



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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MEMORANDUM FOR: John W. Bradbury
Geotechnical Branch
Division of Waste Management, NMSS

WM-RES
WM Record File
B-0290
ORNL

WM Project 10, 11, 16
Docket No. _____
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FROM: George F. Birchard
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Distribution:

BRADBURY

(Return to WM, 523-SS)

SUBJECT: OCTOBER PROGRESS REPORT FOR NMSS TA PROJECT ORNL B0290

Several observations made in this report are worthy of comment. In particular, I believe that the results of the experiment which measured the relationship between sorption ratio "Kd" and particle size should be brought to the attention of NRC staff who might use sorption ratios in performance assessment. The dependence of the sorption ratio on sample particle size which ranged from 4.7 l/kg for the largest particles (-40+70 mesh) to 275 l/kg for the finest particles (-400 mesh) is an extremely important observation because it shows that the sorption ratio is dependent upon sample preparation and is not an intrinsic property of the rock. This relationship has also been observed in RES FIN B6661. The practice of crushing dense intact basalt samples, or samples of any other unaltered "hard" rock will produce samples which are not representative of field conditions. The observed sorption ratios will be, as observed by ORNL, dependent upon sample preparation procedures. An important question needs to be asked: how can sorption in "hard" rock be measured so that results are representative of actual field conditions? Until this question is answered reasonably, modelers who use laboratory determined sorption measurements for "hard" rocks in performance assessment will not know whether their calculations are realistic, conservative or non-conservative.

The second suggestion is that ORNL provide a graph or table to show the effect of temperature, 25°C versus 60°C, on sorption so that we may better interpret results of experiments run at different temperatures.

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