



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

August 19, 1987

Docket

Docket No.: 50-270

Mr. H. B. Tucker, Vice President
Nuclear Production Department
Duke Power Company
422 South Church Street
Charlotte, North Carolina 28242

Dear Mr. Tucker:

Subject: CONFIRMATORY ORDER MODIFYING LICENSE EFFECTIVE IMMEDIATELY
(TAC 65831)

Reference: Oconee Nuclear Station, Unit 2

The Nuclear Regulatory Commission has issued the enclosed Order for Oconee Nuclear Station, Unit 2. This Order confirms the commitments of Duke Power Company (the licensee) as stated in your letters dated April 6 and 7 and July 24, 28, 29, 31, and August 13, 1987.

By letter dated April 10, 1987, the NRC issued a Confirmatory Order for Oconee Nuclear Station that established new interim maximum allowable power levels and corresponding changes to the reactor protection system (RPS) high-flux trip setpoint for Unit 2 while the low-pressure injection (LPI) coolers and the reactor building cooling unit (RBCU) coolers were in a degraded mode.

The RBCUs and LPI provide decay heat removal after the design-basis accident, which is the loss-of-coolant accident. Heat is transferred through the LPI and RBCU coolers to the lake. To ensure adequate heat removal, the Final Safety Analysis Report for Oconee states that a lake temperature of 75°F was used for certain equipment design and analysis. The lake water temperature is measured at the condenser cooling water (CCW) inlet. You have informed the NRC that lake water temperatures have exceeded 75°F in 9 of the past 11 years. Your studies of the effects of higher lake water temperatures indicate a need to reduce the maximum allowable power level below that specified by the April 10, 1987 Order. Accordingly, we have issued the attached Confirmatory Order imposing temporary additional restrictions on maximum allowable power level as a function of lake water temperature.

This Order establishes new interim maximum allowable power levels and corresponding changes to the RPS high-flux trip setpoint for Oconee Unit 2 while the lake is at elevated temperatures and the reactor building cooling unit coolers are in a degraded mode.

The Order will be in place until the end of Cycle 9, which is currently scheduled to end in January 1988. During the refueling outage at the end

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Mr. H. B. Tucker

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of Cycle 9, the Unit 2 LPI and RBCU coolers will be cleaned, tested, evaluated for full-power operation, and approved for full-power operation by the Region II Regional Administrator before they are returned to service. This evaluation will consider the impact elevated lake water temperature has on the equipment.

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

Sincerely,



Steven A. Varga, Director
Division of Reactor Projects I/II

Enclosure: Order

cc w/enclosure: See next page

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Mr. H. B. Tucker
Duke Power Company

Oconee Nuclear Station
Units Nos. 1, 2 and 3

cc:

Mr. A. V. Carr, Esq.
Duke Power Company
P. O. Box 33189
422 South Church Street
Charlotte, North Carolina 28242

Mr. Paul Guill
Duke Power Company
Post Office Box 33189
422 South Church Street
Charlotte, North Carolina 28242

J. Michael McGarry, III, Esq.
Bishop, Liberman, Cook, Purcell & Reynolds
1200 Seventeenth Street, N.W.
Washington, D.C. 20036

Mr. Robert B. Borsum
Babcock & Wilcox
Nuclear Power Generation Division
Suite 220, 7910 Woodmont Avenue
Bethesda, Maryland 20814

Manager, LIS
NUS Corporation
2536 Countryside Boulevard
Clearwater, Florida 33515

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Route 2, Box 610
Seneca, South Carolina 29678

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street, N.W., Suite 2900
Atlanta, Georgia 30323

Mr. Heyward G. Shealy, Chief
Bureau of Radiological Health
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Office of Intergovernmental Relations
116 West Jones Street
Raleigh, North Carolina 27603

Honorable James M. Phinney
County Supervisor of Oconee County
Walhalla, South Carolina 29621

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of
DUKE POWER COMPANY

(Oconee Nuclear Station, Unit 2)

Docket No. 50-270

CONFIRMATORY ORDER MODIFYING LICENSE
(EFFECTIVE IMMEDIATELY)

I.

Duke Power Company (DPC or the licensee) is the holder of Facility Operating License No. DPR-47, which authorizes the operation of Oconee Nuclear Station, Unit 2 (the facility) at a power level not to exceed 2568 megawatts thermal. The facility consists of a pressurized water reactor plant located at the licensee's site in Oconee County, South Carolina.

II.

For Oconee Unit 2, the reactor building cooling units (RBCUs) provide decay heat removal after the design-basis accident, which is the loss-of-coolant accident (LOCA). In a post-accident situation, all three coolers operate continuously circulating the steam-air mixture past the cooling tubes of the RBCU to transfer heat from the containment atmosphere to the low-pressure service water (LPSW) system. Also, the low-pressure injection (LPI) system (in the recirculation mode) cools the water from the reactor building sump. For long-term cooling, the LPI pumps recirculate injected water from the reactor building sump to the core. Heat is transferred through the LPI coolers to the LPSW system.

By telephone on April 3, 1987, and by letter dated April 6, 1987, the licensee informed the NRC staff that recent fouling in the LPSW system (take

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water) side of the RBCUs and LPI coolers had resulted in an inability to transfer the total LOCA heat loads. Consequently, the licensee had reduced power level in Unit 2 to a maximum of 81.7% to match LOCA heat transfer requirements with the capability of the degraded heat exchangers.

In its letter of April 6, 1987, the licensee committed (1) to establish new interim maximum allowable power levels, (2) to change the reactor protection system (RPS) high-flux trip setpoints for Unit 2, and (3) to specify that the third non-engineered safeguards LPI pump for Unit 2 must be operable.

On April 10, 1987, the NRC issued an immediately effective Order confirming the licensee's commitments and establishing new interim maximum allowable power levels and corresponding changes to the RPS high-flux trip setpoint for Unit 2 while the LPI system coolers and the RBCUs are in a degraded mode.

By letters dated July 24, 28, 29, 31, and August 13, 1987, the licensee informed the NRC of the effects for Unit 2 of elevated water temperatures of Lake Keowee. In the letter dated July 24, 1987, the licensee stated that the lake water temperature was increasing and was expected to exceed the design-basis water temperature (75°F) used in the accident analysis documented in the Final Safety Analysis Report (FSAR) for the plant. The licensee stated that the lake temperature has exceeded 75°F in 9 of the past 11 years. Oconee Unit 2 will have to reduce power when the lake water temperature reaches 80°F.

To determine the impact of higher lake water temperatures on station systems and components, the licensee evaluated the effects of temperatures of 80°F and 85°F. The results of the evaluation indicated that under elevated lake water temperature conditions, there is a need to reduce the maximum allowable power level below that specified by the Order of April 10, 1987.

The licensee has committed to reduce power level until all the Unit 2 heat exchangers have been fully cleaned and tested. That commitment is confirmed by this Order which will be in place until the unit shuts down for refueling at the end of Cycle 9, which is currently scheduled for January 1988.

In accordance with the April 10, 1987 Order, the LPI coolers were cleaned, tested, evaluated for full-power operation, and approved for full-power operation by the Region II Regional Administrator before they were returned to service following a brief shutdown before April 22, 1987. The RPS high flux trip setpoint has to be reduced to account for the higher lake water temperatures and the fouling of the RBCU coolers. The RPS high flux trip setpoint will be reduced to correspond to the appropriate maximum allowable power level to ensure that the power level will be maintained below the allowed maximum power level.

III.

In the July 24, 29, and August 13, 1987 letters, the licensee stated that the calculational methods used in determining the heat exchanger performance at the higher lake temperatures were the same as those used and documented in the April 6, 1987 submittal on heat exchanger fouling. The staff had reviewed these methods and found them acceptable before issuing the Confirmatory Order dated April 10, 1987. Using this same calculational technique, the licensee has determined that for Unit 2, power level reduction to 93% is appropriate when the lake water temperature is between 80°F and 85°F. These restrictions apply only until the end of Cycle 9 for Unit 2, when the RBCU heat exchangers will be cleaned and tested.

The licensee provided a conservative calculation that compared the LOCA heat removal requirements with the current degraded heat exchanger capacity to ensure (1) that the post-LOCA equipment qualification temperature limits will not be exceeded and (2) that required decay heat removal requirements can be satisfied. This calculation indicated that a scram from the power level set out above will produce decay heat levels within the heat exchanger capabilities. Actual heat transfer and flow rates through the degraded heat exchangers have been confirmed by testing. The licensee has committed to reduce the RPS high-flux trip setpoint to 93% of rated power for lake water temperatures between 80°F and 85°F. The setpoint reduction will ensure that this power level is not exceeded until the heat exchanger fouling is corrected. If lake temperatures exceed 85°F, Unit 2 will be shutdown.

The staff has reviewed the licensee's heat transfer calculational method and assumptions and has reviewed the overpower trip setpoint. On the basis of these reviews, the staff concurs that, with this setpoint, adequate accident heat removal capacity will be maintained with the current degraded heat exchangers and the projected elevated lake water temperatures.

The licensee has also evaluated the effects of the higher lake water temperature on other equipment and has concluded that the accident analysis is not affected. In the submittals dated July 28 and August 13, 1987, the licensee stated that all of the equipment served by the service water system was purchased with a design inlet water temperature specification of 85°F, except for the turbine-driven emergency feedwater pump lube oil cooler. This cooler has a design inlet temperature of 78°F and is designed to control the lube oil temperature to between 130°F and 160°F. With the 78°F inlet temperature, the lube

oil cooler has been tested to verify its capability to maintain an oil temperature of 130°F. Thus a 7°F increase in inlet water temperature will result in an oil temperature of approximately 137°F, which is within the 130°F - 160°F temperature range for acceptable turbine operation. The staff concurs with the licensee's assessment.

In the July 28 and August 13, 1987 submittals, the licensee also stated that there are 18 temperature sensors that monitor lake water temperature, with the results printed hourly by the plant computer system. The temperature monitoring instrumentation is calibrated during every refueling outage. The peak lake water temperature is also recorded daily. The licensee committed to reduce the power level setpoint to the values indicated above when the lake temperature reaches 79.5°F, as appropriate, to provide assurance that the plant will be operated in accordance with its design basis and within the requirements of the Order.

In the July 28, 29, and August 13, 1987 submittals, the licensee further stated that all of the design-basis accidents identified in the FSAR for Oconee Unit 2, and their attending single active failures, have been reviewed. This review confirmed that, with an assumed 85°F lake water temperature and appropriate reduction in power level, there will be no adverse impact on the public health and safety beyond that identified in the FSAR.

On the basis of the staff's previous approval of the licensee's calculational methodology, the verification of the operability of the components with an increased lake water temperature of 85°F based upon reduced power level, and the licensee's assurance that the lake water temperature is being appropriately monitored with action taken to reduce power level and the high-flux reactor trip setpoint as required, I conclude that there is reasonable

assurance for safe plant operation until the end of Cycle 9. I further conclude that the heat removal capability provided at the reduced power level is adequate to ensure that no adverse consequences to the health and safety of the public will result beyond those identified in the FSAR.

I find the licensee's commitments acceptable and conclude that the plant's safety can be maintained until the fouling can be corrected and lake water temperatures decrease, and the unit returns to full power. I have determined that these commitments are required in the interest of the public health and safety and should, therefore, be confirmed by an immediately effective Order.

IV.

Accordingly, pursuant to Sections 103, 161b, and 161i, of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR 2.204 and Part 50, IT IS HEREBY ORDERED, EFFECTIVE IMMEDIATELY, that license DPR-47, is amended as follows:

1. If the lake water temperature exceeds 79.5°F, Oconee Unit 2 operation will be at reduced power levels and the RPS high flux trip setpoint will be reduced, as follows:
 - a. if the lake water temperature is greater than 79.5°F but equal to or less than 85°F, the RPS high flux trip setpoint shall be set so that the maximum allowable power level shall not exceed 93% rated power; and
 - b. if lake water temperature exceeds 85°F, Unit 2 shall proceed to shut down in accordance with Technical Specification 3.0.
2. The peak lake water temperature shall be recorded daily.
3. Oconee Unit 2 shall not operate at any power level after the end of Cycle 9 unless the Regional Administrator, Region II, has approved the LPI and RBCU coolers for full power operation.

The Regional Administrator, Region II may relax or rescind any of the above conditions upon a showing by the licensee of good cause.

The licensee or any other person who has an interest adversely affected by this Order may request a hearing on this Order within 20 days of the date of its issuance. Any request for a hearing shall be addressed to the Director, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. A copy shall be sent to the Office of the General Counsel, Assistant General Counsel for Enforcement, at the same address, and the Regional Administrator, Region II, at 101 Marietta Street, N.W., Suite 2900, Atlanta, Georgia 30303. If a person other than the licensee requests a hearing, that person shall set forth with particularity the manner in which the petitioner's interest is adversely affected by this Order and should address the criteria set forth in 10 CFR 2.714(d). A REQUEST FOR HEARING SHALL NOT STAY THE IMMEDIATE EFFECTIVENESS OF THIS ORDER.

If a hearing is to be held, the Commission will issue an Order designating the time and place of any such hearing. If a hearing is held, the issue to be considered at the hearing shall be whether this Order should be sustained.

Dated at Bethesda, Maryland, this

FOR THE NUCLEAR REGULATORY COMMISSION
Original signed by
Thomas E. Murley
Thomas E. Murley, Director
Office of Nuclear Reactor Regulation

* SEE PREVIOUS CONCURRENCES

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Office of Administration

FROM: Office of Nuclear Reactor Regulation

SUBJECT: **Genesee Nuclear Station, Unit 2 (Duke Power Company)**

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Office of Nuclear Reactor Regulation

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Contact: **M. Duncan**
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Office of Nuclear Reactor Regulation

Enclosure:
As stated

Contact: M. Duncan
Phone: 28928

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