July 21, 2006

MEMORANDUM TO: Scott C. Flanders, Deputy Director
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Division of Waste Management
and Environmental Protection
Office of Nuclear Material Safety
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THRU: Ryan Whited, Chief **/RA/**
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SUBJECT: JUNE 8, 2006 MEETING SUMMARY: MEETING WITH U.S. DEPARTMENT OF ENERGY REGARDING SAVANNAH RIVER SITE TANKS 18 & 19 REQUESTS FOR ADDITIONAL INFORMATION

On June 8, 2006, staff and management from the U.S. Nuclear Regulatory Commission (NRC) and the U.S. Department of Energy (DOE) met to discuss NRC's Request for Additional Information (RAI) regarding DOE's incidental waste determination for Tanks 18 and 19 at the Savannah River Site. The draft waste determination was submitted to the NRC for review on September 30, 2005. The NRC's RAI was issued to DOE on March 31, 2006. The meeting summary is enclosed for your use.

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Enclosure:
1. Summary of Meeting
2. Attendee List
3. Presentation Slides

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SUMMARY OF JUNE 8, 2006, OPEN MEETING
REGARDING REQUESTS FOR ADDITIONAL INFORMATION
SAVANNAH RIVER SITE TANKS 18 AND 19

Introduction

On June 8, 2006, staff and management from the U.S. Nuclear Regulatory Commission (NRC) and the Department of Energy (DOE) met to discuss NRC's Request for Additional Information (RAI) regarding DOE's incidental waste determination for Tanks 18 and 19 at the Savannah River Site (SRS). This meeting was open to the public and was held at the Aiken Municipal Building in Aiken, SC.

In addition to NRC and DOE staff and contractors present at the meeting, representatives of the Center for Nuclear Waste Regulatory Analyses participated via conference call. In addition, the meeting was attended by representatives of the SRS Citizens Advisory Board (CAB), Environmental Protection Agency, the South Carolina Department of Health and Environmental Control (DHEC), the Defense Nuclear Facilities Safety Board, and United States Senators Isakson and Chambliss offices (Georgia). The list of attendees is included as Enclosure 2. The handouts used during the meeting are provided as Enclosure 3. DOE's draft waste determination for closure of Tanks 18 and 19 at SRS is available in the Agencywide Documents Access and Management System (ADAMS) under accession number ML053110081. The NRC's RAI is available in the ADAMS under accession number ML060800295.

Discussion

The draft waste determination for closure of Tanks 18 and 19 at SRS was submitted to the NRC for review on September 30, 2005. The NRC's RAI was submitted to DOE on March 31, 2006. The purpose of the meeting was for DOE to provide information to NRC staff and management on SRS plans for resolving NRC's RAI. During the meeting, DOE presented information pertaining to the following categories: 1) removal of highly-radioactive radionuclides (RAI #4, 11, 12); 2) inventory and sampling (RAI #14 – 17); 3) receptor description (RAI # 21 - 26, 28, 29); 4) near field release (RAI #30 - 31, 33, 34, 36 - 40, 42, 44 - 48); 5) far field transport (RAI #49 - 50); 6) model implementation (RAI #51 - 58); and 7) sensitivity analyses (RAI #59 - 61). The framework for discussions included information such as the basic path forward recommended by NRC, the proposed DOE approach, key points, and additional information, as appropriate. The presentation material used during the meeting is provided as Enclosure 3. NRC and DOE staffs discussed the information presented in the slides; some of the issues discussed are presented below.

DOE initiated a discussion of the receptor description. RAI #21 indicated that additional information was needed to support the estimate that 4% of the contaminated water leaching from SRS Tanks 18 and 19 will travel to the Congaree aquifer. DOE indicated that the 4% is based on the flow model calibrated using site tritium groundwater travel data and is for the location closest to the flow path from F-Tank Farm to Fourmile Branch. DOE also indicated that a side-by-side modeling comparison using PORFLOW would be performed. Finally, additional sensitivity analyses (SA) will be performed to evaluate the 4% model input, including a SA for the Congaree aquifer with 100% flow. NRC asked about the uncertainty associated with the 4% flow to the Congaree aquifer. DOE indicated that the original report did not give uncertainty

estimates but did provide information about spatial variability across the Congaree aquifer. RAI #23 requested that receptor locations be represented on a single map and a new table included indicating pathway details. DOE stated that the public receptors for soil ingestion and direct radiation are located at the shoreline at the downstream point of maximum surface water exposure, rather than the seepline. NRC staff asked the location of the tank farm boundary since it was not indicated on the previous submitted maps and clarification on where the well locations were measured from (i.e. the administrative boundary of the tank farm, the boundary of the tank farm, the edge of the tanks). DOE replied that the well locations were measured from the edge of the tanks, not the administrative boundary of the tank farm. DOE also indicated that slide 62 in response to RAI #51 is a map which indicates the seepline, groundwater divide, and the whole tank farm with an enlarged inset indicating the F-Tank Farm including well locations modeled at 1 and 100 meters.

RAI #25 requested a clarification on whether the Congaree aquifer was modeled as flowing to Upper Three Runs or to Fourmile Branch and requested a calculation of the dose to a member of the public receptor obtaining drinking water from a well in the Congaree aquifer that is at the edge of the buffer zone in the direction that is down gradient of the tanks. DOE provided a map of stream tracer runs based on the General Separations Area groundwater flow model showing that infiltration in the area of SRS Tanks 18 and 19 moves towards the Upper Three Runs (slide 31). NRC inquired about the stream tracer pathways specifically for tanks 18 and 19. DOE indicated that they could color path lines to indicate the aquifers and provide cross-sectional layers for easier viewing. PORFLOW modeling information was also committed to be provided to the NRC. RAI #26 requested additional information be provided to support the model assumption that the clay layers are continuous layers of low vertical conductivity. DOE's proposed approach was to provide a map indicating the height of the tan and green clay layers at various points throughout the tank farm, discuss the data and run additional sensitivity analyses. NRC inquired if information is available from when the clay cores were taken. DOE indicated that logs from when the wells were installed may be available. NRC indicated that this information would be helpful to its review.

The next agenda item discussed was near field release. RAI #30 requested that an explanation be provided whether pouring the grout through the center riser would move the waste to the edge of the tank bottom and if so, how to prevent waste from concentrating there, or how to estimate the waste at the bottom edge and revise the performance assessment to account for oxidation at that location. In addition, NRC requested that options be described for mixing the tank heel waste with the grout. From DOE's experience with SRS Tanks 17 and 20 and the DOE Hanford tests on similar wastes, DOE indicated that the new grout to be used would not move the residual waste to the edges of the tank bottom. DOE also stated that additional SA including changing the Tc-99 K_d to represent a fully oxidized state would be performed to provide a bounding case for oxidation at the bottom edge. In addition, DOE indicated that there are no readily available, proven methods for mixing the tank heel and grout. NRC indicated that to correctly interpret the results of sensitivity analyses, NRC needs to understand the expected range of uncertainty or variability in the parameters being tested.

RAI #31 indicates a request to provide information on grout thickness, potential shrinkage, and on aluminum and zinc present, and to provide an assessment of the release rates when discrete system features result in a higher flow. DOE selected model input parameters that assume the flow through the basemat will not change in the first 500 years, even with cracks and fast flow paths through the grouted tank. DOE indicated that the 700 year tank liner

integrity assumption was based on the analyses in WSRC-TR-2005-00369 and that no long-term test data is available regarding grout shrinkage. NRC inquired if WSRC-TR-2005-00369 addressed the effects of corrosion. DOE indicated that they did not believe that it did. NRC then indicated that there is a concern that the corrosion of steel could cause cracking of the grout. In addition, there is a concern that cracks are likely to form between the grout and steel boundary since these are dissimilar materials. DOE indicated that they would explore this topic and discuss with other DOE sites.

RAI #33 requested that all F-Tank Farm water level data and other information on the water table depth at the tanks be provided as well as an assessment of the impacts of the water table contacting the tank bottoms on the dose to an inadvertent intruder and member of the public. DOE's approach is to provide a new map indicating the wells close to the tanks (slide 39), well data through the year 2000, and historical data indicating the long-term average below the base case of 224 feet above mean sea level. NRC asked about DOE's hypothesis for the anomalously high water level observed in F-Tank Farm well #12, and the physical characteristics surrounding this well. DOE indicated that there was no reason why the water level in F-Tank Farm well #12 was not tracking with the level in the other wells and that this well is in the F-Tank Farm pit that is paved. NRC then asked whether any tests had been performed on the integrity of the well casing. DOE indicated that no such testing had been performed.

RAI #37 requested a basis to be provided for using concrete K_d values for a grouted tank, addressing formulation differences, and effects of additives. In addition, NRC requested available studies related to pore water pH and radionuclide leaching from waste solids. DOE stated that the selected concrete K_d values were used to conservatively approximate K_d values in the contaminated zone in the absence of measured K_d values for waste. In addition, DOE indicated that they were considering performing additional chemical modeling to predict K_d values. NRC suggested that DOE use the results of the detailed chemical modeling to guide their sensitivity analyses and choice of base case in their performance assessment model.

RAI #48 requested that data be provided showing that the basemats are intact, or an assessment of the impact of current cracks on public and intruder dose be completed. In addition, the NRC requested DOE to provide the basemat design details describing the expected effects of drainage slots on the basemats. DOE indicated that the basemat foundation and floor were constructed of Class C concrete poured without construction joints and concrete testing was performed in accordance with DuPont specifications. In addition, settlement survey data from 1991-2001 shows that there is < 1/4-inch settlement/heave for the tanks. DOE provided a new figure of a typical type IV waste tank indicating that each tank contains a 3-inch cement topping, and leach collection drains connect to an 8-inch leak collection pump (slide 56). DOE's approach is to perform a sensitivity study to evaluate the impacts of modeling the basemat as only 4-inches thick and of not including any basemat in the model. NRC questioned the amount of water that gets into the sump pump and the frequency that the sump pump typically runs. DOE indicated that for tank 18, the sump pump ran infrequently except during high rain periods. DOE indicated that they would provide NRC the sump pump information. NRC requested additional details regarding the leak collection system and disposition of this system. DOE indicated that additional information would be provided to NRC on the description of the leak collection system and the leak collection system would be grouted during the closing of the tanks.

Following discussion of the far field transport, DOE proceeded to provide information on the model implementation. RAI #51 requested that detailed information be provided to clarify the overall computational approach, provide MEPAS files for dose conversion factor calculations, and provide a map with receptor locations. DOE's proposed approach is to provide NRC with the information addressing 7 topic areas including MEPAS calculation mechanics, algorithm used in the early MEPAS runs, explanation of how the pathway dose conversion factors are calculated, and distances used from the tanks to the seepline receptor. NRC requested that an annotated example be provided so that NRC can understand the inventory adjustments and DOE agreed that an example would be provided for one MEPAS model file. RAI #57 requested an explanation for the basis for the water content and density values used in the MEPAS modeling with respect to the grout parameters. DOE indicated that the upper layer of the waste was modeled, not the grout itself. In addition, the densities and water vapor contents for the upper layer are based on actual waste density and water vapor content. NRC questioned the characteristics of the waste after the tank is grouted including mixing information, and location of waste. DOE indicated that some mixing of the waste and grout was expected and that they would provide the expected characteristics and requested information.

DOE SRS indicated they are investigating a new waste removal technology that may potentially be applied to Tanks 18 and 19. DOE is researching additional information about this technology such as cost, schedule impact, potential for additional waste removal, and worker risk. DOE plans to speak with the NRC and SC DHEC about the path forward and potential use of this technology at a future meeting. DOE noted that the potential for implementing a new waste removal technology may impact its schedule for responding to NRC's RAI.

The next topics discussed were the sensitivity analyses, and inventory and sampling. RAI #16 requested a description of the development of the upper confidence limits (UCL) in the Tanks 18 and 19 data including assessment of the Tank 18 unsampled volume, revised inventory based on uncertainty or additional sampling. DOE's proposed approach is to provide NRC with the details of the UCL development for tank 19 which uses four radionuclides with limited data (WSRC-TR-2002-00052, rev. 3) and details of the UCL development for tank 18 which characterizes the southeast mound (U-TR-00005, rev 2). DOE indicated that two dissolution methods were used. In addition, DOE does not intend to revise the inventory. The final topic discussed was removal of highly-radioactive radionuclides. DOE indicated that the waste inventory estimates for Tanks 18 and 19 may change if the new waste removal technology indicated above is used, therefore, the discussion on this topic at this meeting was limited.

Public Comment

A public comment period was provided for public feedback at two times during the open meeting. A representative of the South Carolina Citizens Advisory Board asked for information on the schedule time line. DOE stated that the DOE responses to the NRC's RAIs are draft and based on this open meeting , as well as the pending decision regarding whether to pursue additional waste removal, the responses would be updated. Partial responses to the RAIs will be finalized in about one month and be provided to the NRC.

Closing Remarks & Action Items

DOE stated that a list of actions would be developed by DOE and provided to NRC. NRC staff noted that the actions should include items such as PORFLOW modeling information (RAI #25), a more detailed description of the leak collection system (RAI #48), and an example of one annotated MEPAS file including an explanation of the input data (RAI #51). Both NRC and DOE indicated that the exchange of technical information was helpful and the meeting was adjourned.