

TU ELECTRIC

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10CFR50.92

May 24, 1991

William J. Cahill, Jr.
Executive Vice President

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

COMANCHE PEAK STEAM ELECTRIC STATION (CPSES) - UNIT 1
DOCKET NO. 50-445
LICENSE AMENDMENT REQUEST 91-007
GENERIC LETTER 88-16 (REMOVAL OF CYCLE-SPECIFIC PARAMETERS),
POSITIVE MODERATOR TEMPERATURE COEFFICIENT AND FC SURVEILLANCE

Gentlemen:

Pursuant to 10CFR50.90, TU Electric hereby requests an amendment to the CPSES Unit 1 Operating License (NFP-87) by incorporating the enclosed changes into the CPSES Unit 1 Technical Specifications.

The proposed changes involve:

Implementing Generic Letter 88-16 by relocating cycle-specific parameters from the Technical Specifications to a Core Operating Limits Report (these cycle specific parameters include Moderator Temperature Coefficient, Shutdown Rod Insertion, Control Rod Insertion, Axial Flux Difference, Heat Flux Hot Channel Factor (FQ), and Nuclear Enthalpy Rise Hot Channel Factor);

Replacing the Fxy (Radial Peaking Factor) Surveillance with an FQ (Heat Flux Hot Channel Factor) Surveillance for the FQ Limiting Condition for Operation (LCO), thereby providing a more direct measurement for the LCO, and deleting the "Base Load" alternative; and

Providing an upper bound for the cycle-specific Moderator Temperature Coefficient limit identified in the Core Operating Limits Report.

Enclosure 1 provides a detailed description of the proposed changes, the basis for the changes, and Tu Electric's determination that the proposed changes do not involve a significant hazards consideration.

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Westinghouse and TU Electric have performed the necessary accident and transient evaluations and analyses within their respective scopes to support the implementation of the change to the moderator temperature coefficient. The results of these analyses and evaluations demonstrate that the existing, applicable design and safety criteria remain valid. The Westinghouse analysis is provided as Enclosure 2 to this letter. The TU Electric evaluation is summarized in Enclosure 1.

Enclosure 3 provides the affected Technical Specification pages, marked up to reflect the proposed changes.

Enclosure 4 provides a preliminary version of the Core Operating Limits Report using preliminary Cycle 2 information. This enclosure is for information only. Even though this enclosure provides no information directly supporting the acceptability of the proposed changes, the sample report may help NRC reviewers to understand how TU Electric intends to implement the proposed changes.

TU Electric requests approval of the proposed amendment by October 1, 1991, with an allowable implementation period of 60 days following the date of issuance. This will allow for orderly implementation of the changes during the refueling outage. If approval is not granted by October, 1991, the necessary action to redesign the core to meet the current Technical Specifications could become a critical path activity and could delay the scheduled restart of Unit 1.

Should you have any questions in this matter please contact Jimmy Seawright (214) 812-4375.

Sincerely,

William J. Cahill, Jr.

By: H. D. Bruner
H. D. Bruner
Senior Vice President

JDS/grp
Attachment
Enclosures

c - Mr. R. D. Martin, Region IV
Resident Inspectors, CPSES (2)
Mr. Jim Clifford, NRR

Mr. D. K. Lacker
Bureau of Radiation Control
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1100 West 49th Street
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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of)
)
Texas Utilities Electric Company))
)
(Comanche Peak Steam Electric)
Station, Unit 1))

Docket No. 50-445

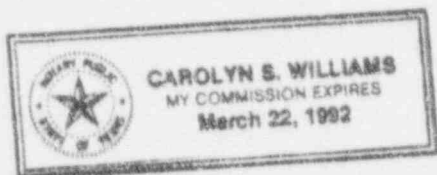
AFFIDAVIT

H. D. Bruner being duly sworn, hereby deposes and says that he is Senior Vice President of TU Electric, that he is duly authorized to sign and file with the Nuclear Regulatory Commission this transmittal of License Amendment Request 91-007; 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.

H. D. Bruner
H. D. Bruner
Senior Vice President

STATE OF TEXAS)
)
COUNTY OF SOMERVELL)

Subscribed and sworn to before me, a Notary Public, on this 24th day of
May, 1991.



Carolyn S. Williams
Notary Public

ENCLOSURE 1 TO TXX-91179

SIGNIFICANT HAZARDS CONSIDERATION

CORE OPERATING LIMITS REPORT, POSITIVE MODERATOR
TEMPERATURE COEFFICIENT AND FQ SURVEILLANCE

SIGNIFICANT HAZARDS CONSIDERATION
PROPOSED CPSES UNIT 1 TECHNICAL SPECIFICATION CHANGES

CORE OPERATING LIMITS REPORT, POSITIVE MODERATOR
TEMPERATURE COEFFICIENT AND FQ SURVEILLANCE

Pursuant to 10CFR50.92, TU Electric has evaluated the proposed amendment to the CPSES Unit 1 Technical Specifications and has determined that operation of the facility in accordance with the proposed amendment would not involve significant hazards considerations. In accordance with the three factor test of 10CFR50.92(c), implementation of the proposed changes would not: 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated, or; 3) involve a significant reduction in the margin of safety.

DESCRIPTION OF PROPOSED CHANGE 1 (CORE OPERATING LIMITS REPORT)

The first proposed Technical Specification change in this submittal concerns the relocation of numerical values for several cycle-specific core operating limits from the Technical Specifications to the Core Operating Limits Report (COLR). The impacted individual Specifications are amended to reflect the relocation of these numerical values to the COLR. Changes to individual Specifications include a reference to the COLR as the source document for the removed values and specify that operation of the plant must be within the criteria established therein. The parameters whose numerical values are relocated to the COLR include:

- 3.1.1.3 Moderator Temperature Coefficient,
- 3.1.3.5 Shutdown Rod Insertion,
- 3.1.3.1 Control Rod Insertion,
- &
- 3.1.3.6
- 3.2.1 Axial Flux Difference,
- 3.2.2 Heat Flux Hot Channel Factor, and
- 3.2.3 Nuclear Enthalpy Rise Hot Channel Factor.

The change adds the definition of the COLR to Section 1.0 of the Technical Specifications.

The BASES for the affected Specifications are revised to reflect these changes.

The Administrative Controls section is revised to describe the controls and content of the COLR and to identify the NRC-approved methodologies that may be used to develop the COLR.

BACKGROUND

NRC Generic Letter 88-16, dated October 4, 1988, Reference 1, was issued to encourage licensees to relocate cycle-specific parameter limits from the Technical Specifications to the Core Operating Limits Report (COLR). These limits, which are developed using NRC-approved methodologies and are consistent with all applicable limits of the safety analysis, may be revised periodically to reflect changes in cycle-specific variables. The use of the COLR would allow changes to the numerical values of core operating limits for each reload cycle without a license amendment, provided an NRC-approved methodology is used in the analysis.

JUSTIFICATION

The generic letter (88-16) provided guidance for removal of certain cycle-dependent core operating limits from the Technical Specifications. This would allow changes to these limits without prior approval by the NRC, so long as an NRC-approved methodology for the parameter limit calculation is followed and all applicable limits of the safety analysis are met. Presently, these core operating limits must be revised by a license amendment request to revise the Technical Specifications which must be evaluated by the NRC for every reload cycle. This is an administrative burden on both the NRC and TU Electric. Instead, these limits will be established and documented in the COLR per the controls identified in the Technical Specifications and the NRC will be provided copies of the COLR upon issuance.

These changes are consistent with the requirements of 10CFR50.36 and with the NRC staff's proposed policy for improving Technical Specifications, delineated in SECY-86-10, "Recommendations for Improving TS." These changes are also considered improvements per NRC stated policy for improving Technical Specifications (52FR3788, February 6, 1987).

DESCRIPTION OF PROPOSED CHANGE 2 (HEAT FLUX HOT CHANNEL FACTOR)

The second proposed change revises the method in Specification 3/4.2.2 for demonstrating that the total heat flux hot channel factor, FQ, will remain within its limits from a Radial Peaking Factor, Fxy, surveillance to FQ surveillance. "Base Load Operation" as an alternative to the normal mode of operation is removed from Specifications 3/4.2.1 and 3/4.2.2. The frequency for determining target flux difference in Specification 3/4.2.1 is specified to coincide with the surveillance on FQ. The BASES for these Specifications are also revised to reflect these changes. Since Fxy is no longer used, the Radial Peaking Factor Limit Report is no longer needed and has been deleted.

BACKGROUND

CPSES Unit 1 Technical Specification 3/4.2.2 currently requires an evaluation of the radial peaking factor, F_{xy} , to insure the heat flux hot channel factor is within its limit. F_{xy} limits are provided for normal operation and "Base Load Operation." The "Base Load" alternative was added to CPSES Unit 1 Technical Specifications during operation of Cycle 1 to make use of available margin in F_{xy} . This more restrictive mode of operation is not expected to be necessary for subsequent cycle operation. Monitoring FQ rather than F_{xy} provides a more direct and convenient form of assuring plant operation below the FQ limit while continuing to use a measured parameter to verify operation within Technical Specification limits.

JUSTIFICATION

The FQ surveillance requirements are proposed to replace the current F_{xy} surveillance requirements. The F_{xy} surveillance assures that FQ remains within allowable limits by monitoring the radial peaking factor, F_{xy} . An adverse axial component is necessarily assumed when the F_{xy} limits are determined. Implementation of the FQ surveillance method requires no such assumption and will result in more direct monitoring of the parameter of interest (Reference 2).

DESCRIPTION OF PROPOSED CHANGE 3 (POSITIVE MODERATOR TEMPERATURE COEFFICIENT)

The third proposed change included in this request revises Specification 3/4.1.1.3 to allow operation with a Positive Moderator Temperature Coefficient (PMTc) at reduced power levels. Currently the Specification requires that the MTC be less positive than $0 \Delta k/k/^\circ F$. The proposed change allows a slightly positive MTC value of $+0.5 \times 10^{-4} \Delta k/k/^\circ F$ below 70% RATED THERMAL POWER, ramping down to $0 \Delta k/k/^\circ F$ at 100% RATED THERMAL POWER.

The accompanying BASES section, B3/4.1.1.3 is also being amended in conjunction with these Technical Specification changes to more clearly define the core conditions for MTC Values.

BACKGROUND

CPSES Unit 1 Technical Specification 3/4.1.1.3 ensures that the value of the Moderator Temperature Coefficient (MTC) remains within the limits assumed in the FSAR transient and accident analyses. This Specification currently requires that the MTC be less positive than $0 \Delta k/k/^\circ F$ at all times when the reactor is critical. Permitting operation with a positive MTC at reduced power levels results in a significant increase in fuel cycle design flexibility, but has only a minor effect on the reactor core response for the accident analyses presented in the FSAR.

JUSTIFICATION

The use of a PMTC would support reductions in fuel cycle costs by reducing burnable absorber inventory, particularly for long fuel cycles which require a large number of burnable absorbers to control the MTC at the beginning of a cycle. This change would reduce burnable absorber handling requirements, minimize problems associated with the storage and disposal of spent absorbers, and decrease the probability of requiring control rod withdrawal limits during the first part of the cycle.

Operation of the plant with a PMTC does not result in violation of any safety limits. The proposed change to Technical Specification 3/4.1.1.3 allows a maximum upper limit of $+0.5 \times 10^{-4} \Delta k/k/^\circ F$ MTC below 70% RATED THERMAL POWER, ramping to 0 $\Delta k/k/^\circ F$ at 100% RATED THERMAL POWER. A power dependent MTC limit was chosen to minimize the effects of PMTC on postulated accidents at higher power levels and because there is less need to allow a positive coefficient as full power is approached. As power level is raised, the average core temperature becomes higher as allowed by the programmed average temperature controller. Also, the boron concentration can be reduced as xenon builds in the core. As fuel burnup is achieved, boron is further reduced and the moderator temperature coefficient will eventually become negative over the entire range of power operation.

In addition to a positive reactivity feedback with increasing core average temperature as a result of a positive MTC, there is a negative reactivity feedback with increasing fuel temperature as a result of the fuel temperature coefficient which is always negative. The dominating influence of the negative fuel temperature coefficient assures that the cumulative reactivity feedback as the reactor core power increases is always negative.

ANALYSIS

The current method of controlling core operating limits to assure conformance to 10CFR50.36 is to include the numerical values within the specifications. These operating limits are developed using NRC-approved calculation methodologies and are consistent with the applicable limits in the Final Safety Analysis Report (FSAR).

The applicable FSAR limits will be maintained and the Technical Specifications will continue to require operation within the core operational limits calculated with NRC-approved methodologies. The relocation of cycle dependent parameters from the Technical Specifications to the COLR has no impact on plant operation or safety. No safety-related equipment, safety function, or plant operation methods will be altered as a result of the proposed COLR change. The Limiting Condition for Operation, Applicability, Action and Surveillance Requirements remain in the Technical Specifications and, as such, require operation based on the limits in the COLR. Therefore, this proposed change is administrative in nature.

The proposed change will continue to control the cycle-specific parameters within the acceptance criteria and assure conformance to 10CFR50.36 by using the approved methodologies to determine the cycle dependent parameter limits. The COLR will document the specific parameter limits, including mid-cycle or other revisions to parameter values. Therefore, the proposed change is in conformance with the requirements of 10CFR50.36.

Periodic surveillance on the axially dependent radial peaking factor, F_{xy} , is currently required as a partial verification that the Heat Flux Hot Channel Factor, FQ , limit is not exceeded during operation. The remaining verification is provided by operation within the axial flux difference and control rod insertion limits. The proposed surveillance method replaces the F_{xy} surveillance with a measurement of a steady-state axially dependent heat flux hot channel factor, $FQ(Z)$. The measured $FQ(Z)$ is increased by a factor, $W(Z)$, which allows for changes due to those plant maneuvers which can be achieved within the axial flux difference and control rod insertion limits permitted by the Technical Specifications. Potential changes caused by power level changes, control rod motion, and xenon transients are included in $W(Z)$. The product of the measured $FQ(Z)$ and the analytically determined $W(Z)$ is then compared to the FQ limit. The proposed FQ surveillance accomplishes the same purpose as the F_{xy} surveillance it replaces and the limit placed on FQ remains unchanged.

The MTC limit is included in the Technical Specifications to ensure that the value of the coefficient remains within the limits assumed in the safety analysis. The affected accident analyses have been evaluated to ensure that the proposed PMTC limit does not result in the violation of any safety limits. The evaluations performed by Westinghouse are presented in Enclosure 2 entitled, "Safety Evaluation for Operation of Comanche Peak Unit 1 with a Positive Moderator Temperature Coefficient." The steam generator tube rupture accident analysis, which TU Electric performed, is more sensitive to the most negative reactivity coefficients and, therefore, the limiting results are not affected by the proposed PMTC. In support of this proposed change, the following transients were evaluated and were found not to be sensitive to the proposed PMTC:

Feedwater System Malfunctions that Result in an Increase in Feedwater Flow

Excessive Increase in Secondary Steam Flow

Inadvertent Opening of a Steam Generator Relief or Safety Valve

Steam System Piping Failure

Loss of Nonemergency AC Power to the Station Auxiliaries

Loss of Normal Feedwater

Feedwater System Pipe Break

Rod Cluster Control Assembly Misalignment

Startup of Inactive Reactor Coolant Pump at an Incorrect Temperature

Chemical and Volume Control System Malfunction that Results in a
Decrease in the Boron Concentration in the Reactor Coolant

Inadvertent Loading and Operation of a Fuel Assembly in an Improper
Position

Inadvertent Operation of the Emergency Core Cooling System During Power
Operation

Mass and Energy Release Analysis for Postulated Secondary System Pipe
Ruptures (Inside Containment)

Mass and Energy Release Analysis for Postulated Secondary System Pipe
Ruptures (Outside Containment)

Loss of Coolant Accident

Steam Generator Tube Rupture

The following transients were analyzed because they are sensitive to PMTC:

Turbine Trip

Partial and Complete Loss of Forced Reactor Coolant Flow

Reactor Coolant Pump Shaft Seizure (Locked Rotor)/ Shaft Break

Uncontrolled Rod Cluster Control Assembly (Bank) Withdrawal from a
Subcritical or Low Power Startup Condition

Uncontrolled Rod Cluster Control Assembly (Bank) Withdrawal at Power

Spectrum of Rod Cluster Control Assembly Ejection Accidents

Inadvertent Opening of a Pressurizer Safety or Relief Valve

The results of these analyses demonstrate that with the proposed PMTC, the
conclusions presented in the FSAR remain valid.

DETAILED DISCUSSION OF PROPOSED TECHNICAL SPECIFICATION CHANGES

A. Technical Specification Index

The Index was changed to reflect incorporation of the COLR. Index changes include (1) addition of the COLR definition; (2) deletion of Figures 3.1-1, 3.2-1, and 3.2-2; and (3) replacement the Radial Peaking Factor Limit Report under section 6.9.1 with the COLR.

B. Section 1.0 Definitions

The definition of the Core Operating Limits Report (1.41) was added to the Definitions section.

C. Specification 3/4.1.1.3

Specification 3/4.1.1.3 and its associated BASES were changed to reference the appropriate cycle-specific MTC limits in the COLR. Additionally, a positive maximum upper limit for MTC is incorporated.

D. Specification 3/4.1.3.1

Specification 3/4.1.3.1 was changed to replace the reference to Figure 3.1-1 with reference to Specification 3.1.3.6 for control rod insertion limitations.

E. Specification 3/4.1.3.5

Specification 3/4.1.3.5 was changed to reference the cycle-specific shutdown rod insertion limit in the COLR.

F. Specification 3/4.1.3.6

Specification 3/4.1.3.6 was changed to reference the cycle-specific control rod insertion limit in the COLR. Figure 3.1-1 is removed from the Technical Specifications and the information previously provided by that figure is now contained in the COLR.

G. Specification 3/4.2.1

Specification 3/4.2.1 and its associated BASES were changed to reference the cycle-specific axial flux difference limits in the COLR. Figure 3.2-1 is removed from the Technical Specifications and the information previously provided by that figure is now contained in the COLR. Additionally, "Base Load" as an alternate mode of operation was removed from the Specification and its BASES. The frequency for determining target flux difference was revised to be consistent with the more conservative frequencies used in revised Specification 3/4.2.2 for determining FQ(Z).

H. Specification 3/4.2.2

Specification 3/4.2.2 was changed to reference the cycle-specific Heat Flux Hot Channel Factor (FQ) limits in the COLR. Figure 3.2-2 is removed from the Technical Specifications and the information previously provided by that figure is now contained in the COLR. The Fxy surveillance method is replaced by the FQ surveillance method and appropriate changes made in the BASES. Additionally, "Base Load" as an alternate mode of operation was removed from the specification. The associated BASES were revised to reflect these changes.

I. Specification 3/4.2.3

Specification 3/4.2.3 was changed to reference the cycle-specific Nuclear Enthalpy Rise Hot Channel Factor limits in the COLR.

J. Specification 6.9.1.6

The Radial Peaking Factor Limit Report in section 6.9.1.6 was deleted and the Core Operating Limits Report (COLR) was inserted. The schedule for submittal of the COLR is consistent with current practice with respect to the Radial Peaking Factor Limit Report. The NRC-approved analytical methods used to determine the core operating limits for CPSES Unit 1 are referenced.

PRECEDENTS

Similar changes have previously been incorporated in Technical Specifications for other Westinghouse supplied PWRs. For example, Technical Specifications for both Shearon Harris and Callaway include COLR, FQ Surveillance, and PMTC Specifications similar to those proposed in this request. These precedents do not justify or demonstrate the acceptability of the proposed CPSES changes, but, due to their similarity, reference to the NRC reviews performed for these other plants may prevent duplication of effort and may reduce or simplify the review effort required for CPSES.

SIGNIFICANT HAZARDS CONSIDERATION EVALUATION PER 10CFR50.92

TU Electric has evaluated the no significant hazards considerations involved with the proposed changes by focusing on the three standards set forth in 10CFR50.92(c) as discussed below:

Does the proposed change:

- (1) Involve a significant increase in the probability or consequences of an accident previously evaluated?

The relocation of cycle-specific core operating limits from the CPSES Unit 1 Technical Specifications to the COLR has no influence on the probability or consequences of any accident previously evaluated. The limits are calculated using NRC-approved methodology and are consistent with all applicable limits of the safety analysis. Merely relocating these limits will not involve a significant increase in the probability or consequences of an accident previously evaluated. This assurance is independent of the location of the cycle-specific core operating limits.

The incorporation of the FQ Surveillance method involves no changes in accident initiators which could change the probability of an accident. The consequences of previously evaluated accidents remain unchanged since only the surveillance method used to verify compliance with the FQ limit is changed. The FQ Limiting Condition for Operation itself is not being changed.

Operation with the proposed PMTC limits only affect the transient response following an initiating event. Therefore, the probability of an initiating event is unaffected by the proposed PMTC limits. The accident analyses have been evaluated and there is not a significant increase in the consequences of any accidents.

Therefore, the proposed Technical Specification changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

- (2) Create the possibility of a new or different kind of accident from any accident previously evaluated?

The relocation of cycle-specific core operating limits from the CPSES Unit 1 Technical Specifications to the COLR 2011 requires that plant operations remain within core operating limits developed using NRC approved methodologies and consistent with all applicable limits of the safety analysis.

The use of the FQ Surveillance method does not involve any design changes. The proposed surveillance procedure does not involve a change in the method of plant operation and does not allow operation outside the limits previously analyzed. Since the plant design, limitations and method of operation are unchanged, this new surveillance method does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Implementation of PMTC does not involve any design changes to the fuel, reactor coolant system or engineered safety features. The MTC was already considered in all accident and transient analysis. Implementation of PMTC requires that all transients and accidents described in the FSAR be evaluated to assess the effect of the PMTC; but no new or different types of accidents can result.

Therefore, the proposed Technical Specification changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) Involve a significant reduction in the margin of safety?

Even though specific values are moved to the COLR, Specifications continue to require operation within the core limits developed using NRC-approved reload design methodologies and consistent with all applicable limits of the safety analysis. As such, the margin of safety is maintained.

The proposed FQ surveillance method accomplishes the same purpose as the Fxy surveillance it replaces and the limit placed on FQ remains unchanged. Since this limit remains the same, the margin of safety is not affected.

Evaluations have been performed to assess the effect of a PMTC on the FSAR accident analyses. The results of the evaluations show no significant increase in accident consequences. The applicable event acceptance criteria continue to be met and the conclusions reached in the FSAR remain valid. Thus, a PMTC does not cause a reduction in the margin of safety.

Therefore, the proposed Technical Specification changes do not involve a significant reduction in the margin of safety.

SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

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

ENVIRONMENTAL EVALUATION

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 effluents 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 the proposed change is not required.

REFERENCES

1. Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," October 4, 1988.
2. WCAP-10216-P-A, "Relaxation of Constant Axial Offset Control FQ Surveillance Technical Specification," June, 1983.

ENCLOSURE 2 TO TXX-91179
SAFETY EVALUATION FOR OPERATION OF
COMANCHE PEAK UNIT 1
WITH A POSITIVE MODERATOR TEMPERATURE COEFFICIENT