March 28, 1995

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

SUBJECT: AMENDMENT NO. 116 TO FACILITY OPERATING LICENSE NO. DPR-43 - KEWAUNEE NUCLEAR POWER PLANT (TAC NO. M91072)

Dear Mr. Marchi:

The Commission has issued the enclosed Amendment No. 116 to Facility Operating License No. DPR-43 for the Kewaunee Nuclear Power Plant (KNPP). This amendment revises the Technical Specifications (TS) in response to your application dated December 2, 1994.

The amendment revises KNPP TS 3.2 by eliminating the requirements for the charging pumps, high concentration boric acid in the boric acid storage tanks (BASTs), the boric acid transfer pumps, and boric acid heat tracing. Changes to TS 3.3 and Table TS 3.5.3 add requirements associated with the emergency core cooling system (ECCS) accumulators, remove the requirements associated with the boric acid storage tanks and increase the minimum required boron concentration in the refueling water storage tank (RWST). Additionally, the surveillance requirements involving the charging pumps, BASTs, associated valves and heat tracing located in Table TS 4.1-1, Table TS 4.1-2 and Section 4.5 have been eliminated.

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,
Original signed by Richard J. Laufer

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.116 to License No. DPR-43
2. Safety Evaluation

cc w/encls: See next page

DOCUMENT NAME: G:\KEWAUNEE\KEW91072.AMD

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DATE	3/27/95		3/28/95		3/14/95		3/15/95		3/28/95	

OFFICIAL RECORD COPY Ann Hodgdon

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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. 116
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 December 2, 1994, 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.116, 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: March 28, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 116

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 3.2-1	TS 3.2-1
TS B3.2-1	TS B3.2-1
TS 3.3-1 through TS 3.3-7	TS 3.3-1 through TS 3.3-7
TS B3.3-2 through TS B3.3-4	TS B3.3-2 through TS B3.3-4
TABLE TS 3.5-3 (3 pages)	TABLE TS 3.5-3 (2 pages)
TABLE TS 4.1-1 (page 3 of 8 and page 4 of 8)	TABLE TS 4.1-1 (page 3 of 8 and page 4 of 8)
TABLE TS 4.1-2 (page 2 of 2)	TABLE TS 4.1-2 (page 2 of 2)
TS 4.5-2 TS B4.5-1	TS 4.5-2 TS B4.5-1

3.2 CHEMICAL AND VOLUME CONTROL SYSTEM

APPLICABILITY

Applies to the operational status of the Chemical and Volume Control System.

OBJECTIVE

To define those conditions of the Chemical and Volume Control System necessary to ensure safe reactor operation.

SPECIFICATIONS

a. When fuel is in the reactor there shall be at least one flow path to the core for boric acid injection.

BASIS - Chemical and Volume Control System (TS 3.2)

The Chemical and Volume Control System provides control of the Reactor Coolant System boron inventory. This is normally accomplished by using any one of the three charging pumps. Also, the Safety Injection pumps can take a suction from the Refueling Water Storage Tank and provide borated water to the Reactor Coolant System.

The quantity of boric acid stored in the Refueling Water Storage Tank is sufficient to achieve COLD SHUTDOWN at any time during core life.

3.3 ENGINEERED SAFETY FEATURES AND AUXILIARY SYSTEMS

APPLICABILITY

Applies to the OPERATING status of Engineered Safety Features and Auxiliary Systems.

OBJECTIVE

To define those LIMITING CONDITIONS FOR OPERATION that are necessary: (1) to remove decay heat from the core in emergency or normal shutdown situations, and (2) to remove heat from containment in normal OPERATING and emergency situations.

SPECIFICATIONS

a. Accumulators

1. The reactor shall not be made critical unless the following conditions are satisfied, except for LOW POWER PHYSICS TESTING and except as provided by TS 3.3.a.2.

   A. Each accumulator is pressurized to at least 700 psig and contains 1250 ft^3 ± 25 ft^3 of water with a boron concentration of at least 1900 ppm, and is not isolated.

   B. Accumulator isolation valves SI-20A and SI-20B shall be opened with their power breakers locked out at or before the Reactor Coolant System pressure exceeds 1000 psig.

2. During power operation or recovery from an inadvertent trip, the following conditions of inoperability may exist during the time interval specified:

   A. One accumulator may have a boron concentration < 1900 ppm for 72 hours.

   B. One accumulator may be inoperable for a reason other than TS 3.3.a.2.A for 1 hour.

   If OPERABILITY is not restored within the time specified, then within 1 hour action shall be initiated to:

   - Achieve HOT STANDBY within the next 6 hours.
   - Achieve HOT SHUTDOWN within the following 6 hours.
   - Achieve COLD SHUTDOWN within an additional 36 hours.

b. Emergency Core Cooling System

1. The reactor shall not be made critical unless the following conditions are satisfied, except for LOW POWER PHYSICS TESTING and except as provided by TS 3.3.b.2 and TS 3.3.b.4.

   A. TWO SI/RHR trains are OPERABLE with each train comprised of:

      1. ONE OPERABLE safety injection pump.

      2. ONE OPERABLE residual heat removal pump.

      3. ONE OPERABLE residual heat removal heat exchanger.

      4. An OPERABLE flow path consisting of all valves, piping and interlocks associated with the above train of components and required to function during accident conditions. This flow path shall be capable of taking suction from the Refueling Water Storage Tank upon a Safety Injection signal and after manual transfer taking suction from the containment sump.

   B. Isolation valves SI-9A, SI-11A, SI-11B, and as a minimum either SI-4A or SI-4B are in the open position with their power breaker locked out.

2. During power operation or recovery from an inadvertent trip, ONE SI/RHR train may be inoperable for a period of 72 hours.

   A. If the inoperability is due to a component in the Safety Injection System and OPERABILITY is not restored within 72 hours, then within 1 hour action shall be initiated to:

      - Achieve HOT STANDBY within the next 6 hours.
      - Achieve HOT SHUTDOWN within the following 6 hours.
      - Achieve COLD SHUTDOWN within an additional 36 hours.

   B. If the inoperability is due to a component in the Residual Heat Removal System and OPERABILITY is not restored within 72 hours, then within 1 hour action shall be initiated to:

      - Achieve HOT STANDBY within the next 6 hours.
      - Achieve HOT SHUTDOWN within the following 6 hours.
      - Achieve and maintain the Reactor Coolant System T_{avg} less than 350°F by use of alternate heat removal methods within an additional 36 hours.

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3. The reactor shall not be made critical unless the following conditions are satisfied except for LOW POWER PHYSICS TESTING and as provided by TS 3.3.b.4.

   A. The Refueling Water Storage Tank shall contain at least 272,500 gallons of water.

   B. The Refueling Water Storage Tank has a boron concentration of at least 2400 ppm.

4. During power operation or recovery from an inadvertent trip, the following conditions of inoperability may exist during the time interval specified.

   A. The calculated Refueling Water Storage Tank boron concentration may be < 2400 ppm for 8 hours.

   B. The Refueling Water Storage Tank may be inoperable for a reason other than that stated in TS 3.3.b.4.A for 1 hour. If OPERABILITY is not restored within the time specified, then within 1 hour action shall be initiated to:

      - Achieve HOT STANDBY within the next 6 hours.
      - Achieve HOT SHUTDOWN within the following 6 hours.
      - Achieve COLD SHUTDOWN within an additional 36 hours.

c. Containment Cooling Systems

1. Containment Spray and Containment Fancoil Units

A. The reactor shall not be made critical unless the following conditions are satisfied, except for LOW POWER PHYSICS TESTS and except as provided by TS 3.3.c.1.A.3.

1. Two containment spray trains are OPERABLE with each train comprised of:

(i) ONE containment spray pump.

(ii) An OPERABLE flow path consisting of all valves and piping associated with the above train of components and required to function during accident conditions. This flow path shall be capable of taking suction from the Refueling Water Storage Tank and from the containment sump.

2. TWO trains of containment fancoil units are OPERABLE with two fancoil units in each train.

3. During power operation or recovery from inadvertent trip, any one of the following conditions of inoperability may exist during the time intervals specified. If OPERABILITY is not restored within the time specified, then within 1 hour action shall be initiated to:

- Achieve HOT STANDBY within the next 6 hours.
- Achieve HOT SHUTDOWN within the following 6 hours.
- Achieve COLD SHUTDOWN within an additional 36 hours.

(i) One containment fancoil unit train may be out of service for 7 days provided the opposite containment fancoil unit train remains OPERABLE.

(ii) One containment spray train may be out of service for 72 hours provided the opposite containment spray train remains OPERABLE.

(iii) Both containment fancoil unit trains may be out of service for 72 hours provided both containment spray trains remain OPERABLE.

(iv) The same containment fancoil unit and containment spray trains may be out of service for 72 hours provided their opposite containment fancoil unit and containment spray trains remain OPERABLE.

2. Spray Additive System

A. The reactor shall not be made critical unless the following conditions are satisfied, except for LOW POWER PHYSICS TESTS and except as provided by TS 3.3.c.2.A.3.

1. A minimum of 300 gallons of not less than 30% by weight of NaOH solution is available as a containment spray system additive.

2. Valves and piping are capable of adding NaOH solution from the additive tank to a containment spray system.

3. During power operation or recovery from inadvertent trip, the spray additive system may be out of service for 72 hours. If OPERABILITY is not restored within 72 hours, then within 1 hour action shall be initiated to:

- Achieve HOT STANDBY within the next 6 hours.
- Achieve HOT SHUTDOWN within the following 6 hours.
- Achieve COLD SHUTDOWN within an additional 36 hours.

d. Component Cooling System

1. The reactor shall not be made or maintained critical unless the following conditions are satisfied, except for LOW POWER PHYSICS TESTS and except as provided by TS 3.3.d.2.

   A. TWO component cooling water trains are OPERABLE with each train consisting of:

      1. ONE component cooling water pump
      2. ONE component cooling water heat exchanger
      3. An OPERABLE flow path consisting of all valves and piping associated with the above train of components and required to function during accident conditions.

2. During power operation or recovery from an inadvertent trip, ONE component cooling water train may be inoperable for a period of 72 hours. If OPERABILITY is not restored within 72 hours, then within 1 hour action shall be initiated to:

   - Achieve HOT STANDBY within the next 6 hours.
   - Achieve HOT SHUTDOWN within the following 6 hours.
   - Achieve and maintain the Reactor Coolant System T_{avg} less than 350°F by use of alternate heat removal methods within an additional 36 hours.

e. Service Water System

1. The reactor shall not be made critical unless the following conditions are satisfied, except for LOW POWER PHYSICS TESTS and except as provided by TS 3.3.e.2.

   A. TWO service water trains are OPERABLE with each train consisting of:

      1. TWO service water pumps

      2. An OPERABLE flow path consisting of all valves and piping associated with the above train of components and required to function during accident conditions. This flow path shall be capable of taking a suction from the forebay and supplying water to the redundant safeguards headers.

   B. The Forebay Water Level Trip System is OPERABLE.

2. During power operation or recovery from an inadvertent trip, ONE service water train may be inoperable for a period of 72 hours. If OPERABILITY is not restored within 72 hours, then within 1 hour action shall be initiated to:

   - Achieve HOT STANDBY within the next 6 hours.
   - Achieve HOT SHUTDOWN within the following 6 hours.
   - Achieve and maintain Reactor Coolant System T_{avg} less than 350°F by use of alternate heat removal methods within an additional 36 hours.

When the inoperable component is part of the Residual Heat Removal (RHR), Component Cooling Water (CCW) or Service Water (SW) Systems, the average Reactor Coolant System temperature (T_{avg}) will be maintained below 350°F through an alternate heat removal method. The various alternate heat removal methods include the redundant RHR train and the steam generators.

Assuming the reactor has been OPERATING at full-rated power for at least 100 days, the magnitude of the decay heat decreases as follows after initiating HOT SHUTDOWN.

Time After Shutdown	Decay Heat, % of Rated Power
1 minute	4.5
30 minutes	2.0
1 hour	1.62
8 hours	0.96
48 hours	0.62

Thus the requirement for core cooling in case of a postulated loss-of-coolant accident while in the HOT SHUTDOWN condition is significantly reduced below the requirements for a postulated loss-of-coolant accident during power operation. Putting the reactor in the HOT SHUTDOWN condition significantly reduces the potential consequences of a loss-of-coolant accident, and also allows more free access to some of the engineered safety features in order to effect repairs. Failure to complete repairs after placing the reactor in the HOT SHUTDOWN condition may be indicative of need for major maintenance, and in such cases the reactor should therefore be placed in the COLD SHUTDOWN condition.

The containment cooling function is provided by two systems: containment fancoil units and containment spray systems. The containment fancoil units and containment spray system protect containment integrity by limiting the temperature and pressure that could be experienced following a Design Basis Accident. The Limiting Design Basis accidents relative to containment integrity are the loss-of-coolant accident and steam line break. During normal operation, the fancoil units are required to remove heat lost from equipment and piping within the containment.[2] In the event of the Design Basis Accident, any one of the following combinations will provide sufficient cooling to limit containment pressure to less than design values: four fancoil units, two containment spray pumps, or two fancoil units plus one containment spray pump.[3]

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(2)USAR Section 6.3

(3)USAR Section 6.4

In addition to heat removal, the containment spray system is also effective in scrubbing fission products from the containment atmosphere. Therefore, a minimum of one train of containment spray is required to remain OPERABLE in order to scavenge iodine fission products from the containment atmosphere and ensure their retention in the containment sump water.[4][5]

Sodium Hydroxide (NaOH) is added to the spray solution for pH adjustment by means of the spray additive system. The resulting alkaline pH of the spray enhances the ability of the spray to scavenge iodine fission products from the containment atmosphere. The NaOH added in the spray also ensures an alkaline pH for the solution recirculated in the containment sump.

The alkaline pH of the containment sump water inhibits the volatility of iodine and minimizes the occurrence of chloride and caustic stress corrosion on mechanical systems and components exposed to the sump fluid. Test data has shown that no significant stress corrosion cracking will occur provided the pH is adjusted within 2 days following the Design Basis Accident.[6][7]

A minimum of 300 gallons of not less than 30% by weight of NaOH solution is sufficient to adjust the pH of the spray solution adequately. The additive will still be considered available whether it is contained in the spray additive tank or the containment spray system piping and Refueling Water Storage Tank due to an inadvertent opening of the spray additive valves (CI-1001A and CI-1001B).

The spray additive system may be inoperable for up to 72 hours. The containment spray system would still be available and would remove some iodine from the containment atmosphere in the event of a Design Basis Accident. The 72-hour completion time takes into account the containment spray system capabilities and the low probability of the worst case Design Basis Accident occurring during this period.

One component cooling water pump together with one component cooling heat exchanger can accommodate the heat removal load either following a loss-of-coolant accident, or during normal plant shutdown. If, during the post-accident phase, the component cooling water supply were lost, core and containment cooling could be maintained until repairs were effected.[8]

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[4] USAR Section 6.4.3

[5] USAR Section 14.3.5

[6] USAR Section 6.4

[7] Westinghouse Chemistry Manual SIP 5-1, Rev. 2, dated 3/77, Section 4.

[8] USAR Section 9.3

A total of four service water pumps are installed, and a minimum of two are required to operate during the postulated loss-of-coolant accident.[9] The service water valves in the redundant safeguards headers have to be OPERABLE in order for the components that they supply to be considered OPERABLE.

The various trains of equipment referred to in the specifications are separated by their power supplies (i.e.: SI Pump 1A, RHR Pump 1A and Valve SI-4A, etc.). Shared piping and valves are considered to be common to both trains of the systems.

[9]USAR Section 9.6

TABLE TS 3.5-3

EMERGENCY COOLING

		1	2	3	4	5	6
NO.	FUNCTIONAL UNIT	NO. OF CHANNELS	NO. OF CHANNELS TO TRIP	MINIMUM OPERABLE CHANNELS	MINIMUM DEGREE OF REDUNDANCY	PERMISSIBLE BYPASS CONDITIONS	OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET
1	Safety Injection						
	a. Manual	2	1	1	-		HOT SHUTDOWN(1)
	b. High Containment Pressure	3	2	2	-		HOT SHUTDOWN(1)
	c. Low Steam Pressure/Line	3	2	2	-	Primary pressure < 2000 psig	HOT SHUTDOWN(1)
	d. Pressurizer Low Pressure	3	2	2	-	Primary pressure < 2000 psig	HOT SHUTDOWN(1)
2	Deleted						
3	Containment Spray						
	a. Manual	2	2	2	(2)		HOT SHUTDOWN(3)
	b. Hi-Hi Containment Pressure (Containment Spray)	3 sets of 2	1 of 2 in each set	1 per set	1/set		HOT SHUTDOWN(3)

(1) If minimum conditions are not met within 24 hours, steps shall be taken to place the plant in COLD SHUTDOWN condition.

(2) Must actuate 2 switches.

(3) If minimum conditions are not met within 24 hours, steps shall be taken to place the plant in COLD SHUTDOWN condition.

TABLE TS 3.5-3

EMERGENCY COOLING

		1	2	3	4	5	6
NO.	FUNCTIONAL UNIT	NO. OF CHANNELS	NO. OF CHANNELS TO TRIP	MINIMUM OPERABLE CHANNELS	MINIMUM DEGREE OF REDUNDANCY	PERMISSIBLE BYPASS CONDITIONS	OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET
4	Motor-Driven Auxiliary Feedwater Pumps						
	a. Either Steam Generator Lo-Lo Level	3/loop	2/loop	2/loop	-		Maintain HOT SHUTDOWN
	b. Loss of Main Feed Water[4]	1	1	1			Maintain HOT SHUTDOWN
	c. Safety Injection	(Refer to Item 1 of this table)					
	d. 4 KV Buses 1-5 and 1-6 under voltage	2/bus[5]	1/bus	1/bus[6]			Maintain HOT SHUTDOWN or operate diesel generators
5	Turbine-Driven Auxiliary Feedwater Pumps						
	a. Both Steam Generator Lo-Lo Level	3/loop	2/loop	2/loop	-		Maintain HOT SHUTDOWN
	b. 4 KV Buses 1-1 and 1-2 under voltage	(Refer to Item 13 of Table TS 3.5-2)					

(4)Tripping of both main feedwater pump breakers starts both motor-driven auxiliary feedwater pumps.

(5)Each channel consists of one instantaneous and one time-delay relay connected in series.

(6)When one component of a channel is taken out of service, that component shall be in the tripped condition.

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TABLE TS 4.1-1

MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TEST OF INSTRUMENT CHANNELS

CHANNEL DESCRIPTION	CHECK	CALIBRATE	TEST	REMARKS
11. a. Steam Generator Low Level	Each shift	Each refueling cycle not to exceed 18 months(a)	Monthly	(a) Only if test indicates calibration required
b. Steam Generator High Level	Each shift	Each refueling cycle not to exceed 18 months(a)	Monthly	(a) Only if test indicates calibration required
12. Steam Generator Flow Mismatch	Each shift	Each refueling cycle not to exceed 18 months(a)	Monthly	(a) Only if test indicates calibration required
13. Deleted				
14. Residual Heat Removal Pump Flow	Each shift (when in operation)	Each refueling cycle not to exceed 18 months	Not applicable	
15. Deleted				
16. Refueling Water Storage Tank Level	Weekly	Annually	Not applicable	
17. Deleted				

* Reference TS 4.1.d

TABLE TS 4.1-1

MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TEST OF INSTRUMENT CHANNELS

CHANNEL DESCRIPTION	CHECK	CALIBRATE	TEST	REMARKS
18. a. Containment Pressure (SIS signal)	Each shift	Each refueling cycle not to exceed 18 months(b)	Monthly(a)	(a) Isolation Valve Signal (b) Only if test indicates calibration required
b. Containment Pressure (Steamline Isolation)	Each shift(a)	Each refueling cycle not to exceed 18 months(a)(b)	Monthly(a)	(a) Narrow range containment pressure (-3.0, +3.0 psig excluded) (b) Only if test indicates calibration required
c. Containment Pressure (Containment Spray Act)	Each shift	Each refueling cycle not to exceed 18 months(a)	Monthly	(a) Only if test indicates calibration required
d. Annulus Pressure (Vacuum Breaker)	Not applicable	Each refueling cycle not to exceed 18 months(a)	Each refueling cycle not to exceed 18 months	(a) Only if test indicates calibration required
19. Radiation Monitoring System	Daily*	Each refueling cycle not to exceed 18 months	Monthly	Includes only channels R11 thru R15, R19, R21, and R23
20. Deleted				
21. Containment Sump Level	Not applicable	Not applicable	Each refueling cycle not to exceed 18 months	

* Reference TS 4.1.d

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TABLE TS 4.1-2

MINIMUM FREQUENCIES FOR SAMPLING TESTS

SAMPLING TESTS	TEST	FREQUENCY	MAXIMUM TIME BETWEEN TESTS (DAYS)
3. Refueling Water Storage Tank Water Sample[4]	Boron Concentration	Monthly[5]	37
4. Deleted			
5. Accumulator	Boron Concentration	Monthly	37
6. Spent Fuel Pool	Boron Concentration	Monthly[6]	37
7. Secondary Coolant	a. Gross Beta or Gamma Activity	Weekly	8
	b. Iodine Concentration	Weekly when gross beta or gamma activity ≥ 1.0 μCi/cc	8

[4] A refueling water storage tank (RWST) boron concentration sample does not have to be taken when the RWST is empty during REFUELING outages.

[5] And after adjusting tank contents.

[6] Sample will be taken monthly when fuel is in the pool.

3. Containment Fancoil Units

Each fancoil unit shall be tested once every operating cycle or once every 18 months, whichever occurs first, to verify proper operation of the motor-operated service water outlet valves and the fancoil emergency discharge and associated backdraft dampers.

b. Component Tests

1. Pumps

A. The safety injection pumps, residual heat removal pumps, and containment spray pumps shall be started and operated quarterly during power operation and within 1 week after the plant is returned to power operation, if the test was not performed during plant shutdown.

B. Acceptable levels of performance are demonstrated by the pumps' ability to start and develop head within an acceptable range.

2. Valves

A. The Refueling Water Storage Tank and containment sump outlet valves shall be tested during the pump tests.

B. The accumulator check valves shall be checked for OPERABILITY during each major REFUELING outage. The accumulator block valves shall be checked to assure "valve open" requirements during each major REFUELING outage.

C. Deleted

D. Spray additive tank valves shall be tested during each major REFUELING outage.

E. Deleted

F. Residual Heat Removal System valve interlocks shall be tested once per operating cycle (not to exceed 18 months).

BASIS

System Tests (TS 4.5.a)

The Safety Injection System and the Containment Vessel Internal Spray System are principal plant safety systems that are normally in standby during reactor operation. Complete systems tests cannot be performed when the reactor is OPERATING because a safety injection signal causes containment isolation, and a Containment Vessel Internal Spray System test requires the system to be temporarily disabled. The method of assuring OPERABILITY of these systems is therefore to combine system tests to be performed during periodic shutdowns with more frequent component tests, which can be performed during reactor operation.

The systems tests demonstrate proper automatic operation of the Safety Injection and Containment Vessel Internal Spray Systems. A test signal is applied to initiate automatic action, resulting in verification that the components received the safety injection signal in the proper sequence. The test demonstrates the operation of the valves, pump circuit breakers, and automatic circuitry.[1]

The Internal Containment Spray (ICS) System is designed to provide containment cooling in the event of a loss-of-coolant accident or steam line break, thereby ensuring the containment pressure does not exceed its design value of 46 psig at 268°F (100% R.H.).[2] To ensure adequate cooling is available, calculations were performed to determine the ICS flow rate necessary to provide post-accident cooling. These calculations showed that a flow rate of 1300 gpm provides the required cooling capabilities for one train. With the KNPP system design, 76 properly functioning spray nozzles per train will adequately provide the required flow rate of 1300 gpm per train.

Component Tests - Containment Fancoil Units (TS 4.5.a.3)

Testing of the containment fancoil unit emergency discharge and backdraft dampers is performed to assure the integrity of the duct work post-LOCA.

Component Tests - Pumps (TS 4.5.b.1)

During reactor operation, the instrumentation which is depended upon to initiate safety injection and containment spray is checked daily and the initiating logic circuits are tested monthly (in accordance with TS 4.1). In addition, the active components (pumps and valves) are to be tested quarterly to check the operation of the starting circuits and to verify that the pumps are in satisfactory running order. The quarterly test interval is based on the judgment that more frequent testing would not significantly increase the reliability (i.e., the probability that the component would operate when required), yet more frequent testing would result in increased wear over a long period of time.

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[1]USAR Section 6.2

[2]USAR Section 6.4

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO AMENDMENT NO.116 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 December 2, 1994, Wisconsin Public Service Corporation (WPSC), the licensee, requested a revision to the Kewaunee Nuclear Power Plant (KNPP) Technical Specifications (TS). The proposed amendment would revise KNPP TS 3.2 by eliminating the requirements for the charging pumps, high concentration boric acid in the boric acid storage tanks (BASTs), the boric acid transfer pumps, and boric acid heat tracing. Changes to TS 3.3 and Table TS 3.5.3 are also being proposed to add requirements associated with the emergency core cooling system (ECCS) accumulators, remove the requirements associated with the boric acid storage tanks, and to increase the minimum required boron concentration in the refueling water storage tank (RWST). Additionally, the surveillance requirements involving the charging pumps, BASTs, associated valves and heat tracing located in Table TS 4.1-1, Table TS 4.1-2 and Section 4.5 would be eliminated.

2.0 BACKGROUND

The KNPP concentrated boric acid system consists of two boric acid storage tanks (BASTs) each with a capacity of 4000 gallons, and two boric acid transfer pumps along with their associated piping, valves, and heat tracing circuitry. One BAST is normally aligned to the suction of the safety injection (SI) pumps. Concentrated boric acid may be injected using the SI pumps or with any one of three charging pumps through either the emergency, manual, or boric acid blender flow paths. One RWST filled with at least 272,500 gallons of borated water is also available as a source of boric acid.

KNPP TS 3.2 currently requires 2000 gallons of high concentration boric acid (19,700 to 23,000 ppm) contained in the BASTs to be available for initial safety injection into the reactor coolant system. After injection of the high concentration boric acid, the SI pump suction is automatically shifted to the RWST.

WPSC has performed an analysis which concludes that a 2400 ppm boron concentration in the RWST, without reliance on the inventory contained in the BASTs, provides sufficient margin for the SI system to fulfill all safety-related functions. The licensee, therefore, is proposing that the RWST boron concentration be raised from the current 1950 ppm to 2400 ppm. This will allow the SI pumps to take their suction directly from the RWST throughout the injection phase and thus eliminate the reliance on the BASTs for high concentration boric acid.

3.0 EVALUATION

The licensee has proposed changes to the KNPP TS which will: 1) change the initial SI pump suction from the BASTs to the RWST; 2) remove the charging pumps from the TS; and, 3) modify the Limiting Conditions for Operation (LCOs) for the accumulators and the RWST.

3.1 Changing initial SI pump suction from BASTs to the RWST

In order to support changing the initial SI pump suction from the BASTs to the RWST, WPSC evaluated the effect of eliminating the high concentration BASTs on the Updated Safety Analysis Report (USAR) Chapter 14 accident analyses. The licensee's evaluation determined that the limiting accidents that would need to be re-analyzed included the Loss-of-Coolant Accident (LOCA) and the Steam Line Break (SLB) event.

3.1.1 LOCA Analysis

The licensee determined that changing the initial SI pump suction to the RWST will not adversely affect the Large or Small-Break LOCA analyses because the evaluation models used in analyzing these accidents did not take credit for the high concentration boric acid stored in the BASTs. However, the evaluation for verification of long term post-LOCA reactor core subcriticality did take credit for the BAST boron concentration. Therefore, WPSC performed an analysis of post-LOCA core subcriticality, which concluded that the inventory contained in the BASTs would not be required provided the minimum RWST boron concentration was increased to 2400 ppm. The elimination of the BAST inventory for safety injection will allow the SI pumps to take their suction directly from the RWST throughout the injection phase. The SI pumps currently take their initial suction from the BASTs through suction valve SI-3, which is maintained in the open position with its power removed. In the proposed configuration (i.e., eliminating the BASTs) the SI pumps will take their initial suction from the RWST through valve SI-4A or SI-4B, one of which will be maintained in the open position with its power removed. The specified volume (272,500 gallons of 2400 ppm borated water) in the RWST is adequate to provide sufficient negative reactivity to bring the reactor to the post-LOCA core subcriticality condition. Furthermore, the loss of the BAST water volume (less than 1% of the total available sump water) has a negligible effect on the post LOCA cooling capability of the SI system in the recirculation mode.

3.1.2 SLB Analysis

In re-analyzing the SLB event the licensee considered both the core response and the containment response. The licensee's analysis concluded that a minimum RWST boron concentration of 1950 ppm is sufficient to provide core protection for the SLB event. The 2400 ppm RWST boron solution proposed by this change will be maintained to address the post-LOCA event and will provide further safety margin for SLB. The licensee's SLB analysis addressed the Departure from Nucleate Boiling Ratio (DNBR) issue, and concluded that a minimum DNBR of 1.45 can be maintained throughout the event. This analysis also evaluated the containment response and concluded that the containment pressure and temperature responses were within the acceptable containment design limits. Since the minimum DNBR of 1.45 can be maintained throughout the event, and the containment pressure and temperature remain within the acceptable containment design limits, there is not a significant reduction in the margin of safety for this event.

3.1.3 Additional Analyses

The licensee performed an additional evaluation to determine the impact of using 2400 ppm RWST water rather than 20,000 ppm BAST water on emergency boration using the charging pumps. A reduction in the boron concentration reduces the rate at which negative reactivity can be added to the primary system. Emergency boration flow is designed to be sufficient to compensate for the maximum burnout rate of xenon. The licensee's calculations showed that both the normal and emergency boration flow paths (using a charging pump with 2400 ppm RWST water) are capable of meeting this requirement. Since the emergency boration design basis can be met without the need of the BAST, the boric acid transfer pumps are no longer required to be in the TS. Furthermore, eliminating the high concentration boric acid as a safety related requirement removes the need to require a TS for heat tracing.

The USAR Section 9.2.1 states that boric acid can be injected at a rate which decreases the core reactivity about 4 percent in less than 20 minutes. The 20-minute value is not a design basis requirement, but rather a statement of system capability. The requirement is not on boration time, but on the rate of negative reactivity insertion. The rate of negative reactivity insertion must be greater than the rate at which reactivity is added as a result of xenon decay. This requirement is satisfied with a RWST boron concentration of 2400 ppm and a charging pump flow rate of 60 gpm.

Other issues that the licensee identified that needed to be addressed in the proposal to increase the RWST boron concentration were heat tracing and post-LOCA containment sump pH. The minimum temperature to prevent boron precipitation for 2400 ppm boron was evaluated and determined to be 35 °F. Since the RWST temperature and the ambient auxiliary building temperature are always significantly above 40 °F, TS requirements for heat tracing the RWST and SI piping are not necessary. A 5 °F temperature has been added to the 35 °F requirement for margin and conservatism.

As for post-LOCA containment sump pH, the licensee's evaluation determined that although the pH would change due to the increase in RWST boron concentration and the elimination of the concentrated boric acid from the BASTs, the pH would be maintained above 7.0 in accordance with the KNPP USAR design criteria.

Based on the above discussion, the staff has determined that the licensee has adequately demonstrated that the BASTs can be eliminated as a safety-related source for SI coolant and replaced by the RWST with an increased boron concentration of 2400 ppm.

3.1.4 Associated TS Changes

The licensee proposed revising the following KNPP TS to incorporate the changes discussed above:

1) Changes to TS 3.2, "Chemical and Volume Control System," are proposed to eliminate the requirements for the high concentration boric acid, the boric acid storage tanks, the boric acid transfer pumps, and boric acid heat tracing.

2) Renumbering TS 3.3.b.1.A regarding the RWST to TS 3.3.b.3 and raising the minimum RWST boron concentration from 1950 ppm to 2400 ppm.

3) Changes to the required valve configuration for safety injection in TS 3.3.b.1.C (new TS 3.3.b.1.b). Since the SI pumps' suction will initially be aligned to the RWST, it is proposed to add valves SI-4A or SI-4B to the TS and remove valve SI-3 from the TS.

4) Removal of the reference to the BASTs in TS 3.3.b.1.B.4 and remove TS 3.3.b.1.D regarding isolation of the BASTs during surveillance testing.

5) A change to Table TS 3.5-3, "Emergency Cooling," is proposed to eliminate item 2, "Selected Boric Acid Storage Tank Level."

6) Changes to Table TS 4.1-1, "Minimum Frequencies for Check, Calibrations and Test of Instrument Channels," are proposed to eliminate item 15, "Boric Acid Tank Level," and item 20, "Boric Acid Make-Up Flow Channel."

7) A change to Table TS 4.1-2, "Minimum Frequencies for Sampling Tests," is proposed to eliminate item 4, "Boric Acid Tanks."

8) Deletion of TS 4.5.b.2.C, the requirement to test the boric acid tank isolation valves to the SI pump.

9) Deletion of TS 4.5.b.2.E, the requirement to test the closing function of the boric acid tank isolation valves concurrent with the opening of the RWST valves.

10) Revision of the Basis sections for TS 3.2, TS 3.3, and TS 4.5 to reflect the changes outlined above.

The staff has reviewed these proposed TS changes and since they accurately incorporate changing the initial SI pump suction from the BASTs to the RWST as discussed above, the staff finds them acceptable.

3.2 <u>Removing Charging Pumps from the TS</u>

The licensee's proposal would also delete the TS requirements associated with the charging pumps. The licensee reviewed the current LCOs for the charging pumps against the NRC's policy statement on TS and concluded that the LCOs did not meet any of the NRC criteria for inclusion in the TS. The licensee intends to maintain the charging system through its operating and maintenance procedures.

The licensee does not take credit for the charging pumps at KNPP as part of the ECCS and the charging pumps are not relied upon to mitigate any of the design basis accidents analyzed in the USAR. The licensee's proposal would delete the requirements for the charging pumps from TS 3.2, "Chemical and Volume Control System," and delete Table TS 4.1-1 item 13, "charging flow," and item 17, "volume control tank level."

Based on the above, and since these TS changes are consistent with the requirements of NUREG-1431, "Westinghouse Standard Technical Specifications," the staff finds them acceptable.

3.3 <u>Modified LCOs for Accumulators and RWST</u>

The licensee proposes modifying the LCOs for both the accumulators and the RWST by separating the current specification for inoperability into two specifications. One specification addresses inoperability due to boron concentration and the other specification addresses inoperability for other reasons.

3.3.1 <u>Accumulators</u>

Currently, TS 3.3.a.2 allows one accumulator to be inoperable for a period of 1-hour. The licensee proposes separating this specification into two specifications as follows:

> TS 3.3.a.2.A would allow one accumulator to have a boron concentration less than 1900 ppm for 72 hours.
>
> TS 3.3.a.2.B would allow one accumulator to be inoperable for a reason other than boron concentration (TS 3.3.a.2.A) for 1-hour.

If the boron concentration of one accumulator is outside the limits, the concentration must be returned to within the limits within 72 hours. The 72-hour LCO action statement is reasonable, since one accumulator below the minimum boron concentration limit will have no effect on the amount of ECCS water available, and an insignificant effect on core subcriticality during reflood.

If one accumulator is inoperable for other reasons, it must be restored to operable status within 1-hour. In this condition, the minimum requirement (contents of one accumulator) cannot be assumed to reach the core during a

LOCA. Due to the severity of the consequences, should a LOCA occur during these conditions, the 1-hour completion time to open the valve, remove power to the valve, or restore proper water volume or nitrogen cover pressure ensures that prompt action will be taken to return the inoperable accumulator to operable status. The 1-hour completion time minimizes the potential for exposure of the plant to a LOCA under these conditions.

Based on the above discussion, and since the proposed TS changes are consistent with the requirements of NUREG-1431, the staff finds them acceptable.

3.3.2 RWST

The licensee's proposal adds a new specification TS 3.3.b.4 which addresses RWST inoperability as follows:

> TS 3.3.b.4.A allows the RWST boron concentration to be less than 2400 ppm for 8 hours.
>
> TS 3.3.b.4.B allows the RWST to be inoperable for a reason other than boron concentration (TS 3.3.b.4.A) for 1-hour.

If the RWST boron concentration is outside the limits, it must be returned to within the limits within 8 hours. The 8-hour LCO action statement concerning RWST boron concentration is a reasonable amount of time for operators to complete actions to restore boron concentration to within limits considering the potential consequences of this situation. Under these conditions, neither the ECCS nor the containment spray system can perform its design function. Therefore, prompt action must be taken to restore the tank to an operable condition. The 8-hour limit to restore the RWST boron concentration to within the limits was developed taking into consideration: 1) the time required to change the boron concentration; 2) the fact that the contents of the tank are still available for injection; and, 3) the low probability of an accident requiring the use of 2400 ppm boron. If boron concentration cannot be returned to specification within 8 hours, then within 1-hour, action shall be initiated to achieve hot standby within the next 6 hours, achieve hot shutdown within the following 6 hours, and achieve cold shutdown within an additional 36 hours.

If the RWST is inoperable for other reasons, it must be restored to operable status within 1-hour. The 1-hour LCO action statement for an inoperable RWST due to reasons other than boron concentration is a reasonable amount of time for operators to complete the required actions considering the potential consequences of the situation. Again, in this condition, neither the ECCS nor the containment spray system can perform its design function. Therefore, prompt action must be taken to restore the tank to an operable status or to place the plant in a mode in which the RWST is not required. The short time of 1-hour to restore the RWST operable status is based on this condition, simultaneously affecting redundant trains. If the RWST cannot be returned to an operable status within 1-hour, then within 1-hour, action shall be initiated to achieve hot standby within the next 6 hours, achieve hot shutdown within the following 6 hours, and achieve cold shutdown within an additional 36 hours.

Based on the above discussion, and since the proposed TS changes are consistent with the requirements of NUREG-1431, "Westinghouse Standard Technical Specifications," the staff finds them acceptable.

4.0 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.

5.0 ENVIRONMENTAL CONSIDERATION

This amendment changes 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 and changes surveillance requirements. 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 (60 FR 508). 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.

6.0 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.

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