



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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TO: King Stablein, HLPD, Division of High-Level Waste Management

FROM: Paul T. Prestholt, Sr. On-Site Licensing Representative

DATE: November 14, 1989

SUBJECT: GUIDANCE ON CONFIRMING TEST PRIORITIZATION ASSOCIATED WITH POTENTIALLY ADVERSE CONDITIONS (From Barrett to Gertz, 10/31/89)

Please find enclosed the above-referenced information.

PTP:nan
cc: John J. Linehan, Director, HLPD w/o enc.

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PDR WASTE
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memorandum

DATE: OCT 31 1989

REPLY TO
ATTN OF: RW-221

SUBJECT: Guidance on Confirming Test Prioritization Associated with Potentially Adverse Conditions

TO: Carl Gertz, Director
Yucca Mountain Project Office

During the past few months, several organizations, including the Nuclear Regulatory Commission (NRC), the Advisory Committee on Nuclear Waste, the State of Nevada, and the Edison Electric Institute, have commented that the Department should ensure that site characterization testing is prioritized to study potentially adverse conditions early on during site characterization. While the Site Characterization Plan (SCP) includes schedules for each study and activity, and includes testing associated with the NRC's potentially adverse conditions (10 CFR Part 60.122, SCP Issue 1.8), additional effort may be needed to address these outside concerns and ensure that planned tests are appropriately sequenced. By this memorandum the Project Office is requested to initiate an effort related to test prioritization for site characterization. Detailed guidance for this effort is included as Attachment 1 and is briefly discussed below.

The requested effort (Attachment 1) would expand on existing information in the SCP. As appropriate, a methodology should be developed to prioritize testing in the initial phase of site characterization and, possibly, to make decisions regarding testing priorities or changes during site characterization. This effort could be used to help define priorities for performance assessment sensitivity studies to be completed over the next one to two years as well as to make use of the initial results from such performance assessment studies. The results of the effort described in Attachment 1 will be an important source of information in terms of defining the process to be used to evaluate potentially adverse conditions during site characterization, and should form the primary basis for a draft methodology to evaluate site suitability. Specifically, the feasibility of developing evaluation criteria for the potentially adverse conditions will be considered. Such criteria may be associated with either the results of field work or the results of performance assessment sensitivity work and should be related to the process to be developed and employed on a continuing basis during site characterization for evaluating site suitability. Such a process would focus initially on geotechnical information obtained from surface-based testing related to characterization of potentially adverse conditions and their potential impacts on waste isolation.

Ultimately, the process would place reliance on the results of performance assessments employing analytical methods to determine whether site conditions, such as those represented by the potentially adverse conditions, would be likely to permit demonstration of compliance with regulatory requirements.

It is envisioned that this task would be completed under appropriate YMP QA controls, and that an implementation management plan would be written to describe the work to be accomplished and documentation to be produced in implementing this guidance. Included in the management plan should be a schedule for completion, with appropriate linkage to the ongoing performance assessment work being undertaken jointly by the Project Office and Headquarters, as well as an assessment of the geosciences, engineering, and performance assessment resources that would need to be committed to the completion of the proposed task. Specific deliverables requested as part of this effort have also been identified in the guidance provided. We request that the implementation plan be provided by 12/15/89 with the final report and recommendation being completed by 9/28/90.

A second effort, separate from but closely related to the one directed by this memo, will be conducted in parallel. This second effort, to evaluate alternative strategies for the activities leading to assessment of site suitability and development of the license application, will be covered by guidance transmitted under separate cover, with Donald Alexander, Office of Systems Integration and Regulation, as the Office of Civilian Radioactive Waste Management manager with primary oversight responsibility. The work conducted under these two efforts should be coordinated, as necessary, to support the comparative evaluations of alternative strategies.

If you have any questions regarding the above request, or the more detailed information provided in the attachments, please contact Stephan Brocoum on FTS 896-4262.



Lake H. Barrett
Acting Associate Director for Facilities
Siting and Development
Office of Civilian Radioactive
Waste Management

Attachment

cc: R. Stein, RW-30
D. Alexander, RW-331
G. Appel, RW-332
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**GUIDANCE ON PRIORITIZATION OF SURFACE-BASED TESTING
AND DEVELOPMENT OF A PROPOSED METHOD FOR SITE-SUITABILITY EVALUATIONS
TO IMPLEMENT THE PROPOSED BASE-CASE SCHEDULE FOR THE REPOSITORY PROGRAM**

1.0 OBJECTIVES

A process should be developed and used to review the prioritization of testing for the surface-based site characterization tests described in the SCP. The objective of the review will be to ensure an early focus on potentially adverse conditions (PACs) that may be significant in terms of system performance and the ability to meet the NRC's performance objectives, and hence significant to site suitability. In addition, a proposal should be developed regarding the method to be used to evaluate site suitability on a continuing basis during site characterization. The results from the activities conducted under this guidance should be reviewed to evaluate the need for additional performance assessment sensitivity or uncertainty studies or a refocusing of priorities for planned performance assessment studies. The results of the prioritization effort should be compared with the planned testing sequence to identify those tests, if any, to be recommended for rescheduling.

2.0 BACKGROUND

- 2.1 Comments received from the ACNW and EEI/UWASTE on the SCP, and the letter from the Director of NMSS transmitting the NRC's site characterization analysis, have suggested that the SCP does not provide an adequate focus on the early identification of conditions that could make the site unsuitable for a geologic repository. In particular, the comments suggest that DOE should conduct site characterization in a manner that will give early priority to addressing those concerns that may have the greatest impact on suitability. The comments also suggest that performance assessment activities should be integrated with site characterization planning in order to help establish priorities for the testing program and to provide for early evaluations of the significance of PACs with respect to meeting the NRC's performance objectives.
- 2.2 The DOE's preliminary strategies for evaluation of the NRC's PACs are covered in the SCP under Issue 1.8, Section 8.3.5.17. The initiating events for various scenario classes and the performance parameters that relate to each of the PACs, as defined under the strategy for evaluating total system performance (Issue 1.1, SCP Section 8.3.5.13), are identified, as are the site-characterization studies or activities planned to acquire the information needed to determine the presence and significance of each condition. The descriptions of the activities that relate to the PACs (including any planned surface-based tests) and the sequencing of these activities are presented in the various subsections of Section 8.3.1.

- 2.3 A decision to initiate underground exploration and testing will be made at some time in the future. That decision will reference and have as part of its basis the results of the surface-based testing and evaluations that have been conducted up to that point. Consequently, the surface-based testing program will serve to support a decision to proceed with underground work, but will not constitute any establishment of prerequisites for such underground work.

3.0 SCOPE

- 3.1 For the purposes of the prioritization activities covered by this guidance, the focus should be on the potentially adverse conditions (PACs), identified by the NRC in 10 CFR 60.122, that should be taken into account in evaluating performance against the NRC's performance objectives relating to waste isolation. In particular, early evaluations of site suitability are expected to be closely related to the identification and characterization of any PACs that may be present and to preliminary assessments of how these PACs might affect performance.
- 3.2 The strategy for addressing the NRC's siting criteria (10 CFR 60.122), described under Issue 1.8 in Section 8.3.5.17 of the SCP, should be reviewed to identify the information and testing needed to characterize the site with respect to each of the PACs. The PACs should be evaluated and judgements made regarding the relative significance of each with respect to the NRC's performance objectives for waste isolation and, hence, to site suitability. The linkage between the PACs and the NRC's performance objectives should be clearly described. If possible, limited performance assessments (e.g., sensitivity studies) should be undertaken for the purposes of supporting such evaluations. These initial evaluations of the PACs should be coordinated with the performance assessment studies that are planned to be conducted over the next year.
- 3.3 The surface-based tests described in the SCP should be evaluated with respect to the PACs and judgements made regarding the relative importance of each test in providing the information needed to characterize the PAC. These evaluations should consider, where possible, performance assessments made specifically for this prioritization effort or those being conducted in parallel as part of the broader performance assessment calculational exercises. Priorities will be established for the testing program through identification of those tests that provide data that are deemed important to the characterization of the most significant PACs. The results of this prioritization effort will be compared with the currently planned sequence for surface-based testing in order to assess the adequacy of the current plans and to develop recommendations for resequencing the testing program, where appropriate, to ensure an early focus on PACs that may represent site-suitability concerns. Comments received from the NRC, the ACNW, the State, and the EEI will be reviewed to determine whether specific site conditions or features have been identified that are not covered by the NRC's PACs that should be factored into the prioritization process.

- 3.4 A process or method that could be used to evaluate site suitability on a continuing basis during site characterization should be defined as part of this effort to ensure that the priorities identified for the testing program are consistent with a reasonable range of options for assessing site suitability. At least two distinctly different types of evaluations should be considered: 1) preliminary evaluations, based on the results from surface-based testing, and 2) detailed evaluations, including a final evaluation conducted near the end of site characterization as part of the process leading to a decision on site recommendation. The strategies presented in the SCP for making findings related to site suitability (Sections 8.3.5.6, 8.3.5.7, and 8.3.5.18) should be reviewed to identify whether programmatic or technical changes would be necessary to implement the evaluation considered under item 2.
- 3.5 The process or method for evaluating site suitability should consider the use of specific evaluation criteria. The evaluation criteria may be related to specific field tests or to performance assessment sensitivity results during the early phase of site characterization.
- 3.6 The results from the activities described in Section 3.2, 3.3, 3.4, and 3.5 should be reviewed to identify whether recommendations should be made on revising priorities for planned performance assessment studies or on adding new sensitivity or uncertainty studies to support prioritization of testing and definition of the bases for site suitability evaluations.
- 3.7 The assumptions made in planning the activities to be conducted under this guidance are as follows:
- The surface-based testing program currently planned provides an adequate basis for initiating site characterization and can proceed in parallel with the evaluations to be conducted under this guidance, once the appropriate prerequisites for initiation of such testing have been satisfied.
 - The implementation of this guidance will require resource commitments from both site characterization and performance assessment program efforts. Planned performance assessment sensitivity studies should be explicitly linked to the evaluation and documentation of testing priorities.
 - Any changes in the testing program recommended as a result of this evaluation will be subject to review and must be approved under the appropriate change-control procedures before any change is implemented. Changes in the testing program and any necessary study plan revisions can be accommodated without causing significant schedule delays.
 - The initial results of this evaluation will be available in time to support implementation of the base-case schedule for site characterization. This will ensure that surface-based tests are

appropriately sequenced to provide an early focus on PACs that are likely to be significant site-suitability concerns. The information is also needed as input to support a separate evaluation of alternative strategies leading to submittal of the license application.

- The decision to proceed with underground exploration and testing once prerequisites have been satisfied is not dependent on the completion of this evaluation or on the completion of the proposed surface-based testing program.

4.0 DEFINITIONS

4.1 **Site suitability:** For the purposes of the activities described in this guidance, site suitability is defined on the basis of evaluations of site and system performance against the performance objectives specified by the NRC in 10 CFR Part 60, taking into account the influence of PACs such as those identified in 10 CFR 60.122. A site is suitable if site conditions permit the natural and engineered barriers to meet the NRC's performance objectives, or other performance objectives approved by the NRC under 10 CFR 60.113(b).

4.2 **Other definitions:** As needed.

5.0 REFERENCES

- 5.1 **Site Characterization Plan, Yucca Mountain Site, Nevada Research and Development Area, Nevada.** DOE/RW-0199, December 1988.
- 5.2 **NRC Staff Site Characterization Analysis of the Department of Energy's Site Characterization Plan, Yucca Mountain Site, Nevada.** July 1989.
- 5.3 **ACNW Review of NRC Comments on DOE Site Characterization Plan.** Letter from D. W. Moeller, Chairman, ACNW, to K. M. Carr, Chairman, NRC, July 3, 1989.
- 5.4 **Comments on Department of Energy Site Characterization Plan for Yucca Mountain Site.** Letter from J. J. Kearney, EEI, to C. P. Gertz, YMPO, transmitting EEI/WASTE comments on SCP, June 1, 1989.
- 5.5 **State of Nevada Preliminary Comments on the Site Characterization Plan for the Yucca Mountain Candidate High-Level Nuclear Waste Repository Site.** Letter from R. R. Loux, Executive Director, Agency for Nuclear Projects, Nuclear Waste Project Office, to C. Gertz, Project Manager, YMPO, May 30, 1989.
- 5.6 **State of Nevada comments on the Site Characterization Plan.** Letter from R. R. Loux to S. Rousso, Acting Director, OCRWM, September 1, 1989.

6.0 DOCUMENTATION AND DELIVERABLES

The documentation and deliverables produced as a result of the implementation of this guidance should include the following:

- 6.1 The first deliverable should be a detailed management plan to describe how the guidance provided here will be implemented. The management plan should describe the sequence of activities to be completed to satisfy the scope of work described in Section 3.0 and present a schedule for the activities that will result in meeting the milestones identified in Section 8.0. The individuals responsible for conducting the work should be identified and the organizational framework described. The plan should identify the deliverables to be developed and the YMPO quality assurance (QA) requirements and procedural controls that will be applied in controlling and documenting the activities.
- 6.2 Briefing materials should be provided as interim deliverables to support interactions associated with milestones 8.4, 8.5 and 8.6.
- 6.3 The final report and supporting documentation should include the following information:
 - A description of the process followed and criteria used in: 1) evaluating the significance of each PAC known or suspected to be present at the site with respect to its potential impacts on waste isolation; 2) identifying and assessing the relative importance of the information needed to characterize each PAC; 3) comparing information needed against the surface-based tests planned to acquire that information; and 4) prioritizing the testing program based on the relative significance of the PACs and the tests associated with their characterization.
 - The results of the evaluation, including: 1) a description of the PACs and their relative ranking in terms of significance to waste isolation, including identification of the site-specific conditions or features that are associated with the possible presence of each PAC; 2) a description and assessment of the relative importance of the information needed to characterize each PAC; 3) priorities for surface-based testing, including justification based on items 1 and 2; and 4) an assessment of the adequacy of the current plans for testing, or recommendations regarding the need for resequencing of planned tests, or modifications to the testing strategy in response to programmatic decisions regarding the scope and timing for site characterization activities.
 - A description of the options considered for conducting site-suitability evaluations on a continuing basis during site characterization, an evaluation of the options, and recommendations for the preferred approach to conducting both the preliminary and more detailed evaluations described in Section 3.4

- A description and discussion of the information used in support of the evaluations.
- A description of the QA controls applied to the activities.
- A listing of the minimum qualifications for participants in each aspect of the evaluations, identifying the actual participants and their qualifications.
- A list of references.

7.1 OVERSIGHT, IMPLEMENTATION AND QUALITY ASSURANCE

- 7.1 The YMPO will have lead responsibility for the actions taken in response to this guidance and for documenting the results. It is expected that this guidance will be implemented through a joint effort involving YMPO, their contractors, and YMP participants, with DOE-HQ management overview of the progress. The prioritization activities should be conducted by a small team (perhaps 6-8 FTEs), with staff representing geoscience, engineering, and performance assessment. Periodic briefings will be scheduled to inform DOE-HQ of the status and preliminary results of these activities. The results will be subject to review and approval by DOE-HQ as noted in Section 7.3.
- 7.2 The evaluations to be conducted warrant the selective application of QA procedural controls sufficient to ensure that the nature of and basis for the evaluations and conclusions are appropriately documented. The activities to be conducted should be assessed in accordance with the YMP QA program requirements to confirm the preliminary determination of QA program applicability and to determine the necessary QA requirements and procedural controls to be applied. The QA controls to be applied by YMPO should be described in the management plan as discussed in Section 6.1.
- 7.3 The final report, presenting the results of the evaluations conducted in response to this guidance (see Section 6.3), will be submitted to OFSD (RW-20) for review by DOE-HQ under OCRWM QAAP 3.1.
- 7.4 A management plan (as described in Section 6.1), covering the activities to be conducted, the responsibilities and personnel involved, the QA controls to applied, and the schedule for the evaluations and preparation of the associated documentation, should be prepared and submitted to OFSD (RW-20) for approval prior to initiating work.

8.0 SCHEDULE AND MILESTONES

	<u>Milestone</u>	<u>Date</u>
8.1	Issue DOE-HQ guidance for activity	10/30/89
8.2	YMFO management (implementation) plan submitted to OFSD (RW-20) for DOE-HQ approval	12/15/89
8.3	DOE-HQ approval of management (implementation) plan	01/05/90
8.4	Brief DOE-HQ on status (progress, problems, etc.)	04/13/90
8.5	Brief DOE-HQ on status and preliminary results of prioritization activities (relative ranking of PACs and prioritization of surface-based testing)	06/08/90
8.6	Brief DOE-HQ on status and preliminary results from identification of bases for evaluating site suitability	08/03/90
8.7	Submit final documentation and recommendations to OFSD (RW-20)	09/28/90
8.8	Briefing to Executive Committee on results	10/19/90
8.9	Recommendations to RW-1 for approval	11/09/90