June 23, 1976

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Docket No. 50-324

Carolina Power & Light Company
ATTN: Mr. J. A. Jones
Executive Vice President
336 Fayetteville Street
Raleigh, North Carolina 27602

Gentlemen:

The Commission has issued the enclosed Amendment No. 18 to Facility Operating License No. DPR-62 for the Brunswick Steam Electric Plant Unit No. 2. The amendment consists of changes to the Technical Specifications and is in response to your request dated June 3, 1976, as supplemented June 7, 1976.

This amendment revises the trip setting for the turbine control valve fast closure scram to not less than 500 psig control oil pressure.

Copies of the related Safety Evaluation and the Federal Register Notice are also enclosed.

Sincerely,

Original signed by

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 18 to DPR-62
2. Safety Evaluation
3. Federal Register Notice

cc: See next page

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SURNAME	CTrammell:tb	Mitchell	ASchwencer			
DATE	6/10/76	6/21/76	6/23/76			

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

CAROLINA POWER AND LIGHT COMPANY

DOCKET NO. 50-324

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 18
License No. DPR-62

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

   A. The application for amendment by Carolina Power & Light Company (the licensee) dated June 3, 1976, as supplemented June 7, 1976, 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 a change to the Technical Specifications as indicated in the attachment to this amendment.

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

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the
Technical Specifications

Date of Issuance: June 23, 1976

ATTACHMENT TO LICENSE AMENDMENT NO. 18

FACILITY OPERATING LICENSE NO. DPR-62

DOCKET NO. 50-324

Revise Appendix A as follows:

Remove the following pages and replace with identically numbered revised pages:

1.1-3 and 1.1-4
3.1-5 and 3.1-6

SAFETY LIMIT	LIMITING SAFETY SYSTEM SETTING
1.1 Fuel Cladding Integrity (Cont'd)	2.1 Fuel Cladding Integrity (Cont'd)
C. Whenever the reactor is in the cold shutdown condition with irradiated fuel in the reactor vessel, the water level shall not be less than 18 inches above the top of the normal active fuel zone.	C. Reactor low water level #1 scram setting shall be ≥ 12.5" on level instruments. D. Turbine stop valve closure scram setting shall be ≤ 10 percent valve closure except that this is bypassed when power ≤ 30 percent. E. Turbine control valve 1. Fast closure - Results from low hydraulic oil pressure. 2. Loss of control oil pressure - setting shall be ≥ 500 psig. 3. For Brunswick Unit No. 2 - fast closure will initiate select rod insert and a reactor protection system trip. F. Main steam isolation scram setting shall be ≤ 10 percent valve closure. G. Main steam isolation on main steam line low pressure at inlet to turbine valves. Pressure setting shall be ≥ 850 psig. H. Reactor low water level #3 initiation of LPCI, core spray and auto blowdown shall be set at or above -147.5 inches indicated level. I. Reactor low water level #2 initiation of HPCI and RCIC shall be set at or above -38 inches indicated level.

BASES:

1.1 FUEL CLADDING INTEGRITY SAFETY LIMIT

The fuel cladding integrity limit is set such that no calculated fuel damage would occur as a result of an abnormal operational transient. Because fuel damage is not directly observable, a step-back approach is used to establish a safety limit such that the minimum critical power ratio (MCPR) is no less than 1.05. MCPR > 1.05 represents a conservative margin relative to the conditions required to maintain fuel cladding integrity.

The fuel cladding represents one of the physical barriers which separate radioactive materials from environs. The integrity of this cladding barrier is related to its relative freedom from perforations or cracking. Although some corrosion or use-related cracking may occur during the life of the cladding, fission product migration from this source is incrementally cumulative and continuously measurable. Fuel cladding perforations, however, can result from thermal stresses which occur from reactor operation significantly above design conditions and the protection system safety settings. While fission product migration from cladding perforation is just as measurable as that from use-related cracking, the thermally-caused cladding perforations signal a threshold, beyond which still greater thermal stresses may cause gross rather than incremental cladding deterioration. Therefore, the fuel cladding safety limit is defined with margin to the conditions which would produce onset of transition boiling (MCPR of 1.0). These conditions represent a significant departure from the condition intended by design for planned operation.

Onset of transition boiling results in a decrease in heat transfer from the clad and, therefore, elevated clad temperature and the possibility of clad failure. However, the existence of critical power, or boiling transition, is not a directly observable parameter in an operating reactor. Therefore, the margin to boiling transition is calculated from plant operating parameters such as core power, core flow, feedwater temperature, and core power distribution. The margin for each fuel assembly is characterized by the critical power ratio (CPR) which is the ratio of the bundle power which would produce onset of transition boiling divided by the actual bundle power. The minimum value of this ratio for any bundle in

NOTES (Cont'd)

(3) When the requirements in the column "Minimum Number of Operating Instrument Channels Per Trip System" cannot be met, the appropriate actions listed below shall be taken:

A. Initiate insertion of operable rods and complete insertion of all operable rods within eight hours.

B. Reduce power level to IRM range and place mode switch in the STARTUP position within eight hours.

C. Reduce turbine load and close main steam line isolation valves within eight hours.

D. Reduce reactor power to less than 30% of rated within eight hours.

(4) "W" is the reactor driving loop flow in percent of rated (see Specification 2.1.A.1).

(5) To be considered operable, an APRM must have at least 2 LPRM inputs per level and at least a total of 11 LPRM inputs.

(6) Twelve and one half inches on the water level instrumentation is 177 inches above the top of the active fuel.

(7) A main steam isolation valve closure bypass is permitted when the reactor mode switch is in either the SHUTDOWN, REFUEL, or STARTUP position.

(8) For Unit 2, low control oil pressure initiates select rod insert, and has the provision to delay reactor protection system trip until determination of turbine bypass valve status. The time delay for bypass valve status determination shall be set at 0.00 sec. In both units, this scram is bypassed if the first stage turbine pressure is less than 30 percent of normal rated power.

(9) A turbine stop valve closure bypass is permitted when the first stage turbine pressure is less than 30 percent of normal rated power.

(10) Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.

(11) Not required to be operable when the primary containment integrity is not required.

(12) IRM's are bypassed when APRM's are on scale and the reactor mode switch is in the RUN position.

(13) The APRM downscale trip is automatically bypassed when the IRM instrumentation is operable and $\leq$ 120/125 of full scale. The APRM downscale trip function is only active when the reactor mode switch is in RUN.

(14) The APRM high flux signal is fed through a time constant circuit of approximately 6 seconds. The APRM fixed scram does not incorporate the time constant, but responds directly to instantaneous neutron flux.

TABLE 3.1-1 (Cont'd)

Trip Function	Trip Settings	Modes in Which Functions Must be Operable: Refuel (1)	Startup	Run	Min. No. Operable Instrument Channels Per Trip System (2)	Required Conditions When Minimum Conditions For Operations are not Satisfied (3)
First stage turbine pressure permissive CAD PS-N008A,B,C,D	(9)			X	2	D
12. Turbine Control valve fast closure EHC-PSL-1756 EHC-PSL-1757 EHC-PSL-1758 EHC-PSL-1759	≥ 500 psig (8) control oil pressure	X	X	X	2	D

NOTES:

(1) When the reactor is subcritical and the reactor water temperature is less than 212°F, only the following trip functions need to be operable:

A. Mode switch in SHUTDOWN

B. Manual scram

C. High flux IRM

D. Scram discharge volume high water level

It is possible during reactor operation to switch to the refuel mode and remain critical. The requirement to have all other scram functions operable in the refuel mode is therefore to assure that shifting to this mode during reactor operation does not diminish the protection afforded by the RPS.

(2) There shall be two operable, one operable and one tripped, or two tripped trip systems for each function. However, when necessary, one channel may be inoperable without tripping the instrument channel for two (2) hours to conduct required functional tests and calibrations provided that at least one other operable channel in the same trip system is monitoring that parameter.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 18 TO FACILITY OPERATING LICENSE NO. DPR-62

CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT UNIT NO. 2

Introduction

By letter dated June 3, 1976, as supplemented on June 7, 1976, Carolina Power & Light Company (the licensee) requested an amendment to Operating License No. DPR-62 for operation of the Brunswick Steam Electric Plant Unit No. 2, located in Brunswick County, North Carolina. The proposed amendment would revise the Technical Specification related to the setpoint for turbine control valve fast closure scram. At present, the reactor is required to scram if the turbine control oil pressure drops below 850 psig. The licensee has requested that this setpoint be changed such that a reactor scram will be required if the turbine control oil pressure drops below 500 psig.

Discussion

With the reactor at power, fast closure of the turbine control valves can result in a significant addition of positive reactivity to the core as the reactor coolant system pressure rises. The turbine control valve fast closure scram, which initiates a scram earlier than either the neutron monitoring system or reactor coolant system high pressure, is required to provide margin to core thermal-hydraulic limits for this category of abnormal operational transients. The scram counteracts the addition of positive reactivity due to pressure by inserting negative reactivity with the control rods. Although the reactor coolant system high pressure scram, in conjunction with the pressure relief system, is adequate to preclude overpressurizing the reactor coolant system boundary, the turbine control valve fast closure scram provides additional margin to the reactor coolant system pressure limit. The turbine control valve fast closure scram setting is selected to provide timely indication of control valve fast closure.

The scram is initiated by pressure switches which sense control oil pressure. The control system for the turbine causes the control oil pressure to drop to zero in the event of a generator load rejection by energizing a fast-acting solenoid which dumps control oil to drain. This, in turn, causes rapid closure of the turbine control valves to prevent turbine overspeed, and a scram occurs.

In addition, the pressure switches will also actuate to cause a scram in the event control oil pressure should drop for other reasons, since loss of control oil pressure causes all turbine valves to close.

During a recent maintenance outage of the unit, several modifications were made to plant systems. One of these modifications was the removal of a 200 millisecond (msec) time delay from the turbine control valve fast closure scram circuit. This time delay was an intregral part of the full-load rejection capability of the unit which has been eliminated.

Upon the return to power operation following the outage, during a routine turbine control valve exercise test, it was found that the control valve oil pressure transient resulting from the test caused a scram because control oil pressure momentarily dipped below 850 psig.

The licensee states that the original vendor recommendation for the control oil pressure switch setting was between 500 and 850 psig. The 850 psig setting was adopted when the original Technical Specifications were issued, but the problem associated with this choice was not apparent until now, because the 200 msec time delay had been sufficient to allow system pressure to be restored above 850 psig by the expiration of the time delay when conducting control valve exercise tests.

The licensee states that the turbine vendor has recently revised the recommended pressure setting to a range of 500 to 600 psig. The new setting range is designed to eliminate control oil pressure switch actuation during the normal hydraulic fluid pressure transients experienced during valve testing.

Evaluation

The safety analysis for the turbine control valve fast closure transient was performed assuming a 30 msec time delay between the start of control valve fast closure and pressure switch actuation. When the fast-acting solenoid is energized, control oil pressure drops from its normal level of 1600 psig to 0 psig in 0 msec, causing the pressure switches to actuate upon reaching 850 psig in .7 msec. With the setpoint changed to 500 psig or greater, this action would occur up to approximately 2.2 msec later, or within 6.9 msec. This new time delay of 6.9 msec is still well within the 30 msec time delay assumed in the safety analysis for control valve fast closure previously reviewed and shown to have acceptable results. This is

an anticipatory scram and results in reactor shutdown before any significant increase in reactor pressure or neutron flux occurs. Since this analysis was conducted assuming a 30 msec delay, these conclusions remain valid, and therefore we find the proposed setpoint change acceptable.

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR § 51.5(d)(4) that an environmental statement, negative declaration, or environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the change does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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.

Date: June 23, 1976

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-324

CAROLINA POWER AND LIGHT COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILILITY OPERATING LICENSE

Notice is hereby given that the U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 18 to Facility Operating License No. DPR-62 issued to the Carolina Power and Light Company, which revised Technical Specifications for operation of the Brunswick Steam Electric Plant, Unit No. 2, located in Brunswick County, North Carolina. The amendment is effective as of the date of issuance.

This amendment revises the trip setting for the turbine control valve fast closure scram to not less than 500 psig control oil pressure.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant

to 10 CFR § 51.5(d)(4) an environmental statement, negative declaration or environmental impact appraisal need not be prepared in connection with issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated June 3, 1976, as supplemented June 7, 1976, (2) Amendment No. 18 to License No. DPR-62, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, NW., Washington, D.C. 20555, and at the Southport-Brunswick County Library, 109 W. Moore Street, Southport, North Carolina 28461.

A single copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 23rd day of June 1976.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors