannah River Site. This was the second of a series of such meetings to occur on successive Thursdays through February 24, 2011.

Meeting Participants are included in Enclosure 1; Summary of discussion is included in Enclosure 2.

Docket No.: PROJ0734

Enclosures:

1. Meeting Participants
2. Summary

cc: D. Watters, USACOE
M. Varga, SCDHEC

CONTACT: James Shaffner, FSME/DWMEP
(3010 415-5496)

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ML110450654

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List of Participants
Teleconference with U.S. Department of Energy Staff
Re: Savannah River Site, F Area Tank Farm

January 27, 2011

<u>Participant</u>	<u>Affiliation</u>
Sherrí Ross	DOE Savannah River (DOE-SR),
Linda Suttora	DOE Headquarters (DOE-HQ),
John Greeves	DOE-HQ Consultant
Steven Thomas	Savannah River Remediation (SRR)
Larry Romanowski	SRR
Rana O'Bryant	SRR
Mark Layton	SRR
Greg Flach	Savannah River National Laboratory
Cynthia Barr	U.S. Nuclear Regulatory Commission (NRC)
Christopher Grossman	NRC
Leah Spradley	NRC
James Shaffner	NRC
Roberto Pabalan	Center for Nuclear Waste Regulatory Analysis (CNWRA)
Cynthia Dinwiddie	CNWRA
David Pickett	CNWRA
Xihua He	CNWRA
Ronald Green	CNWRA
Dave Watters	U.S. Army Corps of Engineers - EPA Consultant

Meeting Summary

Public Technical Exchange between the U.S. Nuclear Regulatory Commission and U.S. Department of Energy

January 27, 2011
1-5 p.m.

After introduction of participants, both U.S. Nuclear Regulatory Commission (NRC) and U.S. Department of Energy (DOE) staff offered brief opening remarks affirming the purpose and desired outcome of the technical exchanges. Technical topic areas for this meeting include requests for additional information (RAIs) and Clarifying Comments (CCs) related to near field (NF) considerations, performance assessment (PA), uncertainty analysis (UA), far field considerations (FF) and intruder analysis (IT).

NF

Discussions related to near field issues were resumed to consider RAIs and clarifying comments not addressed on January 20, 2011.

RAI NF 7 - Regarding K_d verification. DOE should provide more support regarding K_d testing. DOE should document sorption testing approach and results with respect to the potential effects of solubility on the adopted K_d values.

Status: No further clarification is required.

RAI NF 8 - Regarding confidence that iron co-precipitation will constrain Pu and Tc release. This is considered a critical issue because of the potential dose consequences related to these isotopes. There are still questions about the Tc solubility fraction. DOE indicated they had new PNNL references regarding iron co-precipitation. NRC provided reference numbers for PNNL reports that indicated variability with respect to Hanford tank sludges. NRC inquired about timeframes for characterization of tank sludges (e.g., mineralogy, radionuclide retention, and leachability).

Status: No further clarification is required.

RAI NF 10 - Regarding chemical transition times. It was agreed that it is difficult to identify exact transition times. However, NRC is looking for enhanced documentation to support decisions.

Status: No further clarification is required.

RAI NF 11 - Regarding of solubility controlling phases. NRC is looking for a risk informed analysis focused on key radionuclides.

Status: No further clarification is required.

CC NF 1-5 - With minimal discussion, DOE was comfortable with understanding of NRC concern.

Status: No further clarification is required.

CC NF 7, 8, 11, 13, 14 - With minimal discussion, DOE was comfortable with understanding of NRC concerns contained in these clarifying comments.

Status: No further clarification is required.

PA

RAI PA 1 - Regarding a number of concerns related to the base case. DOE asked if NRC has specific concerns unique to this RAI or is it a composite comment against the base case asking DOE to consider the other RAIs in total. NRC indicated this is a roll-up RAI in the sense that it encompasses concerns included in other RAIs. The primary purpose of the RAI was to indicate areas of disconnect between NRC and DOE where DOE had indicated it had made a conservatism assumption in the basecase scenario and NRC did not agree. NRC staff thought the RAI lended itself to a roll-up RAI to state that all of NRC's concerns should be considered cumulatively in determining if the basecase was sufficiently conservative given the amount of uncertainty in the modeling predictions. DOE asked NRC to provide a list of RAIs linked to RAI PA-1. Discussions revealed a difference of opinion regarding the meaning of a conservative approach. There was an agreement in principle for future work to support. NRC indicated that comment resolution through Future Work (PA Section 8.2) would be acceptable, but Section 8.2 should be more specific. This RAI also discussed the need to consider NRC comments in totality in determining whether the basecase scenario was sufficiently conservative (i.e., tends to over- rather than under-predict potential peak dose) given uncertainties in modeling assumptions. Yet, NRC indicated that it might be premature to run an alternative basecase at this time until other technical issues were resolved (i.e., DOE and NRC may not be able to agree on an alternative basecase configuration at this time). A number of RAIs related to the concerns with development of parameter distributions for the probabilistic assessment were also discussed with respect to the potential for high risk realizations to be diluted in the overall statistics presented for all configurations. DOE will explain considerations in probabilistic results, indicated that the probabilistic results represented variability in results and multiple times where failure may occur. There may need to be more collaboration to develop an approach to completely address this RAI. It may be appropriate to link responses to other RAIs to this one.

Status: There may be a need for additional discussion to clarify technical issues implicit in RAI.

RAI PA 2 - Regarding treatment of features, events and processes (FEPs). DOE asked if NRC has specific scenarios in mind that were missed by not using a different process for identifying and evaluating FEPs. NRC did not have specific scenarios in mind. NRC had a general concern that potentially risk-significant features may have been omitted from the analysis. It was not clear if DOE had a process to identify important FEPs, and if other FEPs had been considered and evaluated but not discussed in the PA. Treatment of FEPs impacts appeared inconsistent to NRC staff.

Status: No further clarification is required.

CC PA 1 - Regarding consequences of degradation products. DOE asked if the NRC had specific concerns regarding the modeling impact of colloidal transport facilitated by the presence of corrosion or cementitious material degradation products. NRC did not have specific concerns in mind, but wanted the issue addressed in general, even though the NRC recognized that there is not a wealth of information in this area. NRC is looking for additional information to support DOE's technical position.

Status: No further clarification is required.

CC PA 2 - Regarding barrier analyses for natural systems. DOE treated natural systems different from man-made systems. NRC suggests reconsidering in future work.

Status: No further clarification is required.

CC PA 3, 4 - Regarding capabilities of tank system as a barrier to inadvertent intrusion.

Status: Regarding previous comments re; barrier analysis, NRC agreed to provide a document addressing the approach to barrier analysis use in the HLW program.

CC PA 5 - Regarding ambiguities in barrier analysis in various cases (e.g., contaminated zone and tank grout both affect chemistry of waste zone). According to DOE, barrier analysis is not mechanistic. There is a need to reconcile conflicting fates based on interactions of different barriers. DOE agreed to clarify explanation of apparent inconsistencies. NRC noted that Case 2, instead of Case 1, should have been referenced in second sentence.

Status: No further clarification is required.

CC PA 6, 7, 8 - Regarding capability of various concrete components. After limited discussions DOE understands concerns and will address.

Status: No further clarification is required.

FF

RAI FF 1 - Regarding calcareous voids or soft zones beneath site. DOE explained the current understanding on soft zones and asked if there were areas of concern beside 1) stability, 2) flow, and 3) transport. The main issues are the impact of calcareous soft zones on flow and contaminant transport. According to DOE, these are not cavities but soft zones that were displaced/compacted by grout. DOE has assumed homogeneity of subsurface materials over the distance from the tanks to the 100 meter point of compliance. NRC indicated these were the areas of concern. SRR asked if the NRC believe that the Calcareous zones might have an impact on flow that isn't currently captured in the site groundwater flow data. The NRC is concerned that the SRS well data might not reflect flow impacts. NRC suggests considering other possible points of discharge along seeps or springs. Monitoring wells along the flow path may not provide conclusive evidence of preferential pathways due to the relatively low likelihood of encountering a pathway. Perhaps a tracer study is warranted. It was acknowledged that there is difficulty in identifying preferential flow. NRC indicated that it has identified a new reference that it is trying to obtain: "Case Studies of the Effect of Subsurface Pseudo-Karst on

Preferential Contaminant Transport at the SRS, SC,” International Symposium and Field Seminar on Karst Waters and Environmental Impacts, Antalya, Turkey, by P.A. Thayer, M.K. Harris, and G.C. Blount. DOE indicated that NRC’s MOX EIS contains information on calcareous zones at SRS.

Status: No further clarification is required.

RAI FF 2 - Regarding variations in representations of hydraulic heads. DOE wished to clarify basis for concern and suggested some limitations in hand contouring.

Status: No further clarification is required.

RAI FF 3 - Regarding dispersion modeling in the FTF models. DOE asked for the names of the specific groundwater studies referred to in this RAI. NRC indicated that the studies were listed in the Composite Analysis for A-Area, M-Area and D-Area.

RAI FF 4 - Regarding impact of variably grouted Calcareous zones on sorption coefficients. DOE stated that they planned on addressing the impact of the soft zones on sorption as part of FF-1. This RAI appears to be focused on the impact of the grout on those soft zones. NRC agreed. SRR asked if showing that the Kds being used for the FF are conservative relative to variably grouted calcareous strata would address this RAI. NRC had no issues with this approach. NRC explained that the effect of grout on contaminant migration and its geochemical imprint should be considered.

Status: No further clarification is required.

RAI FF 5 - Regarding assumption of 100-m compliance point. NRC would like additional information to better understand the hydrogeological conceptual model. For example, maximum concentrations in the Gordon aquifer could be beyond the 100-m compliance point based on plume depictions in the DOE’s PA. Aquifer selection was identified as an important parameter in DOE’s sensitivity analysis with the Gordon aquifer representing the most likely location of a well in the probabilistic assessment.

Status: No further clarification is required

RAI FF 6 - Regarding benchmarking to align Goldsim and PORFLOW. Goldsim tended to over-predict contaminant concentrations based on comparisons to PORFLOW modeling results. NRC seeks clarification regarding the physical basis for some of the benchmarking factors applied to decrease the GoldSim results. There is a need to assure no systematic deficiency or bias resulting in the PORFLOW model resulting in an underestimation of peak dose.

Status: No further clarification is required.

CC FF1–3, 5–9 – Required very little discussion during meeting to clarify concerns.

Status: No further clarification is required.

CC FF 4 - Regarding vadose zone modeling assumptions. It was noted that this was discussed during 12/14 telecon. References were to be (and will be) forwarded to DOE. While the cement foundation slabs below all other F-Tank Farm tanks were laid upon undisturbed vadose zone material, the northwest quadrant of Tank 25 is underlain by backfill material (WSRC-TR-2007-00283—bottom of page 7 and top of page 8).

CC FF 10 - Regarding calibration of PORFLOW model. DOE indicated that the groundwater flow maps were created from data in the GSAD, and asked if the NRC had specific questions on the applicability of the GSAD for supporting our modeling efforts. DOE will enhance discussion regarding genesis of plumes.

Status: No further clarification is required.

CC FF 11 - Regarding hydrogeological conceptual models and groundwater divide. DOE said earlier models were very simplified and conservatism was introduced. Understanding of GW divide and inherent uncertainty has matured since tanks 17/20 closure model.

Status: No further clarification is required.

UA

RAI UA 1 - Regarding the likelihood of alternate configurations. DOE asked what type of information the NRC would expect to see in a defensible basis for the likelihood of alternate configurations in the PA. The NRC indicated that an expert elicitation could be performed as part of future work.

Status: No further clarification is required.

RAI UA 2 - Regarding sensitivity analysis looking at timing. According to NRC there needs to be more emphasis on timing, in addition to magnitude of peak doses. DOE could perform additional sensitivity analysis using time of peak dose as an endpoint. Or DOE could use the results of its uncertainty and barrier analyses to qualitatively discuss those factors most important to timing of peak dose. DOE asked what methodology the NRC suggests for determining endpoints. NRC indicated GoldSim can be used to perform a sensitivity analysis using endpoints related to the timing of peak dose.

Status: No further clarification is required.

RAI UA 3 - Regarding exceedence of dose limit in 61.41. NRC indicated that due to the uncertainty in the timing of peak dose and the relatively large magnitude of basecase predicted peak dose for Tc and Pu (i.e., over an order of magnitude higher than compliance limit), that DOE should indicate how the peak dose from these constituents is considered in ALARA and Criterion 2 analyses.

Status: No further clarification is required.

RAI UA 4 - Regarding results for Configuration E and F. NRC would like DOE to present results for these configurations individually (i.e., not combined with the other configurations). DOE plans to present results for Configuration E and F. NRC had no issues with this approach. DOE should consider use of Configuration E as the basecase scenario for certain Type IV tanks due to their proximity to zone of GW fluctuation and given evidence of corrosion due to groundwater inleakage (see RAI-NF-13).

Status: Related to RAI NF 13.

CC UA 1-5 - Regarding miscellaneous input parameters and their impact on dose. DOE will address transparency regarding impact of these parameters.

Status: No further clarification is required.

RAI IT 1 - NRC noted the technical basis for using the geometric average of two data sets was not clear. SRR indicated that the ranges around the transfer factors used in the PA were the range in values found among the various references, and were not intended to be a stochastic range for that value. The transfer factors were selected based on the most recent information, and were not selected conservatively. DOE indicated that the use of the geometric mean was conservative, unlike what is suggested in the RAI. The NRC's concern was that approach was not technically defensible and uncertainty/variability in TFs was not considered. DOE indicated that the averaging approach led to an increase in the transfer factors for the majority of radionuclides and that the Ra PTF went up contrary to what is reported in the RAI. NRC indicated that the author of the RAI was not available, and would check with the author following the meeting. Following the meeting, NRC confirmed that Section 5.1.3 on page 24 of WSRC-STI-2007-00004, Rev. 4. which discusses the updated soil-to-vegetable transfer factors, shows Ra going down significantly from 4.00E-02 to an updated value of 4.64E-03 for the all pathways analysis (based on geometric mean of the current (previously used) value of 4E-02 and the "site-specific" PNNL-13421 value of 3.9E-04, a factor of 100 lower). The author of the RAI was also concerned that for a majority of the radionuclides the TF selected was closer to the minimum rather than the maximum of the range of values reported and that absent site-specific information values should be conservatively selected. The suggestion in the path forward was to evaluate the two data sets independently along with presentation of minimum and maximum values separately.

Status: Values may be updated in future work.

RAI IT 2 - Regarding soil/plant transfer factors. It was noted that there may be higher transfer factors associated with leafy vegetables that would cause a significant increase in the transfer factors for certain key radionuclides such as Tc. Leafy vegetables were not considered in assigning a plant transfer factor based on literature information on crop production rates in SC (rather than critical group information). DOE indicated again that most of the transfer factors would go down considering leafy vegetables.

Status: No further clarification is required.

RAI IT 3 - Regarding drinking water ingestion rate. NRC suggested consideration of higher consumption rates based on its reading of the DOE-provided reference used to support the assumed drinking water ingestion rates and consideration of higher ingestion rates due to a warmer climate.

Status: There was some discussion as to the status of this parameter in previous scoping meetings.

Discussions related to IT clarifying comments will continue on February 3, 2011.