December 22, 1989

Docket No. 50-305

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Mr. Ken H. Evers
Manager - Nuclear Power
Wisconsin Public Service Corporation
Post Office Box 19002
Green Bay, Wisconsin 54307-9002

Dear Mr. Evers:

SUBJECT: AMENDMENT NO. 84 TO FACILITY OPERATING LICENSE NO. DPR-43
(TAC NO. 74195)

The Commission has issued the enclosed Amendment No. 84 to Facility Operating License No. DPR-43 for the Kewaunee Nuclear Power Plant. This amendment revises the Technical Specifications (TSs) in response to your application dated July 14, 1989.

The amendment changes the TSs by revising the surveillance test frequency of the turbine stop valves, control valves, and interceptor valves associated with turbine overspeed protection.

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

Sincerely,

/S/

Anthony T. Gody, Jr., Project Manager
Project Directorate III-3
Division of Reactor Projects - III, IV, V and Special Projects
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 84 to License No. DPR-43
2. Safety Evaluation

CP-1

cc w/enclosures:
See next page

*SEE PREVIOUS CONCURRENCE

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Surname:	PKreutzer	TGody/tg	*JWermiel	JHannon	
Date:	12/22/89	12/22/89	12/12/89	12/22/89	12/22/89

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1/1

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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. 84
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 July 14, 1989 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. 84, 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 issuance and is to be implemented within 30 days from the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

John N. Hannon

John N. Hannon, Director
Project Directorate III-3
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: December 22, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 84

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
TS 4.1-2a	TS 4.1-2a
Table TS 4.1-3 (page 1 of 2)	Table TS 4.1-3 (page 1 of 2)
Table TS 4.1-3 (page 2 of 2)	Table TS 4.1-3 (page 2 of 2)

Turbine Overspeed Protection

Surveillance on the turbine overspeed protection system varies depending on the system. The Electro-Hydraulic system is tested once per refueling cycle. The mechanical trip system has a calibration check performed once per refueling cycle and certain portions of it are tested on a monthly cycle. The Redundant Overspeed Trip system is calibrated once per refueling cycle and tested monthly.

The turbine governor and stop valves are to be tested at a frequency consistent with the methodology presented in WCAP-11525, "Probabilistic Evaluation of Reduction in Turbine Valve Test Frequency," and in accordance with the established NRC acceptance criteria for the probability of a missile ejection incident of 1.0×10^{-5} per year. In no case shall the turbine valve test interval exceed one year.

TABLE 4.1-3

MINIMUM FREQUENCIES FOR EQUIPMENT TESTS
(Page 1 of 2)

Equipment Tests***	Test	Frequency	Maximum Time Between Test (Days)
1. Control Rods	Rod drop times of all full length rods	Each refueling outage	N.A.
	Partial movement of all rods	Every 2 weeks	17
1a. Reactor Trip Breakers	Independent Test(1) Shunt & Undervoltage Trip Attachments	Monthly	37
1b. Reactor Coolant Pump Breakers-Open-Reactor Trip	Operability	Each refueling outage	N.A.
1c. Manual Reactor Trip	Open Trip Reactor(2) Trip & Bypass Bkr	Each refueling outage	N.A.
2. Deleted			
3. Deleted			
4. Containment Isolation Trip	Operability	Each refueling outage	N.A.
5. Refueling System Interlocks	Operability	Prior to each refueling outage	N.A.
6. Deleted			
7. Fire Protection Pump and Power Supply	*Operability	Monthly	37
8. RCS Leak Detection	Operability	Weekly	8
9. Diesel Fuel Supply	*Fuel Inventory	Weekly	8
10. Turbine Stop and Governor Valves	Operability	Annually	365
11. Fuel Assemblies	Visual Inspection	Each refueling outage	N.A.
12. Guard Pipes	Visual Inspection	Each refueling outage	N.A.

TABLE TS 4.1-3

MINIMUM FREQUENCIES FOR EQUIPMENT TESTS
(Page 2 of 2)

Equipment Tests***	Test	Frequency	Maximum Time Between Test (Days)
13. Pressurizer PORV's	Operability	Each Refueling Cycle	N.A.
14. Pressurizer PORV Block Valves	Operability	Quarterly*****	N.A.
15. Pressurizer Heaters	Operability******	Each Refueling Cycle	N.A.
16. Containment Purge and Vent Isolation Valves	Operability****	Each Refueling Cycle	N.A.

NOTES

* See Specification 4.1.d

*** Following maintenance on the above equipment that could affect the operation of the equipment tests should be performed to verify operability.

**** This test shall demonstrate that the valve(s) close in less than or equal to 5 seconds.

***** Not required when valve is administratively closed.

****** Test will verify operability of heaters and availability of an emergency power supply.

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(1) Verify Operability of the Bypass Breaker Undervoltage Trip Attachment Prior to Placing Breaker Into Service.

(2) Using the control room pushbuttons, independently test the Reactor Trip Breakers shunt trip and undervoltage trip attachments. The test shall also verify the undervoltage trip attachment on the Reactor Trip Bypass Breakers.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO AMENDMENT NO. 84 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 July 14, 1989, Wisconsin Public Service Corporation (the licensee) requested an amendment to the Technical Specifications (TSs) appended to Facility Operating License No. DPR-43 for the Kewaunee Nuclear Power Plant. The proposed amendment would change the TSs by revising the surveillance test frequency of the turbine stop valves, control valves, and interceptor valves associated with turbine overspeed protection. Specifically, Technical Specification pages TS 4.1-2a, Table TS 4.1-3 (page 1 of 2), and Table TS 4.1-3 (page 2 of 2) dealing with the test frequency of these turbine valves would be changed from monthly to a frequency consistent with the methodology presented in WCAP-11525, "Probabilistic Evaluation of Reduction in Turbine Valve Test Frequency," and in accordance with the established NRC acceptance criteria for the probability of a turbine missile ejection incident for an unfavorably oriented turbine. However, the test interval shall never exceed one year. Surveillance testing of these valves is necessary to assure the performance of their safety function.

Prior to the use of All-Volatile-Treatment (AVT) for secondary chemistry, the periodic cycling of the turbine valves associated with overspeed protection provided assurance that the buildup of chemical deposits did not cause mechanical binding of the valves. The AVT type of secondary plant chemistry control reduced the specific failure mode of chemical deposit binding to a negligible value. The WCAP-11525 evaluation uses the fact that this failure mode is virtually nonexistent in the risk analysis.

Westinghouse Electric Corporation Topical Report WCAP-11525, "Probabilistic Evaluation of Reduction in Turbine Valve Test Frequency," provides a detailed probabilistic basis for extending the testing intervals of turbine valves. The probability of a turbine missile ejection has been calculated for the Kewaunee Nuclear Power Plant turbines and the effect of extending the time interval of turbine valve testing has been included in the topical report. In a supplement to a safety evaluation dated February 7, 1989 for Northern States Power Company, Prairie Island Nuclear Generating Plant, Unit Nos. 1 and 2, the staff found the methodology described in Westinghouse Topical Report WCAP-11525 acceptable.

In a letter dated February 2, 1987, to the Westinghouse Electric Corporation, Generation Technology Systems Division (Mr. James A. Martin), the NRC staff stated its belief that maintaining, through testing and inspection, an initial small value of the probability of turbine failure resulting in the ejection of fragments through the turbine casing is a reliable means of ensuring that the objectives precluding turbine missiles and unacceptable damage to safety-related structures, systems, and components can be met. Maintaining an initial small value of the probability of a turbine failure as discussed above simplifies and improves procedures for evaluation of turbine missile risks and ensures that the public health and safety are maintained. In this letter the staff provided turbine failure guidelines for turbine missile generation probabilities to be used for determining (1) frequencies of turbine disc ultrasonic inspections, and (2) maintenance and testing schedules for turbine control and overspeed protection systems. The staff has established reliability criteria to ensure the turbine missile generation probability is less than 1×10^{-4} per year for a favorably-oriented turbine and 1×10^{-5} per year for an unfavorably-oriented turbine. This provides adequate assurance that the guideline values of Section 2.2.3 of the Standard Review Plan are satisfied.

2.0 EVALUATION

The licensee tests six stop valves, four intercept valves and four control valves for the turbine during a typical monthly test. The periodic testing of the turbine valves consists of moving the valve stem from the position prior to testing, to full closed and returning the valve stem to the original position. The reactor power level must be reduced to approximately 71 percent to conduct the test because of the reduced steam flow to the turbine generator and the limited steam that can bypass the turbine. The power level reduction is achieved in part by the addition of boron to the reactor coolant system which in turn must be removed when valve testing is completed in order to return the reactor to pretest conditions. The cycling of the reactor power as described above (1) places an unnecessary thermal and pressure cycle on the plant equipment, (2) increases the amount of liquid and solid radioactive waste that results in an increase in personnel exposure, and (3) places plant operation in a vulnerable position where an inadvertent reactor scram is more likely during the transient power reduction and increase.

The staff agrees that certain reload designs can be such that power differences between the top and bottom of the core are more sensitive to control and can develop divergent xenon oscillations when the power reduction occurs during the middle of core life. Near the end of core life, stabilizing even larger differences in axial power distribution becomes more difficult because of the larger isothermal temperature coefficient, lower boron concentration and larger differential xenon transients. Based on the above, the staff has concluded that the margin of safety is reduced when the plant is undergoing turbine valve testing.

By letter dated July 14, 1989, the licensee informed the staff that during the operating life of the Kewaunee Nuclear Power Plant (15 years of operation) the cumulative number of observed turbine valve operations is 183. During this time, there have been three incidents where a turbine valve would not have closed following a turbine trip. All three incidents were caused by mechanical puller assembly interference causing mechanical binding of the stop valve. To prevent recurrence of this failure, the puller mechanism is now removed following each use. There have been no turbine valve malfunctions that would have prevented valve closure following a turbine trip since the last incident on April 9, 1979. The licensee states that there has never been a turbine valve malfunction that would have led to a turbine overspeed condition.

The WCAP-11525 calculated mean annual probabilities of turbine missile ejection for the Kewaunee Nuclear Plant, based on the available data, show small but steady increases in the missile ejection probabilities as the mean test interval increases from 1 month up to 12 months. Thus, small increases in the test interval would not be expected to result in large increases in the missile ejection probability. In addition, the calculated values over this range of test intervals are all well within the acceptance criterion of 1×10^{-5} per year for unfavorably oriented turbines. Therefore, the staff concludes that the calculated values for the Kewaunee Plant turbine missile ejection probabilities contain adequate margins for protection against potential adverse effects due to discrepancies in implementation.

However, it must be kept in mind that, while the WCAP-11525 methodology is determined to be acceptable, all calculated values using the methodology are external to the methodology and are subject to change due to the availability of more recent failure data used in calculating the values provided in WCAP-11525 for Kewaunee. The licensee provided a commitment to assure that the test schedule frequency of turbine stop valve testing will provide adequate margins to accommodate unforeseen variations in both the test schedule and future changes in the KNPP turbine stop valve failure rate data base while keeping the assumptions of the probabilistic analysis unviolated.

The licensee has committed to provide the turbine vendor with valve failure information for the purpose of tracking changes in valve failure rate. Information on valve failure rate will be forwarded to the turbine vendor and included in the plant annual operating report. In addition, the licensee commits in accordance with 10 CFR 50.59 to review the necessity of re-evaluating the turbine valve testing frequency probabilistic analysis (by WCAP-11525 methodology) any time that major changes in the turbine system have been made, or a significant upward trend in KNPP's valve failure rate is identified.

The staff concludes that a reduction in frequency (using WCAP-11525 methodology) for turbine valve testing will reduce: (1) the amount of time the reactor plant is placed in a vulnerable position, (2) unnecessary stress due to the number of thermal cycles for piping, valves, and other equipment, and (3) the amount of radioactive waste generated along with the resultant man-rem exposure. Based on the above, the staff finds the proposed changes in testing frequency acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, or which changes an inspection or a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts or 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.

4.0 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 Contributor: T. Gody

Dated: December 22, 1989