Attachment 2

Technical Specifications Changes

BASES

SECTION PAGE

2. Verifying that each of the following pumps start automatically upon receipt of a safety injection test signal:
   a) Centrifugal charging pump, and
   b) Low head safety injection pump.

f. By verifying that each of the following pumps develop the indicated discharge pressure (after subtracting suction pressure) on recirculation flow when tested pursuant to Specification 4.0.5.

1. Centrifugal charging pump ≥ 2410 psig.
2. Low head safety injection pump ≥ 156 psig.

g. By verifying that the following manual valves requiring adjustment to prevent pump "runout" and subsequent component damage are locked and tagged in the proper position for injection:

1. Within 4 hours following completion of any repositioning or maintenance on the valve when ECCS systems are required to be OPERABLE.
2. At least once per 18 months.
   1. 1-SI-188 Loop A Cold Leg
   2. 1-SI-191 Loop B Cold Leg
   3. 1-SI-193 Loop C Cold Leg
   4. 1-SI-203 Loop A Hot Leg
   5. 1-SI-204 Loop B Hot Leg
   6. 1-SI-205 Loop C Hot Leg

h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying that:

1. For high head safety injection lines, with a single pump running:
   a) The sum of the injection line flow rates, excluding the highest flow rate, is greater than or equal to the minimum flow rate required to demonstrate compliance with 10 CFR 50.46, and
   b) The total pump flow rate is less than or equal to the evaluated pump runout limit.

ECCS SUBSYSTEMS (Continued)

With the RCS temperature below 350°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited co e cooling requirements.

The limitation for a maximum of one centrifugal charging pump and one low head safety injection pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps and low head safety injection pumps except the required OPERABLE pump to be inoperable below 316°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained.

In the event of modifications to an ECCS subsystem that could alter the subsystem flow characteristics, a flow balance test shall be performed. The flow balance test criteria are established based on the system performance assumed in the safety analysis (minimum flow limit) and on HHSI pump runout protection (maximum flow limit). In performing the flow balance, the effects of flow measurement instrument uncertainties accounting for system configuration and the variability between installed pumps must be properly considered.

Numerical acceptance criteria for the flow balance test are specified in the surveillance test procedure. These criteria are established based on the following considerations:

1) The total injected flow to the core (assuming spillage of the branch line with the highest flow) must meet or exceed that assumed in the safety analysis. The limiting safety analysis is the loss of coolant accident (LOCA) analysis. This criterion may vary, particularly since the inputs to the safety analysis controlled by LCO 6.9.1.7 may vary with reload cycle. The safety analysis flow requirements are thus established by the currently applicable LOCA analysis which has demonstrated compliance with the ECCS acceptance limits of 10 CFR 50.46.

2) The total pumped flow must be less than the HHSI pump runout limit. This flow varies with the specific HHSI pump assumed to operate during the accident. Since the HHSI pumps also function as normal charging pumps, their characteristics, including runout limits, will vary over service life.

3) The requirements for reactor coolant pump seal injection must be met during normal operation, and the effects of seal injection during accidents must be considered in meeting constraints 1) and 2) above.

3/4.5.4 BORON INJECTION SYSTEM

The OPERABILITY of the boron injection system as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown. RCS cooldown can be caused by inadvertent depressurization, a loss-of-coolant accident or a steam line rupture.

The limits on injection tank minimum contained volume and boron concentration ensure that the assumptions used in the steam line break analysis are met.

The OPERABILITY of the redundant heat tracing channels associated with the boron injection system ensure that the solubility of the boron solution will be maintained above the solubility limit of 111°F at 15,750 ppm boron.

3/4.5.5 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWST minimum volume and boron concentration ensure that 1) sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following mixing of the RWST and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.5 and 11.0 for quench spray and between 7.7 and 9.0 for the solution recirculated within the containment after a LOCA. This pH minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

An RWST wide range level instrument loop uncertainty was included in the safety analysis and therefore need not be considered by the operator.

BASES

f. By verifying that each of the following pumps develop the indicated discharge pressure (after subtracting suction pressure) on recirculation flow when tested pursuant to Specification 4.0.5.

1. Centrifugal charging pump greater than or equal to 2410 psig.
2. Low head safety injection pump greater than or equal to 156 psig.

g. By verifying that the following manual valves requiring adjustment to prevent pump "runout" and subsequent component damage are locked and tagged in the proper position for injection:

1. Within 4 hours following completion of any repositioning or maintenance on the valve when the ECCS systems are required to be OPERABLE.
2. At least once per 18 months.
   1. 2-SI-89 Loop A Cold Leg
   2. 2-SI-97 Loop B Cold Leg
   3. 2-SI-103 Loop C Cold Leg
   4. 2-SI-116 Loop A Hot Leg
   5. 2-SI-111 Loop B Hot Leg
   6. 2-SI-123 Loop C Hot Leg

h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying that:

1. For high head safety injection lines, with a single pump running:
   a) The sum of the injection line flow rates, excluding the highest flow rate, is greater than or equal to the minimum flow rate required to demonstrate compliance with 10 CFR 50.46, and
   b) The total pump flow rate is less than or equal to the evaluated pump runout limit.

ECCS SUBSYSTEMS (Continued)

With the RCS temperature below 350°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

The limitation for a maximum of one centrifugal charging pump and one low head safety injection pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps and low head safety injection pumps except the required OPERABLE pump to be inoperable below 358°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained.

In the event of modifications to an ECCS subsystem that could alter the subsystem flow characteristics, a flow balance test shall be performed. The flow balance test criteria are established based on the system performance assumed in the safety analysis (minimum flow limit) and on HHSI pump runout protection (maximum flow limit). In performing the flow balance, the effects of flow measurement instrument uncertainties accounting for system configuration and the variability between installed pumps must be properly considered.

Numerical acceptance criteria for the flow balance test are specified in the surveillance test procedure. These criteria are established based on the following considerations:

1) The total injected flow to the core (assuming spillage of the branch line with the highest flow) must meet or exceed that assumed in the safety analysis. The limiting safety analysis is the loss of coolant accident (LOCA) analysis. This criterion may vary, particularly since the inputs to the safety analysis controlled by LCO 6.9.1.7 may vary with reload cycle. The safety analysis flow requirements are thus established by the currently applicable LOCA analysis which has demonstrated compliance with the ECCS acceptance limits of 10 CFR 50.46.

2) The total pumped flow must be less than the HHSI pump runout limit. This flow varies with the specific HHSI pump assumed to operate during the accident. Since the HHSI pumps also function as normal charging pumps, their characteristics, including runout limits, will vary over service life.

3) The requirements for reactor coolant pump seal injection must be met during normal operation, and the effects of seal injection during accidents must be considered in meeting constraints 1) and 2) above.

3/4.5.4 BORON INJECTION SYSTEM

The OPERABILITY of the boron injection system as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown. RCS cooldown can be caused by inadvertent depressurization, a loss-of-coolant accident or a steam line rupture.

The limits on injection tank minimum contained volume and boron concentration ensure that the assumptions used in the steam line break analysis are met. The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The OPERABILITY of the redundant heat tracing channels associated with the boron injection system ensure that the solubility of the boron solution will be maintained above the solubility limit of 111°F at 15,750 ppm boron.

3/4.5.5 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWST minimum volume and boron concentration ensure that 1) sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following mixing of the RWST and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.5 and 11.0 for quench spray and between 7.7 and 9.0 for the solution recirculated within the containment after a LOCA. This pH minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

An RWST wide range level instrument loop uncertainty was included in the safety analysis and therefore need not be considered by the operator.

Attachment 3

Significant Hazards Consideration

SIGNIFICANT HAZARDS CONSIDERATION

North Anna Units 1 and 2 Technical Specification 4.5.2.h requires a surveillance test of the high head safety injection (HHSI) system following the completion of any modification to the Emergency Core Cooling System (ECCS) subsystems that could alter the subsystem flow characteristics. The current surveillance criteria specify values for the sum of the injection line flow rates, excluding the highest flow rate, and the total pump flow rate. These correspond to requirements for the safety analysis flow input and the HHSI pump runout limit, respectively.

The proposed changes would remove specific numerical values and replace them with requirements to ensure that HHSI flow rates meet the loss of coolant accident (LOCA) analysis acceptance criteria and pump runout limits. A discussion of the constraints that affect the HHSI flow balance will also be added to the Bases of the Technical Specifications. These proposed changes are similar in concept to NUREG-1431, Standard Technical Specifications (STS), Westinghouse Plants, dated September 1992.

The HHSI test acceptance criteria in the current Technical Specifications are very narrow because of the various system physical and technical constraints that need to be considered in the flow balance testing. These acceptance criteria may also be more restrictive than required by either the LOCA analysis or the actual pump runout requirements. For example, the LOCA analysis contains input conservatisms that could be used to offset a reduction in the required HHSI flow while still meeting the 10 CFR 50.46 LOCA acceptance criteria. The proposed Technical Specification changes would permit the use of additional available margin, while maintaining a strong technical linkage between the measured system performance and the safety analysis. Although these proposed Technical Specification changes remove the numerical values from Technical Specification 4.5.2.h, neither the methodology nor the acceptance criteria for LOCA analysis are affected.

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

1. Involve a significant increase in the probability or consequences of an accident previously evaluated. The proposed Technical Specification changes continue to require that with one HHSI pump running, the sum of the flows through the two lowest branch lines shall be ≥ the minimum HHSI flow required by the safety analysis and that the total HHSI pump flow rate shall be ≤ the evaluated HHSI pump runout limit.

Likewise, the consequences of the accidents previously evaluated will not increase as a result of the proposed Technical Specification changes. The system performance will remain bounded by the safety analysis for all postulated conditions. The safety analysis will continue to be performed and evaluated in accordance with the requirements of 10 CFR 50.59 and 10 CFR 50.46.

2. Create the possibility of a new or different kind of accident or malfunction from any previously evaluated. The proposed Technical Specification changes will not affect the capability of the HHSI System to perform its intended function. The proposed Technical Specification changes are bounded by the existing safety analysis and do not involve operation of plant equipment in a different manner from which it was designed to operate. Since a new failure mode is not created, a new or different type of accident or malfunction is not created.

3. Involve a reduction in a margin of safety. The system performance will continue to bound the flow rates specified in the safety analysis, therefore safety margins are not reduced.

Virginia Electric and Power Company concludes that the activities associated with these proposed Technical Specification changes satisfy the no significant hazards consideration of criteria of 10 CFR 50.92 and, accordingly, a no significant hazards consideration finding is justified.