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

October 9, 1971

Honorable James R. Schlesinger
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: REPORT ON MCGUIRE NUCLEAR STATION UNITS 1 AND 2

Dear Dr. Schlesinger:

At its 137th meeting, September 9-11, 1971, and its 138th meeting, October 7-9, 1971, the Advisory Committee on Reactor Safeguards reviewed the application by the Duke Power Company for a permit to construct the dual-unit McGuire Nuclear Station. The project was considered at Subcommittee meetings at the plant site on June 4, 1971, in Washington, D. C., on July 22-23, 1971, and in Chicago on August 9, 1971 and September 25, 1971. During its review the Committee had the benefit of discussions with representatives and consultants of the applicant, the Westinghouse Electric Corporation and the AEC Regulatory Staff. The Committee also had the benefit of the documents listed below.

The station will be located on the southern shore of Lake Norman, approximately eleven miles northwest of the nearest boundary of Charlotte, North Carolina, which is the closest population center. Suitable provisions have been proposed for protection against a major flood. A seismic Class I standby nuclear service water pond will be provided to serve as an ultimate heat sink in the event the normal supply of cooling water from Lake Norman should be unavailable.

Each unit employs an ice-condenser system enclosed within a free-standing steel containment vessel surrounded by a reinforced-concrete shield building. The units will utilize four-loop pressurized water reactor nuclear steam supply systems having an initial power level of 3411 MWt and a design similar to the previously reviewed Sequoyah and Trojan units. A slightly higher coolant inlet temperature and coolant flow rate are proposed for the McGuire units. The Committee believes that appropriate additional evidence regarding the core thermal parameters should be obtained from reactors of similar design prior to implementation of the proposed increase in core thermal performance of the McGuire plant.

The applicant has stated that forces associated with longitudinal and circumferential pipe ruptures will be considered in the design of the supports and restraints for the primary and secondary coolant systems in order to assure the continued integrity of the containment, or other vital components, or engineered safety systems.

The relatively high power density of the McGuire core and the lower containment pressure associated with the ice-condenser system will be taken into account to provide an appropriately conservative design for the emergency core cooling system (ECCS). In order to satisfy the AEC "Interim Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Power Reactors," the applicant has found it necessary to base his loss-of-coolant accident analyses for the cold-leg break on a maximum permissible linear power of 14.9 kw per foot at full power. The Committee believes that, since there is no increase in the average power density, this restriction on maximum permissible linear power should permit a satisfactory mode of operation. However, if this mode of operation is to be employed, the Committee believes that the applicant should be prepared to use appropriate in-core monitoring systems.

The applicant is conducting an experimental and analytical program intended to examine several conservative assumptions in the Interim Criteria to provide an early basis for choice of possible improvements in the ECCS design. The Committee recommends that the results of this program and any changes in ECCS design proposed by the applicant be reviewed prior to installation. This matter should be resolved in a manner satisfactory to the AEC Regulatory Staff and the ACRS.

Further studies are in progress with regard to the effects of a failure to scram on anticipated transients and of design features which would make tolerable the results of such an event. These studies should be expedited and the matter resolved in a manner satisfactory to the Regulatory Staff and the ACRS during construction.

Other problems related to large water-cooled and moderated reactors have been identified by the Regulatory Staff and the ACRS and cited in previous ACRS reports. The Committee believes that resolution of these items should apply equally to the McGuire station.

The ACRS believes that the above items can be resolved during construction and that, if due consideration is given to these items, the McGuire Nuclear Station Units 1 and 2 can be constructed with reasonable assurance that they can be operated without undue risk to the health and safety of the public.

Sincerely yours,

Spencer H. Bush

Spencer H. Bush
Chairman

References

1. Duke Power Company Letter dated September 18, 1970; License Application; Preliminary Safety Analysis Report (PSAR), Volumes I, II and III

2. Westinghouse Electric Corporation Letter dated September 11, 1971; Reference Safety Analysis Report (RESAR), Volumes I and II, Unclassified, Volumes I and II, Proprietary

3. Amendments 1, 2, and 4 through 10 to the PSAR and RESAR