VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

September 24, 1998

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 98-557
NL&OS/GSS/ETS R0
Docket Nos. 50-338/339
License Nos. NPF-4/7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
TECHNICAL SPECIFICATIONS BASES CHANGE
SI ACCUMULATOR BORON CONCENTRATION VERIFICATION

Virginia Electric and Power Company has changed the Bases for Technical Specifications 3/4.5.1, "Accumulators." These changes are being made to clarify that although the run of piping between the two Safety Injection Accumulator (SIA) discharge check valves is credited in demonstrating compliance with Technical Specification LCO 3.5.1 minimum SIA volume requirement, the minimum boron concentration requirement does not apply to this run of piping. Therefore, we are providing the following Technical Specification Bases changes to the accumulators for your information.

The Technical Specifications Bases changes have been reviewed and approved by the Station Nuclear Safety and Operating Committee and the Management Safety Review Committee. It has been determined that these changes do not involve an unreviewed safety question as defined in 10 CFR 50.59. A discussion and the Technical Specifications Bases changes are provided in Attachments 1 and 2, respectively.

If you have any further questions, please contact us.

Very truly yours,

James P. O'Hanlon
Senior Vice President - Nuclear

Commitments made in this letter:

1. There are no commitments in this letter.

Attachments
1. Discussion of Changes
2. Proposed Technical Specifications Basis Changes

cc: U.S. Nuclear Regulatory Commission
Region II
Atlanta Federal Center
61 Forsyth Street, SW
Suite 23T85
Atlanta, Georgia 30303

Mr. M. J. Morgan
NRC Senior Resident Inspector
North Anna Power Station

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by J. P. O'Hanlon, who is Senior Vice President - Nuclear, of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 24th day of September, 1998.

My Commission Expires: March 31, 2000.

Maggie McClure
Notary Public

(SEAL)

ATTACHMENT 1

DISCUSSION OF CHANGES

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA UNITS 1 AND 2

Discussion of Change

Introduction

Virginia Electric and Power Company proposes changes to the Technical Specifications Bases Section 3/4.5.1, "Accumulators." The Bases section for the accumulators states that the limits on accumulator volume, boron concentration, and pressure ensure that the assumptions of the safety analysis are met. The proposed changes to the Technical Specification Bases section will clarify that, although the run of piping between the two Safety Injection Accumulator (SIA) discharge check valves (approximately 84 feet of piping) is credited in demonstrating compliance with the Technical Specification 3.5.1 minimum SIA volume requirement, the minimum boron concentration requirement does not apply to this run of piping. This clarification accommodates the potential for in-leakage from the RCS into the unsampled portion of the volume credited in meeting the Technical Specification 3.5.1 minimum SIA volume requirement.

Background

Licensing/Design Basis

The Safety Injection Accumulators are pressure vessels filled with borated water and pressurized with nitrogen gas. During normal operation each SIA is isolated from the Reactor Coolant System (RCS) by two check valves in series. Should the RCS pressure fall below the SIA pressure, the check valves open and borated water is forced into the RCS. One SIA is attached to each cold leg of the RCS. Mechanical operation of the swing-disk check valves is the only action required to open the injection path from the accumulators to the core via the cold leg.

Connections are provided for remotely adjusting the level and boron concentration of the water in each SIA during normal plant operation as required. Accumulator water level may be adjusted either by draining to the primary drain transfer tank or by pumping borated water from the RWST to the SIA. Samples of the solution in the Safety Injection Accumulators are taken periodically to verify the boron concentration.

Discussion

The operability of each Safety Injection Accumulator ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs in the event that the RCS pressure falls below the pressure of the accumulators. Technical Specifications Limiting Condition for Operation (LCO) 3.5.1.c states that each accumulator shall be operable with between 2200 and 2400 ppm of boron. Surveillance Requirement 4.5.1.b states that each accumulator shall be demonstrated operable at least once per 31 days and within 6 hours after each solution volume

increase of greater than or equal to 5 percent of tank volume by verifying the boron concentration of the SIA solution.

Station SIA Tank curves correlate the indicated SIA level (%) to the Technical Specifications minimum and maximum levels. A review of the basis for these curves identified that the implementing procedures do not properly account for the boron concentration in the entire SIA tank, which includes the volume between the two SIA check valves as well as the tank volume. The surveillance techniques for SIA sampling do not sample the volume between the two check valves down-stream of the SIA, although this volume is considered part of the SIA volume required by Technical Specification 3.5.1.c. The piping length between the SIA tank and the second SIA discharge check valve is approximately 94 feet. The piping length between SIA tank and the first check valve is approximately 12 feet.

Changes to the Technical Specifications Bases will clarify that, although the piping between the two SIA discharge check valves is credited in demonstrating compliance with Technical Specification 3.5.1 minimum SIA volume requirement, the minimum boron concentration requirement does not apply to this run of piping. This clarification accommodates the potential for in-leakage from the RCS into the unsampled portion of the volume credited in meeting the Technical Specifications minimum SIA volume requirement.

A review of the design and licensing basis requirements for the minimum SIA boron concentration specified in TS 3.5.1 revealed that the boron concentration must meet the design requirements for post-LOCA subcriticality, and post-LOCA sump pH for iodine retention and minimization of chloride-induced stress corrosion cracking of stainless steel components inside containment. Although the current design and licensing bases calculations have explicitly considered the potential for in-leakage from the RCS into the unsampled portion of the credited SIA volume, this potential raises a verbatim compliance concern for TS 3.5.1. Therefore, clarification is being made to Technical Specifications Bases Section 3/4.5.1 to address this issue.

Specific Changes

The following paragraph is being added to TS Bases Section 3/4.5.1:

Although the run of piping between the two Safety Injection Accumulator (SIA) discharge check valves is credited in demonstrating compliance with Technical Specification 3.5.1 minimum SIA volume requirement, the minimum boron concentration requirement does not apply to this run of piping. Applicable accident analyses have explicitly considered in-leakage from the RCS, and the resulting reduction in boron concentration in this run of piping, which is not sampled.

Safety Significance

A change to the Bases for Technical Specification 3.5.1 will clarify that the minimum SIA boron concentration requirement does not apply to the unsampled run of piping between the two SIA discharge check valves.

1. The proposed Bases change does not increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report (SAR):

   SIA boron concentration is not an accident initiator or a precursor to any equipment malfunction important to safety previously evaluated in the SAR. Thus, the proposed TS Basis change does not increase the probability of occurrence of events previously evaluated in the SAR.

   The SIA boron concentration is a design input into the post-LOCA shutdown reactivity and post-LOCA sump pH calculations. The design and licensing basis post-LOCA shutdown reactivity and sump pH analyses are assumed to be initiated from a hot full power condition, at which the RCS boron concentration is (by definition) equal to the hot full power critical boron concentration. The post-LOCA shutdown reactivity and post-LOCA sump pH analyses assume that the boron concentration of the unsampled portion of the SIA discharge line is equal to the hot full power critical boron concentration. This assumption is conservative, since in-leakage from the RCS into the unsampled portion of the credited SIA volume which may occur over an operating cycle will not cause the boron concentration of this volume to be reduced below the hot full power critical RCS boron concentration. Thus, the proposed TS Bases change does not increase the consequences of events previously evaluated in the SAR.

   A reduction in the boron concentration of the unsampled portion of the credited SIA volume due to in-leakage from the RCS does not itself constitute a malfunction of safety related equipment (i.e., the SIAs), since such in-leakage has been explicitly considered in the safety analyses which constitute the design and licensing bases for the Technical Specifications minimum SIA boron concentration.

2. The proposed Bases change does not create the possibility of an accident or malfunction of a different type than any evaluated previously in the safety analysis report. Specifically, the possibility of a boron dilution event due to inadvertent SIA discharge is not created by accommodating the potential for in-leakage from the RCS into the unsampled portion of the SIA volume which is credited in meeting the minimum Technical Specifications SIA volume requirement. The effect of SIA discharge under design basis large break LOCA conditions with a reduced boron concentration in the SIA discharge line due to

RCS in-leakage has been explicitly evaluated in affected accident analyses. Inadvertent discharge under conditions other than design basis LOCA conditions is not considered credible, since inadvertent SIA discharge is administratively precluded. That is, the discharge MOV is procedurally disabled in the closed position prior to achieving an RCS pressure that could result in inadvertent SIA discharge. Moreover, the unsampled portion of the SIA volume (approximately 1100 gallons in 3 SIAs) is a small fraction of the total SIA volume (approximately 23,000 gallons), and a very small fraction of the RCS volume (approximately 70,000 gallons). Thus, although not explicitly analyzed, this small volume of water subject to in-leakage from the RCS does not present the potential for significant reactivity addition in the event of inadvertent SIA discharge. Thus, the proposed Bases change does not create the possibility of an accident or malfunction of a different type than any evaluated previously in the Safety Analysis Report.

3. The proposed Bases change does not result in a reduction in margin of safety as defined in the basis for any Technical Specifications. The accident analyses which assume a minimum boric acid concentration in the SIAs explicitly accommodate the potential for in-leakage from the RCS into the unsampled portion of the SIA volume which is credited in meeting the minimum Technical Specifications SIA volume requirement. Therefore, the bases change simply clarifies the existing safety analysis bases for the minimum SIA boric acid concentration requirement, and does not constitute a reduction in the margin of safety as defined in the basis for any Technical Specifications.