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Department of Nuclear Energy

August 2, 1984

Mr. Everett A. Wick
High Level Waste Licensing Management Branch
Division of Waste Management
Mail Stop 965 SS
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Washington, DC 20555

WM Record File
A3167

WM Project 10, 11, 16
Docket No. 0
PDR 0
LPDR (B, U, S)

Distribution:
Wick
(Return to WM, 623-SS) *af*

Dear Mr. Wick:

Review of the Draft Technical Position on
Repository Environmental Parameters Relevant
to Assessing Performance of High Level Waste Packages (NUREG-1076)

BNL staff have reviewed the subject document and offer the following comments.

The report should use the term "Draft Technical Position" so that it is clear that the opinions expressed are those of ORNL and not necessarily those of the NRC. Furthermore, the discussion on regulatory perspective and the interpretation of 10 CFR 60 is misleading and incorrect in part (pages 1 through 5). If the DOE can demonstrate containment with reasonable assurance for more than 1000 years the NRC may choose to give them credit for it. The quote, including the discussion on containment, "...that such period shall not be less than 300 years or more than 1000 years after...." should be interpreted that the Commission will not require the applicant to demonstrate more than 1000-year containment.

Section 2.1.6

Is the DTP's claim that it will take at least "tens of years to reach hydrostatic pressure" valid? There is no apparent basis for this position to our knowledge. If references are available they should be cited.

Section 2.3

There is a general problem in this section where data are requested for properties that apply to phenomena that may not be considered in the analysis submitted by the applicant. For example, the heat capacity of waste forms is only necessary for a transient calculation where the initial temperature evolution is computed. Such temperature-time evolution during the first hours or days would be demonstrated by conditions at emplacement where the ventilation

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of the tunnels dictates repository temperatures. In fact, the initial conditions of the rock near the canister would be cooler than the geothermal temperature, and probably no thermal analysis would need to get to that level of detail.

Similarly, much is made of the need for detailed radiation calculations, when it is not clear that we will ever have a water chemistry and corrosion model that could properly use the radiation dose results of a crude "shielding handbook" approach.

The point of this comment is that some disclaimer is needed to show that the level of detail of the data should be commensurable with the methodology proposed by the applicant.

Section 2.5

It is stated that a submodel which is non-conservative is unacceptable. It should be made clear that this does not necessarily call for conservative submodels. The general aim of the DTP should be to specify the use of realistic models and to handle the need for reassurance through the width of the probability density function of the results.

Section 2.6

"Feedback is the statement that the primary cause of non-linearity" has no real meaning. When a reaction rate as a function of temperature shows an exponential dependence it is not due to feedback. Similarly, a heat conduction model with temperature dependent coefficients could be said to be non-linear because of feedback but this is misleading. The statement should be changed to say that problems could be linearized when the effect of neglecting non-linearities can be shown to be insignificant.

Section A.3

It is very improbable that during the pressure transient when the condition in the galleries goes from atmospheric pressure to hydrostatic pressure at closure time, when pumping stops, that the water velocity of a few centimeters per year would be applicable. We would not have, at that time, the normal hydraulic gradient, but the full column of water (hydrostatic pressure) to cause water flow.

Appendix B

We have reviewed this Appendix before and have no substantive comments. However, it seems too lengthy and the fatigue failure mode appears impossible, as we stated previously.

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Appendix C

We have no comments on this section.

Appendix D

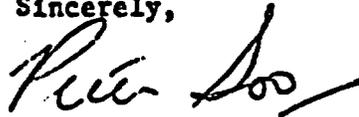
At the top of page D4 it is stated that the groundwater concentration ranges specified should include those caused by concentration effects. This is not obvious since after the steam period, when a liquid water front passes over deposited salts, much higher levels of dissolved ions may occur. We know of no data to quantify this effect. In fact, at the recent BWIP/NRC Workshop in Gaithersburg, BWIP stated that they intend to study this problem.

Section D2 - Table D.1.1

The range of chloride ion should be 0-500 and not 500-500 mg/l.

Please feel free to call me if you have questions on this review.

Sincerely,



Peter Soo, Associate Division Head
Nuclear Waste Management Division

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