October 14, 2009

MEMORANDUM TO: Patrice Bubar, Deputy Director
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

THRU: Gregory Suber, Chief **/RA/**
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

FROM: Nishka Devaser, Project Manager **/RA/**
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

SUBJECT: AUGUST 5, 2009, MEETING SUMMARY: MEETING WITH THE DEPARTMENT OF ENERGY REGARDING U.S. NUCLEAR REGULATORY COMMISSION MONITORING ACTIVITIES AT THE SAVANNAH RIVER SITE, SALTSTONE FACILITY

On August 5, 2009, the U.S. Department of Energy staff and its contractors met with U.S. Nuclear Regulatory Commission staff to discuss resolution of various follow-up actions and open issues related to ongoing monitoring activities at the Savannah River Site, Saltstone Disposal Facility.

Enclosure: Meeting Summary

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ML092650394

OFC	DWMEP:PM	DWMEP:BC	DWMEP:BC	DWMEP:PM
NAME	NDevaser	CMcKenney	GSuber	NDevaser
DATE	09/23/09	10/06/09	10/13/09	10/14 /09

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A Summary of Meeting: Meeting with the Department of Energy Regarding U.S. Nuclear Regulatory Commission Monitoring Activities at the Savannah River Site, Saltstone Facility

Date: August 5, 2009

Place: U.S. Nuclear Regulatory Commission
One White Flint North
Rockville, MD 20852

Attendees: See Attachment 1

Purpose:

The purpose of the meeting was for the U.S. Department of Energy (DOE) and its contractors, Savannah River Remediation (SRR) and Savannah River Nuclear Solutions (SRNS), to provide or propose resolution to current follow-up actions and open issues related to the U.S. Nuclear Regulatory Commission's (NRC's) ongoing monitoring activities at the Savannah River Site (SRS), Saltstone Disposal Facility. This meeting also afforded an opportunity for the DOE and its contractors to respond to inquiries made by NRC staff and its contractor, the Center for Nuclear Waste Regulatory Analyses (CNWRA), concerning ongoing technical reviews performed under monitoring.

Discussion:

Prior to the meeting, SRR provided four documents via email, which are provided as Attachments 2 – 5.

Attachment 2: "*NRC Salt Waste Monitoring Open Item Status, SRR-CWDA-2009-00007*"
(ADAMS Accession Number ML092650420)

Attachment 3: "*Saltstone Facility Technical Review Comment Sheet: Saltstone and Concrete Interactions with Radionuclides: Sorption (K_d), Desorption, and Reduction Capacity Measurements, ML090150234*"
(ADAMS Accession Number ML092650417)

Attachment 4: "*Saltstone Facility Technical Review Comment Sheet: Hydraulic and Physical Properties of Saltstone Grouts and Vault Concretes, SRNL-STI-2008-00421*"
(ADAMS Accession Number ML092650422)

Attachment 5: "*Saltstone Facility Technical Review Comment Sheet: Thermodynamic and Mass Balance Analysis of Expansive Phase Precipitation in Saltstone, WSRC-STI-2008-00236*"
(ADAMS Accession Number ML092650424)

Saltstone Disposal Facility Open Item and Follow-up Action Status

Nishka Devaser, of NRC/FSME, opened the meeting with a brief introduction to the project and described the protocol of a Category II open meeting. After introductions and Mr. Devaser's opening remarks, Ms. Ginger Dickert of SRR began with an update on recent activity associated with the Saltstone facility and a brief status report on changes resulting from the new Liquid Waste Contractor managing operations at Saltstone. Mr. Malcolm Smith of SRR provided the status of Disposal Cell 2 construction activities that have occurred since NRC's last onsite observation on June 3, 2009. Mr. Smith then provided a near-term, high-level schedule of Disposal Cell 2 construction activities. The schedule, which is shown on Slide 11 of Attachment 2, defines start and finish dates and supplies status of each construction activity.

Mr. Larry Romanowski of SRR provided an update on performance assessment and research activities that went into revising the Saltstone Disposal Facility Performance Assessment (PA). Mr. Romanowski explained the how the eight key factors identified in NRC's Technical Evaluation Report (NRC, 2005) were used to incorporate NRC's concerns from vaults 1 and 4 into the PA revision.

Mr. Romanowski then provided status on the three open issues associated with NRC's monitoring of the saltstone disposal process and described SRR's proposed means of closing each of the open issues. In each case, once the explanation of the issue was complete, NRC staff agreed that the proposed closure activity seemed appropriate and in line with NRC's vision of the issues closure. Details of each open issue and SRR's proposed means of closure are available on slides 15 – 24 of Attachment 2.

The presentation continued with an explanation of the follow-up actions listed in Table 1. In this portion of the presentation, Mr. Smith provided either a status of the resolution to the action or a proposal to resolve (close) the action. Of the 28 follow-up actions existing before this meeting, 14 have been closed to date and one has been added. Presently 15 follow-up actions remain open.

Notable Changes to Follow-up Actions Listed in Table 1

ML091320439-003 (Open)

This follow-up action was a request by NRC for SRS to provide sufficient documentation to support quarterly Saltstone Permit Reports for the period from third quarter 2007 through second quarter 2008. SRS staff did provide documentation to support NRC inquiries. NRC staff has requested further explanation of calculations performed in the supplied documents and has agreed to provide these questions for SRS staff to respond to and to meet with SRS staff for discussions.

ML092380273-001 - 007 (Closed)

SRS staff responded appropriately to close all follow-up actions described in "Topics for Denham Technical Review Inquiry - Thermodynamic and Mass Balance Analysis of Expansive Phase Precipitation in Saltstone." Though these actions are closed, SRS staff addressed several of the NRC comments by stating that this research was the initial step and that further investigations are ongoing. NRC staff noted that the use of research to support assumptions and parameters in performance assessments should

be consistent with the maturity of the research. If the research supporting the effect of the expansive phases is not sufficiently mature, then the PA should conservatively account for the expansive phase formation. Should the research mature and not address concerns noted in these follow-up actions, the actions would be revisited and possibly reopened.

ML092380273-012 (Closed)

SRS staff responded to this follow-up action appropriately, however, NRC staff requests SRS staff incorporate one change to any document referring to this and similar concepts (e.g. data fitting of moisture characteristic curves). If the PA models verify that the liquid saturation values are close to saturated such that the uncertainty in the moisture characteristic curves does not significantly influence the results, SRS staff should state this information for clarity.

ML092650394-001 (Open)

SRS staff responded to follow-up action ML091320439-007 appropriately, however, NRC staff expressed concern about the variability in the measured non-sediment control sample concentrations. To close the issue, NRC staff would like further explanation of how much variability was observed.

Table 1: Status of Currently Open Follow-up Actions

Action Index	Issue Definition	Status
ML091320439-001	DOE agreed to take photographs of construction joints, prior to covering the joints with additional construction layers or concrete	Closed
ML091320439-002	At NRC staff's request, DOE will provide a complete set of Vault 2 design drawings	Closed
ML091320439-003	Provide sufficient documentation to support quarterly Saltstone Permit Reports for the period from third quarter 2007 through second quarter 2008	Open
ML091320439-004	Provide evaluation of Tank 50 material balance, from third quarter 2007 to present	Open

Action Index	Issue Definition	Status
ML091320439-005	Inform NRC when DOE is ready to exit its ARP/MCU management control plan	Open
ML091320439-006	DOE should continue to investigate the source of iodine-129 detected in soil samples	Open
ML091320439-007	Explain what measures were taken to ensure that experiments with technetium were not affected by experimental losses, such as technetium holdup in lab ware, resulting in underestimates of technetium concentration Ref: ML090150234	Closed
ML091320439-008	Clarify the pH of the calcite solution used in these experiments (page 9 and 16 state the pH = 10; page 7 states that solution pH = 8.3) Ref: ML090150234	Closed
ML091320439-009	Clarify the selenium Kd value reported in Table 5, which is different than the value reported previously in the report Ref: ML090150234	Closed
ML091320439-010	Clarify whether bleed water was leaking from sealed containers during the hydraulic properties study, when the report indicated the samples were sealed Ref: ML090150298	Closed
ML091320439-011	Clarify the impact of changing pore solution concentration on measured hydraulic properties on page 8 of Report 7 Ref: ML090150298	Open
ML091320439-012	Explain how uncertainty will be addressed for moisture characteristic curves that are fit to data reported on page 18 of Report 7 Ref: ML090150298	Closed

Action Index	Issue Definition	Status
ML091320439-013	Justify the use of logarithmic averages for recommended hydraulic property values on p. 19 Ref: ML090150298	Open
ML091320439-014	Provide up-to-date copy of the PA maintenance plan Ref: ML090150306	Open
ML091320439-015	Evaluate the sensitivity of grid spacing to predicted front propagation in the sulfate attack evaluation Ref: ML090150306	Open
ML091320439-016	Explain how spatial representation in the numerical experiments of sulfate attack will be translated into a PA model, since the geometries of the real system will be much more complex (e.g., a random collection of different size blocks determined by crack distributions) than those considered in the numerical experiments Ref: ML090150306	Open
ML091320439-017	Explain how cracks are incorporated into the sulfate attack representation in the PA model, since cracks could significantly impact the degradation assessment (page 15). Explain assumption I that the transport rate through damaged concrete of sulfate ions is not different from undamaged concrete (page 21) Ref: ML090150306	Open
ML091320439-018	Clarify the conceptual model for sulfate attack. For example, does sulfate attack proceed along a front, or is it a generalized mechanism Ref: ML090150306	Open
ML091320439-019	Clarify the conceptual model represented by case 2 (page 6). If the concentration was diluted by diffusion, then what is the fate of diffused species? If species are diffusing through the vault wall, then why isn't the vault wall degraded? Ref: ML090150306	Open
ML091320439-020	Explain why it is appropriate to neglect minor species (page A2-14) Ref: ML090150306	Open

Action Index	Issue Definition	Status
ML091320439-021	Justify the use of Berner's approach for these materials and solutions (page A2-15) Ref: ML090150306	Open
ML092380273-001	What was the basis for choosing the solid phases included in the initial saltstone normative composition (Table 3) and the suite of minerals that were allowed to precipitate in the saltstone (Table 6)? Specifically, what was the basis for including gibbsite, quartz, and kaolinite in these sets of phases? What effect does the inclusion of gibbsite, quartz, and kaolinite in the solid phases have on the results obtained? Ref: ML083400055	Closed
ML092380273-002	What data and observations are available to compare to and constrain the modeling calculations? Ref: ML083400055	Closed
ML092380273-003	This study does not consider the effects of organic additives or pozzolanic replacement on the dissolution and precipitation of cement-related compounds. These components of concrete and grout may have an effect on the generation of expansive phases. Ref: ML083400055	Closed
ML092380273-004	Geochemical modeling seems to have many unknowns (initial conditions, phase selection or suppression, fundamental thermodynamic data, kinetics) that would impact the confidence in any particular result. Ref: ML083400055	Closed
ML092380273-005	This study is a deterministic analysis. A probabilistic (stochastic) analysis would provide insights into the importance and sensitivity of the model results to certain thermodynamic or physical properties. Ref: ML083400055	Closed
ML092380273-006	Geochemists Workbench is based on an equilibrium reaction model. However, reaction kinetics could result in metastable products that are often associated with an increase in volume. Ref: ML083400055	Closed
ML092380273-007	The staff observes that the conclusions reached in this study area could be integrated with other ongoing or recently completed studies. Dixon (2008) recently completed a study on the physical properties of grout, which included bulk porosity measurements. Ref: ML083400055	Closed

Action Index	Issue Definition	Status
ML092650394-001 **(New Follow-up Action)**	Provide details on the amount of variability observed in the measured concentration of the non-sediment control sample (i.e. C_0 in Attachment 3).	Open

References

Denham, M., "Thermodynamic and Mass Balance Analysis of Expansive Phase Precipitation in Saltstone, WSRC-STI-2008-00236." Savannah River National Laboratory (SRNL), WSRC, May 2008. (Agencywide Documents Access and Management System (ADAMS) Accession No. ML083400055)

Dixon, K., et al., "Hydraulic and Physical Properties of Saltstone Grouts and Vault Concretes, SRNL-STI-2008-00421, Rev 0." SRNL, WSRC. November 2008 (ADAMS Acc. No. ML090150298)

Kaplan, D. I., et al., "Saltstone and Concrete Interactions with Radionuclides: Sorption (K_d), Desorption, and Reduction Capacity Measurements, SRNS-STI-2008-00045," SRNL, WSRC October 2008. (ADAMS Acc. No. ML090150234)

Langton, C., "Evaluation of Sulfate Attack on Saltstone Vault Concrete and Saltstone, Part I: Final Report, SRNS-STI-2008-00050, Rev 0", SRNL, SRNS. August 19, 2008 (ADAMS Acc. No. ML090150306)

U.S. Nuclear Regulatory Commission (NRC). "Technical Evaluation Report for Draft Waste Determination for Salt Waste Disposal." Letter from L. Camper to C. Anderson, DOE. December 28, 2005. (ADAMS Acc. No. ML053010225)

_____. "Nuclear Regulatory Commission March 25-26, 2009 Onsite Observation Report for the Savannah River Site Saltstone Facility," May 22, 2009a (ADAMS Acc. Number ML091320439)

_____. Technical Review Inquiry: "Technical Review: Thermodynamic and Mass Balance Analysis of Expansive Phase Precipitation in Saltstone." August 26, 2009b. (ADAMS Acc. No. ML092380273)

Meeting Attendees

Nishka Devaser	U.S. Nuclear Regulatory Commission
David Esh	U.S. Nuclear Regulatory Commission
Karen Pinkston	U.S. Nuclear Regulatory Commission
Chris McKenney	U.S. Nuclear Regulatory Commission
David Pickett	Center for Nuclear Waste Regulatory Analyses
Lane Howard	Center for Nuclear Waste Regulatory Analyses
F. Malcolm Smith	Savannah River Remediation
Ginger Dickert	Savannah River Remediation
Kent Rosenberger	Savannah River Remediation
Larry Romanowski	Savannah River Remediation
Steve Thomas	Savannah River Remediation
Miles Denham	Savannah River Nuclear Solutions
Chun Pang	U.S. Department of Energy
Jim Folk	U.S. Department of Energy
Linda Suttora	U.S. Department of Energy
Martin Letourneau	U.S. Department of Energy
Patricia Suggs	U.S. Department of Energy
Sherri R. Ross	U.S. Department of Energy
Jim Lieberman	Talisman
John Greeves	Talisman