

AUG 18 1993

Mr. Dwight E. Shelor, Associate Director
for Systems and Compliance
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D. C. 20585

Dear Mr. Shelor:

SUBJECT: STATUS OF VOLCANISM ISSUES FOR THE PROPOSED HIGH-LEVEL WASTE
SITE AT YUCCA MOUNTAIN

On March 9, 1993, the U.S. Department of Energy (DOE) transmitted the preliminary draft Los Alamos National Laboratory technical report, "Status of Volcanic Hazard Studies for the Yucca Mountain Site Characterization Project" (hereafter, Los Alamos report) for review by staff of the U.S. Nuclear Regulatory Commission. The primary goal of the report was to provide a basis for discussions at a June 9, DOE/NRC Technical Exchange on the methodology and logic of approaches used in DOE's volcanism studies through 1992. On March 10, 1993, and March 29, 1993, respectively, DOE transmitted two volcanism related study plans, Revision 2 of "Probability of Magmatic Disruption of the Repository" and Revision 1 of "Characterization of Volcanic Features," to the NRC for review and comment. In addition, on March 9, 1993, the DOE provided responses to 13 comments and 1 question resulting from the NRC staff's review of Revision 0 of Study Plan 8.3.1.8.1.1, "Probability of Magmatic Disruption of the Repository."

The NRC staff completed its review of the Los Alamos report and provided comments related to the results of that review as part of the discussions at the June 9, 1993, Technical Exchange on volcanism studies (Letter from Holonich to Shelor, June 30, 1993). The staff is continuing its review of the two revised study plans and DOE's responses to NRC staff concerns. The results of those reviews will be transmitted to DOE in the near future.

Based on its review of information provided in all of the aforementioned transmittals related to volcanism, the staff believes that there continue to be significant unresolved concerns related to the methodology and approach used by DOE to address the issue of igneous activity in the vicinity of Yucca Mountain. Principally, the staff is concerned that the DOE's overall approach to addressing potentially adverse conditions may be insufficient to provide reasonable assurance that the 10 CFR Part 60 performance objectives can be met.

In view of DOE's expressed interest to resolve site-related volcanism concerns in the near future, the staff believes that it is appropriate to summarize our principal concerns to assure that ample consideration is given to them before DOE finalizes its positions. As noted above, the staff's concerns are not limited to specific technical issues on data gathering, but also relate to the

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methodology and approach used in the Los Alamos report and related study plans. Specifically, the staff's major concerns are listed below:

- 1) The adequacy of existing and planned characterization activities, principally geophysical testing, to address key technical factors related to igneous activity cannot be determined. Based on information provided by DOE in study plans and other reports and at recent technical exchanges, the staff has no clear understanding of when or where additional geophysical testing will be used in the investigation of key technical factors related to igneous activity. As a result, the staff is unable to judge the sufficiency of planned testing.
- 2) The "tripartite" probability as used in the draft Los Alamos report, although perhaps suitable for demonstrating compliance with the disqualifying conditions of 10 CFR 960, is insufficient for assessing compliance with 10 CFR 60 performance objectives, because not all the effects of volcanism (i.e., indirect) are considered in determining the relevant probability.
- 3) Conclusions made in the Los Alamos report, such as references to waning volcanism, are unsupported or poorly supported by data presented in the report. Although those conclusions may not directly affect the probability of disruption, they apparently are used to determine the "most likely" values. This lack of support casts doubt on the approach used, particularly the consideration of viable alternatives, and the conservatism of the analysis.
- 4) The probabilistic analysis in the draft report does not incorporate models other than the homogenous poissonian model and, therefore, unwarranted a priori conclusions eliminating other probability models from consideration have been made.
- 5) The approach to addressing uncertainty in the analysis, including the treatment of alternative tectonic models, is not fully transparent. The staff considers that the analysis of volcanic hazard should explicitly treat the degree of data uncertainty and clearly present the potential for disruption of the site by all viable models. Failure to test and evaluate viable models because they may appear overly conservative is unwarranted prior to the completion of site characterization [this does not preclude the eventual selection of a most likely tectonic model].
- 6) There appears to be a lack of significant progress towards resolution of open items derived from previous study plan reviews, including some of the concerns noted above, in the Los Alamos draft report.

It is the staff's position that DOE should address the above concerns in the same manner and with the same degree of oversight that it would give to issues identified as objections, comments, or questions. When DOE issues the final report on volcanism, the staff will review the report against the concerns expressed in this letter, the Technical Exchange, and reviews of related study

plans and will formalize any of these unresolved concerns to be tracked as open items to be resolved prior to submittal of a License Application.

The enclosure provides, for DOE's information, the Center for Nuclear Waste Regulatory Analyses' (CNWRA) review of the Los Alamos draft report. Although an independent product of the CNWRA, the review provides some of the bases for concerns identified in item numbers 1,3,4, and 5 above.

If you have any questions related to this letter or the enclosure, please contact Ms. Charlotte Abrams of my staff at (301) 504-3403.

Sincerely,

/s/
Joseph J. Holonich, Director
Repository Licensing and Quality
Assurance Project Directorate
Division of High-Level Waste
Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated *on the shelf*

cc: R. Loux, State of Nevada
T. Hickey, Nevada Legislative Committee
C. Gertz, DOE/NV
M. Murphy, Nye County, NV
M. Baughman, Lincoln County, NV
D. Bechtel, Clark County, NV
D. Weigel, GAO
P. Niedzielski-Eichner, Nye County, NV
B. Mettam, Inyo County, CA
V. Poe, Mineral County, NV
F. Sperry, White Pine County, NV
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See previous concurrence*

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