



Department of Energy  
Washington, DC 20585

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Mr. Joseph J. Holonich, Director  
Repository Licensing & Quality Assurance  
Project Directorate  
Division of High-Level Waste Management  
Office of Nuclear Material Safety  
and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Holonich:

Enclosed with this letter is a controlled copy of Study Plan 8.3.1.15.1.8, Revision 0, prepared by the U.S. Department of Energy (DOE) for the Yucca Mountain site. The study plan numbers correspond to the same numbers used in the Site Characterization Plan (SCP) for the Yucca Mountain site.

<u>Number</u>	<u>Title</u>
8.3.1.15.1.8, R0	"In Situ Design Verification"

DOE has reviewed the study plan for consistency with the content requirements for study plans, as given in Attachment B to the Summary of the DOE/U.S. Nuclear Regulatory Commission (NRC) meeting on the Level-of-Detail for the SCP (May 7-8, 1986). DOE is submitting this plan to NRC as agreed to in the meeting.

As discussed during the DOE/NRC meeting (December 15, 1988) on study plans, DOE has decided to control preparation and review of study plans as a quality activity. This study plan was reviewed under current Yucca Mountain Site Characterization Project Office (YMPO) quality assurance (QA) procedures.

It should be noted that there may be some inconsistencies in the milestone report titles and schedules given in this study plan and those in the SCP. Study plans, in general, represent a further evolution of the study in the areas related to schedules and milestones relative to the SCP, and as such, represent DOE's current plans.

Monitoring activities described in Study Plan 8.3.1.15.1.8, Revision 0, will be performed in the Yucca Mountain Exploratory Studies Facility starter tunnel. The construction of the starter tunnel is planned to begin in April 1993. Therefore, DOE is requesting that NRC advise DOE of the results of its Phase I review of this study plan before March 31, 1993.

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DOE wishes to call to NRC's attention Site Characterization Analysis Open Comments 4 and 56, which were directed to Study 8.3.1.15.1.8. Enclosure 2 provides a discussion of how these open items are addressed in the study plan.

The Document Transmittal/Acknowledgement Record for your controlled copy of the study plan should be signed and dated and returned to the Document Control Center in Las Vegas, Nevada.

If you have any questions, please contact Mr. Chris Einberg of my office at 202-586-8869.

Sincerely,



John P. Roberts  
Acting Associate Director for  
Systems and Compliance  
Office of Civilian Radioactive  
Waste Management

Enclosures:

1. Study Plan 8.3.1.15.1.8, R0
2. Relation of Study Plan 8.3.1.15.1.8  
to NRC Open Items

cc: w\enclosures  
Alice Cortinas, CNWRA, San Antonio, TX

cc: w\ enclosure 2 only  
C. Gertz, YMPO  
R. Loux, State of Nevada  
T. Hickey, Nevada Legislative Commission  
M. Baughman, Lincoln County, NV  
J. Bingham, Clark County, NV  
B. Raper, Nye County, NV  
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J. Pitts, Lincoln County, NV  
R. Williams, Lander County, NV  
J. Hayes, Esmeralda County, NV  
B. Mettam, Inyo County, CA  
C. Abrams, NRC

## RELATION OF STUDY PLAN 8.3.1.15.1.8 TO NRC OPEN ITEMS

### Comment 4

In the response to SCA Comment 4, the DOE stated that in Study 8.3.1.15.1.8 the effects of temperature on radon release would be discussed. Unfortunately, this is not completely correct, as was pointed out by the NRC in their evaluation of the DOE response. This Study considers only ambient temperature measurements of radon release. However, it is noted in Study Plan 8.3.1.15.1.8 in Section 2.4.6, *Interrelationships with Other Activities*, under the heading "Interrelationships with Other Studies:" that temperature effects on radon release will be measured as part of other studies. Specifically the Study Plan states that "Radon daughter concentrations will be measured in the Canister Scale Heater experiment (SCP Section 8.3.1.15.1.6.2) and possibly in the Heated Room experiment; these results will be compared with ambient-temperature measurements collected in the Design Verification study."

Study 8.3.1.15.1.6 contains testing that will contribute data about near-field behavior in the Canister-Scale Heater Experiment, and data about the far-field behavior in the Heated Room Experiment. These data are intended to support both model validation and repository design. Additional far-field behavior data will be obtained in the performance confirmation period. Changes to near-field data requirements have not been made, because design of the repository has not progressed sufficiently. Parametric studies involving near-field behavior, such as investigations of different waste emplacement modes, are currently being performed. Far-field studies are also underway, such as far-field thermal analyses are trade-off studies. Study Plan 8.3.1.15.1.8 does not specifically address the NRC question of why the near-field and far-field have not been emphasized.

Study Plan 8.3.1.15.1.8 does not directly contribute to any of the performance/design goals or confidence level in the geoen지니어ing parameters discussed in SCP Section 8.3.1.18.1. The purpose of this study is to verify design concepts and methodology and not to produce geoen지니어ing parameters. Additional parametric sensitivity studies have been conducted and are currently being conducted, but they do not have any direct bearing on this study. No sections of the Study Plan describe additional parametric sensitivity studies. However, the study does reference the Drift Design Methodology, (Hardy and Bauer, 1991), which describes the sensitivity of ground support systems and drift stability on rock mass parameters. Validation of the ground support methodology is discussed in the Study Plan in Section 2.1.2, *Evaluation of Ground Support Systems Experiment*, and in Section 5.3, *Monitoring Drift Stability Experiment*.

### Comment 56

In the response to SCA Comment 56, the DOE states that additional detail concerning model validation would be provided in the study plans relating to the in situ tests, which includes this Study Plan. Specifically in comment 56, the NRC mentions thermal modeling and the data that will be collected for incorporation into thermal models. This study describes monitoring activities at ambient temperature only, and so does not directly support thermal modeling. However, the Study Plan does support thermal modeling indirectly in Section 1.1.4, *Air Quality and Ventilation Experiments*, where it is stated that "Rock temperature changes also will be measured to evaluate the thermal exchange coefficients for convective and radiative heat flow from the drift walls." and in Section 4.4, *Air Quality and Ventilation Experiment*, where it is stated that "Investigations will be conducted to determine the thermal exchange coefficient between the rock and the ventilation air, in conjunction with the In Situ Thermomechanical Properties experiments (SCP section 8.3.1.15.1.6). Heat balance surveys in the ventilation air and cool-down of the test drifts by ventilation air, as indicated by the test instrumentation, will provide the necessary data."

In SCA comment 56, the NRC also states that more detail is needed to show how predictive results will be compared to appropriate observations and experimental results. Because the purpose of the study plan is to verify design concepts and methodology and not to validate rock mechanics models, this

Study Plan does not supply more detail concerning how models will be validated, nor does it directly list experimental results to be compared with predictive data from a model. However, Section 2.1.3 discusses measurements to validate models of the long-term behavior of the rock mass around openings, to evaluate the degree of elastic response of the rock mass relaxation. Section 2.1.4 states how the Air Quality and Ventilation experiment will collect data that will be used to design the repository ventilation system and to validate the repository ventilation system models. Additionally, Section 2.1.4 describes how the parameters collected in the Air Quality and Ventilation experiment will be used to support model validation under Study 8.3.1.15.1.6.