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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Reactor Coolant System
Average Temperature ($T_{avg}$) Uncertainty
With the Temperature Averaging Scheme

Reference: Resolution of Proof & Review Technical Specifications and Revised Offsite Dose Calculation Manual, M. R. Wisenburg, HL&P, Letter to the NRC; ST-HL-AE-2164; dated May 8, 1987

The STP safety analysis value for $T_{avg}$ has changed from 597.7°F to 598.0°F. This is consistent with the most recent revision of the STP Statistical Setpoint Study and a safety evaluation of the licensing basis accident analyses for STP. Please note that the associated technical specification changes were previously submitted by the referenced letter.

The change in the value for $T_{avg}$ is to reflect an additional uncertainty allowance associated with the treatment of the failure of a single hot leg resistance temperature detector (RTD) in any reactor coolant loop. At STP, the Qualified Display Processing System (QDPS) receives input from the three $T_{hot}$ RTDs for each reactor coolant system (RCS) loop and computes the average $T_{hot}$ value. During QDPS validation, tests were conducted which demonstrated that the Temperature Averaging System (TAS) requires an additional uncertainty allowance during two RTD operation. This situation would exist in the event that one RCS hot leg RTD had failed. The TAS continuously monitors the differences between the three $T_{hot}$ RTD signals for each RCS loop. Should any RTD deviate beyond the error limit, its input is rejected. An average is calculated using the remaining two RTDs and a bias factor is included to compensate for the failed sensor. A detailed description of the TAS is provided in STP FSAR Section 7.2.1.1.5. Allowance for the use of the bias factor in the loop $T_{hot}$ calculation introduces an additional error term of $\pm$0.3°F in the $T_{avg}$ instrument loop uncertainty.

In conjunction with the incorporation of the additional error allowance into the Technical Specifications and the Statistical Setpoint Study, the impact of this additional allowance on each of the accident analyses in FSAR Chapters 6 and 15 was evaluated. The safety evaluations were completed on





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an analysis-by-analysis basis and addressed the increase in the total temperature uncertainty allowance to $\pm 5^{\circ}F$ for $T_{avg}$. For each of the evaluations, the appropriate approach to assess the impact (e.g., calculations, use of existing sensitivity studies, or limited/selective reanalysis) was determined and utilized. For each of the safety analyses in the FSAR, the safety evaluations confirmed the acceptability of operating South Texas Units 1 and 2 with a total allowance of $\pm 5^{\circ}F$ on $T_{avg}$.

These safety evaluations included evaluations of the more limiting transients, as discussed below, with respect to overtemperature $\Delta T$, overpower $\Delta T$ and decay heat removal. Each of the transients has been evaluated with respect to the impact of the increased temperature uncertainty on DNB, peak RCS pressure, peak RCS water volume, and peak clad temperature. In all cases, the conclusions presented in the South Texas FSAR remain valid under this increased temperature uncertainty allowance assumption.

The steamline break at hot full power (HFP) conditions is a DNB transient for which protection is provided by the overpower $\Delta T$ reactor trip function as described in WCAP-9226 (FSAR Reference 15.1-4). It was analyzed to support the RTD bypass elimination design change. The temperature uncertainty allowance value used in the safety analysis is $4.7^{\circ}F$. This event has been evaluated assuming an initial temperature uncertainty allowance of $5.0^{\circ}F$ and the DNB design criterion has been satisfied.

The complete loss of forced reactor coolant flow event is a DNB transient for which protection is provided by the undervoltage and underfrequency reactor trip functions. It was also analyzed to support the RTD bypass elimination design change; therefore, there is an analysis available with an initial temperature uncertainty allowance of $4.7^{\circ}F$. This event has been evaluated assuming an initial uncertainty temperature allowance of $5.0^{\circ}F$ and the DNB criterion remained satisfied.

The uncontrolled RCCA bank withdrawal at power event is the limiting DNB transient for which protection is provided by the overtemperature $\Delta T$ reactor trip function. It was analyzed to support the RTD bypass elimination design change; therefore, there is an analysis available with an initial temperature uncertainty allowance of $4.7^{\circ}F$. This event has been evaluated assuming an initial temperature uncertainty allowance of $5.0^{\circ}F$ and the DNB design criterion remained satisfied.

These analyses assume thermal design flow. The flowrate required by Technical Specifications assumes an uncertainty of 3.5%.

The documentation associated with the safety evaluations described is maintained in the Westinghouse offices and is available for audit. Should reanalysis of any or all of the transients take place at any time in the future, the revised total temperature allowance for the average RCS temperature will be considered in the reanalysis.

If you have any questions regarding this matter, please contact Mr. J. S. Phelps at (713) 993-1367.

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