

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

August 14, 1973

Honorable Dixy Lee Ray
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: REPORT ON THREE MILE ISLAND NUCLEAR STATION, UNIT 1

Dear Dr. Ray:

During its 160th meeting, August 9-11, 1973, the Advisory Committee on Reactor Safeguards completed its review of the application of the Metropolitan Edison Company, Jersey Central Power and Light Company, Pennsylvania Electric Company, and General Public Utilities Corporation for a license to operate Unit 1 of the Three Mile Island Nuclear Station at power levels up to 2535 MW(t). This project was considered during a Subcommittee site visit and meeting conducted on May 27 and 28, 1971. The Subcommittee visited the site again on May 3, 1973, and held a meeting in Washington, D. C. on July 25, 1973. In the course of the review, the Committee had the benefit of discussions with representatives and consultants of the Metropolitan Edison Company, the General Public Utilities Corporation, Gilbert Associates, the Babcock and Wilcox Company, and the AEC Regulatory Staff, and of the documents listed. The Committee reported to the Commission on the construction of this Unit in its letters of January 17 and April 6, 1968, and on the construction of Unit 2 in its letter of July 17, 1969.

Three Mile Island Nuclear Station is located on Three Mile Island in the Susquehanna River, about 10 miles southeast of Harrisburg, Pennsylvania. Harrisburg International Airport is located 2-1/2 miles northwest of Unit 1. The applicant has provided protection of the engineered safety features and safe shutdown equipment in the unlikely event of the impact of an aircraft up to 200,000 pounds, and against fires resulting from crashes of even larger aircraft.

The application for a construction permit proposed initial operation at power levels up to 2452 MW(t), the same as the construction permit power level of Oconee Nuclear Station, Unit 1 which employs a similar reactor. Safety studies and performance analyses have been made for a power level of 2535 MW(t) for Three Mile Island Nuclear Station, Unit 1. The

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Committee believes that review of the operation of Oconee Nuclear Station, Unit 1 by the Regulatory Staff should be completed and satisfactory performance of Oconee Nuclear Station, Unit 1 should be demonstrated before Three Mile Island Nuclear Station, Unit 1 is operated at full licensed power.

The hot functional testing of Oconee Nuclear Station, Unit 1 which was conducted in 1972 caused damage of some components, including reactor vessel internals. The design changes which were made for Oconee Nuclear Station, Unit 1 have been applied to Three Mile Island Nuclear Station, Unit 1. The Committee believes that these changes are acceptable.

The applicant has been responsive to the Committee's recommendation that suitable instrumentation be sought to monitor for loose parts and for vibration; such instrumentation has been designed and will be utilized.

The applicant stated that he will propose appropriate additional operating limitations if, at any time during operation, the moderator temperature coefficient of reactivity is positive. This matter should be resolved in a manner satisfactory to the Regulatory Staff.

The Regulatory Staff has been investigating on a generic basis the problems associated with a potential reactor coolant pump overspeed in the unlikely event of a particular type of rupture at certain locations in a main coolant pipe. Some additional protective measures may be warranted and this matter should be resolved to the satisfaction of the Regulatory Staff. The Committee wishes to be kept informed.

The Committee reiterates its previous comments on the need for further study of means for preventing common mode failures from negating reactor scram action, and of design features to make tolerable the consequences of failure to scram during anticipated transients. The Committee believes it desirable to expedite these studies and to implement in timely fashion such design modifications as are found to improve significantly the safety of the plant in this regard. The Committee wishes to be kept informed of the resolution of this matter.

The applicant should assure himself that instrumentation for determining the course of potentially serious accidents, on a time scale that will permit appropriate emergency action, is provided at the station and that appropriate calibration methods and calculated bases for interpreting instrument responses are available.

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It was reported that some of the steel bearing plates at the upper ends of the vertical prestressing tendons in the containment wall had depressed into the concrete as much as one-eighth inch during the tensioning operation. The Committee believes that the cause of this behavior should be determined and its possible effects should be evaluated. This matter should be resolved in a manner satisfactory to the Regulatory Staff. The Committee wishes to be kept informed.

The applicant has proposed measures, including alarms and administrative procedures, to prevent operating under conditions which might result in exceeding acceptable fuel limits established from accident studies and other considerations. The current review has been confined to the first fuel cycle and the analyses have been based on the as-built fuel. The ACRS recommends that the Regulatory Staff establish suitable criteria for these measures, and provide suitable bases for evaluating future loadings. The Committee wishes to be kept informed.

The Committee recognizes that re-evaluation of operating limits may be necessary as a result of possible changes in the acceptance criteria for emergency core cooling systems. The Committee wishes to be kept informed.

Other problems relating to large water reactors which have been identified by the Regulatory Staff and the ACRS and cited in previous reports should be dealt with appropriately by the Regulatory Staff and the applicant as suitable approaches are developed.

The Advisory Committee on Reactor Safeguards believes that, if due regard is given to the items mentioned above, and subject to satisfactory completion of construction and preoperational testing, there is reasonable assurance that Three Mile Island Nuclear Station, Unit 1 can be operated at power levels up to 2535 MW(t) without undue risk to the health and safety of the public.

Sincerely yours,

HS/

H. G. Mangelsdorf
Chairman

Attachment:

List of References

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References

1. Final Safety Analysis Report, Vols. 1 through 5
2. Amendments 13 through 41 to the Application
3. BAW-1389 (Proprietary), dated June 15, 1973, "Three Mile Island, Unit 1 Fuel Densification Report"
4. DL Technical Report on Densification of B&W Reactor Fuel, dated July 6, 1973
5. DL Safety Evaluation, dated July 11, 1973