

July 20, 2011

ORGANIZATION: U.S. Department Of Energy

PROJECT MANAGER: Nishka Devaser **/RAI/**
Low-Level Waste Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

PROJECT: Savannah River Site, Saltstone Facility

SUBJECT: MAY 3, 2011 SUMMARY OF TELEPHONE CONFERENCE CALL
TO DISCUSS SECOND REQUEST FOR ADDITIONAL
INFORMATION FOR REVIEW OF THE UPDATED
PERFORMANCE ASSESSMENT FOR THE SALTSTONE
DISPOSAL FACILITY, DOCKET NUMBER PROJ0734

On May 3, 2011, the U.S. Nuclear Regulatory Commission (NRC) participated in a working-level phone call with the U.S. Department of Energy (DOE) to discuss DOE's proposed approach for responses to the NRC staff's second request for additional information (RAI). The purpose of the call was to ensure the comments are fully understood by DOE such that DOE may adequately respond to the NRC's second RAI made during review of the Performance Assessment for the Saltstone Facility at the Savannah River Site. NRC is reviewing the Saltstone Performance Assessment in accordance with its monitoring responsibilities under Section 3116 of the National Defense Authorization Act for Fiscal Year 2005. No formal decisions were made or intended to be made at this meeting. The purpose was for information exchange at the technical staff level and no management was present at the meeting.

Enclosure 1 provides a listing of the telephone conference participants. Enclosure 2 contains a listing of the RAI's discussed and a brief description of the status of each item. A copy of this summary was provided to the DOE for comment.

Docket No.: PROJ0734

Enclosure: Meeting Summary

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ML111440310

OFC	DWMEP	DWMEP	DWMEP	DWMEP	DWMEP
NAME	NDevaser	ARidge	AWalkerSmith	ALS for CMcKenney	NDevaser
DATE	05/24/11	05/24/11	05/25/11	05/26/11	07/20/11

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List of Participants
Telephone Conference with the U.S. Department of Energy
Regarding the Savannah River Site, Saltstone Facility

George Alexander	U.S. Nuclear Regulatory Commission
Nishka Devaser	U.S. Nuclear Regulatory Commission
Karen Pinkston	U.S. Nuclear Regulatory Commission
Christianne Ridge	U.S. Nuclear Regulatory Commission
Sherri R. Ross	U.S. Department of Energy
Patricia Suggs	U.S. Department of Energy
Linda Suttora	U.S. Department of Energy
Kent Rosenberger	Savannah River Remediation
Richard Sheppard	Savannah River Remediation
Malcolm Smith	Savannah River Remediation
Greg Flach	Savannah River National Laboratory

**Request for Additional Information Discussion and Status with Regard to the U.S.
Nuclear Regulatory Commission Monitoring Activities at the Saltstone Disposal Facility
at the Savannah River Site
May 3, 2011**

The U.S. Nuclear Regulatory Commission (NRC) sent its second Request for Additional Information (RAI) on December 15, 2010 (ML103400571). Due to the complexity of performance assessments and associated RAIs, extensive clarification of RAI comments is sometimes necessary. Additionally, the NRC staff provided some indication of the risk significance of the basis for various RAI comments to the U.S. Department of Energy (DOE). The summary below captures the main topics discussed during the call and does not include comments which required no additional discussion.

PA-5: **Comment:** Additional information is needed about the benchmarking factors and other GoldSim parameter adjustments based on benchmarking to the PORFLOW model.

Discussion: NRC staff noted that the proposed response did not include the links between the benchmarking factors and the conceptual model, as requested in the original comment. DOE indicated it would add the links to the response.

Status: Question required clarification, NRC staff clarified the RAI to DOE staff; no additional technical discussion is required. NRC looks forward to reviewing the response.

PA-7: **Comment:** Model support for the PA is limited and plans for development of additional support are not provided.

Discussion: DOE indicated that they would provide the NRC two references addressing plans for generating more model support with the RAI response in August, or at the next monitoring visit.

Status: Question required clarification, NRC staff clarified the RAI to DOE staff; no additional technical discussion is required. NRC looks forward to reviewing the response.

PA-11: **Comment:** The GoldSim probabilistic model used for sensitivity and uncertainty analyses is not adequately supported.

Discussion: At the April 27, 2011, meeting, DOE indicated that it did not plan to include a GoldSim analysis for Case K. During the May 3, 2011, phone call, NRC staff noted Case K was being supplied in response to PA-8, which was a question about the base case. NRC staff indicated that, if Case K is to be a significant part of DOE's compliance demonstration, NRC needs to understand the effects of the parameter uncertainties. Alternately, conservative parameter choices can be made. However, choosing overly pessimistic parameter values

could undermine the utility of Case K. Discussion on this topic was postponed to a public meeting with management involvement.

Status: Question required clarification, NRC staff discussed the RAI with DOE staff; additional technical discussion is required.

PA-14: **Comment:** The PA does not discuss the existence or implications of calcareous material, or soft zones, underlying Z-Area.

Discussion: NRC staff asked if geotechnical evaluations were conducted for nearby facilities (e.g., Salt Waste Processing Facility, Defense Waste Processing Facility, and the High-Level Waste storage facility). DOE stated that they are reviewing those documents and will provide that information to the NRC.

Status: Question required clarification, NRC staff clarified the RAI to DOE staff; no additional technical discussion is required. NRC looks forward to reviewing the response.

IEC-7: **Comment:** The PA should evaluate the potential implications of saturated conditions above the lateral drainage layer in the closure cap.

Discussion: DOE stated that they do not expect saturation, and the potential degradation mechanisms due to saturated conditions, to occur within the cover. DOE indicated NRC staff would soon receive relevant information in a response to a similar comment made on the F-Tank Farm PA. The NRC asked if DOE expected the effects of cover saturation to be significant to the results, in which case they should be included in Case K. DOE replied that the effects were not expected to be significant.

Status: Question required clarification, NRC staff clarified the RAI to DOE staff; no additional technical discussion is required. NRC looks forward to reviewing the response.

IEC-8: **Comment:** The PA should provide a technical basis for the long-term performance of the geotextile filter fabric and the upper and lower lateral drainage layers.

Discussion: During this phone call, DOE staff indicated it would provide additional documentation to the NRC regarding the long-term performance of the lateral drainage layers. NRC staff stated that they will review any documents that are provided, but that it was not clear that support is available that is commensurate with the level of credit taken for the lower lateral drainage layer in DOE's current base case model.

Status: Question required clarification, NRC staff discussed the RAI with DOE staff; additional technical discussion is required.

- SP-4:** **Comment:** Characteristic curves implemented in the PA are based on a continuum approach that does not reflect non-equilibrium flow.
- Discussion:** NRC staff stated that: (i) DOE's model is very sensitive to the moisture characteristic curves implemented in the PA, (ii) the moisture characteristic curves are inconsistent with the literature and the NRC staff's expectation (e.g., the difference between 99.4% and 99.3% saturation in the fractured vault walls results in a difference of more than 6 orders of magnitude in hydraulic conductivity), and (iii) the moisture characteristic curves have very limited support. NRC staff suggested if adequate model support (e.g., field studies and laboratory experiments) is not available, further consideration of unsaturated flow should be included in all revised cases. DOE indicated that this approach could change and should be discussed again later. The NRC agreed to continue this conversation when the appropriate subject matter expert is available.
- Status:** Question required clarification, NRC staff discussed the RAI with DOE staff; additional technical discussion is required.
- SP-8:** **Comment:** The initial grout mineralogy used in evaluating expansive phase precipitation is inconsistent with the initial mineralogy used to determine E_H and pH transitions in pore fluids. Depending on which initial mineralogy is more appropriate, the conclusions of either report could change.
- Discussion:** NRC asked if the effects of assuming a different initial grout mineralogy could change the expansive phase calculations upon which the expected cracking of saltstone is based. DOE said it did not know yet. NRC asked what would happen if the results showed the uncertainty in the initial mineralogy resulted in calculated E_H -pH transitions outside of the 50% uncertainty range included in the GoldSim model. DOE indicated it did not know yet.
- Status:** Question required clarification, NRC staff discussed the RAI with DOE staff; additional technical discussion is required.
- SP-10:** **Comment:** There are indications that some measured plutonium and neptunium sorption coefficients in cementitious materials could reflect solubility rather than sorption, which could lead to a significant overestimate of plutonium and neptunium sorption.
- Discussion:** NRC indicated it understood that using a K_d to model solubility, though conceptually incorrect, could work if (1) there was very little source depletion over the time period of interest and (2) the total concentration in the field was similar to or greater than the total concentration in the experiments. NRC noted that lab experiments that were solubility limited could yield arbitrarily large measured " K_d " values as the total radionuclide concentration is increased. DOE noted it was aware of these limitations. NRC asked why DOE could not

model solubility constraints directly. DOE indicated it took too much computational time.

Status: Question required clarification, NRC staff clarified the RAI to DOE staff; no additional technical discussion is required. NRC looks forward to reviewing the response.

SP-11: **Comment:** In recent experiments used to help define K_d values for cementitious materials, the distinction between “middle” and “old” age conditions was based chiefly on water chemistry—not on the mineralogical assemblage. It is not clear whether the differences in solid phases for the different stages can be neglected.

Discussion: NRC staff noted in the second RAI that this issue could be handled in monitoring.

Status: Question required clarification, NRC staff clarified the RAI to DOE staff; no additional technical discussion is required. NRC looks forward to reviewing the response.

SP-19: **Comment:** Research related to the release of Tc-99 from saltstone appears to be inconsistent with the Tc-99 releases modeled in the PA.

Discussion: NRC staff reiterated the points it made about DOE’s new research on Tc sorption in the public meeting (i.e., that DOE needs to explain how the $H_{2(g)}$ and $O_{2(g)}$ of the experiment compare to the values expected in the environment). NRC staff also noted that the value of just over 700 mL/g DOE used from the experiment actually declined to just over 500 mL/g at longer times. NRC noted it had previously indicated it realized the 1000 mL/g number used in the PA was approximate but that the results were expected to be sensitive to the fraction oxidized rather than the K_d in the reduced fraction. Nonetheless, NRC noted that 500 mL/g was sufficiently different from 1000 mL/g that it would investigate the potential impact of the difference. DOE noted that their contractor Savannah River National Laboratory (SRNL) believes that as the system is given additional time to reach equilibrium the data will support 1000 mL/g.

Status: Question required clarification, NRC staff discussed the RAI with DOE staff; additional technical discussion is required.

FFT-4: **Comment:** The PA should discuss the implications of calcareous zones within the far field transport model.

Discussion: DOE clarified that the reference to grouting of aquifer soft zones in the proposed response pertains to the F-Tank Farm and not Z Area, as there has not been any grouting of soft zones at Z Area. The NRC will review DOE’s comment response when referenced documents and justification are provided.

Status: Question required clarification, NRC staff clarified the RAI to DOE staff; no additional technical discussion is required. NRC looks forward to reviewing the response.

A-1: **Comment:** Social, economic, and public policy considerations do not appear to have been considered in an analysis of maintaining doses “As Low As is Reasonably Achievable” (ALARA).

Discussion: NRC asked if there had been any new consideration of radionuclide removal technologies since 2005. DOE indicated that there had been. NRC suggested it be described or referenced in the response. DOE asked why NRC staff was asking for this type of information, and asked if the as low as reasonably achievable (ALARA) analysis should be based on worker dose. NRC staff indicated that worker dose was an important ALARA consideration and was included in 10 CFR 61.43, but that NRC regulations at 10 CFR 61.41, protection of the general population, also included an ALARA requirement and that dose to the general population was expected to be sensitive to radionuclide removal.

Status: Question required clarification, NRC staff clarified the RAI to DOE staff; no additional technical discussion is required. NRC looks forward to reviewing the response.

C-4: **Comment:** Clarify the basis for the selenium K_d of 150 mL/g for old oxidizing conditions. It is not clear from the PA, or the supporting report WSRC-STI-2007-00640, how the value was selected. Clarify whether the evaluation considered the presence in solution of the selenium as selenate, which is potentially less sorptive than selenite.

Discussion: DOE stated that they would evaluate the sensitivity of predicted dose to the K_d value for Se-79 and determine if future laboratory testing should be conducted. NRC stated that any additional modeling activities should include the best information available. NRC staff also indicated the K_d value of 150 mL/g for selenate in DOE’s base case model appears to be incorrect and should be reconsidered in any revised case.

Status: Question required clarification, NRC staff discussed the RAI with DOE staff; additional technical discussion is required.

Additional Comments:

DOE summarized that neither (1) the inventory of Th-230 and Ra-226 nor (2) recent K_d data, including data for iodine and radium were originally intended to be changed in Case K, but that, at the NRC staff’s suggestion, DOE was currently considering including new data about both of these topics in Case K.