



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

June 30, 1997

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
Las Vegas, Nevada 89036-0307

SUBJECT: ISSUE RESOLUTION STATUS REPORT ON METHODS TO EVALUATE CLIMATE CHANGE AND ASSOCIATED EFFECTS AT YUCCA MOUNTAIN (KEY TECHNICAL ISSUE: UNSATURATED AND SATURATED FLOW UNDER ISOTHERMAL CONDITIONS)

Dear Dr. Brocoum:

As you know, the staff of the U.S. Nuclear Regulatory Commission is developing a program for early resolution of technical issues at the staff level, and climate change has been selected as a pilot topic to illustrate the NRC process. In the past, staff-level issue resolution has been achieved by responding to the U.S. Department of Energy's (DOE's) proposed closure of NRC open items, or through response to topical reports. This pilot topic is different in that the staff has independently conducted a pre-licensing review of available information, the results of which are available to interested parties.

Climate change was chosen as the pilot topic for several reasons. First, it is an important hydrologic subissue that must be addressed to estimate long-term infiltration rates at Yucca Mountain. Second, DOE's Waste Containment and Isolation Strategy states that seepage into emplacement drifts is the most important factor affecting the ability of a repository to isolate waste. And third, enough relevant information exists to reach early resolution at the staff level on methods to assess climate variability and related topics.

Consistent with 10 CFR Part 60 requirements and a 1992 agreement with DOE, staff-level issue resolution can be achieved during the prelicensing 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 prelicensing 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 resolution at the staff level may be limited to documenting a common understanding regarding differences in NRC and DOE points of view.

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Pertinent additional information could raise new questions or comments regarding a previously resolved issue. The enclosed issue resolution status report (IRSR) summarizes an independent, pre-licensing review of future climate change and associated hydrologic effects. This report goes beyond the scope of the expert elicitation study on climate that the staff sponsored in

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1993. These current views have been significantly influenced by the results of documents published since 1993. The staff concludes that methods based on paleoclimatic and paleohydrologic data can be used to bound the range of past climates in the Yucca Mountain region and to estimate future precipitation and water-table rise. These are basically the same methods that have been used by DOE investigators and others to evaluate climate change. Therefore, resolution can be achieved regarding methodology.

The staff is aware that DOE is supporting climate modeling studies. Although those studies can provide additional information, staff will not require climate modeling to estimate the range of future climates at Yucca Mountain. Paleoclimate data, along with insights gained from previous climate modeling, can be used to estimate conditions during past pluvial climates that produced cooler and wetter conditions at Yucca Mountain. The return of such conditions in the future would challenge repository performance and, consequently, should be considered an integral part of performance assessments.

As discussed in the IRSR, staff has identified no open items that are solely related to climate issues. Therefore, based on the foregoing and consistent with the agreement on issue resolution at the staff level, staff has no questions at this time on methods to estimate future climate change and associated water-table fluctuations. However, it should be noted that all of the information and analyses necessary to demonstrate the methodology have not been qualified under DOE's Quality Assurance Program. It is necessary that appropriate data and analyses will be fully qualified before NRC's receipt of a DOE license application.

Finally, the enclosure should be viewed as a status report that provides the staff's most current views on these climate-related topics. The report may be updated or revised in the future as additional site and regional information becomes available. We welcome a dialogue on this subject with DOE, oversight committees, State of Nevada, and other interested parties. If you have any questions about this letter, please contact Neil Coleman of my staff at (301) 415-6615, or via internet mail service (nmc@nrc.gov).

Sincerely,
(ORIGINAL SIGNED BY:)
Newton K. Stablein, Acting Chief
Engineering and Geosciences Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated

cc: See attached list

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