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

August 19, 1977

Honorable Joseph M. Hendrie
Chairman
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: REPORT ON SHEARON HARRIS NUCLEAR POWER PLANT

Dear Dr. Hendrie:

During its 208th meeting, August 11-13 1977, the Advisory Committee on Reactor Safeguards completed an updated review of the application of Carolina Power and Light Company for a permit to construct the Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4. The application was first reviewed by the Committee in late 1972-early 1973 and reported on in its letter of January 17, 1973. Subsequently (May 8, 1975) the Applicant announced a three to six year delay in the project and an interruption of licensing activities. The principal matters of this review are: (1) the applicability of new significant safety issues to the Shearon Harris plant and (2) the updating of previously reviewed matters to current requirements. These matters had been considered at a Subcommittee meeting with the Staff and the Applicant in Raleigh, N. C. on August 6, 1977, following a site visit the preceding day. The Committee had the benefit of discussions with representatives and consultants of the Carolina Power and Light Company, the Westinghouse Electric Corporation, Ebasco Services, Inc., and the Nuclear Regulatory Commission Staff (Staff). The Committee also had the benefit of the documents listed.

Each Shearon Harris unit will utilize a 2775 MWt three loop Westinghouse pressurized water reactor (with 17x17 fuel assemblies) enclosed in a steel lined concrete containment. The basic design of the nuclear steam supply system is similar to designs used for Virgil C. Summer, Unit 1, reported on in the Committee's letter of November 15, 1972 and Koshkonong Nuclear Plant Units 1 and 2, reported on in ACRS letters of January 15, 1976 and May 12, 1976.

The safe shutdown earthquake acceleration for the Shearon Harris plant is 0.15g and that for the operating basis earthquake is 0.075g.

The Applicant has developed conservative seismic design response spectra and other seismic design bases in agreement with the latest NRC Regulatory Guides. The Staff and the Committee concur that the bases for design of Category I structures, systems and components are appropriate. The Applicant made a comprehensive investigation into the history of movement along the geological fault, discovered in 1974, in the excavation for the Waste Processing Building. Results from a series of diverse radioactive dating methods indicated that the last movement of the fault had occurred a minimum of 2.5-35 million years ago. Based upon other geological considerations, the Applicant concluded that the last movement had occurred at least 150 million years ago. The Staff reviewed the information developed by the Applicant and agreed that the radiometric test results were minimum age assessments. The Staff concluded from other geological considerations that the last movement took place more than 136 million years ago. The Committee concurs with the conclusion of the Applicant and Staff that the fault is not capable.

The Applicant has reviewed the Shearon Harris safety design to assure that design, equipment, materials, fabrication and construction meet or will be upgraded to meet current requirements. Safety systems undergoing major modifications include: reactor core, reactor coolant, emergency core cooling, residual heat removal and waste processing systems, and Category I plant structures. The Applicant and the Staff concur that the Shearon Harris plant, to the extent details have been developed at this stage of the project, conforms to current requirements. Both the Staff and the Applicant need to continue to apply appropriate quality assurance measures to ensure that such compliance continues throughout construction with particular attention paid to problems which could arise as a consequence of the unusual length of construction.

Two safety issues remain to be resolved prior to the Staff recommendation for issuance of a Construction Permit. These issues are confirmation of the "worst case" break for emergency core cooling system performance evaluation and the methodology and acceptance criteria for containment subcompartment analysis.

These matters should be resolved in a manner satisfactory to the Staff.

The Committee believes that the items mentioned above can be resolved during construction.

With regard to generic problems cited in the Committee's report, "Status of Generic Items Relating to Light-Water Reactors: Report No. 5," dated February 24, 1977, items considered relevant to the Shearon Harris Nuclear Power Plant Units 1, 2, 3, and 4 are: II-2, 3, 4, 5, 6, 7, 9, 10; IIA-4, 5, 7; IIB-2; IIC-1, 2, 3, 5, 6; IID-2. These problems should be dealt with by the Staff and the Applicants as solutions are found.

The design and construction of the four units at the Shearon Harris Station will span almost two decades. The commitment by the Applicant to participate in the timely resolution of generic matters identified by the NRC Staff and by the ACRS and the appropriate implementations are of major significance. The ACRS recommends that the Applicant provide the Staff with annual reports on these matters. The reports should include the safety programs in which the Applicant participates, evaluations made to improve reliability and effectiveness of engineered safety features, and design improvements incorporated into the units.

The Advisory Committee on Reactor Safeguards believes that if due consideration is given to the foregoing, the Shearon Harris Nuclear Power Plant Units 1, 2, 3, and 4 can be constructed with reasonable assurance that they can be operated without undue risk to the health and safety of the public.

Sincerely,

M. Bender

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Chairman

References

1. Shearon Harris Nuclear Power Plant Units 1, 2, 3, and 4, Preliminary Safety Analysis Report, Volumes 1-9

2. Amendments 1-62 to the Preliminary Safety Analysis Report

3. Safety Evaluation Report, related to the construction of the Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4, Supplement Nos. 1-3.

4. Letter from J. A. Jones, Carolina Power and Light Company to E. Case, U. S. Nuclear Regulatory Commission, on Fault Investigation, Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4, dated March 7, 1975.

5. Letter from J. A. Jones, Carolina Power and Light Company to B. C. Rusche, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission, concerning responses to NRC questions on the geological fault investigation, dated June 1975.