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Office of Civilian Radioactive Waste Management
Yucca Mountain Site Characterization Office
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TOTAL SYSTEM PERFORMANCE ASSESSMENT - 1995: AN EVALUATION OF THE POTENTIAL YUCCA MOUNTAIN REPOSITORY, NOVEMBER 1995 (SCPB: N/A)

Enclosed for your information is the Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O) document, Total System Performance Assessment - 1995: An Evaluation of the Potential Yucca Mountain Repository, dated November 1995. The Total System Performance Assessments (TSPA) are conducted iteratively to identify significant performance-related issues which should be addressed by the site characterization and design activities as well as for providing input to regulatory and programmatic decisions. Previous iterations of TSPA for the Yucca Mountain site and associated engineering barrier systems were completed in 1991 and 1993, and provided to the U.S. Nuclear Regulatory Commission for information. The enclosed document, hereafter referred to as TSPA-1995, presents objectives, approach, assumptions, input, results, conclusions, and recommendations associated with the latest iteration.

The specific goals of TSPA-1995 are to:

1. Utilize what are believed to be more representative conceptual models that build upon assumptions employed in TSPA-1993, in particular the treatment of the engineered barrier system including the waste package.

2. Incorporate more recent design information since the completion of TSPA-1993.

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3. Utilize the most recent site information and models (where available) acknowledging their uncertainty and variability.

4. Evaluate the engineered barrier system release performance measures as well as alternative measures of total system performance.

The present TSPA-1995 identifies issues and addresses those components and processes that have been determined from previous analyses to be most significant and also some concerns that have been raised by regulatory and technical oversight groups. Specifically, more representative models have been developed and analyzed for:

1. Drift-scale thermal-hydrologic environment to provide more reasonable estimates of relative humidity and temperature adjacent to the waste package.

2. Waste package degradation, including the effects of the variable near-field environment and the temporal degradation history of the waste packages.

3. Near-field unsaturated-zone aqueous flux.

4. Unsaturated-zone flow and transport, including the potential effects of fracture-matrix interaction.

In addition to identifying the most significant issues, some processes have been eliminated, based on earlier iterations of TSPA, from consideration in the current analyses. These include disruptive events such as volcanism and human intrusion due to their insignificant effect on post-closure performance, and gaseous-phase transport in the unsaturated zone because the gaseous-phase transport rate to the atmosphere is much faster than the degradation rate of the waste package. Also, where appropriate, the current TSPA iteration has incorporated revised design and site information, new since completion of TSPA-1993, to enhance the representativeness of the analyses.

We are sending you an advance copy of TSPA-1995. The document is now being printed, and a routine, more complete distribution to the usual recipients of our technical reports will be made of the published document in about two months.

If you have any questions, please contact Abraham E. Van Luik of my staff at (702) 794-7525.

April V. Gil for

Stephan J. Brocoum
Assistant Manager for
Suitability and Licensing

AMSL:TWB-754

Enclosure:
Total System Performance
Assessment - 1995: An
Evaluation of the Potential
Yucca Mountain Repository

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TOTAL SYSTEM PERFORMANCE ASSESSMENT - 1995:

AN EVALUATION OF THE POTENTIAL YUCCA MOUNTAIN REPOSITORY

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Civilian Radioactive Waste Management System

Management & Operating Contractor

B&W Fuel Company
Duke Engineering & Services, Inc.
E. R. Johnson Associates, Inc.
Fluor Daniel, Inc.
INTERA Inc.
JK Research Associates, Inc.
Logicon RDA
Morrison-Knudsen Corporation
Woodward-Clyde Federal Services

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