

September 16, 2004

MEMORANDUM TO: E. William Brach, Director
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards

FROM: Farouk Eltawila, Director **/RA/**
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research

SUBJECT: USER NEED MEMORANDUM-REQUEST TO RESEARCH TO
VALIDATE FLUENT CFD METHODOLOGY WITH INEEL's VSC-17
EXPERIMENTAL DATA (NMSS-2004-008)

In your memorandum to me dated September 3, 2004, NMSS requested assistance from RES regarding the development of a three-dimensional (3-D) Fluent CFD model of the Ventilated Storage Cask (VSC-17) and compare the output results to the available experimental data provided by Idaho National Engineering and Environmental Laboratory (INEEL). The purpose for this request is to provide confidence in the analytical methods that will be applied to upcoming licensing reviews involving significant increase in heat loads from high burnup fuel.

NMSS Request: Develop a 3-D Fluent CFD model of the VSC-17 storage cask and perform a thermal-hydraulic analysis for the normal storage conditions. The developed model should include a vertical cask configuration for both helium and vacuum conditions. After the model has been validated, RES should apply this analytic method to the HI-STORM 100 MPC-24, MPC-32 and MPC-68. SFPO staff will work with RES in performing some of the analyses and reviewing the developed thermal-hydraulic models. The methods should then be documented in a technical report.

NMSS Requested Completion Date: Four months after the starting date.

RES Response: 3-D model of a VSC-17 will be developed to study the normal steady storage conditions for both helium and vacuum conditions. Fuel assemblies, basket plates, downcomer will be represented in the model. Porous media will be used to model fuel rods within each fuel assembly. To accomplish the work, RES will need complete sets of drawings for the VSC-17 and the physical properties of all the components that the storage cask consists of. After the model has been validated, RES will help SFPO staff to apply these analytical methods to the HI-STORM 100 MPC-24, MPC-32 and MPC-68.

Due to the complexity of the work, RES estimates that the work can be completed in seven months after receiving requested information. We have discussed the new date with your staff and it was agreed that it will have no impact on licensing decisions.

Should you require additional information regarding this response, please contact Ghani Zigh of my staff on 415-5895.

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*See previous concurrence

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