ENCLOSURE 1

EMERGENCY TECHNICAL SPECIFICATION (TS) CHANGE

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-95-21)

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3/4.7.5 ULTIMATE HEAT SINK

LIMITING CONDITION FOR OPERATION

3.7.5 The ultimate heat sink shall be OPERABLE with:

a. A minimum water level at or above elevation 670 feet mean sea level USGS datum, and

b. An average ERCW supply header water temperature of less than equal to 83°F, and

c. When the water level is above 680 feet mean sea level USGS datum, the average ERCW supply header water temperature may be less than or equal to 84.5°F.*

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the requirements of the above specification not satisfied, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.7.5.1 The ultimate heat sink will be determined OPERABLE at least once 24 hours by verifying the average ERCW supply header temperature and water level to be within their limits.

* 87°F is allowed until September 30, 1995.

3/4.7.5 ULTIMATE HEAT SINK

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APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the requirements of the above specification not satisfied, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.7.5.1 The ultimate heat sink will be determined OPERABLE at least once per 24 hours by verifying the average ERCW supply header temperature and water level to be within their limits.

* 87 °F is allowed until September 30, 1995.

ENCLOSURE 2

EMERGENCY TECHNICAL SPECIFICATION (TS) CHANGE

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-95-21)

DESCRIPTION AND JUSTIFICATION FOR INCREASEING

SQN'S ULTIMATE HEAT SINK (UHS) TEMPERATURE

Description of Change

TVA proposes to modify the Sequoyah Nuclear Plant (SQN) Units 1 and 2 technical specifications (TSs) to revise TS Limiting Condition for Operation (LCO) 3.7.5.c to allow for an increase in the UHS temperature from 84.5 degrees Fahrenheit (°F) to 87°F. SQN TS LCO 3.7.5.c currently states: "When the water level is above 680 feet mean sea level USGS datum, the average ERCW supply header water temperature may be less than or equal to 84.5°F." TVA's proposed change provides an asterisk after 84.5°F with a footnote that reads, "87°F is allowed until September 30, 1995."

Reason for Change

The Tennessee River (Chickamauga reservoir) serves as the UHS for both units at TVA's Sequoyah Nuclear Plant (SQN). SQN TS 3.7.5.c currently limits this UHS temperature to less than or equal to 84.5°F when the water level is above 680 feet. This maximum temperature limit ensures that sufficient cooling capacity is available to either: (1) provide normal cooldown of the facility or (2) to mitigate the effects of accident conditions within acceptable limits. The maximum temperature limitation is based on providing a 30-day (reference Regulatory Guide 1.27) cooling water supply to safety-related equipment without exceeding their design basis temperature. A reservoir elevation of 680 feet is established in TS 3.7.5.c to ensure that sufficient margin exists to remove plant heat loads by way of the essential raw cooling water (ERCW) system concurrent with a design basis accident.

The average water temperature of the Chickamauga reservoir (as measured at SQN's ERCW header) on August 18, 1995, reached 83°F. This high temperature is the result of a continuing high pressure cell within the Tennessee Valley and daytime temperatures that remain above 90°F. The Chickamauga reservoir water level is above the 680-foot elevation. Continuing daytime high temperatures in the upper 90's are expected to cause the average ERCW temperature to increase at a rate of 0.5°F per day. This increase could cause the average temperature to reach the TS limit of 84.5°F early on August 21, 1995.

In the event the 84.5°F limit is reached, the TS action would require that both units be placed in hot standby within 6 hours and in cold shutdown within the following 30 hours.

A discretionary enforcement letter was submitted (refer to TVA's letter to NRC dated August 18, 1995) to allow increasing the maximum UHS temperature to 87°F while above elevation 680 feet until an emergency TS amendment can be submitted and approved by NRC. This emergency TS change proposes to use existing margins in SQN's safety analysis for increasing SQN's UHS temperature limit from 84.5°F to 87°F.

Justification for Changes

TVA's Engineering staff has identified existing margins in the UHS safety analysis that would justify increasing the limit from 84.5°F to 87°F. In addition, the following compensatory actions have been put in place: (1) maintaining control of lake level above the 680-foot elevation through daily communications with TVA's Norris laboratory and frequent monitoring of lake level indication by station personnel, (2) controlling hydroelectric operation of TVA's upstream dams to ensure steady river flow and thereby minimize temperature fluctuations, and (3) controlling any actions that would impact ERCW flow rates or availability of ERCW pumps.

TVA Engineering conducted an evaluation of the analyses that are directly affected by the increase in ERCW temperatures. The containment pressure analysis (WCAP-12455) was reviewed to determine the effects on the overall containment peak accident pressure relative to the ERCW temperature. This analysis is based on a double-ended pump suction guillotine loss-of-coolant accident (LOCA) with a minimum ice condenser ice weight of 1.93 million pounds of ice with minimum safety-injection capability (maximum peak containment pressure of 10.9 pounds per square inch [psi]) and an assumed 11 percent tube plugging penalty for the containment spray heat exchangers (increasing the peak pressure by 0.14 psi to 11.04 psi). Since the containment spray system (CSS) heat exchanger is served by the ERCW system, the effects of increased ERCW temperature will ultimately affect the amount of energy transferred between containment spray and the heat sink (i.e., heat out of containment) after the plant switches over to containment sump recirculation (i.e., after the contents of the refueling water storage tank are emptied via containment spray and emergency core cooling system [ECCS]). The analysis was reviewed and computer model sensitivity studies were performed at varying ERCW temperatures above the TS limit. By allowing this parameter to be the only condition varied, no other licensing or design basis assumption will be challenged. These sensitivity analyses have shown that with an increase in ERCW temperature of 1°F, the corresponding increase in peak containment pressure is less than 0.2 psi with no adverse effect on the margin to ice bed melt-out time relative to containment sump inventory swapover. By varying the ERCW temperature in 1°F increments, it has been demonstrated that the corresponding pressure increase is approximately linear in this temperature range. Therefore, based on the present calculated maximum containment pressure of 11.04 psi (due to a large break LOCA), the maximum peak containment pressure expected with an ERCW temperature of 87°F is 11.44 psi (the present licensed analysis is actually performed with an ERCW temperature of 85°F and not at the TS limit of 84.5°F). This 11.44 psi containment peak pressure is still below the TS integrated leak rate test pressure and containment design pressure of 12.0 pounds per square inch gauge (psig).

Note that Unit 1 presently has a TS change (TS 95-09) to extend the surveillance period on ice mass for approximately seven days to meet the current refueling outage schedule. This extension was granted based on an ice mass sensitivity study that was performed at 1.88 million pounds of ice. This sensitivity study showed that, assuming a 102 percent reactor power double-ended guillotine break, the containment pressure would not exceed 11.9 psig. Unit 1 is presently operating at less than 82 percent reactor power and is continuing in coastdown for the September 9 refueling outage. Therefore, due to the lower mass and energy releases associated with the lower reactor power level, and the fact that the ice bed is expected to be only slightly below the 1.93 million pound analytical limit, the impact of this surveillance interval extension on the design basis analyzed containment peak pressure of 11.04 psig is negligible. Since essentially no margin has been utilized for the surveillance interval extension, it is acceptable to use this margin to justify the UHS temperature increase to 87°F, which results in a peak containment pressure of 11.44 psig.

It should be noted that the containment subcompartment pressure analysis is not affected by this increase in the UHS temperature. This analysis is for the immediate (first few seconds) response to the double-ended break and does not utilize the UHS as a heat removal source. Likewise, the peak containment temperature analysis is unaffected by this temperature increase. The peak containment temperature results from a main steam line break and occurs very early in the transient during blowdown from the faulted steam generator (S/G). The temperature decreases in containment with the long-term ice melt rate, and at the time when swapover to the containment sump is initiated, the containment temperature is well below the calculated maximum.

As for the long-term containment cooling capability, it has been previously shown in analyses supporting TS Change 88-21 that any increase in the UHS temperature will decrease the rate of cooldown. The analysis that was utilized to support TS Change 88-21 showed that the correlation between the UHS temperature and the long-term containment temperature was basically one-to-one. Therefore, it is plausible that the long-term cooling effect of the lower compartment coolers (cooled by ERCW) would increase the long-term containment temperature by 2°F. This is an analytical result and does not take into account the actual performance of the ERCW (flow rates higher than assumed in the analyses proven by TS testing). Extending the long-term cooldown rate of containment does not affect the results of this analysis to the point of equipment degradation (i.e., environmental qualification limits). It should also be noted that the long-term definition for these events is 100 days and it is not justifiable to assume that the UHS will be at an elevated temperature for a 100-day period (this temporary increase in river water temperature is not expected to last into the fall season). Therefore, the long-term containment temperature analysis, the long-term cooling analysis for pipe breaks outside of containment, and the environmental qualification analysis should not be affected by this short-term variance.

The increased river water temperature may also result in excess heatup of the containment sump water temperatures following a postulated LB LOCA.

Subsequently, the net positive suction head (NPSH) requirements on the containment sump pumps and residual heat removal (RHR) pumps may be challenged. The current analysis (SQN-SQS2-0082) for both pumps assumes a containment sump water temperature of 190°F and a minimum sump water elevation. The peak post-LOCA long-term sump water temperature is presently analyzed at 160°F. Sensitivity analyses have shown that the long-term sump temperature will increase less than 5°F for every corresponding 1°F increase in river water temperature. Therefore, based on the above assumed maximum of 87°F river water temperature, sufficient margins to NPSH requirements for the RHR and containment spray pumps are not challenged.

It should also be noted that other analytical variables outside of heat sink temperature are also realistically within conservative margins with respect to the analytical limits (such as core decay heat, ECCS flow capability, actual containment spray heat exchangers tube plugging criteria [3815 gallons per minute actual versus 3600 gallons per minute). Although no changes to these parameters were made to the above analyses and sensitivity studies, it is prudent to mention them to further show that the proposed variance is conservative with respect to the safety analyses.

The following analyses have been identified as not being affected by the increased ERCW temperature since they do not depend upon heat removal via the UHS for mitigation of the consequences of the event:

- Major or minor secondary system ruptures
- Complete loss of forced reactor coolant system (RCS) flow or single reactor coolant pump locked rotor
- Rod cluster withdrawal at full power
- Rod cluster control assembly ejection
- Fuel handling accident
- Waste gas decay tank rupture
- Inadvertent loading of a fuel assembly into an improper location

The consequences of a S/G tube rupture will not be altered by the proposed change. However, the last mitigative action item listed for the operator in the Final Safety Analysis Report (FSAR) analysis for this event is initiation of RHR for cooldown. The RHR heat exchangers transfer heat load to the UHS via the CCS. Therefore, cooldown of the RCS may be slightly extended. The extended cooldown does not represent any unacceptable consequences.

The ECCS analysis is unaffected since the 10 CFR 50.46 limits and Appendix K requirements are met in the short-term accident mitigation period. As previously discussed, the swapover to containment inventory occurs after these analyzed limits occur.

An evaluation of the latest ERCW flow balance data taken in June 1994 was performed to determine impacts on safety related equipment and components served by ERCW. This evaluation concluded that for major safety-related heat exchangers the limiting component is the Unit 2 CSS Heat Exchanger 2A with a 12.21 percent flow margin. The CSS heat exchanger is modeled directly in the containment peak pressure analysis in which the UHS data point (ERCW temprerarture) input was changed to 87°F. As previously discussed, this analysis met the established acceptance criteria with an 87°F UHS temperature.

Other large heat exchangers were found to have significantly higher flow margin than the CSS heat exchangers, which will more than offset the increase in UHS maximum temperature to 87°F. Other ERCW served components were also evaluated, such as safety-related (attendant) room and oil coolers. These components were determined to have sufficient flow margin to more than offset any performance degradation caused by an increase in the UHS temperature. Operational and accident performance capabilities of safety-related components will not be decreased.

From the evaluations performed, the increase to 87°F for SQN's UHS will not challenge any safety-related equipment served by ERCW due to the large flow margins, which currently exist in the ERCW system.

In addition, an evaluation was performed for piping, pipe supports, and components. A change in ERCW supply temperature will affect secondary piping stresses only. Primary piping stresses, specifically deadweight and seismic, will not be affected. Therefore, piping seismic margins will not decrease. Alternately analyzed ERCW piping and rigorously analyzed ERCW supply piping inside containment and annulus are not affected because the thermal analysis performed on this piping bounds the 87°F condition.

The balance of the ERCW piping, primarily rigorously analyzed ERCW piping in the Auxiliary Building, will have a slight increase in thermal stress of approximately 17 percent due to the increase in river temperature to 87°F. The equation for allowable thermal piping stresses, ASME Equation 11, contains pressure, deadweight, and thermal stress components. Therefore, a thermal stress increase of 17 percent would yield a much lower increase in total Equation 11 stresses. In addition, Equation 11 is not generally the controlling stress equation in the ERCW system due to the low operating temperatures. However, even if total stress increased by 17 percent, piping would still remain operable. In addition, thermal stresses are also self-relieving in nature and a one-time stress increase of this low magnitude will not cause a thermal fatigue problem in the piping.

The pipe support load increase resulting from the increase in river temperature to 87°F is also approximately 17 percent. The total support load is comprised of deadweight, thermal, and seismic loading conditions. The thermal component of the total support load is relatively small because ERCW supply piping is a low temperature line. Sufficient margin exists between Sequoyah's design basis limits and interim operability limits to accommodate a temporary load increase of 17 percent.

In general, TVA used "Design by Rule" methodology (ASME Section III, Class 2 & 3; MSS-SP-66, or ANSI B16.5) for ERCW components. The 87°F temperature is well within the pressure-temperature limits established by "Design by Rule."

In conclusion, ERCW piping, pipe supports, and components will remain operable for the increase in river temperature to 87°F.

Environmental Impact Evaluation

The proposed change does not involve an unreviewed environmental question because operation of SQN Units 1 and 2 in accordance with this change would not:

1. Result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Statement (FES) as modified by NRC's testimony to the Atomic Safety and Licensing Board, supplements to the FES, environmental impact appraisals, or decisions of the Atomic Safety and Licensing Board.

2. Result in a significant change in effluents or power levels.

3. Result in matters not previously reviewed in the licensing basis for SQN that may have a significant environmental impact.

ENCLOSURE 3

EMERGENCY TECHNICAL SPECIFICATION CHANGE

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-95-21)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Significant Hazards Evaluation

TVA has evaluated the proposed technical specification (TS) change and has determined that it does not represent a significant hazards consideration based on criteria established in 10 CFR 50.92(c). Operation of Sequoyah Nuclear Plant (SQN) in accordance with the proposed amendment will not:

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

   The probability of occurrence or the consequences of an accident are not increased as presently analyzed in the safety analyses since the objective of the event mitigation is not changed. No changes in event classification as discussed in Final Safety Analysis Report Chapter 15 will occur due to the increased river water temperature (with respect to both containment integrity and safety-system heat removal). Therefore, the probability of an accident or malfunction of equipment presently evaluated in the safety analyses will not be increased. The containment design pressure is not challenged by allowing an increase in the river water temperature above that allowed by the TSs, thereby ensuring that the potential for increasing offsite dose limits above those presently analyzed at the containment design pressure of 12 pounds per square inch is not a concern. Therefore, the variance to TS 3.7.5.c will not increase the consequences previously evaluated and reported for the containment analysis.

2. Create the possibility of a new or different kind of accident from any previously analyzed.

   The possibility of a new or different accident situation occurring as a result of this condition is not created. The essential raw cooling water (ERCW) system is not an initiator of any accident and only serves as a heat sink for normal and upset plant conditions. By allowing this change in operating temperatures, only the assumptions in the containment pressure analysis are changed. The variance in the ERCW temperature results in minimal increase in peak containment accident pressure. As for the net positive suction head requirements relative to the essential core cooling system and containment spray system, it has been demonstrated that this operational variance will not challenge the present design requirements. Therefore, the potential for creating a new or unanalyzed condition is not created.

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

   The margin of safety as reported in the basis for the TSs is also not reduced. The design pressure for the containment and all supporting equipment and components for worse-case accident condition is 12.0 pounds per square inch gauge (psig). This variance in river water temperature will not challenge the design condition of containment. Further, 12.0 psig design limit is not the failure point of containment, which would lead to the loss of containment integrity. Therefore, a significant reduction in the margin to safety is not created by this variance.