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Ref. # 10CFR50.90
10CFR50.36

C. Lance Terry
Group Vice President

May 16, 1997

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
SUBMITTAL OF LICENSE AMENDMENT REQUEST 97-002
REVISION TO UNIT 2 REACTOR TRIP SETPOINT

Gentlemen:

Pursuant to 10CFR50.90, TU Electric hereby requests an amendment to the CPSES Unit 1 Operating License (NPF-87) and CPSES Unit 2 Operating License (NPF-89) by incorporating the attached changes into the CPSES Units 1 and 2 Technical Specifications. These changes apply equally to CPSES Units 1 and 2 except where a specific unit is indicated.

Based on analyses of the core configuration and expected operation for CPSES Unit 2, Cycle 4, revised core safety limit curves and revised Overtemperature N-16 reactor trip setpoints are required.

Attachment 1 is the required affidavit. Attachment 2 provides a detailed description of the proposed changes, a safety analysis of the proposed changes and TU Electric's determination that the proposed changes do not involve a significant hazard consideration. Attachment 3 provides the affected Technical Specification pages marked-up to reflect the proposed changes.

TU Electric requests approval of this proposed license amendment by October 18, 1997, with implementation of the Technical Specification changes to occur within 30 days after NRC approval.

In accordance with 10CFR50.91(b), TU Electric is providing the State of Texas with a copy of this proposed amendment.

A012

Should you have any questions, please contact Mr. Jimmy Seawright at (817) 897-0140.

Sincerely,

C. L. Terry

JDS/grp
Attachments: 1. Affidavit
2. Description and Assessment
3. Affected Technical Specifications pages as revised by all approved license amendments

c - Mr. E. W. Merschoff, Region IV
Mr. T. J. Polich, NRR
Mr. J. I. Tapia, Region IV
Resident Inspectors, CPSES

Mr. Arthur C. Tate
Bureau of Radiation Control
Texas Department of Public Health
1100 West 49th Street
Austin, Texas 78704

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
Texas Utilities Electric Company	)	Docket Nos. 50-445
	)	50-446
(Comanche Peak Steam Electric	)	License Nos. NPF-87
Station, Units 1 & 2)	)	NPF-89

AFFIDAVIT

C. L. Terry being duly sworn, hereby deposes and says that he is Group Vice President, Nuclear Production of TU Electric, the licensee herein; that he is duly authorized to sign and file with the Nuclear Regulatory Commission this License Amendment Request 97-002; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.

C. L. Terry
Group Vice President,
Nuclear Production

STATE OF TEXAS)
)
COUNTY OF Somervell)

Subscribed and sworn to before me, on this 16 day of May, 1997

Notary Public

JEAN AMUNDSON
NOTARY PUBLIC
STATE OF TEXAS
My Commission Expires 7-1-98

ATTACHMENT 2 to TXX-97119

DESCRIPTION AND ASSESSMENT

DESCRIPTION AND ASSESSMENT

I. BACKGROUND

Based on analyses of the core configuration for CPSES Unit 2, Cycle 4, revised core safety limit curves and Overtemperature N-16 reactor trip setpoints are required. The core safety limits are the loci of points of THERMAL POWER, Reactor Coolant System (RCS) pressure and average temperature below which either the calculated Departure from Nucleate Boiling Ratio (DNBR) is no less than the safety analysis limit value, or the average enthalpy at the vessel exit is less than the enthalpy of saturated liquid. Important parameters used to establish these lines include the RCS flow rate, the design nuclear enthalpy rise hot channel factor ($F_{\Delta H}$), the cycle-specific reference axial power shape, and the cycle-specific core configuration. The core safety limits are calculated for pressures between the Pressurizer Pressure - Low and Pressurizer Pressure - High reactor trip setpoints and for powers up to the overpower reactor trip setpoint.

The Overtemperature N-16 reactor trip setpoint is calculated such that a reactor trip will be initiated before the core safety limits are exceeded. The Overtemperature N-16 reactor trip function provides DNB protection from events which result in changes in power, pressure, temperature, or axial power shape. As for the core safety limits, the range over which the overtemperature reactor trip setpoint is calculated is bounded by the Pressurizer Pressure - Low and Pressurizer Pressure - High reactor trip setpoints and the overpower reactor trip setpoint. The operation of the Main Steam Safety Valves also limit the power/temperature range over which the overtemperature trip setpoint must provide DNB protection. If an event results in an axial power shape which is more severe, from a DNB standpoint, than the reference axial power shape, the Overtemperature N-16 trip setpoint is automatically reduced in order to assure that the DNB protection afforded by the trip setpoint remains adequate. The axial power shapes are "recognized" by the plant instrumentation in terms of delta-flux (ΔI); i.e., the difference between the currents generated by the top two excore power range neutron flux detector sections and the currents generated by the bottom two detector sections. These instruments are spanned to detect axial flux imbalances in the range of ± 75% RTP.

II. DESCRIPTION OF TECHNICAL SPECIFICATIONS CHANGE REQUEST

The core safety limits of Figure 2.1-1b and the Overtemperature N-16 reactor trip function setpoints are revised to reflect the analyses performed to support operation with the Unit 2, Cycle 4 core configuration. This configuration consists of 172 fuel assemblies manufactured by Siemens Power Company and 21 fuel assemblies manufactured by Westinghouse Electric Company. The mixed-core penalty is significantly less than in previous core designs due to the greatly reduced number of Westinghouse fuel assemblies. The coefficients presented in the current Technical Specifications that define the overtemperature setpoint for Unit 2 Cycle 3

were found to adequately protect the Unit 2 Cycle 4 core safety limits. (There was a slight change to the safety analysis limit of the K_1 coefficient, but the current Technical Specifications value is unchanged.) However, because the Unit 2, Cycle 4 axial power distributions are calculated to be more skewed toward the top half of the core than those calculated for Unit 2, Cycle 3, a revision to the f(ΔI) trip reset function of the Overtemperature N-16 trip setpoint is required. For this cycle, it was determined that no trip setpoint reduction was required for those bottom-skewed axial power differences ($\Delta I < 0.0$) over the span of the ΔI instrumentation. In addition, the core safety limits and the Overtemperature N-16 trip setpoint are revised to reflect the Unit 2, Cycle 4 core configuration with the reduced mixed core penalty by:

A. Using the methodologies specified in Technical Specification 6.9.1.6b, calculations and analyses have been performed to identify the new reactor core safety limit curves for Unit 2. Technical Specification Figure 2.1-1b has been revised to replace the old curves with the new reactor core safety limit curves.

B. Using the new reactor core safety limit curves from "A" above, calculations and analyses have been performed to determine that the K_1, K_2, and K_3 coefficients of the overtemperature setpoint equation remain valid; however, the f(ΔI) trip reset function is revised as noted below:

   In Technical Specification Table 2.2-1, Note 1 for the Overtemperature N-16 Trip Setpoint, the following Terms will be changed as noted.

   - $q_t - q_b$ range from -65% and +2.5% to -65% and +7.5%
   - Overtemperature N-16 setpoint reduction from 1.86% to 0.0% for each percent that the magnitude of $q_t - q_b$ exceeds -65%
   - Overtemperature N-16 setpoint reduction from 1.65% to 2.00% for each percent that the magnitude of $q_t - q_b$ exceeds +7.5% (current value +2.5%)
   - Footnote identifying that no setpoint reduction is required for the negative span of the ΔI indication.

   In Technical Specification Table 2.2-1, Note 2, for the Overtemperature N-16 Allowable Value, the maximum amount by which the Trip Setpoint is allowed to exceed the computed Trip Setpoint, is decreased from 1.88% to 1.66%.

SUMMARY

To summarize, TU Electric proposes changing the reactor core safety limits in CPSES Unit 2, Cycle 4. As a result of the new reactor core safety limits, the Overtemperature N-16 trip setpoints have been recalculated. The Unit 2, Cycle 4 analyses have been performed using methodologies which are NRC approved and satisfy the applicable safety analyses limits. These changes are consistent with the Westinghouse Improved Standard Technical Specifications (NUREG-1431, Revision 1).

III. ANALYSIS

The core safety limits were recalculated based on the Unit 2 Cycle 4 core configuration. The changes relative to the limits in the current Technical Specification are due to the reduced allowance required for the effects of the mixed core penalty that are somewhat offset by the effects of a more top skewed axial power distribution. The methodologies used by TU Electric to determine the reactor core safety limits are wholly consistent with and represent no change to the Technical Specification 2.1 BASES for Safety Limits.

The Reactor Trip System setpoint limits specified in Technical Specification 2.2, Table 2.2-1 are the nominal values at which the reactor trips are set for each functional trip. The trip setpoints have been selected to ensure that the core and Reactor Coolant System (RCS) are prevented from exceeding their safety limits during normal operation and design basis anticipated operational occurrences. The Overtemperature N-16 trip function initiates a reactor trip which helps protect the core and RCS from exceeding their safety limits.

The Overtemperature N-16 trip provides core protection to prevent DNB and vessel exit saturation for all combinations of pressure, power, coolant temperature, and axial power distribution, provided that: the transient is slow with respect to piping delays from the core to the N-16 detectors; the pressure is within the range between the Pressurizer High and Low pressure reactor trip setpoints; and the power is less than the Overpower N-16 trip setpoint. The Overtemperature N-16 reactor trip setpoint is automatically varied with coolant temperature, pressurizer pressure, and axial power distribution.

With a normal operations axial power distribution, the Overtemperature N-16 reactor trip limit is always below the reactor core safety limits. If the axial flux difference is greater than that of the reference distribution, as indicated by the difference between top and bottom power range neutron flux detectors, the Overtemperature N-16 reactor trip setpoint is automatically reduced according to the notations (Note 1) in Technical Specification 2.2, Table 2.2-1. This reduction provides protection consistent with the reactor core safety limits.

The current Unit 2 Overtemperature N-16 reactor trip setpoint (with the exception of the f(ΔI) trip reset function) was shown to adequately protect the Unit 2 Cycle 4 core safety limits. The f(ΔI) overtemperature trip reset function is designed to automatically reduce the Overtemperature reactor trip setpoint if an axial power shape is detected which is more severe, with respect to DNB, than the reference shape used in the development of the core safety limits. The slope of the trip reset function required for Unit 2 Cycle 4 is steeper than the slope contained in the current Technical Specification. The range for which no trip reset is required is extended out from a ΔI of 2.5% to one of +7.5%. In addition, no trip reset is required for negative flux imbalances.

The FSAR Chapter 15 event most affected by the change in the Overtemperature trip setpoint is the rod withdrawal at power event presented in FSAR Section 15.4.2. This event was reanalyzed using the revised Overtemperature trip setpoint. All relevant event acceptance criteria were determined to be satisfied. Therefore, this change does not result in any reduction in any margin of safety. The other less limiting events in which the Overtemperature setpoint is used will be evaluated prior to Unit 2, Cycle 4 operation through the Reload Safety Evaluation performed in accordance with 10CFR50.59. This safety evaluation will be contingent upon the NRC approval of the Overtemperature setpoint change.

All analyses of the core safety limits, the overtemperature N-16 trip setpoint, and the Rod Withdrawal at Power event were performed in accordance with the NRC-approved methodologies listed in the Technical Specification 6.9.1.6b, Items 9, 10, 11, 12, 13 and 14.

IV SIGNIFICANT HAZARDS CONSIDERATIONS ANALYSIS

TU Electric has evaluated whether or not a significant hazards consideration is involved with the proposed changes by focusing on the three standards set forth in 10CFR50.92(c) as discussed below:

1. Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?

   A. Revision to the Unit 2 Core Safety Limits

   Analyses of reactor core safety limits are required as part of reload calculations for each cycle. TU Electric has performed the analyses of the Unit 2, Cycle 4 core configuration to determine the reactor core safety limits. The methodologies and safety analysis values result in new operating curves which, in general, permit plant operation over a similar range of acceptable conditions. This change means that if a transient were to occur with the plant operating at the limits of the new curve, a different temperature and power level might be attained than if the plant were operating within the bounds of the old curves. However, since the new curves were developed using NRC approved methodologies which are wholly consistent with and do not represent a change in the Technical Specification BASES for safety limits, all applicable postulated transients will continue to be properly mitigated. As a result, there will be no significant increase in the consequences, as determined by accident analyses, of any accident previously evaluated.

   B. Revision to Unit 2 Overtemperature N-16 Reactor Trip Setpoints

   As a result of changes discussed, the Overtemperature reactor trip setpoint has been recalculated. These trip setpoints help ensure that the core safety limits are protected and that all applicable limits of the safety analysis are met.

Based on the calculations performed, no significant changes to the safety analysis values for Overtemperature reactor trip setpoint were required. The f(ΔI) trip reset function was revised due to more top-skewed axial power distributions predicted for this cycle. The analyses performed show that, using the TU Electric methodologies, all applicable limits of the safety analysis are met. This setpoint provides a trip function which allows the mitigation of postulated accidents and has no impact on accident initiation. Therefore, the changes in safety analysis values do not involve an increase in the probability of an accident and, based on satisfying all applicable safety analysis limits, there is no significant increase in the consequences of any accident previously evaluated.

In addition, sufficient operating margin has been maintained in the overtemperature setpoint such that the risk of turbine runbacks or reactor trips due to upper plenum flow anomalies or other operational transients will be minimized, thus reducing potential challenges to the plant safety systems.

SUMMARY

The changes in the amendment request applies NRC approved methodologies to changes in safety analysis values, new core safety limits and new N-16 setpoint and parameter values to assure that all applicable safety analysis limits have been met. The potential for an operational transient to occur has not been affected and there has been no significant impact on the consequences of any accident previously evaluated.

2. Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed changes involve the calculation of new reactor core safety limits and overtemperature reactor trip setpoint resets. As such, the changes play an important role in the analysis of postulated accidents but none of the changes effect plant hardware or the operation of plant systems in a way that could initiate an accident. Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Do the proposed changes involve a significant reduction in a margin of safety?

In reviewing and approving the methods used for safety analyses and calculations, the NRC has approved the safety analysis limits which establish the margin of safety to be maintained. While the actual impact on safety is discussed in response to question 1, the impact on margin of safety is discussed below:

A. Revision to the Unit 2 Reactor Core Safety Limits

The TU Electric reload analysis methods have been used to determine new reactor core safety limits. All applicable safety analysis limits have been met. The methods used are wholly consistent with Technical Specification BASES 2.1 which is the bases for the safety limits. In particular, the curves assure that for Unit 2, Cycle 4, the calculated DNBR is no less than the safety analysis limit and the average enthalpy at the vessel exit is less than the enthalpy of saturated liquid. The acceptance criteria remains valid and continues to be satisfied; therefore, no change in a margin of safety occurs.

B. Revision to Unit 2 Overtemperature N-16 Reactor Trip Setpoints

Because the reactor core safety limits for CPSES Unit 2, Cycle 4 are recalculated, the Reactor Trip System instrumentation setpoint values for the Overtemperature N-16 reactor trip setpoint which protect the reactor core safety limits must also be recalculated. The Overtemperature N-16 reactor trip setpoint helps prevent the core and Reactor Coolant System from exceeding their safety limits during normal operation and design basis anticipated operational occurrences. However, it was shown in these calculations that the current Unit 2 overtemperature reactor trip setpoint (presented in the current Technical Specifications and excluding the f(ΔI) trip reset function) remains valid. The most relevant design basis analysis in Chapter 15 of the CPSES Final Safety Analysis Report (FSAR) which is affected by the Overtemperature reactor trip setpoint is the Uncontrolled Rod Cluster Control Assembly Bank Withdrawal at Power (FSAR Section 15.4.2). This event has been analyzed with the new safety analysis value for the Overtemperature reactor trip setpoint to demonstrate compliance with event specific acceptance criteria. Because all event acceptance criteria are satisfied, there is no degradation in a margin of safety.

The nominal Reactor Trip System instrumentation setpoints values for the Overtemperature N-16 reactor trip setpoint (Technical Specification Table 2.2-1) are determined based on a statistical combination of all of the uncertainties in the channels to arrive at a total uncertainty. The total uncertainty plus additional margin is applied in a conservative direction to the safety analysis trip setpoint value to arrive at the nominal and allowable values presented in Technical Specification Table 2.2-1. Meeting the requirements of Technical Specification Table 2.2-1 assures that the Overtemperature reactor trip setpoint assumed in the safety analyses remains valid. The CPSES Unit 2, Cycle 4 Overtemperature reactor trip setpoint is not significantly different from the previous cycle, and thus provides operational flexibility to withstand mild transients without initiating automatic protective actions. Although the value of the f(ΔI) trip reset function setpoint is different, the Reactor Trip System instrumentation

setpoint values for the Overtemperature N-16 reactor trip setpoint are consistent with the safety analysis assumptions which have been analytically demonstrated to be adequate to meet the applicable event acceptance criteria. Thus, there is no reduction in a margin of safety.

Using the NRC approved TU Electric methods, the reactor core safety limits are determined such that all applicable limits of the safety analyses are met. Because the applicable event acceptance criteria continue to be met, there is no significant reduction in the margin of safety.

Based on the above evaluations, TU Electric concludes that the activities associated with the above described changes present no significant hazards consideration under the standards set forth in 10CFR50.92(c) and, accordingly, a finding by the NRC of no significant hazards consideration is justified.

V. ENVIRONMENTAL EVALUATION

TU Electric has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10CFR20, or would change an inspection or surveillance requirement. TU Electric has evaluated the proposed changes and has determined that the changes do not involve (I) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed changes meet the eligibility criterion for categorical exclusion set forth in 10CFR51.22(c)(9). Therefore, pursuant to 10CFR51.22(b), an environmental assessment of proposed change is not required.