



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

September 15, 1999

Dr. Stephan Brocoum  
Assistant Manager for Licensing  
U.S. Department of Energy  
Office of Civilian Radioactive Waste Management  
Yucca Mountain Site Characterization Office  
P.O. Box 30307  
North Las Vegas, Nevada 89036-0307

SUBJECT: ISSUE RESOLUTION STATUS REPORT (KEY TECHNICAL ISSUE: THERMAL EFFECTS ON FLOW, REVISION 2)

Dear Dr. Brocoum:

As you know, the staff of the U.S. Nuclear Regulatory Commission (NRC) has developed a program for early resolution of technical issues at the staff level. Revision 0 of this Issue Resolution Status Report (IRSR) on the Key Technical Issue of Thermal Effects on Flow focused on defining acceptance criteria for staff use in reviewing the treatment of thermal effects on flow (TEF) in the U.S. Department of Energy's (DOE's) testing, modeling and performance assessment program areas (letter from N. K. Stablein to S. Brocoum dated November 13, 1997). Revision 1 focused on evaluating DOE's thermohydrologic testing program in the context of the acceptance criteria (letter from M. J. Bell to S. Brocoum dated October 1, 1998). This revision focuses on evaluating DOE's modeling and performance assessment program, with respect to thermal effects on flow, in the context of the acceptance criteria.

Consistent with NRC regulations on preclicensing consultations and a 1992 agreement with DOE, staff-level issue resolution can be achieved during the preclicensing consultation period; however, such resolution at the staff level would not preclude the issue being raised and considered during the licensing proceedings. Issue resolution at the staff level during preclicensing is achieved when the staff has no further questions or comments (i.e., open items) at a point in time regarding how the DOE program is addressing an issue. There may be some cases where the resolution at the staff level may be limited to documenting a common understanding regarding the differences in NRC and DOE points of view. Further, pertinent additional information could raise new questions or comments regarding a previously resolved issue.

The enclosure should be viewed as a status report that provides the staff's most current views related to thermal effects on flow potentially affecting the repository at Yucca Mountain. NRC plans to update this report in FY2000 to reflect progress on relevant subissues. The revised IRSR will also reflect changes in the NRC program, such as the change from the "Key Elements of Subsystem Abstraction" (KESA) to the "Integrated Subissue" (ISI) approach for performance assessment abstraction activities. This change is not functionally different from

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our current approach, but it enhances integration, helps develop the Yucca Mountain License Application Review Plan, and more closely ties our review activities to a performance assessment framework.

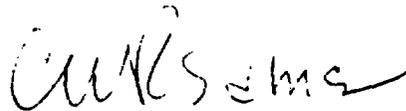
The status of resolution of programmatic and technical acceptance criteria for the three subissues is summarized in Table 7 of the enclosed IRSR. With respect to subissue one (thermal testing), there remains only one open technical criterion (Criterion 1.7, accounting for all mass and energy losses/gains in the model system). This topic was first discussed at an Appendix 7 meeting on April 28, 1999 wherein DOE project staff indicated methods for monitoring heat and mass loss through the drift-scale test bulkhead would be evaluated within the existing budget framework. We look forward to follow-up discussions on this topic.

Included in this revision of the IRSR is an evaluation of subissues two and three (process-level and total system modeling) in the context of the acceptance criteria. This represents our first attempt at evaluating these subissues in this context. As summarized in Table 7 in the IRSR, those acceptance criteria considered to be "open" can be used to focus future interactions related to thermal effects on flow.

We would like to note that we continue to have very successful interactions with DOE project personnel on the thermohydrologic testing program. We appreciate the continuing opportunity to attend DOE's Quarterly Progress Meetings. This IRSR should help facilitate the exchange of ideas between NRC and DOE, as well as provide DOE with an understanding of the criteria that NRC will be using to evaluate information presented on this subject in DOE's Total System Performance Assessment-License Application.

We welcome a dialogue on this subject with DOE, the U.S. Nuclear Waste Technical Review Board, State of Nevada, and other interested parties. If you have any questions about this letter, please contact Jeffrey Pohle of my staff at (301) 415-6703, or via Internet mail service ([jap2@nrc.gov](mailto:jap2@nrc.gov)).

Sincerely,



C. William Reamer, Chief  
High-Level Waste and Performance  
Assessment Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: As stated

cc: See attached list

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Letter to S. Brocoum from C. Reamer dated: September 15, 1999

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