



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

June 4, 1990

Phase 1 - Iterative Performance Assessment 148



MEMORANDUM FOR: Chairman Carr  
Commissioner Roberts  
Commissioner Rogers  
Commissioner Curtiss  
Commissioner Remick

FROM: James M. Taylor  
Executive Director  
for Operations

SUBJECT: STAFF DEVELOPMENT OF CAPABILITY TO EVALUATE PERFORMANCE  
ASSESSMENTS FOR A HIGH-LEVEL WASTE REPOSITORY

Enclosed for your information is a staff report entitled "Phase 1 Demonstration of the Nuclear Regulatory Commission's Capability to Conduct a Performance Assessment For a High-Level Waste (HLW) Repository." This report documents a milestone in the U.S. Nuclear Regulatory Commission (NRC) staff's program for achieving one of its Five-Year Plan activities, i.e., developing methods and a capability to independently evaluate the U.S. Department of Energy's (DOE's) HLW repository performance assessments.

The enclosed report describes an initial effort by the staff to demonstrate its capability to do such evaluations. The initial effort involved staff implementation of a methodology to estimate the performance of a repository. Only a preliminary analysis was attempted, using many simplifying assumptions, limited site-specific data, and a small number of scenarios. It should be noted that, in some demonstration model runs, the numerical estimates of performance exceed the U.S. Environmental Protection Agency (EPA) radiation protection standard, 40 CFR Part 191. However, because of the lack of data, large modeling uncertainties, and simplifying assumptions, the staff does not believe that these numerical estimates can be used to assess compliance, or lack thereof, with any regulatory standard. Consequently, as noted in the report, the results of the Phase 1 demonstration effort are not and should not be interpreted to be representative of the expected performance of a HLW repository at Yucca Mountain.

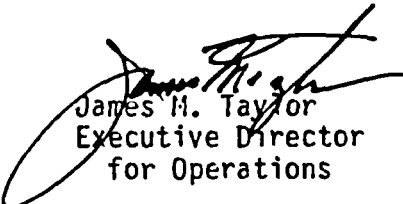
The staff's comments on DOE's Site Characterization Plan made special note of the need for total systems performance assessments to be conducted periodically, starting at an early date. In partial response to the staff's concerns, DOE representatives have indicated a desire to informally review their progress in systems performance assessments soon. Such assessments are important means of providing early and ongoing evaluations of (1) the adequacy of data acquired during the site characterization program and (2) the presence of any potentially adverse conditions that could significantly affect the ability of the site to meet the 10 CFR Part 60 performance objectives. Consequently, the staff has an urgent need to develop its capability to evaluate independently DOE's performance assessments. It should be noted that the staff's objective

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is to develop calculational methods to apply in evaluating DOE performance assessments. Methods being developed by the staff are not intended to substitute for DOE methods and would not be sufficient in and of themselves to demonstrate compliance with the performance requirements of the regulations.

The models used in the Phase I demonstration effort are as yet not refined enough to evaluate DOE's performance assessments. Consequently, continuing development of the staff capability is underway. Thus, an iteration of this preliminary analysis is planned, using numerical models of groundwater transport in unsaturated tuff developed by an NRC contractor (Sandia National Laboratory), which are expected to be more realistic than those used in the enclosed report. A major objective of this next iteration is the transfer and evaluation of the Sandia tuff performance assessment technology to the NRC staff and its contractor, the Center for Nuclear Waste Regulatory Analyses (CNWRA). Staff from the Office of Nuclear Material Safety and Safeguards (NMSS), the Office of Nuclear Regulatory Research (RES), and the CNWRA are expected to participate in the next iteration. ✓

This report is being made available to DOE, EPA, the State of Nevada, and other interested parties. A technical exchange meeting between DOE and NRC on performance assessment is currently scheduled for July 1990, and the staff plans to discuss the report at that meeting.

  
James M. Taylor  
Executive Director  
for Operations

Enclosure:  
As stated

cc: SECY  
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