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MEMORANDUM FOR: Hubert J. Miller, Chief
High-Level Waste Technical Development Branch, NMSS

THRU: Leon L. Beratan, Chief
Earth Sciences Branch, RES

FROM: Robert A. Kornasiewicz, Meteorologist
Earth Sciences Branch, RES

SUBJECT: REVIEW OF THE SITE CHARACTERIZATION REPORT FOR THE
BASALT WASTE ISOLATION PROJECT, DOE/RL 82-3, NOVEMBER 1982

As requested, I have reviewed Chapter 8, "Climatology, Meteorology, and Air Quality" and Chapter 13, "Site Issues and Plans." In Chapter 13, the Work Elements relevant to my review were: Work Element S.1.49.D, Evaluate the effect of possible climatic changes, and Work Element S.2.5, Determine meteorologic, climatological, and air-quality conditions to be used as design and operating bases and assess future climatic changes that may affect repository performance.

My comments fall into two categories. The first, and most important, are those comments related to deficiencies in the information which has been provided concerning future climatic changes and the potential effects of these changes. The other category of comments are those related to the use and referencing of information that has been superseded or where additional, relevant information is available but has not been utilized. These are primarily in the area of severe weather phenomena used as design bases.

In Section 8.3, LONG-TERM CLIMATIC ASSESSMENT, the report presents information which suggests that the most likely climatic trend is one of global cooling toward ice age conditions. In such a case, according to the information provided, the glacial ice sheet could reach as far south as the Hanford site, and within 10,000 years, be as far south as northern Washington. Concurrent with this glacial advance, estimates of sea-levels ranging from 85 to 165 or more meters below present levels are postulated.

However, when the future impacts of climatic change are discussed, the information is essentially restricted to effects that are similar to those that might be expected during the recession stage of an ice age. These effects are related to the catastrophic flooding caused by the release of glacier-dammed lakes.

Since the onset of an ice age is the trend considered by the applicant to be most likely, information should be provided that addresses the effects that might be expected during a glacial advance. These effects should include, but not necessarily

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be restricted to, such topics as the effect of falling sea-levels on the hydrologic situation, glacial scouring effects on the hydrology of the region, and precipitation, runoff, and recharge effects associated with the displaced storm tracks in response to the ice sheet advance.

Another scenario for potential future climatic change is also touched upon in this section but not developed. This scenario is one that postulates a global warming, due to anthropogenic releases of CO₂ into the atmosphere, over an initial period of up to the next 500 years or so followed by a trend toward the glacial conditions as the atmosphere recovers its equilibrium. Some further discussion should be provided on this scenario, including possible impacts on the hydrology. Finally, some consideration should be given to the possibility of a global warming that persists, with no return to a glacial climate.

Concurrently, Work Elements S.1.49.D and S.2.5 in Chapter 13 should be amended to address these concerns and their potential impacts on the hydrologic regime, and in planning the acquisition of additional climatological information to better confirm the decisions made with regard to the potential impacts.

The following comments concern the information provided on severe weather phenomena used as design bases.


In Section 8.1, additional, more recent data concerning thunderstorms are available in NUREG/CR-2252, "National Thunderstorm Frequencies for the Contiguous United States."

In Section 8.4, NUREG/CR-2919, PNL-4380, "XOQDOQ:Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations" has superseded NUREG-0324 (NRC 1977) referenced in the report. NUREG/CR-2919 is the final version of this document, of which NUREG-0324 was the draft version.

Similarly, ANSI A58.1-1972, "Building Code Requirements for Minimum Design Loads in Buildings and Other Structures" has been superseded by the 1982 version of this American National Standards Institute document.

Finally, the applicant may wish to supplement the information presented on the weight of snow and ice loads with information provided in NUREG/CR-2638, "Snow Loads for the Design of Nuclear Power Plant Structures."

I have attached copies of Chapters 8 and 13, with my marginal comments marked by paper clips, for your further information.


Robert A. Kornasiewicz, Meteorologist
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cc: P. Prestholt, NMSS