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CHARLES (RUS) PURCELL
CONSULTANT

WM DOCKET CONTROL CENTER

'85 MAR 11 A11:38

March 5, 1985

Ben Rice
USNRC
Div. Waste Management, NMSS
Washington, D.C. 20555

Re: Contract #AT-(49-24)-1600

Dear Ben:

The attached paragraphs respond to your request for documentation of the NRC's comment on erosion rates at Yucca Mountain. Literature documentation is very scant. I will expand on the literature in my report following the Penrose Conference.

Ben, these rates are not greater than those presented in the EA but do form a basis for the arguments about the data base and the potential for high, local variability.

If you have any questions don't hesitate to call.

Sincerely,

Rus

Charles (Rus) Purcell

102/85/45

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The use of long-term, mean erosion/incision rates in the desert areas of the southwestern United States is extremely limited because of the numerous variables involved, especially in the local environment. For example, Dohrenwend and others, 1984, cite an average rate of downwasting of 2.1cm/1000yrs. This average is based on numerous (11+) data points, combined with radiometric age determinations. Even with this substantial data base, the local downwasting rates in this volcanic environment (the Cima Volcanic Field) ranged up to 2 to 3 times greater than the average.

The erosion rates presented for the Yucca Mountain Site are 1) listed as contemporaneous, and 2) based on only three data points. The use of a contemporaneous rate (i.e. m/yr) is essentially meaningless in geological time. More importantly, the three data point sample is not an adequate sample on which to base regional, long-term mean erosion rates. Furthermore, the rates presented are assumed to be based on the amount of downcutting of fluvial terraces dated by the Uranium Series method. This method gives, at best, dating accuracies of ±50%. When combined with probable, local variations of up to 3 or more times, you are now dealing with rates of at least 4 to 5 times greater, and could potentially reach an order of magnitude greater in a small area.

The important aspect of this subject is that substantially increased incisionrates may locally prevail for extended periods of time. Its these local variations that need to be better understood at the Yucca Mountain Site to adequately address the potential erosion hazard to the proposed repository.

Rus Purcell
3-5-85