UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

February 5, 1986

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MEMORANDUM FOR: Dr. Dade W. Moeller, ACRS Member
Dr. Paul G. Shewmon, ACRS Member

FROM: Dr. S.J.S. Parry, ACRS Senior Fellow

SUBJECT: Meeting Report - NRC/SRP (Salt Repository Project) Waste Package Meeting - January 22-24, 1986, Columbus, Ohio

The jointly agreed to and signed summary of this meeting is attached. Also attached is a list of anticipated attendees, most of whom attended, and there were additional attendees.

The summary does a good job of cataloging the NRC staff's findings, with the DOE's rebuttals or alternative points. I shall largely draw on the summary for my comments, but will report some independent conclusions in addition. The meeting was very well organized and it was obvious that an extreme effort had been made to thoroughly cover the agenda. I had assumed that this was to be a detailed data transfer type of meeting. It turned out that the meeting was largely a programmatic overview session, which was much more informative and valuable since it provided previously unavailable background information on the logic behind the program, or its absence.

The principal foundation point of the program is that there will only be a limited volume of brine available for attack of any one package. The possible scenario of a major influx of brine from either a brine pocket or a breach of the bedded salt by a human or geologic event has not been seriously considered. As a consequence the entire program is predicated on the assumption of limited brine availability.

Of equal concern is the admission by the Office of Nuclear Waste Isolation (ONWI, a Battelle group) staff that the post-emplacement conditions adjacent to the waste packages are only partially known or estimated. Of the three principal variables, temperature, pressure and composition, only temperature has been modelled and calculated in detail and pressure to only a limited degree. The composition, in terms of chemical constituents and/or physical phases (liquid, solid or mixture) is essentially unknown. This situation, of course, raises serious questions about the applicability of the experimental data on the corrosion of the waste package overpack that has been obtained up to this time.

In the limited discussions on the details of the experimental results, it became apparent that the results of the containers corrosion studies are of limited value since the tests and data have not been reproduced and only a few (generally less than four) specimens have been tested to any one condition or period of time.

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Photomicrographs of specimens raised questions as to their interpretation. It was stated that pitting, or localized, corrosion had not been observed. Yet some specimens had been totally consumed and others were badly fragmented. Transverse photomicrographs clearly showed surface irregularities that were clearly hemispherical in cross-section. I believe that these specimens were subjected to an extensive form of pit corrosion that could be described as "generalized pitting corrosion". Regardless of the terminology used, the corrosion rates observed were so high, that if an adequate supply of brine were to be available, no reasonably sized waste package could survive.

Under Item 3 in the section "Open Items and Agreements", page 9 of the Summary, the test plans and procedures are discussed. In early 1985 ONWI committed to have a series of test procedures prepared. This, in part, was a remedial action associated with the corrections made in PNL's QA program referred to in Item 11 on page 5. In 1985 ONWI indicated that these procedures would be independently reviewed, and eventually approved, by the Materials Review Board, chaired by Dr. M.J. Steindler, ANL. It now appears that such a review, by external peers, is not to be undertaken. Such a decision may be understandable in so far as the Materials Review Board is concerned, since Dr. Steindler has also headed an Ad Hoc Corrosion Panel review of the DOE's corrosion programs, which found the current status of the corrosion program to be deficient. But not to provide for an independent analysis of their test procedures at all, I believe is short-sighted. It was apparent that this point is a very sensitive matter since my raising it was characterized as a "cheap shot" by one of the ONWI staff. This point of test procedure review will be addressed in my conclusions.

In sum the meeting was a major advance in our knowledge and appreciation of ONWI's status and plans. The NRC staff were lucid and forceful in their questions and maintained a skeptical but open-minded attitude toward the ONWI/DOE positions.

Conclusions:

1. Data Reliability - As I have stated before it is my belief that it is an absolute requirement that we be assured that the data, from whatever source, be thoroughly tested for adequacy. Given that no corrosion tests have been duplicated. I believe that all the data obtained to this point in time is suspect and should be considered as unverified. If the procedures used in these corrosion tests had been verified either by an independent peer review or by an adequate development program which would include rerunning the tests numerous times, one might be able to accept the data. But failing such a review, the data is unsupported, at best.

2. Data Review/Exchange Meeting - Given #1 above and the DOE's Item #5 on page 13 of the Summary, I suggest that a meeting be held, in which the experimental details of both the NRC and DOE testing programs can be examined.

3. NRC Staff Observations - These are well drawn and I would stress those relating to defining the near-field repository conditions and providing for contingencies.

4. Status of Metallic Corrosion Studies - Based upon the present status of these studies and the expected rate of expenditures, I do not believe that a waste package design can be shown to meet the criteria of 10 CFR 60 in time to support a license application for a repository in salt in the 1991 time frame.

Attachments:
As Stated

cc: ACRS Members
ACRS Technical Staff
ACRS Fellows