April 11, 1991

Docket Nos. 50-280
and 50-281

DISTRIBUTION
See attached sheet

Mr. W. L. Stewart
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

Dear Mr. Stewart:

SUBJECT: SURRY UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: BORON CONCENTRATION (TAC NOS. 79327 AND 79328)

The Commission has issued the enclosed Amendment No. 153 to Facility Operating License No. DPR-32 and Amendment No. 150 to Facility Operating License No. DPR-37 for the Surry Power Station, Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TS) in response to your application transmitted by letter dated December 21, 1990, as supplemented February 8, 1991.

These amendments increase the boron concentration in the refueling water storage tank and in the safety injection accumulators, and require the minimum boron concentration in the spent fuel pool to be 2300 ppm. In addition, a TS has been added to lock out the primary grade water flow path during refueling and cold shutdown 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.

Sincerely,

(Original Signed By)

Bart C. Buckley, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 153 to DPR-32
2. Amendment No. 150 to DPR-37
3. Safety Evaluation

cc w/enclosures:
See next page

OFC	LA:PD22	PM:PD22	D:PD22	SRXB	OGC		
NAME	DMiller	BBuckley:kdj	HBerkow	RJones			
DATE	3/19/91	3/19/91	3/19/91	/ /91	3/21/91		

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AMENDMENT NO. 153 TO FACILITY OPERATING LICENSE NO. DPR-32 - SURRY UNIT 1
AMENDMENT NO. 150 TO FACILITY OPERATING LICENSE NO. DPR-37 - SURRY UNIT 2

Docket File
NRC & Local PDRs
PDII-2 Reading
S. Varga, 14/E/4
G. Lainas, 14/H/3
H. Berkow
D. Miller
B. Buckley
OGC-WF
L. Kopp, 8/E/23
R. Jones, 8/E/23
D. Hagan, 3302 MNBB
E. Jordan, 3302 MNBB
B. Grimes, 9/A/2
G. Hill (8), P-137
Wanda Jones, P-130A
J. Calvo, 11/F/23
ACRS (10)
GPA/PA
OC/LFMB
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Others as required

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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-280

SURRY POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 153
License No. DPR-32

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

   A. The application for amendment by Virginia Electric and Power Company (the licensee) dated December 21, 1990, as supplemented February 8, 1991, 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 3.B of Facility Operating License No. DPR-32 is hereby amended to read as follows:

(B) <u>Technical Specifications</u>

The Technical Specifications contained in Appendix A, as revised through Amendment No. 153 , 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 the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, 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 11, 1991

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

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-281

SURRY POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 150
License No. DPR-37

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

   A. The application for amendment by Virginia Electric and Power Company (the licensee) dated December 21, 1990, as supplemented February 8, 1991, 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 3.B of Facility Operating License No. DPR-37 is hereby amended to read as follows:

(B) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 150 , 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 the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow

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

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 11, 1991

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 153 FACILITY OPERATING LICENSE NO. DPR-32

AMENDMENT NO. 150 FACILITY OPERATING LICENSE NO. DPR-37

DOCKET NOS. 50-280 AND 50-281

Revise Appendix A as follows:

Remove Pages	Insert Pages
TS 3.2-4	TS 3.2-4
TS 3.2-5	TS 3.2-5
TS 3.3-1	TS 3.3-1
TS 3.4-2	TS 3.4-2
TS 3.4-5	TS 3.4-5
TS 3.8-3	TS 3.8-3
TS 3.10-3	TS 3.10-3
TS 3.10-5	TS 3.10-5
TS 5.4-2	TS 5.4-2

E. The requirements of Specifications 3.2.B.1 and 3.2.B.6, concerning the opposite unit's charging pumps and associated piping, valves and control board indications, may be modified to allow the following components to be unavailable.

1. The opposite unit's charging pumps may be unavailable for a period not to exceed 7 days provided immediate attention is directed to making repairs. If not available within 7 days, be in at least hot shutdown within the next 6 hours and in cold shutdown within the next 30 hours.

2. The cross tie piping, associated valves and control board instrumentation and controls may be unavailable for a period not to exceed 7 days provided immediate attention is directed to making repairs. If not available within 7 days, be in at least hot shutdown within the next 6 hours and in cold shutdown within the next 30 hours.

F. During refueling and cold shutdown conditions, the following valves in the affected unit shall be locked, sealed, or otherwise secured in the closed position except during planned boron dilution or makeup activities:

For Unit 1:

a. 1-CH-223 or

b. 1-CH-212, 1-CH-215, and 1-CH-218

For Unit 2:

a. 2-CH-223 or

b. 2-CH-212, 2-CH-215, and 2-CH-218

Following a planned dilution or makeup activities, the valves listed above shall be locked, sealed, or otherwise secured in the closed position within 15 minutes.

<u>Basis</u>

The Chemical and Volume Control System provides control of the Reactor Coolant System Boron inventory. This is normally accomplished by using boric acid transfer pumps which discharge to the suction of each unit's charging pumps. The Chemical and Volume Control System contains four boric acid transfer pumps. Two of these pumps are normally assigned to each unit but, valving and piping arrangements allow pumps to be shared such that three out of four pumps can service either unit. An alternate (not normally used) method of boration is to use the charging pumps taking suction directly from the refueling water storage tank. There are two sources of borated water available to the suction of the charging pumps through two different paths; one from the refueling water storage tank and one from the discharge of the boric acid transfer pumps.

A. The boric acid transfer pumps can deliver the boric acid tank contents (7.0% solution of boric acid) to the charging pumps.

B. The charging pumps can take suction from the volume control tank, the boric acid transfer pumps and the refueling water storage tank. Reference is made to Technical Specification 3.3.

The quantity of boric acid in storage from either the boric acid tanks or the refueling water storage tank is sufficient to borate the reactor coolant in order to reach cold shutdown at any time during core life.

Approximately 6000 gallons of the 7.0% solution of boric acid are required to meet cold shutdown conditions. Thus, a minimum of 6000 gallons in the boric acid tank is specified. An upper concentration limit of 8.5% boric acid in the tank is specified to maintain solution solubility at the specified low temperature limit of 112°F. For redundancy, two channels of heat tracing are installed on lines normally containing concentrated boric acid solution.

The Boric Acid Tank(s), which are located above the Boron Injection Tank(s), are supplied with level alarms which would annunciate if a leak in the system occurred.

For one-unit operation, it is required to maintain available one charging pump with a source of borated water on the opposite unit, the associated piping and valving, and the associated instrumentation and controls in order to maintain the capability to cross-connect the two unit's charging pump discharge headers. In the event the operating unit's charging pumps become inoperable, this permits the opposite unit's charging pump to be used to bring the disabled unit to cold shutdown conditions. Initially, the need for the charging pump cross-connect was identified during fire protection reviews.

The requirement that certain valves remain closed during refueling and cold shutdown conditions, except for planned boron dilution or makeup activities, provides assurance that an inadvertent boron dilution will not occur. This specification is not applicable at intermediate shutdown, hot shutdown, reactor critical, or power operations.

3.3 SAFETY INJECTION SYSTEM

Applicability

Applies to the operating status of the Safety Injection System.

Objective

To define those limiting conditions for operation that are necessary to provide sufficient borated cooling water to remove decay heat from the core in emergency situations.

Specifications

A. A reactor shall not be made critical unless the following conditions are met:

1. The refueling water storage tank contains not less than 387,100 gallons of borated water. The boron concentration shall be at least 2300* ppm and not greater than 2500* ppm.

2. Each accumulator system is pressurized to at least 600 psia and contains a minimum of 975 ft^3 and a maximum of 1025 ft^3 of borated water with a boron concentration of at least 2250** ppm.

* These limits apply to Cycle 12 and subsequent cycles for Unit 1 and to Cycle 11 and subsequent cycles for Unit 2. For prior operating cycles, boron concentration shall be at least 2000 ppm and not greater than 2500 ppm.

** This limit applies to Cycle 12 and subsequent cycles for Unit 1 and to Cycle 11 and subsequent cycles for Unit 2. For prior operating cycles, boron concentration shall be at least 1950 ppm.

2300* ppm and not greater than 2500* ppm which will assure that the reactor is in the refueling shutdown condition when all control rod assemblies are inserted.

4. The refueling water chemical addition tank shall contain not less than 4,200 gal of solution with a sodium hydroxide concentration of not less than 17 percent by weight and not greater than 18 percent by weight.

5. All valves, piping, and interlocks associated with the above components which are required to operate under accident conditions shall be operable.

6. The total uncollected system leakage from valves, flanges, and pumps located outside containment shall not exceed the limit shown in Table 4.5-1 as verified by inspection during system testing. Individual component leakage may exceed the design value given in Table 4.5-1 provided that the total allowed system uncollected leakage is not exceeded.

B. During power operation the requirements of Specification 3.4-A may be modified to allow the following components to be inoperable. If the components are not restored to meet the requirements of Specification 3.4-A within the time period specified below, the reactor shall be placed in the hot shutdown condition. If the requirements of Specification 3.4-A are not satisfied within an additional 48 hours the reactor shall be placed in the cold shutdown condition using normal operating procedures.

* These limits apply to Cycle 12 and subsequent cycles per Unit 1, and to Cycle 11 and subsequent cycles for Unit 2. For prior operating cycles, boron concentration shall be at least 2000 ppm and not greater than 2500 ppm.

Each Recirculation Spray Subsystem draws water from the common containment pump. In each subsystem the water flows through a recirculation spray pump and recirculation spray cooler, and is sprayed into the containment atmosphere through a separate set of spray nozzles. Two of the recirculation spray pumps are located inside the containment and two outside the containment in the containment auxiliary structure.

With one Containment Spray Subsystem and two Recirculation Spray Subsystems operating together, the Spray Systems are capable of cooling and depressurizing the containment to subatmospheric pressure in less than 60 minutes following the Design Basis Accident. The Recirculation Spray Subsystems are capable of maintaining subatmospheric pressure in the containment indefinitely following the Design Basis Accident when used in conjunction with the Containment Vacuum System to remove any long term air in leakage.

In addition to supplying water to the Containment Spray System, the refueling water storage tank is also a source of water for safety injection following an accident. This water is borated to a concentration which assures reactor shutdown by approximately 5 percent $\Delta k/k$ when all control rod assemblies are inserted and when the reactor is cooled down for refueling.

The shutdown margins are selected based on the type of activities that are being carried out. The 5 percent Δk/k shutdown margin during refueling precludes criticality under any circumstances, even though fuel and control rod assemblies are being moved.

The allowable value for the containment air partial pressure is presented in TS Figure 3.8-1 for service water temperatures from 25 to 92°F. The allowable value varies as shown in TS Figure 3.8-1 for a given containment average temperature. The RWST water shall have a maximum temperature of 45°F.

The horizontal limit lines in TS Figure 3.8-1 are based on LOCA peak calculated pressure criteria, and the sloped line is based on LOCA subatmospheric peak pressure criteria.

The curve shall be interpreted as follows:

> The horizontal limit line designates the allowable air partial pressure value for the given average containment temperature. The horizontal limit line applies for service water temperatures from 25°F to the sloped line intersection value (maximum service water temperature).

From TS Figure 3.8-1, if the containment average temperature is 112°F and the service water temperature is less than or equal to 83°F, the allowable air partial pressure value shall be less than or equal to 9.65 psia. If the average containment temperature is 116°F and the service water temperature is less than or equal to 88°F, the allowable air partial pressure value shall be less than or equal to 9.35 psia. These horizontal limit lines are a result of the higher allowable initial containment average temperatures and the analysis of the pump suction break.

6. At least one residual heat removal pump and heat exchanger shall be operable to circulate reactor coolant. The residual heat removal loop may be removed from operation for up to 1 hour per 8-hour period during the performance of core alterations or reactor vessel surveillance inspections.

7. Two residual heat removal pumps and heat exchangers shall be operable to circulate reactor coolant when the water level above the top of the reactor pressure vessel flange is less than 23 feet.

8. At least 23 feet of water shall be maintained over the top of the reactor pressure vessel flange during movement of fuel assemblies.

9. With the reactor vessel head unbolted or removed, any filled portions of the Reactor Coolant System and the refueling canal shall be maintained at a boron concentration which is:

   a. Sufficient to maintain K-effective equal to 0.95 or less, and

   b. Greater than or equal to 2300 ppm and shall be checked by sampling at least once every 72 hours.

10. Direct communication between the Main Control Room and the refueling cavity manipulator crane shall be available whenever changes in core geometry are taking place.

11. No movement of irradiated fuel in the reactor core shall be accomplished until the reactor has been subcritical for a period of at least 100 hours.

Basis

Detailed instructions, the above specified precautions and the design of the fuel handling equipment, which incorporates built-in interlocks and safety features, provide assurance that an accident, which would result in a hazard to public health and safety, will not occur during refueling operations. When no change is being made in core geometry, one neutron detector is sufficient to monitor the core and permits maintenance of the out-of-function instrumentation. Continuous monitoring of radiation levels and neutron flux provides immediate indication of an unsafe condition. Containment high radiation levels and high airborne activity levels automatically stop and isolate the Containment Purge System. The fuel building ventilation exhaust is diverted through charcoal filters whenever refueling is in progress. At least one flow path is required for cooling and mixing the coolant contained in the reactor vessel so as to maintain a uniform boron concentration and to remove residual heat.

During refueling, the reactor refueling water cavity is filled with approximately 220,000 gal of water borated to at least 2300 ppm boron. The boron concentration of this water, established by Specification 3.10.A.9, is sufficient to maintain the reactor subcritical by at least 5% Δk/k in the cold shutdown condition with all control rod assemblies inserted. This includes a 1% Δk/k and a 50 ppm boron concentration allowance for uncertainty. This concentration is also sufficient to maintain the core subcritical with no control rod assemblies inserted into the reactor. Checks are performed during the reload design and safety analysis process to ensure the K-effective is equal to or less than 0.95 for each core. Periodic checks of refueling water boron concentration assure the proper shutdown margin. Specification 3.10.A.10 allows the Control Room Operator to inform the manipulator operator of any impending unsafe condition detected from the main control board indicators during fuel movement.

assemblies to assure k_{eff} 0.95, even if unborated water were used to fill the spent fuel storage pit. The spent fuel pool is divided into a two-region storage pool. Region 1 comprises the first three rows of fuel racks (324 storage locations) adjacent to the Fuel Building Trolley Load Block. Region 2 comprises the remainder of the fuel racks in the fuel pool. During spent fuel cask handling, Region 1 is limited to storage of spent fuel assemblies which have decayed at least 150 days after discharge and shall be restricted to those assemblies in the "acceptable" domain of Figure 5.4-1. Administrative controls with written procedures will be employed in the selection and placement of these assemblies. The enrichment of the fuel stored in the spent fuel racks shall not exceed 4.1% weight percent of U-235.

C. Whenever there is spent fuel in the spent fuel pit, the pit shall be filled with borated water at a boron concentration not less than 2300* ppm to match that used in the reactor cavity and refueling canal during refueling operations.

D. The only drain which can be connected to the spent fuel storage area is that in the reactor cavity. The strict step-by-step procedures used during refueling ensure that the gate valve on the fuel transfer tube which connects the spent fuel storage area with the reactor cavity is closed before draining of the cavity commences. In addition, the procedures require placing the bolted blank flange on the fuel transfer tube as soon as the reactor cavity is drained.

* This limit takes effect at the time the Unit 2 reactor cavity is flooded following the end of Operating Cycle 10.

<u>References</u>

FSAR Section 9.5 Fuel Pit Cooling System
FSAR Section 9.12 Fuel Handling System

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 153 TO FACILITY OPERATING LICENSE NO. DPR-32

AND AMENDMENT NO. 150 TO FACILITY OPERATING LICENSE NO. DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-280 AND 50-281

1.0 INTRODUCTION

By letter dated December 21, 1990, as supplemented February 8, 1991, Virginia Electric and Power Company, the licensee for the Surry Power Station, submitted a request for an amendment in the form of changes to the Technical Specifications (TS) for Units 1 and 2. In addition to the two Surry units, the licensee operates two other nuclear units at North Anna. It has been the licensee's outage planning philosophy to stagger outages whenever possible, which, in many instances, has resulted in end-of-cycle (EOC) power coastdowns. Since these coastdowns represent an off-nominal operational mode, they are undesirable from the standpoint of maximizing electrical generation. Designing reload cores with increased initial core reactivity is one means to reduce the need for extended EOC coastdowns. The Surry 2 Cycle 11 core, for example, is being designed with eight more fresh reload assemblies than originally intended, thereby increasing overall cycle burnup capability. The increased initial core reactivity, of course, requires additional reactivity holddown at beginning-of-cycle (BOC) which can be achieved by the proposed TS changes.

The proposed changes to TS 3.3.A, 3.4.A, 3.10.A, and Bases 3.10 would increase the boron concentration in the refueling water storage tank (RWST) to a range of 2300-2500 ppm from the current range of 2000-2200 ppm. In addition, the minimum boron concentration in the safety injection accumulators specified in TS 3.3.A would be increased to 2250 ppm from the present value of 1950 ppm. An additional TS, 3.2.F, would be added to lock out the primary grade water flow path during refueling and cold shutdown conditions. Finally, TS 5.4.C would be revised to require the minimum boron concentration in the spent fuel pool to be 2300 ppm. The acceptability of these proposed TS revisions are addressed in the following evaluation.

2.0 EVALUATION

The licensee has evaluated the effect of the proposed increased boron concentration limits on each of the Chapter 14 transients presented in the Surry UFSAR. Only the boron dilution events required reanalyses. The NRC Standard Review Plan (SRP) states that there should be at least 30 minutes available at refueling conditions between positive indication of a boron dilution in progress to loss of shutdown margin for corrective operator action. At cold shutdown through power conditions, the SRP specifies that at least 15 minutes must be available between positive indication of a boron dilution in progress to loss of shutdown margin. During refueling and cold shutdown with energy being removed by the residual heat removal (RHR) system, the effective RCS volume being diluted in the event of an inadvertent boron dilution is reduced with respect to other modes of operation where one or more reactor coolant pumps are operating. Therefore, during RHR operation, boron dilution rates can be higher for a given primary grade water addition rate than for the other operational modes. Rather than impose additional shutdown margin requirements to meet the SRP time intervals, a requirement to lockout the primary grade water flow path during refueling and cold shutdown conditions has been added by specifying valves to be locked, sealed, or otherwise secured in the closed position except during planned boron dilution or makeup activities. This precludes a boron dilution event during cold shutdown or refueling conditions. At intermediate and hot shutdown conditions, the licensee has shown that the present administratively implemented shutdown margin limits ensure that at least 15 minutes are available from initiation of dilution to loss of shutdown margin for corrective operator action. During startup and power conditions, at least 15 minutes are available for corrective operator action from positive indication of a dilution in progress (alarm or reactor trip) to loss of shutdown margin.

The effect of an increased boron concentration on the LOCA transient was evaluated for both the large- and small-break scenarios. During the blowdown phase of the accident, the core is shut down and remains shut down due to void formation. Therefore, peak clad temperature is not dependent on the boron concentration in the accumulators or RWST. For the large-break LOCA, the reactor will remain shut down during the reflood and long-term cooling phase with the increased boron concentration even with no control rods inserted in 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.

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 23.5 weight percent, which is the boric acid solubility limit less a 4 weight percent margin. 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 periodically. A new hot leg recirculation switchover time was calculated for the proposed increased RWST and accumulator boron concentration and will be implemented into the Surry emergency procedures concurrently with any approved increase in boron concentration.

The licensee performed an evaluation to determine the impact that the increase in boron concentration would have on containment and recirculation spray pH. They have determined that during the injection phase, when borated water flowing from the RWST is mixed with the sodium hydroxide solution flowing from the chemical addition tank (CAT), the pH of the containment spray solution remains within the 8.9 to 10.4 range. However, during the recirculation phase, when all of the containment spray solution comes from the containment sump where borated water and sodium hydroxide solution are mixed, the pH ranges from 7.9 to 8.5. The pH values for both the injection and recirculation phases meet the requirements of the SRP (Rev. 2 Section 6.5.2) for iodine removal. However, the upper limit of pH for the injection phase exceeds the value specified in the SRP (Rev. 2 Section 6.1.1) for protection against stress corrosion cracking of stainless steel. Also, this high value of pH may cause corrosion of aluminum surfaces present in the containment and the resulting generation of hydrogen. Since these phenomena will occur only during the injection phase, which lasts a relatively short time, the degradation produced will be insignificant. The values of the pH of the containment spray solutions specified by the licensee are, therefore, acceptable.

Increasing the boron concentration limit from 2000-2200 ppm to 2300-2500 ppm will not adversely affect the environmental qualification of electrical equipment. The corrosive agent in the chemical spray is primarily NaOH. Increasing the boron concentration lowers the solution pH, making it less corrosive (closer to neutral). Therefore, the higher boron concentration limits are acceptable, even for those components qualified at a lower boron concentration.

3.0 SUMMARY

The staff has reviewed the effects of the proposed increased boron concentration limits on the non-LOCA and LOCA safety analyses, the time to switchover between cold and hot leg recirculation following a LOCA, the post-LOCA containment sump pH, and the equipment qualification, and concludes that all pertinent safety criteria are satisfactorily met. Therefore, based on the above, the licensee's request to increase the specified boron concentration from 2000-2200 ppm to 2300-2500 ppm in the RWST and from 1950 ppm to 2250 ppm in the accumulators is acceptable. In addition, the proposed lockout of the primary grade water flow path during refueling and cold shutdown and the specification of a minimum boron concentration of 2300 ppm in the spent fuel pool is acceptable.

4.0 STATE CONSULTATION

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

5.0 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 (56 FR 9390). 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.

6.0 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 these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: L. Kopp

Date: April 11, 1991