

April 26, 1978

Dockets Nos.: 50-269  
50-270 ✓  
and 50-287

Duke Power Company  
ATTN: Mr. William O. Parker, Jr.  
Vice President - Steam  
Production  
P. O. Box 2178  
422 South Church Street  
Charlotte, North Carolina 28242

Gentlemen:

The Commission has issued the enclosed Order for Modification of License which amends Facility Operating Licenses Nos. DPR-38, 47, and 55 for Oconee Nuclear Station Units Nos. 1, 2, and 3.

The Order specifies additional limits to the operating provisions of the license which require submission of a reevaluation of Emergency Core Cooling System cooling performance calculated in accordance with the Babcock & Wilcox evaluation model, and requires operation in accordance with procedures described in your letter dated April 21, 1978.

A copy of this Order is being filed with the Office of the Federal Register for publication.

Sincerely,

Robert W. Reid, Chief  
Operating Reactors Branch #4  
Division of Operating Reactors

Enclosure:  
Order for Modification  
of License

cc w/enclosure: See next page

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Duke Power Company

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Honorable James M. Phinney  
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Washington, D. C. 20460

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Atlanta, Georgia 30308

cc w/enclosures & incoming dtd:  
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116 West Jones Street  
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UNITED STATES OF AMERICA  
 NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
DUKE POWER COMPANY	)	Dockets Nos. 50-269
	)	50-270
Oconee Nuclear Station, Units Nos. 1, 2, and 3	)	and 50-287

ORDER FOR MODIFICATION OF LICENSE

I.

The Duke Power Company (the licensee), is the holder of Facility Operating Licenses Nos. DPR-38, 47, and 55 which authorize the operation of the nuclear power reactors known as Oconee Nuclear Station, Units Nos. 1, 2, and 3, (the facility) at steady reactor power levels not in excess of 2568 megawatts thermal (rated power) for each unit. The facility consists of Babcock & Wilcox Company designed pressurized water reactors (PWR) located at the licensee's site in Oconee County, South Carolina.

II.

In accordance with the requirements of the Commission's ECCS Acceptance Criteria, 10 CFR 50.46, the licensee submitted on July 9, 1975, an ECCS evaluation for the facility. The ECCS performance submitted by the licensee was based upon an ECCS Evaluation Model developed by the Babcock & Wilcox Company (B&W), the designer of the Nuclear Steam Supply System

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for this facility. The B&W ECCS Evaluation Model had been previously found to conform to the requirements of the Commission's ECCS Acceptance Criteria, 10 CFR Part 50.46 and Appendix K. The evaluation indicated that with the limits set forth in the facility's Technical Specifications, the ECCS cooling performance for the facility would conform with the criteria contained in 10 CFR 50.46(b) which govern calculated peak clad temperature, maximum cladding oxidation, maximum hydrogen generation, coolable geometry and long-term cooling.

On April 12, 1978, B&W informed the NRC that it had determined that in the event of a small break LOCA on the discharge side of a reactor coolant pump, high pressure injection (HPI) flow to the core could be reduced somewhat. Subsequent calculations indicated that in such a case the calculated peak clad temperature might exceed 2200F.

Previous small break analyses for B&W 177 fuel assembly (FA) lowered loop plants had identified the limiting small break to be in the suction line of the reactor coolant pump. Recent analyses have shown that the discharge line break is more limiting than the suction line break.

Each Oconee Nuclear Station unit has an ECCS configuration which consists of two high pressure injection (HPI) trains which are supplied by three HPI pumps. Each train injects into two of the four reactor coolant system (RCS) cold legs on the discharge side of the RCS pump.

The two parallel HPI trains are connected but are kept isolated by manual valves (known as the cross-over valves) that are normally closed.

Duke Power has proposed to maintain all three pumps in an operable status. The Qconee emergency power system is designed with sufficient capacity for this mode of operation. Upon receiving a safety injection signal the HPI pumps are started and valves in the injection lines are opened. Assuming loss of offsite power and the worst single failure (the HPI pump C or the HPI valve HP26), two HPI pumps would still be available and only one of the two injection valves would fail to open.

If a small break is postulated to occur in the RCS piping between the RCS pump discharge and the reactor vessel, the high pressure injection flow injected into this line (about 50% of the output of two high pressure pumps) could flow out the break. Therefore, for the worst combination of break location and single failure, 50% of the flow rate of two high pressure ECCS pumps would contribute to maintaining the coolant inventory in the reactor vessel. This situation had not been previously analyzed and B&W had indicated that the limits specified in 10 CFR 50.46 may be exceeded.

B&W has stated that they have analyzed a spectrum of small breaks in the pump discharge line and have determined that to meet the limits of 10 CFR 50.46, operator action is required to open the two manual operated

crossover valves and to manually align the motor driven isolation valve which had failed to open. This would allow the flow from the two HPI pumps to feed all four reactor coolant legs. B&W has assumed that 30% of the flow would be lost through the break and 70% would refill the core. The licensee has committed to provide for the necessary operator actions within the required time frame. That is, in the event of a small break and a limiting single failure, manual action will be taken to begin opening these valves within five minutes and have them fully opened and an adequate flow split obtained within the following 10 minutes. The analyses performed by B&W assumed that the flow split was established at 650 seconds by operator action. We conclude that the analyses are a reasonable approximation of the operator action that actually will be taken, provided specific procedures are prepared and followed to assure such action.

B&W has stated that a .15 ft.<sup>2</sup> discharge line break, with the aforementioned operator actions, is the most limiting case. To arrive at this conclusion, B&W has performed analyses at break sizes of .3, .2, .15, .1, and .04 ft.<sup>2</sup>, using an approved Appendix K model for blowdown. Additional analyses for the Oconee plants at 2568 Mwt indicate no core uncover for the 0.15 ft.<sup>2</sup> limiting break. For this break size B&W has conservatively estimated the peak clad temperature to be well below the limits of 10 CFR §50.46(b).

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B&W has indicated the manner in which the calculational methods have been revised and has indicated that their revised calculations are wholly in conformance with the requirements of 10 CFR 50.46. However, B&W has not yet had the opportunity to fully present the result of its calculations to the licensee for submittal to the NRC staff, and the staff has accordingly not had the opportunity to fully assess the new calculations.

Therefore, until the staff has had the opportunity to fully assess the B&W revised calculations, operation in accordance with the operating procedures specified in this Order, will assure that the ECCS will conform to the performance requirements of 10 CFR 50.46(b).

Accordingly, such procedures provide reasonable assurance that the public health and safety will not be endangered. Upon notification by the NRC staff, the licensee committed to provide the staff with B&W's reevaluation of ECCS performance applicable to the licensee's facility as promptly as possible, and to submit a technical specification requiring appropriate operating procedures to assure required operator action as discussed herein. Such procedures were described and the commitments confirmed by the licensee's letter of April 21, 1978.

The staff believes that the licensee's action, under the circumstances, is appropriate and that this action should be confirmed by NRC Order. Upon satisfactory completion of our assessment of the revised evaluation, we will accordingly modify the authorization to operate the facility.

## IV.

Copies of the following document are available for inspection at the Commission's Public Document Room at 1717 H Street, Washington, D.C. 20555, and are being placed in the Commission's local public document room at the Oconee County Library, 201 South Spring, Walhalla, South Carolina 29691.

- (1) Letter from Mr. William O. Parker, Jr. to Mr. Edson G. Case, Acting Director, Office of Nuclear Reactor Regulation, dated April 21, 1978.

Accordingly, pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's Rules and Regulations in 10 CFR Parts 2 and 50, IT IS ORDERED THAT Facility Operating Licenses Nos. DPR-38, 47, and 55 are hereby amended by adding the following new provisions:

- (1) As soon as possible, the licensee shall submit a reevaluation wholly in conformance with 10CFR50.46 of ECCS cooling performance calculated in accordance with the B&W Evaluation Model for operation with operating procedures described in its letter of April 21, 1978, and
- (2) Until further authorization by the Commission, the licensee shall operate in accordance with the procedures described in its letter of April 21, 1978.

FOR THE NUCLEAR REGULATORY COMMISSION



Victor Stello, Jr., Director  
Division of Operating Reactors  
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland,  
this 26th day of April 1978.