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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 199 TO FACILITY OPERATING LICENSE NO. DPR-32

AND AMENDMENT NO. 199 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 June 9, 1994, the Virginia Electric and Power Company (the licensee or VEPCO) requested a license amendment for the Surry Units 1 and 2 plants that would change the Technical Specifications (TS). The proposed changes would modify, in part, the Chemical and Volume Control System specifications and the Safety Injection System TS.

The proposed changes to the TS are in part due to a modification to the operation of the charging pumps. The Surry Power Station's charging pumps are dual purpose pumps. As components of the Chemical and Volume Control System (CVCS), they provide normal charging to the Reactor Coolant System (RCS). As part of the emergency core cooling system, they provide high head safety injection when required. The pump manufacturer, Byron Jackson, has proposed a once-through process flow cooling arrangement for the Surry charging pump mechanical seals. This modification eliminates the need for the existing mechanical seal coolers, charging pump component cooling subsystem and intermediate seal coolers, by providing a seal cooling supply from the low pressure stages of the charging pump casing. Elimination of the charging pump component cooling subsystem and implementation of the proposed modifications requires changes to Surry TS.

Changes are proposed to restructure the CVCS specifications and the Safety Injection System (SI) specifications consistent with the proposed modification of the charging pump seal cooling, elimination of the charging pump component cooling subsystem, and prior removal of the boron injection tank.

The requirement to maintain two channels of heat tracing operable is being deleted and a minimum boric acid solution temperature is being specified.

The specifications have been restructured to address operability requirements on a subsystem basis rather than an individual component basis. The restructuring of the Specifications continues to ensure that no single failure can disable both emergency core cooling trains and the criteria of 10 CFR 50.46 remain satisfied.

Certain requirements are being relocated or deleted as follows:

1. The Specification 3.3 requirement regarding RCS loop stop valves is being relocated to Specification 3.1, Reactor Coolant System.

2. The Specification 3.3 requirement for total system leakage outside containment is being deleted.

3. The requirement to position and remove AC power from specified SI System motor operated valves (existing Specifications 3.3.A.8 and 3.3A.9) is relocated to surveillance specification 4.11, SI System Tests.

Portions of the changes include certain line-item improvements identified in GL 93-05, Item 7.1, Item 7.4 and NUREG-1366. The licensee has proposed the following changes:

1. A surveillance requirement has been added (new Specification 4.11.B) to verify safety injection accumulator boron concentration, volume and nitrogen cover-pressure.

2. A requirement to verify boron concentration within 6 hours of a specified solution volume increase has been added but is not required when the volume increase makeup source is the reactor water storage tank (RWST). The minimum RWST boron concentration is equal to or greater than the minimum required safety injection accumulator boron concentration limit.

3. The SI accumulator instrument channel surveillance requirements for level and pressure will be deleted.

2.0 BACKGROUND

The CVCS is designed to provide boric acid solution through the charging pumps to the RCS for reactivity control and to compensate for minor leakage of reactor coolant. The CVCS also has the capability to achieve Cold Shutdown of both units from any operating condition with one control rod assembly withdrawn at any time in core life, and has the capability to achieve Refueling Shutdown from Cold Shutdown. The SI system functions to provide adequate emergency core cooling, thereby maintaining core geometry and clad integrity during the unlikely event of postulated accidents. This system includes passive safety injection accumulators, high head charging, and low-head injection subsystems. To ensure operability of the CVCS and SI systems, the pumps and various components are tested on a surveillance frequency as required by the TS.

In an evaluation documented in NUREG-1366, the NRC made a comprehensive examination of surveillance requirements in TS that require testing at power. The NRC staff found that, while the majority of testing at power is important,

safety can be improved, equipment degradation decreased, and an unnecessary burden on personnel resources eliminated by reducing the amount of testing at power that is required by TS. Based on the results of the evaluation documented in NUREG-1366, the NRC issued Generic Letter 93-05, dated September 27, 1993, which, as discussed below, identified certain line item improvements.

3.0 EVALUATION

The changes, which are described below, include: (1) modification of the high head charging pumps seal cooling subsystem, (2) restructuring of the CVCS and SI System Specifications, (3) relocation of certain specification requirements within existing specifications, (4) specification of a minimum boric acid solution temperature in lieu of heat tracing channel operability, and (5) minor wording changes which are administrative in nature for consistency in terminology, capitalization of defined terms and clarification.

3.1 Charging Pump

The passive design charging pump modification uses effluents from the charging pump low pressure stages to provide the function of the charging pump component cooling water subsystem. This modification provides for the elimination of the charging pump component cooling water subsystem including pumps, heat exchangers, piping, and support sundries. Based on the licensee's engineering evaluation of the manufacturer's proposed modification and the pump seal manufacturer's concurrence with the modification, they have determined this modification to be acceptable with no reduction in the pump's safety-related function. Therefore, there is no decrease in the systems ability to mitigate the consequences of any accident identified in the safety analysis report. The CVCS and SI System, including their subsystems and components, are required to be operable in accordance with the Specification 1.0.D definition of "operable," allowing for the elimination of redundant language regarding piping, valves and control board indication. The operability requirements of the common boric acid storage system were clarified with requirements for boric acid solution volume, concentration, and temperature specified to support operability on a subsystem basis.

The requirement for a charging pump from the opposite unit to be available (existing TS 3.2.B.1, 3.2.B.6, 3.2.E and footnote page TS 3.2-2) prior to reactor critical has been clarified. The requirements identifying availability of the opposite unit's charging pump and explaining its meaning, were previously identified in a footnote and throughout the specification. The availability requirements of the opposite unit's charging pumps are now included as a specific requirement within the specification (new specification 3.2.B.2).

Specification 3.2.F, addressing dilutions during refueling, shutdown, and cold shutdown conditions, is clarified. An administrative change is made to restructure the specification by numbering the requirement that the specified valves be locked, sealed, or otherwise secured within 15 minutes following planned dilutions and makeup activities (new specification 3.2.E.3).

Based on the NRC staff evaluation, we find the proposed changes acceptable.

3.2 Restructure of CVCS, SI and Associated Specifications

VEPCO stated that the changes proposed to restructure the CVCS and the SI system specifications are consistent with the proposed modifications of the charging pump seal cooling, and elimination of the charging pump component cooling subsystem. The proposed changes relate to the following:

3.2.1 Outage Times

An allowed outage time of 72 hours, as a reasonable time for repair of affected components, is specified for conditions where a CVCS subsystem or SI System subsystem becomes inoperable. This is consistent with NUREG-0453, NRC Memorandum, "Recommended Interim Revisions to LCOs for ECCS Components," dated December 1, 1975, and NUREG-1431. A reliability analysis (reference NRC memo above) has shown that the impact of having one subsystem inoperable is sufficiently small to justify continued operation for 72 hours. Following this guidance, VEPCO has deleted the presently specified allowed period of 48 hours between achieving Hot Shutdown and initiation of Cold Shutdown procedures. Therefore, the proposed changes do not increase the required allowed outage times to achieve Cold Shutdown.

Based on the NRC staff evaluation, we find the proposed changes acceptable.

3.2.2 Allowed Outage Times Engineering Evaluation

VEPCO stated that the allowed outage times are based upon engineering evaluation of the changes being made and are consistent with the safety analysis and NUREG-0452. Specific parameters for refueling water storage tank borated water volume, concentration, and temperature were added for consistency within the Specifications. An allowed outage time of 8 hours was added for conditions where the refueling water storage tank is inoperable due to the boron concentration or solution temperature not being within specified limits consistent with NUREG-1431. This is acceptable based on a safety analysis showing that the outage time of 8 hours does not impact the plant accident analysis. The refueling water storage tank contents remain available for injection or sprays during the 8-hour period allowed for restoring the temperature and boron concentration to within specified limits. The changes ensure that the refueling water storage tank remains capable of providing a sufficient supply of borated water for injection by the emergency core cooling system in the event of a loss of cooling accident (LOCA) and that the reactor will remain subcritical in Cold Shutdown consistent with LOCA analyses.

Clarification is made to TS Figure 3.8-1, Figure Notes, Item 1, by adding reference to the 8-hour allowed outage time for conditions where the RWST temperature is not within specified limits.

An allowed outage time of 1 hour is added for conditions where the RWST becomes inoperable due to volume. The allowed outage time of 1 hour is

consistent with SI specification 3.3.B.10 which allows the RWST to be inoperable for 1 hour. The allowed outage time of 1 hour is also consistent with NUREG-0452 for the boric acid flow path from the RWST to the RCS.

Based on the NRC staff evaluation, we find the proposed changes acceptable.

3.2.3 Line-item Improvements Identified in GL 93-05

The proposed changes include certain line-item improvements identified in GL 93-05. The requested changes to the SI accumulator surveillance requirements for boron concentration, boron solution volume, and nitrogen cover-pressure are consistent with GL 93-05, Item 7.1, Item 7.4 and NUREG-1366. An allowed outage time of 72 hours is specified for the condition where one accumulator is inoperable due to boron concentration not being within specified limits, consistent with NUREG-1431.

A surveillance requirement has been added which verifies the borated water volume and nitrogen cover-pressure at least once per 12 hours consistent with NUREG-1431 and GL 93-05, Item 7.4. This surveillance was previously performed each shift in accordance with Specification Table 4.1-1, Item 20. As identified in GL 93-05, Item 7.4, the NRC staff had recognized that accumulator instrumentation operability is not directly related to the capability of the SI accumulators to perform their safety function, and permitted the surveillance requirement for this instrumentation to be relocated from the TS. The SI accumulator instrumentation surveillance requirements will be maintained within station procedures in accordance with the administrative requirements of Specification 6.4.

An accumulator boron concentration surveillance of at least once per 31 days has been specified, consistent with NUREG-1431 and GL 93-05, Item 7.1. This surveillance was previously performed monthly in accordance with Specification Table 4.1-2B, Item 8. A surveillance requirement was added to verify boron concentration within 6 hours of each solution volume increase of greater than or equal to 1% of accumulator tank volume consistent with NUREG-1431 and GL 93-05, Item 7.1. As permitted in GL 93-05, Item 7.1, this surveillance is not required when the volume makeup source is the RWST.

Based on the NRC staff evaluation, we find the proposed changes acceptable.

3.3 Relocation of Certain Specification Requirements

To support restructuring of these specifications, certain requirements are being relocated as follows:

3.3.1 RCS Loop Stop Valves

The Specification 3.3 requirement regarding RCS loop stop valves is being relocated to Specification 3.1, Reactor Coolant System, with no change in the specified requirements. However, Section 3.1.A.4 is revised to add a requirement that during power operation specified loop stop valves shall have

AC power removed and the breakers tagged open.

Based on the NRC staff evaluation, we find the proposed changes acceptable.

3.3.2 Total System Leakage Outside of Containment

The Specification 3.3 requirement for total system leakage outside containment is being deleted. The requirements for reducing leakage from systems located outside containment are identified in administrative controls in Specification 6.4.K and Chapter 6 of the UFSAR. Deletion of this requirement and similar requirements in Specification 3.3.B.9, 3.4.A.6, 3.4.B.4, 4.5.B.4 and 4.11.A.4.d eliminates the existing confusion and redundancy, and maintains total uncollected system leakage requirements within existing administrative controls consistent with the requirements contained in Specification 6.4.K and with NUREG-0452.

Based on the NRC staff evaluation, we find the proposed changes acceptable.

3.3.3 Uncollected System Leakage

The NRC Safety Evaluation for Amendment 162 (Surry Unit 1) and Amendment 161 (Surry 2), regarding total system uncollected leakage, determined that the associated changes were "a non-required change" and that there are "no requirements in the Westinghouse Standardized Technical Specification for total leakage limits allowed for the Recirculation Spray (RS) System and for periodic verification of system leakage within limits for the RS and Safety Injection (SI) systems." Consequently, VEPCO proposes to delete the uncollected system leakage requirements in Specification 3.3.A.12, 3.3.B.9, 3.4.A.6, 3.4.B.4, 4.5.B.4 and 4.11.A.4.d and their associated Basis for the SI and the RS System.

Based on the NRC staff evaluation, we find the proposed changes acceptable.

3.3.4 Safety Injection System and Reactor Coolant System Motor Operated Valves

The requirement for certain SI system motor operated valves to be de-energized in a specified position prior to power operation is being relocated to the SI surveillance section, Specification 4.11, consistent with restructuring the SI specification and NUREG-0452 for similar valves. An administrative surveillance is added which involves tagging each valve's breaker in the off position once the valve has been properly positioned and de-energized. De-energizing these valves in their proper position and tagging the valves' breaker ensure that they cannot change position as a result of an active failure or be inadvertently misaligned. These actions ensure the flow path from the emergency core cooling pumps to the reactor coolant system is maintained and that misalignment of these valves does not render both emergency core cooling system trains inoperable.

Specification 3.3.A.8 and 3.3.A.9 requirements for removal of AC power to specified valves are relocated as an additional surveillance requirement. Surveillance Specification 4.11.C.4 is added with minor wording changes to specify additional verification requirements for tagging the valves' breakers to be locked, sealed, or otherwise secured in the off position. This is consistent with applicable portions of NUREG-0452 and NUREG-1431.

The requirement to have the SI accumulator discharge valves blocked open (existing Specification 3.3.A.10) has been appropriately relocated to the requirement for SI accumulator operability, with an additional requirement that the valves' breakers be locked, sealed, or otherwise secured in the open position (new Specification 3.3.A.2.d).

Reference to the SI accumulator discharge motor-operated valves receiving an open signal (page TS 3.3-7) is deleted. These valves are required by Specification (new Specification 3.3.A.2.d) to be de-energized in the open position when RCS pressure exceeds 1,000 psig. While de-energized, they do not receive an open signal, and do not require an open signal to perform their SI function.

The charging pump surveillance requirements (existing Specification 4.11.A.2), are changed to delete the words "on recirculation flow," and are renumbered (new Specification 4.11.C.2). During testing, these pumps are flow tested to the RCS. The motor-operated valve surveillance requirements (existing Specification 4.11.A.3) have not changed and are renumbered (new Specification 4.11.C.3).

A surveillance requirement has been added to demonstrate each SI subsystem is operable by verifying: (1) specified motor-operated valves are blocked open by de-energizing AC power to the valve operators (existing Specification 3.3.A.8), and (2) specified motor-operated valves are blocked closed by de-energizing AC power to the valve operators (existing Specification 3.3.A.9). An additional requirement is added for the valves' breakers to be locked, sealed or otherwise secured in the off position after de-energizing AC power.

The requirements for RCS loop isolation valves (existing Specification 3.3.A.11) have been relocated to Specification 3.1.A.4. A requirement is added to have the valves' breakers to be locked, sealed, or otherwise secured in the open position after AC power is removed.

Minor wording changes are made for consistency by using the terminology "actuates to its correct position upon receipt of a safety injection test signal" when referring to surveillance testing of automatic valves capable of receiving an SI signal and pump circuit breakers during refueling shutdown (new Specifications 4.11.C.5.a and 4.11.C.5.b).

Based on the NRC staff evaluation, we find the proposed changes acceptable.

3.4 Heat Tracing vs. Minimum Solution Temperature

The heat tracing requirements in Specification 3.3, Chemical and Volume Control System, existed to support operation of the boron injection tank and its higher boric acid concentrations and solution temperatures. The boric acid concentration was previously reduced and the boron injection tank (BIT) operability requirements were previously removed in Amendment 95 (Unit 1) and Amendment 95 (Unit 2). However, the heat tracing operability requirements of Specification 3.3 were not previously deleted when the boric acid concentration was reduced and the BIT operability requirements were removed. Chapter 9.1 of the UFSAR does not require heat tracing to be operable for proper functioning of the CVCS. Therefore, the licensee states that heat tracing is not required for the operability of the SI System nor does it affect the ability of the SI System to mitigate the consequences of any postulated accident identified in the safety analysis. It is therefore proposed to delete the requirement in Specification 3.3 to maintain two channels of heat tracing operable. However, a minimum boric acid solution temperature is specified.

In lieu of specifying heat tracing channel operability requirements in Specification 3.3, a minimum solution temperature is being specified consistent with NUREG-1431 for similar system parameters. The heat tracing will be maintained in accordance with station procedures and continue to be administratively controlled in accordance with Specification 6.4. Temperature monitoring circuitry is provided with automatic actuation of undertemperature and overtemperature alarms indicated in the Main Control Room. A minimum temperature limit of 112 degrees Fahrenheit ensures that the solution does not reach the boric acid precipitation point.

Based on the NRC staff evaluation, we find the proposed changes acceptable.

3.5 Administrative Changes

There are miscellaneous changes throughout the Technical Specifications for capitalization of defined terms, consistency in terminology, and clarity.

Clarification is made to TS Figure 3.8-1, Figure Notes, Item 1, by adding reference to the 8-hour allowed outage time for conditions where the RWST temperature is not within specified limits.

The licensee has stated that the restructuring of the CVCS and SI System specifications on a subsystem basis, as described above, maintains the capability of ensuring that the reactor can be made subcritical from any operating condition and provide sufficient shutdown margin to preclude inadvertent criticality when in the shutdown condition. Also, with the above changes the SI System subsystems continue to maintain sufficient boration capability to mitigate reactivity transients within the design limits associated with postulated accident conditions, including inadvertent depressurization, a loss-of-coolant accident, or steam line rupture. The two SI System subsystems ensure that sufficient emergency core cooling capability

will be available in the event of LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators remains capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits in accordance with the loss-of-coolant accident analysis.

The staff has found the above TS changes to be acceptable for the reasons explained above, including consistency with NUREG-0452, NUREG-1431, and GL-93-05.

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 (59 FR 37089). 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 staff has reviewed the licensee's submittal to support the changes to the Technical Specifications related to the Chemical and Volume Control System and Safety Injection System. Our evaluation in Section 3.0 has found the TS changes to be acceptable.

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.

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Date: May 31, 1995