

February 14, 1990

Dockets Nos.: 50-369  
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.103 TO FACILITY OPERATING LICENSE NPF-9 AND  
AMENDMENT NO. 85 TO FACILITY OPERATING LICENSE NPF-17 - MCGUIRE  
NUCLEAR STATION, UNITS 1 AND 2 (TACS 75362/75363)

The Nuclear Regulatory Commission has issued the enclosed Amendment No.103 to Facility Operating License NPF-9 and Amendment No. 85 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 October 30, 1989.

The amendments modify TSs 4.9.8.1 and 4.9.8.2 to reduce the required residual heat removal system flow rate during refueling, and add a surveillance requirement to ensure that the reactor coolant system temperature is maintained no more than 140°F. The amendments also modify associated TS Bases 3/4.9.8 to provide the technical justification for the revision.

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

Sincerely,

Original Signed By:

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

Enclosures:

1. Amendment No.103 to NPF-9
2. Amendment No. 85 to NPF-17
3. Safety Evaluation

cc w/enclosures:

See next page

LA:PDII-3

RIngram

2/13/90

DSH  
PM:PDII-3

DHood:jkd

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MCGUIRE AMEND 75362/75363

SRXB OGC

RJones

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D:PDII-3

DMatthews

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DATED: February 14, 1990

AMENDMENT NO. 103 TO FACILITY OPERATING LICENSE NPF-9 - McGuire Nuclear Station, Unit 1  
AMENDMENT NO. 85 TO FACILITY OPERATING LICENSE NPF-17 - McGuire Nuclear Station, Unit 2

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McGuire R/F

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R. Ingram 14-H-25

D. Hood 14-H-25

OGC-WF 15-B-18

E. Jordan MNBB-3302

W. Jones P-130A

G. Hill (8) P1-137

ACRS (10) P-135

GPA/PA 17-F-2

ARM/LFMB AR-2015

E. Butcher 11-F-23

D. Hagan MNBB-3302



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. 103  
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 30, 1989, 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, 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.

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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. 103, 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: February 14, 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. 85  
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 30, 1989, 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, 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. 85, 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: February 14, 1990

ATTACHMENT TO LICENSE AMENDMENT NO. 103

FACILITY OPERATING LICENSE NO. NPF-9

DOCKET NO. 50-369

AND

TO LICENSE AMENDMENT NO. 85

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 9-10  
3/4 9-11  
B 3/4 9-2

3/4 9-9  
3/4 9-12  
B 3/4 9-1

REFUELING OPERATIONS

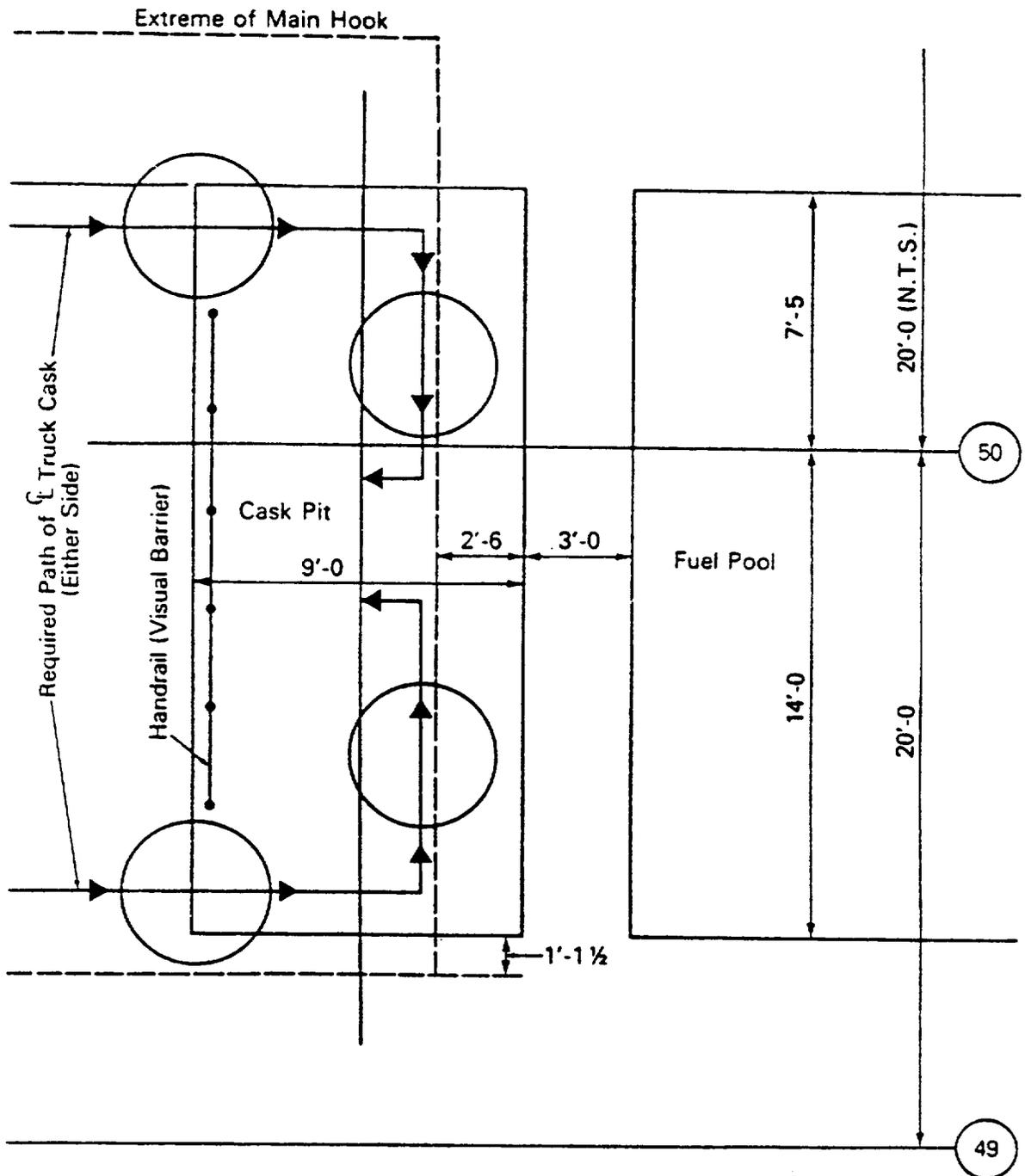


FIGURE 3.9-1  
REQUIRED PATH FOR MOVEMENT OF TRUCK CASKS

## REFUELING OPERATIONS

### 3/4.9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

#### HIGH WATER LEVEL

#### LIMITING CONDITION FOR OPERATION

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3.9.8.1 At least one residual heat removal (RHR) loop shall be OPERABLE and in operation.\*

APPLICABILITY: MODE 6 when the water level above the top of the reactor vessel flange is greater than or equal to 23 feet.

#### ACTION:

With no RHR loop OPERABLE and in operation, suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required RHR loop to OPERABLE and operating status as soon as possible. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

#### SURVEILLANCE REQUIREMENTS

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4.9.8.1 At least once per 12 hours, one RHR loop shall be verified in operation and circulating reactor coolant at a flow rate:

- a. greater than or equal to 1000 gpm; and
- b. sufficient to maintain the RCS temperature at less than or equal to 140°F.

\*The RHR loop may be removed from operation for up to 1 hour per 8-hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor vessel hot legs.

## REFUELING OPERATIONS

### LOW WATER LEVEL

#### LIMITING CONDITION FOR OPERATION

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3.9.8.2 Two independent residual heat removal (RHR) loops shall be OPERABLE, and at least one RHR loop shall be in operation.\*

APPLICABILITY: MODE 6 when the water level above the top of the reactor vessel flange is less than 23 feet.

#### ACTION:

- a. With less than the required RHR loops OPERABLE, immediately initiate corrective action to return the required RHR loops to OPERABLE status, or to establish greater than or equal to 23 feet of water above the reactor vessel flange, as soon as possible.
- b. With no RHR loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required RHR loop to operation. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

#### SURVEILLANCE REQUIREMENTS

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4.9.8.2 At least once per 12 hours, one RHR loop shall be verified in operation and circulating reactor coolant at a flow rate:

- a. greater than or equal to 1000 gpm; and
- b. sufficient to maintain the RCS temperature at less than or equal to 140°F.

\*Prior to initial criticality, the RHR loop may be removed from operation for up to 1 hour per 8-hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor vessel hot legs.

## REFUELING OPERATIONS

### 3/4.9.9 WATER LEVEL - REACTOR VESSEL

#### LIMITING CONDITION FOR OPERATION

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3.9.9 At least 23 feet of water shall be maintained over the top of the reactor vessel flange.

APPLICABILITY: During movement of fuel assemblies or control rods within the reactor vessel when either the fuel assemblies being moved or the fuel assemblies seated within the reactor vessel are irradiated.

#### ACTION:

With the requirements of the above specification not satisfied, suspend all operations involving movement of fuel assemblies or control rods within the reactor vessel.

#### SURVEILLANCE REQUIREMENTS

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4.9.9 The water level shall be determined to be at least its minimum required depth within 2 hours prior to the start of and at least once per 24 hours thereafter during movement of fuel assemblies or control rods.

## 3/4.9 REFUELING OPERATIONS

### BASES

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#### 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.

#### 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.

## REFUELING OPERATIONS

### BASES

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#### 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. 103 TO FACILITY OPERATING LICENSE NPF-9  
AND AMENDMENT NO. 85 TO FACILITY OPERATING LICENSE NPF-17

DUKE POWER COMPANY

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

DOCKETS NOS. 50-369 AND 50-370

1.0 INTRODUCTION

By letter dated October 30, 1989, Duke Power Company (the licensee) proposed amendments to the operating licenses for McGuire Nuclear Station, Units 1 and 2. The amendments would revise Technical Specifications (TSs) 4.9.8.1 and 4.9.8.2 and their associated Bases to: (1) reduce the required Residual Heat Removal (RHR) system flow rate during Mode 6 (refueling) operation, when the Reactor Coolant System (RCS) is partially drained, from greater than or equal to 3000 gpm to greater than or equal to 1000 gpm, (2) add a Surveillance Requirement to ensure that the RCS temperature is maintained no more than 140°F, and (3) provide the technical justification for the revision in TS Bases 3/4.9.8.

2.0 EVALUATION

At the currently required flow rate of 3000 gpm, the RHR system could be susceptible to vortexing at the RHR pump suction when the RCS is partially drained. Vortexing can lead to RHR system air entrainment and pump cavitation and subsequent loss of RHR system flow.

Operation with the RCS partially drained in Mode 6 is necessary for required inspection and maintenance of RCS components such as reactor coolant pumps and steam generators. As indicated in NUREG-1269, "Loss of Residual Heat Removal at Diablo Canyon Unit 2," reduced RHR flow rate, when the RCS is partially drained, would provide a greater margin against vortexing and preclude an inadvertent loss of decay heat removal capability due to air entrainment and cavitation of the RHR pumps. As the time after plant shutdown increases, decay heat removal requirements from the RHR flow are reduced since decay heat decreases as a function of time after initial reactor shutdown. The change proposed by the licensee will provide sufficient flow rate to maintain RCS temperature at less than or equal to 140°F. In addition, a minimum RHR flow rate is required to prevent boron stratification and minimize the potential for localized variation in boron concentration in the RCS. For McGuire, the licensee stated that a flow rate of 1000 gpm would maintain RCS temperature below 140°F, minimize the effect of a boron dilution incident, and prevent boron stratification.

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The licensee also reviewed the proposed TS amendments with regard to the concerns raised by NRC Bulletin 88-04, "Potential Safety-Related Pump Loss." Specifically, operating the RHR pumps at flow rates less than 3000 gpm will increase the stress on the pump lower bearings. The licensee will monitor the bearings' wear and will replace the bearings if inspection reveals significant degradation.

The proposed amendments are consistent with Generic Letter (GL) 88-17, "Loss of Decay Heat Removal," dated October 17, 1988, which recommended that licensees identify and submit appropriate changes to TSs that restrict or limit the safety benefit of actions identified in GL 88-17.

The NRC staff has reviewed the licensee's submittals and finds that the proposed changes would reduce the potential for damage and loss of an RHR pump during mid-loop or similar operations and at the same time would mitigate the consequences of a boron dilution incident and prevent boron concentration. The changes have no adverse impact on safety and would not pose an undue risk to public health and safety. Therefore, they are acceptable.

### 3.0 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 NRC staff 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 made a proposed determination that the amendments involve no significant hazards consideration which was published in the Federal Register (55 FR 932) on January 10, 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 Contributor: D. Hood, PDII-3/DRP-I/II

Dated: February 14, 1990

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, Chief  
Radiation Protection Branch  
Division of Facility Services  
Department of Human Resources  
701 Barbour Drive  
Raleigh, North Carolina 27603-2008

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  
Route 4, Box 529  
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