ENCLOSURE

TECHNICAL SPECIFICATION (TS) BASES CHANGE

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

LIST OF AFFECTED PAGES

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Steam Generator Water Level

The Steam Generator Water Level Low-Low trip protects the reactor from loss of heat sink in the event of a sustained steam/feedwater flow mismatch resulting from loss of normal feedwater or a feedwater system pipe break outside of containment. This function also provides input to the steam generator level control system. IEEE 279 requirements are satisfied by 2/3 logic for protection function actuation, thus allowing for a single failure of a channel and still performing the protection function. Control/protection interaction is addressed by the use of the Median Signal Selector which prevents a single failure of a channel providing input to the control system requiring protection function action. That is, a single failure of a channel providing input to the control system does not result in the control system initiating a condition requiring protection function action. The Median Signal Selector performs this by not selecting the channels indicating the highest or lowest steam generator levels as input to the control system. R145 BR-5

With the transmitters located inside containment and thus possibly experiencing adverse environmental conditions (due to a feedline break), the Environmental Allowance Modifier (EAM) was devised. The EAM function (Containment Pressure (EAM) with a setpoint of $\leq$ 0.5 psig) senses the presence of adverse containment conditions (elevated pressure) and enables the Steam Generator Water Level - Low-Low trip setpoint (Adverse) which reflects the increased transmitter uncertainties due to this environment. The EAM allows the use of a lower Steam Generator Water Level - Low-Low (EAM) trip setpoint when these conditions are not present, thus allowing more margin to trip for normal operating conditions. R145

The Trip Time Delay (TTD) creates additional operational margin when the plant needs it most, during early escalation to power, by allowing the operator time to recover level when the primary side load is sufficiently small to allow such action. The TTD is based on continuous monitoring of primary side power through the use of RCS loop ΔT. Two time delays are calculated, based on the number of steam generators indicating less than the Low-Low Level trip setpoint and the primary side power level. The magnitude of the delays decreases with increasing primary side power level, up to 50% RTP. Above 50% RTP there are no time delays for the Low-Low level trips.

In the event of failure of a Steam Generator Water Level channel, it is placed in the trip condition as input to the Solid State Protection System and does not affect either the EAM or TTD setpoint calculations for the remaining operable channels. It is then necessary for the operator to force the use of the shorter TTD time delay by adjustment of the single steam generator time delay calculation (T_S) to match the multiple steam generator time delay calculation (T_M) for the affected protection set, through the Eagle-21 System Man-Machine-Interface (MMI) test cart. Failure of the Containment Pressure (EAM) channel to a protection set also does not affect the EAM setpoint

Steam Generator Water Level

calculations. This results in the requirement that the operator adjust the affected Steam Generator Water Level - Low-Low (EAM) trip setpoints to the same value as the Steam Generator Water Level - Low-Low (Adverse) trip setpoints. Failure of the RCS loop ΔT channel input (failure of more than one T_H RTD or failure of a T_C RTD) does not affect the TTD calculation for a protection set. This results in the requirement that the operator adjust the threshold power level for zero seconds time delay from 50% RTP to 0% RTP, through the MMI. R-45

High Containment Pressure

The High Containment Pressure trip protects the reactor from loss of heat sink in the event of a sustained steam/feedwater flow mismatch resulting from a feedwater system pipe break inside of containment. IEEE 279 requirements are satisfied by 2/3 logic for protection function actuation, thus allowing for a single failure of a channel and still performing the protection function. BR-5

Undervoltage and Underfrequency - Reactor Coolant Pump Busses

The Undervoltage and Underfrequency Reactor Coolant Pump bus trips provide reactor core protection against DNB as a result of loss of voltage or underfrequency to more than one reactor coolant pump. The specified set points assure a reactor trip signal is generated before the low flow trip set point is reached. Time delays are incorporated in the underfrequency and undervoltage trips to prevent spurious reactor trips from momentary electrical power transients. For undervoltage, the delay is set so that the time required for a signal to reach the reactor trip breakers following the simultaneous trip of two or more reactor coolant pump bus circuit breakers shall not exceed 1.2 seconds. For underfrequency, the delay is set so that the time required for a signal to reach the reactor trip breakers after the underfrequency trip set point is reached shall not exceed 0.6 seconds.

Loss of Flow

The Loss of Flow trips provide core protection to prevent DNB in the event of a loss of one or more reactor coolant pumps.

Above 11 percent of RATED THERMAL POWER, an automatic reactor trip will occur if the flow in any two loops drops below 90 percent of nominal full loop flow. Above the P-8 interlock, automatic reactor trip will occur if the flow in any single loop drops below 90 percent of nominal full loop flow. This latter trip will prevent the minimum value of the DNBR from going below 1.30 during normal operational transients and anticipated transients when 3 loops are in operation and the Overtemperature Delta T trip setpoint is adjusted to the value specified for all loops in operation. R132 R132

Steam Generator Water Level

The Steam Generator Water Level Low-Low trip protects the reactor from loss of heat sink in the event of a sustained steam/feedwater flow mismatch resulting from loss of normal feedwater or a feedwater system pipe break, outside of containment. This function also provides input to the steam generator level control system. IEEE 279 requirements are satisfied by 2/3 logic for protection function actuation, thus allowing for a single failure of a channel and still performing the protection function. Control/protection interaction is addressed by the use of the Median Signal Selector which prevents a single failure of a channel providing input to the control system requiring protection function action. That is, a single failure of a channel providing input to the control system does not result in the control system initiating a condition requiring protection function action. The Median Signal Selector performs this by not selecting the channels indicating the highest or lowest steam generator levels as input to the control system. R132 BR-6

With the transmitters located inside containment and thus possibly experiencing adverse environmental conditions (due to a feedline break), the Environmental Allowance Modifier (EAM) was devised. The EAM function (Containment Pressure (EAM) with a setpoint of $\leq$ 0.5 psig) senses the presence of adverse containment conditions (elevated pressure) and enables the Steam Generator Water Level - Low-Low trip setpoint (Adverse) which reflects the increased transmitter uncer-tainties due to this environment. The EAM allows the use of a lower Steam Gen-erator Water Level - Low-Low (EAM) trip setpoint when these conditions are not present, thus allowing more margin to trip for normal operating conditions. R132

The Trip Time Delay (TTD) creates additional operational margin when the plant needs it most, during early escalation to power, by allowing the operator time to recover level when the primary side load is sufficiently small to allow such action. The TTD is based on continuous monitoring of primary side power through the use of RCS loop ΔT. Two time delays are calculated, based on the number of steam generators indicating less than the Low-Low Level trip setpoint and the primary side power level. The magnitude of the delays decreases with increasing

Steam Generator Water Level (Cont'd)

primary side power level, up to 50 percent RTP. Above 50 percent RTP there are no time delays for the Low-Low level trips.

In the event of failure of a Steam Generator Water Level channel, it is placed in the trip condition as input to the Solid State Protection System and does not affect either the EAM or TTD setpoint calculations for the remaining operable channels. It is then necessary for the operator to force the use of the shorter TTD time delay by adjustment of the single steam generator time delay calculation (T_S) to match the multiple steam generator time delay calculation (T_M) for the affected protection set, through the MMI. Failure of the Containment Pressure (EAM) channel to a protection set also does not affect the EAM setpoint calculations. This results in the requirement that the operator adjust the affected Steam Generator Water Level - Low-Low (EAM) trip setpoints to the same value as the Steam Generator Water Level - Low-Low (Adverse). Failure of the RCS loop ΔT channel input (failure of more than one T_H RTD or failure of a T_C RTD) does not affect the TTD calculation for a protection set. This results in the requirement that the operator adjust the threshold power level for zero seconds time delay from 50 percent RTP to 0 percent RTP, through the MMI. R132

High Containment Pressure

The High Containment Pressure trip protects the reactor from loss of heat sink in the event of a sustained steam/feedwater flow mismatch resulting from a feedwater system pipe break inside of containment. IEEE 279 requirements are satisfied by 2/3 logic for protection function actuation, thus allowing for a single failure of a channel and still performing the protection function. BR-6

Undervoltage and Underfrequency - Reactor Coolant Pump Busses

The Undervoltage and Underfrequency Reactor Coolant Pump bus trips provide reactor core protection against DNB as a result of loss of voltage or underfrequency to more than one reactor coolant pump. The specified setpoints assure a reactor trip signal is generated before the low flow trip setpoint is reached. Time delays are incorporated in the underfrequency and undervoltage trips to prevent spurious reactor trips from momentary electrical power transients. For undervoltage, the delay is set so that the time required for a signal to reach the reactor trip breakers following the simultaneous trip of two or more reactor coolant pump bus circuit breakers shall not exceed 1.2 seconds. For underfre-quency, the delay is set so that the time required for a signal to reach the reactor trip breakers after the underfrequency trip setpoint is reached shall not exceed 0.6 seconds. BR

Turbine Trip

A Turbine Trip causes a direct reactor trip when operating above P-9. Each of the turbine trips provide turbine protection and reduce the severity of the ensuing transient. No credit was taken in the accident analyses for operation of these trips. Their functional capability at the specified trip settings is required to enhance the overall reliability of the Reactor Protection System. BR