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**RESPONSES TO THE EDISON ELECTRIC INSTITUTE (EEI) AND THE UTILITY NUCLEAR WASTE MANAGEMENT GROUP (UNWVG) ON THE SITE CHARACTERIZATION PLAN/CONSULTATION DRAFT (SCP/CD)**

Enclosed are the responses to the comments received from the EEI and the UNWVG, transmitted via a letter dated August 12, 1988, on the SCP/CD. The SCP/CD was issued on January 8, 1988. These comments were received too late to be considered in the statutory SCP issued in December of 1988. The enclosure provides responses to the comments offered. It is hoped that the responses will clarify the Yucca Mountain Project Office (Project Office) position with respect to the concerns raised, or identify actions that already have been or are being taken to address the comments or concerns raised. The Project Office appreciates that the EEI and the UNWVG provided focused and constructive comments and suggestions on how the comments and concerns could be addressed.

The EEI comments on the statutory SCP, dated June 1, 1989, which were received from John J. Kearney, are presently being addressed.

If you should have any further questions or need of clarifications, please contact me or David C. Dobson of my staff at (702) 794-7940 or FTS 544-7940.

Carl P. Gertz, Project Manager  
Yucca Mountain Project Office

YMP:DCD-243

Enclosure:  
Responses to Comments


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## ENCLOSURE 1

### RESPONSES TO EEI/UNWVG COMMENTS ON SITE CHARACTERIZATION PLAN/CONSULTATION DRAFT

The Edison Electric Institute (EEI) and Utility Nuclear Waste Management Group (UNWVG) have offered several general comments on the Department of Energy's (DOE) Consultation Draft Site Characterization Plan (SCP/CD) for the Yucca Mountain site, issued on January 8, 1988. These comments were contained in a report, transmitted via a letter dated August 12, 1988, and were received too late to be considered in completing the statutory SCP issued in December 1988. The following responses to the EEI/UNWVG comments are being offered by the DOE in the hope that they will help to clarify the DOE's position with respect to the concerns raised, or identify actions that already have been or are being taken that are expected to address these concerns. The DOE appreciates the focused and constructive nature of the comments and that the EEI/UNWVG provided suggestions as to how the comments could be addressed.

In the overview of their comments (Section 2.1 of the EEI/UNWVG Report), the EEI/UNWVG agreed with the five "objections" raised by the NRC in their final point papers on the SCP/CD, dated May 11, 1988. The DOE responded to each of these objections during the completion of the statutory SCP and provided written responses to the objections and the other NRC concerns at the time of SCP issuance. Actions taken in response to the NRC's objections included DOE/NRC meetings on the NRC's draft point papers, alternative conceptual models, QA open items and QA plans, and exploratory shaft facility (ESF) issues, all of which were attended by EEI/UNWVG representatives. The DOE also made substantial revisions to the SCP to address all five of the objections; changes related to alternative conceptual models, ESF issues, and the QA program. However, unlike the other objections, the NRC's objection on the DOE's QA program is, for the most part, being dealt with separately from the SCP as the response lies generally outside the scope of the SCP. The DOE is committed to resolving major QA concerns regarding the qualification of the QA program before new site characterization activities begin.

The EEI/UNWVG also provided five specific comments on various aspects of the SCP/CD (Sections 2.2-2.6 of their report). These comments with their related recommendations are summarized and responded to individually in the remainder of this document.

#### COMMENT 1 (Section 2.2)

The organization of the SCP/CD separates discussion of the present technical and design information (Chapter 1-7) from discussions of the rationale for the program (Section 8.1) and the strategies and activities planned to resolve issues (Section 8.2-8.3). This structure makes it more difficult to identify the DOE's integrated strategic and technical approach for demonstrating compliance with regulatory requirements.

#### Recommendation:

Supplement the SCP by preparing separate "guide" documents, highlighting and integrating the various factors bearing on each of the major issues, and providing a "road-map" of where information is to be found.

## RESPONSE

The comment regarding the organization of the SCP/CD was valid and remains so for the SCP; however, the separation of the various types of information is based on the guidance provided by the NRC in Regulatory Guide 4.17. An effort has been made to provide appropriate forward references to Chapter 8 in Chapters 1-7, and to refer to the existing information discussed in Chapters 1-7 through references provided in Chapter 8. In addition, the DOE issued an SCP Overview which serves as a general information base and allows the reader to find where more detailed information can be found in the SCP. Study Plans will provide a more detailed technical presentation and will relate the activities performed to other studies that would potentially utilize the information. The recommendation to develop supplemental guides for the major issues has merit, but the DOE believes that a series of currently planned interactions with the NRC on the major issues needs to occur prior to committing to such guides. In any case, the strategy and activities necessary to resolve major issues will be defined early during site characterization in order to organize the issues for development of the LA.

## COMMENT 2 (Section 2.3)

The SCP/CD reflects a positive approach in its expectations that site characterization data will resolve uncertainties regarding the site and that the data, analyses, and expert judgments employed will lead to clear resolution of licensing issues. Although such an approach is appropriate, the SCP/CD does not provide for a conservative treatment of uncertainties in existing data by considering a full range of alternative interpretations (NRC objection on alternative conceptual models is referenced). In addition, the SCP/CD does not reflect the fact that substantial uncertainties may remain even after site characterization is complete. Interpretive expert judgments based on site characterization data may be subject to challenge. Such uncertainties and interpretive judgment could make closure of issues concerning site suitability and performance more difficult than the SCP/CD implies.

### Recommendation:

Develop and describe in the SCP a strategy for dealing with potential difficulties in issue closure associated with uncertainties remaining after site characterization is complete. Specific candidate strategies include: reliance on wide margins between required and predicted performance; use of multiple, independent expert judgment groups, performing technical review functions; and seeking early NRC rule-making to guide resolution of issues. The SCP should clearly indicate how uncertainties are being accommodated and the aspects of site characterization important to accommodating such uncertainties.

## RESPONSE

Consideration of uncertainties in existing data and alternative conceptual models for the site were addressed by the DOE in the statutory SCP in response to the NRC's objection on this topic. Substantial revisions were made to the SCP text to identify uncertainties with respect to the hypotheses

that comprise the DOE's conceptual models for the site, the alternative hypotheses that have been considered, and the tests that are being proposed to evaluate these alternatives. The general format for these changes was established in the DOE/NRC meeting on alternative conceptual models that was held in April, 1988. With respect to the EEI/UNWGM recommendations, information and analyses available to date indicate that predicted performance (e.g., for ground-water travel time or total-system releases) is likely to substantially exceed the current regulatory criteria. Plans are being developed to conduct sensitivity and uncertainty analyses to help prioritize activities as site characterization proceeds so that DOE may remain cognizant of the margins between the regulatory requirements and predicted performance of the site. The manner in which the DOE intends to use independent technical reviewers and expert judgment in the issue-closure process is covered by revisions to Section 8.1 and 8.3.5.8 of the SCP in response to an NRC comment on this subject. Although not explicitly covered in the SCP, the DOE intends to make use of rule-making, where appropriate, and has already initiated actions to identify potential topics for such rule-making. Topics for rule-making must be carefully selected owing to the time-consuming nature of the process and the fact that codification may unnecessarily reduce flexibility for both the DOE and the NRC.

#### COMMENT 3 (Section 2.4)

The SCP/CD treats postclosure regulatory requirements as independent issues, which is appropriate for licensing purposes. There is, however, a high degree of commonality in the technical factors and information needs bearing on compliance with these standards. As an aid to conducting characterization activities, and to assist in eliminating unnecessary activities, it would be helpful if the SCP contained an integrated plan for the conduct of tests, analyses, and studies.

#### Recommendation:

Develop an integrated plan for tests, analyses and studies, identifying the interrelationships among the issues and the characterization activities being conducted under each technical discipline.

#### RESPONSE

In the process of reviewing and revising the SCP/CD, the DOE developed detailed schedule networks of the activities planned for resolution of each of the performance and design issues discussed in Section 8.3.2-8.3.5, and for each of the major site programs discussed in Sections 8.3.1.2-8.3.1.17. The links among the issues, and between the issues and the site programs were considered in developing these networks. Development of these networks allowed the DOE to evaluate the need for the planned activities, and to identify and resolve potential scheduling and sequencing problems. Summary versions of these networks were included in the statutory SCP (such networks were not included in the SCP/CD). The networks presented in Section 8.3 of the SCP show the relationships among the studies or activities planned for the resolution of each issue, or to be conducted under each site program. Logic diagrams were used in the subsections of Section 8.3 to indicate the general relationships among the site programs and the issues calling for the

information. The networks also indicate the links among issues and site activities. Overall networks for site characterization were presented in Section 8.5 of the SCP to indicate relationships among programs and identify major milestones. Summary networks were presented in Section 8.5 for ESF and drilling activities.

#### COMMENT 4 (Section 2.5)

The DOE's scenario assessment process, as described in the SCP/CD, is fundamentally sound. Nevertheless, the DOE's plans and activities concerning scenario assessment should reflect greater sensitivity to the potential for disagreement. Given the uniqueness of scenario selection and evaluation for the geologic repository, a number of expert judgments will be needed to identify those that are important. These expert judgments are almost certain to undergo close scrutiny and be challenged. Because of inherent uncertainties, "proving" to the satisfaction of all parties that the proper scenarios have been selected may be difficult.

#### Recommendation:

In addition to establishing a formal process for applying expert judgment, as discussed in Section 2.3 (Comment 2 above), demonstrate that an adequately representative scope of scenarios has been selected. A means for implementing this strategy would be to use a set of multiple, independent methods for obtaining the "required results," which are those necessary for a comprehensive evaluation of compliance with regulatory standards. A specific, multiple-method approach would be to identify and evaluate "specific, significant-threat scenarios" that might not emerge from the approach described in the SCP/CD.

#### RESPONSE

The NRC's final point papers contained four comments that dealt specifically with their concerns regarding the scenario-selection process described in the SCP/CD and with the methodology to be used in demonstrating compliance with the EPA standard for total-system releases. The DOE made substantial revisions to the SCP (Section 8.3.5.13, Issue 1.1) to address these comments. These revisions provide more discussion of the scenario-screening process and the rationale for distinguishing between credible and non-credible scenarios. Specific "threats," such as significant variations in water-table evaluation, were considered explicitly in these revisions. The revisions made to the site program sections of Section 8.3.1 in response to the NRC's concerns regarding alternative conceptual models also provide information on the alternative hypotheses for site behavior, and identify the tests being planned to evaluate these alternatives. The concept of using "specific-significant threat scenarios" to determine the severity of "upset conditions" necessary to cause repository performance to fall below regulatory requirements is worth evaluating and will be considered in implementing the performance assessment strategy of the program.

#### COMMENT 5 (Section 2.6)

EEL/UNWNG agree with the DOE and the NRC that there is no basis for determining, at this time, that the Yucca Mountain site may be unsuitable. In view of the fact that detailed site characterization is only now beginning, however, the possibility that the site could be found unsuitable cannot be dismissed. Any possibility — however remote — that the site could be found unsuitable or unlicensable after years of characterization work and the expenditure of billions of dollars should be minimized. To guard against such an outcome, the DOE should conduct its site characterization program in a way that will provide early warning of any factor or set of factors indicative of fundamental unsuitability.

#### Recommendation:

The DOE should begin to evaluate various approaches to determining site suitability and integrate such a process into the site characterization program, as appropriate. There are a number of possible approaches to evaluating site suitability as characterization proceeds. For example: (1) characterization activities could be phased so as to identify, at an early stage, both the presence of all "qualifying conditions" and the absence of any "disqualifying conditions," as defined in the DOE's site-selection guidelines, 10 CFR Part 960; or (2) conduct an independent review of suitability, separate and apart from the basic program of site investigations presented in the SCP.

#### RESPONSE

The principal areas of uncertainty regarding the suitability of the Yucca Mountain site are: (1) geohydrology — hydrologic processes operating in the unsaturated zone (UZ), (2) preclosure tectonics — potential surface faulting and ground motion, (3) postclosure tectonics — potential for volcanism and the impact of tectonic processes on hydrologic conditions and (4) human interference — potential for significant natural resource occurrence. High-priority surface-based testing activities related to each of these areas of uncertainty have been identified and are either already underway (i.e., ongoing) or are scheduled to start as early in the site program as possible. Investigations to determine the potential for faulting near the surface facility locations are presently scheduled to commence with trenching studies in Midway Valley as soon as possible. Studies related to determining the potential for volcanic and other tectonic activity affecting waste isolation have been given high priority and have started. The information from all of these studies will be evaluated with respect to its impact on site suitability and will be used in the overall consideration of site suitability.

High-priority tests are also planned in and near the exploratory shaft. Two multipurpose boreholes, one near each shaft, are planned to be constructed prior to shaft sinking. These holes will be used to monitor baseline UZ hydrologic conditions and changes in these conditions during shaft construction. Another set of tests, including radial borehole tests to obtain UZ hydrologic data and shaft-wall mapping studies, will be conducted from within the shaft as it is sunk. The information from these tests and from monitoring and short-duration testing in the ESF will be evaluated with respect to suitability concerns and used to support the site-suitability determinations required.

A series of long-duration in-situ tests is also planned for the ESF; however, these tests are being conducted primarily for purposes of validating the models and concepts that relate to UZ flow models and the near-field waste package environment. These tests will provide input to support licensing and are likely to be continued as part of the performance confirmation program following submittal of the license application.

According to the NWPA of 1982, as amended in 1987, a recommendation by the Secretary of Energy to the President to approve a site for development as a repository must include a comprehensive statement of the basis for that recommendation, including engineering specifications for the facility, description of the waste form and package and its relationship to the geologic medium, a discussion of site data obtained related to safety, the final EIS, preliminary comments of the NRC about sufficiency of the site data base and the waste form for inclusions in license application, and other information as noted. The nature of the analyses and evaluations to support the Secretary's recommendation will be established at a later date.