

## **Hanford Waste Management Area C WIR Evaluation 11-06-2018 DOE-NRC Teleconference Summary**

Department of Energy (DOE) Attendees: Sherri Ross (DOE-HQ), Jan Bovier (DOE-ORP), Rod Lobos

Nuclear Regulatory Commission (NRC) Attendees: Hans Arlt, Dave Esh, Lloyd Desotell

DOE Contractor Attendees: Sunil Mehta (INTERA), Matt Kozak (INTERA), Paul Rutland (WRPS), Doug DeFord (WRPS), Mike Connelly (TecGeo), Jim Field (WRPS), Bill McMahon (CHPRC)

Member of the Public Attendees: No members of the public identified themselves

The following topics regarding NRC's review of the Draft Waste Incidental to Reprocessing (WIR) Evaluation for Closure of Waste Management Area C (WMA C) at the Hanford Site were discussed during a November 06, 2018 teleconference. These items were not covered in a previous teleconference due to time constraints. The item numbers start with 32.

This teleconference was open to the public. The call in information for this teleconference was posted on the following DOE Hanford webpage:

<https://www.hanford.gov/page.cfm/WasteManagementAreaC>

### Topic: Radionuclide Inventory (Tanks)

- 32 NRC staff stated that Tables 3-10 and 3-12 from the PA do not seem to match. DOE stated that the tables provide different information. DOE stated that Table 3-10 presents the history of waste transfers into the tanks while Table 3-12 presents the best estimate of wastes types after retrieval.
- 33 NRC staff stated that Sec. 6.2.1.1 from the PA does not discuss tank C-301. DOE stated that a discussion on Tank C-301 is missing and that it should be added.
- 34 NRC staff asked if Tank C-205 represents Tank C-301 in PA Fig. 7-1. DOE stated that this is a typo and Tank C-205 does represent Tank C-301 and that it will be corrected.
- 35 DOE discussed how it would update the draft WIR evaluation and performance assessment if new inventory information became available. DOE stated that that the PA is a living document and that there is a control process for emerging issues. DOE stated that if the inventory changes significantly they will do a special analysis.
- 36 The representativeness of waste tank sampling was briefly discussed. DOE stated that the representativeness and uncertainties related to tank sampling and analysis are discussed in Section 5.2.1 of the PA. DOE stated that samples were obtained using a data quality objective process (RPP-23403) in addition to discussions with regulators. DOE indicated that they can't always achieve what they desire because of riser locations

and other limitations but that they do try to sample different colors (phases) of waste. They can't sample walls or stiffener rings.

- 37 NRC staff asked DOE to describe the tanks/isotopes that are based on the Hanford Defined Waste Model/Hanford Tank Waste Operations Simulator (HDW/HTWOS). As data has been collected some comparisons have been made between measured concentrations and previously estimated values using HDW/HTWOS. Please show the uncertainty ranges considered for the inventory compared to the differences between observed and predicted for the HDW/HTWOS. Table 3-22 shows HTWOS seem to have higher uncertainty than implemented in the uncertainty analyses. DOE indicated that inventory estimates with HTWOS makes assumptions about movement and mobility. The report describing HDW is Rev 5 of RPP-19822. DOE relies on HDW when they have no sample results, which is the case for 18-20 radionuclides. HDW estimates have "high" uncertainty but DOE hasn't determined what the uncertainties are. DOE believes the HDW uncertainties are higher than the sampled uncertainties.
- 38 NRC staff stated that the overall tritium inventory in the system seems to be low compared to that observed in other DOE tank systems (e.g. SRS, INL, WVDP) relative to other isotopes. DOE stated that they have done a material balance and that tritium is likely in the groundwater due to historical crib discharges.
- 39 NRC staff stated that Tank C-106 inventory for uranium appears low. DOE stated that Tank C-106 was cleaned with oxalic acid which resulted in low uranium residual inventory. Table 5-1 shows uranium present in C-106.

Topic: Waste Release

- 40 NRC stated that, in some cases, 30% or more of the waste inventory is on the walls or in the peripheral region of the tanks and asked why lateral diffusion from source/walls is not considered in the PA. DOE stated that most of the waste is near the base. DOE also stated that some detailed tank calculations were performed that did not end up in the PA and that they could perform a sensitivity analyses if needed.
- 41 NRC stated that due to the limited number of samples with respect to uranium solubility analyses, the true solubility range may not be captured. DOE stated they believe the solubility values are already conservative and consistent with those presented in the literature. DOE stated that the basis is provided in Section 6.3.1.2 of the PA document and 1E-04 mol/L solubility limit is based on assumption of amorphous uranium phases and was applied for 1,000 years. While the concentration value of 1E-4 mol/L was the maximum observed in the flow-through column experiments, this value was based on calcium carbonate leachant; the concentrations dropped off rapidly in the experiment.
- 42 NRC staff indicated that empirical measurements are encouraged because they provide the most direct information on the performance of the system. However, the empirical

approach to waste release has limitations because of the limited about of waste compositions and conditions tested. The phases and release mechanisms remain indeterminate. These results are very uncertain given waste heterogeneity. Please discuss why the range of uncertainty in the source term release is bound by the results of limited measurements. (Please see the response to question 41 for uranium). DOE indicated that the release of Tc-99 is fairly rapid in the PA model. While the experimental data may be limited, it is sufficient to justify the release rates used in the model.

- 43 NRC staff asked if the analysis for diffusive releases to air considered discrete pathways to release. DOE stated they did not consider discrete pathways and do not consider it to be a credible scenario because of the tank grouting procedure.
- 44 NRC staff stated that the liner failure timing is very uncertain and asked if alternate advective and diffusive conceptual models of flow/release with the liner present and not present (bathtub) have been considered. DOE stated that they have not considered that approach but have conducted some bounding sensitivity cases such as the GRT4 and DIF3 cases presented in Section 8 of the PA.

Additional clarification topics:

- A. During the discussions pertaining to comment 41, NRC staff asked about the meaning of “matrix degradation” as used in Sec. 2.4.1. DOE made clear that matrix degradation should not be confused with “grout degradation” as described for grout sensitivity cases grt1, 2, 3, and 4 in Tab. 8-15. Matrix degradation process is not an actual degradation process but the process associated with the release of contaminants (i.e., Tc-99) into the pore waters of the material in the tank and ancillary equipment and their migration from the residual waste matrix.

Action Items

Item Number	Date	Action	Status
9-6.3a	9-6-18	NRC to provide GoldSim run log to DOE	Completed 9-25-18
9-6.3b	9-6-18	DOE to provide NRC with GoldSim model for 400,000 year simulation	Completed 9-27-18
9-6.5	9-6-18	DOE to provide additional details regarding the scaling for other uranium isotopes	pending
9-6.6	9-6-18	DOE to provide the aqueous relative permeability parameters assigned in STOMP model	pending
9-6.8	9-6-18	DOE to provide map showing the location of node 69 in relation to the tank footprint	Completed 10-25-18
9-6.9	9-6-18	DOE to provide a water budget table with inflow at the surface and inflow/outflow at the four aquifer boundaries	pending
9-6.12	9-6-18	DOE to provide the simulated hydraulic heads from the	pending

		STOMP model for the monitoring wells as seen in Fig. C-11, page C-22	
9-6.14	9-6-18	Future presentation on Leapfrog geological model	pending
9-6.15	9-6-18	DOE to check the discrepancy between 580 m <sup>3</sup> /d on PA p. C-8 and 730 m <sup>3</sup> /d on p. C-12.	pending
10-2.10	10-2-18	DOE to send information on tank specific retrieval technology selection information	pending
10-2.12	10-2-18	NRC to check information in NUREG 1854 on waste classification criterion guidelines	Completed 11-13-18
10-2.a	10-2-18	DOE to check posting on website	Completed 10-02-18
10-11.5	10-11-18	Item #5 from the 10-11-18 clarification call list will be revisited next call when Bill McMahon is available.	Completed 10-25-18
10-11.6	10-11-18	DOE will generate a figure that represents the pipeline source area used in the STOMP model.	Completed 10-25-18
10-11.7	10-11-18	DOE will review the discussion of Figure 7-16 on page 7-24 of the PA document and make corrections as needed.	pending
10-11.8	10-11-18	DOE will produce a revised figure showing the early times (0 to 2000 years) for figures 7-15 and 7-16.	Completed 10-25-18
10-11.9	10-11-18	Item #9 from the 10-11-18 clarification call list will be revisited next call when Bill McMahon is available.	Completed 10-25-18
10-11.11	10-11-18	Item #11 from the 10-11-18 clarification call list will be revisited next call when Bill McMahon is available.	Completed 10-25-18
10-11.13	10-11-18	DOE to provide access to WRPS document RPP-ENV-334418 and CH2M Hill Hanford Group Inc. document RPP-32681	Completed 10-11-18
10-11.15	10-11-18	DOE to provide NRC document that discusses how the unsaturated zone is effective at filtering colloids.	pending
10-11.16	10-11-18	DOE to provide access to PNNL document PNNL-15226	Completed 10-11-18
10-11.18	10-11-18	DOE to provide access to Washington Closure Hanford document WCH-520	Completed 10-11-18
10-11.20	10-11-18	Item #20 from the 10-11-18 clarification call list will be revisited next call when Bill McMahon is available.	Completed 10-25-18
10-11.21	10-11-18	NRC will locate the Sr-90 plume map it referenced in Item #21 from the 10-11-18 clarification call list.	pending
10-11.31	10-11-18	DOE will address the typographic errors identified in Item #31 from the 10-11-18 clarification call list.	pending
10-11.9a	10-25-18	DOE will correct the text on p. 8-80 related to the vertical extent of the modeled clastic dike	pending
10-11.22	10-25-18	DOE to provide access to DOE/RL-2015-75	Completed 10-25-18
10-11.26	10-25-18	DOE to provide cross sections shown in Fig. 2.7 in PNNL-13024, and the cross-section G – G' from Fig. B-1 in RPP-RPT-46088, Rev. 2	pending
10-11.30	10-25-18	NRC staff to provide reference (PNNL-16407) to support discussion of y unknown subsurface features	Completed 11-05-18

10-11.a	10-25-18	DOE to provide the most appropriate reference supporting the use of a no-flow bottom boundary in the 3D STOMP model	pending
10-30.6	10-30-18	DOE to provide access to DOE/RL-2016-37	Completed 10-30-18
10-30.10	10-30-18	DOE to provide access to CERCLA documents that relate to closure of the pipelines outside WMA C	Completed 11-09-18
10-30.15	10-30-18	DOE to provide access to RPP-RPT-55804	Completed 11-01-18
10-30.16	10-30-18	DOE to provide access to GRT4 GoldSim file	Completed 11-09-18
10-30.25	10-30-18	DOE to search for references related to equipment that will remain in the tanks at closure	pending
10-30.27	10-30-18	DOE to provide access to PNNL-15503 Rev 1	Completed 11-09-18
10-30.29	10-30-18	DOE to search for additional references related grout degradation	pending
11-01.1	11-01-18	DOE to provide reference that supports land use assumptions and the procedure for determining which exposure scenarios will be evaluated	Completed 11-09-18
11-01.2	11-01-18	DOE to provide reference that supports the farmer scenario assumptions	pending
11-01.13	11-01-18	DOE stated they would look for a report that describes regional drilling practices	pending
11-01.25	11-01-18	DOE stated they would provide a map showing the eight assumed plugged cascade lines and the V122 pipeline	Completed 11-09-18
11-01.26	11-01-18	DOE stated that the would provide NRC access to RPT-24257	Completed 11-09-18
11-01.28	11-01-18	DOE stated that the would provide NRC access to SD-RE-EV-001	Completed 11-09-18
11-01.39	11-06-18	NRC will search for the figure it referenced regarding low uranium content in Tank C-106	pending

### **Acronyms and Abbreviations**

CPGW	Central Plateau Groundwater
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
DOE U.S.	Department of Energy
DOE-ORP	U.S. Department of Energy Office of River Protection
DOE-HQ	U.S. Department of Energy Headquarters
EHM	equivalent homogeneous media
INL	Idaho National Laboratory
NRC	U.S. Nuclear Regulatory Commission
PA	performance assessment
PNNL	Pacific Northwest National Laboratory
SST	single-shell tank
SRS	Savannah River Site
WVDP	West Valley Demonstration Project

WIR waste incidental to reprocessing  
WMA waste management area  
WMA C Waste Management Area C  
WRPS Washington River Protection Solutions, LLC