UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

February 10, 1981

Honorable John F. Ahearne
Chairman
U. S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: REPORT ON SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 AND 3 SEISMOLOGY AND GEOLOGY

Dear Dr. Ahearne:

During its 250th meeting, February 5-7, 1981, the Advisory Committee on Reactor Safeguards completed its review of seismic and geologic issues as part of its review of the application of Southern California Edison Company, et al, to operate San Onofre Nuclear Generating Station Units 2 and 3. These matters had been considered previously during a Subcommittee meeting in Inglewood, California on January 31, 1981. A tour of the site was conducted on January 30, 1981. The Committee commented previously on these matters in its report of July 21, 1972 on the application to construct these units. During the current review, the Committee had the benefit of discussions with representatives and consultants of Southern California Edison Company, the Nuclear Regulatory Commission (NRC) Staff, and the U.S. Geological Survey (USGS), as well as comments from members of the public. The Committee also had the benefit of the documents listed.

The San Onofre site is located on the coast of southern California in San Diego County approximately 62 miles southeast of Los Angeles, and within the boundaries of Camp Pendleton United States Marine Corps Base.

The geology and seismology of the site were reviewed in detail prior to issuance of construction permits for San Onofre 2 and 3 by the staff of the U.S. Atomic Energy Commission and its geological and seismological advisors, the U.S. Geological Survey and the National Oceanic and Atmospheric Administration, and by the Committee.

Extensive additional investigations were made after the issuance of construction permits for San Onofre 2 and 3. Included were detailed examinations of excavations along the Cristianitos fault and of the sea cliff exposures, geologic mapping, field examinations, offshore seismic reflection profiles, and analyses of recent seismic data. The geologic information and data from this work and other sources have amplified the knowledge of the hypothesized Offshore Zone of Deformation (OZD). The OZD lies about five miles offshore from the San Onofre site, and extends from the Newport-Inglewood fault zone south to the Rose Canyon fault zone. The OZD is considered potentially active and is the controlling geologic feature on which the seismicity of the San Onofre site is determined.

Although the site is located within one mile of the Cristianitos fault, investigations show that the 120,000 year old overlying terrace deposits have not been disturbed by fault activity. This and other available evidence indicate that the Cristianitos fault is "noncapable."

Offshore from the site is a region of faulting that has been termed the Cristianitos Zone of Deformation (CZD). The CZD lies oblique to the OZD and extends to within one mile of the OZD. Investigations have shown that the CZD should be treated as "noncapable."

A number of different methods were used to assess earthquake potential of the OZD, including the following:

- Historical seismicity
- Slip-rate
- Fault-length
- Fault area

Determination of potential earthquake magnitude using the various methods noted above, indicates that a surface wave magnitude of $M_S 7$ represents a reasonable and conservative interpretation of the available geological and seismological information. Potential ground motion at the plant site was evaluated assuming that an $M_S 7$ earthquake could occur along the OZD. Both empirical data and theoretical models were utilized.

Based on our review of the information which has become available since the Committee's construction permit review, we agree that the San Onofre 2 and 3 safe shutdown earthquake high frequency acceleration anchor point (0.67g) and design spectrum are acceptable.

Sincerely,

J. Carson Mark
Chairman

REFERENCES

1. Final Safety Analysis Report (FSAR) for San Onofre Nuclear Generating Station, Units 2 and 3, Vols. 1-23
2. "Safety Evaluation Report (Geology and Seismology) Related to the Operation of San Onofre Nuclear Generating Station, Units 2 and 3" - NUREG-0712, dated December 1980.
3. Letter from Richard Wharton, Attorney for Intervenors, to Richard Savio regarding San Onofre site seismology and geology, dated February 2, 1981.
4. Letter from H. William Menard, U.S. Department of the Interior, Geological Survey, to Harold Denton regarding USGS review of San Onofre site seismology and geology, dated November 26, 1980.