December 17, 1993

Docket Nos. 50-413
and 50-414

Distribution
Docket File
NRC/Local PDRs
PDII-3 Reading
S.Varga
L.Plisco
R.Martin
L.Berry
OGC 15B18
R.Jones, 8E23
D.Hagan MNB4702
G.Hill(4) P1-37
C.Grimes 11F22
ACRS(10) P-135
PA 2G5
OC/LFMB MNB11104
E.Merschoff, RII
E.Kendrick, 8E23

Mr. David L. Rehn
Vice President, Catawba Site
Duke Power Company
4800 Concord Road
York, South Carolina 29745

Dear Mr. Rehn:

SUBJECT: ISSUANCE OF AMENDMENTS - CATAWBA NUCLEAR STATION, UNITS 1 AND 2, RELOAD FOR UNIT 1, CYCLE 8 (TAC NOS. M87693 AND M87694)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 112 to Facility Operating License NPF-35 and Amendment No. 106 to Facility Operating License NPF-52 for the Catawba Nuclear Station, Units 1 and 2. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated September 7, 1993.

The amendments revise the TS to (a) reduce the slope of the axial power imbalance penalty in the overtemperature-delta temperature reactor protection system trip setpoint equation, and (b) increase the boron concentration limits in the cold leg accumulators, the refueling water storage tank, the reactor coolant system, and refueling canal during MODE 6 conditions. These changes reflect the reloading of Unit 1 with Mark BW fuel for Cycle 8 including an increase in cycle length from 350 effective full power days (EFPD) to 390 EFPD.

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:

Robert E. Martin, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 112 to NPF-35
2. Amendment No. 106 to NPF-52
3. Safety Evaluation

cc w/enclosures:
See next page

*SEE PREVIOUS CONCURRENCE

OFFICE	PDII-3/LA	PDII-3/PM	BC:SRXB *	OGC	(A)PDII-3/D
NAME	L. BERRY	R. MARTIN	R. JONES	[illegible]	L. PLISCO
DATE	12/14/93	12/14/93	12/ 8 /93	12/15/93	12/17/93

OFFICIAL RECORD COPY
FILE NAME:G:\CATAWBA\CAT87693.AMD

230041

DF01

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

December 17, 1993

Docket Nos. 50-413
and 50-414

Mr. David L. Rehn
Vice President, Catawba Site
Duke Power Company
4800 Concord Road
York, South Carolina 29745

Dear Mr. Rehn:

SUBJECT: ISSUANCE OF AMENDMENTS - CATAWBA NUCLEAR STATION, UNITS 1 AND 2, RELOAD FOR UNIT 1, CYCLE 8 (TAC NOS. M87693 AND M87694)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 112 to Facility Operating License NPF-35 and Amendment No. 106 to Facility Operating License NPF-52 for the Catawba Nuclear Station, Units 1 and 2. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated September 7, 1993.

The amendments revise the TS to (a) reduce the slope of the axial power imbalance penalty in the overtemperature-delta temperature reactor protection system trip setpoint equation, and (b) increase the boron concentration limits in the cold leg accumulators, the refueling water storage tank, the reactor coolant system, and refueling canal during MODE 6 conditions. These changes reflect the reloading of Unit 1 with Mark BW fuel for Cycle 8 including an increase in cycle length from 350 effective full power days (EFPD) to 390 EFPD.

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,

Robert E. Martin

Robert E. Martin, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 112 to NPF-35
2. Amendment No. 106 to NPF-52
3. Safety Evaluation

cc w/enclosures:
See next page

Mr. David L. Rehn
Duke Power Company

Catawba Nuclear Station

cc:
Mr. Z. L. Taylor
Regulatory Compliance Manager
Duke Power Company
4800 Concord Road
York, South Carolina 29745

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

J. Michael McGarry, III, Esquire
Winston and Strawn
1400 L Street, NW
Washington, DC 20005

North Carolina Municipal Power Agency Number 1
1427 Meadowwood Boulevard
P. O. Box 29513
Raleigh, North Carolina 27626-0513

Mr. T. Richard Puryear
Nuclear Technical Services Manager
Westinghouse Electric Corporation
Carolinas District
2709 Water Ridge Parkway, Suite 430
Charlotte, North Carolina 28217

County Manager of York County
York County Courthouse
York, South Carolina 29745

Richard P. Wilson, Esquire
Assistant Attorney General
South Carolina Attorney General's Office
P. O. Box 11549
Columbia, South Carolina 29211

Piedmont Municipal Power Agency
121 Village Drive
Greer, South Carolina 29651

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

North Carolina Electric Membership Corporation
P. O. Box 27306
Raleigh, North Carolina 27611

Senior Resident Inspector
Route 2, Box 179 N
York, South Carolina 29745

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

Max Batavia, Chief
Bureau of Radiological Health
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Mr. G. A. Copp
Licensing - EC050
Duke Power Company
P. O. Box 1006
Charlotte, North Carolina 28201-1006

Saluda River Electric
P. O. Box 929
Laurens, South Carolina 29360

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

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

DUKE POWER COMPANY

NORTH CAROLINA ELECTRIC MEMBERSHIP CORPORATION

SALUDA RIVER ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-413

CATAWBA NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 112
License No. NPF-35

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Catawba Nuclear Station, Unit 1 (the facility) Facility Operating License No. NPF-35 filed by the Duke Power Company, acting for itself, North Carolina Electric Membership Corporation and Saluda River Electric Cooperative, Inc. (licensees), dated September 7, 1993, 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-35 is hereby amended to read as follows:

    Technical Specifications

    The Technical Specifications contained in Appendix A, as revised through Amendment No. 112 , and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Duke Power Company 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

Loren R. Plisco

Loren R. Plisco, Acting Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
  Changes

Date of Issuance: December 17, 1993

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

DUKE POWER COMPANY

NORTH CAROLINA MUNICIPAL POWER AGENCY NO. 1

PIEDMONT MUNICIPAL POWER AGENCY

DOCKET NO. 50-414

CATAWBA NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 106
License No. NPF-52

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Catawba Nuclear Station, Unit 2 (the facility) Facility Operating License No. NPF-52 filed by the Duke Power Company, acting for itself, North Carolina Municipal Power Agency No. 1 and Piedmont Municipal Power Agency (licensees), dated September 7, 1993, 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-52 is hereby amended to read as follows:

   Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 106 , and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Duke Power Company 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

Loren R. Plisco

Loren R. Plisco, Acting Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: December 17, 1993

ATTACHMENT TO LICENSE AMENDMENT NO. 112

FACILITY OPERATING LICENSE NO. NPF-35

DOCKET NO. 50-413

AND

TO LICENSE AMENDMENT NO. 106

FACILITY OPERATING LICENSE NO. NPF-52

DOCKET NO. 50-414

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	Insert Pages
2-8	A2-8 B2-8
3/4 1-11	3/4 A1-11 3/4 B1-11
3/4 1-12	3/4 A1-12 3/4 B1-12
3/4 5-1	3/4 A5-1 3/4 B5-1
3/4 5-2	3/4 A5-2 3/4 B5-2
3/4 5-11	3/4 A5-11 3/4 B5-11
3/4 9-1	3/4 A9-1 3/4 B9-1
B 3/4 1-3	B 3/4 1-3
B 3/4 1-3a	B 3/4 1-3a
B 3/4 5-1	B 3/4 5-1
B 3/4 9-1	B 3/4 9-1
IV	IV
Va	Va
VIII	VIII
X	X

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 1: (Continued)

$T' \leq$ 590.8°F (Nominal T_{avg} allowed by Safety Analysis);

K_3 = 0.001414;

P = Pressurizer pressure, psig;

P' = 2235 psig (Nominal RCS operating pressure);

S = Laplace transform operator, s^{-1};

and $f_1(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range neutron 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 -39.9% and +3.0%,

$f_1(\Delta I) = 0$, 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 ΔI that the magnitude of $q_t - q_b$ is more negative than -39.9%, the ΔT Trip Setpoint shall be automatically reduced by 3.910% of ΔT_o; and

(iii) For each percent ΔI that the magnitude of $q_t - q_b$ is more positive than +3.0%, the ΔT Trip Setpoint shall be automatically reduced by 1.525% (Unit 1) of ΔT_o.

NOTE 2: The channel's maximum Trip Setpoint shall not exceed its computed Trip Setpoint by more than 3.0%.

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 1: (Continued)

$T' \leq$ 590.8°F (Nominal T_{avg} allowed by Safety Analysis);

K_3 = 0.001414;

P = Pressurizer pressure, psig;

P' = 2235 psig (Nominal RCS operating pressure);

S = Laplace transform operator, s^{-1};

and $f_1(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range neutron 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 -39.9% and +3.0%,

$f_1(\Delta I) = 0$, 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 ΔI that the magnitude of $q_t - q_b$ is more negative than -39.9%, the ΔT Trip Setpoint shall be automatically reduced by 3.910% of ΔT_o; and

(iii) For each percent ΔI that the magnitude of $q_t - q_b$ is more positive than +3.0%, the ΔT Trip Setpoint shall be automatically reduced by 2.316% (Unit 2) of ΔT_o.

NOTE 2: The channel's maximum Trip Setpoint shall not exceed its computed Trip Setpoint by more than 3.0%.

BORATED WATER SOURCE - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.5 As a minimum, one of the following borated water sources shall be OPERABLE:

a. A Boric Acid Storage System with:

   1) A minimum contained borated water volume of 12,000 gallons,

   2) A minimum boron concentration of 7000 ppm, and

   3) A minimum solution temperature of 65°F.

b. The refueling water storage tank with:

   1) A minimum contained borated water volume of 45,000 gallons,

   2) A minimum boron concentration of 2175 ppm, and

   3) A minimum solution temperature of 70°F.

APPLICABILITY: MODES 5 and 6. (Unit 1)

ACTION:

With no borated water source OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.1.2.5 The above required borated water source shall be demonstrated OPERABLE:

a. At least once per 7 days by:

   1) Verifying the boron concentration of the water,

   2) Verifying the contained borated water volume, and

   3) Verifying the boric acid storage tank solution temperature when it is the source of borated water.

b. At least once per 24 hours by verifying the refueling water storage tank temperature when it is the source of borated water and the outside air temperature is less than 70°F.

BORATED WATER SOURCE - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.5 As a minimum, one of the following borated water sources shall be OPERABLE:

a. A Boric Acid Storage System with:

1) A minimum contained borated water volume of 12,000 gallons,

2) A minimum boron concentration of 7000 ppm, and

3) A minimum solution temperature of 65°F.

b. The refueling water storage tank with:

1) A minimum contained borated water volume of 45,000 gallons,

2) A minimum boron concentration of 2000 ppm, and

3) A minimum solution temperature of 70°F.

APPLICABILITY: MODES 5 and 6. (Unit 2)

ACTION:

With no borated water source OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.1.2.5 The above required borated water source shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1) Verifying the boron concentration of the water,

2) Verifying the contained borated water volume, and

3) Verifying the boric acid storage tank solution temperature when it is the source of borated water.

b. At least once per 24 hours by verifying the refueling water storage tank temperature when it is the source of borated water and the outside air temperature is less than 70°F.

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.6 As a minimum, the following borated water source(s) shall be OPERABLE as required by Specification 3.1.2.2:

a. A Boric Acid Storage System with:

   1) A minimum contained borated water volume of 22,000 gallons,

   2) A minimum boron concentration of 7000 ppm, and

   3) A minimum solution temperature of 65°F.

b. The refueling water storage tank with:

   1) A contained borated water volume of at least 363,513 gallons,

   2) A minimum boron concentration of 2175 ppm,

   3) A minimum solution temperature of 70°F, and

   4) A maximum solution temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3, and 4. (Unit 1)

ACTION:

a. With the Boric Acid Storage System inoperable and being used as one of the above required borated water sources, restore the system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F; restore the Boric Acid Storage System to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.6 As a minimum, the following borated water source(s) shall be OPERABLE as required by Specification 3.1.2.2:

a. A Boric Acid Storage System with:

   1) A minimum contained borated water volume of 22,000 gallons,

   2) A minimum boron concentration of 7000 ppm, and

   3) A minimum solution temperature of 65°F.

b. The refueling water storage tank with:

   1) A contained borated water volume of at least 363,513 gallons,

   2) A minimum boron concentration of 2000 ppm,

   3) A minimum solution temperature of 70°F, and

   4) A maximum solution temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3, and 4. (Unit 2)

ACTION:

a. With the Boric Acid Storage System inoperable and being used as one of the above required borated water sources, restore the system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F; restore the Boric Acid Storage System to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

3/4.5 EMERGENCY CORE COOLING SYSTEMS

3/4.5.1 ACCUMULATORS

COLD LEG INJECTION

LIMITING CONDITION FOR OPERATION

3.5.1 Each cold leg injection accumulator shall be OPERABLE with:

a. The discharge isolation valve open,

b. A contained borated water volume of between 7630 and 8079 gallons,

c. A boron concentration of between 2000 and 2275 ppm,

d. A nitrogen cover-pressure of between 585 and 678 psig, and

e. A water level and pressure channel OPERABLE.

APPLICABILITY: MODES 1, 2, and 3*. (Unit 1)

ACTION:

a. With one cold leg injection accumulator inoperable, except as a result of a closed isolation valve or boron concentration less than 2000 ppm, restore the inoperable accumulator to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. With one cold leg injection accumulator inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

c. With one accumulator inoperable due to boron concentration less than 2000 ppm and:

   1) The volume weighted average boron concentration of the accumulators 2000 ppm or greater, restore the inoperable accumulator to OPERABLE status within 24 hours of the low boron determination or be in at least HOT STANDBY within the next 6 hours and reduce Reactor Coolant System pressure to less than 1000 psig within the following 6 hours.

   2) The volume weighted average boron concentration of the accumulators less than 2000 ppm but greater than 1900 ppm, restore the inoperable accumulator to OPERABLE status or return the volume weighted average boron concentration of the accumulators to greater than 2000 ppm and

*Reactor Coolant System pressure above 1000 psig.

3/4.5 EMERGENCY CORE COOLING SYSTEMS

3/4.5.1 ACCUMULATORS

COLD LEG INJECTION

LIMITING CONDITION FOR OPERATION

3.5.1 Each cold leg injection accumulator shall be OPERABLE with:

a. The discharge isolation valve open,

b. A contained borated water volume of between 7630 and 8079 gallons,

c. A boron concentration of between 1900 and 2100 ppm,

d. A nitrogen cover-pressure of between 585 and 678 psig, and

e. A water level and pressure channel OPERABLE.

APPLICABILITY: MODES 1, 2, and 3*. (Unit 2)

ACTION:

a. With one cold leg injection accumulator inoperable, except as a result of a closed isolation valve or boron concentration less than 1900 ppm, restore the inoperable accumulator to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. With one cold leg injection accumulator inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

c. With one accumulator inoperable due to boron concentration less than 1900 ppm and:

   1) The volume weighted average boron concentration of the accumulators 1900 ppm or greater, restore the inoperable accumulator to OPERABLE status within 24 hours of the low boron determination or be in at least HOT STANDBY within the next 6 hours and reduce Reactor Coolant System pressure to less than 1000 psig within the following 6 hours.

   2) The volume weighted average boron concentration of the accumulators less than 1900 ppm but greater than 1800 ppm, restore the inoperable accumulator to OPERABLE status or return the volume weighted average boron concentration of the accumulators to greater than 1900 ppm and

*Reactor Coolant System pressure above 1000 psig.

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

enter ACTION c.1 within 6 hours of the low boron determination or be in HOT STANDBY within the next 6 hours and reduce Reactor Coolant System pressure to less than 1000 psig within the following 6 hours.

3) The volume weighted average boron concentration of the accumulators 1900 ppm or less, return the volume weighted average boron concentration of the accumulators to greater than 1900 ppm and enter ACTION c.2 within 1 hour of the low boron determination or be in HOT STANDBY within the next 6 hours and reduce Reactor Coolant System pressure to less than 1000 psig within the following 6 hours.

SURVEILLANCE REQUIREMENTS

4.5.1 Each cold leg injection accumulator shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

1) Verifying, by the absence of alarms, the contained borated water volume and nitrogen cover-pressure in the tanks, and

2) Verifying that each cold leg injection accumulator isolation valve is open.

b. At least once per 31 days and within 6 hours after each solution volume increase of greater than or equal to 75 gallons by verifying the boron concentration of the accumulator solution;

c. At least once per 31 days when the Reactor Coolant System pressure is above 2000 psig by verifying that power is removed from the isolation valve operators on Valves NI54A, NI65B, NI76A, and NI88B and that the respective circuit breakers are padlocked; and

d. At least once per 18 months by verifying that each cold leg injection accumulator isolation valve opens automatically under each of the following conditions:**

1) When an actual or a simulated Reactor Coolant System pressure signal exceeds the P-11 (Pressurizer Pressure Block of Safety Injection) Setpoint, and

2) Upon receipt of a Safety Injection test signal.

**This surveillance need not be performed until prior to entering HOT STANDBY following the Unit 1 refueling.

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

enter ACTION c.1 within 6 hours of the low boron determination or be in HOT STANDBY within the next 6 hours and reduce Reactor Coolant System pressure to less than 1000 psig within the following 6 hours.

3) The volume weighted average boron concentration of the accumulators 1800 ppm or less, return the volume weighted average boron concentration of the accumulators to greater than 1800 ppm and enter ACTION c.2 within 1 hour of the low boron determination or be in HOT STANDBY within the next 6 hours and reduce Reactor Coolant System pressure to less than 1000 psig within the following 6 hours.

SURVEILLANCE REQUIREMENTS

4.5.1 Each cold leg injection accumulator shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

1) Verifying, by the absence of alarms, the contained borated water volume and nitrogen cover-pressure in the tanks, and

2) Verifying that each cold leg injection accumulator isolation valve is open.

b. At least once per 31 days and within 6 hours after each solution volume increase of greater than or equal to 75 gallons by verifying the boron concentration of the accumulator solution;

c. At least once per 31 days when the Reactor Coolant System pressure is above 2000 psig by verifying that power is removed from the isolation valve operators on Valves NI54A, NI65B, NI76A, and NI88B and that the respective circuit breakers are padlocked; and

d. At least once per 18 months by verifying that each cold leg injection accumulator isolation valve opens automatically under each of the following conditions:**

1) When an actual or a simulated Reactor Coolant System pressure signal exceeds the P-11 (Pressurizer Pressure Block of Safety Injection) Setpoint, and

2) Upon receipt of a Safety Injection test signal.

**This surveillance need not be performed until prior to entering HOT STANDBY following the Unit 1 refueling.

3/4.5.4 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.4 The refueling water storage tank shall be OPERABLE with:

a. A minimum contained borated water volume of 363,513 gallons,

b. A boron concentration of between 2175 and 2275 ppm of boron,

c. A minimum solution temperature of 70°F, and

d. A maximum solution temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3, and 4. (Unit 1)

ACTION:

With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.4 The refueling water storage tank shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1) Verifying the contained borated water level in the tank, and

2) Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the refueling water storage tank temperature when the outside air temperature is less than 70°F or greater than 100°F.

3/4.5.4 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.4 The refueling water storage tank shall be OPERABLE with:

a. A minimum contained borated water volume of 363,513 gallons,

b. A boron concentration of between 2000 and 2100 ppm of boron,

c. A minimum solution temperature of 70°F, and

d. A maximum solution temperature of 100°F.

APPLICABILITY: MODES 1, 2, 3, and 4. (Unit 2)

ACTION:

With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.4 The refueling water storage tank shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1) Verifying the contained borated water level in the tank, and

2) Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the refueling water storage tank temperature when the outside air temperature is less than 70°F or greater than 100°F.

3/4.9 REFUELING OPERATIONS

3/4.9.1 BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

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

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

b. A boron concentration of greater than or equal to 2175 ppm.

APPLICABILITY: MODE 6.* (Unit 1)

ACTION:

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

SURVEILLANCE REQUIREMENTS

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

a. Removing or unbolting the reactor vessel head, and

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

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

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

3/4.9 REFUELING OPERATIONS

3/4.9.1 BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

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

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

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

APPLICABILITY: MODE 6.* (Unit 2)

ACTION:

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

SURVEILLANCE REQUIREMENTS

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

a. Removing or unbolting the reactor vessel head, and

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

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

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

BORATION SYSTEMS (Continued)

MARGIN from expected operating conditions of 1.3% Δk/k after xenon decay and cooldown to 200°F. The maximum expected boration capability requirement occurs at EOL from full power equilibrium xenon conditions and requires 9,851 gallons of 7000 ppm borated water from the boric acid storage tanks or 57,107 gallons of 2175 ppm borated water for Unit 1 and 2000 ppm borated water for Unit 2 from the refueling water storage tank.

The Technical Specification requires 22,000 gallons of 7000 ppm borated water from the boric acid tanks to be available in Modes 1-4. This volume is based on the required volume for maintaining shutdown margin, unusable volume (to allow for a full suction pipe), instrument error, and additional margin to account for different cores and conservatism as follows:

Modes 1-4 Boric Acid Tank	
Required volume for maintaining SDM	9,851 gallons
5% Additional Margin	496 gallons
Unusable Volume (to maintain full suction pipe)	7,230 gallons
14" of water equivalent	
Vortexing (4" of water above top of suction pipe	2,066 gallons
Instrumentation Error (Based on Total Loop Acc. for 1&2 NV5740 loops) - 2" of water equivalent	1,550 gallons
	21,193 gallons

This value is increased to 22,000 gallons for additional margin.

A similar approach is taken for calculating the required Refueling Water Storage Tank volume:

When the temperature of one or more cold legs drops below 285°F in Mode 4, the potential for low temperature overpressurization of the reactor vessel makes it necessary to render one charging pump INOPERABLE and at least one safety injection pump INOPERABLE. The limitation for a maximum of one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable below 285°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

Refueling Water Storage Tank Requirements For Maintaining SDM - Modes 1-4

Required Volume for Maintaining SDM	57,107 gallons
Unusable Volume (below nozzle)	13,442 gallons
Instrument Inaccuracy	11,307 gallons
Vortexing	13,247 gallons
	95,103 gallons

The Technical Specification Volume 363,513 gallons was determined by correcting the tank's low level setpoint (level at which makeup is added to

BORATION SYSTEMS (Continued)

tank) for instrument inaccuracy. This level provides the maximum available volume to account for shutdown margin, worst case single failure, adequate containment sump volume for transfer to recirculation, and sufficient volume above the switchover initiation level such that no operator action is required prior to ten minutes after the initiation of the accident.

With the coolant temperature below 200°F, one Boron Injection flow path is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity changes in the event the single Boron Injection flow path becomes inoperable.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1% $\Delta k/k$ after xenon decay and cooldown from 200°F to 140°F. This condition requires either 585 gallons of 7000 ppm borated water from the boric acid storage tanks or 3500 gallons of 2175 ppm borated water for Unit 1 and 2000 ppm borated water for Unit 2 from the refueling water storage tank.

The Boric Acid Tank and Refueling Water Storage Tank volumes required in Modes 5-6 to provide necessary SDM are based on the following inputs as discussed previously:

Boric Acid Tank

Required Volume for maintaining SDM	585 gallons
Unusable Volume, Vortexing, Inst. Error	10,846 gallons
5% additional margin	33 gallons
	11,464 gallons

This value is increased to the Technical Specification value of 12,000 gallons for additional margin.

Refueling Water Storage Tank

Required Volume for Maintaining SDM	3,500 gallons
Water Below the Nozzle	13,442 gallons
Instrument Inaccuracy	11,307 gallons
Vortexing	13,247 gallons
	41,496 gallons

This value is increased to the Technical Specification value of 45,000 gallons for additional margin.

The contained water volume limits include allowance for water not available because of discharge line location and other physical characteristics.

3/4.5.1 ACCUMULATORS

The OPERABILITY of each Reactor Coolant System accumulator ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs from the cold leg injection accumulators and directly into the reactor vessel from the upper head injection accumulators in the event the Reactor Coolant System pressure falls below the pressure of the accumulators. This initial surge of water into the core provides the initial cooling mechanism during large pipe ruptures.

The limits on accumulator volume, boron concentration and pressure ensure that the assumptions used for accumulator injection in the safety analysis are met.

The allowed down time for the accumulators are variable based upon boron concentration to ensure that the reactor is shutdown following a LOCA and that any problems are corrected in a timely manner. Subcriticality is assured when boron concentration is above 1900 ppm for Unit 1 and 1800 ppm for Unit 2, so additional down time is allowed when concentration is above this value. A concentration of less than 2000 ppm for Unit 1 and 1900 ppm for Unit 2 in any single accumulator or as a volume weighted average may be indicative of a problem, such as valve leakage, but since reactor shutdown is assured, additional time is allowed to restore boron concentration in the accumulators.

The accumulator power operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these accumulator isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with an accumulator inoperable for any reason except an isolation valve closed minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional accumulator which may result in unacceptable peak cladding temperatures. If a closed isolation valve cannot be immediately opened, the full capability of one accumulator is not available and prompt action is required to place the reactor in a mode where this capability is not required.

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 safety 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 2175 ppm for Unit 1 and 2000 ppm for Unit 2 or greater includes a conservative uncertainty allowance of 50 ppm boron.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the Boron Dilution Mitigation System ensures that 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 safety analyses.

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

The requirements on containment building penetration closure and OPERABILITY of the Reactor Building Containment Purge System ensure that a release of radioactive material within containment will be restricted from leakage to the environment or filtered through the HEPA filters and activated carbon adsorbers prior to release 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 System and the resulting iodine removal capacity are consistent with the assumption of the safety analysis. Operation of the system with the heaters operating to maintain low humidity using automatic control for at least 10 continuous hours in a 31-day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters. ANSI N510-1980 will be used as a procedural guide for surveillance testing.

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

SECTION PAGE

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 112 TO FACILITY OPERATING LICENSE NPF-35

AND AMENDMENT NO. 106 TO FACILITY OPERATING LICENSE NPF-52

DUKE POWER COMPANY, ET AL.

CATAWBA NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOS. 50-413 AND 50-414

1.0 INTRODUCTION

By letter dated September 7, 1993, Duke Power Company, et al. (the licensee), submitted a request for changes to the Catawba Nuclear Station, Units 1 and 2, Technical Specifications (TS). The changes are required by the reloading of Unit 1 with Mark-BW fuel for operation in Cycle 8. Duplicate TS pages have been created to preserve certain TS values unchanged for Unit 2. As discussed with the licensee, the Table of Contents has also been revised to reflect the new page numbering sequence.

The requested changes would revise the TS to (a) reduce the slope of the axial power imbalance penalty in the overtemperature-delta temperature reactor protection system trip setpoint equation, and (b) increase the boron concentration limits in the cold leg accumulators (CLA), the refueling water storage tank (RWST), and the reactor coolant system and refueling canal during MODE 6 conditions. The changes in boron concentrations are required to offset the additional reactivity needed for an increase in cycle length from 350 effective full power days (EFPD) to 390 EFPD and to offset the increased positive reactivity inserted following the cooldown of a core with a higher percentage of Mark-BW fuel.

2.0 EVALUATION

The Catawba Unit 1 plant recently completed operating in Cycle 7 with a core that was more than 2/3 loaded with B&W Fuel Company (BWFC) Mark-BW 17x17 fuel. The staff's evaluation of TS changes made for that cycle of operation was reported in Reference 1. The Catawba Unit 1 Cycle 8 (C1C8) core will consist of 193 fuel assemblies. Seventy-six of these are fresh assemblies manufactured by the BWFC; 117 are Mark-BW assemblies that have completed one or two cycles; and 9 are Westinghouse OFA assemblies that have completed 3 cycles. The design cycle length of C1C8 is increased to 390 EFPD from the previous cycle's 350 EFPD. The use of the Mark-BW fuel design in Catawba has been previously approved as summarized in Reference 1.

There are no significant changes in the fuel assembly design, the fuel rod design, the thermal or material design of the Cycle 8 fuel from that previously described in Reference 1 for Cycle 7. The licensee states that (a)the replacement Batch 10 of Mark-BW fuel assemblies will have an enrichment of 3.65 percent by weight of U^{235}, (b) calculated cladding creep collapse time is predicted to be greater than fuel residence time, (c) cladding stress is predicted to be within ASME limits, and (d) cladding strain is predicted to be below the one percent strain limit. The thermal design analysis indicates that the maximum predicted fuel rod burnup values in Cycle 8 will be less than the cladding collapse burnup values. The limiting fuel rod internal pressure has been found to be less than reactor coolant system pressure. The licensee states that these parameters have been analyzed with approved methodology (References 2, 3, 4 and 5). The results of these analyses are consistent with previously established limits and were performed by DPC with the methodology described in approved topical reports, and therefore, are acceptable.

2.1 Fuel System Design

Nuclear Design

The core physics parameters for Cycle 8 were generated similarly to those for Cycle 7, using the PDQ-7 and EPRI-NODE-P computer codes and methodology that has previously been approved by the NRC staff (report DPC-NF-2010-A, Reference 6 and DPC-NE-3001-PA, Reference 12). The physics analysis described in DPC-NF-2010-A is intended to determine the values of safety related parameters including those describing the core power distribution, reactivity worths and coefficients, and the reactor kinetics characteristics. The DPC-NE-3001-PA report describes the methodology used by the licensee to ensure that the accident analysis for a defined reference core conservatively bounds the reload core. The important key safety parameters for each FSAR Chapter 15 event are identified, and the methods for calculating these parameters are described. In reload aplications, the licensee shows that the reference analysis described in the report is bounding by demonstrating that the event-specific key safety parameters of the reload core are within the conservative envelope of the reference analysis. Also, as for Cycle 7, the reactor protection limits and core operational limits were analyzed with approved methodology (Reference 7).

Control Requirement

The value of the required shutdown margin occurs at the end-of-cycle and at hot zero power conditions. Sufficient net available control rod worth, including a maximum worth stuck rod and appropriate calculation uncertainties, exist to meet shutdown margin requirements. These results were developed using approved methods and incorporated appropriate assumptions and are, therefore, acceptable.

Thermal-Hydraulic Design

The thermal performance of Cycle 8 fuel was analyzed using NRC-approved methodology (Reference 8). The analysis methodology is consistent with that for Cycle 7 analyses in that they are based on the BWCMV departure from nucleate boiling (DNB) correlation (Reference 9) with a generic statistical DNB ratio limit of 1.40. A margin is added to account for uncertainties, including the transition from Westinghouse OFA fuel to Mark BW fuel, to arrive at a design DNBR value of 1.55.

Accident Analysis

The licensee has evaluated the following listed anticipated operational occurrences and postulated accidents: increase in feedwater flow, excessive load increases, steam system piping failures, turbine trip, feedwater system pipe break, partial loss of forced reactor coolant flow, complete loss of forced reactor coolant flow, reactor coolant pump shaft seizure, uncontrolled rod bank withdrawal at power, dropped rod/rod bank, statically misaligned rod, single rod withdrawal, startup of an inactive reactor coolant pump, boron dilution, rod ejection, steam generator tube failure, and loss-of-coolant accidents (LOCA). With the exception of the steamline break event and the post-LOCA subcriticality analyses, the licensee found the C1C8 thermal-hydraulic and physics parameters to be bounded by the existing Final Safety Analysis Report (FSAR) Chapter 15 analyses. The licensee's analysis of the steam line break event with the more positive C1C8 boron worth (BOC boron worth changes from -7.81 to -7.28 pcm/ppmb and EOC boron worth changes from -8.91 to -8.31 pcm/ppmb from C1C7 to C1C8) showed the existing limiting case to be unchanged and to require no changes to the TS. The post-LOCA subcriticality analysis required an increase in RWST concentration from 2000 to 2175 ppm and an increase in CLA minimum concentration from 1900 to 2000 ppm. The maximum RWST and CLA limits, are accordingly, increased to preserve an operating band. These changes are reflected in TS 3.1.2.5, 3.1.2.6, 3.5.1, 3.5.4, and 3.9.1.

In addition, the increases in RWST and CLA maximum boron concentration limits necessitated a reanalysis of the post-LOCA boron precipitation evaluation and of the post-LOCA containment sump pH. The post-LOCA boron precipitation analysis requires a reduction in the time that the operator must initiate recirculation through the hot leg from 9 hours to 7 hours. The post-LOCA sump pH analysis indicated that the existing range in the TS BASES is acceptable.

The licensee has also found that the slope and breakpoint of the over-temperature delta-temperature reactor trip function, as specified in TS Table 2.2-1, may be changed to remove some conservatism in the C1C7 value for Unit 1.

These analyses were performed using methodology as described in the topical reports listed as references in the licensee's application. These topical reports have been reviewed previously by the NRC and have been found acceptable as stated in the safety evaluations for those reports. The staff's review of the C1C8 reload parameters found them to be bounded by the accident analysis assumptions stated by the licensee, and are therefore acceptable.

2.2 Technical Specification Changes

(1) Table 2.2-1

Table 2.2-1, Reactor Trip System Instrumentation Trip Setpoints, Note 1(iii), is revised for Unit 1 such that for each percent ΔI that the power imbalance

$q_t - q_b$ is more positive than +3%, the ΔT trip setpoint shall be reduced by 1.525% versus the previous value of 2.316%. A duplicate of this TS page is created as applicable to Unit 2 to retain the current value of 2.316% for Unit 2. This is acceptable.

(2) TS 3.1.2.5, 3.1.2.6, and 3.5.1

Catawba Unit 1 Cycle 8 (C1C8) is characterized by an increase in the length of the fuel cycle from 350 EFPD to 390 EFPD as the transition is made to a higher percentage of Mark BW fuel. The licensee's analyses show that higher minimum boron concentrations in the RWST and the CLAs are needed to offset the additional reactivity needed to accomplish the longer cycle length and to offset the increased positive reactivity insertion, that would accompany the post-LOCA cooldown of a core with a higher percentage of Mark BW fuel. The increased positive reactivity insertion derives from a generally more negative moderator temperature coefficient associated with the Mark BW fuel's smaller water to uranium ratio.

Associated with an increase in the minimum boron concentration is an increase in the maximum concentration since an allowable operating space range of concentrations must be preserved.

The increase in the minimum concentration is reflected in TS 3.1.2.5, 3.1.2.6, and 3.5.4 for the RWST (2000 ppm to 2175 ppm) and in TS 3.5.1 for the CLA (1900 ppm to 2000 ppm). The increase in the maximum concentration is reflected in TS 3.5.1 (2100 ppm to 2275 ppm) for the CLA and TS 3.5.4 for the RWST (2100 ppm to 2275 ppm). The CLA volume weighted average boron concentration range in TS 3.5.1 is increased from 1800 ppm - 1900 ppm to 1900 ppm - 2000 ppm for the same reasons as cited above.

Also, for TS 3.9.1, the required reactor coolant system (RCS) and refueling canal minimum boron concentration during MODE 6 conditions has been revised from 2000 ppm to 2175 ppm. This maintains consistency in the RCS and RWST concentrations during MODE 6 conditions and is acceptable.

The changes in the minimum boron concentrations require consideration of (a) adequate shutdown margin during all modes of norman operation, and (b) post-LOCA subcriticality. Boron concentration changes may also affect the post-LOCA recirculated coolant pH analysis. As noted earlier, DPC's analysis found that previous results remained bounding and no TS changes were required.

The licensee's submittal of January 13, 1993 (Reference 17), which has been incorporated by reference by the licensee, references an approved topical report, DPC-NF-2010 A, Section 4.0, as providing the methodology for normal operation shutdown margin determination. The minimum required shutdown margin values, 1.3% $\Delta\rho$ for $T_{AVG} \geq 200$ °F and 1.0% $\Delta\rho$ for $T_{AVG} < 200$ °F) are included as Limiting Conditions for Operation in TS 3.1.1.1 and 3.1.1.2. The calculated value for C1C8 is reported as 1.367%$\Delta\rho$ in Table 5-2 of the application. Since it was determined in accordance with the approved DPC Topical Report DPC-NF-2010 and is otherwise in accordance with TS 3.1.1, it is acceptable.

The licensee's submittal of January 13, 1993, references the post-LOCA subcriticality analysis methodology as provided in FSAR Section 15.6.5.2. Also, the required all-rods-out (ARO) critical boron concentration, which must be bounded by the calculated boron concentration during the sump recirculation mode, is determined using approved methodology in DPC-NF-2010 A, Section 9. Since the principal parameter in this determination, the limiting ARO critical boron concentration, has been determined using approved methodology we conclude that the post-LOCA subcriticality analysis is acceptable.

The change in the maximum boron concentration requires assurance that boron precipitation is precluded following a LOCA. As stated in the licensee's application of September 7, 1993, post-LOCA boron precipitation would be prevented with a reduction in the hot leg recirculation initiation time from 9 hours to 7 hours. This is acceptable.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

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 NRC 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 (58 FR 57847 dated October 27, 1993). 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.

5.0 CONCLUSION

The Commission 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.

Principal Contributors: R. E. Martin, PD II-3
S. L. Wu, SRXB

Date: December 17 , 1993

References

1. Letter, R. E. Martin, NRC, to M. S. Tuckman, DPC, forwarding amendments numbered 101 and 95 for Catawba Units 1 and 2, respectively, dated September 14, 1992.

2. BAW-10172-PA, Mark-BW Mechanical Design Report, Babcock & Wilcox (B&W) Topical Report, December 19, 1989.

3. DPC-NE-2001-PA, Rev. 1, Fuel Mechanical Reload Analysis Methodology for Mark-BW Fuel, Duke Power Company (DPC) Topical Report, October 1990.

4. BAW-19984-A, Rev. 2, Program to Determine In-Reactor Performance of B&W Fuels - Cladding Creep Collapse, B&W Topical Report, October 1978.

5. BAW-10141-PA, Rev. 1, TACO2 - Fuel Performance Analysis, B&W Topical Report, June 1983.

6. DPC-NF-2010-A, McGuire Nuclear Station/Catawba Nuclear Station Nuclear Physics Methodology for Reload Design, DPC Topical Report, June 1985.

7. DPC-NE-2011-PA, Nuclear Design Methodology for Core Operating Limits of Westinghouse Reactors, DPC Topical Report, March 1990.

8. DPC-NE-2004-PA, McGuire and Catawba Nuclear Stations Core Thermal-Hydraulic Methodology using VIPRE-01, DPC Topical Report, December 1991.

9. BAW-10159-PA, BWCMV Correlation of Critical Heat Flux in Mixing Vane Grid Fuel Assemblies, B&W Topical Report, July 1990.

10. BAW-10173-PA, Rev. 2, Mark-BW Reload Safety Analysis for Catawba and McGuire, B&W Topical Report, February 20, 1991.

11. DPC-NE-3000P, Rev. 1, Thermal-Hydraulic Transient Analysis Methodology, DPC Topical Report, May 1989.

12. DPC-NE-3001-PA, Rev.1, Multidimensional Reactor Transients and Safety Analysis Physics Parameters Methodology, DPC Topical Report, November 1991.

13. BAW-10174-A, Mark-BW Reload LOCA Analysis for the Catawba and McGuire Units, B&W Topical Report, May 1991.

14. BAW-10168-A, B&W Loss-of-Coolant Accident Evaluation Model For Recirculating Steam Generator Plants, B&W Topical Report, January 1991.

15. DPC-NE-1003-A, Rev. 1, McGuire Nuclear Station/Catawba Nuclear Station Rod Swap Methodology Report for Startup Physics Testing, DPC Topical Report, December 1986.

16. DPC-NE-3002-A, McGuire Nuclear Station/Catawba Nuclear Station FSAR Chapter 15 System Transient Analysis Methodology, DPC Topical Report, November 1991.

17. Letters, M. S. Tuckman, DPC, to NRC, Catawba Nuclear Station, Docket Nos. 50-413 and 50-414, McGuire Nuclear Station, Docket Nos. 50-369 and 50-370, Technical Specification Amendment, Relocation of Cycle-Specific Parameter Limits, dated January 13, and April 26, 1993.