

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

JUN 12 1975

Honorable William A. Anders
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: REPORT ON PARTIAL REVIEW OF DIABLO CANYON NUCLEAR POWER
STATION UNITS 1 AND 2

Dear Mr. Anders:

At its 182nd meeting, June 5-7, 1975, the Advisory Committee on Reactor Safeguards completed a partial review of the application of the Pacific Gas and Electric Company for authorization to operate the Diablo Canyon Nuclear Power Station Units 1 and 2. The project was previously considered at Subcommittee meetings in Washington D.C. on September 12, 1974; in San Luis Obispo, California on February 18-19, 1975; and in Los Angeles, California on May 23, 1975. During its review, the Committee had the benefit of discussions with representatives and consultants of the Pacific Gas and Electric Company, the Westinghouse Electric Corporation, and the Nuclear Regulatory Commission (NRC) Staff. The Committee also had the benefit of the documents listed. The Committee reported on the application for a construction permit for the Diablo Canyon Nuclear Power Station Unit 1 in its letter of December 20, 1967, and for Unit 2 in its letter of October 16, 1969.

The site is located on 750 acres adjacent to the Pacific Ocean in San Luis Obispo, County, and is approximately 12 miles west-southwest of the city of San Luis Obispo.

The two units at the Diablo Canyon Station are essentially identical. Each includes a four-loop Westinghouse nuclear steam supply system similar in most respects to that for the Trojan Nuclear Plant, on which the ACRS reported on November 20, 1974. The design core power level for Unit 1 is 3338 MW(t) and Unit 2 is 3411 MW(t). The slight difference in output for the two units is due to the upgraded turbine generator design for Unit 2.

JUN 12 1975

The Committee has not completed its review of the seismic design bases, the adequacy of the seismic design, or of the requirements with regard to protection against tsunamis. These, and some additional matters discussed below, will be reviewed by the Committee following completion of review of seismic-related topics by the NRC Staff.

The Diablo Canyon Units 1 and 2 are scheduled to be among the first to go into operation using a full-core of 17x17 fuel. While many of the various required verification programs have been completed and reviewed by the NRC Staff, other tests and analyses are still to be documented and reviewed. These include: DNB tests for non-uniform heat flux, fuel assembly flow tests, and the effect of fuel rod bowing on DNB after the first fuel cycle. The results of such tests and analyses should be evaluated fully by the NRC Staff, and resolved to its satisfaction, prior to the full-core use of 17x17 fuel to produce power. Prototype 17x17 fuel rod assemblies are to be loaded into operating pressurized water reactors in the near future; the results of these irradiations should be followed closely. The Committee wishes to be kept informed concerning the results of the various ongoing 17x17 test and analytical programs, and any design changes which may be proposed in the future.

Following each cycle of operation, 17x17 fuel assemblies will be examined for fuel rod integrity, fuel rod and assembly dimension and alignment, and surface deposits. In view of the fact that the 17x17 fuel array is a new design and that no prototype irradiations are planned for 17x17 fuel containing eight spacer-grids, the results of surveillance programs for this type fuel should be followed closely. The Committee wishes to be kept informed.

The recently proposed method of constant axial offset control will be used for core power distribution monitoring and control. The NRC Staff should review the effectiveness of this method in protecting against adverse consequences of postulated reactor transients and accidents. The Committee wishes to be kept informed.

Several changes have been made in the Westinghouse ECCS evaluation model to bring it into conformance with the Commission criteria as given in 10 CFR 50, Appendix K. The performance of the emergency core cooling systems will be reevaluated with the approved evaluation model, and appropriate operating limits and procedures for ensuring monitoring of the power distribution are to be incorporated in the Technical Specifications. The Committee wishes to be kept informed.

JUN 12 1975

The evaluation of Anticipated Transients Without Scram has been made generically for Westinghouse plants, and the applicant has made comparisons indicating that the results obtained are applicable to Diablo Canyon Units 1 and 2. NRC Staff review should be completed and this matter resolved in a manner satisfactory to the NRC Staff and the ACRS.

Diablo Canyon Units 1 and 2 may be among the first reactors of this type to operate at a power as high as 3411 MW(t). Because there is limited operating experience with very large, high-power density reactors, the ACRS has previously recommended a more cautious-than-normal approach to full power, with longer periods of operation at power levels in the range of 70 to 90% of full power, and with additional monitoring of core and systems performance throughout the life of the first core. The applicant discussed with the Committee an augmented startup program, which is proposed for implementation on several of the first plants to operate with a full-core employment of the 17x17 fuel assembly. The Committee believes that the augmented program is desirable and recommends that the NRC Staff evaluate the results of this program, as well as overall operating experience with large high power-density reactors, prior to sustained operation at full power.

Certain aspects of the protection against tornadic missiles are still under evaluation. This matter should be resolved in a manner satisfactory to the NRC Staff.

The applicant has not provided adequate information to confirm the environmental qualification of Class I instrumentation and electrical equipment. This matter should be resolved in a manner satisfactory to the NRC Staff and the ACRS.

Generic problems relating to large water reactors have been identified by the NRC Staff and the ACRS and discussed in the Committee's report dated March 12, 1975. These problems should be dealt with appropriately by the NRC Staff and the applicant as suitable approaches are developed.

Several unresolved items were identified by the NRC Staff in their Supplement No. 2 to the Safety Evaluation Report, and at the May 23, 1975 Subcommittee Meeting. The ACRS expects these to be resolved in timely fashion and plans to review several of them, including matters relating to water-hammer effects and subcompartment pressures in a postulated LOCA, in connection with its further review of seismic-related aspects. There also remain some systems behavior and interactions questions and some questions concerning forces on the pressure vessel support structure during blowdown for certain postulated accidents which the Committee expects to review further.

JUN 17 1975

Excepting the seismic and other matters identified above as requiring further Committee review, the ACRS believes that, if due regard is given to the items mentioned above, and subject to satisfactory completion of construction and pre-operational testing, there is reasonable assurance that the Diablo Canyon Nuclear Power Station Units 1 and 2 can be operated at power levels up to 3338 and 3411 MW(t), respectively, without undue risk to the health and safety of the public. The Committee will report in the future on those matters not reviewed herein.

Sincerely,



W. Kerr
Chairman

References

1. Final Safety Analysis Report (FSAR) for the Diablo Canyon Nuclear Power Station, Units 1 & 2, and Amendments 1-28 to the FSAR.
2. Safety Evaluation Report dated October 16, 1974, and Supplements 1 & 2 dated January 31, 1975 and May 9, 1975, respectively.
3. Letter dated April 7, 1975, Pacific Gas and Electric Company (PG&E) to NRC, concerning evaluation of corrosion resistance of alternate steam generator tube materials.
4. Emergency Plan for the Diablo Canyon facility dated March 21, 1974, and Appendix I dated June 1974.