

SUMMARY OF MARCH 29, 2022 NRC/DOE Teleconference to Discuss Type I and II Tank SA TRR findings and Updated Geochemical Modeling

Date: 4 April 2022

Attendees (NRC): Chris McKenney, Steve Koenick, Cynthia Barr, George Alexander, Mathews George

Attendees (DOE): Charles Comeau

Attendees (SRMC): Mark Layton, Gregory Flach, Aaron Staub, Larry Romanowski, Jerimiah Mangold

Attendees (SCDHEC): Leigh Beatty, Fatina Clark, Heather Cathcart

Attendees (CNWRA): Cynthia Dinwiddie, Dave Picket, Stu Stuthoff

General

As a result of the Meeting between U.S. Nuclear Regulatory Commission (NRC) and the U.S. Department of Energy (DOE) for Technical Review Report (TRR) Type I and II Tank SA held on 11 January 2022, there was an action item to follow up on the following topics:

- a. Type I and II Tank SA TRR findings
- b. Updated geochemical modeling

Agenda item: a. Type I and II Tank SA TRR findings

NRC staff referenced TABLE ES-1 (17 specific line items) in the Type I and II Tank Special Analysis Technical Review Report (Cover Letter/Memo) for the first agenda item.

Discussions were broken down into the following segments from table ES-1.

Items 1-3: NRC staff provided feedback on iodine solubility and sorption and inquired on whether DOE had made any progress on iodine solubility studies. The DOE responded that they will be conservative with respect to not taking credit for iodine solubility in the H-Tank PA.

Items 4-5: NRC staff provided feedback from the TRR regarding Pu solubility and sorption and solicited feedback from DOE or SWRI. With respect to cement leachate factors, DOE provided feedback that they began to study this problem but the principle investigator retired and work on this topic is on hold at this time.

Items 6-7: NRC staff provided feedback from the TRR on development of primary tank and annular inventories, the DOE responded that they plan to continue to sample and develop inventories for primary tank and annular inventories.

Items 8-9: NRC staff noted the importance of validation of assumptions regarding ancillary equipment inventories. The DOE indicated that they will develop individual ancillary structure inventories and prepare special analyses.

Items 10-15: NRC staff discussed its comments with respect to the alternate fast zone simulations. The DOE responded that PORFLOW models are being developed for submerged Type 1 and partially submerged Type 2 tanks, including additional materials and simulations of aquifer cross-flow. The models will employ a 2D – cartesian coordinate representation versus a cylindrical coordinate approach. An alternative case will consider water table rise.

Items 16-17: NRC staff provided feedback that the results are not clear

Agenda item: b. Updated Geochemical Modeling

NRC requested the documents listed in the 2021 Performance Assessment Maintenance plan related to grout degradation, chemical transition times, and solubility modeling: SRR-CWDA-2021-00034, *Chemical and Physical Evolution of Tank Closure Cementitious Materials*, and SRR-CWDA-2021-00042, *Recommended Solubilities for Tank Closure Performance Assessment Modeling*.

The DOE indicated that two additional references provide the rationale for the updated degradation and solubility modeling. The NRC offered to table the updated solubility modeling discussion until after it could review the two references, and the DOE was ready to discuss. The DOE explained that in response to the NRC's comments regarding the conceptual model for grout degradation and coupling of models, the revised modeling approach considers mechanical degradation through corrosion of cooling coils, expansion and cracking of the grout monolith. The updated modeling also considers decalcification of the grout monolith.

Following the meeting, the DOE provided the following references: IEI 2024-001: *Opportunities to Update the Model of Tank Closure Grout Aging (SRNL-STI-2012-00404) Based on Experimental Results by the Savannah River Ecology Laboratory*, and IEI 2024-002: *Recommended Updates to Solubility Controls for Modeling Leaching of Technetium, Uranium, Neptunium, Plutonium, and Iodine from the Residual Waste Layer of Closed Savannah River Site High-Level Waste Tanks*.

The DOE also indicated that updated steel liner degradation modeling was discussed at the Waste Management Symposium and offered to send the presentation and paper.

Other items:

The NRC staff also provided an update regarding its plans to re-initiate saltstone leaching experiments using the new grout formulation to evaluate hydraulic and chemical performance. NRC staff requested information on "sandpaper grit size" used by SREL in similar saltstone experiments as discussed in the 2017 research exchange with DOE (ML17352A059).

ACTION ITEM: NRC requested the following items from DOE

1. Waste Management Presentation on updated steel liner degradation modeling

2. Sandpaper Grid Size for SREL saltstone experiments cited in ML17352A059
3. Grout degradation and updated solubility modeling reports

KEY

South Carolina Department of Health and Environmental Control (SCDHEC)

Savannah River Mission Completion (SRMC)

Savannah River Remediation (SRR)

Technical Review Report (TRR)