RICHARD H. BRYAN
Governor

STATE OF NEVADA

ROBERT R. LOUX
Executive Director

AGENCY FOR NUCLEAR PROJECTS
NUCLEAR WASTE PROJECT OFFICE
Capitol Complex
Carson City, Nevada 89710
(702) 885-3744

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Mr. John J. Linehan, Acting Chief
Repository Projects Branch
Division of Waste Management
Office of Nuclear Material
Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Linehan:

The State of Nevada has solicited the Department of Energy's (DOE) comments on the Disturbed Zone Generic Technical Position from the U.S. Nuclear Regulatory Commission (NRC), has subsequently reviewed these comments, and offers the following additional comments to the Generic Technical Position based on the DOE's comments of November 13, 1986 from Ralph Stein.

The DOE certainly has a point when they discuss the discrepancies of the definition of "disturbed zone" in 10 CFR 60 and in the GTP, and we agree this disparity should be cleared up.

Our understanding of the thrust of DOE comments is as follows. The DOE would like to see the disturbed zone concept dropped, or at least changed, because they believe the minimum 50-meter distance required by the NRC is too large, and effects from construction, not heat, should be used to determine the extent of this zone. Further, they like the definition of "disturbed zone" in 10 CFR 60 better than the one offered in the GTP. They state the changes in the host rock considered to be "significant" should be based on performance of the repository. They believed this repository performance to be well defined in the regulations (i.e. the EPA Standard) whereas the changes in intrinsic rock properties are not described within the regulatory framework and the significance of changes in these properties vague.

The State of Nevada sympathizes with the difficult job of the DOE has in getting through the tangle of regulations and we believe that regulations and technical positions should be consistent. As we stated in our previous comments: 1) Chu, 1983 calls for an unambiguous determination of the extent of the disturbed zone and of the term "significant effect", and 2) the

usefulness and adequacy of the GTP is dependent on how well the NRC has defined "significant" with respect to affecting repository performance.

Our previous comments further indicate that deficiencies exist in the GTP due to 1) lack of guidance to salt sites, 2) lack of completeness with respect to thermochemical and thermohydraulic effects, and 3) an apparent change in intent with respect to buoyancy effects.

The State believes that an effect on the repository performance can be interpreted as 1) an incremental change in the performance standard (as DOE believes), and 2) an increase in the uncertainty of the calculations.

The NRC in the GTP clearly lays out the rationale for separating the extent of the disturbed zone from the performance standard. This is mainly due to the large uncertainties involved in assessing compliance versus the uncertainties in assessing rock properties.

Statements such as the following (excerpted from the GTP) serve to describe the NRC's reluctance to include areas potentially affected by construction or heat from the ground water travel time because of the uncertainties involved in the calculation.

> "Second, the staff considers that credit towards the 1000-year pre-emplacement travel time should not be taken within that portion of the current geologic setting which might be substantially disturbed by construction of the facility or by the thermal effects of emplacement of HLW (irrespective of the possible offsetting benefits of engineered barriers such as waste containers and backfill). Because of potential changes in the rock properties, the geologic setting within this "disturbed zone" may not be well represented by pre-emplacement properties and conditions and thus it may be difficult to predict the contributions of this volume of rock to repository performance. The disturbed zone was chosen by the Commission as the starting point for determining the ground water travel time because the physical and chemical processes which isolate the waste are "especially difficult to understand in the area close to the emplaced waste because the area is physically and chemically disturbed by the heat generated by those wastes. (46 FR 35280, 35281, July 8, 1981)". Therefore, a pre-emplacement analysis based on existing conditions within this zone would not supply an appropriate measure of the quality of the geologic setting for the purpose of assessing future performance. To avoid the uncertainties of characterizing the rock

very close to the emplaced waste, the "disturbed zone" was defined and established as the inner boundary from which travel time calculations are to be made for demonstrations of compliance with 10 CFR 60.113(a)(2).

"In summation, the pre-waste emplacement ground-water travel time criterion was established to gain a simple measure of the HLW capabilities of the geologic setting based on existing conditions; the "disturbed zone" was subtracted from the "geologic setting" for this criterion for two reasons. First, the zone directly adjacent to the underground facility should not be depended upon to provide the major portion of natural barrier protection from HLW releases to the accessible environment. Second, the "disturbed zone" would not be well-characterized by pre-emplacement conditions and prediction of its contribution to the actual performance of the geologic setting might be difficult and uncertain. Therefore, assumption of existing properties within this zone for use in travel-time calculations may not result in a reasonably conservative measure of the HLW isolation capabilities of the geologic setting."

The State believes the NRC approach, related to changes in rock properties is correct for the calculation of travel time. Changes in rock properties may be considered to be a "significant change" with respect to performance due to the increased uncertainties which would arise by including this zone in the calculation of performance. We agree further definition is required in the technical position and in 10 CFR 60. We do not agree with the DOE conclusion that 50 meters is too large or with the NRC's conclusion that the dimensions of the disturbed zone are implied to be 50 meters. The State maintains the extent of the zone may be well in excess of the 50 meters (the mechanically disturbed zone). We would urge the NRC to continue to use this definition and not be persuaded by the DOE arguments to drop the concept.

Sincerely,

Robert R. Loux
Executive Director

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