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

August 17, 1972

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

Subject: REPORT ON KEWAUNEE NUCLEAR POWER PLANT

Dear Dr. Schlesinger:

During its 148th meeting, on August 10-12, 1972, the Advisory Committee on Reactor Safeguards completed its review of the application of the Wisconsin Public Service Corporation, the Wisconsin Power and Light Company, and the Madison Gas and Electric Company for authorization to operate the Kewaunee Nuclear Power Plant at power levels up to 1650 MW(t). The Wisconsin Public Service Corporation acts for all three organizations and will operate the plant. The project was considered previously by a Subcommittee during a visit to the site on July 27, 1972. During its review, the Committee had the benefit of discussions with 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 Committee previously discussed this project in a construction permit report dated May 15, 1968.

The Kewaunee Nuclear Power Plant is located on the shore of Lake Michigan in Kewaunee County, about 25 miles southeast of Green Bay, Wisconsin. The surrounding countryside is rural and relatively sparsely populated. The Point Beach Nuclear Plant (ACRS report April 16, 1970) is located four and one-half miles to the south.

The containment consists of a free-standing steel vessel within a reinforced-concrete shield building. An annular space of about five feet separates the two structures. Given an accident signal, this space will be evacuated to a pressure slightly less than ambient within a short time and thereby serve as a volume in which to trap leakage from the primary steel containment. The gas in the annulus will be circulated through particulate and charcoal filters with about 5% of the filtered flow released to the atmosphere; the remainder will be returned to the annulus. A region of the auxiliary building (contiguous to the shield building) is designated as a special ventilation zone and contains the outside

terminations of penetrations to the interior of the primary containment. The perimeter of this zone is constructed as a medium leakage barrier and the zone is equipped with redundant fan-filter systems either of which can maintain a negative pressure relative to the environment. Thus any leakage to this portion of the secondary containment is subjected to at least single pass filtration prior to release to the environment. The Committee believes that this containment concept is acceptable.

Defects have developed in unpressurized fuel in some plants. The Kewaunee fuel is pre-pressurized and there is reason to expect improved performance with such fuel. However, the phenomena are not fully understood, and some effects on fuel performance are anticipated. The applicant will submit further information with regard to this matter and will propose acceptable upper limits for linear power and procedures for adequate surveillance of core power distribution and fuel condition. The Regulatory Staff and the ACRS should review these proposals prior to operation at appreciable power.

The Committee recommends that the Regulatory Staff confirm the adequacy of the applicant's analysis of peak overall accident pressures during postulated loss-of-coolant accidents, as well as the response of compartment walls within the containment to dynamic forces during such events.

The Committee reiterates its previous comments on 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 ACRS reports, should be dealt with appropriately by the Regulatory Staff and the applicant as suitable approaches are developed. In particular, the Committee recommends that as the results of additional research, analyses, and design studies become available they should be used by the applicant for evaluation and possible improvement of the Emergency Core Cooling System.

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 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 yours,

C. P. Siess

C. P. Siess
Chairman

References

1. Amendment No. 7 (Volumes 1-5 of Final Safety Analysis Report (FSAR)), Wisconsin Public Service Corporation letter, dated January 21, 1971

2. Amendments 8-18 to the Application for Construction Permit and Operating License