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

June 12, 1975

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

Subject: REPORT ON JOSEPH M. FARLEY NUCLEAR PLANT, UNITS NO. 1 and NO. 2

Dear Mr. Anders:

At its 182nd meeting, June 5-7, 1975, the Advisory Committee on Reactor Safeguards reviewed the application by Alabama Power Company for authorization to operate the two unit Joseph M. Farley Nuclear Plant. The project had been previously considered at a Subcommittee meeting on May 30, 1975, and a tour of the facility was made by Subcommittee members on May 29, 1975. During its review, the Committee had the benefit of discussions with representatives and consultants of the Alabama Power Company, Southern Services, Inc., the Bechtel Corporation, the Westinghouse Electric Corporation, and the NRC Staff. The Committee also had the benefit of the documents listed. The Committee reported on the application for a construction permit for the Joseph M. Farley Units No. 1 and No. 2 in its letter of October 14, 1971.

The Farley Plant is located in a sparsely populated region of Alabama, on an 1850-acre site near the west bank of the Chattahoochee River, 16 1/2 miles east of Dothan, Alabama.

Each unit includes a three-loop Westinghouse pressurized water reactor to be operated at 2652 MW(t). The reactor system is similar to other high power density Westinghouse systems on which the Committee has reported recently. The containment structures are of prestressed concrete. The Farley reactors will be among the first to operate with fuel assemblies having a 17x17 rod array.

The NRC Staff has proposed that electrical power be normally disconnected from certain motor-operated feedwater valves required for emergency core cooling operations in order to prevent a single failure in the electrical system from disabling a part of an essential safety system. The applicant has argued that a spurious repositioning of these valves is highly improbable and that locking out power to these valves will not lead to greater safety. The Committee believes that a complete systems analysis of this generic problem has not been made which takes account of all possible failures, both electrical and mechanical, for these valves in both the locked-out and normal configurations. Additional studies of possible alternatives are being made by the Applicant and should be evaluated before this matter is resolved. 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 Appendix K of 10CFR50. The performance of the emergency core cooling systems will be re-evaluated 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.

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 the Farley Plant. NRC Staff review should be completed and this matter resolved in a manner satisfactory to the NRC Staff. The Committee wishes to be kept informed.

A fuel surveillance program has been developed by the NRC Staff to follow the behavior of the 17x17 fuel as its

irradiation progresses. Sufficient data are expected to be obtained from the Trojan and Diablo Canyon Plants, so that it should not be necessary to obtain these same data from the Farley Plant; however, if the earlier plants fail to provide these data for any reason, the Farley Plant should be prepared to provide them. To this end, as in other plants, one Farley fuel assembly will contain fuel rods which can be removed to facilitate interim and end-of-life fuel rod evaluation as a function of exposure. 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 this surveillance program should be followed closely. The Committee wishes to be kept informed.

It is planned to use the method of constant axial offset control 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.

Potentially damaging water hammer has been observed in the feed water inlet piping of some PWR steam generators. Corrective measures are planned upon completion of studies and experimental investigation of the phenomenon. The adequacy of the corrective measures should be experimentally verified to the satisfaction of the Regulatory Staff. The Committee wishes to be kept informed.

A question has arisen concerning loads on the vessel support structures for certain postulated loss-of-coolant accidents in pressurized water reactors. This matter should be resolved for the Farley Plant in a manner satisfactory to the NRC Staff.

The Applicant is depending on data from the H. B. Robinson 2 Nuclear Plant, supplemented by data from the Trojan Nuclear Plant, to satisfy the intent of Regulatory Guide 1.20 to

demonstrate that flow induced vibrations will not cause damage to the Farley plant reactor internals. The Robinson Plant has an annular thermal shield and fuel assemblies with a 15x15 fuel rod array. The Trojan Plant, like the Farley Plant, has neutron shield pads and a 17x17 fuel rod array. The estimated fuel load date for the Trojan reactor is 3 months prior to that for Unit 1 of the Farley Plant. Visual inspection after hot functional testing will be implemented to provide added confirmation of the capability of the structural elements of the reactor internals to sustain the flow-induced vibrations. The data from the Robinson and Trojan Plants should be examined and the above inspections should be completed to the satisfaction of the NRC Staff, prior to operation at substantial power.

Suitable instrumentation to follow the course of an accident has been generically identified as an important feature needed to assist operating personnel in diagnosing unexpected events. The NRC Staff should initiate prompt action to clarify the essential requirements for this instrumentation including information to be monitored, environmental conditions under which it must operate, location and type of display, relationship to normally used instrumentation and methods of assuring functional effectiveness at the time of need. Arrangements should be made to incorporate the required instrumentation in all plants licensed for construction. Where possible, the necessary equipment should also be provided on licensed operating power plants.

Since the Farley Plant is located in the southeast corner of Alabama, emergency planning involves the Alabama, Georgia, and Florida state governments. Arrangements should be made to ensure that coordinated emergency plans have been developed, suited to the needs of the Farley site, and taking into consideration points in the Committee's letter dated April 8, 1975.

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.

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 the Joseph M. Farley Nuclear Plant, Units 1 and 2, can be operated at power levels up to 2652 MW(t) each without undue risk to the health and safety of the public.

Sincerely yours,

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William Kerr
Chairman

References

1. Final Safety Analysis Report for the Joseph M. Farley Nuclear Plant, Unit No. 1 and Unit No. 2 (including Amendments 1-47).

2. "Safety Evaluation Report, Joseph M. Farley Nuclear Plant, Unit 1 and Unit 2", May 2, 1975, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission, Washington, D. C.