



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

September 11, 1990

Docket Nos. 50-369  
50-370

Mr. H. B. Tucker, Vice President  
Nuclear Production Department  
Duke Power Company  
P.O. Box 1007  
Charlotte, North Carolina 28201-1007

Dear Mr. Tucker:

Subject: ISSUANCE OF AMENDMENT NO. 112 TO FACILITY OPERATING LICENSE NPF-9  
AND AMENDMENT NO. 94 TO FACILITY OPERATING LICENSE NPF-17 - MCGUIRE  
NUCLEAR STATION, UNITS 1 AND 2 (TACS 77202 AND 77203)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 112 to Facility Operating License NPF-9 and Amendment No. 94 to Facility Operating License NPF-17 for the McGuire Nuclear Station, Units 1 and 2. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated July 13, 1990.

The amendments delete a portion of the surveillance requirements of TS 4.5.2.d regarding periodic verification that the suction isolation valves of the Residual Heat Removal (ND) System automatically close on a Reactor Coolant System signal less than or equal to 560 psig. These amendments, in effect, authorize removal of the ND Autoclosure Interlock (ACI) circuitry.

Because removal of the ACIs from the two McGuire units will occur at separate times, you have stated that the TSs deleted by these amendments will be administratively implemented by Duke Power Company in order that the amendments can be issued for both units simultaneously. The modifications will be performed first on Unit 2 during its cycle 7 refueling outage that begins September 1, 1990; modifications for Unit 1 are scheduled during its next (cycle 8) outage in mid 1991. Thus, we have issued these amendments immediately effective to both units on the basis that, for Unit 1, you will continue to implement the TS provisions that existed prior to these amendments until its hardware modifications have been completed.

*Handwritten initials:* JF/111 and C/P/111

Mr. H. B. Tucker  
Duke Power Company

McGuire Nuclear Station

cc:

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

Dr. John M. Barry  
Department of Environmental Health  
Mecklenburg County  
1200 Blythe Boulevard  
Charlotte, North Carolina 28203

County Manager of Mecklenburg County  
720 East Fourth Street  
Charlotte, North Carolina 28202

Mr. Dayne H. Brown, Director  
Department of Environmental,  
Health and Natural Resources  
Division of Radiation Protection  
P.O. Box 27687  
Raleigh, North Carolina 27611-7687

Mr. J. S. Warren  
Duke Power Company  
Nuclear Production Department  
P. O. Box 33189  
Charlotte, North Carolina 28242

Mr. Alan R. Herdt, Chief  
Project Branch #3  
U.S. Nuclear Regulatory Commission  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30323

J. Michael McGarry, III, Esq.  
Bishop, Cook, Purcell and Reynolds  
1400 L Street, N.W.  
Washington, D. C. 20005

Ms. Karen E. Long  
Assistant Attorney General  
N. C. Department of Justice  
P.O. Box 629  
Raleigh, North Carolina 27602

Senior Resident Inspector  
c/o U.S. Nuclear Regulatory Commission  
12700 Hagers Ferry Road  
Huntersville, North Carolina 28078

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

Ms. S. S. Kilborn  
Area Manager, Mid-South Area  
ESSD Projects  
Westinghouse Electric Corporation  
MNC West Tower - Bay 239  
P. O. Box 355  
Pittsburgh, Pennsylvania 15230



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

DUKE POWER COMPANY

DOCKER NO. 50-369

MCGUIRE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 112  
License No. NPF-9

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment to the McGuire Nuclear Station, Unit 1 (the facility) Facility Operating License No. NPF-9 filed by the Duke Power Company (the licensee) dated July 13, 1990, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, as amended, 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 set forth in 10 CFR Chapter I;
  - 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 hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of the Facility Operating License No. NPF-9 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 112, are hereby incorporated into the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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

FOR THE NUCLEAR REGULATORY COMMISSION



David B. Matthews, Director  
Project Directorate II-3  
Division of Reactor Projects-1/II  
Office of Nuclear Reactor Regulation

Attachment:  
Technical Specification  
Changes

Date of Issuance: September 11, 1990



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

DUKE POWER COMPANY

DOCKET NO. 50-370

MCGUIRE NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 94  
License No. NPF-17

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment to the McGuire Nuclear Station, Unit 2 (the facility) Facility Operating License No. NPF-17 filed by the Duke Power Company (the licensee) dated July 13, 1990, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, as amended, 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 set forth in 10 CFR Chapter I;
  - 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 hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-17 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.94 , are hereby incorporated into the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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

FOR THE NUCLEAR REGULATORY COMMISSION



David B. Matthews, Director  
Project Directorate II-3  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Technical Specification  
Changes

Date of Issuance: September 11, 1990

ATTACHMENT TO LICENSE AMENDMENT NO. 112

FACILITY OPERATING LICENSE NO. NPF-9

DOCKET NO. 50-369

AND

TO LICENSE AMENDMENT NO. 94

FACILITY OPERATING LICENSE NO. NPF-17

DOCKET NO. 50-370

Replace the following page of the Appendix "A" Technical Specifications with the enclosed page. The revised page is identified by Amendment number and contains a vertical line indicating the area of change.

Remove Page

3/4 5-6

Insert Page

3/4 5-6

## SURVEILLANCE REQUIREMENTS

### 4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

- a. At least once per 12 hours by verifying that the following valves are in the indicated positions with power to the valve operators removed:

<u>Valve Number</u>	<u>Valve Function</u>	<u>Valve Position</u>
NI162A	Cold Leg Recirc.	Open*
NI121A	Hot Leg Recirc.	Closed
NI152B	Hot Leg Recirc.	Closed
NI183B	Hot Leg Recirc.	Closed
NI173A	RHR Pump Discharge	Open*
NI178B	RHR Pump Discharge	Open*
NI100B	SI Pump RWST Suction	Open
FW27A	RHR/RWST Suction	Open*
NI147A	SI Pump Mini flow	Open

- b. At least once per 31 days by:

- 1) Verifying that the ECCS piping is full of water by venting the ECCS pump casings and accessible discharge piping high points, unless the pumps and associated piping are in service or have been in service within 31 days, and
- 2) Verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

- c. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suction during LOCA conditions. This visual inspection shall be performed:

- 1) For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and
- 2) Of the areas affected within containment at the completion of each containment entry when CONTAINMENT INTEGRITY is established.

- d. At least once per 18 months by:

- 1) Verifying automatic interlock action of the RHR System from the Reactor Coolant System by ensuring that with a simulated or actual Reactor Coolant System pressure signal greater than or equal to 425 psig the interlocks prevent the valves from being opened.

\* Valves may be realigned to place RHR System in service and for testing pursuant to Specification 4.4.6.2.2.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 112 TO FACILITY OPERATING LICENSE NPF-9  
AND AMENDMENT NO. 94 TO FACILITY OPERATING LICENSE NPF-17

DUKE POWER COMPANY

DOCKET NOS. 50-369 AND 50-370

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

## 1.0 INTRODUCTION

By letter dated July 13, 1990, Duke Power Company (the licensee) proposed amendments to the operating licenses for McGuire Nuclear Station, Units 1 and 2. The proposed amendments would delete a portion of the surveillance requirements of Technical Specification (TS) 4.5.2.d regarding periodic verification that the suction isolation valves of the Residual Heat Removal (ND) System automatically close on a Reactor Coolant (NC) System signal less than or equal to 560 psig. Issuance of these amendments, in effect, authorizes removal of the ND Autoclosure Interlock (ACI) circuitry.

## 2.0 BACKGROUND

The ND System for each McGuire unit includes two isolation valves arranged in series on the inlet line between the high pressure NC System and the lower pressure ND System. The two motor-operated gate valves are normally closed but are opened for decay heat removal purposes once NC System pressure and temperature have been reduced to about 425 psig and 350 degrees F. Each isolation valve is interlocked with one of two independent NC System pressure signals. One interlock prevents the valves from being opened when NC System pressure exceeds an actual plant setpoint of about 385.5 psig. This interlock and its associated TSs are not affected by the proposed amendments. When the valves are in the open position, the other interlock, known as the ACI, causes the valves to automatically close if NC System pressure increases to an actual setpoint of about 530 psig. These actual setpoints of 385.5 and 530 psig are conservative relative to the corresponding limits of 425 and 560 psig presently specified by TS 4.5.2.d.1.

The Commission and industry have previously recognized the safety benefits of removing the ACI circuitry from the ND System. The Commission's case study on long term decay heat removal, Case Study Report AEOD/C503, "Decay Heat Removal Problems at U.S. Pressurized Water Reactors," December 1985, recommended that consideration be given to removal of the ACI circuitry to minimize loss of decay heat removal events. The case study recognized, however, that in view of the differences among plants, the effects of ACI removal upon plant safety would need to be evaluated on a plant-specific basis. Also, a study performed for the Commission by Brookhaven National Laboratory, NUREG/CR-5015, "Improved Reliability of Residual Heat Removal Capability in PWRs as Related to Resolution

of Generic Issue 99," May 1988, listed several improvements to reduce the risk of loss of decay heat removal. One improvement was the removal of the ACI circuitry from ND Systems. Also, in Generic Letter (GL) 88-17, "Loss of Decay Heat Removal," the Commission requested that TSs that restrict or limit the safety benefit of actions identified in GL 88-17 should be identified and that appropriate changes should be submitted. One of the items listed by GL 88-17 that could limit such safety benefits was the ACI.

In parallel with the Commission's activities, the Westinghouse Owners Group evaluated the removal of the ACI circuitry on Westinghouse designed plants and issued WCAP-11736, "Residual Heat Removal System Autoclosure Interlock Deletion Report for the Westinghouse Owners Group," Volumes 1 and 2, Revision 0.0, February 1988. WCAP-11736 documents the probabilistic analysis performed on the removal of the ACI circuitry in terms of (1) the likelihood of an interfacing loss-of-coolant accident (LOCA), (2) ND System availability, and (3) low temperature overpressurization concerns. The results show that (1) the frequency of an interfacing system LOCA decreases with the removal of the ACI circuitry from the ND System accompanied by the addition of a control room alarm and procedural enhancements, (2) removal of the ACI increases ND System availability, and (3) removal of the ACI from the ND System has no effect on heat input transients, but will result in a small, but not significant, increase in the frequency of occurrence for some types of mass input transients with a decrease in others. The net effect of ACI deletion from the ND System is a net improvement in safety.

WCAP-11736 was based on four lead plants typical of the different ND configurations and ND design characteristics among Westinghouse plants. The lead plant which best represents the McGuire Station is Salem Unit 1.

WCAP-11736 also indicated that ACI removal should be accompanied by certain specific improvements. Five specific improvements applicable to plants such as McGuire were:

- (1) An alarm should be added to each ND suction valve that will actuate if the valve is open and ND System pressure is high.
- (2) Valve position indication to the alarm should be provided and power to the switches should not be affected by power lockout of the valve.
- (3) Procedural improvements described in the WCAP should be implemented.
- (4) Power should be removed from the ND suction valves prior to their being leak-checked, if feasible.
- (5) ND suction valve operators should be sized such that the valves cannot be opened against full system pressure.

The WCAP also recommended that although probabilistic risk assessments (PRAs) had been provided for the lead plants, sufficient PRA and safety analyses should be performed on each specific plant proposing to remove the ACI to ensure that results are consistent with and support the conclusions of the WCAP.

### 3.0 EVALUATION

In support of the application for amendments, the licensee referenced WCAP-11736. This report was approved by the Commission's staff for reference purposes August 8, 1989, subject to applications on a plant-specific basis demonstrating applicability of results and conclusions of the WCAP to that facility, and further provided that the five key improvements in the WCAP are implemented. Accordingly, the licensee's July 13, 1990, proposal provides analyses to demonstrate that the results and conclusions of WCAP-11736 are valid for McGuire Units 1 and 2 and describes how the improvements identified by the WCAP will be implemented at McGuire.

The licensee's submittal referenced the results from WCAP-11736 and presented applicable McGuire information, including results of a series of evaluations. These results take into account the impact of the removal of the autoclosure interlock (ACI) feature on the ND inlet isolation valves. The licensee concluded that implementation of the proposed design, TS and procedure changes will reduce the frequency of an ND overpressurization event and increase the ND system availability at McGuire.

The hardware changes proposed for McGuire Station will be the removal of the ACI function from the ND suction valves. The existing open permissive interlock, which has an actual setpoint of 385.5 psig, will remain intact. An alarm (i.e., an annunciator in the control room) will be added to each isolation valve which will actuate if the valve is not fully closed (i.e., if the valve is in the "open" or "intermediate" position) and if NC pressure is above the actual setpoint. The licensee has chosen a value of 440 psig for the alarm setpoint. The licensee has selected a setpoint of 440 psig because this value is well below the ND System design pressure of 600 psig and provides adequate notification of increasing NC pressure while avoiding potential conflicting interaction with the open permissive setpoint of 385.5 psig. Valve position indication will be provided to the annunciator by the motor operator limit switch.

The licensee prefers use of the limit switch because it provides a direct position indication that is independent of the motor control circuit. Valve position indication and the NC System pressure signal are sent to the annunciators through isolation devices. This portion of the circuit is powered by the reliable, battery-backed 120 volt AC Vital Instrument and Control Power System. This arrangement provides position indication to the annunciator that is unaffected by power lockout to the valves. The staff concludes that the proposed hardware changes meet the first two key plant improvements identified in WCAP-11736 and the associated staff SER and are acceptable.

The licensee has identified procedural changes that will be completed and implemented by the time the ND ACI is deleted. These include the following:

- (1) Plant startup procedures and procedures for ND System operation will be modified to require closure and removal of power from the ND isolation valves at the appropriate times.

- (2) The annunciator response procedure used during plant startup will be modified to reflect the alarm recognition responses for the added alarm. The procedure will be written to direct the operator to take necessary actions to close the open ND suction valves upon actuation of the annunciator or else cool down to an acceptable value of NC System temperature.
- (3) The performance procedure for leak testing ND System valves will be modified to ensure valve closure and removal of power prior to the leak test.

In addition to the hardware and procedural changes described above, the licensee has reviewed the size and setting of the ND suction valve's operators regarding the ability of these valves to be opened against full NC System pressure (2485 psig). The Rotork 90NA1 operators are set at maximum opening torque, and the valve control circuitry includes a torque switch bypass in both the open and closed circuits. This allows the valve actuator to provide its full torque capability to the valve stem during the initial high-load period of unseating at differential pressure conditions, while providing over-torque protection during the intermediate to full open position. The licensee finds that the size and setting of the operators could enable the ND isolation valves to open on full NC System pressure. However, the licensee notes that the ND valve's open permissive interlock (set at 385.5 psig and discussed above) prevents the valves from inadvertently opening during normal plant operation. Separate pressure transmitter designs made by separate manufacturers provide increased assurance that common mode failures will not occur. By procedure, both ND suction valves will have power removed from their operators after they are closed and, thus, cannot spuriously open. The staff agrees with the licensee that adequate consideration has been given for reasonable assurance that the valve will not be opened when NC pressure is excessive.

Accordingly, the Commission's staff concludes that removal of the ACI from the McGuire ND System isolation valves, along with removal of power from the valves, and implementation of a reliable alarm system with associated training and procedures, are in accordance with WCAP-11736 as approved by the Commission and GL 88-17. Moreover, these modifications and actions represent a net improvement in safety. Therefore, the proposed TS changes reflecting these modifications and actions are acceptable.

#### 4.0 ENVIRONMENTAL CONSIDERATION

These amendments involve changes in requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes in surveillance requirements. The staff has determined that the amendments involve 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 exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding. Accordingly, the amendments meet 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 these amendments.

## 5.0 CONCLUSION

The Commission's proposed determination that the amendments involve no significant hazards consideration was published in the Federal Register (55 FR 32326) on August 8, 1990. The Commission consulted with the State of North Carolina. No public comments were received, and the state of North Carolina did not have any comments.

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: D. Hood, PD#II-3/DPR-I/II  
M. McCoy, SRXB

Dated: September 11, 1990

DATED: September 11, 1990

AMENDMENT NO. 112 TO FACILITY OPERATING LICENSE NPF-9 - McGuire Nuclear Station, Unit 1  
AMENDMENT NO. 94 TO FACILITY OPERATING LICENSE NPF-17 - McGuire Nuclear Station, Unit 2

DISTRIBUTION:

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D. Matthews  
G. Lainas  
R. Ingram  
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D. Hagan  
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G. Hill  
Wanda Jones  
J. Calvo  
R. Jones  
ACRS (10)  
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McGuire Plant File

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Mr. H. B. Tucker

- 2 -

A copy of the related Safety Evaluation supporting these amendments is enclosed. Notice of issuance of amendments will be included in the Commission's biweekly Federal Register notice.

Sincerely,



Darl Hood, Project Manager  
Project Directorate II-3  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 112 to NPF-9
- 2. Amendment No. 94 to NPF-17
- 3. Safety Evaluation

cc w/enclosures:  
See next page

LA:PDII-3,  
RIngram  
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*Jan Jones*  
PM:PDII-3  
DHood  
8/16/90

BC:SRXB  
RJones  
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