STRIBUTION
e attached sheet

July 24, 1996

Mr. J. P. O'Hanlon
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

SUBJECT: NORTH ANNA UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: CHARGING AND LOW-HEAD SAFETY INJECTION PUMPS (TAC NOS. M93007 AND M93008)

Dear Mr. O'Hanlon:

The Commission has issued the enclosed Amendment Nos. 202 and 183 to Facility Operating License Nos. NPF-4 and NPF-7 for the North Anna Power Station, Units No. 1 and No. 2 (NA-1&2). The amendments revise the Technical Specifications (TS) in response to your letter dated July 26, 1995, as supplemented April 25, 1996.

The amendments clarify the Technical Specifications to allow switching of charging and low-head safety injection pumps during unit shutdown conditions. These amendments also allow additional methods of rendering these same pumps incapable of injecting into the reactor coolant system when required for low-temperature conditions.

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

This completes our efforts on this issue and we are, therefore, closing out TAC Nos. M93007 and M93008.

Sincerely,
Bart C. Buckley
Bart C. Buckley, Senior Project Manager
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-338
and 50-339

Enclosures:
1. Amendment No. 202 to NPF-4
2. Amendment No. 183 to NPF-7
3. Safety Evaluation

cc w/enclosures:
See next page

FILENAME - G:\NOANNA\M93007.AMD

OFFICE	LA:PDII-1	PM:PDII-1	D:PDII-1	OGC	SRXB
NAME	Dunnington ETD	BBuckley	EImbro EAD	APH	RCTCollins
DATE	6/7/96	6/11/96	7/18/96	6/24/96	7/17/96
COPY	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Mr. J. P. O'Hanlon
Virginia Electric & Power Company

North Anna Power Station
Units 1 and 2

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Mr. Al Belisle
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101 Marietta Street N. W. Suite 2900
Atlanta, Georgia 30323-0199

DATED: July 24, 1996

AMENDMENT NO. 202 TO FACILITY OPERATING LICENSE NO. NPF-4-NORTH ANNA UNIT 1
AMENDMENT NO. 183 TO FACILITY OPERATING LICENSE NO. NPF-7-NORTH ANNA UNIT 2

Docket File
PUBLIC
PDII-1 RF
S. Varga, 14/E/4
J. Zwolinski
G. Hill (4), TWFN 5/C/3
C. Grimes, 11/F/23
ACRS
A. Belisle, RII

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

VIRGINIA ELECTRIC AND POWER COMPANY

OLD DOMINION ELECTRIC COOPERATIVE

DOCKET NO. 50-338

NORTH ANNA POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 202
License No. NPF-4

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

   A. The application for amendment by Virginia Electric and Power Company et al., (the licensee) dated July 26, 1995, as supplemented April 25, 1996, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations 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;

   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 amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.D.(2) of Facility Operating License No. NPF-4 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 202 , are hereby incorporated in the 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.

FOR THE NUCLEAR REGULATORY COMMISSION

EV Imbro

Eugene V. Imbro, Director
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 24, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 202

TO FACILITY OPERATING LICENSE NO. NPF-4

DOCKET NO. 50-338

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages as indicated. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

Remove Pages	Insert Pages
V	V
3/4 1-11	3/4 1-11
3/4 1-12	3/4 1-12
3/4 5-3	3/4 5-3
3/4 5-5	3/4 5-5
3/4 5-6	3/4 5-6
3/4 5-6a	3/4 5-6a
B 3/4 1-3	B 3/4 1-3
B 3/4 5-2	B 3/4 5-2
B 3/4 5-3	B 3/4 5-3

CHARGING PUMP – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.3 One charging pump in the boron injection flow path required by Specification 3.1.2.1 shall be OPERABLE.

APPLICABILITY: MODES 5 and 6

ACTION:

a. With no charging pump OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes until one charging pump is restored to OPERABLE status.

b. With no charging pump OPERABLE and the opposite unit in MODE 1, 2, 3 or 4, immediately initiate corrective action to restore at least one charging pump to OPERABLE status as soon as possible.

SURVEILLANCE REQUIREMENTS

4.1.2.3.1 The above required charging pump shall be demonstrated OPERABLE by verifying, that on recirculation flow, the pump develops a discharge pressure of greater than or equal to 2410 psig when tested pursuant to Specification 4.0.5.

4.1.2.3.2 At least once per 12 hours, verify that a maximum of one charging pump is OPERABLE and capable of injecting into the RCS.*

* Two charging pumps may be OPERABLE and capable of injecting into the RCS during pump switching operations.

CHARGING PUMPS – OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.4 At least two charging pumps shall be OPERABLE.

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

ACTION:

With only one charging pump OPERABLE, restore a second charging pump to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to at least 1.77% Δk/k at 200°F within the next 6 hours; restore a second charging pump to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours. The provisions of Specification 3.0.4 are not applicable for one hour following heatup above 235°F or prior to cooldown below 235°F.

SURVEILLANCE REQUIREMENTS

4.1.2.4.1 The above required charging pumps shall be demonstrated OPERABLE by verifying, that on recirculation flow, each pump develops a discharge pressure of greater than or equal to 2410 psig when tested pursuant to Specification 4.0.5.

4.1.2.4.2 At least once per 12 hours, verify that a maximum of one charging pump is OPERABLE and capable of injecting into the RCS whenever the temperature of one or more of the RCS cold legs is less than or equal to 235°F.**

---

* A maximum of one charging pump shall be OPERABLE and capable of injecting into the RCS whenever the temperature of one or more of the RCS cold legs is less than or equal to 235°F.

** Two charging pumps may be OPERABLE and capable of injecting into the RCS during pump switching operations.

ECCS SUBSYSTEMS – Tavg GREATER THAN OR EQUAL TO 350°F

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE charging pump,

b. One OPERABLE low head safety injection pump,

c. An OPERABLE flow path capable of transferring fluid to the Reactor Coolant System when taking suction from the refueling water storage tank on a safety injection signal or from the containment sump when suction is transferred during the recirculation phase of operation or from the discharge of the outside recirculation spray pump.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

c. The provisions of Specification 3.0.4 are not applicable to 3.5.2.a and 3.5.2.b for one hour following heatup above 235°F or prior to cooldown below 235°F.

2. Verifying that each of the following pumps start automatically upon receipt of a safety injection test signal:
   a. Charging pump, and
   b. Low head safety injection pump.

f. By verifying that each of the following pumps develop the indicated discharge pressure (after subtracting suction pressure) on recirculation flow when tested pursuant to Specification 4.0.5.

1. Charging pump greater than or equal to 2410 psig.
2. Low head safety injection pump greater than or equal to 156 psig.

g. By verifying that the following manual valves requiring adjustment to prevent pump "runout" and subsequent component damage are locked and tagged in the proper position for injection:

1. Within 4 hours following completion of any repositioning or maintenance on the valve when the ECCS subsystems are required to be OPERABLE.
2. At least once per 18 months.
   1. 1-SI-188 Loop A Cold Leg
   2. 1-SI-191 Loop B Cold Leg
   3. 1-SI-193 Loop C Cold Leg
   4. 1-SI-203 Loop A Hot Leg
   5. 1-SI-204 Loop B Hot Leg
   6. 1-SI-205 Loop C Hot Leg

h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying that:

1. For high head safety injection lines, with a single pump running:
   a. The sum of the injection line flow rates, excluding the highest flow rate, is greater than or equal to the minimum flow rate required to demonstrate compliance with 10 CFR 50.46, and
   b. The total pump flow rate is less than or equal to the evaluated pump runout limit.

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

a. One OPERABLE charging pump#,

b. One OPERABLE low head safety injection pump#, and

c. An OPERABLE flow path capable of automatically transferring fluid to the reactor coolant system when taking suction from the refueling water storage tank or from the containment sump when the suction is transferred during the recirculation phase of operation or from the discharge of the outside recirculation spray pump.

APPLICABILITY: MODE 4.

ACTION:

a. With no ECCS subsystem OPERABLE because of the inoperability of either the charging pump or the flow path from the refueling water storage tank, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.

b. With no ECCS subsystem OPERABLE because of the inoperability of the low head safety injection pump, restore at least one ECCS subsystem to OPERABLE status or maintain the Reactor Coolant System T_{avg} less than 350°F by use of alternate heat removal methods.

c. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

A maximum of one charging pump and one low head safety injection pump shall be OPERABLE and capable of injecting into the RCS whenever the temperature of one or more of the RCS cold legs is less than or equal to 235°F except two charging pumps may be OPERABLE and capable of injecting into the RCS during pump switching operations.

SURVEILLANCE REQUIREMENTS

4.5.3.1 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.

4.5.3.2 At least once per 12 hours, verify that a maximum of one charging pump and one low head safety injection pump is OPERABLE and capable of injecting into the RCS whenever the temperature of one or more of the RCS cold legs is less than or equal to 235°F.*

* Two charging pumps may be OPERABLE and capable of injecting into the RCS during pump switching operations.

3/4.1.2 BORATION SYSTEMS (Continued)

With the RCS average temperature above 200°F, a minimum of two separate and redundant boron injection systems are provided to ensure single functional capability in the event an assumed failure renders one of the systems inoperable. Allowable out-of-service periods ensure that minor component repair or corrective action may be completed without undue risk to overall facility safety from injection system failures during the repair period.

The boration capability of either system is sufficient to provide a SHUTDOWN MARGIN from expected operating conditions of 1.77% Δk/k after xenon decay and cooldown to 200°F. This expected boration capability requirement occurs at EOL from full power equilibrium xenon conditions and requires 6,000 gallons of 12,950 ppm borated water from the boric acid storage tanks or 54,200 gallons of 2300 ppm borated water from the refueling water storage tank.

The limitation for a maximum of one charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable below 235°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

Having more than one charging pump OPERABLE during pump switching operations is allowed. This is acceptable based on pump switching being a momentary action under the direct administrative control of a licensed operator. Rendering a charging pump inoperable for this requirement may be accomplished by methods such as placing the control switch in the pull-to-lock position, tagging of the power supply breaker, or closing of the pump discharge valve. If the pump discharge valve is used to render a pump inoperable during solid water operation, the valve will be deenergized and tagged in the closed position.

With the RCS temperature below 200°F, one injection system is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATION and positive reactivity change in the event the single injection system becomes inoperable.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1.77% Δk/k after zenon decay and cooldown from 200°F to 140°F. This condition requires either 1378 gallons of 12,950 ppm borated water from the boric acid storage tanks or 3400 gallons of 2300 ppm borated water from the refueling water storage tank.

The contained water volume limits include allowance for water not available because of discharge line location and other physical characteristics. The OPERABILITY of one boron injection system during REFUELING insures that this system is available for reactivity control while in MODE 6.

ECCS SUBSYSTEMS (Continued)

With the RCS temperature below 350°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

The limitation for a maximum of one charging pump and one low head safety injection pump to be OPERABLE and the Surveillance Requirement to verify that a maximum of one charging pump and one low head safety injection pump is capable of injecting into the RCS below 235°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

Having more than one charging pump OPERABLE during pump switching operations is allowed. This is acceptable based on pump switching being a momentary action under the direct administrative control of a licensed operator. Rendering a charging pump inoperable for this requirement may be accomplished by methods such as placing the control switch in the pull-to-lock position, tagging of the power supply breaker, or closing of the pump discharge valve. If the pump discharge valve is used to render a pump inoperable during solid water operation, the valve will be deenergized and tagged in the closed position.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained.

In the event of modifications to an ECCS subsystem that could alter the subsystem flow characteristics, a flow balance test shall be performed. The flow balance test criteria are established based on the system performance assumed in the safety analysis (minimum flow limit) and on HHSI pump runout protection (maximum flow limit). In performing the flow balance, the effects of flow measurement instrument uncertainties accounting for system configuration and the variability between installed pumps must be properly considered.

Numerical acceptance criteria for the flow balance test are specified in surveillance test procedure. These criteria are established based on the following considerations:

1) The total injected flow to the core (assuming spillage of the branch line with the highest flow) must meet or exceed that assumed in the safety analysis. The limiting safety analysis is the loss of coolant accident (LOCA) analysis. This criterion may vary, particularly since the inputs to the safety analysis controlled by LCO 6.9.1.7 may vary with reload cycle. The safety analysis flow requirements are thus established by the currently applicable LOCA analysis which has demonstrated compliance with the ECCS acceptance limits of 10 CFR 50.46.

2) The total pumped flow must be less than the HHSI pump runout limit. This flow varies with the specific HHSI pump assumed to operate during the accident. Since the HHSI pumps also function as normal charging pumps, their characteristics, including runout limits, will vary over service life.

ECCS SUBSYSTEMS (Continued)

3) The requirements for reactor coolant pump seal injection must be met during normal operation, and the effects of seal injection during accidents must be considered in meeting constraints 1) and 2) above.

3/4.5.4 BORON INJECTION SYSTEM

The OPERABILITY of the boron injection system as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown. RCS cooldown can be caused by inadvertent depressurization, a loss-of-coolant accident or a steam line rupture.

The limits on injection tank minimum contained volume and boron concentration ensure that the assumptions used in the steam line break analysis are met.

The OPERABILITY of the redundant heat tracing channels associated with the boron injection system ensure that the solubility of the boron solution will be maintained above the solubility limit of 111°F at 15,750 ppm boron.

3/4.5.5 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWST minimum volume and boron concentration ensure that 1) sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following mixing of the RWST and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.5 and 11.0 for quench spray and between 7.7 and 9.0 for the solution recirculated within the containment after a LOCA. This pH minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

An RWST wide range level instrument loop uncertainty was included in the safety analysis and therefore need not be considered by the operator.

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

VIRGINIA ELECTRIC AND POWER COMPANY

OLD DOMINION ELECTRIC COOPERATIVE

DOCKET NO. 50-339

NORTH ANNA POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 183
License No. NPF-7

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

   A. The application for amendment by Virginia Electric and Power Company et al., (the licensee) dated July 26, 1995, as supplemented April 25, 1996, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations 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;

   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 amended by 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-7 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 183 , are hereby incorporated in the 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.

FOR THE NUCLEAR REGULATORY COMMISSION

Eugene V. Imbro, Director
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 24, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 183

TO FACILITY OPERATING LICENSE NO. NPF-7

DOCKET NO. 50-339

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages as indicated. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

Remove Pages	Insert Pages
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3/4 1-11	3/4 1-11
3/4 1-12	3/4 1-12
3/4 5-3	3/4 5-3
3/4 5-4	3/4 5-4
3/4 5-5	3/4 5-5
3/4 5-6	3/4 5-6
3/4 5-7	3/4 5-7
B 3/4 1-3	B 3/4 1-3
B 3/4 5-2	B 3/4 5-2
B 3/4 5-3	B 3/4 5-3

CHARGING PUMP – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.3 One charging pump in the boron injection flow path required by Specification 3.1.2.1 shall be OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

a. With no charging pump OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes until one charging pump is restored to OPERABLE status.

b. With no charging pump OPERABLE and the opposite unit in MODE 1, 2, 3 or 4, immediately initiate corrective action to restore at least one charging pump to OPERABLE status as soon as possible.

SURVEILLANCE REQUIREMENTS

4.1.2.3.1 The above required charging pump shall be demonstrated OPERABLE by verifying, that on recirculation flow, the pump develops a discharge pressure of greater than or equal to 2410 psig when tested pursuant to Specification 4.0.5.

4.1.2.3.2 At least once per 12 hours, verify that a maximum of one charging pump is OPERABLE and capable of injecting into the RCS.*

* Two charging pumps may be OPERABLE and capable of injecting into the RCS during pump switching operations.

REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.4 At least two charging pumps shall be OPERABLE.

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

ACTION:

With only one charging pump OPERABLE, restore a second charging pump to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to at least 1.77% delta k/k at 200°F within the next 6 hours; restore a second charging pump to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours. The provisions of Specification 3.0.4 are not applicable for one hour following heatup above 270°F or prior to cooldown below 270°F.

SURVEILLANCE REQUIREMENTS

4.1.2.4.1 The above required charging pumps shall be demonstrated OPERABLE by verifying, that on recirculation flow, each pump develops a discharge pressure of greater than or equal to 2410 psig when tested pursuant to Specification 4.0.5.

4.1.2.4.2 At least once per 12 hours, verify that a maximum of one charging pump is OPERABLE and capable of injecting into the RCS whenever the temperature of one or more of the RCS cold legs is less than or equal to 270°F.##

A maximum of one charging pump shall be OPERABLE and capable of injecting into the RCS whenever the temperature of one or more of the RCS cold legs is less than or equal to 270°F.

Two charging pumps may be OPERABLE and capable of injecting into the RCS during pump switching operations.

ECCS SUBSYSTEMS – Tavg GREATER THAN OR EQUAL TO 350°F

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE charging pump,

b. One OPERABLE low head safety injection pump,

c. An OPERABLE flow path capable of transferring fluid to the Reactor Coolant System when taking suction from the refueling water storage tank on a safety injection signal or from the containment sump when suction is transferred during the recirculation phase of operation.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected safety injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

c. The provisions of Specification 3.0.4 are not applicable to 3.5.2.a and 3.5.2.b for one hour following heatup above 270°F or prior to cooldown below 270°F.

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. At least once per 12 hours by verifying that the following valves are in the indicated positions with power to the valve operators removed:

SURVEILLANCE REQUIREMENTS (Continued)

Valve Number	Valve Function	Valve Position
a. MOV-2890A	a. LHSI to hot leg	a. closed
b. MOV-2890B	b. LHSI to hot leg	b. closed
c. MOV-2836	c. Ch pump to cold leg	c. closed
d. MOV-2869A	d. Ch pump to hot leg	d. closed
e. MOV-2869B	e. Ch pump to hot leg	e. closed

b. At least once per 31 days by verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

c. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suctions during LOCA conditions. This visual inspection shall be performed:

1. For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and
2. Of the areas affected within containment at the completion of each containment entry when CONTAINMENT INTEGRITY is established.

d. At least once per 18 months by:

1. A visual inspection of the containment sump and verifying that the subsystem suction inlets are not restricted by debris and that the sump components (trash racks, screens, etc.) show no evidence of structural distress or corrosion.

e. At least once per 18 months, during shutdown, by:

1. Verifying that each automatic valve in the flow path actuates to its correct position on a safety injection test signal.
2. Verifying that each of the following pumps start automatically upon receipt of a safety injection test signal:
   a) Charging pump, and
   b) Low head safety injection pump.

SURVEILLANCE REQUIREMENTS (Continued)

f. By verifying that each of the following pumps develop the indicated discharge pressure (after subtracting suction pressure) on recirculation flow when tested pursuant to Specification 4.0.5.

1. Charging pump greater than or equal to 2410 psig.
2. Low head safety injection pump greater than or equal to 156 psig.

g. By verifying that the following manual valves requiring adjustment to prevent pump "runout" and subsequent component damage are locked and tagged in the proper position for injection:

1. Within 4 hours following completion of any repositioning or maintenance on the valve when the ECCS subsystems are required to be OPERABLE.
2. At least once per 18 months.
    1. 2-SI-89 Loop A Cold Leg
    2. 2-SI-97 Loop B Cold Leg
    3. 2-SI-103 Loop C Cold Leg
    4. 2-SI-116 Loop A Hot Leg
    5. 2-SI-111 Loop B Hot Leg
    6. 2-SI-123 Loop C Hot Leg

h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying that:

1. For high head safety injection lines, with a single pump running:
    a) The sum of the injection line flow rates, excluding the highest flow rate, is greater than or equal to the minimum flow rate required to demonstrate compliance with 10 CFR 50.46, and
    b) The total pump flow rate is less than or equal to the evaluated pump runout limit.

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

a. One OPERABLE charging pump#,

b. One OPERABLE low head safety injection pump#, and

c. An OPERABLE flow path capable of automatically transferring fluid to the reactor coolant system when taking suction from the refueling water storage tank or from the containment sump when the suction is transferred during the recirculation phase of operation.

APPLICABILITY: MODE 4.

ACTION:

a. With no ECCS subsystem OPERABLE because of the inoperability of either the charging pump or the flow path from the refueling water storage tank, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.

b. With no ECCS subsystem OPERABLE because of the inoperability of the low head safety injection pump, restore at least one ECCS subsystem to OPERABLE status or maintain the Reactor Coolant System T_{avg} less than 350°F by use of alternate heat removal methods.

c. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected safety injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

A maximum of one charging pump and one low head safety injection pump shall be OPERABLE and capable of injecting into the RCS whenever the temperature of one or more of the RCS cold legs is less than or equal to 270°F except two charging pumps may be OPERABLE and capable of injecting into the RCS during pump switching operations.

SURVEILLANCE REQUIREMENTS

4.5.3.1 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.

4.5.3.2 At least once per 12 hours, verify that a maximum of one charging pump and one low head safety injection pump is OPERABLE and capable of injecting into the RCS whenever the temperature of one or more of the RCS cold legs is less than or equal to 270°F.*

* Two charging pumps may be OPERABLE and capable of injecting into the RCS during pump switching operations.

3/4.1.2 BORATION SYSTEMS

The boron injection system ensures that negative reactivity control is available during each mode of facility operation. The components required to perform this function include 1) borated water sources, 2) charging pumps, 3) separate flow paths, 4) boric acid transfer pumps, 5) associated heat tracing systems, and 6) an emergency power supply from OPERABLE diesel generators.

With the RCS average temperature above 200°F, a minimum of two boron injection flow paths are required to ensure single functional capability in the event an assumed failure renders one of the flow paths inoperable. The boration capability of either flow path is sufficient to provide a SHUTDOWN MARGIN from expected operation conditions of 1.77% delta k/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 6000 gallons of 12,950 ppm borated water from the boric acid storage tanks or 54,200 gallons of 2300 ppm borated water from the refueling water storage tank.

With the RCS temperature below 200°F, one injection system 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 change in the event the single injection system becomes inoperable.

The limitation for a maximum of one charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable below 270°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

Having more than one charging pump OPERABLE during pump switching operations is allowed. This is acceptable based on pump switching being a momentary action under the direct administrative control of a licensed operator. Rendering a charging pump inoperable for this requirement may be accomplished by methods such as placing the control switch in the pull-to-lock position, tagging of the power supply breaker, or closing of the pump discharge valve. If the pump discharge valve is used to render a pump inoperable during solid water operation, the valve will be deenergized and tagged in the closed position.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1.77% delta k/k after zenon decay and cooldown from 200°F to 140°F. This condition requires either 1378 gallons of 12,950 ppm borated water from the boric acid storage tanks or 3400 gallons of 2300 ppm borated water from the refueling water storage tank.

ECCS SUBSYSTEMS (Continued)

With the RCS temperature below 350°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

The limitation for a maximum of one charging pump and one low head safety injection pump to be OPERABLE and the Surveillance Requirement to verify that a maximum of one charging pump and one low head safety injection pump is capable of injecting into the RCS below 270°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

Having more than one charging pump OPERABLE during pump switching operations is allowed. This is acceptable based on pump switching being a momentary action under the direct administrative control of a licensed operator. Rendering a charging pump inoperable for this requirement may be accomplished by methods such as placing the control switch in the pull-to-lock position, tagging of the power supply breaker, or closing of the pump discharge valve. If the pump discharge valve is used to render a pump inoperable during solid water operation, the valve will be deenergized and tagged in the closed position.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained.

In the event of modification to an ECCS subsystem that could alter the subsystem flow characteristics, a flow balance test shall be performed. The flow balance test criteria are established based on the system performance assumed in the safety analysis (minimum flow limit) and on HHSI pump runout protection (maximum flow limit). In performing the flow balance, the effects of flow measurement instrument uncertainties accounting for system configuration and the variability between installed pumps must be properly considered.

Numerical acceptance criteria for the flow balance test are specified in the surveillance test procedure. These criteria are established based on the following considerations:

1) The total injected flow to the core (assuming spillage of the branch line with the highest flow) must meet or exceed that assumed in the safety analysis. The limiting safety analysis is the loss of coolant accident (LOCA) analysis. This criterion may vary, particularly since the inputs to the safety analysis controlled by LCO 6.9.1.7 may vary with reload cycle. The safety analysis flow requirements are thus established by the currently applicable LOCA analysis which has demonstrated compliance with the ECCS acceptance limits of 10 CFR 50.46.

2) The total pumped flow must be less than the HHSI pump runout limit. This flow varies with the specific HHSI pump assumed to operate during the accident. Since the HHSI pumps also function as normal charging pumps, their characteristics, including runout limits, will vary over service life.

ECCS SUBSYSTEMS (Continued)

3) The requirements for reactor coolant pump seal injection must be met during normal operation, and the effects of seal injection during accidents must be considered in meeting constraints 1) and 2) above.

3/4.5.4 BORON INJECTION SYSTEM

The OPERABILITY of the boron injection system as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown. RCS cooldown can be caused by inadvertent depressurization, a loss-of-coolant accident or a steam line rupture.

The limits on injection tank minimum contained volume and boron concentration ensure that the assumptions used in the steam line break analysis are met. The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The OPERABILITY of the redundant heat tracing channels associated with the boron injection system ensure that the solubility of the boron solution will be maintained above the solubility limit of 111°F at 15,750 ppm boron.

3/4.5.5 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWST minimum volume and boron concentration ensure that 1) sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following mixing of the RWST and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.5 and 11.0 for quench spray and between 7.7 and 9.0 for the solution recirculated within the containment after a LOCA. This pH minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

An RWST wide range level instrument loop uncertainty was included in the safety analysis and therefore need not be considered by the operator.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 202 AND 183 TO

FACILITY OPERATING LICENSE NOS. NPF-4 AND NPF-7

VIRGINIA ELECTRIC AND POWER COMPANY

OLD DOMINION ELECTRIC COOPERATIVE

NORTH ANNA POWER STATION, UNITS NO. 1 AND NO. 2

DOCKET NOS. 50-338 AND 50-339

1.0 INTRODUCTION

During plant startup and shutdown while the reactor is operated under low temperature conditions, two of the three charging pumps and one of the two safety injection pumps must be rendered incapable of injecting water into the reactor coolant system (RCS). This is required to maintain the plant operating status consistent with the assumptions used in the analysis of a mass addition transient for determining setpoints for Low Temperature Overpressure Protection (LTOP) system. With respect to the above requirements, the current technical specifications (TS) do not have provisions that allow switching from one operating charging pump to another without temporarily interrupting the needed seal injection flow to the reactor coolant pumps (RCPs). Also, the current TS require that the pumps be rendered inoperable by only one method - placing their control switches in the pull-to-lock position.

By letters dated July 26,1995 and April 25, 1996, Virginia Electric and Power Company proposed changes to TS 3/4.1.2.3, 3/4.1.2.4, 3/4.5.3 and their associated Bases which would permit switching from one operable charging pump to another without interrupting the required seal injection flow to RCPs and provide an alternative means of rendering the pumps inoperable. The proposed changes also include several administrative and editorial changes to TS 3/4.1.2.3, 3/4.1.2.4, 3/4.5.2, 3/4.5.3, and their associated Bases. The April 25, 1996, letter provided clarifying information that did not change the scope of the July 26, 1995, application and initial proposed no significant hazards consideration determination.

2.0 EVALUATION

In its letter dated July 26, 1995, the licensee proposed to add footnotes to TS 3/4.1.2.3, 3/4.1.2.4 and 3/4.5.3 for North Anna Units 1 and 2 to permit two operating charging pumps that are capable of injecting into the RCS as a means of providing the required RCP seal injection flow while switching from one operable charging pump to another. The plant administrative controls will

ensure that the momentary two-pump-operable pump switching method would not be utilized during water solid conditions. This proposed change is consistent with the Improved Standard Technical Specification. The justification for this change is based on the pump switching evolution being under the direct administrative control of a licensed operator and being of short duration.

The licensee also proposed to delete the current TS requirement relative to the method of rendering pumps inoperable. The licensee proposed changes to the TS Bases to indicate that rendering a pump inoperable may be accomplished by methods such as placing the control switch in the pull-to-lock position, tagging (securing the breaker in the open position) of the power supply breaker, or closing of pump discharge valve. However, there is only one isolation valve at each of the charging pump discharge lines. Therefore, closing of the single discharge valve is not sufficient to prevent the charging pump from injecting flow into the RCS considering the possibility of a single human error following a mass addition event. In response to this concern, in a letter dated April 25, 1996, the licensee submitted its revised TS Bases which indicate that if the pump discharge valve is used to render a pump inoperable during solid water operation, the valve will be deenergized and tagged in the closed position. The staff considers this approach reasonable.

The licensee's proposed changes in TS reflect the changes discussed above. The staff has reviewed the licensee's submittal and finds that the changes are reasonably conservative and are acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Virginia State official was notified of the proposed issuance of the amendment. The State official had no comment.

4.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement 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 these amendments involve no significant hazards consideration and there has been no public comment on such finding (60 FR 45190). Accordingly, these 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 Contributor: C. Liang

Date: July 24, 1996