VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

March 22, 2002

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Serial No.:	01- 560D
CM/RAB	R0
Docket Nos.:	50-338
	50-339
License Nos.:	NPF-4
	NPF-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
PROPOSED IMPROVED TECHNICAL SPECIFICATIONS
REQUEST FOR ADDITIONAL INFORMATION
ISTS 3.7.7 BEYOND SCOPE ISSUE (TAC Nos. MB1439 and MB1440)

This letter transmits our response to the NRC's request for additional information (RAI) regarding the North Anna Power Station (NAPS) Units 1 and 2 proposed Improved Technical Specifications (ITS). The North Anna ITS license amendment request was submitted to the NRC in a December 11, 2000 letter (Serial No. 00-606).

The NRC requested additional information regarding Improved Standard Technical Specification (ISTS) 3.7.7, "Component Cooling Water (CCW) System," and ITS 3.7.9, "Ultimate Heat Sink," in a letter dated September 6, 2001 (TAC Nos. MB1439, MB1440, MB1451, and MB1452). On November 19, 2001, Dominion submitted responses to the NRC's RAIs (Serial Number 01-560). In a subsequent telephone call with members of your staff, Dominion agreed to revise one response and to submit additional information to address certain questions in the September 6, 2001 letter. The revised response and the additional information were transmitted in a letter dated January 25, 2002 (Serial Number 01-560A). In a letter dated February 11, 2002, the NRC requested further information on the North Anna reservoir. The additional information was transmitted in a letter dated February 18, 2002 (Serial Number 01-560B). In a telephone call on February 28, 2002, the NRC requested additional information on Component Cooling and the North Anna reservoir. The additional information was transmitted in a letter dated March 7, 2002 (Serial Number 01-560C). In a telephone call on March 15, 2002, the NRC stated that they required no further information on the relocation of the North Anna reservoir to the Technical Requirements Manual, but that additional justification would be required for the relocation of Component Cooling. This letter transmits the additional justification.

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If you have any further questions or require additional information, please contact us.

Very truly yours,

Leslie N. Hartz
Vice President - Nuclear Engineering

Attachment

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission
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SN: 01-560D
Docket Nos.: 50-338/339
Subject: Proposed ITS – RAI – ISTS 3.7.7

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Leslie N. Hartz, who is Vice President - Nuclear Engineering, of Virginia Electric and Power Company. She has affirmed before me that she 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 her knowledge and belief.

Acknowledged before me this 22nd day of March, 2002.

My Commission Expires: March 31, 2004.

Maggie McClure

Notary Public

(SEAL)

Attachment

Proposed Improved Technical Specifications
Beyond Scope Issue
ISTS 3.7.7, "Component Cooling Water System"
Additional Justification

Virginia Electric and Power Company
(Dominion)

North Anna Power Station Units 1 and 2

North Anna Improved Technical Specifications (ITS) Request for Additional Information Component Cooling Water (CC) System (TAC Nos. MB1439, MB1440)

Summary

On March 15, 2002, the NRC and the Company conducted a teleconference regarding the relocation of the Component Cooling (CC) system specification and the Lake Anna Reservoir requirements to the Technical Requirements Manual (TRM) as part of the North Anna Improved Technical Specifications (ITS) conversion. In the teleconference, the NRC stated that they needed no further information from the Company to support the relocation of the Lake Anna Reservoir requirements to the TRM.

The NRC stated that they needed additional information to support the Company's relocation of the CC system to the TRM. Specifically, the NRC stated that they believe that the North Anna CC system meets Criterion 4 in 10 CFR 50.36(c)(2)(ii)(D), in that the system's risk significance was high enough to be considered "significant to public health and safety," as used in Criterion 4. The NRC stated that to support the relocation of the CC system to the TRM, the Company should either show that the risk significance of the CC system is lower than that currently understood by the NRC or show that the risk associated with the unavailability of the CC system is adequately managed by other Technical Specifications.

It is the Company's position that Probabilistic Risk Analysis (PRA) demonstrates that CC is not significant to public health and safety, as described in 10 CFR 50.36(c)(2)(ii)(D). In addition, the following discussion demonstrates that the proposed North Anna ITS adequately manages the risk associated with the CC system regardless of the calculated PRA results.

The CC system performs many functions, as described in the Dominion letter dated November 19, 2001 (Serial Number 01-560), but the risk associated with the unavailability of the CC system is associated with only two of those functions. The risk significant event associated with each of these CC functions has been evaluated and the Company has determined that the constraints proposed in the North Anna ITS are sufficient to manage the associated risk. These evaluations are discussed below.

It should be noted that the Technical Specification Required Actions contribute to managing risk by limiting the length of time that the plant can operate in a degraded condition. This risk benefit of the Technical Specifications is not explicitly included in the PRA model.

In addition to the Technical Specifications restrictions which manage the risk associated with the CC system, 10 CFR 50.65(a)(4) states, "Before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventative maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities." This requirement is applicable to the CC system at North Anna. Therefore, this regulation manages the unavailability of CC by requiring evaluation and management of risk associated with the system.

In conclusion, the Company has determined that the risk associated with the unavailability of CC is adequately managed by the proposed ITS.

Event 1

Loss of Reactor Coolant Pump (RCP) Seal Cooling

Event Description

The Reactor Coolant Pump (RCP) labyrinth seals are cooled using seal injection flow from the charging pumps. There are three charging pumps for each unit and one charging pump is sufficient to provide seal injection for all three RCPs. Should all charging pump flow to the RCP labyrinth seals be lost, a backup system, the RCP thermal barrier, would provide cooling to the RCP seals. CC provides cooling to the RCP thermal barrier heat exchanger. If both cooling methods are lost, the risk analysis assumes that the RCP seals will fail resulting in excessive Reactor Coolant System (RCS) leakage.

Risk Significant Role Played by CC in the Event

CC provides cooling to the RCP thermal barrier heat exchanger, which is a backup to RCP seal injection provided by the charging pumps.

ITS Constraints that Manage the Risk Associated with CC in the Event

The CC system is used for RCP seal cooling as a backup to the seal injection provided by the charging pumps. The capacity of one charging pump is sufficient to provide RCP seal injection to all RCPs. Therefore, CC is only needed for RCP seal cooling if all three charging pumps are inoperable. As described below, LCOs 3.5.2 and 3.5.3 require two of the three charging pumps to be OPERABLE in MODES 1, 2, and 3 and one charging pump to be OPERABLE in MODE 4. If only one charging pump is OPERABLE in MODES 1, 2, and 3, a plant shutdown must commence in 72 hours. If no charging pumps are OPERABLE in the MODES in which the RCPs are allowed to operate (MODES 1, 2, 3, and 4), an immediate plant shutdown is required under LCO 3.0.3.

LCO 3.5.2 requires two ECCS trains to be OPERABLE in MODES 1, 2 and 3, and LCO 3.5.3 requires one ECCS train to be OPERABLE in MODE 4. Each ECCS train consists of a High Head Safety Injection (HHSI) subsystem and a Low Head Safety Injection (LHSI) subsystem. The HHSI pumps are also the charging pumps which provide seal injection to the RCPs. In MODES 1, 2 and 3, with one HHSI subsystem inoperable, the HHSI subsystem must be restored to OPERABLE status within 72 hours or a plant shutdown is required. In MODES 1, 2, and 3, with two HHSI subsystems inoperable, LCO 3.0.3 is entered and the plant shutdown is started in one hour. In MODE 4 with the one required ECCS train inoperable, it must be restored within 1 hour or the plant must be placed in MODE 5 within 24 hours. RCP seal injection is not needed in MODES 5 or 6 because the RCPs are not required to operate in those MODES.

Should both RCP seal injection and RCP thermal barrier cooling be lost for any reason, including inoperable charging pumps, the Technical Specifications would require a plant shutdown. ITS LCOs 3.4.4, 3.4.5, and 3.4.6 require reactor coolant loops to be OPERABLE in MODES 1, 2, and 3, and RCS or Residual Heat Removal (RHR) loops to be OPERABLE in MODE 4. The LCO Bases define an OPERABLE RCS loop as requiring an OPERABLE RCP, and an OPERABLE RCP is defined in the LCO Bases as being able to provide forced flow. When an RCP is running and providing forced flow, it must have seal cooling. Physical limitations and plant procedures require stopping an RCP that does not have seal cooling. This will render the RCP and the associated RCS loop inoperable under the ITS. In MODES 1 and 2, ITS 3.4.4 requires being in MODE 3 in 6 hours if an RCS loop is inoperable. In MODES 3 and 4, ITS 3.4.5 and 3.4.6 require immediate action to restore a required RCS loop to be in operation. These Required Actions place the unit in a condition in which seal cooling is not needed for the affected RCP(s).

As the ITS limits operation in conditions in which CC would be called on to provide RCP thermal barrier cooling, the proposed North Anna ITS adequately manages the risk associated with the loss of CC and a subsequent inability to provide RCP thermal barrier cooling.

Furthermore, the physical design of the system prevents this event from being significant to public health and safety. The RCPs utilize high temperature seals. The high temperature RCP seals have been recently installed and are not yet modeled in the PRA. These seals are designed to maintain their integrity following loss of seal cooling for the period of time required to cool and depressurize the RCS, without reliance on the RCP thermal barrier. The high temperature seals provide a substantial risk benefit and a corresponding substantial reduction in the risk significance of the CC system. Also, seal injection can be supplied from either a normal or alternate charging pump discharge header in case a loss of RCP seal injection is flow path related. If a loss of RCP seal injection is due to a loss of all charging pumps on one unit, the charging systems for Units 1 and 2 may be cross-connected using installed isolation valves in accordance with existing procedures. One charging pump on either unit is capable of providing seal injection for the RCPs on both units.

Conclusion

ITS LCOs 3.4.4, 3.4.5, 3.4.6, 3.5.2, and 3.5.3 adequately manage the risk associated with the unavailability of CC in a loss of RCP seal cooling event. Additional LCO restrictions on CC are not needed to manage the risk to a level that is not significant to public health and safety, as described in 10 CFR 50.36(c)(2)(ii)(D).

Event 2

Steam Generator Tube Rupture (SGTR)

Event Description

In the event of a SGTR, the RCS is cooled and depressurized as quickly as possible in order to terminate the primary to secondary leakage. The preferred method for cooling the RCS is Auxiliary Feedwater (AFW) flow to the intact SGs. Steam from the SGs is dumped to the condenser if offsite power is available to maintain condenser vacuum. Otherwise, steam is released from the intact SGs using the SG Power Operated Relief Valves (SG PORVs) or the decay heat release valve. The Emergency Operating Procedures also give the option to use the RHR system to cool the RCS after RHR entry conditions are reached, but RHR is not the preferred method of cooling and depressurizing the RCS. CC is a support system to RHR. Therefore RHR, and by association CC, can play a role in reducing RCS temperature and pressure following a SGTR.

A SGTR is only assumed to occur in MODES 1, 2, or 3 as the lower RCS pressure in other MODES make a SGTR unlikely.

The Design Basis Accident (DBA) analysis of a SGTR, discussed in Section 15.4.3 of the North Anna Updated Final Safety Analysis Report (UFSAR) does not assume the use of the RHR or CC systems. In fact, RHR and CC are not credited in any North Anna DBA or Transient analysis.

Risk Significant Role Played by CC in the Event

RHR is an alternative method for cooling the RCS following a SGTR after reaching RHR entry conditions. CC provides the cooling water for the RHR heat exchangers.

ITS Constraints that Manage the Risk Associated with CC in the Event

Following a SGTR, the RCS is cooled and depressurized as quickly as possible in order to minimize primary to secondary leakage through the SG tube break. AFW is used to feed the intact SGs in order to rapidly cool and depressurize the RCS. ITS LCO 3.7.5 requires three AFW trains to be OPERABLE in MODES 1, 2, 3, and MODE 4 when steam generators are relied on for heat removal. If an AFW train is inoperable in MODES 1, 2, or 3, it must be restored within 72 hours. If the train is not restored to OPERABLE status, or if two AFW trains are inoperable in MODES 1, 2, or 3, the unit must be in MODE 3 in 6 hours and MODE 4 within 18 hours. If all three AFW trains are inoperable in MODES 1, 2, or 3, action must be taken to immediately restore a train to service. (A plant shutdown is not required until one train is restored in order to minimize the risk associated with a loss of main feedwater and AFW during a plant shutdown.) Therefore, the proposed ITS limits operation in conditions in which the preferred method for responding to a SGTR (AFW) is not available.

Following a SGTR, after the unit has been cooled and depressurized to the RHR entry conditions, RHR can be used as an alternative method to further cool and depressurize the RCS. The only risk-significant role played by CC in this event is as a support system to RHR. CC provides cooling water to the RHR heat exchangers. The ITS definition of OPERABILITY states,

> *A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant . . . cooling ... water ...equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).*

Therefore, any time RHR is required to be OPERABLE by the ITS, CC must be capable of performing its function to support RHR.

ITS LCOs 3.4.6, 3.4.7, 3.4.8, 3.9.5, and 3.9.6 require RHR to be OPERABLE in MODES 5 and 6, and RHR or RCS loops are required to be OPERABLE in MODE 4. The entry condition for MODE 3 is an RCS Temperature ≥ 350 °F. The system design requires the RHR system to be isolated from the RCS at temperatures above 350 °F and pressures above 450 psig. Under the definition of OPERABILITY given above, the RHR system cannot be OPERABLE in MODE 1, 2, or 3 because it cannot perform its specified safety function. Therefore, in all of the MODES and conditions that CC could be required to provide cooling water to the RHR system, the existing RHR specifications require RHR to be OPERABLE (and by definition, CC must be capable of performing its support function for RHR). As a result, no additional ITS restrictions are needed to adequately manage the risk associated with CC for this event beyond the existing LCOs on RHR.

Note that in events in which it is assumed that a steam valve is stuck open on the ruptured SG, RCS cooling using AFW to the intact SGs is still the preferred method of cooldown because the RCS can be cooled and depressurized (terminating the release) more rapidly than with RHR.

Conclusion

The risk associated with the unavailability of CC to support RHR for RCS cooldown following a SGTR is adequately managed by ITS LCOs 3.7.5, 3.4.6, 3.4.7, 3.4.8, 3.9.5, and 3.9.6. Additional LCO restrictions on CC are not needed to manage the risk to a level that is not significant to public health and safety, as described in 10 CFR 50.36(c)(2)(ii)(D).