NRC Salt Waste Disposal Monitoring
Onsite Observation Meeting Summary
7/28/10

The following draft summary information is provided for information. In accordance with SRS-NRC Salt Waste Monitoring Protocol, the final meeting summary will be posted on saltmonitoring.srs.gov.

The NRC conducted an onsite observation Wednesday, July 28, 2010 as part of their Salt Waste Disposal Monitoring responsibilities under NDAA, Section 3116(b). The NRC Onsite Observation consisted of:

1. A field walk down of Disposal Unit 2 (a.k.a., Vault 2)
2. A status update on the activities associated with investigation of damp spots and actions currently in progress for Disposal Unit 2
3. A review of the Saltstone Facility inadvertent transfer that occurred May 19, 2010
4. A status update of research and development activities related to verifying parameters in the new SDF Performance Assessment

Representatives of DOE-SR, NRC, SCDHEC, and SRR in attendance for all or part of this visit were

DOE-SR	NRC	SCDHEC	SRR
Carl Lanigan	Gregory Suber	John McCain	Mark Schmitz
David Hoel	David Esh	Jason Shirley	Ginger Dickert
Chun Pang	Karen Pinkston		David Little
	Nishka Devaser		Steve Thomas
			Malcolm Smith
			Karl Weis
			Aaron Staub
			Coleman Miles
			Keith Liner

The Onsite Observation started with a walk down of both the interior and exterior of Disposal Unit 2. NRC observed the condition of the exterior of the cells including the shotcrete excavations, and epoxy injections completed to date. NRC also entered cell 2A to observe conditions of the interior of the cell. Specifically, the interior coating installation and repairs and the installation of CIM 1000 coating at sensitive locations such as the anchor bolts and the curb were observed.

Following the walk down, M. Schmitz provided an update of the status of Disposal Unit 2, including a summary of damp spot activity and internal and external repairs completed to date. Schmitz also discussed the Engineering Improvements Team formed to address issues and corrective actions associated with Disposal Unit 2, noting that repair options under consideration include adding curbing on the exterior of the cell and cutting off the interior anchor bolts on the cell floor and coating with the CIM 1000 material in a continuous coat up to 5 feet along the cell walls.

D. Little provided an overview of the inadvertent transfer event of May 19, 2010. Little noted that approximately 1900 gallons of diluted salt solution was inadvertently transferred from the Saltstone Production Facility to Vault 4, Cell F while the production facility was in a special test mode. The cause of the transfer was attributed to operator error resulting in a valve misalignment. Little noted that, in the test configuration, the facility was able to access the salt feed/mix components and obtain a sample of the liquid that was transferred. Based on analysis of the chemical constituents the facility estimates that the liquid was dilute (~10%) salt solution.

D. Esh asked if the radiological composition of the liquid was analyzed.
D. Little noted that only the chemical composition was evaluated.

Esh requested that SRR provide an estimated radiological composition of the liquid.

Esh asked for the volume of the bleed water system within the cell.
Little stated that this volume had been calculated by the facility and could be provided.

Esh asked how much material has been placed in the cell since the event.
K. Liner stated that approximately 4 feet of clean material has been placed in the cell since the event.

Esh asked if any environmental monitoring had occurred since the event.
Little responded that monitoring had occurred and no evidence of contaminant release was identified.

Esh asked where the nearest environmental monitoring point was.
Liner noted that a monitoring well is near the east side of the vault.

J. McCain asked what additional layers of defense are being evaluated in response to this event.
Little responded that, in the near term, independent verification of valve positioning and alignment would be required. Longer term, SRS may consider electronic monitoring of valve positioning.

McCain asked about the timeline of events associated with the event.
Little noted that SRS estimated that the event occurred over a 17-minute period and was evident by observing an unanticipated drop in the salt feed tank level indication. Once the facility recognized that they were in an unanticipated condition, the test was stopped and the facility placed in a safe condition. This took approximately one minute.

N. Devaser asked when the facility restarted after the event.
Little responded that the facility was down until the 26th and that the facility wanted to review the sample results prior to restart.

After lunch A. Staub provided an estimate of the radiological composition of the waste based on a 10% solution of the Tank 50 material presumed to be in the Salt Feed Tank at the time of the inadvertent transfer.

A. Staub and M. Smith presented the status of Salt Waste Disposal research and development activities currently underway. Staub and Smith reviewed the status of activities related to:

1. Saltstone cores removed from Vault 4, Cell E, including a discussion of the evaluation of sampling techniques proposed for use in the future;
2. Testing of the saltstone simulants for the properties believed to be sensitive to the quality of the saltstone waste form;
3. K_d testing of saltstone simulants.

D. Esh noted that it had been some time since the saltstone cores had been extracted from the vault. Staub and Smith noted that there was extensive mock up and testing work done to provide reasonable assurance that the cores could be extracted efficiently and effectively. In particular, the coring equipment was assembled and tested in a mock up in SRNL using simulated grout. In addition, special sample transfer tubes were fabricated to ensure that the cores would remain in an inert environment until they could be transported and stored in SRNL. Finally, the sampling crews practiced the techniques to ensure that their stay time in a radiation area could be minimized. In addition, specific procedures and equipment have been developed and installed to perform radioactive testing of these samples.

Staub provided an overview of the formed core sampling methodology developed for use with saltstone. Esh stated that SRS should consider evaluating the sampling methodology for impacts to the sample itself. In particular, NRC observed SRS should demonstrate that the scale of the saltstone monolithic pour process (i.e., grout parameters such as flowability and homogeneity) are not impacted by the use of a relatively small scale formed core sampling device. J. McCain stated that SRS should evaluate the ability to test actual saltstone core material using the RCRA TCLP procedure.

Smith provided an update on the testing of saltstone simulants needed to assess saltstone quality as a function of the variability of critical parameters such as water-to-pre mix ratio, dry feeds variability, aluminate concentration, and cure temperature. Smith noted that initial testing of saltstone simulants performed during 2009 was used to define parameters meriting further study. Smith stated that the simulants are being developed and cured in batches every two weeks. The simulants are allowed to cure for 90 days and then sent to MACTEC for analysis. The pace of the simulant preparation is limited to the ability of MACTEC to receive and process samples. The first cured samples are scheduled to be sent to MACTEC the first week of August.

Smith provided an overview of the K_d testing underway at SRNL. Smith stated that a saltstone simulant had been prepared and spiked with Tc-99 and had been curing approximately one month. The first sample material has been removed, and the extractable Tc-99 removed and sent for quantification. Smith noted that this is a long-term study to assess the K_d and reduction behavior of Tc-99 over time and is a follow up to work done during the previous year.

At the conclusion of the day NRC provided an exit briefing to summarize the results of their observation as well as any action items generated during the observation. The following summarizes the NRC exit briefing.

Disposal Unit 2 Status

NRC stated that they were encouraged by the progress made to identify and correct issues associated with damp spots on Cells 2A and 2B. NRC did not provide indications of the acceptability of proposed design modifications to Disposal Unit 2, rather they (Esh) noted that they are interested in assessing how those proposed corrective actions would impact modeling and results in the SDF Performance Assessment (PA).

NRC (Esh) stated that if anchor bolts associated with the drain water system were a likely pathway for release of liquids then the drain water system currently installed in Vault 4 should be assessed for similar behavior. Esh acknowledged that leak paths associated with anchor bolt penetrations in Vault 4 are likely bounded by a previous UDQE that addressed non-mechanistic leak paths resulting in 1000 liters of raw salt solution being released from Vault 4. However, Esh felt that SRS should document the assessment of this specific release pathway.

NRC (Devaser) stated that the potential for Vault 4 floor issues would need to be addressed in the TER that they are currently developing for the SDF PA.

NRC (Esh) noted that if anchor bolt penetrations intersect reinforcing bar locations and result in a leak path through the floor, then the modeling and assumptions of corrosion behavior of the floor of Disposal Unit 2 should take this into consideration.

NRC (Devaser, Pinkston) noted that the information provided during the observation included key dates related to the hydrostatic testing of cells 2A and 2B, but requested additional detail related to the sequence of events. In addition, NRC requested the QA records that record the evolution of the tests.

NRC (Esh) stated that SRS should evaluate the affect of environmental conditions on the test results. Esh noted that the seasonal variations in temperature and humidity have the potential to mask results of testing (i.e., obtaining false negative indications of leakage) if the evaporation rate exceeds the postulated leakage rate.

Saltstone Research and Development Activities

Formed Core Sampling Technique Development

NRC stated that they recognize that the current saltstone coring methodology has the potential to change the characteristics of the sample. In general, while the formed core technique may represent a less impactive method of retrieving sample material, SRS should develop additional data to demonstration that the formed core technique does not impact the sample, or if it does, how does that affect the analytical results. In particular, NRC observed SRS should demonstrate that the scale of the saltstone monolithic pour process (i.e., grout parameters such as flowability and homogeneity) are not impacted by the use of a

relatively small scale formed core sampling device. NRC referenced testing that is being done with a vendor on their behalf to better understand these behaviors.

Document Review

NRC stated that the documents provided during the Onsite Observation relating to (1) the testing of the formed core sampling method (SRNL-STI-2009-00167) and (2) the visual characteristics of radioactive saltstone (SRNL-STI-2009-00804) will be reviewed after the onsite observation and may generate follow-up questions as a result. NRC also noted that, although they will review the photographs of saltstone core material presented in SRNL-STI-2009-00804 they may request additional core photographs.

Inadvertent Transfer of May 19, 2010

NRC thanked SRS for the overview of the inadvertent transfer event of May 19, 2010. NRC requested that SRS provide a technical evaluation of the radiological composition of the inadvertent transfer material.