March 16, 1990

Dockets Nos. 50-369
and 50-370

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

Dear Mr. Tucker:

SUBJECT: ISSUANCE OF AMENDMENT NO.106 TO FACILITY OPERATING LICENSE NPF-9 AND AMENDMENT NO. 88 TO FACILITY OPERATING LICENSE NPF-17 - MCGUIRE NUCLEAR STATION, UNITS 1 AND 2 (TACS 75086/75087)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 106 to Facility Operating License NPF-9 and Amendment No. 88 to Facility Operating License NPF-17 for the McGuire Nuclear Station, Units 1 and 2. These amendments consist of changes to the Technical Specifications (TS) in response to your application dated October 6, 1989, as supplemented January 31, 1990.

The amendments change TS 4.9.1.3 to allow greater flexibility in isolating reactor makeup water supply to the reactor coolant system (NC) during refueling operations.

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

Sincerely,

/s/

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

Enclosures:
1. Amendment No. 106to NPF-9
2. Amendment No. 88 to NPF-17
3. Safety Evaluation

cc w/enclosures:
See next page

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McGuire Nuclear Station

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DATED: March 16, 1990

AMENDMENT NO. 106 TO FACILITY OPERATING LICENSE NPF-9 - McGuire Nuclear Station, Unit 1
AMENDMENT NO. 88 TO FACILITY OPERATING LICENSE NPF-17 - McGuire Nuclear Station, Unit 2

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

DUKE POWER COMPANY

DOCKET NO. 50-369

McGUIRE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 106
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 October 6, 1989, as supplemented January 31, 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-9 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.106 , 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

Lawrence P. Crocker for

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: March 16, 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. 88
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 October 6, 1989, as supplemented January 31, 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. 88 , 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

Lawrence P. Crocker

for 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: March 16, 1990

ATTACHMENT TO LICENSE AMENDMENT NO. 106

FACILITY OPERATING LICENSE NO. NPF-9

DOCKET NO. 50-369

AND

TO LICENSE AMENDMENT NO. 88

FACILITY OPERATING LICENSE NO. NPF-17

DOCKET NO. 50-370

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the areas of change. The corresponding overleaf pages are also provided to maintain document completeness.

Amended Page	Overleaf Page
3/4 9-1	3/4 9-2
B3/4 9-1	B3/4 9-2

3/4.9 REFUELING OPERATIONS

3/4.9.1 BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1 The boron concentration of all filled portions of the Reactor Coolant System and the refueling canal shall be maintained uniform and sufficient to ensure that the more restrictive of the following reactivity conditions is met:

a. Either a K_{eff} of 0.95 or less, or

b. A boron concentration of greater than or equal to 2000 ppm.

APPLICABILITY: MODE 6*, with the reactor vessel head closure bolts less than fully tensioned or with the head removed.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7000 ppm boron or its equivalent until K_{eff} is reduced to less than or equal to 0.95 or the boron concentration is restored to greater than or equal to 2000 ppm, whichever is the more restrictive.

SURVEILLANCE REQUIREMENTS

4.9.1.1 The more restrictive of the above two reactivity conditions shall be determined prior to:

a. Removing or unbolting the reactor vessel head, and

b. Withdrawal of any full length control rod in excess of 3 feet from its fully inserted position within the reactor vessel.

4.9.1.2 The boron concentration of the Reactor Coolant System and the refueling canal shall be determined by chemical analysis at least once per 72 hours.

4.9.1.3 NV-250 shall be verified closed under administrative control at least once per 72 hours; or, NV-131, NV-140, NV-176, NV-468, NV-808, and either NV-132 or NV-1026 shall be verified closed under administrative control at least once per 12 hours when necessary to makeup to the RWST during refueling operations.

*The reactor shall be maintained in MODE 6 whenever fuel is in the reactor vessel with the vessel head closure bolts less than fully tensioned or with the head removed.

3/4.9.2 INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.9.2 As a minimum, two Source Range Neutron Flux Monitors shall be OPERABLE and operating with Alarm Setpoints at 0.5 decade above steady-state count rate, each with continuous visual indication in the control room and one with audible indication in the containment and control room.

APPLICABILITY: MODE 6.

ACTION:

a. With one of the above required monitors inoperable or not operating, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

b. With both of the above required monitors inoperable or not operating, determine the boron concentration of the Reactor Coolant System at least once per 12 hours.

SURVEILLANCE REQUIREMENTS

4.9.2 Each Source Range Neutron Flux Monitor shall be demonstrated OPERABLE by performance of:

a. A CHANNEL CHECK at least once per 12 hours,

b. An ANALOG CHANNEL OPERATIONAL TEST within 8 hours prior to the initial start of CORE ALTERATIONS, and

c. An ANALOG CHANNEL OPERATIONAL TEST at least once per 7 days.

3/4.9.1 BORON CONCENTRATION

The limitations on reactivity conditions during REFUELING ensure that: (1) the reactor will remain subcritical during CORE ALTERATIONS, and (2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel. These limitations are consistent with the initial conditions assumed for the boron dilution incident in the accident analyses. The value of 0.95 or less for K_{eff} includes a 1% delta k/k conservative allowance for uncertainties. Similarly, the boron concentration value of 2000 ppm or greater includes a conservative uncertainty allowance of 50 ppm boron.

The Reactor Makeup Water Supply to the Chemical and Volume Control (NV) System is normally isolated during refueling to prevent diluting the Reactor Coolant System boron concentration. Isolation is normally accomplished by closing valve NV-250. However, isolation may be accomplished by closing valves NV-131, NV-140, NV-176, NV-468, NV-808, and either NV-132 or NV-1026, when it is necessary to makeup water to the Refueling Water Storage Tank during refueling operations.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the Source Range Neutron Flux Monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short-lived fission products. This decay time is consistent with the assumptions used in the accident analyses.

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

The requirements on containment building penetration closure and OPERABILITY of the Reactor Building Containment Purge Exhaust System HEPA filters and charcoal adsorbers ensure that a release of radioactive material within containment will be restricted from leakage to the environment or filtered through the HEPA filters and charcoal adsorbers prior to discharge to the atmosphere. The OPERABILITY and closure restrictions are sufficient to restrict radioactive material release from a fuel element rupture based upon the lack of containment pressurization potential while in the REFUELING MODE. Operation of the Reactor Building Containment Purge Exhaust System HEPA filters and charcoal adsorbers and the resulting iodine removal capacity are consistent with the assumptions of the accident analysis. The methyl iodide penetration test criteria for the carbon samples have been made more restrictive than required for the assumed iodine removal in the accident analysis because the humidity to be seen by the charcoal adsorbers may be greater than 70% under normal operating conditions.

3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity conditions during CORE ALTERATIONS.

3/4.9.6 MANIPULATOR CRANE

The OPERABILITY requirements for the manipulator cranes ensure that: (1) manipulator cranes will be used for movement of drive rods and fuel assemblies, (2) each crane has sufficient load capacity to lift a drive rod or fuel assembly, and (3) the core internals and reactor vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL STORAGE POOL BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel and control rod assembly and associated handling tool over other fuel assemblies in the storage pool ensures that in the event this load is dropped: (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident analyses.

3/4.9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

The requirement that at least one residual heat removal (RHR) loop be in operation ensures that: (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor vessel below 140°F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the core to minimize the effect of a boron dilution incident and prevent boron stratification.

The requirement to have two RHR loops OPERABLE when there is less than 23 feet of water above the reactor vessel flange ensures that a single failure of the operating RHR loop will not result in a complete loss of RHR capability. With the reactor vessel head removed and 23 feet of water above the reactor vessel flange, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating RHR loop, adequate time is provided to initiate emergency procedures to cool the core.

To prevent vortexing in the suction of the RHR pumps, the flow rate requirements for the RHR system were lowered from 3000 gpm to 1000 gpm. A specific surveillance has been added to ensure the flow remains high enough to ensure the reactor coolant system temperature remains less than or equal to 140 degrees-F. The problems associated with vortexing and mid-loop operations is provided in Generic Letter 88-17, Loss of Decay Heat.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.106 TO FACILITY OPERATING LICENSE NPF-9

AND AMENDMENT NO.88 TO FACILITY OPERATING LICENSE NPF-17

DUKE POWER COMPANY

DOCKETS NOS. 50-369 AND 50-370

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

1.0 INTRODUCTION

By letter dated October 6, 1989, as supplemented January 31, 1990, Duke Power Company (the licensee) proposed amendments to change a surveillance requirement of Technical Specification (TS) 4.9.1.3 to allow greater flexibility in isolating reactor makeup water supply to the reactor coolant system (NC) during refueling operations. TS 4.9.1.3 ensured this isolation by specifically requiring that valve "NV-250 shall be verified closed...." The proposed TS would read, "Verify the Reactor Makeup Water Supply to the Chemical and Volume Control System is isolated...." The associated Bases 3/4.9.1 would be supplemented to explain isolation flexibility accordingly:

> The Reactor Makeup Water Supply to the Chemical and Volume Control (NV) System is normally isolated during refueling to prevent diluting the Reactor Coolant System boron concentration. Isolation is normally accomplished by closing valve NV-250. However, isolation may be accomplished by closing valves NV-131, NV-140, NV-176, NV-468, NV-808, and either NV-132 or NV-1026, when it is necessary to makeup water to the Refueling Water Storage Tank during refueling operations.

The purpose of TS 4.9.1.3 is to prevent diluting the NC boron concentration during refueling. Closure of valve NV-250 will accomplish this purpose. However, it is necessary to make up water to the Refueling Water Storage Tank (RWST) several times during the course of refueling, and NV-250 must be opened when this is done. The proposed change adds an optional valve alignment that will also isolate potential flow paths which could deliver unborated water to the NC, allowing operators to make up water to the RWST. The optional alignment involves closure of six valves identified in the revised Bases.

2.0 EVALUATION

The Makeup Water Supply (MUWS) to the Chemical and Volume Control System (CVCS) is normally isolated during refueling to prevent diluting Reactor Coolant System (RCS) boron concentration. As required in the current TSs, the isolation is accomplished by closing valve NV-250. With closure of valve NV-250, the MUWS is also isolated from the Refueling Water Storage Tank (RWST). In order to maintain sufficient empty space in the RWST to receive the water in the

refueling cavity after refueling, the RWST water inventory during refueling is normally maintained just above the minimum level required by the TSs for the refueling mode. Since the RWST is also used for maintaining refueling cavity level or for filling systems being returned to normal alignment after maintenance, the RWST needs makeup water from the MUWS to meet the minimum TS required water level. However, with valve NV-250 closed, the operation to make up water to the RWST cannot be accomplished without interruption of the other refueling activities. In order to continue refueling activities while making up water to the RWST, the licensee proposed TS changes to use six valves replacing valve NV-250 as an option to isolate the MUWS from the CVCS. With the proposed valve alignment with six valves closed, valve NV-250 can be opened allowing the borated water to the RWST. The makeup of the RWST is achieved by pumping water to the boric acid blender with a reactor makeup water pump concurrent with boric acid solution being pumped to the blender with a boric acid pump.

The six valves closed as an optional valve alignment for isolation of the MUWS are:

Valve NV-131, Boronometer Inlet Isolation,
Valve NV-140, Volume Control Tank Inlet Isolation,
Valve NV-176, Boric Acid Blender Discharge to Volume Control Tank Outlet,
Valve NV-468, Boric Acid Blender Outlet Sample,
Valve NV-808, Boronometer Flush Supply, and
Valve NV-1026, Boronometer Inlet Isolation, or Valve NV-132, Boronometer Outlet Isolation.

The TS requires verification of closure of valve NV-250 once per 72 hours when isolation is provided by valve NV-250. The amendments do not change this surveillance frequency with NV-250 closed. However, by letter of January 31, 1990, the licensee proposed TS changes to require the six valves be verified closed under administrative control at least once every 12 hours whenever isolation is provided by the six valves. This increase in surveillance frequency assists in minimizing the risk from a potential error when six valves are used for isolation rather than the one. The risk is further reduced by the licensee's administrative controls for verifying valve position. The administrative controls specify, in part, that red tags are to be attached to the closed valves. Red tags are used at McGuire for personnel safety and are rigidly followed by all station personnel because of their dependence upon them to protect against possible injury.

The NRC staff has reviewed the proposed TS changes. The staff finds that (1) the proposed valve alignment will isolate against the same potential flow path as that isolated by the previously approved valve NV-250 and (2) although there are more valves in the proposed valve alignment for isolation, each valve will be individually isolated and administratively controlled using the McGuire Red Tag procedure and checked to the higher surveillance frequency (once per 12 hours versus 72 hours for valve NV-250) to verify the closure of each valve. Therefore, the staff concludes that the proposed method provides comparable assurance that isolation will be achieved and maintained.

The boron dilution event due to malfunction of the CVCS was previously analyzed and included in Final Safety Analysis Report (FSAR) Section 15.4.6.3.2. The results of the previous analysis were approved by NRC and showed that adequate time (57 minutes) would be available for the operator to recognize the high count rate signal and to manually terminate the dilution. The following plant conditions which are used in the assumptions for the boron dilution event during refueling remain unchanged: (1) one residual heat removal pump is operating to ensure continuous water mixing in the reactor vessel, (2) the boron concentration of the refueling water is approximately 2000 ppm, and (3) a high flow alarm at the discharge of the CVCS is active providing an alarm to the operator when the flow rate from the charging pump exceeds 175 gpm. Since the plant conditions are consistent with the assumptions for the bounding analysis in the FSAR, the results of the previously approved analysis continue to apply to the operating conditions allowed by the proposed TS changes. Therefore, the NRC staff finds that the safety margin (57 minutes as the available time for the operator to terminate the boron dilution) does not decrease.

Accordingly, the NRC staff finds that the alternate method of isolation, in conjunction with the proposed increased surveillance, provides comparable protection against boron dilution events, and that the proposed changes to TS 3/4.9.1 are, therefore, acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

These amendments involve 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 radiation 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.

4.0 CONCLUSION

The Commission's proposed determination that the amendments involve no significant hazards consideration was published in the Federal Register (55 FR 4266) on February 7, 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/DRP-I/II
S. Sun, SRXB/DST

Dated: March 16, 1990