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June 7, 1997

Mr. M. L. Marchi
Manager - Nuclear Business Group
Wisconsin Public Service Corporation
Post Office Box 19002
Green Bay, WI 54307-9002

SUBJECT: AMENDMENT NO. 133 TO FACILITY OPERATING LICENSE NO. DPR-43 - KEWAUNEE NUCLEAR POWER PLANT (TAC NO. M98504)

Dear Mr. Marchi:

The Commission has issued the enclosed Amendment No. 133 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 April 28, 1997, as supplemented on May 19, 1997.

The amendment establishes a new design basis flow rate for the auxiliary feedwater (AFW) pumps consistent with the assumptions used in the reanalysis of the limiting design basis event for the AFW system. The Basis for TS 3.4.b, "Auxiliary Feedwater System," has been revised to reflect the change in AFW flow and to clarify the requirements for the AFW cross-connect valves.

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.

DF01

Sincerely,

ORIGINAL SIGNED BY:

Richard J. Laufer, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-305

Enclosures: 1. Amendment No. 133 to License No. DPR-43
2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 7, 1997

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Wisconsin Public Service Corporation
Post Office Box 19002
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Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-305

Enclosures: 1. Amendment No. 133 to License No. DPR-43
2. Safety Evaluation

cc w/encls: See next page

cc:

Foley & Lardner
Attention: Mr. Bradley D. Jackson
One South Pinckney Street
P. O. Box 1497
Madison, Wisconsin 53701-1497

Chairman
Town of Carlton
Route 1
Kewaunee, Wisconsin 54216

Mr. Harold Reckelberg, Chairman
Kewaunee County Board
Kewaunee County Courthouse
Kewaunee, Wisconsin 54216

Chairman
Wisconsin Public Service Commission
610 N. Whitney Way
Madison, Wisconsin 53705-2729

Attorney General
114 East, State Capitol
Madison, Wisconsin 53702

U. S. Nuclear Regulatory Commission
Resident Inspectors Office
Route #1, Box 999
Kewaunee, Wisconsin 54216

Regional Administrator - Region III
U. S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4531

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Chief Engineer
Wisconsin Public Service Commission
610 N. Whitney Way
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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. 133
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 April 28, 1997, as supplemented on May 19, 1997, 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. 133 , 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, and is to be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Richard J. Laufer

Richard J. Laufer, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of issuance: June 7, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 133

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 vertical lines indicating the area of change.

REMOVE	INSERT
TS B3.4-2	TS B3.4-2
TS B3.4-3	TS B3.4-3
TS B3.4-4	TS B3.4-4
TS B3.4-5	---

Auxiliary feedwater trains are defined as follows:

"A" train -	"A" motor-driven auxiliary feedwater pump and associated AFW valves and piping to "A" steam generator, not including AFW-10A or AFW-10B
"B" train -	"B" motor-driven auxiliary feedwater pump and associated AFW valves and piping to "B" steam generator, not including AFW-10A or AFW-10B
Turbine-driven train -	Turbine-driven AFW pump and associated AFW valves and piping to both "A" steam generator and "B" steam generator, including AFW-10A and AFW-10B

In the unlikely event of a loss of off-site electrical power to the plant, continued capability of decay heat removal would be assured by the availability of either the steam-driven AFW pump or one of the two motor-driven AFW pumps, and by steam discharge to the atmosphere through the main steam safety valves. Each motor-driven pump and turbine-driven AFW pump is normally aligned to both steam generators; valves AFW-10A and AFW-10B are normally open. Any single AFW pump can supply sufficient feedwater for removal of decay heat from the reactor.

As the plant is cooled down, heated up, or operated in a low power condition, AFW flow will have to be adjusted to maintain an adequate water inventory in the steam generators. This can be accomplished by:

1. Throttling the discharge valves on the motor-driven AFW pumps, or

2. Closing one or both of the cross-connect flow valves, or

3. Stopping the pumps.

If the main feedwater pumps are not in operation at the time, valves AFW-2A and AFW-2B must be throttled or the control switches for the AFW pumps located in the control room will have to be placed in the "pull out" position to prevent their continued operation and overfill of the steam generators. The cross-connect flow valves may be closed to specifically direct AFW flow. Manual action to re-initiate flow after it has been isolated is considered acceptable based on analyses performed by WPSC and the Westinghouse Electric Corporation. These analyses conservatively assumed the plant was at 100% initial power and demonstrated that operators have at least 10 minutes to manually initiate AFW during any design basis accident with no steam generator dryout or core damage. The placing of the AFW control switches in the "pull out" position, the closing of one or both cross-connect valves, and the closing or throttling of valves AFW-2A and AFW-2B are limited to situations when reactor power is <15% of RATED POWER to provide further margin in the analysis.

During accident conditions, the AFW System provides three functions:

1. Prevents thermal cycling of the steam generator tubesheet upon loss of the main feedwater pump;

2. Removes residual heat from the Reactor Coolant System until the temperature drops below 300-350°F and the RHR System is capable of providing the necessary heat sink;

3. Maintains a head of water in the steam generator following a loss-of-coolant accident.

Each AFW pump provides 100% of the required capacity to the steam generators as assumed in the accident analyses to fulfill the above functions. Since the AFW System is a safety features system, the backup pump is provided. This redundant motor-driven capability is also supplemented by the turbine-driven pump.

The pumps are capable of automatic starting and can deliver full AFW flow within one minute after the signal for pump actuation. However, analyses from full power demonstrate that initiation of flow can be delayed for at least 10 minutes with no steam generator dryout or core damage. The head generated by the AFW pumps is sufficient to ensure that feedwater can be pumped into the steam generators when the safety valves are discharging and the supply source is at its lowest head.

Analyses by WPSC and the Westinghouse Electric Corporation show that AFW-2A and AFW-2B may be in the throttled or closed position, or the AFW pump control switches located in the control room may be in the "pull out" position without a compromise to safety. This does not constitute a condition of inoperability as listed in TS 3.4.b.1 or TS 3.4.b.2. The analysis shows that diverse automatic reactor trips ensure a plant trip before any core damage or system overpressure occurs and that at least 10 minutes are available for the operators to manually initiate auxiliary feedwater flow (start AFW pumps or fully open AFW-2A and AFW-2B) for any credible accident from an initial power of 100%.

The OPERABILITY of the AFW System following a main steam line break (MSLB) was reviewed in our response to IE Bulletin 80-04. As a result of this review, requirements for the turbine-driven AFW pump were added to the Technical Specifications.

For all other design basis accidents, the two motor-driven AFW pumps supply sufficient redundancy to meet single failure criteria. In a secondary line break, it is assumed that the pump discharging to the intact steam generator fails and that the flow from the redundant motor-driven AFW pump is discharging out the break. Therefore, to meet single failure criteria, the turbine-driven AFW pump was added to Technical Specifications.

The cross-connect valves (AFW-10A and AFW-10B) are normally maintained in the open position. This provides an added degree of redundancy above what is required for all accidents except for a MSLB. During a MSLB, one of the cross-connect valves will have to be repositioned regardless if the valves are normally opened or closed. Therefore, the position of the cross-connect valves does not affect the performance of the turbine-driven AFW train. However, performance of the train is dependent on the ability of the valves to reposition. Although analyses have demonstrated that operation with the cross-connect valves closed is acceptable, the TS restrict operation with the valves closed to <15% of RATED POWER. At ≥15% RATED POWER, closure of the cross-connect valves renders the TDAFW train inoperable.

An AFW train is defined as the AFW system piping, valves and pumps directly associated with providing AFW from the AFW pumps to the steam generators. The action with three trains inoperable is to maintain the plant in an operating condition in which the AFW System is not needed for heat removal. When one train is restored, then the LIMITING CONDITIONS FOR OPERATION specified in TS 3.4.b.2 are applied. Should the plant shutdown be initiated with no AFW trains available, there would be no feedwater to the steam generators to cool the plant to 350°F when the RHR System could be placed into operation.

It is acceptable to exceed 350°F with an inoperable turbine-driven AFW train. However, OPERABILITY of the train must be demonstrated within 72 hours after exceeding 350°F or a plant shutdown must be initiated.

Condensate Storage Tank (CST)(TS 3.4.c)

The specified minimum water supply in the condensate storage tanks (CST) is sufficient for 4 hours of decay heat removal. The 4 hours are based on the Kewaunee site specific station blackout (loss of all AC power) coping duration requirement.

The shutdown sequence of TS 3.4.c.3 allows for a safe and orderly shutdown of the reactor plant if the specified limits cannot be met.

Secondary Activity Limits (TS 3.4.d)

An evaluation was performed to determine the maximum permissible steam generator primary-to-secondary leak rate during a steam line break event. The evaluation considered both a preaccident and accident initiated iodine spike. The results of the evaluation show that the accident initiated spike yields the limiting leak rate. This evaluation was based on a 30 REM thyroid dose at the site boundary and initial primary and secondary coolant iodine activity levels of 1.0 μCi/gm and 0.1 μCi/gm DOSE EQUIVALENT I-131 respectively. A leak rate of 34.0 gpm was determined to be the upper limit for allowable primary-to-secondary leakage in the steam generator faulted loop. The steam generator in the intact loop was assumed to leak at a rate of 0.1 gpm, the standard operating leakage limit applied for the tube support plate voltage-based plugging criteria specified in TS 4.2.b.5.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO AMENDMENT NO. 133 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 April 28, 1997, as supplemented on May 19, 1997, Wisconsin Public Service Corporation (WPSC), the licensee, requested a revision to the Kewaunee Nuclear Power Plant (KNPP) Technical Specifications (TSs). The proposed amendment would establish a new design basis flow rate for the auxiliary feedwater (AFW) pumps consistent with the assumptions used in the reanalysis of the limiting design basis event for the AFW system. The Basis for TS 3.4.b, "Auxiliary Feedwater System," would be revised to reflect the change in AFW flow and to clarify the requirements for the AFW cross-connect valves.

The May 19, 1997, submittal provided clarifying information that did not change the initial proposed no significant hazards consideration determination published in the Federal Register on May 7, 1997 (62 FR 24977).

2.0 EVALUATION

During a safety system operational inspection (SSOPI) conducted at KNPP in January 1997, NRC inspectors identified a concern with the AFW pumps not achieving the flow values assumed in the current safety analyses of record. The current KNPP Updated Safety Analysis Report (USAR), Section 6.6, describes the two motor-driven and one turbine-driven AFW pumps as each having a capacity of 240 gpm with up to 40 gpm of the 240 gpm providing continuous recirculation. The same section of the USAR also states that "the feedwater flow rate required to prevent thermal cycling of the tube sheet and for removing residual heat is the same, about 160 gpm for the reactor (or 80 gpm per steam generator). A 200 gpm flow to the steam generators is, therefore, sufficient to fulfil the above functions." The Basis for TS 3.4.b also contains these same words. The concerns raised during the SSOPI was that the AFW pumps could not deliver 200 gpm to the steam generators (SGs) as designed.

In response to the staff concerns, the licensee, in its April 28 and May 19, 1997, submittals, stated that a new design basis AFW flow rate of 176 gpm had been established. To support this minimum AFW flow rate, the licensee completed a reanalysis of the limiting design basis accidents and transients involving the AFW system. The licensee concluded that changing the AFW flow rate will not affect the consequences of the most limiting transients; (1) loss of load with respect to peak system pressure, and (2) uncontrolled rod withdrawal with respect to minimum departure from nucleate boiling ratio (MDNBR). Changing the AFW flow rate will not impact these transients since, in the time frame of interest for the safety analysis, the AFW system is not operating following these events.

The loss of feedwater transient, however, is affected by the change in AFW flow rate. The licensee performed a reanalysis of this event assuming AFW flow of 176 gpm delivered to SGs and the results of the reanalysis demonstrated that all acceptance criteria for this event are met. The licensee stated that the small break loss of coolant accident (LOCA) has been previously analyzed assuming 176 gpm AFW flow rate with the results meeting the acceptance criteria of 10 CFR 50, Appendix K. The licensee has also evaluated the impact of the AFW flow change on other licensing basis analysis, including Appendix R design requirements, Station Blackout, and anticipated transient without scram (ATWS). The relevant acceptance criteria continue to be satisfied for these analyses.

To clarify the design basis AFW flow rate of 176 gpm at Kewaunee, the licensee proposed the following:

1) The Basis for TS 3.4.b would be modified to remove the explicit values of required AFW flow and pump capacities. A general statement would be added to indicate that each AFW pump has 100% of the required capacity assumed in the accident analysis.

2) The USAR would be updated to document the safety analyses performed to support the minimum AFW flow rate of 176 gpm. The USAR will also be revised to clarify references to AFW flow and to reflect a pump capability of 216 gpm (176 gpm + 40 gpm recirculation flow) and accident analysis assumptions of 176 gpm AFW flow to the SGs.

3) The acceptance criteria for inservice testing (IST) performed per TS 4.2.a.2 would be revised to assure that the AFW pumps are capable of delivering the minimum required flow to the SGs under the plant conditions assumed in the safety analysis.

4) The Basis for TS 3.4.b would also be revised to clarify the restrictions for the operation of the AFW cross connect valves during plant power operation.

The staff has reviewed the licensee's submittal and finds that the reanalysis of minimum AFW flow is reasonably conservative and, therefore, acceptable. The staff also finds that the proposed TS and USAR changes accurately incorporate the results of the AFW flow reanalysis and are, therefore, acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Wisconsin State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent 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 (62 FR 24977). 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; (2) such activities will be conducted in compliance with the Commission's regulations; and (3) 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: C. Liang
W. LeFave

Date: June 7, 1997