April 24, 97

Mr. H. B. Barron
Vice President, McGuire Site
Duke Power Company
12700 Hagers Ferry Road
Hunterville, NC 28078-8985

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SUBJECT: ISSUANCE OF AMENDMENT - MCGUIRE NUCLEAR STATION, UNITS 1 AND 2 (TAC NOS. M97664 AND M97665)

Dear Mr. Barron:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 174 to Facility Operating License NPF-9 and Amendment No. 156 to Facility Operating License NPF-17 for the McGuire Nuclear Station, Units 1 and 2. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated January 6, 1997, as supplemented by letters dated April 10 and 15, 1997. The amendments revise portions of the TS to permit a one-time operation of the Containment Purge Ventilation System during Modes 3 and 4 after the current and forthcoming steam generator replacement outages.

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

Sincerely,

ORIGINAL SIGNED BY:

Victor Nerses, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-369 and 50-370

Enclosures:
1. Amendment No. 174 to NPF-9
2. Amendment No. 156 to NPF-17
3. Safety Evaluation

cc w/encls: See next page

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DOCUMENT NAME: G:\MCGUIRE\97664.AMD

OFFICE	PDII-2/PM	PDII-2/LA	EMEB:DE	OGC	PDII-2/D
NAME	V.NERSES:cn	L.BERRY	DTERAO	R.Bachman	H.BERKOW
DATE	4/18/97	4/18/97	4/18/97	4/21/97	4/23/97
COPY	YES NO	YES NO	YES NO	YES NO	YES NO

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 24, 1997

Mr. H. B. Barron
Vice President, McGuire Site
Duke Power Company
12700 Hagers Ferry Road
Hunterville, NC 28078-8985

SUBJECT: ISSUANCE OF AMENDMENT - MCGUIRE NUCLEAR STATION, UNITS 1 AND 2 (TAC NOS. M97664 AND M97665)

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The Nuclear Regulatory Commission has issued the enclosed Amendment No. 174 to Facility Operating License NPF-9 and Amendment No. 156 to Facility Operating License NPF-17 for the McGuire Nuclear Station, Units 1 and 2. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated January 6, 1997, as supplemented by letters dated April 10 and 15, 1997. The amendments revise portions of the TS to permit a one-time operation of the Containment Purge Ventilation System during Modes 3 and 4 after the current and forthcoming steam generator replacement outages.

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

Sincerely,

Victor Nerses

Victor Nerses, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-369 and 50-370

Enclosures: 1. Amendment No. 174 to NPF-9
2. Amendment No. 156 to NPF-17
3. Safety Evaluation

cc w/encls: See next page

McGuire Nuclear Station
Units 1 and 2

cc:
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Raleigh, North Carolina 27611-7687

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE POWER COMPANY

DOCKET NO. 50-369

MCGUIRE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 174
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, dated January 6, 1997, as supplemented by letters dated April 10 and 15, 1997, 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. 174 , which are attached hereto, are hereby incorporated into this license. Duke Power Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
  Changes

Date of Issuance: April 24, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 174

FACILITY OPERATING LICENSE NO. NPF-9

DOCKET NO. 50-369

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	Insert
3/4 6-1	3/4 6-1
3/4 6-2	3/4 6-2
3/4 6-11	3/4 6-11
3/4 6-13	3/4 6-13

CONTAINMENT SYSTEMS

CONTAINMENT LEAKAGE

LIMITING CONDITION FOR OPERATION

3.6.1.2 Containment leakage rates shall be limited to:

a. An overall integrated leakage rate of less than or equal to L_a, 0.30% by weight of the containment air per 24 hours at P_a, 14.8 psig,

b. A combined leakage rate of less than 0.60 L_a for all penetrations and valves subject to Type B and C tests, when pressurized to P_a, and

c. A combined bypass leakage rate of less than 0.07 L_a for all penetrations identified as secondary containment bypass leakage paths when pressurized to P_a.

APPLICABILITY: MODES 1, 2, 3, and 4.*

ACTION:

With (a) the measured overall integrated containment leakage rate exceeding 0.75 L_a or (b) the measured combined leakage rate for all penetrations and valves subject to Types B and C tests exceeding 0.60 L_a, or (c) the combined bypass leakage rate exceeding 0.07 L_a, restore the overall integrated leakage rate to less than 0.75 L_a and the combined leakage rate for all penetrations and valves subject to Type B and C tests to less than 0.60 L_a, and the combined bypass leakage rate to less than 0.07 L_a prior to increasing the Reactor Coolant System temperature above 200°F.

SURVEILLANCE REQUIREMENTS

4.6.1.2 Type A containment leakage rates shall be demonstrated as required by 10 CFR 50.54(o) and Appendix J of 10 CFR 50, Option B, as modified by approved exemptions, and in accordance with the guidelines of Regulatory Guide 1.163, September, 1995.

*A one-time change is granted to have the containment purge supply and/or exhaust isolation valves for the upper and lower compartment open in Modes 3 and 4 following the steam generator replacement outage. The cumulative time for having the valves open in Modes 3 and 4 is limited to fourteen (14) days. All other provisions of this specification apply with the exception of those containment purge valves open in Modes 3 and 4. Each valve will be sealed closed prior to initial entry into Mode 2.

3/4.6 CONTAINMENT SYSTEMS

3/4.6.1 PRIMARY CONTAINMENT

CONTAINMENT INTEGRITY

LIMITING CONDITION FOR OPERATION

3.6.1.1 Primary CONTAINMENT INTEGRITY shall be maintained.

APPLICABILITY: MODES 1, 2, 3, and 4. ***

ACTION:

Without primary CONTAINMENT INTEGRITY, restore CONTAINMENT INTEGRITY within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.1 Primary CONTAINMENT INTEGRITY shall be demonstrated:

a. At least once per 31 days by verifying that all penetrations* not capable of being closed by OPERABLE containment automatic isolation valves or operator action during periods when containment isolation valves are open under administrative control,** and required to be closed during accident conditions are closed by valves, blind flanges, or deactivated automatic valves secured in their positions;

b. By verifying that each containment air lock is in compliance with Specification 3.6.1.3; and

c. After each closing of each penetration subject to Type B testing, except the containment air locks, if opened following a Type A or B test, by leak rate testing the seal with gas at P_a, 14.8 psig, and verifying that when the measured leakage rate for these seals is added to the leakage rates determined pursuant to Specification 4.6.1.2d. for all other Type B and C penetrations, the combined leakage rate is less than 0.60 L_a.

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*Except valves, blind flanges, and deactivated automatic valves which are located inside the containment and the annulus and are locked, sealed or otherwise secured in the closed position. These penetrations shall be verified closed during each COLD SHUTDOWN except that such verification need not be performed more often than once per 92 days.

**The following valves may be opened on an intermittent basis under administrative control: NC-141, NC-142, WE-13, WE-23, VX-34, VX-40, FW-11, FW-13, FW-4.

***A one-time change is granted to have the containment purge supply and/or exhaust isolation valves for the upper and lower compartment open in Modes 3 and 4 following the steam generator replacement outage. The cumulative time for having the valves open in Modes 3 and 4 is limited to fourteen (14) days. All other provisions of this specification apply with the exception of those containment purge valves open in Modes 3 and 4. Each valve will be sealed closed prior to initial entry into Mode 2.

CONTAINMENT SYSTEMS

ANNULUS VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.1.8 Two independent Annulus Ventilation Systems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.*

ACTION:

a. With one Annulus Ventilation System inoperable for reasons other than the pre-heaters tested in 4.6.1.8.a and 4.6.1.8.d.5, restore the inoperable system to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the pre-heaters tested in 4.6.1.8.a and 4.6.1.8.d.5 inoperable, restore the inoperable pre-heaters to OPERABLE status within 7 days, or file a Special Report in accordance with Specification 6.9.2 within 30 days specifying the reason for inoperability and the planned actions to return the pre-heaters to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.6.1.8 Each Annulus Ventilation System shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS, by initiating, from the control room, flow through the HEPA filters and charcoal adsorbers and verifying that the system operates for at least 10 hours with the pre-heaters operating;

b. At least once per 18 months, or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the system, by:

   1) Verifying that the ventilation system satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 1% and uses the test procedure guidance of Regulatory Positions C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978, and the system flow rate is 8000 cfm ± 10%;

   2) Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, and tested per ASTM D3803-89 has a methyl iodide penetration of less than 4%; and

   3) Verifying a system flow rate of 8000 cfm ± 10% during system operation when tested in accordance with ANSI N510-1975.

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* A one-time change is granted in Modes 3 and 4 to allow repair activities for the containment purge supply and/or exhaust isolation valves for the upper and lower compartment that were open in Modes 3 and 4 following the steam generator replacement outage.

CONTAINMENT SYSTEMS

CONTAINMENT VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.1.9 Each containment purge supply and/or exhaust isolation valve shall be OPERABLE and:

a. Each containment purge supply and/or exhaust isolation valve for the lower compartment (24-inch) and instrument room (12-inch and 24-inch) shall be sealed closed, and

b. The containment purge supply and/or exhaust isolation valve(s) for the upper compartment (24-inch) may be opened for up to 250 hours during a calendar year provided no more than one pair (one supply and one exhaust) are open at one time.

APPLICABILITY: MODES 1, 2, 3, and 4.*

ACTION:

a. With any containment purge supply and/or exhaust isolation valve for the lower compartment or instrument room open or not sealed closed, close and/or seal closed that valve or isolate the penetration(s) within 4 hours, otherwise be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the containment purge supply and/or exhaust isolation valve(s) for the upper compartment open for more than 250 hours during a calendar year, close any open valve or isolate the penetration(s) within 4 hours, otherwise be in at least HOT STANDBY within the next 6 hours, and in COLD SHUTDOWN within the following 30 hours.

c. With a containment purge supply and/or exhaust isolation valve(s) having a measured leakage rate in excess of the limits of Specifications 4.6.1.9.3 and/or 4.6.1.9.4, restore the inoperable valve(s) to OPERABLE status within 24 hours, otherwise be in at least HOT STANDBY within the next 6 hours, and in COLD SHUTDOWN within the following 30 hours.

* A one-time change is granted to have the containment purge supply and/or exhaust isolation valves for the upper and lower compartment open in Modes 3 and 4 following the steam generator replacement outage. The cumulative time for having the valves open in Modes 3 and 4 is limited to fourteen (14) days. All other provisions of this specification apply with the exception of those containment purge valves open in Modes 3 and 4. Each valve will be sealed closed prior to initial entry into Mode 2.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE POWER COMPANY

DOCKET NO. 50-370

McGUIRE NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 156
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 (licensee) dated January 6, 1997, as supplemented by letters dated April 10 and 15, 1997, 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:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 156 , are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
  Changes

Date of Issuance: April 24, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 156

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	Insert
3/4 6-1	3/4 6-1
3/4 6-2	3/4 6-2
3/4 6-11	3/4 6-11
3/4 6-13	3/4 6-13

3/4.6 CONTAINMENT SYSTEMS

3/4.6.1 PRIMARY CONTAINMENT

CONTAINMENT INTEGRITY

LIMITING CONDITION FOR OPERATION

3.6.1.1 Primary CONTAINMENT INTEGRITY shall be maintained.

APPLICABILITY: MODES 1, 2, 3, and 4. ***

ACTION:

Without primary CONTAINMENT INTEGRITY, restore CONTAINMENT INTEGRITY within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.1 Primary CONTAINMENT INTEGRITY shall be demonstrated:

a. At least once per 31 days by verifying that all penetrations* not capable of being closed by OPERABLE containment automatic isolation valves or operator action during periods when containment isolation valves are open under administrative control,** and required to be closed during accident conditions are closed by valves, blind flanges, or deactivated automatic valves secured in their positions;

b. By verifying that each containment air lock is in compliance with Specification 3.6.1.3; and

c. After each closing of each penetration subject to Type B testing, except the containment air locks, if opened following a Type A or B test, by leak rate testing the seal with gas at P_a, 14.8 psig, and verifying that when the measured leakage rate for these seals is added to the leakage rates determined pursuant to Specification 4.6.1.2d. for all other Type B and C penetrations, the combined leakage rate is less than 0.60 L_a.

---

*Except valves, blind flanges, and deactivated automatic valves which are located inside the containment and the annulus and are locked, sealed or otherwise secured in the closed position. These penetrations shall be verified closed during each COLD SHUTDOWN except that such verification need not be performed more often than once per 92 days.

**The following valves may be opened on an intermittent basis under administrative control: NC-141, NC-142, WE-13, WE-23, VX-34, VX-40, FW-11, FW-13, FW-4.

***A one-time change is granted to have the containment purge supply and/or exhaust isolation valves for the upper and lower compartment open in Modes 3 and 4 following the steam generator replacement outage. The cumulative time for having the valves open in Modes 3 and 4 is limited to fourteen (14) days. All other provisions of this specification apply with the exception of those containment purge valves open in Modes 3 and 4. Each valve will be sealed closed prior to initial entry into Mode 2.

CONTAINMENT LEAKAGE

LIMITING CONDITION FOR OPERATION

3.6.1.2 Containment leakage rates shall be limited to:

a. An overall integrated leakage rate of less than or equal to L_a, 0.30% by weight of the containment air per 24 hours at P_a, 14.8 psig,

b. A combined leakage rate of less than 0.60 L_a for all penetrations and valves subject to Type B and C tests, when pressurized to P_a, and

c. A combined bypass leakage rate of less than 0.07 L_a for all penetrations identified as secondary containment bypass leakage paths when pressurized to P_a.

APPLICABILITY: MODES 1, 2, 3, and 4.*

ACTION:

With (a) the measured overall integrated containment leakage rate exceeding 0.75 L_a or (b) the measured combined leakage rate for all penetrations and valves subject to Types B and C tests exceeding 0.60 L_a, or (c) the combined bypass leakage rate exceeding 0.07 L_a, restore the overall integrated leakage rate to less than 0.75 L_a and the combined leakage rate for all penetrations and valves subject to Type B and C tests to less than 0.60 L_a, and the combined bypass leakage rate to less than 0.07 L_a prior to increasing the Reactor Coolant System temperature above 200°F.

SURVEILLANCE REQUIREMENTS

4.6.1.2 Type A containment leakage rates shall be demonstrated as required by 10 CFR 50.54(o) and Appendix J of 10 CFR 50, Option B, as modified by approved exemptions, and in accordance with the guidelines of Regulatory Guide 1.163, September, 1995.

*A one-time change is granted to have the containment purge supply and/or exhaust isolation valves for the upper and lower compartment open in Modes 3 and 4 following the steam generator replacement outage. The cumulative time for having the valves open in Modes 3 and 4 is limited to fourteen (14) days. All other provisions of this specification apply with the exception of those containment purge valves open in Modes 3 and 4. Each valve will be sealed closed prior to initial entry into Mode 2.

LIMITING CONDITION FOR OPERATION

3.6.1.8 Two independent Annulus Ventilation Systems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.*

ACTION:

a. With one Annulus Ventilation System inoperable for reasons other than the pre-heaters tested in 4.6.1.8.a and 4.6.1.8.d.5, restore the inoperable system to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the pre-heaters tested in 4.6.1.8.a and 4.6.1.8.d.5 inoperable, restore the inoperable pre-heaters to OPERABLE status within 7 days, or file a Special Report in accordance with Specification 6.9.2 within 30 days specifying the reason for inoperability and the planned actions to return the pre-heaters to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.6.1.8 Each Annulus Ventilation System shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS, by initiating, from the control room, flow through the HEPA filters and charcoal adsorbers and verifying that the system operates for at least 10 hours with the pre-heaters operating;

b. At least once per 18 months, or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the system, by:

   1) Verifying that the ventilation system satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 1% and uses the test procedure guidance of Regulatory Positions C.5.a, C.5.c and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978, and the system flow rate is 8000 cfm ± 10%;

   2) Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, and tested per ASTM D3803-89 has a methyl iodide penetration of less than 4%; and

   3) Verifying a system flow rate of 8000 cfm ± 10% during system operation when tested in accordance with ANSI N510-1975.

---

* A one-time change is granted in Modes 3 and 4 to allow repair activities for the containment purge supply and/or exhaust isolation valves for the upper and lower compartment that were open in Modes 3 and 4 following the steam generator replacement outage.

CONTAINMENT VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.1.9 Each containment purge supply and/or exhaust isolation valve shall be OPERABLE and:

a. Each containment purge supply and/or exhaust isolation valve for the lower compartment (24-inch) and instrument room (12-inch and 24-inch) shall be sealed closed, and

b. The containment purge supply and/or exhaust isolation valve(s) for the upper compartment (24-inch) may be opened for up to 250 hours during a calendar year provided no more than one pair (one supply and one exhaust) are open at one time.

APPLICABILITY: MODES 1, 2, 3, and 4.*

ACTION:

a. With any containment purge supply and/or exhaust isolation valve for the lower compartment or instrument room open or not sealed closed, close and/or seal closed that valve or isolate the penetration(s) within 4 hours, otherwise be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With the containment purge supply and/or exhaust isolation valve(s) for the upper compartment open for more than 250 hours during a calendar year, close any open valve or isolate the penetration(s) within 4 hours, otherwise be in at least HOT STANDBY within the next 6 hours, and in COLD SHUTDOWN within the following 30 hours.

c. With a containment purge supply and/or exhaust isolation valve(s) having a measured leakage rate in excess of the limits of Specifications 4.6.1.9.3 and/or 4.6.1.9.4, restore the inoperable valve(s) to OPERABLE status within 24 hours, otherwise be in at least HOT STANDBY within the next 6 hours, and in COLD SHUTDOWN within the following 30 hours.

* A one-time change is granted to have the containment purge supply and/or exhaust isolation valves for the upper and lower compartment open in Modes 3 and 4 following the steam generator replacement outage. The cumulative time for having the valves open in Modes 3 and 4 is limited to fourteen (14) days. All other provisions of this specification apply with the exception of those containment purge valves open in Modes 3 and 4. Each valve will be sealed closed prior to initial entry into Mode 2.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 174 TO FACILITY OPERATING LICENSE NPF-9

AND AMENDMENT NO. 156 TO FACILITY OPERATING LICENSE NPF-17

DUKE POWER COMPANY

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOS. 50-369 AND 50-370

1.0 INTRODUCTION

The McGuire Nuclear Station, Units 1 and 2 steam generators (SGs) are being replaced during the current and forthcoming outages. The SG replacement will involve modifications to interfacing piping and supports. These modifications will, in turn, involve the installation of new insulation material and extensive use of cutting fluids, lubricants, cleaning fluids, hydraulic fluids, and chemicals associated with nondestructive examinations. During the initial plant heatup following the modifications, there will be an anticipated large amount of thermal decomposition products (TDPs) produced in the containment atmosphere. This would render a closed containment atmosphere unfit for breathing by personnel who must enter the containment to perform adjustments, tests, and inspections during this period. The Duke Power Company has also determined that use of respiratory protection would be hazardous, and that a high vent/purge flow would be the most suitable means of permitting personnel access.

Accordingly, by letter dated January 6, 1997, Duke Power Company (the licensee) requested NRC approval for a one-time change to McGuire Nuclear Station, Units 1 and 2 Technical Specifications (TS) to allow operation of the Containment Purge Ventilation System in Modes 3 and 4 during the startup following the current and forthcoming outages to replace the steam generators. The licensee has stated that the TS change is needed to protect personnel from airborne hazardous materials during containment entries during the initial startup with the new steam generators. Operation of the ventilation system is planned to reduce the concentration of these materials.

In conference calls, on March 3 and 12, 1997, the staff requested additional information. By letters dated April 10 and 15, 1997, the licensee responded. The responses provided clarifying information that did not change the scope of the January 6, 1997, application for amendment and the initial proposed no significant hazards consideration determination.

2.0 EVALUATION

2.1 Containment Ventilation Systems and Associated Technical Specifications

The licensee considered numerous options for dealing with the TDP problem during the initial post-SG-replacement heatup. The licensee concluded that high flow rate purging would be the most feasible means of permitting personnel to work in the containment. The McGuire facilities are provided with several containment ventilation systems that are capable of supplying fresh outside air to the containment to replace contaminated containment air. These systems are the Containment Purge Ventilation System (described in Section 9.4.5 of the Final Safety Analysis Report (FSAR)) and the Hydrogen Purge System (described in FSAR Section 6.2.5).

2.1.1 Hydrogen Purge System

The Containment Hydrogen Purge System has a single blower that is designed to supply 100 cubic feet per minute of purge air to the containment under accident conditions to reduce hydrogen concentration. This system provides a backup post-accident hydrogen control capability for use in the event of failure of the recombiner and hydrogen igniter systems. During post-accident hydrogen purging conditions, fresh air would be supplied to the containment, and containment air would be exhausted to the annulus. Because of its low flow capacity, use of this system for ventilation would not provide a significant reduction in TDP concentration during the startup.

2.1.1 Containment Purge Ventilation System

The Containment Purge Ventilation System (CPVS), referred to as the "Containment Purge System" in the application, has supply and exhaust fans designed to ventilate the upper and lower containment compartments and incore instrument compartment at high flow rates (1½ air changes per hour). It has no accident mitigation function, but is intended for use during refueling and for containment atmosphere cleanup before personnel entry into the containment during power operation. Exhaust air is filtered by carbon filters and discharged to the plant vent, which provides radiation monitoring. Containment isolation valves in the supply and exhaust lines are 24-inch diameter butterfly valves with pneumatic diaphragm type "air-to-open" operators. The valve operators are provided with instrumentation and controls such that they isolate automatically in the event of safety injection or high radiation. The TS require that these Containment Purge Ventilation System containment isolation valves be sealed closed during Modes 1, 2, 3, and 4 except that one pair of the upper compartment valves may be opened up to 250 hrs/yr for purging prior to containment entry. This requirement is based on the fact that these valves have not been previously shown to be capable of closing against loss-of-coolant accident (LOCA) dynamic forces. Additional considerations are that the resiliently seated, butterfly valves typically used in this application have a history of significant leakage test failures, and that these valves are relied on to seal containment "bypass" pathways (i.e., the leakage would not be collected, treated, and released to an elevated release point).

2.2 Proposed TS Change and Associated Safety Concerns

Specifically, the following addition of a footnote was proposed by the licensee for Sections 3.6.1.1, 3.6.1.2, and 3.6.1.9:

> A one-time change is granted to have the containment purge supply and/or exhaust isolation valves for the upper and lower compartment open in Modes 3 and 4 following the steam generator replacement outage. The cumulative time for having the valves open in Modes 3 and 4 is limited to fourteen (14) days. All other provisions of this specification apply with the exception of those containment purge valves open in Modes 3 and 4. Each valve will be sealed closed prior to initial entry into Mode 2.

Also, Section 3.6.1.8 would be changed to add a footnote specifying that:

> A one-time change is granted in Modes 3 and 4 to allow repair activities for the containment purge supply and/or exhaust isolation valves for the upper and lower compartment that were open in Modes 3 and 4 following the steam generator replacement outage.

The proposed TS changes would apply to the first startup following the SG replacement outage and only for the period that the facility is in Mode 3 (Hot Standby) or Mode 4 (Hot Shutdown). During these periods, the Reactor Coolant System will be brought up to normal operating temperature and pressure using coolant pump heat input. However, the core will be subcritical and producing very little decay heat. Since the Reactor Coolant System will be hot and pressurized, and irradiated fuel will be in the reactor pressure vessel, a LOCA is a postulated event and containment integrity is required. Unlike the initial startup of a new facility, the proposed initial post-SG-replacement startup does not encompass a separate pre-fuel-loading hot functional testing phase to verify piping support loadings and pipe displacement measurements.

In view of the associated safety concerns, the staff's review encompassed the following areas: (1) what tests and analyses, and debris protection measures confirm the capability of the containment vent/purge valves to close against LOCA dynamic forces, and (2) what would be the radiological consequences of a LOCA assuming a failure to isolate the containment.

2.2.1 Containment Purge/Vent System (CPVS) Valve Isolation Reliability

For valves that are not sealed closed, Branch Technical Position CSB 6-4 and Standard Review Plan Section 3.10 (NUREG-0800) state that the operability of the containment purge and vent valves, particularly their ability to close during a design-basis accident, must be demonstrated to ensure containment isolation. McGuire Nuclear Station, Units 1 and 2, Safety Evaluation Report (SER), Supplement 2, concludes that the licensee has demonstrated the operability of the upper compartment purge system containment isolation valves. The TS allows the upper compartment 24-inch containment isolation valves to be opened for up to 250 hours during a calendar year provided no more than one pair (one supply and one exhaust) are open at one time. With regard to the lower compartment, the SER states that the purge system will not be used during Modes 1 through 4; and the lower compartment isolation valves are required by TS to be sealed closed in Modes 1, 2, 3, and 4.

The licensee has subsequently provided additional information in order to demonstrate adequate containment isolation following a postulated design-basis LOCA (DBLOCA) during startup from the steam generator replacement outage. The evaluation below discusses the ability of these valves to close during such conditions, considering the information provided by the licensee in submittals dated January 6, 1997, and April 10, 1997, for this one-time change to the TS.

The 24-inch butterfly valves in question are air-spring operated with an offset disc (Fisher Type 9200). These purge valves use air to open and spring force to close. The valves and actuators are safety-related, Seismic Category I.

The closure adequacy review performed by the valve vendor, Fisher Controls, in a report dated May 30, 1995, determined the following:

1. The critical valve components can withstand the specified pressure differential conditions without approaching yield.

2. The weakest valve component is the shaft in shear at the disc pin connection, followed by the key in compression at the shaft radius, the key in shear at the key connection, and the pin in shear at the shaft radius. Yield torque of the weakest component (shaft) is 29,614 in-lbf.

3. A flow closed negative torque characteristic is expected for both the inboard and outboard valves at opening angles up to 80 degrees open. This characteristic may be weak at opening angles of 50 degrees or less, requiring some actuator action to overcome friction (which is within the capabilities of the Bettis 732C-SR60 actuators).

4. At full 90 degrees open, the torque characteristics (depending on orientation) are expected to be nil or positive, possibly requiring maximum output from the actuator to initiate closure.

5. Sufficient spring-return torque output is expected from the Bettis actuator to initiate closure from 90 degrees open for the inboard valves.

6. The spring-return torque output from the outboard valve actuator may be insufficient to initiate closure from 90 degrees open; therefore, the maximum opening should be limited to 80 degrees or less.

In evaluating the expected performance of the purge valves, Fisher Controls (Fisher) determined that both the inboard (hub downstream) and outboard (hub upstream) butterfly valves would be self-closing from open angles of 10 degrees up to 80 degrees under the postulated accident conditions. To ensure that the outboard butterfly valves remain self-closing when open to large angles, the actuators on the outboard butterfly valves will be modified to prevent the valves from opening more than 80 degrees. Fisher predicts that the inboard valves will require 7,103 in-lbf of torque to initiate closure at the 90-degree open position. Fisher predicts the seating torque requirement as 5,348 in-lbf for both the inboard and outboard valves.

Fisher uses information from its laboratory testing of a 6-inch butterfly valve in predicting the performance of the 24-inch purge valves. The licensee reviewed the valve performance predicted by Fisher and has found the predictions to parallel valve behavior observed during testing in response to Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." Recent testing by the Electric Power Research Institute suggest that flow and torque coefficients for low aspect-ratio (defined here as disc thickness divided by disc diameter) butterfly valves (such as the McGuire purge valves) are linear. However, because of the extensive extrapolation of the Fisher test information, the staff considers it important for the licensee to demonstrate significant margin in the capability of the actuators to close the purge valves.

Fisher reports that the spring in each purge valve actuator can supply 12,930 in-lbf of torque at the 90-degree open position and 6,876 in-lbf at the 0-degree closed position. The outboard valve is self-closing for most of the closure stroke and is predicted to have nearly 30 percent margin above required seating torque. The inboard valve is predicted to have more than 80 percent margin at the full open position, to be self-closing from 80 degrees to almost closed, and then to have nearly 30 percent margin above required seating torque. On the basis of these margins, the staff finds the actuators to have sufficient capability for the primarily self-closing inboard and outboard purge valves to perform their intended function although a leak-tight seal might not be achieved.

The licensee states that a leak-tight seal is not necessary for the purge valves during the proposed purge of lower containment because of the small radiological source term during startup from the steam generator replacement outage. The licensee's radiological analyses predict doses much lower than the applicable 10 CFR Part 100 dose limits using these bounding leakage rates. The acceptability of the licensee's radiological consequences analyses is discussed in Section 2.2.2.

The licensee has committed to conduct specific testing to confirm certain assumptions in the capability and radiological analyses of the purge valves. Specifically, the testing to be conducted by the licensee on each of the valves prior to entry into Mode 4 includes: (1) a leak test, a remote position indication verification test, fail safe test, and stroke test that are performed as part of ASME Section XI inservice testing program required by 10 CFR 50.55a; and (2) a spring torque output test. The staff agrees that these specific tests be performed and notes the licensee's commitment to perform these tests.

For a one-time basis only during startup from the steam generator replacement outage in Modes 3 and 4, the staff finds that the licensee's proposal to rely on the containment purge valves provides a reasonable assurance that the valves in question would perform their function to close following a DBLOCA.

Opening of the VP isolation valves during power operation is inconsistent with certain provisions of Standard Review Plan Section 6.2.4/Branch Technical Position CSB 6-4, "Containment Purging During Normal Plant Operations" in that:

> All VP isolation valves would be opened and both trains used for purging rather than just one train during the startup.
>
> Debris screens are not provided in the VP lines between the containment airspace and inboard isolation valves.
>
> The lines exceed 8 inches in diameter.

The staff has considered the potential effects of these factors with respect to isolation reliability. Of the factors, the lack of debris strainers is the most significant. Debris strainers are typically provided to protect the isolation valves from loss of ability to fully close due to LOCA-generated debris entering the vent/purge lines during blowdown. The Final Safety Analysis Report states that debris strainers are unnecessary because of the rapid closure capability of the valves, and (for the upper compartment), the filtering effect of the ice condenser.

The licensee's supporting dose consequences analysis arbitrarily assumed a very high containment leakage rate function to provide a conservative upper bound on purge isolation valve leakage. The dose analysis assumes that the containment leaks at 100 percent/day. This assumed leakage rate is considerably in excess of that postulated for a design-basis accident (DBA). With the increased leakage assumption, the results were still comparable to those of the DBA analyses (due to the source term reduction). Based on analyzed dose consequences, and the limited time period involved, the staff has determined that installation of temporary strainers is unwarranted.

2.2.2 Radiological Consequences Analyses

The licensee provided calculations of the expected radiation doses that would be received by individuals offsite and in the control room if a LOCA were to occur coincident with purge/vent operation. The results of these calculations indicate the requirements of 10 CFR Part 100 and General Design Criterion (GDC) 19 in Appendix A to 10 CFR Part 50 would be met during this postulated accident. For these calculations, it was assumed that two thirds of the reactor core had been operated at power then decayed for a minimum of 70 days due to the extended outage. The other one third would be new unirradiated fuel, therefore contributing no fission products to the source term. Due to the uncertainty of how well the purge/vent isolation valves will seal following a containment isolation signal, the licensee conservatively assumed that they would leak at a rate equal to 100 percent of the containment volume per day for the first 24 hours then 50 percent per day for the remainder of the accident. Since leakage through the purge/vent system bypasses the containment annulus, no credit for fission product holdup in the annulus nor removal by the annulus ventilation system filtration was assumed. In addition, no fission product removal by the containment ice beds was assumed.

However, credit was taken in the analysis for fission product removal by the containment spray system and the purge/vent system filters.

The staff reviewed the licensee's calculations and performed an independent analysis of the expected offsite and control room doses resulting from the postulated LOCA. Using the assumptions stated above and input parameters taken from the current licensing basis, whole body and thyroid doses for an individual at the Exclusion Area Boundary (EAB) and the Low Population Zone (LPZ) as well as whole body, thyroid and skin doses for operators in the control room were calculated using the HABIT computer code. Since no credit was taken for iodine removal by the ice beds, the containment was modelled as two compartments (nodes) with the Containment Recirculation System providing 30,000 cubic feet per minute of unfiltered forced recirculation.

Table 1 (attached) lists the results of the staff's analysis of the offsite and control room doses resulting from the postulated LOCA along with the applicable acceptance criteria from the Standard Review Plan (SRP). The input parameters used in the staff's analysis are listed in Table 2 (attached). These results indicate that the radiation doses resulting from containment leakage through the purge system during the postulated LOCA (e.g., accident occurs with the containment purge system operating during the startup following a steam generator replacement outage), are within the acceptance criteria in the SRP and meet the design criteria in 10 CFR Part 100 for offsite doses and GDC 19 in Appendix A of 10 CFR 50 for control room operators. The radiological consequences are, thus, acceptable.

3.0 STAFF CONCLUSION

The proposed amendments will permit a vulnerable containment condition during a period of time when there is an increased possibility of a LOCA due to extensive reactor coolant system repairs having been performed and the piping vibration measurement, thermal displacements and pipe support forces will have not yet been verified to be in conformance with piping flexibility/support calculations. The staff has determined that the amendments are acceptable based on (1) the greatly reduced core fission product inventory that will exist under the precritical conditions, and (2) the 14-day, limited duration (one-time) for which the amendments would apply.

4.0 STATE CONSULTATION

In accordance with the Commissions's regulations, the North Carolina State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATIONS

The amendments change requirements with respect to installation or use of a facility component 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 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 (62 FR 6574 dated February 12, 1997). 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 the amendments.

6.0 CONCLUSION

The staff has 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Attachment: Tables 1 and 2

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Table 1

Radiological Consequences of LOCA
While Purging Following a
Steam Generator Replacement Outage
For McGuire Unit 1 or Unit 2

	Dose (Rem)	Acceptance Criteria
Exclusion Area Boundary (2 Hour):		
Whole Body	.053	25
Thyroid	70	300
Low Population Zone (30 Days):		
Whole Body	.018	25
Thyroid	18	300
Control Room (30 Days):		
Whole Body	.014	5
Thyroid	6.6	30
Skin	30	30

Table 2

Input Parameters for LOCA Analysis For McGuire Unit 1 or Unit 2

Off-site Doses:

Reactor power prior to shutdown (Adjusted to account for 1/3 core of new fuel)	3565 MWt
Fission product decay time	70 days
Containment volume	1.2×10^{6} ft^3
Fraction of core inventory available for leakage	
Iodines	25%
Noble Gases	100%
Initial iodine composition	
Elemental	91%
Organic	4%
Particulate	5%
Containment Spray [Lamda (Sec^{-1}) : Max. DF]	
Elemental	2.53×10^{-4} : 5.87
Organic	0 : 1.0
Particulate	6.59×10^{-4} : 100
VP System Filter Efficiencies	
Elemental	90%
Organic	70%
Particulate	99%
Atmospheric dispersion	
0 to 2 hours	9.0×10^{-4} s/m^3
0 to 8 hours	8.0×10^{-5} s/m^3
8 to 24 hours	5.2×10^{-6} s/m^3
24 to 96 hours	1.7×10^{-6} s/m^3
96 to 720 hours	3.7×10^{-7} s/m^3

Table 2 continued

Control Room Doses:

Control room volume	1.16×10^5 Ft^3
Air volume flow rates	
Filtered make-up	1800 CFM
Unfiltered make-up	10 CFM
Filter efficiencies	
Elemental iodine	99%
Organic iodine	99%
Particulate	99%
Atmospheric dispersion	
0 to 4 hours	2.0×10^{-3} s/m^3
4 to 8 hours	1.0×10^{-3} s/m^3
8 to 24 hours	7.0×10^{-4} s/m^3
24 to 96 hours	4.5×10^{-4} s/m^3
96 to 720 hours	2.4×10^{-4} s/m^3