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

June 12, 1973

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

Subject: REPORT ON KEWAUNEE NUCLEAR POWER PLANT

Dear Dr. Ray:

In the August 17, 1972, report on the Kewaunee Nuclear Power Plant the Committee recommended that the Regulatory Staff and the ACRS review, prior to operation of the plant at appreciable power, the applicant's proposal for operating power limits as related to the possible densification of fuel in this reactor; the Committee also requested the Regulatory Staff to review the applicant's calculations of containment pressure subsequent to postulated rupture of a reactor coolant pipe within containment. In addition, following the review in August, the question of protecting reactor shutdown equipment against the consequences of rupture, external to the containment, of a pipe carrying high energy fluid was presented to the applicant.

These matters were considered during a Subcommittee meeting held in Washington, D. C. on May 22, 1973, and during the 158th meeting of the ACRS, June 7-9, 1973. During its review, the Committee had the benefit of discussions with representatives of the Wisconsin Public Service Corporation, the Westinghouse Electric Corporation, Pioneer Service and Engineering Company, the AEC Regulatory Staff and their consultants. The Committee also had the benefit of the documents listed.

The possible effects of fuel densification on power distribution have been included in the applicant's analyses of postulated accidents, and he proposes to restrict operation of the core so that total peaking factor (peak maximum-to-average-power ratio) does not exceed 2.59, which corresponds to a non-augmented factor of 2.38 when the allowance for flux peaking due to possible fuel gaps is not included. The Regulatory Staff and the applicant have agreed that part-length control rods

will not be used during the first cycle (except for physics tests), and appropriate in-core surveillance will be required when the reactor is operating at high power. The Committee agrees that these conditions are acceptable and recommends that they be implemented to the satisfaction of the Regulatory Staff.

The Committee recommends that the Regulatory Staff confirm the conservatism of the applicant's peaking factor analysis. The Committee also recommends that, if proposed future operation at high power requires controlling the non-augmented peaking factor to values lower than 2.38, the matter should be reviewed by the Regulatory Staff and the ACRS.

In regard to protection against the consequences of rupture of a high energy piping line outside of containment, the applicant described an evaluation carried out in accordance with criteria established by the Regulatory Staff. Appropriate design and construction modifications including encapsulation sleeves, equipment protection, equipment relocation, and impingement barriers are being made and are to be completed prior to operation above five percent of design power. The Committee believes this approach is satisfactory.

The applicant has re-examined, and the Regulatory Staff has reviewed, the calculation of pressurization of the containment building following postulated rupture of a high energy pipe within containment. These studies confirm the adequacy of the containment structure and also confirm the design strength of compartment walls within the containment which might be subjected to dynamic forces during such an unlikely event.

The Advisory Committee on Reactor Safeguards believes that, if due regard is given to the items mentioned above, in addition to those mentioned in its report of August 17, 1972, and subject to satisfactory completion of construction and preoperational testing, there is reasonable assurance that the Kewaunee Nuclear Power Plant can be operated at power levels up to 1650 MW(t) without undue risk to the health and safety of the public.

Sincerely,

H. G. Mangelsdorf

H. G. Mangelsdorf
Chairman

References Attached.

References

1. Amendments Nos. 21 through 29 to the Application for Construction Permit and Operating License for the Kewaunee Nuclear Power Plant.

2. Supplement No. 1, dated December 18, 1972, to Safety Evaluation Report by the Directorate of Licensing, USAEC, dated July 24, 1972.

3. Supplement No. 2, dated May 10, 1973, to Safety Evaluation Report by the Directorate of Licensing, USAEC, dated July 24, 1972.

4. WCAP-8092, 'Westinghouse Proprietary Class 2 Report,' "Fuel Densification - Kewaunee Nuclear Power Plant," dated March 1973.

5. Letter AEC/DL to ACRS dated May 16, 1973.

6. Draft Report, "Main Steam and Feedwater Line Rupture Study," Pioneer Service and Engineering Co., dated November 22, 1972.

7. Anonymous letter, dated October 25, 1972 regarding unresolved safety related items for Kewaunee and Prairie Island projects.