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Tel. 301/504-2240 (Wednesday, December 30, 1992)

NOTE TO EDITORS:

The Nuclear Regulatory Commission's Office of Nuclear Material Safety & Safeguards has received from the NRC's independent Advisory Committee on Nuclear Waste the two attached letter-type reports. They provide comments on the impact of long-range climate change on the anticipated performance of the proposed high-level waste (HLW) repository at Yucca Mountain, NV, and phase 2 of the NRC staff's HLW performance assessment.

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Attachments:
As stated

December 22, 1992

Mr. Robert M. Bernero, Director
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Bernero:

SUBJECT: ITERATIVE PERFORMANCE ASSESSMENT PHASE 2

The Advisory Committee on Nuclear Waste (ACNW) held a Working Group meeting on December 16, 1992, to evaluate the current status of the NRC staff's Iterative Performance Assessment (IPA) Phase 2. The ACNW also discussed this subject during its 49th meeting on December 17 and 18, 1992. An additional objective of the Working Group meeting was to compare the IPA results with the U.S. Department of Energy's Total System Performance Assessment. Participating in the Working Group meeting were performance assessment specialists from the NRC staff and the DOE's High-Level Radioactive Waste Disposal Program staff and representatives from the State of Nevada. This letter provides our initial comments on Phase 2 of the NRC staff's IPA.

1. The NRC staff has made notable progress in IPA since the completion of Phase 1, and deserve commendation for this major effort. They have clearly stated the objectives of the program, carried Phase 2 work nearly to completion, and they have delineated reasonable goals for future performance assessment (PA) work.

2. The staff should be provided adequate resources to meet their expanding responsibilities in this area. We note with interest the Strategic Plan being developed to guide these activities. This Plan should provide for expanded utilization of codes and other tools developed elsewhere.

3. The ACNW has significant concerns regarding the PA process and its application. One example is the treatment of uncertainties. We plan to study these matters and will communicate our comments and suggestions to you shortly.

We are looking forward to reviewing the Strategic Plan for HLW Performance Assessment being developed by the NRC staff. Additional information and further insights on the above comments are available from the transcripts of the Working Group meeting and the discussion of the ACNW during the latter half of the first day of our 49th meeting.

Sincerely,

Dade W. Moeller, Chairman
Advisory Committee on Nuclear Waste

December 22, 1992

Mr. Robert M. Bernero, Director
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Bernero:

SUBJECT: IMPACT OF LONG-RANGE CLIMATE CHANGE IN THE SOUTHERN GREAT BASIN

The Advisory Committee on Nuclear Waste (ACNW) held a Working Group meeting on the Impact of Long-Range Climate Change in the Southern Great Basin on November 18, 1992. The ACNW also discussed this subject during its 48th and 49th meetings on November 19 and 20, 1992 and December 17 and 18, 1992, respectively. The objective of the Working Group meeting was to explore the state of knowledge of the potential impact of long-range climate change on the anticipated performance of the proposed high-level radioactive waste (HLW) repository at Yucca Mountain, Nevada. The principal questions of concern to the Committee at this meeting were:

- What is the significance of potential climate change in the Southern Great Basin to the integrity of the proposed HLW repository at Yucca Mountain?
- What are the nature and quality of models that will be used for predicting the climate for the next 10,000 years at Yucca Mountain?
- Are data and methods available to test and qualify the models?

Participating in the Working Group were nine specialists in climate change from the U.S. Geological Survey, the National Geophysical Data Center of the National Oceanic and Atmospheric Administration, the National Center for Atmospheric Research, the Center for Nuclear Waste Regulatory Analyses, and consultants to the U.S. Department of Energy (DOE) and the State of Nevada. Presentations were made on: (1) the impact of climate change on the repository; (2) paleoclimatological and paleohydrological methodologies, DOE Study Plans to conduct the required investigations, and preliminary results from the Yucca Mountain region; (3) the role and status of paleoclimatic and

paleohydrologic data; and (4) the basis, role, and status of global climate models and regional (southwestern U.S.) climate models.

The meeting provided an excellent opportunity for dialogue among climatologists, geologists, geochemists, hydrologists, and modelers and gave the ACNW a useful view of the climatology studies of the Yucca Mountain region currently underway by the DOE and its contractors and consultants. Several specific items came to our attention during the Working Group meeting that we believe are of sufficient importance and interest that they should be communicated to you. These include:

1. The current paleohydrologic and paleoclimatic studies at Yucca Mountain serve as a baseline for forecasting climate and for testing climatic models by hindcasting. These investigations will not be completed until late in this decade, at the earliest, thereby impeding timely analysis of the potential impact of climate change on the integrity of the proposed HLW site.

2. A critical element in determining the effect of climate change is the rate of infiltration (fracture and matrix permeability) through the vadose zone at Yucca Mountain. The relationship between precipitation and infiltration flux is an essential parameter in relating predicted climatic conditions to the impact on the proposed repository. The definition of this parameter, its variability, and the related uncertainties should be given high priority.

3. Preliminary estimates of the impact of climate change over the next 10,000 years at Yucca Mountain indicate that the proposed repository will remain above the water table. However, these predictions are based on climatic and hydrologic models that are preliminary in nature and are supported by an inadequate data base. Additional data acquisition and analytical studies are warranted. Sensitivity studies should be conducted to determine the degree of uncertainty that can be accepted in these data and these models without invalidating conclusions regarding the likely impact of climate change on the repository.

4. The meeting revealed an apparent lack of intra- and inter-communication among the several disciplines involved in climate study (e.g., hydrology and climate modeling). While individual researchers displayed a high degree of understanding of their own science and mission, they also displayed a lack of awareness of important information that could have come from other investigators.

5. Climatology is a significant discipline that needs to be represented within the areas of staff expertise available to the Commission. There is a need to monitor the Yucca

Mountain climate change program and especially the climate modeling efforts of the DOE contractors.

6. Not all current DOE programs aimed at investigating climate change at Yucca Mountain are being performed under the study plan submitted to the NRC.

Additional items of potential interest and further elaboration of the above points are available from the transcripts of the Working Group meeting and the discussions during the latter half of the first day of the 48th meeting of the ACNW.

Sincerely,

Dade W. Moeller, Chairman
Advisory Committee on Nuclear Waste