MEMORANDUM FOR: Robert Johnson, Section Leader HLW and Quality Assurance Section HLUR/DWM/NMSS

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THROUGH: Margaret Federline, Chief PAHB/DWM/NMSS

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- Norman Eisenberg, Section Leader FROM: Performance Assessment and Health Physics Section PAHB/DWM/NMSS
- SUBJECT: EVALUATION OF DOE SUPPLEMENTAL RESPONSES TO SCA COMMENTS 99, 102, AND 103

The Performance Assessment and Health Physics Section has reviewed DOE's responses to the subject Site Characterization Analysis (SCA) comments (transmitted as enclosures to the December 23, 1993, letter from D. Shelor to C. W. Reamer). Based on our evaluation (see enclosures), we believe that these SCA comments should remain open.

If you have any questions, please contact Mr. James Park. He can be reached in Room 7F-15 or at 415-6699.

& Margaret Federline

Norman Eisenberg, Section Leader Performance Assessment and Health Physics Section PAHB/DWM/NMSS

Enclosures: As stated

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ENCLOSURES

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EVALUATION OF DOE RESPONSES TO SCA COMMENTS 99, 102, AND 103

Section 8.3.5.13 Total System Performance

SCA COMMENT 99

For some scenario classes in which a particular release mode is thought to dominate or, at least, dominate for a particular time period, the consequences that are calculated may not be adequately represented unless all of the release modes are quantified, especially the residual part of the inventory continuing to participate in the nominal or undisturbed mode(s) of release. Premature and inappropriate limiting of the consequence analysis in this way may distort the performance allocation process so that insufficient priority is placed on some data or important data acquisition activities may be omitted from site characterization.

EVALUATION OF DOE RESPONSE

• SCA Comment 99 (NRC, 1989) expressed NRC staff concerns that in evaluating the impacts of a scenario on long-term repository performance, DOE would need to consider releases along all potential release pathways throughout the full period of regulatory interest, and not to rely solely on releases via a perceived "dominant," and potentially short-lived, release pathway. The staff did allow that the "use of a single mode of release to calculate consequences for a given scenario is acceptable only when calculations show that the releases by modes that have been omitted do not contribute to the CCDF in a substantial fashion, either individually or aggregated over the entire range of scenarios" (NRC, 1989).

The staff recommended that calculations of consequences from each scenario include all appropriate modes of radionuclide release, and that the performance allocation process should consider all release modes from each scenario, with appropriate consideration given to the magnitude of release via the different modes.

- In its response, DOE expressed its belief that the NRC staff position "suggests a course of extraordinary rigor" and that following such a course of action would require DOE to expend significant resources in determining probabilities of occurrence or quantifying consequences for contributors (i.e., processes and events) preliminarily determined to be minor. DOE believes that the prioritization of site work (and thus, site characterization, as a whole) must be based on "a partial and preliminary understanding of site performance."
- DOE further states that it believes that its performance assessment program is acting faithfully on the spirit of the staff's recommendations in SCA Comment 99, and on this basis, it believes the comment should be resolved.
- The NRC staff considers its position to be a reasonable and appropriate approach to estimating the consequences of scenarios on long-term repository performance. The staff considers it reasonable to expect that in DOE's compliance demonstrations for the overall system performance objective (10 CFR 60.112), calculations of radionuclide releases for all scenarios along all release pathways which contribute

substantially to the CCDF will be included. Appropriate analyses should be included to support the omission of potential radionuclide release pathways of a scenario on the basis of lack of contribution to the CCDF in the compliance demonstration.

- The staff notes that the concerns expressed in Comment 99 were reiterated in the NRC staff concerns on DOE's TSPA-1991 (Barnard, et al., 1992) (see letter from Holonich to Shelor, dated October 21, 1993). The staff observed that DOE's analysis of consequences due to volcanism did not include radionuclide releases which could occur prior to, and following, the period of volcanic activity, and therefore, did not include releases via all potentially important release pathways over the full 10,000-year period of regulatory interest.
- The staff considers that this comment will be resolved when DOE provides information indicating how various release pathways are being addressed in performance allocation and the calculations of the CCDF.
- The NRC staff considers this comment open.

REFERENCES

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Barnard, R.W., et al., 1992, "TSPA 1991: An Initial Total-System Performance Assessment for Yucca Mountain," SAND91-2795, Sandia National Laboratories, Albuquerque, New Mexico. [Prepared for the U.S. Department of Energy]

U.S. Nuclear Regulatory Commission, 1989, "NRC Staff Site Characterization Analysis of the Department of Energy's Site Characterization Plan, Yucca Mountain Site, Nevada," NUREG-1347, Office of Nuclear Material Safety and Safeguards, Washington, D.C.. Section 8.3.5.13 Total System Performance

SCA COMMENT 102

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The model for Ross sequences number 10 (p. 8.3.5.13-29), 14 and 15 (p. 8.3.5.13-30) seems to be at variance with the hydrologic model of flow at Yucca Mountain; because (as in this case) the basis for developing scenarios to guide the site characterization program appears to be inconsistent, site characterization may fail to provide the information needed for licensing.

EVALUATION OF DOE RESPONSE

- DOE states that the approach in the SCP has been superseded by a more "exhaustive and systematic" approach. DOE believes this new approach, when completed, will separate conceptual model considerations from scenario definitions. Based on the development of this revised approach, DOE considers that a "defensible analysis" is being applied to the screening of scenarios, and therefore, it considers the comment to be resolved.
- The staff looks forward to reviewing DOE's application of this revised approach within, and documented through, its iterative performance assessment program, and its impacts on the direction of the site characterization program. Depending on the outcome of these reviews, additional formal interactions may be necessary.
- The NRC staff considers this comment open.

Section 8.3.5.13 Total System Performance

SCA COMMENT 103

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Ross sequence numbers 59-62 and 64-69 appear to characterize either anticipated conditions or alternative conceptual models, rather than scenarios.

EVALUATION OF DOE RESPONSE

- DOE states that the approach in the SCP has been superseded by a more "exhaustive and systematic" approach. DOE believes this new approach, when completed, will separate conceptual model considerations from scenario definitions. Based on the development of this revised approach, DOE considers that a "defensible analysis" is being applied to the screening of scenarios, and therefore, it considers the comment to be resolved.
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