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

December 15, 1972

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

Subject: REPORT ON JAMES A. FITZPATRICK NUCLEAR POWER PLANT

Dear Dr. Schlesinger:

At its 152nd meeting, on December 7-9, 1972, the Advisory Committee on Reactor Safeguards completed its review of the application by the Power Authority of the State of New York (PASNY) and the Niagara Mohawk Power Corporation for authorization to operate the James A. FitzPatrick Nuclear Power Plant at power levels up to 2436 MW(t). This project was considered at a Subcommittee meeting at the plant site on November 25, 1972. During its review, the Committee had the benefit of discussions with representatives and consultants of the Power Authority of the State of New York, the Niagara Mohawk Power Corporation, the General Electric Company, the Stone and Webster Engineering Corporation, and the AEC Regulatory Staff. The Committee also had the benefit of the documents listed. The Committee reported to the Commission on the construction of this plant in its letter of January 27, 1970.

The James A. FitzPatrick Nuclear Power Plant is located on the shore of Lake Ontario approximately seven miles northeast of Oswego, New York, the nearest population center, and 36 miles northwest of Syracuse. The plant employs a General Electric boiling water nuclear steam supply system of design similar to several previously approved for operation.

PASNY owns the nuclear plant and has sole responsibility for its construction. The Niagara Mohawk Power Corporation will operate the FitzPatrick Plant under contract with PASNY. Niagara Mohawk also owns and operates the Nine Mile Point Nuclear Station which is located 3000 ft. west of the FitzPatrick Plant on a contiguous site.

The FitzPatrick reactor will operate at a power density similar to that of the recently reviewed Browns Ferry and Peach Bottom reactors. The reactor core design has been modified from that proposed at the construction permit stage. The originally planned boron-steel control curtains have been replaced by full-length gadolinia-urania fuel pins and by part-length gadolinia-urania fuel pins to provide axial flux shaping throughout the fuel cycle.

The FitzPatrick Plant reactor is the first to be placed in service with the proposed internals arrangment. An acceptable prototype vibration testing program has been committed to by the applicants.

Analyses of postulated control rod drop accidents have been revised by the applicants to employ a more realistic rate of reactivity insertion than formerly assumed, and to account for changes made in core design, in the use of a number of fuel enrichments, and employment of full-and part-length gadolinia bearing fuel rods. These analyses indicate that, for postulated accidents during certain portions of the fuel cycle, the results are unacceptable. The applicants have proposed a rod sequence control system which is intended to render the probability of occurrence of such an accident negligibly low. This matter is under review and should be resolved in a manner satisfactory to the Regulatory Staff and the Committee. Approved measures should be placed into effect prior to operation above 1% of rated power.

The potential effects of some aspects of fuel performance and LOCA-related phenomena on acceptable linear fuel heat ratings for the FitzPatrick Plant are under study. This matter should be resolved in a manner satisfactory to the Regulatory Staff. The Committee wishes to be kept informed.

For control of combustible gas concentrations in the containment following a postulated loss-of-coolant accident, the applicants will install a containment atmospheric dilution (CAD) system by the end of the first normal refueling period. With this system the desired dilution is accomplished by controlled addition of nitrogen, and results in the maintenance of higher containment pressure than would otherwise exist during a portion of the post-LOCA period. The Committee believes that, in general, use of such dilution schemes, which involve repressurization of the containment, is not desirable. However, as an added provision to a plant well along in construction, use of this approach is believed by the Committee to be acceptable. The Committee nevertheless recommends that the applicants study means to assure that the peak repressurization pressure will be limited to a value substantially below the containment design pressure.

The in-service inspection program proposed for the reactor coolant system complies with Section XI of the ASME Boiler and Pressure Vessel Code to the extent permitted by the existing design. The Committee believes the program is acceptable, but recommends that the applicants continue to study means of assuring reactor vessel integrity in regions currently inaccessible for inspection.

The applicants will employ a recirculation pump trip as a means of limiting the consequences of the unlikely occurrence of a failure to scram during an anticipated transient. The Committee believes that this represents a substantial improvement and should be provided prior to start of commercial power operation. The specific means for implementing the pump trip should be resolved in a manner satisfactory to the Regulatory Staff.

In the unlikely event that a break occurs in the recirculation pump discharge line, the pump impeller may act as a turbine causing the pump and motor to overspeed and become potential sources of missiles. The applicant is reviewing means of dealing with this matter, including an overriding clutch between the pump and motor. The Committee believes that this matter should be resolved in a manner satisfactory to the Regulatory Staff.

In its construction report on the FitzPatrick Plant the Committee noted that additional information should be provided by the applicant regarding leakage through the main steam line isolation valves. Recent boiling water reactor plants reviewed for construction have included provisions for sealing the isolation valves. The Committee believes that evaluation should be made of the operating experience with such valves for FitzPatrick and other reactors, and that, if appropriate, suitable changes be made in the FitzPatrick Plant to maintain acceptably low leakage rates. This matter should be resolved in a manner satisfactory to the Regulatory Staff. 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 ACRS 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 the James A. FitzPatrick Nuclear Power Plant can be operated at power levels up to 2435 MW(t) without undue risk to the health and safety of the public.

Sincerely yours,

/s/ C. P. Siess

C. P. Siess
Chairman

References attached.

References

1. Final Safety Analysis Report, Volumes 1-5 to the James A. FitzPatrick Nuclear Power Plant

2. Supplements 1-16 to the Final Safety Analysis Report

3. Power Authority of the State of New York letter dated October 2, 1972

4. Power Authority of the State of New York letter dated November 1, 1972

5. Power Authority of the State of New York letter dated November 2, 1972

6. Safety Evaluation, dated November 20, 1972, by the Directorate of Licensing