March 14, 1988

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Docket No. 50-305

Mr. D. C. Hintz
Vice President - Nuclear Power
Wisconsin Public Service Corporation
Post Office Box 19002
Green Bay, Wisconsin 54307-9002

Dear Mr. Hintz:

The Commission has issued the enclosed Amendment No. 77 to Facility Operating License No. DPR-43 for the Kewaunee Nuclear Power Plant. This amendment is in response to your application dated October 8, 1987.

The amendment would revise the Technical Specifications covering the low frequency trip setpoints for the reactor coolant pump breakers. Specifically, the low frequency trip setpoints would be changed from 57.5 Hz to 55.0 Hz.

A copy of the Safety Evaluation is also enclosed. The notice of issuance of this action will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

/s/

Joseph G. Giitter, Project Manager
Project Directorate III-3
Division of Reactor Projects - III,
IV, V and Special Projects

Enclosures:
1. Amendment No. 77 to
   License No. DPR-43
2. Safety Evaluation

cc w/enclosures:
See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

WISCONSIN PUBLIC SERVICE CORPORATION

WISCONSIN POWER AND LIGHT COMPANY

MADISON GAS AND ELECTRIC COMPANY

DOCKET NO. 50-305

KEWAUNEE NUCLEAR POWER PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 77
License No. DPR-43

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Wisconsin Public Service Corporation, Wisconsin Power and Light Company, and Madison Gas and Electric Company (the licensees) dated October 8, 1987 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-43 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 77 , are hereby incorporated in the license. The licensees shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Kenneth E. Perkins, Director
Project Directorate III-3
Division of Reactor Projects - III,
IV, V and Special Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 14, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 77

FACILITY OPERATING LICENSE NO. DPR-43

DOCKET NO. 50-305

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change.

REMOVE	INSERT
2.3-3	2.3-3
2.3-5	2.3-5
2.3-6	1.3-6

4. Reactor Coolant Flow

   A. Low reactor coolant flow per loop $\geq$ 90% of normal indicated flow as measured by elbow taps.

   B. Reactor coolant pump motor breaker open

      1) Low frequency set point $\geq$ 55.0 Hz

      2) Low voltage set point $\geq$ 75% of normal voltage

5. Steam Generators

   Low-low steam generator water level $\geq$ 5% of narrow range instrument span.

6. Reactor Trip Interlocks

   Protective instrumentation settings for reactor trip interlocks shall be as follows:

   A. Above 10% of rated power, the low pressurizer pressure trip, high pressurizer level trip, the low reactor coolant flow trips (for both loops), and the turbine trip-reactor trip are made functional.

   B. Above 10% of rated power, the single-loop loss-of-flow trip is made functional.

7. Other Trips

   Undervoltage $\geq$ 75% of normal voltage

   Turbine Trip

   Manual Trip

   Safety Injection Trip (Refer to table TS 3.5-1 for trip settings)

level trip protects the pressurizer safety valves against water relief. The specified set point allows margin for instrument error[2] and transient level overshoot before the reactor trips.

Reactor Coolant Temperature

The overtemperature ΔT reactor trip provides core protection against DNB for all combinations of pressure, power, coolant temperature, and axial power distribution, provided only that (a) the transient is slow with respect to piping transit delays from the core to the temperature detectors (about 4 seconds), and (b) pressure is within the range between the high and low pressure reactor trips. With normal axial power distribution, the reactor trip limit, with allowance for errors[2], is always below the core safety limits shown in Figure TS 2.1-1. If axial peaks are greater than design, as indicated by differences between top and bottom power-range nuclear detectors, the reactor trip limit is automatically reduced.

The over power ΔT reactor trip prevents power density anywhere in the core from exceeding a value at which fuel pellet centerline melting would occur, and includes corrections for axial power distribution, change in density and heat capacity of water with temperature, and dynamic compensation for piping delays from the core to the loop temperature detectors. The specified set points meet this requirement and include allowance for instrument errors.[2]

The over power and over temperature protection system setpoints include the effects of fuel densification and clad flattening on core safety limits.[6]

Reactor Coolant Flow

The low-flow reactor trip protects the core against DNB in the event of either a decreasing actual measured flow in the loops or a sudden loss of power to one or both reactor coolant pumps. The set point specified is consistent with the value used in the accident analysis.[4]

The undervoltage and low frequency reactor trips provide additional protection against a decrease in flow. The undervoltage setting provides a direct reactor trip and a reactor coolant pump breaker trip. The undervoltage setting assures a reactor trip signal will be generated before the low flow trip setting is reached. The low frequency setting provides only a reactor

coolant pump breaker trip. Based on the accident analysis[7], the low flow trip setting will be reached before a reactor trip signal is generated by the low frequency setting. However, the analysis conservatively assumed a reactor trip on low frequency rather than low flow.

The low frequency set point includes a margin of 0.5 Hz above the value of 54.5 Hz assumed in the accident analysis.[7] The 0.5 Hz margin includes a channel uncertainty of 0.2 Hz[7] plus an additional buffer of 0.3 Hz.

Steam Generators

The low-low steam generator water level reactor trip assures that there will be sufficient water inventory in the steam generators at the time of trip to allow for starting the Auxiliary Feedwater System.[5]

Reactor Trip Interlocks

Specified reactor trips are by-passed at low power where they are not required for protection and would otherwise interfere with normal operation. The prescribed set points above which these trips are made functional assure their availability in the power range where needed. Confirmation that bypasses are automatically removed at the prescribed set points will be determined by periodic testing. The reactor trips related to loss of one or both reactor coolant pumps are unblocked at approximately 10 percent of power.

Table TS 3.5-1 lists the various parameters and their set points which initiate safety injection signals. A safety injection signal also initiates a reactor trip signal. The periodic testing will verify that safety injection signals perform their intended function. Refer to the basis of Sec. 3.5 of these specifications for details of SIS signals.

References

(1) FSAR Section 14.1.1
(2) USAR, Page 14.1-5
(3) FSAR Section 14.3.1
(4) FSAR Section 14.1.8
(5) FSAR Section 14.1.10
(6) WCAP-8092
(7) WCAP-11547

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATING TO AMENDMENT NO. 77 TO FACILITY OPERATING LICENSE NO. DPR-43

WISCONSIN PUBLIC SERVICE CORPORATION
WISCONSIN POWER AND LIGHT COMPANY
MADISON GAS AND ELECTRIC COMPANY
KEWAUNEE NUCLEAR POWER PLANT

DOCKET NO. 50-305

1.0 INTRODUCTION

By letter dated October 8, 1987, Wisconsin Public Service Corporation (the licensee), submitted a request for changes to the Technical Specifications for Kewaunee Nuclear Power Plant. The changes would modify the underfrequency trip setpoint for the reactor coolant pump trip and make a minor editorial change.

2.0 DISCUSSION

The underfrequency trip setpoint for the reactor coolant pumps is designed to protect the reactor against departure from nucleate boiling (DNB) in the event of reduced primary system flow resulting from electrical system disturbances which cause frequency decay.

3.0 EVALUATION

In support of the proposed Technical Specification change for reducing the underfrequency setpoint, a reanalysis of the complete loss-of-flow transient was performed by Westinghouse. The assumptions used in the analysis were consistent with the assumptions in the Updated Safety Analysis Report (USAR) except for the following, more conservative, assumptions:

1. Prior to reaching the underfrequency setting, reactor coolant system flow was assumed to decay linearly in response to a frequency decay at a constant rate of 5 Hz per second. The 5 Hz per second decay rate has been determined to be conservative for the Wisconsin - Upper Michigan transmission system.

2. An underfrequency signal occurs at 54.5 Hz. An additional 0.5 Hz allowance was included in the Technical Specification value, 55.0 Hz, for channel uncertainty (0.2 Hz) and 0.3 Hz for additional conservatism.

3. The Reactor Coolant Pump (RCP) breakers open 0.6 seconds after 54.5 Hz is reached. Once the RCP breakers are opened, the RCP motors are free from the grid and a natural coast-down begins.

4. The reactor trip delay time is 0.7 seconds. Therefore, the rod motion was assumed to begin 0.7 seconds after 54.5 Hz was reached.

The analysis bounded core designs of standard Advanced Nuclear Fuel's fuel design and also applied to a reactor core bypass flow of 7%. The resulting DNB ratio (DNBR) using the Westinghouse W-3 correlation minimized at 1.52 approximately 3.2 seconds following the beginning of the transient. This is well above the allowable DNBR of 1.3 and compared favorably with the results of the loss of coolant flow accident presented in Section 14.1.8 of the USAR (minimum value of 1.57).

The minimum DNBR (MDNBR) value was obtained using the VIPRE-01 thermal-hydraulic computer code. VIPRE-01 was reviewed and accepted for thermal-hydraulic analysis applications by the NRC in May, 1986. The methodology for Wisconsin Public Service Corporation's application of the VIPRE-01 code for safety analyses was submitted for NRC staff review in March, 1987. Based on the review performed to date, the staff has reasonable assurance that use of the VIPRE-01 code is acceptable for this specific reanalysis of a complete loss-of-flow transient. The results of the staff's generic review of the VIPRE-01 code will be published in a separate SER.

Based on its review, the staff finds that the proposed underfrequency trip setpoint will provide adequate margin over the accepted DNBR limit. In addition, a minor editorial change has been made to page 2.3-5 to correct a grammatical error. Therefore, the licensee's proposed changes are acceptable.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

5.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: T. Quay
R. Jones

Dated: March 14, 1988