

Sac



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

January 31, 1986

'86 FEB -4 A11:59

MEMORANDUM FOR: D. W. Moeller, Chairman, Waste Management Subcommittee
FROM: O. S. Merrill, Staff Engineer *O. S. Merrill*
SUBJECT: P. SHEWMON'S REPORT ON THE DOE/NRC WASTE PACKAGE WORKSHOP, BATTELLE COLUMBUS, JANUARY 22-24, 1986

Attached for your information is Paul Shewmon's report of the subject meeting, which he recently sent to me and requested that it be distributed.

Attachment:
As stated

- cc: ACRS Members
ACRS Technical Staff
ACRS Fellows
✓ R. Browning, WM
T. Johnson, WMEG
F. Costanzi, WMBR
K. Goller, DRPES
J. Linehan, WMRP
S. Grace, WMRP

8604170679 860131
PDR WASTE
WM-16 PDR

WM Record File
106

WM Project 16
Docket No. _____
PDR ✓
LPDR ✓

Distribution:
REB MJB JTG MRK
JOB LBH
(Return to WM, 623-SS)

cc: *Linehan*
SGrace

Sac

1292

January 25, 1986

To: File, Radiological Effects
From: Paul Shewmon
Subject: DOE/NRC Waste Package Workshop,
Battelle Columbus, Jan. 22-24, 1986

This three day review was given by DOE contractors to describe the work on the waste package for a salt (as opposed to a basalt or tuff) repository, and to provide an exchange of views with the relevant NRC staff. These meetings are infrequent, but this one was well prepared, and worthwhile. The attendees were primarily DOE contractors, and NRC/DWM staff, with a few people from RES. Jack Perry also attended and has copies of the handouts if you care to see them. What follows are some of the things I learned that may be of general interest to members of the Com.

The waste to go into the site will be either a glass from reprocessed Defense waste or spent fuel elements from commercial power reactors. These will be inside a stainless steel canister designed to aid handling, which in turn will be inside a thick walled cast carbon steel container (sometimes called overpack) designed to:

- be strong enough to keep the lithostatic pressure from crushing the canister,
- provide corrosion protection from the brine, and
- adsorb radiation enough to eliminate concern about radiolysis enhanced corrosion at the package/brine interface.

Carbon steel will resist corrosion by NaCl brine at the predicted temperatures for 1000 yr., but will be corroded by high magnesium brine. The position the DOE is trying to develop is that 4 to 6 inches of steel will be more than enough to avoid corrosion through the waste package in 1000 years. This is credible if:

- the quantity of brine is limited to that found in brine inclusions in the salt that can migrate by diffusion through the salt (up the temperature gradient) to the waste, i.e. no significant flow of water through the salt, and/or
- the magnesium content of any brine that may flow to the container is low.

It is hard to assure that some of the packages won't be corroded through in under 300 years, and then one must try to estimate how many, and how far what isotopes might migrate if there was a failure. There was some talk of alternate package material if steel looks bad, but one gets the impression DOE isn't really working on it. One could also slow down the corrosion appreciably by letting the waste decay for say 40 yr. before burying it, as some foreign countries are talking about, but apparently DOE has committed to take fuel of any age, so they won't talk about this conclusions, for now.

There was also some discussion of how the regulators might define, 'substantially complete containment.'

cc: ACRS
ACRS Staff as appropriate