

November 20, 1990

Docket Nos. 50-369
and 50-370

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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. 116 TO FACILITY OPERATING LICENSE NPF-9 AND
AMENDMENT NO. 98 TO FACILITY OPERATING LICENSE NPF-17 - MCGUIRE
NUCLEAR STATION, UNITS 1 AND 2 (TACS 77558/77559)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 116 to Facility Operating License NPF-9 and Amendment No. 98 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 September 4, 1990.

The amendments reduce the required measured reactor coolant system flow rate by one percent from 97220 GPM/loop to 96250 GPM/loop. Additionally, an administrative change removes references to the resistance temperature detector bypass manifold system. This system was removed from both McGuire units and previously approved by the NRC in Facility Operating License Amendment Nos. 84 (Unit 1) and 65 (Unit 2).

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

Sincerely,

18/

Timothy A. Reed, Project Manager
Project Directorate II-3
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 116 to NPF-9
2. Amendment No. 98 to NPF-17
3. Safety Evaluation

cc w/enclosures:
See next page

LA:PDII3.
Ringram
10/19/90

PM: *TR*
T. Reed:
10/24/90

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E. HOLLER
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11/19/90

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Mr. H. B. Tucker
Duke Power Company

McGuire Nuclear Station

cc:

Mr. A.V. Carr, Esq.
Duke Power Company
422 South Church Street
Charlotte, North Carolina 28242-0001

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. Paul Guill
Duke Power Company
Nuclear Production Department
P.O. Box 1007
Charlotte, North Carolina 28201-1007

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, DC 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

DATED: November 20, 1990

AMENDMENT NO. 116 TO FACILITY OPERATING LICENSE NPF-9 - McGuire Nuclear Station, Unit 1
AMENDMENT NO. 98 TO FACILITY OPERATING LICENSE NPF-17 - McGuire Nuclear Station, Unit 2

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D. Hagan MNBB 4702

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M. McCoy 8E23



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. 116
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 September 4, 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, 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. 116, 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: November 20, 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. 98
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 September 4, 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, 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. 98, 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: November 20, 1990

ATTACHMENT TO LICENSE AMENDMENT NO. 116

FACILITY OPERATING LICENSE NO. NPF-9

DOCKET NO. 50-369

AND

TO LICENSE AMENDMENT NO. 98

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.

Remove Pages

2-2a
2-5
2-9

Insert Pages

2-2a
2-5
2-9

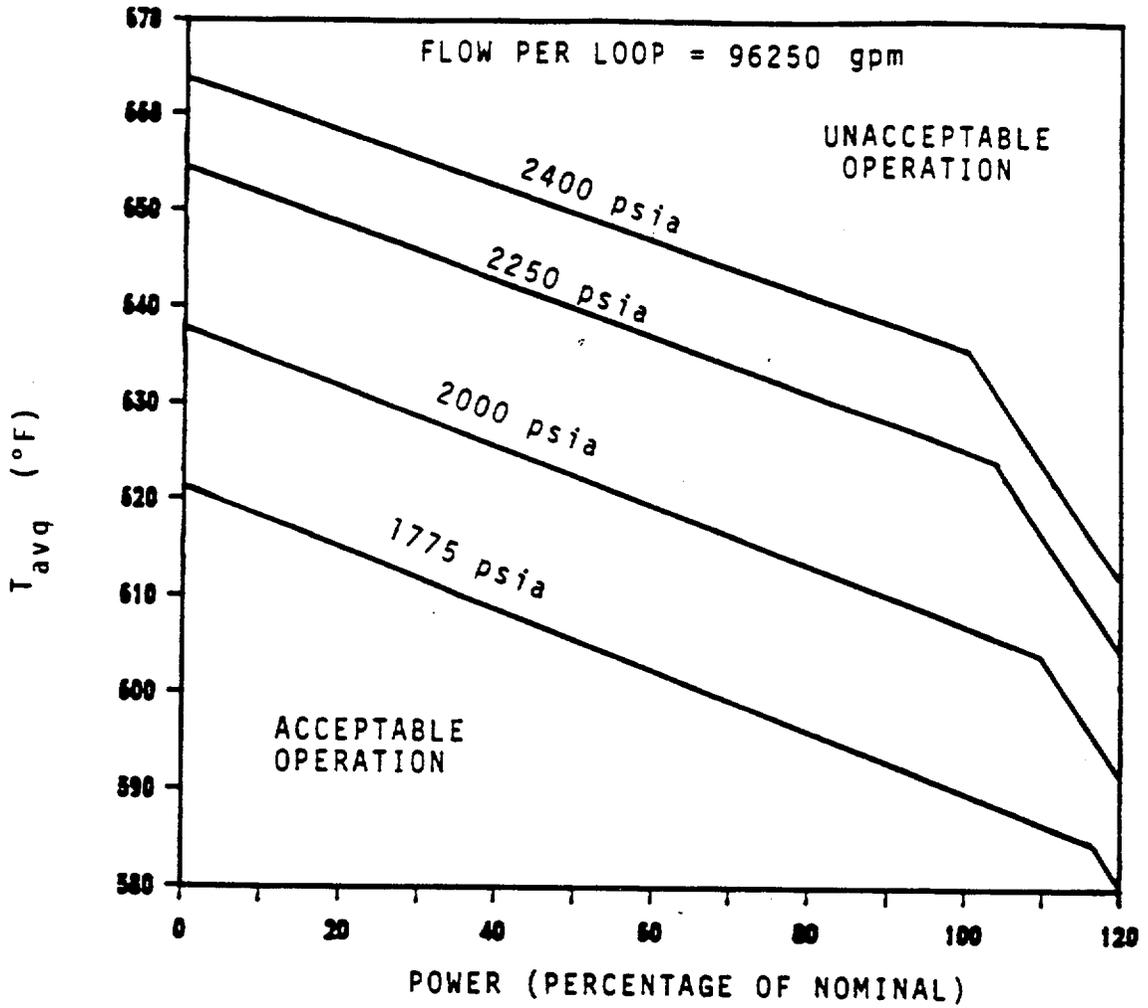


FIGURE 2.1-1

UNITS 1 AND 2

REACTOR CORE SAFETY LIMIT - FOUR LOOPS IN OPERATION

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>
1. Manual Reactor Trip	N.A.	N.A.
2. Power Range, Neutron Flux	Low Setpoint - \leq 25% of RATED THERMAL POWER High Setpoint - \leq 109% of RATED THERMAL POWER	Low Setpoint - \leq 26% of RATED THERMAL POWER High Setpoint - \leq 110% of RATED THERMAL POWER
3. Power Range, Neutron Flux, High Positive Rate	\leq 5% of RATED THERMAL POWER with a time constant \geq 2 seconds	\leq 5.5% of RATED THERMAL POWER with a time constant \geq 2 seconds
4. Power Range, Neutron Flux, High Negative Rate	\leq 5% of RATED THERMAL POWER with a time constant \geq 2 seconds	\leq 5.5% of RATED THERMAL POWER with a time constant \geq 2 seconds
5. Intermediate Range, Neutron Flux	\leq 25% of RATED THERMAL POWER	\leq 30% of RATED THERMAL POWER
6. Source Range, Neutron Flux	\leq 10^5 counts per second	\leq 1.3×10^5 counts per second
7. Overtemperature ΔT	See Note 1	See Note 3
8. Overpower ΔT	See Note 2	See Note 4
9. Pressurizer Pressure--Low	\geq 1945 psig	\geq 1935 psig
10. Pressurizer Pressure--High	\leq 2385 psig	\leq 2395 psig
11. Pressurizer Water Level--High	\leq 92% of instrument span	\leq 93% of instrument span
12. Low Reactor Coolant Flow	$>$ 90% of minimum measured flow per loop*	$>$ 88.8% of minimum measured flow per loop*

*Minimum measured flow is 96,250 gpm per loop.

McGUIRE - UNITS 1 and 2

2-5

Amendment No. 116 (Unit 1)
Amendment No. 98 (Unit 2)

TABLE 2.2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

NOTATION (Continued)

NOTE 1: (Continued)

- τ_6 = Time constant utilized in the measured T_{avg} lag compensator, $\tau_6 \leq 2$ sec
- T' = $\leq 588.2^\circ\text{F}$ Reference T_{avg} at RATED THERMAL POWER,
- K_3 = 0.001095,
- P = Pressurizer pressure, psig,
- P' = 2235 psig (Nominal RCS operating pressure),
- S = Laplace transform operator, sec^{-1} ,

and $f_1(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range nuclear ion chambers; with gains to be selected based on measured instrument response during plant startup tests such that:

- (i) for $q_t - q_b$ between -29% and +7.0%; $f_1(\Delta I) = 0$, where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER;
- (ii) for each percent that the magnitude of $q_t - q_b$ exceeds -29%, the ΔT Trip Setpoint shall be automatically reduced by 3.151% of its value at RATED THERMAL POWER; and
- (iii) for each percent that the magnitude of $q_t - q_b$ exceeds +7.0%, the ΔT Trip Setpoint shall be automatically reduced by 1.50% of its value at RATED THERMAL POWER.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 116 TO FACILITY OPERATING LICENSE NPF-9
AND AMENDMENT NO. 98 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 September 4, 1990, Duke Power Company (the licensee) proposed amendments for McGuire Nuclear Station, Units 1 and 2. The proposed amendments would reduce the required measured reactor coolant system (RCS) flow rate by one percent from 97220 GPM/loop to 96250 GPM/loop. Additionally, an administrative change would remove reference to the resistance temperature detector (RTD) bypass manifold system. This system was removed from both McGuire units and previously approved by the NRC in License Amendment Nos. 84 (Unit 1) and 65 (Unit 2).

2.0 EVALUATION

Due to tube degradation, some of the tubes in the McGuire Units 1 and 2 steam generators have been removed from service through plugging while others have been sleeved and returned to service. Additional steam generator tubes were plugged during the recent refueling outage for Unit 2 such that the RCS flow may be reduced below that currently identified in the Technical Specifications (TSs). The amount of potential flow reduction is sufficient to require reevaluation of the Final Safety Analysis Report (FSAR) Chapter 15 transients and accidents to determine if the current analyses continue to be applicable. The proposed reduction in flow is from 97220 GPM per loop to 96250 GPM per loop, or one percent.

In its September 4, 1990 submittal, the licensee evaluated the impact of operation at one percent reduction in minimum measured flow on thermal margin. The reduced flow rate resulted in a slight reduction in core departure from nucleate boiling (DNB) limits. Consequently, the licensee developed revised core safety limits for average RCS temperature as a function of power for the reduced flow rate. These revised limits are identified in a proposed TS Table 2.1-1, "Reactor Core Safety Limit - Four Loops In Operation." The flow per loop identified on proposed Figure 2.1-1 is 96250 GPM, which is the minimum measured flow (MMF) rather than the thermal design flow (TDF). The MMF differs from the TDF by an amount equal to instrument uncertainty. For consistency, the terminology in TS Table 2.2-1 is changed from "design flow" to "minimum measured flow" when the loop flow of 96250 GPM is identified. These changes are acceptable.

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Removal of the RTD bypass manifold systems for McGuire Units 1 and 2 was approved by issuance of Amendment No. 84 to Facility Operating License NPF-9 and Amendment No. 65 to Facility Operating License NPF-17 dated May 18, 1988. Therefore, a proposed deletion of an obsolete reference to the RTD bypass manifold in Table 2.2-1 is acceptable.

The licensee has determined that the current Overtemperature Δ -T (OT Δ T) and Overpower Δ -T (OP Δ T) setpoint equation constants (specified in TS Table 2.2-1) are conservative and provide the necessary core protection against departure from nucleate boiling (DNB) under the proposed reduction in flow. The factors involved in establishing the setpoints include the reactor coolant temperature in each loop and the axial distribution of core power measured by excore neutron detectors. Potential setpoint changes related to reactor coolant temperature were accounted for in the license amendments addressing the removal of the RTD bypass manifold systems and the current setpoints remain applicable to the revised TS Figure 2.1-1. Increases in neutron flux difference between upper and lower ion chamber readings beyond a pre-defined deadband result in a decrease in trip setpoint (see TS Table 2.2-1, Note 1). The deadband range of the $f(\Delta I)$ function in the OT Δ T and OP Δ T setpoint equations is revised from its current range of $- 29\% > q_t - q_b > 9\%$ to $- 29\% > q_t - q_b > 7\%$ to define the deadband. This change is in a conservative direction which maintains protection in the event of a power imbalance between the top and bottom of the core and is acceptable.

2.1 Effects of RCS Flow Reduction on Safety Analyses

Recent safety analyses for the McGuire units were performed for a loss-of-coolant accident (LOCA) in connection with the isolation or removal of the Upper Head Injection (UHI) system for the McGuire units (see NRC Safety Evaluation for Amendment No. 57 to Facility Operating License NPF-9 and Amendment No. 38 to Facility Operating License NPF-17, dated May 13, 1986). The small and large break LOCAs are reanalyzed for the proposed flow reduction because a potential increase in the predicted peak clad temperatures (PCTs) is possible as a result of a decrease in RCS flow rate. The large break LOCA analysis was performed with a TDF of 93500 GPM per loop. This flow was intentionally chosen conservatively low to preclude the need for future reanalyses resulting from RCS flow related issues. The current analysis thus remains conservative for the proposed reduction to 94500 GPM. The small break analysis performed with an approved evaluation model showed that for a reduction in TDF from 95500 to 94500 GPM, the RCS cold leg temperature was reduced by 0.3 deg F. This small change had no significant impact on the margin to the 10 CFR 50.46 PCT limit of 2200 deg F.

Two plant transients were reanalyzed in connection with the UHI amendment request. These were the "Inadvertent Opening of a Steam Generator Relief or Safety Valve" and the "Steam System Piping Failure" events (FSAR Section 15.1.5). The safety analyses were done with approved codes, and plant and core characteristics without UHI were demonstrated to be within regulatory limits. In the review of the effect of the RCS flow reduction, it was noted that the current licensing basis analysis was performed with a thermal design flow of 94250 GPM which is more conservative than the reduced TDF of 94500 GPM. Therefore, the conclusions of the current licensing basis remain valid.

Other transient analyses using a more conservative TDF than the reduced flow proposal were "Loss of Non-Emergency A-C Power to the Station Auxiliaries" (FSAR Section 15.2.6), "Loss of Normal Feedwater" (FSAR Section 15.2.7), "Feedwater System Pipe Break" (FSAR Section 15.2.8), "Reactor Coolant Pump Shaft Seizure" (FSAR Section 15.3.3), "Uncontrolled RCCA Bank Withdrawal from a Subcritical or Low Power Startup Condition" (FSAR Section 15.4.1), and "Spectrum of RCCA Ejection Accidents" (FSAR Section 15.4.8). The conclusions of the current licensing basis, therefore, remain valid.

Other transient events, such as "Feedwater System Malfunctions" (FSAR Sections 15.1.1, 15.1.2), "Loss of External Electric Load" (FSAR Section 15.2.2), "Inadvertent Closure of MSIVs" (FSAR Section 15.2.4), "Reactor Coolant Pump Break" (FSAR Section 15.3.4), and "CVCS Malfunction that Results in a Decrease in the Boron Concentration in the Reactor Coolant" (FSAR Section 15.4.6) are bounded by other events or are not affected since RCS flow is not explicitly modeled.

The "Steam Generator Tube Rupture Event" (FSAR Section 15.6.4) was reviewed to assess the effect of the flow reduction. A sensitivity study showed a slight increase in primary to secondary break flow and a slight decrease in atmospheric steam flow from the failed steam generator. The FSAR conclusion that the doses are within the limits of 10 CFR 100 remain valid for a one percent reduction in RCS flow.

As a result of the thermal margin evaluation and transient and non-LOCA reanalysis, the licensee concluded that, even with an assumed one percent reduction, no safety criteria will be violated during transients and non-LOCAs, and the results differ insignificantly from that in the current licensing basis analyses.

The licensee has determined that the reduction in RCS flow reduces the cold leg temperature less than one degree. As a result, reactor vessel internal blowdown forces are not significantly affected, and there is no adverse effect on the structural adequacy of vessel internals, core components, and coolant loop piping.

The licensee has determined that the reduction in RCS flow has a negligible effect on the containment analyses of FSAR Section 6.2.1. This conclusion stems from the negligible change in the RCS initial fluid and metal stored energy. As a result, mass and energy releases to containment remain unchanged, and the current analyses remain valid.

The NRC staff has reviewed the Duke Power Company request to reduce the required measured RCS flow rate by one percent and the associated TS changes. Based on its review of the LOCA and transient analyses provided by the licensee, the staff has concluded that there is reasonable assurance that operation of the McGuire units at full power with a one percent flow reduction does not violate the safety limits associated with the accident analyses presented in the FSAR for the McGuire Units.

3.0 ENVIRONMENTAL CONSIDERATION

These amendments involve changes in the requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. 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 40465) on October 3, 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: M. McCoy, DST/SRXB
T. Reed, DRP-I/II/PDII-3

Dated: November 20, 1990