August 26, 2014

MEMORANDUM TO: Anthony H. Hsia, Deputy Director
Division of Spent Fuel Storage and Transportation, NMSS

FROM: Pierre Saverot, Project Manager **/RA/**
Licensing Branch
Division of Spent Fuel Storage and Transportation, NMSS

SUBJECT: SUMMARY OF AUGUST 19, 2014, MEETING WITH THE U.S. DEPARTMENT OF ENERGY

Background

The U.S. Department of Energy (DOE) requested this pre-application meeting to present results from the on-going structural and containment evaluations of the West Valley melter as a package, in order to obtain a special authorization from NRC for shipment of the melter from the West Valley site in 2015.

The meeting attendance list and the presentation slides are provided as Enclosure Nos. 1 and 2, respectively.

Discussion

SFST staff suggested that DOE considers including, in the application, a cross-reference table listing potential departures from regulatory requirements, a clear identification of the differences, and a justification for an equivalent level of safety to the one required by 10 CFR Part 71, to allow staff to make a safety determination while minimizing also the review time. In addition, staff said that DOE should make most of the application publicly available, except for the drawings which are always considered proprietary.

The melter contains 3,554 curies, including surface contaminants, and about 81 grams of fissile mass from all three sources, i.e., heel, spout, and glazing on refractory bricks. The melter is 15'-9" long, 12'-6" wide and 12'-6" high, and has a total weight of 389,000 lbs, including the low-density cellular concrete (LDCC).

DOE presented data from drop tests of glass canisters and results from the structural assessment of the package, with various drop orientations. DOE said that: (i) the bolted door is reinforced to meet containment requirements, (ii) the melter behaves as a rigid unit, (iii) the concrete stays intact with a localized -less than 10% by volume- impact zone in the LDCC, and (iv) the glass does not get pulverize inside the melter. All large deformations come from the steel tubes – which are filled with foam - and the impact limiters while the bolts are the limiting component of the design. Thus, the model is run with bolt failure since most bolts fail on a 30 foot, center of gravity over edge, drop.

Staff asked questions about the basis for the model, its benchmarking, its ability to characterize attributes for a 30-ft drop, the energy-balance method used, and suggested that DOE ought to estimate the crush strength corresponding to the energy levels. Staff asked what material properties were called out since it appears that the only driver is the strength of the LDCC. DOE responded that the LDCC is modeled as foam since it is isotropic and it crushes. Staff expressed some concerns on the reasons for selecting a standard calculation problem proposed by a software provider to do some benchmarking, and suggested that the application should include a complete discussion on this topic because a standard calculation may not be appropriate. Staff reminded DOE of the need for a sensitivity analysis and said that the word "gap", as used in the presentation, may create some confusion since there is no opening, but only a deflection, of the door. The deflection of 6 inches, as currently shown, should also be clearly addressed in the simulation because it is well defined and covers one edge of the door.

Regarding containment, DOE will have to consider loss of confinement and the presence of cracks in the concrete under hypothetical accident conditions (HAC). Staff asked DOE to explain the basis for the use of every number in the release calculations and release factors, e.g., 0.1 for the leak path factor, 1 for the respirable fraction, etc. Staff also asked DOE to (i) evaluate the pressure inside the package, and (ii) prepare a justification for the "gap" size being inconsequential to shielding. Staff suggested to include calculations characterizing the streaming paths that may affect shielding and said that the shielding chapter of the application should include a short discussion on the results of the structural evaluation.

Regarding the thermal evaluation, staff said that DOE must use the normal conditions of transport (NCT) steady-state temperatures (with insolation) as the initial temperatures of the package for the HAC thermal analysis. Staff also reminded DOE that 10 CFR 71.73 requires that an average fire emissivity of at least 0.9, with an average flame temperature of at least 800^{o}C, and a package surface absorptivity of at least 0.8, be used in the calculation when the package is fully exposed to the 30 minute fire. With only one emissivity allowed in an ANSYS code, the applicant should use 0.9. This would not be the case if other computer codes, allowing for more than one emissivity input, are used.

DOE is planning a mid to end of October 2014 submittal for a shipment in FY 2015. Staff asked that the input/output files, as well as all reference materials, be put on a separate disk. Staff said that all exceptions taken, as well as the important to safety (ITS) components to support performance acceptance criteria, should be listed, the different categories A,B,C of components should be justified, and the codes and standards used should be specified in order to facilitate the review and avoid unnecessary RAIs.

Staff made no regulatory commitments during the meeting.

Docket No. 71-9797
TAC No. L24918

Enclosure 1: Meeting Attendees
Enclosure 2: Presentation

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Enclosure 1: Meeting Attendees; Enclosure 2: Presentation
Distribution: Attendees, M. Lombard, M. Sampson

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Meeting Between DOE and the
Nuclear Regulatory Commission
August 19, 2014
Meeting Attendees

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Enclosure 1