Hanford Waste Management Area C WIR Evaluation
9-06-2018 DOE-NRC Teleconference Summary

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

Nuclear Regulatory Commission (NRC) Attendees: David Esh, Hans Arlt, Lloyd Desotell, and Richard Chang

DOE Contractor Attendees: Marcel Bergeron (WRPS), Doug DeFord (WRPS), William McMahon (CH-PRC), Sunil Mehta (INTERA), Matt Kozak (INTERA), David Watson (PNNL) Paul Rutland (WRPS), Keith Quigley (Veolia) and Kent Rosenberger (SRR)

Member of the Public Attendees: None

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 September 6, 2018 teleconference. 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

1. The screening calculations used to limit the number of radionuclides evaluated in the Performance Assessment (PA) document (RPP-ENV-58782, Rev 0) were discussed. DOE stated that hypothetical source terms were used. Additionally, maximum recharge rates associated with each period for each surface type, vadose zone hydraulic properties that produce the fastest pore water velocity for each hydrostratigraphic unit and a source advective release function were used for the calculations as discussed in Section 6.3.2.3 of the PA document.

2. The exchange of information between the STOMP and GoldSim models was discussed. DOE stated that this was a manual process and done under Quality Assurance procedures.

3. NRC indicated that a number warning and error messages were encountered when running and modifying the GoldSim model. NRC stated that it will send DOE its run logs to enable DOE to evaluate the warning and error messages. Also, DOE stated that they will send NRC an additional GoldSim file that has a 400,000 year simulation period.

4. The radionuclide diffusive release modeling was discussed. DOE stated that lateral diffusion is not modeled within GoldSim. Additionally, DOE stated that each GoldSim model derived source term is equally distributed within its respective source area in the STOMP model.

5. The scaling of modeling results for U-238 to other isotopes was discussed. NRC asked if scaling was applied to isotopes that have significantly different half-lives. DOE stated that scaling for other uranium isotopes is performed in the GoldSim based system model

using the results of U-238 from the 3-D STOMP model. DOE can provide additional details regarding the implementation of the scaling procedure.

6. NRC indicated that the aqueous relative permeability parameters are assigned in STOMP but are not provided in the PA documentation. DOE stated that these would be provided to NRC.

7. The process the STOMP model uses to calculate radionuclide concentrations in groundwater was discussed. DOE stated that the concentrations are flux-averaged values over approximately 30m wide by 5m deep planes as depicted in Figure 7-11 of the PA document. Additionally, DOE stated that the output times for the model concentrations and maximum time-step size can be controlled based on input file instructions.

8. The location of node 69 within the STOMP model was discussed. DOE stated that this node is located, in plan view, near the center of the Tank C-105 footprint and that DOE would send NRC a map showing the location of node 69 in relation to the tank footprint.

9. NRC asked if there is a general water budget table for the STOMP model included in the PA document. DOE stated that they don't believe a water budget table is presented in the PA document but that they could generate one that would include inflow at the surface and inflow/outflow at the four aquifer boundaries and send it to NRC.

10. The STOMP model boundary conditions were discussed. DOE stated that the northeast and southwest sides of the model are no-flow boundaries.

11. NRC asked the basis for prescribing a fixed head at the southeast boundary of the STOMP model. DOE stated that this value is based on results from the Central Plateau Groundwater Model (CPGWM). DOE stated that sensitivity analyses for the prescribed head value were not conducted but sensitivity analyses were conducted for the prescribed flux boundary as discussed in Section 8.2.2 of the PA document. DOE stated that the prescribed flux was used at the northwest boundary since this allowed consistency with the CPGWM output.

12. NRC asked what the resulting hydraulic gradient from the STOMP simulation is. DOE stated that it is approximately 2E-05 m/m. DOE would send the information necessary to calculate the hydraulic gradient to NRC (e.g., the simulated hydraulic heads from STOMP for the monitoring wells as seen in Fig. C-11, page C-22).

13. The methodology to assign groundwater flux to the northwest side of the STOMP model to account for the non-uniform aquifer thickness as presented in Table D-15 of the PA document was discussed after NRC staff asked DOE if there were additional references available related to that methodology. DOE stated that this was simply a proportionality approach and they don't believe there are references describing it.

14. NRC asked what was the data source used for representing bottom of the aquifer in the STOMP model. DOE stated that this information was based on the ECF-Hanford-13-0029 (2015) document including 4 data points in the WMA-C area. Additionally, DOE stated that in a future teleconference, the Leapfrog model could be presented to give NRC additional insights into the geologic model.

15. NRC asked what the basis was for using the average rounded layer thickness weighted hydraulic conductivity instead of the individual model layer values. DOE stated that the aquifer properties in the 3-D STOMP model are based on equivalent homogenous media approach where effective hydraulic properties are used to be consistent with the equivalent homogeneous medium approach used for the vadose zone modeling. Additionally, NRC asked about the discrepancy between the CPGWM-calculated flow through the window volume in the year 2100 value on page C-8 (580 cubic meters per day) and on page C-12 (730 cubic meters per day) of the PA document. DOE stated that the values on page C-12 are correct but they will look into the values presented on page C-8 (and compare to C-12).

16. NRC asked if hydraulic head information (in addition to that already presented) could be obtained from the CPGWM for the monitoring wells shown in Figure C-11 (page C-22) of the PA document in order see how representative the assumed hydraulic gradient is as discussed in Section C.4.1.2. DOE stated that they will check on the possibility of providing the simulated hydraulic heads from the CPGWM model for the monitoring wells as seen in Fig. C-11 (page C-22).

17. NRC asked if there is additional information that could supplement the basis for the saturated zone model development presented in Section 6.4.6 of the PA document. DOE stated that the basis is largely presented in the CPGWM documentation.

18. NRC asked about the following statement on model limitations in Section D7.0 of the PA document: “Results represent incremental groundwater contamination from WMA C residuals and do not include interaction with earlier WMA C waste releases or contamination from other sources.” DOE indicated that to account for the impact of previous releases they chose Kd values representing an intermediate impact zone and referenced page 6-93 of the PA document and PNNL-15503.

Additional clarification topics:

19. Figure C-5 (page C-13) of the PA document: The 300-ft length and the 200-ft width are not aligned with the volumetric flux calculation window in this figure. DOE indicated that the offset of arrows occurred during conversion of native figure to PDF, which can be fixed. In addition, after questions from NRC staff, DOE stated that no water sources or sinks are present and they do not believe that any problems should arise due to the CPGWM volumetric flux calculation window not aligning with the orientation of the WMA-C STOMP model used in the PA. The hydraulic gradient and specific discharge are consistent with the CPGWM.

20. Table D-15 (page D-43) of the PA document: DOE confirmed that based on an aquifer area along northwest cross section boundary of 6,151.04 m^2 and a model boundary of 795.3 m, the aquifer thickness along the northwest model boundary is 7.7 m thick.

21. Figure 6-36 (page 6-81) of the PA document: After questions by the NRC staff, DOE confirmed that the surface seen in Fig. 6-36 is the present-day surface and represents the first active cells in the STOMP model where recharge to the model in applied. These upper cells and nodes near the surface are not represented in PA document Fig. 6-47 (page 6-110) where the top node (node 69) represents the vadose zone immediately below the tanks.

ECF-Hanford-13-0029, 2015, "Development of the Hanford South Geologic Framework Model, Hanford Site, Washington," Rev. 1, CH2M HILL Plateau Remediation Company, Richland, Washington.