

PHASE I REVIEW
EFFECTS OF LOCAL SITE GEOLOGY
ON SURFACE AND SUBSURFACE MOTIONS
STUDY PLAN 8.3.1.17.3.4
by

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Introduction

The purpose of this study plan is to collect information to be used to support design and performance considerations and to examine the effects of local site geology on surface and subsurface ground motions resulting from natural and man-made seismic sources. The study plan will also develop methods to predict such ground motions. The information will be used as input to the deterministic and probabilistic seismic and fault displacement hazard analysis.

The study plan consists of two activities:

1. Determine site effects from ground motion recordings
2. Model site effects using the wave properties of the local geology

The data that will be used in this study plan will be based mainly on data gathered in study 8.3.1.17.4.1 "Historical and current seismicity", Investigation 8.3.1.14.2 (Studies to provide soil and rock properties of potential locations of surface facilities) and from seismographs to be deployed specifically for this study. The earthquake data will consist of local micro-earthquakes, regional earthquakes, and underground nuclear explosions (UNE). The results from this study will be used to evaluate the hazards resulting from ground motions at Yucca Mountain.

The study plan was reviewed in accordance with "Review Plan for NRC Staff Review of DOE Study Plans, Revision 1, December 6, 1990."

The NRC staff reviewed the study plan to identify significant concerns with DOE's plans to gather the necessary information that DOE identified in the SCP as needed to resolve licensing issues or to gain an adequate understanding of the site. The review was done with respect to:

A. Evaluation of Study Plan Relative to the Agreement

Criterion 1 The content of the study plan under review is reasonably consistent, as appropriate for the activities tests and analyses described, with the agreement (NRC/DOE meeting on the level of detail for site characterization plans (SCP) and study plans, May 7-8, 1986).

Staff Review: The content of this study plan is consistent with the NRC/DOE agreements on the content of study plans.

Criterion 2 All study plan references have been provided when the study plan was issued.

Staff Review: The references mentioned in the study plan are USGS Open-File Reports, Bull. Seism. Soc. Am. and other references which are accessible to the NRC staff except the reference by Lee, K.W. and Finn, W.D.L., 1978.

B. Evaluation of Study Plan Relative to Identification of Objections (Objectives 2 through 6)

Criterion 1 Potential adverse effects on repository performance.

Staff Review: The work to be performed relevant to the two activities mentioned in the study plan will not have any adverse impact on the ability of Yucca Mountain to isolate waste.

Criterion 2 Potential significant and irreversible effects on characterization that would physically preclude obtaining information necessary to licensing.

Staff Review: Data collection for this study plan will not have any irreversible effect on site characterization.

Criterion 3 Potential significant disruption to characterization schedules or sequencing of studies that would substantially reduce the ability of DOE to obtain information necessary for licensing.

Staff Review: This study plan depends on study 8.3.1.17.4.1, Investigation 8.3.1.14.2 and the deployment of new seismographs, therefore any delay in this study or the investigation or the deployment of the seismographs may cause a disruption in the schedule of this study plan, however, this disruption should not reduce the ability of DOE to obtain information necessary to licensing.

C. Evaluation of Study Plan Relative to Closure of NRC Open Items (Objectives 8 and 11)

Criterion 1 If DOE has proposed that one or more NRC open items be closed on the basis of the material in the study plan, determine whether those items can be closed.

Staff Review: The DOE has not requested any open items to be closed based on this study plan.

D. Evaluation of Study Plan Relative to Need for Detailed Technical Review

Staff Review: This study plan will not require a detailed technical review, but it is recommended that non-linear soil behavior, non-vertical incident body waves, and two dimensional velocity structure be considered in modeling effects of local site geology.

Conclusion: Based on the Phase I review we conclude that we have no objections to this study plan, and we recommend that this study plan not undergo detailed review.