UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
FLORIDA POWER CORPORATION, ET AL	)	Docket No. 50-302
	)	
Crystal River Unit No. 3 Nuclear Generating Plant	)	

ORDER

I.

Florida Power Corporation (FPC or the licensee) and eleven other co-owners are the holders of Facility Operating License No. DPR-72 which authorizes the operation of the nuclear power reactor known as Crystal River Unit No. 3 Nuclear Generating Plant (the facility or Crystal River Unit 3), at steady state power levels not in excess of 2452 megawatts thermal (rated power). The facility is a Babcock & Wilcox (B&W) designed pressurized water reactor (PWR) located at the licensees' site in Citrus County, Florida.

II.

In the course of its evaluation to date of the accident at the Three Mile Island Unit No. 2 facility, which utilizes a B&W designed PWR, the Nuclear Regulatory Commission staff has ascertained that B&W designed reactors appear to be unusually sensitive to certain off-normal transient conditions originating in the secondary system. The features of the B&W design that contribute to this sensitivity are: (1) design of the steam generators to operate with relatively small liquid volumes in the secondary side; (2) the lack of direct initiation of reactor trip upon the

occurrence of off-normal conditions in the feedwater system; (3) reliance on an integrated control system (ICS) to automatically regulate feedwater flow; (4) actuation before reactor trip of a pilot-operated relief valve on the primary system pressurizer (which, if the valve sticks open, can aggravate the event); and (5) a low steam generator elevation (relative to the reactor vessel) which provides a smaller driving head for natural circulation.

Because of these features, B&W designed reactors place more reliance on the reliability and performance characteristics of the auxiliary feedwater system, the integrated control system, and the emergency core cooling system (ECCS) performance to recover from frequent anticipated transients, such as loss of offsite power and loss of normal feedwater, than do other PWR designs. This, in turn, places a large burden on the plant operators in the event of off-normal system behavior during such anticipated transients.

As a result of a preliminary review of the Three Mile Island Unit No. 2 accident chronology, the NRC staff initially identified several human errors that occurred during the accident and contributed significantly to its severity. All holders of operating licenses were subsequently instructed to take a number of immediate actions to avoid repetition of these errors, in accordance with bulletins issued by the Commission's Office of Inspection and Enforcement (IE). In addition, the NRC staff began an immediate reevaluation of the design features of B&W

reactors to determine whether additional safety corrections or improvements were necessary with respect to these reactors. This evaluation involved numerous meetings with B&W and certain of the affected licensees.

The evaluation identified design features as discussed above which indicated that B&W designed reactors are unusually sensitive to certain off-normal transient conditions originating in the secondary system. As a result, an additional bulletin was issued by IE which instructed holders of operating licenses for B&W designed reactors to take further actions, including immediate changes to decrease the reactor high pressure trip point and increase the pressurizer pilot-operated relief valve setting. Also, as a result of this evaluation, the NRC staff identified certain other safety concerns that warranted additional short-term design and procedural changes at operating facilities having B&W designed reactors. These were identified as items (a) through (e) on page 1-7 of the Office of Nuclear Reactor Regulation Status Report to the Commission of April 25, 1979.

After a series of discussions between the NRC staff and the licensee concerning possible design modifications and changes in operating procedures, the licensee agreed in a letter dated May 1, 1979, to perform promptly the following actions:

(a) Upgrade the timeliness and reliability of delivery from the Emergency Feedwater System by carrying out actions as identified in Enclosure 1 of the licensee's letter of May 1, 1979.

(b) Develop and implement operating procedures for initiating and controlling emergency feedwater independent of Integrated Control System control.

(c) Implement a hard-wired control-grade reactor trip that would be actuated on loss of main feedwater and/or turbine trip.

(d) Complete analyses for potential small breaks and develop and implement operating instructions to define operator action.

(e) All licensed reactor operators and senior reactor operators will have completed the Three Mile Island Unit No. 2 (TMI-2) simulator training at B&W.

In its letter the licensee also stated that the facility is shut down and would remain shut down until (a) through (e) above are completed.

In addition to these modifications to be implemented promptly, the licensee has also proposed to carry out certain additional long-term modifications to further enhance the capability and reliability of the reactor to respond to various transient events. These are:

- The licensee will make modifications to provide verification in the control room of emergency feedwater flow to each steam generator.

- The licensee will submit a failure mode and effects analysis of the Integrated Control System to the NRC staff as soon as practicable. The licensee stated that this analysis is now underway with high priority by B&W.

- The reactor trip following loss of main feedwater and/or trip of the turbine to be installed promptly pursuant to this Order will thereafter be upgraded so that the components are safety grade. The licensee will submit this design to the NRC staff for review.

- The licensee will continue reactor operator training and drilling of response procedures to assure a high state of preparedness.

The Commission has concluded that the prompt actions set forth as (a) through (e) above are necessary to provide added reliability to the reactor system to respond safely to feedwater transients and should be confirmed by a Commission order.

The Commission finds that operation of the facility should not be resumed until the actions described in paragraphs (a) though (e) above have been satisfactorily completed.

For the foregoing reasons, the Commission has found that the public health, safety and interest require that this Order be effective immediately.

III.

Copies of the following documents are available for inspection at the Commission's Public Document Room at 1717 H Street, N.W., Washington, D.C. 20555, and are being placed in the Commission's local public document room in the Crystal River Public Library, Crystal River, Florida, 32629:

(1) Office of Nuclear Reactor Regulation Status Report on Feedwater Transients in B&W Plants, April 25, 1979.

(2) Letter from B. L. Griffin (FPC) to Harold Denton (NRR) dated May 1, 1979.

IV.

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 HEREBY ORDERED THAT:

(1) The licensee shall take the following actions with respect to Crystal River Unit 3:

(a) Upgrade the timeliness and reliability of delivery from the Emergency Feedwater System by carrying out actions as identified in Enclosure 1 of the licensee's letter of May 1, 1979.

(b) Develop and implement operating procedures for initiating and controlling emergency feedwater independent of Integrated Control System control.

(c) Implement a hard-wired control-grade reactor trip that would be actuated on loss of main feedwater and/or turbine trip.

(d) Complete analyses for potential small breaks and develop and implement operating instructions to define operator action.

(e) All licensed reactor operators senior reactor operators will have completed the TMI-2 simulator training at B&W.

(2) The licensee shall maintain Crystal River Unit 3 in a shutdown condition (the facility was shut down on April 23, 1979) until items (a) through (e) in paragraph (1) above are satisfactorily completed. Satisfactory completion will require confirmation by the Director, Office of Nuclear Reactor Regulation, that the actions specified have been taken, the specified analyses are acceptable, and the specified implementing procedures are appropriate.

(3) The licensee shall as promptly as practicable also accomplish the long-term modifications set forth in Section II of this Order.

V.

Within twenty (20) days of the date of this Order, the licensees or any person whose interest may be affected by this Order may request a hearing with respect to this Order. Any such request shall not stay the immediate effectiveness of this Order.

FOR THE NUCLEAR REGULATORY COMMISSION

Samuel J. Chilk
Secretary of the Commission

Dated at Washington, D.C.
this 16th day of May 1979.

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NUCLEAR REGULATORY COMMISSION

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(Crystal River Unit No. 3)	)	

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document(s) upon each person designated on the official service list compiled by the Office of the Secretary of the Commission in this proceeding in accordance with the requirements of Section 2.712 of 10 CFR Part 2 - Rules of Practice, of the Nuclear Regulatory Commission's Rules and Regulations.

Dated at Washington, D.C. this
17th day of May 1979.

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Office of the Secretary of the Commission

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