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

February 10, 1972

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

Subject: REPORT ON ARKANSAS NUCLEAR ONE, UNIT 2

Dear Dr. Schlesinger:

At its 142nd meeting, February 3-5, 1972, the Advisory Committee on Reactor Safeguards completed its review of the application of the Arkansas Power and Light Company to construct Arkansas Nuclear One, Unit 2. This project was considered at Subcommittee meetings on December 29, 1971 and January 27, 1972, in Washington, D. C., and at the 141st ACRS meeting on January 6-8, 1972. During its review the Committee had the benefit of discussions with representatives and consultants of the Arkansas Power and Light Company, Combustion Engineering, Incorporated, the Bechtel Corporation, and the AEC Regulatory Staff. The Committee also had the benefit of the documents listed.

Arkansas Nuclear One, Unit 2 will be located about six miles from Russellville, Arkansas, on a peninsula formed by the Dardanelle Reservoir on the Arkansas River. Unit 2 will be adjacent to Arkansas Nuclear One, Unit 1, formerly known as the Russellville Nuclear Unit, which was considered in our September 12, 1968, report. Unit 2 will utilize a natural draft cooling tower system.

The nuclear reactor for Unit 2 will be a 2760 MWt pressurized water reactor with an approximate 27% increase in the average linear power density over that for the Hutchinson Island Plant Unit No. 1, the highest power density Combustion Engineering, Incorporated reactor previously reviewed, and reported on in the Committee's letter of March 12, 1970. Major features of the design include a 20% increase in coolant average mass velocity and a reduction of about 13.5% in the flux peaking factors. The applicant has described continuing analytical and experimental studies directed toward further substantiation of the calculations on which the power level increase is based. These include extensive fuel management studies with detailed reviews of the margins for the effects of core asymmetry, xenon redistribution, control rod effects, and additional thermal and hydraulic analyses and testing. If the designer's expectations should not be adequately confirmed, system modifications or restrictions on operation may be appropriate.

The emergency core cooling systems (ECCS) for the reactor have been evaluated by the applicant using the recently approved Combustion Engineering Evaluation Model for use with the "Interim Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Power Reactors." The applicant stated that a design parameter study for the safety injection tank system would be made to achieve increased safety margins over the full spectrum of break sizes, and that improvements judged to be desirable would be adopted for Unit 2. The final design of the safety injection tank system should be reviewed by the Regulatory Staff and the ACRS prior to fabrication and installation of major components thereof.

The applicant outlined work underway for the improvement of codes, including studies of the sensitivity of the calculated results to changes in system parameters. The applicant also described work in progress on pump studies, injection system experiments, transient heat transfer, and on methods of improving reflooding rates. The Committee believes that these studies are appropriate and recommends that as the results become available they be considered for possible improvement of the ECCS for Arkansas Nuclear One, Unit 2.

The applicant described the progress being made on programs for inservice monitoring of vibration and loose parts, and will consider installing monitoring equipment when suitably developed. The Committee continues to encourage this effort.

The applicant stated that Safety Guide No. 7 will be followed in design of the hydrogen control system. To assure that adequate mixing is obtained in the containment, a set of fans, in addition to the fan coolers and spray systems will be installed in the upper dome regions.

The applicant stated that the 1971 version of the IEEE Criteria for Nuclear Power Plant Protection Systems (IEEE-279) will be used for Arkansas Nuclear One, Unit 2.

The Committee reiterates its previous comments concerning the need to study further means of preventing common mode failures from negating reactor scram action, and design features to make tolerable the consequences of failure to scram during anticipated transients. The Committee believes it desirable to expedite these studies and to implement in timely fashion such design modifications as are found to improve significantly the safety of the plant in this regard. The Committee wishes to be kept informed of the resolution of this matter.

Other problems relating to large water reactors, which have been identified by the Regulatory Staff and the ACRS and cited in previous 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 the items mentioned above can be resolved during construction and that, if due consideration is given to the foregoing, Arkansas Nuclear One, Unit 2 can be constructed with reasonable assurance that it can be operated without undue risk to the health and safety of the public.

Sincerely, yours,

/s/ C. P. Siess

C. P. Siess
Chairman

References

1) Arkansas Power and Light Company letter dated September 10, 1970 transmitting Preliminary Safety Analysis Report, Volumes I, II and III to Arkansas Nulear One, Unit 2

2) Supplements 1 through 3 to the License Application for Arkansas Nuclear One, Unit 2

3) Amendments 4 through 7 and 9 through 17 to the License Application for Arkansas Nuclear One, Unit 2