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NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

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MEMORANDUM FOR: Kien Chang  
Engineering Branch  
Division of Waste Management  
NMSS

FROM: Michael B. McNeil  
Waste Technology Section  
Waste Management Branch  
Division of Health, Siting,  
and Waste Management, RES

SUBJECT: BWIP BARRIER MATERIALS TEST PLAN

Per your request of April 12, 1984, I have reviewed the subject document. There are many minor points which I can address in our forthcoming workshop, but I should like to raise three major issues formally.

1. The schedule charts seem to imply slippage in DOE's program; it appears to me that DOE is now expecting to be in 1990 about where they expected two years ago to be in 1987. I think NMSS ought to note whether that scheduling of results is consistent with DOE's mission plan and the NWA.
2. DOE talks of developing pH and EH measurement techniques (e.g. on p5-35 and on Figure 5-5), both for autoclaves and for in-site experiments. I do not think DOE or Rockwell are aware of the magnitude of the problems confronting them, especially in regard to temperature/pressure effects and the effects of other ions. I believe that if Rockwell hopes to provide reliable measurement technology in these areas they will have to make a fairly major long-term commitment to instrumentation development, and think they would be well advised to familiarize themselves with ongoing work elsewhere (notably in Dr. Zemel's laboratory at the University of Pennsylvania) and to consider the effect of radiation on their measurement equipment.
3. Rockwell continues to insist that the groundwater will become highly reducing fairly rapidly after decommissioning (p5-34 and pp 5-73 ff). The arguments (based on the reducing characteristics of CH<sub>4</sub>, the chemistry of the basalt/water interaction, and water radiolysis) have been criticized repeatedly by Dr. Schweitzer and

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myself (as well as others). Rockwell shows no awareness of these criticisms and so their assertions of the subject of  $E_H$  (assuming  $E_H$  is the appropriate measurement, which is not entirely clear) cannot be regarded with any confidence. The Rockwell experimental corrosion program on very anoxic waters is, in my opinion, simply unrelated to reality, at least for non-self-shielded containers. Again this was pointed out to them last November in Boston and they show no signs of paying the least attention.

Another point is that Plackett-Burman experimental design seems to assume independence of experimental variables. If this is so application of the techniques to a situation in which temperature, concentrations, and radiation fields are fairly closely connected is very questionable. I think Rockwell should be asked to give us a more detailed description of the foundations of their experimental design program.

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