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NRC STAFF VALIDATES EXISTING SEISMIC DESIGN OF DIABLO CANYON NUCLEAR POWER PLANT

The Nuclear Regulatory Commission staff, with the aid of a number of consultants including the U.S. Geological Survey, has concluded that the existing seismic design of Pacific Gas and Electric Company's (PG&E) Diablo Canyon nuclear power plant at San Luis Obispo, California, continues to provide an adequate margin of safety. This conclusion is subject to the completion of certain confirmatory calculations by Pacific Gas and Electric.

The staff's conclusion results from a detailed review of the Long-Term Seismic Program (LTSP), a reevaluation of the existing seismic design which PG&E conducted as a condition of its NRC operating license for Unit 1 of the Diablo Canyon facility.

At the time construction permits for the Diablo Canyon facilities were issued, in April 1968 and December 1970, the approved seismic design bases were based on two hypothetical events--a magnitude 7¼ earthquake on the Nacimiento fault 20 miles from the site and magnitude 6 3/4 aftershock at the site associated with a large earthquake on the San Andreas fault. It was believed that there was no other fault capable of causing higher ground motion at the site.

In 1971, however, information became available on the existence of a major zone of faulting (the Hosgri) about three miles offshore from the site. As the result of detailed investigations of this fault and prior to issuance of the operating licenses, the plant seismic design was reevaluated and the plant upgraded to safely withstand the ground motion which would result from a postulated earthquake of magnitude 7.5 on the Hosgri fault at its closest approach to the site. Full power operating licenses for Diablo Canyon Units 1 and 2 were issued in 1984 and 1985, respectively.

During its review, in 1978, of the application for operating licenses for the Diablo Canyon plant, the Commission's independent Advisory Committee on Reactor Safeguards recommended that the seismic design be reevaluated in about 10 years taking into account applicable new information. The Commission, on the basis of this recommendation and taking into account the substantial amount of offshore exploration for hydrocarbons and significant advances in geology, seismology and geophysics since the site review began, conditioned the Unit 1 operating license accordingly.

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Specifically, the Commission required a reevaluation program consisting of four elements:

(1) identification, examination and evaluation of all relevant geologic and seismic data, information and interpretations becoming available after 1979 in order to update the geology, seismology and tectonics in the region of Diablo Canyon and, if needed, reevaluation of earlier information and acquisition of additional new data;

(2) reevaluaton of the magnitude of the earthquake used to determine the seismic bases of Diablo Canyon using information from element one;

(3) reevaluation of the ground motion at the site based on the results from element two with full consideration of site and other relevant effects; and

(4) an assessment of the significance of conclusions drawn from elements one, two and three--using probabilistic risk analysis and deterministic studies as necessary to assure adequacy of seismic margins.

PG&E addressed each element as part of the LTSP. The NRC staff conducted an in-depth review of Pacific Gas and Electric's response to each of these elements and concluded that:

(1) -- the geological, seismological and geophysical investigations and analyses are the most extensive, thorough and complete ever conducted for a nuclear facility in this country and have advanced the state of knowledge in these disciplines significantly;

(2) -- the Hosgri fault is the seismic source that could cause the maximum vibratory ground motion at the Diablo Canyon site; the maximum earthquake that could occur on that fault would have a magnitude of 7.2 and its epicenter could be as close as about 4.5 kilometers from the site;

(3) The staff's estimate of vibratory ground motion at the Diablo site is equal to or less than Pacific Gas and Electric's estimates over part of the frequency range of interest but exceeds Pacific Gas and Electric' estimates over another part of the range;

(4) Pacific Gas and Electric has concluded that plant seismic margins are adequate to withstand the staff's vibratory ground motion estimates in element three and the staff finds the utility's conclusion to be acceptable but will require Pacific Gas and Electric to perform calculations to confirm its conclusion. As a result of a separate reevaluation by the NRC staff, Pacific Gas and Electric plans to modify all safety-related masonry walls.

Based on the above conclusions, the NRC staff finds that PG&E has satisfied the license condition. Finally, the staff has concluded that, for future plant design modifications, the staff's higher ground motion estimates from element three of the license condition should be used to provide further assurance that plant seismic design margins remain acceptable.

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