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

June 10, 1975

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

SUBJECT: REPORT ON ST. LUCIE PLANT, UNIT No. 1

Dear Mr. Anders:

At its 182nd meeting, June 5-7, 1975, the Advisory Committee on Reactor Safeguards completed its review of the application of the Florida Power and Light Company for authorization to operate the St. Lucie Plant, Unit No. 1. The project was previously considered at Subcommittee meetings at West Palm Beach, Florida on May 16, 1974; in Washington, D. C. on November 12-13, 1974, and on June 4, 1975. The facility was toured on May 16, 1974. In its review, the Committee had the benefit of discussions with representatives and consultants of the Applicant, Combustion Engineering, Inc., Ebasco Services, Inc. and the NRC Staff. The Committee reported on the construction permit application of St. Lucie Plant, Unit No. 1 (Hutchinson Island), on March 12, 1970, and on the construction permit application of St. Lucie Plant, Unit No. 2, on December 12, 1974.

The St. Lucie Plant, Unit No. 1, is located on Hutchinson Island on a tract of land of approximately 1100 acres, about half way between Fort Pierce and Stuart on the east coast of Florida. About 1000 people live within a five-mile radius of the site, the originally proposed low population zone (LPZ). The minimum exclusion distance is 5100 feet. The nearest population center is Fort Pierce (1970 population about 30,000), which is eight miles to the northwest. However, some buildup of population on the island is probable in the coming years, and the plant and its engineered safety features are being modified to meet an LPZ radius of 1 mile.

The plant site is underlain by sand to a depth of several hundred feet. To provide satisfactory bearing and settlement characteristics and resistance to liquefaction, the area of most seismic Category I structures was dewatered, excavated to minus 60 feet (MSL), and filled with compacted soils to form a 30-foot-thick base.

Earthquake-induced liquefaction of the banks of the cooling water canals or under the dam to Big Mud Creek, which provides a seismic Class 1 source of water for the ultimate heat sink, represents a potential problem for the continued reliability of shutdown cooling. The Applicant and the NRC Staff differ in their conclusions regarding a prudent interpretation of the existing data with regard to the potential for liquefaction. The Committee agrees with the Staff that unless additional information by the Applicant establishes that unacceptable soil movements cannot occur, appropriate remedial measures should be taken. This matter should be resolved in a manner satisfactory to the NRC Staff.

Questions related to the potential effects of a stalled hurricane on the integrity of safety features are currently under review. This matter should be resolved in a manner satisfactory to the NRC Staff.

Additional information and evaluation thereof is required with regard to the potential effects of tornado-induced missiles on some engineered safety features. This matter should be resolved in a manner satisfactory to the NRC Staff.

The St. Lucie Plant, Unit No. 1, includes a pressurized water reactor similar to that currently employed at the Calvert Cliffs and Millstone 2 plants. The current application requests an operating license of 2560 MWt; the power level requested in the construction permit application was 2440 MWt.

Several changes have been made in the Combustion Engineering ECCS evaluation model to bring it into conformance with the Commission Criteria per 10 CFR 50, Appendix K. A partial analysis (a break in the pump discharge leg) has been made using the new model; hot leg and suction leg analyses remain to be evaluated, but the Applicant and the NRC Staff expect the pump discharge leg break to be limiting. This analysis leads to a maximum permitted linear heat generation rate of 14.6 kw/ft. A relatively low peaking factor is required to achieve this limit and the Applicant proposes to use both in-core and ex-core instrumentation in order to assure adequate accuracy of measurement of core power distributions.

The Committee believes that the proposed monitoring methods may be acceptable, but that an augmented startup program be employed, and that satisfactory experience at steady state, 100% power and during transients at less than full power should be obtained, reviewed, and evaluated by the NRC Staff prior to operating at full power in a system-load-follow mode.

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

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 NRC Staff. The Committee wishes to be kept informed.

The analysis of Anticipated Transients Without Scram is incomplete for the St. Lucie Plant, Unit No. 1. The Committee recommends that a schedule for submission of information and for any modifications, if necessary, be prepared, and that this matter be resolved in a manner satisfactory to the NRC Staff. The Committee wishes to be kept informed.

Some questions remain with respect to the handling of heavy loads over the fuel storage pool. This matter should be resolved in a manner satisfactory to the NRC Staff.

Means of qualification of the electric cables from the diesel generators for operation under various environmental conditions are still under review. This matter should be resolved in a manner satisfactory to the NRC Staff.

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. The Committee wishes to be kept informed.

The Applicant is making progress in arrangements for emergency procedures to be followed in case of an accidental release of radioactive materials from the plant. Yet to be confirmed, however, are plans of the state

agencies whose actions would be essential in dealing with the population in case of some such events. The Committee recommends that the applicant and the NRC Staff continue to collaborate with the State in moving ahead to complete development of an emergency response plan and that the adequacy of arrangements for implementing such a plan be confirmed prior to initial operation of the plant.

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 pre-operational testing, there is reasonable assurance that the St. Lucie Plant, Unit No. 1, can be operated at power levels up to 2560 MW(t) without undue risk to the health and safety of the public.

Sincerely yours,

W. Kerr
Chairman

References

1) Final Safety Analysis Report (FSAR) with Amendments 12 through 44

2) Safety Evaluation Report by the Directorate of Licensing (DL), dated November 8, 1975

3) Supplement No. 1 to Safety Evaluation Report by DL, dated May 9, 1975

4) Letter, dated March 31, 1975, Florida Power and Light (FP&L) to DL concerning analysis of ATWT

5) Letter, dated April 9, 1975, FP&L to DL, concerning ECCS analysis

6) Letter, dated September 13, 1974, FP&L to DL, concerning design features to ensure that guideline doses of 10 CFR 100 are not exceeded

7) Letter, dated September 1, 1974, FP&L to DL, concerning the emergency plan

8) Letter, dated December 31, 1973, FP&L to DL, concerning information regarding ATWT

9) Letter, dated October 27, 1972, FP&L to DL, concerning failure of any non-Category I (seismic) equipment which could cause degradation of safety-related equipment

10) Letter, dated May 27, 1975, Conservation Alliance of St. Lucie County to ACRS, concerning emergency planning, quality control and training