Quaternary Paleoseismology and Stratigraphy of the Yucca Mountain Area, Nevada

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Foreword

The U.S. Geological Survey has conducted a comprehensive series of fault studies to determine the history and extent of Quaternary deformation in the Yucca Mountain area of southwestern Nevada as part of a broad, multidisciplinary site-characterization program to evaluate the suitability of the mountain to host a geologic repository for the safe and permanent storage of high-level radioactive wastes. The results of the detailed studies reported here provide basic data that are fundamental to assessing the risks posed by potential future earthquakes and fault displacements with respect to the design and long-term performance of the proposed facilities. The scope and objectives of fault investigations were largely guided by regulations established by the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy for the siting of geologic repositories for the storage of high-level radioactive wastes.

This report focuses primarily on eight faults within and near Yucca Mountain that are known to have been active during Quaternary time, as well as on two other conspicuous fault systems in nearby areas that also demonstrate neotectonic activity. The overall objective was to obtain, for each individual fault or fault system, definitive information on the number, magnitude, and estimated dates of surface-rupturing paleoearthquakes. Compiling such information involved extensive field investigations, excavation and logging of trenches, detailed descriptions of surficial deposits and soils, and selected sampling and analyses for numerical age determinations, all of which were performed in accordance with a rigorous set of technical procedures and guidelines that were formulated to comply with quality-assurance standards—an essential requirement for activities related to the siting of nuclear facilities.

Beyond the specific purpose of providing a basis for the seismic-risk analysis of Yucca Mountain, the accumulated data and resulting interpretations constitute a valuable contribution to our knowledge and understanding of the neotectonics in this part of the Basin and Range Province. Faults in few other parts of the region have been studied as thoroughly and comprehensively, and so the pattern of Quaternary deformation within this limited area may serve as an example of the structural relations and the locations and magnitudes of potential future earthquakes elsewhere in the Great Basin.

Contents

[Numbers designate chapters]

Plates

Figures

Tables

Conversion Factors and Abbreviations

Multiply	By	To obtain
kilometers (km)	0.6214	miles
meters (m)	3.2808	feet
centimeters (cm)	0.3937	inches
millimeters (mm)	0.0394	inches

yr	years
k.y.	thousand years
ka	thousands of years before present
m.y.	million years
Ma	millions of years before present