

April 14, 1987

Docket Nos. 50-338
and 50-339

Mr. W. L. Stewart
Vice President - Nuclear Operations
Virginia Electric and Power Company
Post Office Box 26666
Richmond, Virginia 23261

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J Partlow	B Grimes

Dear Mr. Stewart:

The Commission has issued the enclosed Amendment Nos. 93 and 78 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 December 22, 1986. The amendments are effective prior to restart for the forthcoming refueling outages, Cycle 6 and Cycle 5 for NA-1&2, respectively.

The amendments increase the boron concentration in the refueling water storage tank, the casing cooling tank and the accumulators. The increase in boron concentration is required to maintain the design shutdown margin (reactivity control requirements) at refueling conditions due to the transition to eighteen month refuelings and the recent core power increase for NA-1&2.

A copy of the Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's next regular bi-weekly Federal Register notice.

Sincerely,

/s/

Leon B. Engle, Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:

1. Amendment No. 93 to NPF-4
2. Amendment No. 78 to NPF-7
3. Safety Evaluation

cc w/enclosures:
See next page

*SEE PREVIOUS CONCURRENCE

PA:PAD2*	PM:PAD2*	PD:PAD2	OGC*
D Miller	L Engle	LRubenstein	M Young
3/11/87	3/13/87	3/27/87	3/20/87

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The amendments increase the boron concentration in the refueling water storage tank, the casing cooling tank and the accumulators. The increase in boron concentration is required to maintain the design shutdown margin (reactivity control requirements) at refueling conditions due to the transition to eighteen month refuelings and the recent core power increase for NA-1&2.

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Sincerely,

Leon B. Engle, Project Manager
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Division of PWR Licensing-A
Office of Nuclear Reactor Regulation

Enclosure:

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2. Amendment No. to NPF-7
3. Safety Evaluation

cc w/enclosures:
See next page

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Mr. W. L. Stewart
Virginia Electric & Power Company

North Anna Power Station
Units 1 and 2

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

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. 93
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 December 22, 1986, 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.

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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. 93, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective prior to restart after the Cycle 6 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION



Lester S. Rubenstein, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 14, 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 93

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. The corresponding overleaf pages are also provided to maintain document completeness.

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REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - SHUTDOWN

LIMITING CONDITION FOR OPERATION

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

- a. A boric acid storage system and associated heat tracing with:
 - 1. A minimum contained borated water volume of 1378 gallons,
 - 2. Between 12,950 and 15,750 ppm of boron, and
 - 3. A minimum solution temperature of 115°F.
- b. The refueling water storage tank with:
 - 1. A minimum contained borated water volume of 51,000 gallons,
 - 2. Between 2300 and 2400 ppm of boron, and
 - 3. A minimum solution temperature of 35°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water source OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes until at least one borated water source is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.2.7 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 of the tank, 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 RWST temperature when it is the source of borated water and the outside air temperature is < 35°F.

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 Each of the following borated water sources shall be OPERABLE:

- a. A boric acid storage system and associated heat tracing with:
 - 1. A contained borated water volume of between 6000 and 16,280 gallons,
 - 2. Between 12,950 and 15,750 ppm of boron, and
 - 3. A minimum solution temperature of 115°F.
- b. The refueling water storage tank with:
 - 1. A contained borated water volume of between 475,058 and 487,000 gallons,
 - 2. Between 2300 and 2400 ppm of boron, and
 - 3. A solution temperature between 40°F and 50°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With the boric acid storage system inoperable, restore the storage 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 1.77% $\Delta k/k$ 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 one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 Each borated water source shall be demonstrated OPERABLE:

3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

ACCUMULATORS

LIMITING CONDITION FOR OPERATION

3.5.1 Each reactor coolant system accumulator shall be OPERABLE with:

- a. The isolation valve open,
- b. A contained borated water volume of between 7580 and 7756 gallons
- c. Between 2200 and 2400 ppm of boron, and
- d. A nitrogen cover-pressure of between 599 and 667 psig.

APPLICABILITY: MODES 1, 2 and 3*.

ACTION:

- a. With one accumulator inoperable, except as a result of a closed isolation valve, restore the inoperable accumulator to OPERABLE status within one hour or be in HOT SHUTDOWN within the next 12 hours.
- b. With one accumulator inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in HOT STANDBY within one hour and be in HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.5.1 Each accumulator shall be demonstrated OPERABLE:

- a. At least once per 12 hours by:
 1. Verifying the contained borated water volume and nitrogen cover-pressure in the tanks, and
 2. Verifying that each accumulator isolation valve is open.

*Pressurizer Pressure above 1000 psig. Power lock out of valves is not permitted in MODE 3 when below 1000 psig.

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- b. At least once per 31 days and within 6 hours after each solution volume increase of $\geq 5\%$ of tank volume by verifying the boron concentration of the accumulator solution.
- c. At least once per 31 days when the RCS pressure is above 2000 psig by verifying that the breaker supplying power to the isolation valve operator is locked in the off position.
- d. At least once per 18 months by verifying that each accumulator isolation valve opens automatically under each of the following conditions:
 - 1. When the RCS pressure exceeds 2010 psig,
 - 2. Upon receipt of a safety injection test signal.

EMERGENCY CORE COOLING SYSTEMS

REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

- a. A contained borated water volume of between 475,058 and 487,000 gallons.
- b. Between 2300 and 2400 ppm of boron, and
- c. A solution temperature between 40°F and 50°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

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

4.5.5 The RWST shall be demonstrated OPERABLE:

- a. At least once per 7 days by:
 1. Verifying the contained borated water volume in the tank, and
 2. Verifying the boron concentration of the water.
- b. At least once per 24 hours by verifying the RWST temperature.

CONTAINMENT SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- d. At least once per 5 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

CONTAINMENT SYSTEMS

CONTAINMENT RECIRCULATION SPRAY SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.2.2 The containment recirculation spray system shall be OPERABLE with:

- a. Four separate and independent containment recirculation spray subsystems, each composed of a spray pump, associated heat exchanger and flow path.
- b. Two separate and independent outside recirculation spray pump casing cooling subsystems, each composed of a casing cooling pump, and flow path capable of transferring fluid from the casing cooling tank to the suction of the outside recirculation spray pumps.
- c. One casing cooling tank shall be OPERABLE with:
 1. Contained borated water volume of at least 116,500 gallons.
 2. Between 2300 and 2400 ppm boron concentration.
 3. A solution temperature $\geq 35^{\circ}$ and $\leq 50^{\circ}$ F.

APPLICABILITY: Modes 1, 2, 3 and 4.

ACTION:

- a. With one containment recirculation spray subsystem or casing cooling subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours; restore the inoperable subsystem to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the next 30 hours.
- b. With the casing cooling tank inoperable, restore the tank to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

3/4.9 REFUELING OPERATIONS

BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1 With the reactor vessel head unbolted or removed, 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:

- a. Either a K_{eff} of 0.95 or less, or
- b. A boron concentration of ≥ 2300 ppm

APPLICABILITY: MODE 6*.

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 > 10 gpm of $> 12,950$ ppm boric acid solution or its equivalent until \bar{K}_{eff} is reduced to < 0.95 or the boron concentration is restored to ≥ 2300 ppm, whichever is the more restrictive. The provisions of Specification 3.0.3 are not applicable.

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 located within the reactor pressure vessel, in excess of 3 feet from its fully inserted position.

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 when the reactor vessel head is unbolted or removed.

REFUELING OPERATIONS

INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.9.2 As a minimum, two source range neutron flux monitors shall be operating, each with continuous visual indication in the control room and one with audible indication in the containment.

APPLICABILITY: MODE 6.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.2 Each source range neutron flux monitor shall be demonstrated OPERABLE by performance of:

- a. A CHANNEL FUNCTIONAL TEST at least once per 7 days, and
- b. A CHANNEL FUNCTIONAL TEST within 8 hours prior to the initial start of CORE ALTERATIONS, and
- c. A CHANNEL CHECK at least once per 12 hours during CORE ALTERATIONS.

REACTIVITY CONTROL SYSTEMS

BASES

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% $\Delta k/k$ 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 centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable below 320°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

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 boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1.77% $\Delta k/k$ after xenon 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.

REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.2 BORATION SYSTEMS (Continued)

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 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.

At least one charging pump must remain operable at all times when the opposite unit is in MODE 1, 2, 3, or 4. This is required to maintain the charging pump cross-connect system operational.

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section ensure that (1) acceptable power distribution limits are maintained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) limit the potential effects of rod misalignment on associated accident analyses. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits.

The ACTION statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original design criteria are met. Misalignment of a rod requires measurement of peaking factors or a restriction in THERMAL POWER; either of these restrictions provides assurance of fuel rod integrity during continued operation. In addition those accident analyses affected by a misaligned rod are reevaluated to confirm that the results remain valid during future operation.

Control rod positions and OPERABILITY of the rod position indicators are required to be verified on a nominal basis of once per 12 hours with more frequent verifications required if an automatic monitoring channel is inoperable. These verification frequencies are adequate for assuring that the applicable LCO's are satisfied.

The maximum rod drop time restriction is consistent with the assumed rod drop time used in the accident analyses. Measurement with $T_{avg} \geq 500^{\circ}F$ and with all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a reactor trip at operating conditions.

EMERGENCY CORE COOLING SYSTEMS

BASES

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.

3/4.9 REFUELING OPERATIONS

BASES

3/4.9.1 BORON CONCENTRATION

The limitations on reactivity conditions during REFUELING ensure that: 1) the reactor will remain subcritical during CORE ALTERATIONS, and 2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel. These limitations are consistent with the initial conditions assumed for the boron dilution incident in the accident analyses. The value of 0.95 or less for K_{eff} includes a 1% $\Delta k/k$ conservative allowance for uncertainties. Similarly, the boron concentration of 2300 ppm or greater includes a conservative uncertainty allowance of 50 ppm boron.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the source range neutron flux monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor pressure vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short lived fission products. This decay time is consistent with the assumptions used in the accident analyses.

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

The requirements on containment building penetration closure and OPERABILITY ensure that a release of radioactive material within containment will be restricted from leakage to the environment. The OPERABILITY and closure restrictions are sufficient to restrict radioactive material release from a fuel element rupture based upon a lack of containment pressurization potential while in the REFUELING MODE.

3/4.9.5 COMMUNICATIONS

The requirement for communication capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity conditions during CORE ALTERATIONS.

REFUELING OPERATIONS

BASES

3/4.9.6 MANIPULATOR CRANE OPERABILITY

The OPERABILITY requirements for the manipulator cranes ensure that: 1) manipulator cranes will be used for movement of control rods and fuel assemblies, 2) each crane has sufficient load capacity to lift a control rod or fuel assembly, and 3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL PIT

The restriction on movement of loads in excess of the nominal weight of a fuel and control rod assembly and associated handling tool over other fuel assemblies in the storage pool ensures that in the event this load is dropped, 1) the activity release will be limited to that contained in a single fuel assembly, and 2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident analyses.

3/4.9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

The requirement that at least one residual heat removal (RHR) loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effect of a boron dilution incident and prevent boron stratification.

The requirement to have two RHR loops OPERABLE when there is less than 23 feet of water above the reactor pressure vessel flange ensures that a single failure of the operating RHR loop will not result in a complete loss of residual heat removal capability. With the reactor vessel head removed and 23 feet of water above the reactor pressure vessel flange, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating RHR loop, adequate time is provided to initiate emergency procedures to cool the core.

3/9.9 CONTAINMENT PURGE AND EXHAUST ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment vent and purge penetrations will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.



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

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. 78
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 December 22, 1986 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.

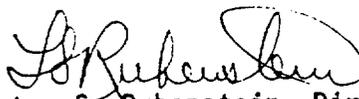
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-7 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 78 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective prior to restart after Cycle 5 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION



Lester S. Rubenstein, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 14, 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 78

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. The corresponding overleaf pages are also provided to maintain document completeness.

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B3/4 9-1

3/4.9 REFUELING OPERATIONS

BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.9.1 With the reactor vessel head unbolted or removed, 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:

- a. Either a K_{eff} of 0.95 or less, or
- b. A boron concentration of ≥ 2300 ppm

APPLICABILITY: Mode 6*

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 ≥ 10 gpm of $\geq 12,950$ ppm boric acid solution or its equivalent until K_{eff} is reduced to ≤ 0.95 or the boron concentration is restored to ≥ 2300 ppm, whichever is the more restrictive. The provisions of Specification 3.0.3 are not applicable.

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 located within the reactor pressure vessel, in excess of 3 feet from its fully inserted position.

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 when the reactor vessel head is unbolted or removed.

REFUELING OPERATIONS

INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.9.2 As a minimum, two source range neutron flux monitors shall be operating, each with continuous visual indication in the control room and one with audible indication in the containment.

APPLICABILITY: MODE 6.

ACTION:

- a. With one of the above required monitors inoperable, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes.
- b. With both of the above required monitors inoperable, determine the boron concentration of the reactor coolant system at least once per 12 hours.
- c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.2 Each source range neutron flux monitor shall be demonstrated OPERABLE by performance of:

- a. A CHANNEL CHECK at least once per 12 hours,
- b. A CHANNEL FUNCTIONAL TEST within 8 hours prior to the initial start of CORE ALTERATIONS, and
- c. A CHANNEL FUNCTIONAL TEST at least once per 7 days.

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - SHUTDOWN

LIMITING CONDITION FOR OPERATION

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

- a. A boric acid storage system and at least one associated heat tracing system with:
 - 1. A minimum contained borated water volume of 1378 gallons,
 - 2. Between 12,950 and 15,750 ppm of boron, and
 - 3. A minimum solution temperature of 115°F.
- b. The refueling water storage tank with:
 - 1. A minimum contained borated water volume of 51,000 gallons,
 - 2. Between 2300 and 2400 ppm of boron, and
 - 3. A minimum solution temperature of 35°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water source OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes until at least one borated water source is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.2.7 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 of the tank, 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 RWST temperature when it is the source of borated water and the outside air temperature is less than 35°F.

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 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 and at least one associated heat tracing system with:
 1. A contained borated water volume of between 6000 and 16,280 gallons,
 2. Between 12,950 and 15,750 ppm of boron, and
 3. A minimum solution temperature of 115°F.
- b. The refueling water storage tank with:
 1. A contained borated water volume of between 475,058 and 487,000 gallons,
 2. Between 2300 and 2400 ppm of boron, and
 3. A solution temperature between 40°F and 50°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With the boric acid storage system inoperable and being used as one of the above required borated water sources, restore the storage 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 1.77% $\Delta k/k$ 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 one 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 (ECCS)

ACCUMULATORS

LIMITING CONDITION FOR OPERATION

3.5.1 Each reactor coolant system accumulator shall be OPERABLE with:

- a. The isolation valve open,
- b. A contained borated water volume of between 7580 and 7756 gallons
- c. Between 2200 and 2400 ppm of boron, and
- d. A nitrogen cover-pressure of between 599 and 667 psig.

APPLICABILITY: MODES 1, 2 and 3*.

ACTION:

- a. With one accumulator inoperable, except as a result of a closed isolation valve, restore the inoperable accumulator to OPERABLE status within one hour or be in HOT SHUTDOWN within the next 12 hours.
- b. With one accumulator inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in HOT STANDBY within one hour and be in HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.5.1.1 Each accumulator shall be demonstrated OPERABLE:

- a. At least once per 12 hours by:
 1. Verifying the contained borated water volume and nitrogen cover-pressure in the tanks, and
 2. Verifying that each accumulator isolation valve is open.

*Pressurizer Pressure above 1000 psig. Power lock out of valves is not permitted in MODE 3 when below 1000 psig.

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- b. At least once per 31 days and within 6 hours after each solution volume increase of greater than or equal to 5% of tank volume by verifying the boron concentration of the accumulator solution.
- c. At least once per 31 days when the RCS pressure is above 2000 psig by verifying that the breaker supplying power to the isolation valve operator is locked in the off position.
- d. At least once per 18 months by verifying that each accumulator isolation valve opens automatically under each of the following conditions:
 - 1. When a simulated RCS pressure signal exceeds 2010 psig,
 - 2. Upon receipt of a safety injection test signal.

EMERGENCY CORE COOLING SYSTEMS

REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

- a. A contained borated water volume of between 475,058 and 487,000 gallons.
- b. Between 2300 and 2400 ppm of boron, and
- c. A solution temperature between 40°F and 50°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

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

4.5.5 The RWST shall be demonstrated OPERABLE:

- a. At least once per 7 days by:
 1. Verifying the contained borated water volume in the tank, and
 2. Verifying the boron concentration of the water.
- b. At least once per 24 hours by verifying the RWST temperature.

CONTAINMENT SYSTEMS

CONTAINMENT RECIRCULATION SPRAY SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.2.2 The containment recirculation spray system shall be OPERABLE with:

- a. Four separate and independent containment recirculation spray subsystems, each composed of a spray pump, associated heat exchanger and flow path.
- b. Two separate and independent outside recirculation spray pump casing cooling subsystems, each composed of a casing cooling pump, and flow path capable of transferring fluid from the casing cooling tank to the suction of the outside recirculation spray pumps.
- c. One casing cooling tank shall be OPERABLE with:
 1. Contained borated water volume of at least 116,500 gallons.
 2. Between 2300 and 2400 ppm boron concentration.
 3. A solution temperature $\geq 35^{\circ}\text{f}$ and $\leq 50^{\circ}\text{F}$.

APPLICABILITY: Modes 1, 2, 3 and 4.

ACTION:

- a. With one containment recirculation spray subsystem or casing cooling subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours; restore the inoperable subsystem to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the next 30 hours.
- b. With the casing cooling tank inoperable, restore the tank to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.2.2.1 Each containment recirculation spray subsystem and casing cooling subsystem shall be demonstrated OPERABLE:

- a. 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.

CONTAINMENT SYSTEMS

CONTAINMENT RECIRCULATION SPRAY SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

- b. Verifying, that on recirculation flow, each outside recirculation spray pump develops a discharge pressure of greater than or equal to 115 psig and each casing cooling pump develops a discharge pressure of greater than or equal to 46 psig when tested pursuant to Specification 4.0.5.
- c. At least once per 18 months by:
 - 1. Verifying that on a Containment Pressure--High-High signal, each casing cooling pump starts automatically without time delay, and each recirculation spray pump starts automatically with the following time delays: inside 195 ± 9.75 seconds, outside 210 ± 21 seconds.
 - 2. Verifying that each automatic valve in in the flow path actuates to its correct position on a Containment Pressure--high-high test signal.
- d. At least once per 5 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

4.6.2.2.2 The casing cooling tank shall be demonstrated OPERABLE:

- a. At least once per 7 days by:
 - 1. Verifying the contained borated water volume in the tank, and
 - 2. Verifying the boron concentration of the water.
- b. At least once per 24 hours by verifying the casing cooling tank temperature.

REACTIVITY CONTROL SYSTEMS

BASES

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 centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable below 340°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 1.77 delta k/k after xenon 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.

REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.2 BORATION SYSTEMS (Continued)

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.

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 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.

At least one charging pump must remain operable at all times when the opposite unit is in MODE 1, 2, 3 or 4. This is required to maintain the charging pump cross-connect system operational.

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section ensure that (1) acceptable power distribution limits are maintained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) limit the potential effects of rod misalignment on associated accident analyses. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits.

The ACTION statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original design criteria are met. Misalignment of a rod requires measurement of peaking factors or a restriction in THERMAL POWER; either of these restrictions provides assurance of fuel rod integrity during continued operation. In addition those accident analyses affected by a misaligned rod are reevaluated to confirm that the results remain valid during future operation.

Control rod positions and OPERABILITY of the rod position indicators are required to be verified on a nominal basis of once per 12 hours with more frequent verifications required if an automatic monitoring channel is inoperable. These verification frequencies are adequate for assuring that the applicable LCO's are satisfied.

The maximum rod drop time restriction is consistent with the assumed rod drop time used in the accident analyses. Measurement with T_{avg} greater than or equal to 500°F and with all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a reactor trip at operating conditions.

EMERGENCY CORE COOLING SYSTEMS

BASES

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.

3/4.9 REFUELING OPERATIONS

BASES

3/4.9.1 BORON CONCENTRATION

The limitations on reactivity conditions during REFUELING ensure that: 1) the reactor will remain subcritical during CORE ALTERATIONS, and 2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel. These limitations are consistent with the initial conditions assumed for the boron dilution incident in the accident analyses. The value of 0.95 or less for K_{eff} includes a 1% $\Delta k/k$ conservative allowance for uncertainties. Similarly, the boron concentration of 2300 ppm or greater includes a conservative uncertainty allowance of 50 ppm boron.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of the source range neutron flux monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

3/4.9.3 DECAY TIME

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor pressure vessel ensures that sufficient time has elapsed to allow the radioactive decay of the short lived fission products. This decay time is consistent with the assumptions used in the accident analyses.

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

The requirements on containment building penetration closure and OPERABILITY ensure that a release of radioactive material within containment will be restricted from leakage to the environment. 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.

3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity conditions during CORE ALTERATIONS.

REFUELING OPERATIONS

BASES

3/4.9.6 MANIPULATOR CRANE OPERABILITY

The OPERABILITY requirements for the manipulator cranes ensure that: 1) manipulator cranes will be used for movement of control rods and fuel assemblies, 2) each crane has sufficient load capacity to lift a control rod or fuel assembly, and 3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL PIT

The restriction on movement of loads in excess of the nominal weight that of a fuel and control rod assemblies and associated handling tool over other fuel assemblies in the storage pool ensures that in the event this load is dropped, 1) the activity release will be limited to that contained in a single fuel assembly, and 2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident.

3/4.9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

The requirement that at least one residual heat removal (RHR) loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effect of a boron dilution incident and prevent boron stratification.

The requirement to have two RHR loops OPERABLE when there is less than 23 feet of water above the reactor pressure vessel flange ensures that a single failure of the operating RHR loop will not result in a complete loss of residual heat removal capability. With the reactor vessel head removed and 23 feet of water above the reactor pressure vessel flange, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating RHR loop, adequate time is provided to initiate emergency procedures to cool the core.

3/4.9.9 CONTAINMENT PURGE AND EXHAUST ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment vent and purge penetrations will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 93 AND 78 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

INTRODUCTION

By letter dated December 22, 1986, the Virginia Electric and Power Company (the licensee) requested a change to the Technical Specifications (TS) for the North Anna Power Station, Units Nos. 1 and 2 (NA-1&2). The proposed change would amend the NA-1&2 TS by increasing the boron concentration in the refueling water storage tank (RWST), the casing cooling tank (CCT) and the safety injection accumulators. The requested change to the NA-1&2 TS is required since design changes such as the recently approved core power uprate and the transition to an eighteen-month fuel cycle have reduced the available shutdown margin at current boron concentrations. The proposed change would increase the boron concentration in the RWST and CCT from the current NA-1&2 TS limit of 2000-2100 parts per million (ppm) to 2300-2400 ppm. Also, the safety injection accumulator boron concentration would be increased from 1900-2100 ppm to 2200-2400 ppm.

DISCUSSION

NA-1&2 Emergency Core Cooling System (ECCS) boration is provided by the RWST, CCT and accumulators. The boron from these sources provides negative reactivity to ensure core shutdown for the Loss of Coolant Accidents (LOCA) and other accidents. The NA-1&2 TS currently require that the RWST boron concentration be maintained between 2000 and 2100 ppm, while the accumulator boron concentration must be maintained between 1900 and 2100 ppm. By raising the allowed boron concentration limits by 300 ppm, high energy core reloads would maintain the necessary shutdown requirements. An increase in the boron concentration affects several areas. The licensee has addressed these areas by evaluating the impact of the increased boron concentration on the following: accidents affected by core boration, post-LOCA boron precipitation, post accident sump pH and equipment qualification, non-LOCA accident analyses, RWST solubility limits and plant chemistry.

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Loss of coolant accidents (LOCA) require core boration. The licensee has analyzed the effects of increased boron concentration on both large break and small break LOCAs. The licensee characterized the large break LOCA by two phases, ECCS operation and long term cooling. Peak clad temperature occurs during the first phase of the accident, and therefore, peak clad temperature is not dependent on the boron concentration in the accumulators or RWST. Void formation rather than core boration initially shuts down the reactor following a large break. For these reasons the docketed accident analysis presently in place for NA-1&2 remains valid. The results of the licensee's analysis of the increased boron concentration indicates that the reactor will remain shutdown during the reflood and long term cooling phase even with no control rods inserted into the core. The small break LOCA model assumes the insertion of control rods in the calculation of core shutdown. Consequently, the boron concentration required to achieve the level of negative reactivity necessary to assure shutdown for the small break LOCA is significantly lower than the concentration required to assure shutdown for a large break LOCA. The increase in boron concentration provides additional conservatism for the small break LOCA. The licensee has not specifically reanalyzed the effects for increased RWST, CCT and accumulator boron concentration citing the above reasoning for the continued validity of previous analysis. Therefore, raising the limits for allowable boron concentration in the RWST, CCT and accumulators will provide additional margin for maintaining the core subcritical.

One effect of boration during a LOCA is the progressive increase over time of the boron concentration in the core. This occurs because the water vaporizes out of the break and leaves behind the boron it originally contained. If the concentration exceeds a critical value, boric acid can crystallize in the core and precipitate out of solution. The concern is that the precipitation of boric acid crystals could block core cooling.

To preclude the possibility of boron precipitation, the concentration should not exceed 23.53 weight percent, which is the boric acid solubility limit less a 4 weight percent margin. The increased boron concentration in the RWST, CCT and accumulators will require a shorter hot leg/cold leg recirculation switchover time than that which was calculated in the original NA-1&2 analysis. The licensee has analyzed this situation and determined that boron precipitation can be prevented if the operator alternates between hot leg and cold leg recirculation every 10 hours as opposed to the current limit of 18 hours. This will require a change to the North Anna Nuclear Plant Emergency Procedures. This change will be implemented concurrently with any increase in boron concentration.

The licensee performed an evaluation to determine the impact that the increase in boron concentration would have on sump pH and how this would affect the environmental qualification of safety-related electrical equipment inside containment. The results demonstrate that the pH varied only slightly and that the range is maintained within the range of NA-1&2 TS Basis 3/4.5.5. Consequently there is no impact on environmental qualification from the proposed change. In addition, the effect on stress corrosion cracking and iodine evolution are negligible because the pH remains within the Standard Review Plan (SRP) limits.

Each of the NA-1&2 Chapter 15 transients specified in the Updated Final Safety Analysis Report (UFSAR) were evaluated for the effects of the increased boron concentration. Only the non-LOCA boron dilution transient was found to have a more potentially severe result due to increased boron concentration. The other non-LOCA transients either were not impacted or were made less severe from the proposed increase in boron concentration. For the boron dilution transient, the presently specified NA-1&2 TS 3.1.1.3.2 precludes the possibility of an unplanned boron dilution by specifying that the primary grade water flow control valve be locked closed during operations in Modes 3, 4, 5 and 6 except during planned boron dilution or makeup activities. The current SRP acceptance criteria for the boron dilution transient are met through this presently specified NA-1&2 TS 3.1.1.3.2. Only the boron dilution transient during refueling and startup was determined to be more severe at the proposed boron concentration. The dilution transient during refueling is most limiting since the primary coolant volume is smallest at that time. An analysis for the proposed boron concentration during refueling and based on the maximum flow rate available shows that the operator would have 37 minutes to take corrective action in the event of excessive dilution during planned activities. The 37 minutes available for operator action is only very slightly less than the 39 minutes operator action time specified in the NA-1&2 Final Safety Analysis Report (FSAR) in Section 15.2.4 for an uncontrolled boron dilution transient. Thus the operator would have sufficient time to terminate the boron dilution event before shutdown margin is lost and the consequences are not significantly increased by the proposed boron concentration.

The boron solubility limit at 32°F is 3850 ppm. An increase in the boron concentration to 2400 ppm will not cause crystallization of the RWST contents. Margin in excess of TS limits is maintained despite the increase in concentration.

EVALUATION:

Regarding the approach of solubility limits caused by the increased boron concentrations, the staff has verified that sufficient margin exists to preclude boron "freeze-up" of the tanks and piping. The licensee has demonstrated satisfactory assessment of the effects of increased boron concentration on large and small break LOCAs, post LOCA boron precipitation in the reactor vessel, equipment qualification, non-LOCA accidents, RWST and CCT solubility limits, and overall plant chemistry. Therefore, based on the above, the licensee's request to increase the specified boron concentration in the RWST and CCT from 2000-2100 ppm to 2300-2400 ppm is acceptable. In addition, based on the above, the request to increase the boron concentration in the accumulators from 1900-2100 ppm to 2200-2400 ppm is also acceptable.

ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously published a proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding. 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 these amendments.

CONCLUSION

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Date: April 14, 1987

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