

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

February 14, 2003

Re: 10 CFR 50.4

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

Serial No. 02-633
NL&OS/MAE: R4'
Docket Nos. 50-338/-339
License Nos. NPF-4/-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNIT 2
STEAM GENERATOR PORV COMMITMENT CLARIFICATION

The purpose of this letter is for Virginia Electric and Power Company (Dominion) to clarify a commitment associated with the operation of the steam generator power operated relief valves (SG PORVs) for North Anna Unit 2. This commitment clarification is related to Branch Technical Position RSB 5-1, Design Requirements of the Residual Heat Removal System. A discussion of the commitment clarification is attached.

Although North Anna Units 1 and 2 SG PORVs are designed and operated in the same manner, this issue was only raised as part of the licensing process for the North Anna Unit 2 Operating License, and therefore the specific commitment does not apply to North Anna Unit 1.

If you have any questions, please contact us.

Very truly yours,



Leslie N. Hartz
Vice President – Nuclear Engineering

Attachment

Commitments made by this letter:

1. Appropriate Design Basis and Licensing Basis Documents will be revised.

A001

cc: U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Suite 23 T85
Atlanta, Georgia 30303-8931

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

Mr. S. R. Monarque
NRC Project Manager
North Anna Power Station

Attachment

STEAM GENERATOR PORV COMMITMENT CLARIFICATION

Background

The steam generator power operated relief valves (SG PORVs) provide an alternate method of cooling the plant to pressures and temperatures that permit operation of the Residual Heat Removal (RHR) System, should the preferred method of cooling through the condenser dump valves not be available.

During Unit 2 licensing, the NRC requested additional information regarding Branch Technical Position RSB 5-1, Design Requirements of the Residual Heat Removal System, (BTP RSB 5-1) in a March 7, 1980 letter. Specifically, the NRC requested Dominion to provide the following information for the SG PORVs (also referred to as atmospheric steam dump valves or the steam generator dump valves):

"Provide safety-grade steam generator dump valves, operators, air and power supplies which meet the single failure criteria. Provide a commitment to demonstrate the ability to manually operate the atmospheric steam dump valves and demonstrate the ability to communicate with the control room while doing so."

Dominion responded in a March 20, 1980 letter (Serial No. 252/030780). The response stated in part:

"Each North Anna steam generator is provided with one safety grade seismically supported atmospheric dump valve... Electrical power to the electropneumatic controller, which controls the valve position, is provided to each valve from separate channels of uninterruptable safety grade power from independent station batteries.

The most limiting single failure would be the loss of one main steam line atmospheric dump valve. This could be caused by the loss of the electrical channel which supplies power to one atmospheric dump valve. This situation would prevent operation of one atmospheric dump valve from the control room. Two valves would still be available to control cooldown."

Issue:

During recent research for an unrelated design change package, a potential discrepancy was discovered in the quality classification for control circuitry associated with the SG PORVs. Specifically, the raceways and cables providing electrical signals

to the SG PORVs are designated as non-safety-related. Additionally, the control cables to all three SG PORVs are routed in the same non-safety-related cable tray and conduit. This potential discrepancy was evaluated in light of the March 1980 correspondence discussed above since this condition potentially subjects all three SG PORVs to a single failure resulting in a loss of remote SG PORV control.

Evaluation

Component Classification

The SG PORVs are safety-related. The non-safety-related normally supplied air system is backed up with a dedicated air flask and check valve to each SG PORV to assure operation on the loss of normal air supply, until such time that manual valve operation can be established. The control systems are powered from independent safety-related vital AC inverters backed up by uninterruptible safety-related batteries. The non-safety-related control cables to all three SG PORVs are routed in the same non-safety-related cable tray and conduit. This circuitry design reflects the original control-grade design of this system.

Limiting Single Failure

The most limiting single failure in our March 20, 1980 letter was stated to be the loss of one main steam line atmospheric dump valve. This is consistent with the guidance in NUREG-0800, Standard Review Plan, Section 5.4.7, Residual Heat Removal System. This section states in Item III.6 that the system that is used to bring the reactor to conditions permitting operation of the RHR system assumes the failure of a single active component with only either onsite or offsite electric power available. Since the control circuitry/wiring is non-safety-related, it cannot be assured to operate in a design basis accident. A single failure of the non-safety-related cable tray could remove all remote control capability for the SG PORVs. However, this non-safety-related circuitry is not credited in the accident analysis and does not preclude local manual operation. Only the components necessary to locally, manually control the SG PORV are required to remain operable during a design basis accident. Thus, the single failure loss of a single SG PORV remains limiting.

BTP RSB 5-1 Requirements

BTP RSB 5-1 stated that for heat removal and Reactor Coolant System (RCS) circulation during cool down to cold shutdown the possible solution for full compliance was to:

"Provide safety-grade dump valves, operators, and power supply, etc. so that manual action should not be required after SSE except to meet single failure."

A note was provided that discussed the impact that this new requirement would have on existing plants (North Anna Unit 2 is a Class 2 plant):

"Note 1: The implementation for Class 2 plants does not result in a major impact while providing additional capability to go to cold shutdown. The major impact results from the requirement for safety-grade steam dump valves."

The above requirements are inferred to require as robust a design as practicable for this originally designed control-grade PORV system as indicated by specifying that certain critical components be designated as safety-grade, while not specifying that the entire system or function be classified as safety-related. Evidence of this interpretation is the acceptance by the NRC of the possible need for manual operator action to mitigate failures and the subsequent requirement to demonstrate this ability.

Operability of the SG PORVs

The Technical Specification Bases for Limiting Condition for Operation 3.7.4 for the SG PORVs state that:

"An SG PORV is considered OPERABLE when it is capable of providing controlled relief of the main steam flow and capable of fully opening and closing, remotely or by local manual operation on demand."

Moreover, the Bases confirms the need for manual action regarding the manual PORV isolation valve impact on PORV operability:

"A closed manual isolation valve does not render it or its SG PORV line inoperable because operator action time to open the manual isolation valve is supported in the accident analysis."

The NRC's March 7, 1980 letter addressed the possible need for manual operator action to mitigate failures with the specific requirement to demonstrate the feasibility and success of these actions. The SG PORVs are equipped to allow local manual operation in the Main Steam Valve House should the remote control system become unavailable. An individual at the SG PORVs can open and close them as required to control steam release and RCS temperature as directed by the control room via radio. As documented in Section 5.4.3 of NUREG-0053, Supplement No. 11, Safety Evaluation Report related to the operation of North Anna Power Station, Unit 2, dated August 1980, Dominion has performed tests confirming the manual operation of the SG PORVs. Manual actions, if needed, have been proceduralized, validated and are readily accomplished.

Accident Analysis

Several of the accident analyses are evaluated against the Main Steam System overpressure criterion. These analyses do not take credit for the operation of the SG PORVs. Per the plant design basis, only the main steam safety valves (MSSVs) are credited to operate for pressure relief.

The steam generator tube rupture (SGTR) analysis assumes release of radioisotopes through the ruptured SG's PORV for 30 minutes. Implicit in this analysis is the assumption that the SG PORV for the ruptured steam generator sticks open when it initially opens in response to increasing steam generator pressure. For a SGTR event, procedural guidance for the operator to isolate flow from the ruptured steam generator is provided in the emergency operating procedure and includes remote and local actions as required. The safety analysis does not take credit for any operator action to cool down and depressurize the RCS for the first 30 minutes. However, steam releases from the ruptured steam generator are assumed to be terminated after 30 minutes. Therefore, the SG PORVs must be capable of being closed either remotely or manually within 30 minutes. This can be accomplished by closing the SG PORV either remotely or manually or by closing its associated block valve manually per the procedures.

The assumption that releases are terminated beyond 30 minutes implies that there is some mechanism for removing decay heat via the intact steam generators and controlling their pressures (and therefore, the corresponding RCS temperature) to below the PORV setpoint, and ultimately, below the faulted steam generator pressure in order to terminate the break flow. The operator has three proceduralized options to conduct a cooldown, depending on what is available: the intact SG PORVs, the condenser steam dumps, and the decay heat release valve.

Evaluation Conclusion

Although the non-safety-related control cables to all three SG PORVs are routed in the same non-safety-related cable tray and conduit, the SG PORVs are still capable of performing their intended design function. The SG PORVs are designed to permit local manual operation in the Main Steam Valve House should the remote control system become unavailable. An individual at the SG PORVs can open and close the valves as directed by the control room via radio. This permits control of steam release and RCS temperature as required. Dominion demonstrated the ability to perform these actions as part of the North Anna Unit 2 power ascension testing.

The accident analysis for North Anna demonstrates that the Main Steam System Overpressure criterion is met without crediting the SG PORVs. For long term heat removal, either remote control of these valves or manual operation of these valves has been shown to be acceptable. This is further delineated in the Technical Specifications that consider the SG PORVs OPERABLE with either remote or local manual operation.

Commitment Clarification

The 1980 commitment that "Each North Anna steam generator is provided with one safety grade seismically supported atmospheric dump valve... Electrical power to the electropneumatic controller... is provided to each valve from separate channels of uninterruptable safety grade power from independent station batteries" is clarified to specifically identify that associated cabling is neither safety-related nor independent, and is not required to be. Appropriate Design Basis and Licensing Basis documents will be changed accordingly.