3/4.7 PLANT SYSTEMS

3/4.7.1 TURBINE CYCLE

SAFETY VALVES

LIMITING CONDITION FOR OPERATION

3.7.1.1 All main steam line code safety valves associated with each steam generator of an unisolated reactor coolant loop shall be OPERABLE with lift settings as specified in Table 3.7-2.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

a. With one or more main steam line code safety valves inoperable, operation in MODES 1, 2 and 3 may proceed provided, that within 4 hours, either the inoperable valve is restored to OPERABLE status or the Power Range Neutron Flux High Setpoint trip is reduced per Table 3.7-1; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.1.1 No additional Surveillance Requirements other than those required by Specification 4.0.5.

TABLE 3.7-1

MAXIMUM ALLOWABLE POWER RANGE NEUTRON FLUX HIGH SETPOINT WITH INOPERABLE STEAM LINE SAFETY VALVES

Maximum Number of Inoperable Safety Valves on Any Operating Steam Generator	Maximum Allowable Power Range Neutron Flux High Setpoint (Percent of RATED THERMAL POWER)
1	52
2	37
3	21

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3/4.7.1 TURBINE CYCLE

3/4.7.1.1 SAFETY VALVES

The OPERABILITY of the main steam line code safety valves ensure that the secondary system pressure will be limited to within 110% of the system design pressure, during the most severe anticipated system operational transient. The maximum relieving capacity is associated with a turbine trip from 100% RATED THERMAL POWER coincident with an assumed loss of condenser heat sink (i.e., no steam bypass to the condenser).

The specified valve lift settings and relieving capacities are in accordance with the requirements of Section III of the ASME Boiler and Pressure Code, 1971 Edition. The total relieving capacity for all safety valves on all of the steam lines is 12.83×10^6 lbs/hr which is greater than the total secondary steam flow of 12.77×10^6 lbs/hr at 100% RATED THERMAL POWER. A minimum of 2 OPERABLE safety valves per steam generator ensures that sufficient relieving capacity is available for the allowable THERMAL POWER restriction in Table 3.7-1.

STARTUP and/or POWER OPERATION is allowable with safety valves inoperable within the limitations of the ACTION requirements on the basis of the reduction in secondary system steam flow and THERMAL POWER required by the reduced reactor trip settings of the Power Range Neutron Flux channels. The reactor trip setpoint reductions are derived from the following conservative calculation such that the maximum power level allowed for operation with inoperable MSSVs is below the heat removing capability of the operable MSSVs.

In order to calculate these setpoints, the governing equation is the relationship: $q = m \Delta h$, where q is the heat input from the primary side, m is the steam flow rate, and Δh is the heat of the vaporization at the steam relief pressure. Therefore, the equation used in defining the revised setpoint values is:

$$\text{Hi } \Phi = \frac{100}{Q} \times \frac{(w_g \cdot h_{fg} \cdot N)}{K}$$

Where:

$Hi\ \Phi$ = Safety analysis power range high neutron flux setpoint, percent

Q = Nominal NSSS power rating of the plant (including reactor coolant pump heat, MWt

K = Conversion factor, 947.82 (Btu / sec) / MWt

w_g = Minimum total steam flow rate capability of the operable MSSVs on any one steam generator at the highest MSSV operating pressure including tolerance and accumulation, as appropriate, lbm / sec

h_{fg} = Heat of vaporization for steam at the highest MSSV opening pressure including tolerance and accumulation, as appropriate, Btu / lbm

N = Number of loops in plant

The resulting values calculated from this equation are reduced by 9% power to account for instrument and channel uncertainties. With the revised values, the maximum plant operating power level would be lower than the reactor protection system setpoint by an appropriate operating margin.

3/4.7.1.2 AUXILIARY FEEDWATER SYSTEM

The OPERABILITY of the auxiliary feedwater system ensures that the Reactor Coolant System can be cooled down to less than 350°F from normal operating conditions in the event of a total loss of off-site power.

The original design basis of the AFW system provided for two motor driven AFW pumps (AFWP) each capable of delivering 340 gpm and a single turbine driven AFWP capable of delivering 700 gpm to the steam generators during accident conditions. The design basis accidents for the AFW system are the loss of normal feedwater (LONF), the loss of offsite power (LOOP), which are ANS Condition II events, and the main feedline break (MFLB), which is an ANS Condition IV event.

Current analyses of the design basis accidents for the AFW system have shown that the applicable accident analysis acceptance criteria are met, including the effects of a single active failure of any AFWP to start, if each AFWP is capable of delivering ≥ 300 gpm to its respective steam generator at the safety valve set pressure (including the effects of setpoint drift).

3/4.7 PLANT SYSTEMS

3/4.7.1 TURBINE CYCLE

SAFETY VALVES

LIMITING CONDITION FOR OPERATION

3.7.1.1 All main steam line code safety valves associated with each steam generator of an unisolated reactor coolant loop shall be OPERABLE with lift settings as specified in Table 3.7-2.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

a. With one or more main steam line code safety valves inoperable, operation in MODES 1, 2 and 3 may proceed provided, that within 4 hours, either the inoperable valve is restored to OPERABLE status or the Power Range Neutron Flux High Setpoint trip is reduced per Table 3.7-1; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.1.1 No additional Surveillance Requirements other than those required by Specification 4.0.5.

TABLE 3.7-1

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3/4.7.1 TURBINE CYCLE

3/4.7.1.1 SAFETY VALVES

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The specified valve lift settings and relieving capacities are in accordance with the requirements of Section III of the ASME Boiler and Pressure Code, 1971 Edition. The total relieving capacity for all safety valves on all of the steam lines is 12.83×10^6 lbs/hr which is greater than the total secondary steam flow of 12.77×10^6 lbs/hr at 100% RATED THERMAL POWER. A minimum of 2 OPERABLE safety valves per steam generator ensures that sufficient relieving capacity is available for the allowable THERMAL POWER restriction in Table 3.7-1.

STARTUP and/or POWER OPERATION is allowable with safety valves inoperable within the limitations of the ACTION requirements on the basis of the reduction in secondary system steam flow and THERMAL POWER required by the reduced reactor trip settings of the Power Range Neutron Flux channels. The reactor trip setpoint reductions are derived from the following conservative calculation such that the maximum power level allowed for operation with inoperable MSSVs is below the heat removing capability of the operable MSSVs.

In order to calculate these setpoints, the governing equation is the relationship: $q = m \Delta h$, where q is the heat input from the primary side, m is the steam flow rate, and Δh is the heat of the vaporization at the steam relief pressure. Therefore, the equation used in defining the revised setpoint values is:

$$\text{Hi } \Phi = \frac{100}{Q} \times \frac{(w_g \cdot h_{fg} \cdot N)}{K}$$

Where:

Hi Φ = Safety analysis power range high neutron flux setpoint, percent

Q = Nominal NSSS power rating of the plant (including reactor coolant pump heat, MWt

K = Conversion factor, 947.82 (Btu / sec) / MWt

w_g = Minimum total steam flow rate capability of the operable MSSVs on any one steam generator at the highest MSSV operating pressure including tolerance and accumulation, as appropriate, lbm / sec

h_{fg} = Heat of vaporization for steam at the highest MSSV opening pressure including tolerance and accumulation, as appropriate, Btu / lbm

N = Number of loops in plant

The resulting values calculated from this equation are reduced by 9% power to account for instrument and channel uncertainties. With the revised values, the maximum plant operating power level would be lower than the reactor protection system setpoint by an appropriate operating margin.

3/4.7.1.2 AUXILIARY FEEDWATER SYSTEM

The OPERABILITY of the auxiliary feedwater system ensures that the Reactor Coolant System can be cooled down to less than 350°F from normal operating conditions in the event of a total loss of off-site power.

The original design basis of the AFW system provided for two motor driven AFW pumps (AFWP) each capable of delivering 340 gpm and a single turbine driven AFWP capable of delivering 700 gpm to the steam generators during accident conditions. The design basis accidents for the AFW system are the loss of normal feedwater (LONF), the loss of offsite power (LOOP), which are ANS Condition II events, and the main feedline break (MFLB), which is an ANS Condition IV event.

Current analyses of the design basis accidents for the AFW system have shown that the applicable accident analysis acceptance criteria are met, including the effects of a single active failure of any AFWP to start, if each AFWP is capable of delivering ≥ 300 gpm to its respective steam generator at the safety valve set pressure (including the effects of setpoint drift).

ATTACHMENT 3

SIGNIFICANT HAZARDS CONSIDERATION

VIRGINIA ELECTRIC AND POWER COMPANY

SIGNIFICANT HAZARDS CONSIDERATION

Virginia Electric and Power Company requests changes to Technical Specifications Limiting Condition for Operation 3.7.1.1 Action Statements, Technical Specifications Table 3.7-1, dually entitled "Maximum Allowable Power Range Neutron Flux High Setpoint With Inoperable Steam Line Safety Valves During 3 Loop Operation" and "Maximum Allowable Power Range Neutron Flux High Setpoint With Inoperable Steam Line Safety Valves During 2 Loop Operation," and the Technical Specifications Bases 3/4.7.1.1, "Safety Valves" for North Anna Power Station Units 1 and 2. Table 3.7-1 provides the maximum allowable power range neutron flux high setpoints with one or more main steam safety valves (MSSVs) inoperable during two loop and three loop operation. The proposed changes provide more conservative power range neutron flux high setpoints calculated utilizing the Westinghouse Electric Corporation (Westinghouse) recommended methodology and delete the information for setpoints for two loop operation. The proposed changes also revise the Technical Specifications Bases to reflect the methodology used to establish the new setpoints, and delete the Limiting Condition for Operation Action Statement and the Technical Specifications Bases for two loop operation.

The proposed changes do not affect the design, operation, or failure modes of the main steam system. The Loss of Load/Turbine Trip accident analysis is not revised as a result of these changes and remains bounding. The revised trip setpoints ensure that the heat addition rate to the secondary system remains below the heat removal capability of the remaining operable MSSVs, and thus the accident analysis consequences are unaffected. To ensure that the revised setpoints are used, if necessary, pending approval of this Technical Specifications change, North Anna has established additional administrative controls (i.e., Standing Order) directing that the revised setpoints be implemented in the event entry into the Action Statement is required. The current Technical Specifications provide this flexibility because the Technical Specifications are expressed in terms of the maximum permissible setpoints. Implementing setpoints less than the maximum does not conflict with the existing Technical Specification requirement. Finally, the proposed changes involve no unreviewed safety question or significant hazards consideration.

Westinghouse issued Nuclear Safety Advisory Letter NSAL-94-001, "Operation at Reduced Power Levels with Inoperable MSSVs" dated January 20, 1994 which

identified a potential concern for plant operations with the existing Technical Specifications setpoints with inoperable main steam safety valves. It was identified that the current Westinghouse methodology used for reducing the power range neutron flux high trip setpoints was potentially inadequate for protecting the main steam system from an overpressure condition. A deficiency was identified which involved the assumption that the maximum allowable initial power level was a linear function of the available Main Steam Safety Valve (MSSV) relief capacity. This assumption was determined invalid by Westinghouse.

An evaluation performed by Westinghouse concluded that this deficiency did not represent a substantial safety hazard. However, Westinghouse determined that it was a condition which required further review by each affected licensee for impact on its site specific licensing bases. Based upon the results of our review of the Westinghouse Nuclear Safety Advisory Letter with supporting recommendations, it was determined that additional calculations were required. By using the more conservative methodology recommended by Westinghouse, new setpoints have been calculated and are being submitted for NRC review and approval. In the interim, a Standing Order had been issued to ensure that conservative setpoints consistent with the accident analysis would be used in the event entry into the Action Statement of Technical Specifications 3.7.1.1 was required.

Additionally, the information in Table 3.7-1 and the Limiting Condition for Operation Action Statement associated with two loop operation have been deleted since Virginia Electric and Power Company is prohibited by the license from operating in this configuration.

Virginia Electric and Power Company has reviewed the proposed Technical Specification changes against the requirements of 10 CFR 50.92 and has determined that the proposed changes would not pose a significant hazards consideration. Specifically, operation of the North Anna Power Station in accordance with the proposed Technical Specifications changes will not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

This change reduces the power level at which the reactor may be operated with one or more main steam safety valves (MSSVs) inoperable to ensure that the secondary system is not overpressurized during the most severe pressurization transient of the secondary side. There is no change to the function of the MSSVs by the proposed change and will not alter any accident analysis assumptions or results. The proposed changes will provide conservative power range neutron flux high trip setpoints such that the maximum power level allowed for operation with inoperable MSSVs is below the heat removing capability of the operable MSSVs. Therefore, this change will not increase the probability of an accident.

This change is consistent with the current accident analysis assumptions for the MSSVs and does not change the containment response for any design basis event. Therefore, no change in the mitigation of an accident will result from this proposed change and no change will occur in the consequences of any accident currently analyzed.

2. Create the possibility of a new or different kind of accident from any accident previous evaluated.

Since the implementation of the proposed changes to the setpoints will not require hardware modifications (i.e., alterations to plant configuration), operation of the facilities with these proposed Technical Specifications does not create the possibility for any new or different kind of accident which has not already been evaluated.

The proposed revision to the Technical Specifications will not result in any physical alteration to any plant system, nor would there be a change in the method by which any safety-related system performs its function. The design and operation of the main steam system is not being changed.

These changes do not change the design, operation, or failure modes of the main steam system. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Involve a significant reduction in a margin of safety.

The proposed change reduces the total energy of the reactor coolant system that will ensure the ability of the MSSVs to perform their intended function as assumed in the current accident analyses. Correcting this non conservatism restores the margin of safety to what was originally envisioned. In addition, the results of the accident analyses which are documented in the UFSAR bound operation under the proposed changes, so that there is no safety margin reduction. Therefore, the proposed change does not involve a significant reduction in a margin of safety.