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

June 11, 1974

Honorable Dixy Lee Ray
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: REPORT ON H. B. ROBINSON UNIT NO. 2

Dear Dr. Ray:

During its 170th meeting, June 6-8, 1974, the Advisory Committee on Reactor Safeguards reviewed the request by the Carolina Power and Light Company for an amendment to License No. DPR-23 to permit an increase in the steady-state power level of the H. B. Robinson Unit No. 2 from 2200 MWt to 2300 MWt. During this review the requested power increase and the operating experience of the H. B. Robinson Unit No. 2 were considered at a Subcommittee meeting on May 21, 1974, in Washington, D. C. During its review, the Committee had the benefit of discussions with representatives of the Applicant, the Westinghouse Electric Corporation, and the AEC Regulatory Staff. The Committee also had the benefit of the documents listed below. The Committee reported on the construction of this plant on February 17, 1967, and on its operation on April 16, 1970.

The H. B. Robinson Unit No. 2 achieved criticality on September 20, 1970. The licensed full power of 2200 MWt was reached on February 23, 1971, and commercial operation started on March 14, 1971. Robinson-2 has operated successfully for two fuel cycles. Examination of data from startup testing and power operation by the Directorates of Licensing and Regulatory Operations have shown that design predictions were confirmed in most areas initially and in the remaining areas after modifications.

Although Robinson-2 was designed for operation at 2300 MWt, initial operation has been limited to 2200 MWt. The proposed increase in maximum power is based on favorable operating experience, use of prepressurized high density fuel, and on the application of thermal-hydraulic and ECCS performance evaluation models currently approved for use for Westinghouse pressurized water reactors. On the basis of analyses, the Interim Acceptance Criteria for Emergency Core Cooling Systems in Light Water

Reactors, including consideration of the effects of fuel densification, can be met for the fuel loading proposed for Fuel Cycle 3 if the linear power generation in the fuel is limited to 15.8 kw/ft. Based on this limit, operation up to power levels of 2300 MWt is acceptable, providing the total peaking factor (F_Q^T) is no greater than 2.65. The Applicant intends to use excore radiation detection instrumentation to monitor the axial offset limits required to meet this peaking factor restriction.

Re-evaluation of operating limits will be necessary as a result of the recently promulgated 10 CFR Part 50.46. The Committee wishes to be kept informed.

During Fuel Cycle 2, Robinson-2 was the first nuclear power plant to depend upon the Westinghouse Axial Power Density Monitoring System (APDMS) as a means for monitoring limiting linear power generation rates in order to operate at full power. The operation of the system was generally successful and enabled safe operation with peaking factors below those which can be adequately monitored using excore instrumentation alone. This Applicant does not expect to use the APDMS system in Fuel Cycle 3 under the Interim Acceptance Criteria. However, the system may be proposed for use in this and other Westinghouse plants in the future. Consequently the Committee recommends that the use of APDMS be reviewed, giving attention to the experience in Robinson-2 and to the evaluation of possible sources of uncertainties in using APDMS to monitor peaking factors whose magnitudes are below those which can be monitored using excore surveillance techniques. The Committee wishes to be kept informed.

The Applicant has installed a strong motion recorder to monitor horizontal and vertical ground accelerations and has established the inspection and corrective actions required in the event of a seismic alarm. The Committee concurs with the Regulatory Staff that the reactor be required to be shut down if the operating basis earthquake is exceeded and remain shut down until inspection shows that no damage has been incurred which would jeopardize safe operation of the facility, or until such damage is repaired. This matter should be resolved to the satisfaction of the Regulatory Staff.

The Committee recommends that the Applicant and the Regulatory Staff review the design of the redundant turbine overspeed control system to assure proper functioning under all fault conditions. This matter should be resolved to the satisfaction of the Regulatory Staff.

The Committee believes the Applicant and the Regulatory Staff should review possible sources of debris, such as particles of loose insulation in the containment, as well as the possible effect of such debris on the functioning of engineered safeguards systems.

The Committee recommends that the Technical Specifications for H. B. Robinson-2 specify heatup and cooldown pressure-temperature limits that can be shown to be as conservative as practical with respect to 10 CFR Part 50, Appendix G.

Other generic problems relating to large water reactors identified by the Regulatory Staff and the ACRS have been discussed in the Committee's report dated February 13, 1974. These problems should be dealt with appropriately by the Regulatory Staff and the Applicant.

The Advisory Committee on Reactor Safeguards believes that, if due regard is given to the items mentioned above and in its previous reports, there is reasonable assurance that the H. B. Robinson Unit No. 2 can be operated at power levels up to 2300 MWt without undue risk to the health and safety of the public.

Sincerely yours,

W. R. Stratton

W. R. Stratton
Chairman

References:

1. Safety Evaluation by the Directorate of Licensing, USAEC (DRL), H. B. Robinson Steam Electric Plant Unit No. 2, Power Increase, dated May 20, 1974

2. WCAP-8243, "H. B. Robinson Unit 2 - Justification of Operation at 2300 MWt", dated December 1973

3. Application by Carolina Power & Light Company (CP&L) dated February 1, 1974, requesting amendment No. DPR-23 to permit operation at steady-state power levels not in excess of 2300 MWt

4. Letter dated March 12, 1974, CP&L to DRL, submitting additional information pertinent to 2300 MWt operation

5. Letter dated April 12, 1974, CP&L to DRL, submitting additional information pertinent to 2300 MWT operation

6. Letter dated April 29, 1974, CP&L to DRL, submitting additional information pertinent to 2300 MWt operation

7. Letter dated September 7, 1973, V. Stello (DRL) to D. Skovholt (DRL) concerning use of R technique