July 21, 2010

MEMORANDUM TO: Cathy Haney, Director
Office of Nuclear Material Safety and Safeguards

FROM: Brian W. Sheron, Director ***/RA/***
Office of Nuclear Regulatory Research

SUBJECT: COMPLETION OF: THE OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS USER NEED (NMSS-2007-003)

In a memorandum from E. William Brach to F. Eltawila, dated April 27, 2007, the Office of Nuclear Material Safety and Safeguards (NMSS), Division of Spent Fuel Storage and Transportation (SFST) requested assistance from the Office of Nuclear Regulatory Research (RES) pertaining to computational fluid dynamics (CFD) modeling of dry cask storage designs. In particular, NMSS requested RES assistance in developing CFD models in order to perform confirmatory analyses to support the reviews of the Magnastor and the HI-STORM 100U spent fuel storage casks and the future transportation, aging, and disposal (TAD) designs. Additionally, NMSS requested RES to develop best practice CFD guidelines for analyzing spent fuel storage and transportation cask designs to help transfer knowledge to the NMSS staff. In a memorandum from B. Sheron to M. Weber, dated June 1, 2007, RES accepted this work request and assigned the number NMSS-2007-003 to the user need for tracking purposes.

To meet NMSS' needs RES provided assistance to SFST staff in their review of Magnastor and the HI-STORM 100U spent fuel storage casks, which included preparation of requests for additional information, performance of detailed reviews of the applicants' computational model and results, and participation in conference calls with the applicants and briefings of NMSS management. RES also performed independent CFD analyses to confirm the applicants' submittals.

To facilitate knowledge transfer in this technical area, staff in RES and SFST collaborated on multiple papers that were presented at international conferences. In addition, RES prepared a report entitled, "CFD Best Practice Guidelines for Dry Cask Applications." This document includes best practice guidelines based on existing knowledge within the CFD community and factors in RES experience through the application of CFD to dry cask analyses. The content of this report was presented to the SFST staff and their comments have been addressed. It is attached to this memorandum.

RES performed a three-dimensional CFD model of the new TAD designs proposed by the Department of Energy using the Fluent code. The documentation of this model is also attached to this memorandum. It has been reviewed by the SFST staff and their comments have been addressed.

With the transfer of these two final reports, both SFST and RES staff have agreed that the user need NMSS-2007-003 can be closed. Please contact Dr. Ghani Zigh of my staff if further assistance is required.

RES has established a quality survey so User Offices can provide feedback on the quality of delivered RES products and services. This survey can be found at http://cio5-dev.nrc.gov/isea/index.cfm?fuseaction=Survey.Welcome&SurveyUUID=1593F137-F3EF-08F8-0EFC429A952B8B1D. I appreciate your support in ensuring completion of this 5-minute survey within the next 10 working days.

Enclosures:
1: CFD Best Practice Guidelines for Dry Cask Analysis
2: CFD Analysis of W150 Storage Cask for Application in Transportation, Aging, and Disposal Storage Cask Thermal Evaluation

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