

Log # TXX-98196
 File # 916 (3/4.3)
 10010
 Ref. # 10CFR50.90
 10CFR50.36

C. Lance Terry
 Senior Vice President
 & Principal Nuclear Officer

October 2, 1998

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 98-006
 REVISION TO SG TUBE PLUGGING CRITERIA

- REF: 1) TU Electric Letter Logged TXX-97105 from C. L. Terry to the NRC dated May 15, 1997
 2) NUREG-1431, "Standard Technical Specifications Westinghouse Plants," Revision 1, April 1995

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 to CPSES Unit 1 and administratively to CPSES Unit 2.

TU Electric proposes to amend Technical Specification 4.0.6, "Steam Generator Surveillance Requirements" which provides tube inspection requirements and acceptance criteria to determine the level of degradation for which the tube may remain in service. The proposed amendment would add definitions required for the F* alternate plugging criterion and it identifies the portion of the tube subject to the criteria.

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. Attachment 4 provides a mark-up of the Improved Technical Specification pages submitted in reference 1 to reflect the proposed changes from reference 2. Attachment 5 provides proposed changes to the CPSES Final Safety Analysis Report.

TU Electric requests approval of this license amendment request prior to October 1, 1999, with implementation of the Technical Specification changes to occur within 30 days after NRC approval, to allow use during the next refueling outage for Unit 1.

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COMANCHE PEAK STEAM ELECTRIC STATION
 P.O. Box 1002 Glen Rose, Texas 76043-1002

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

Enclosed are copies of WCAP-15004 (proprietary) and WCAP-15005 (non-proprietary), "F* Tube Plugging Criterion for Tubes with Degradation in the Tubesheet Region of the Comanche Peak Unit 1 Steam Generators." Also enclosed are a Westinghouse proprietary authorization letter, CAW-97-1193, accompanying affidavit, Proprietary Information Notice, and Copyright Notice.

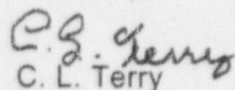
As Enclosure 2 contains information proprietary to Westinghouse Electric Company, it is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the consideration listed in paragraph (b)(4) of Section 2.790 of the Commission's regulations.

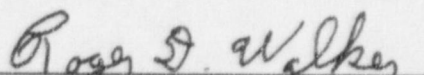
Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.790 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse Affidavit should reference CAW-97-1193 and should be addressed to N.J. Liparulo, Manager Equipment Design and Regulatory Engineering, Westinghouse Electric Company, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Should you have any questions, please contact Mr. J. D. Seawright at (254) 897-0140.

Sincerely,


C. L. Terry

By: 
Roger D. Walker
Regulatory Affairs Manager

JDS/jds

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- Attachments:
1. Affidavit
 2. Description and Assessment
 3. Affected Technical Specifications pages as revised by all approved license amendments
 4. Affected ITS Technical Specification Pages
 5. Affected Final Safety Analysis Report Pages

- Enclosures:
1. Westinghouse proprietary authorization letter, CAW-97-1193, accompanying affidavit, Proprietary Information Notice, and Copyright Notice.
 2. 1 copy of WCAP-15004 (Proprietary), "F* Tube Plugging Criterion For Tubes With Degradation In The Tubesheet Region Of The Comanche Peak Unit 1 Steam Generators"
 3. 5 copies of WCAP-15005 (Non-Proprietary) "F* Tube Plugging Criterion For Tubes With Degradation In The Tubesheet Region Of The Comanche Peak Unit 1 Steam Generators"

- c - Mr. E. W. Merschhoff, Region IV (1 - Proprietary, 1 - Non-Proprietary)
Mr. T. J. Polich, NRR (5 - Proprietary, 1 - Non-Proprietary)
Mr. J. I. Tapia, Region IV (1 - Proprietary, 1 - Non-Proprietary)
Resident Inspectors, CPSES (1 - Proprietary, 1 - Non-Proprietary)

Mr. Arthur C. Tate (1 - Proprietary, 1 - Non-Proprietary)
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)

(Comanche Peak Steam Electric)
Station, Units 1 & 2))

Docket Nos. 50-445
50-446
License Nos. NPF-87
NPF-89

AFFIDAVIT

Roger D. Walker being duly sworn, hereby deposes and says that he is the Regulatory Affairs Manager of TU Electric, the licensee herein; that he is duly authorized to sign and file with the Nuclear Regulatory Commission this License Amendment Request 98-006; 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.

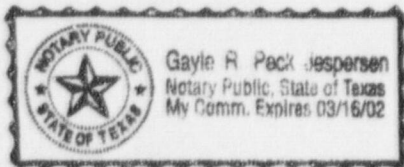
Roger D. Walker

Roger D. Walker
Regulatory Affairs Manager

STATE OF TEXAS)

COUNTY OF *Somerset*)

Subscribed and sworn to before me, on this 2nd day of October, 1998.



Gayle R. Peck Jespersen
Notary Public

ATTACHMENT 2 to TXX-98196
DESCRIPTION AND ASSESSMENT

DESCRIPTION AND ASSESSMENT

I. BACKGROUND

The amendment is proposed to address eddy current indications of tube degradation which can occur in the roll expanded portion of the tubes within the tubesheet in the steam generators. The steam generators at Comanche Peak Unit 1 were manufactured with most of the tubes receiving a full depth roll expansion in the tubesheet. Interpretation of eddy current data from similar plants to Comanche Peak Unit 1 has shown a potential for primary water stress corrosion cracking (PWSCC) within the roll expanded portion of the tube in the tubesheet. Using the existing Technical Specification tube plugging limit for the length of tube within the tubesheet may result in many of the tubes being plugged unnecessarily. It is shown that tube plugging is not required to maintain steam generator tube integrity upon implementation of the F* distance (a designated portion of the tube for which tube degradation does not necessitate remedial action) criterion. The F* distance criterion does not apply to those tubes in the Comanche Peak Unit 1 steam generators that have been full depth expanded in the tubesheet using the Westinghouse Explosive Tube Expansion (WEXTEx) process.

The hot and cold legs of active tubes were shotpeened to reduce the residual tensile stresses in the hard roll region in the tubesheet. Application of this process provides additional margin against inner diameter primary water stress corrosion cracking. If degradation does occur in the tubesheet region below the F* distance, the implementation of the alternate plugging criteria would permit the affected tube to remain in service. No other structure, system, or component will be affected by this activity.

This analysis supports the proposed license amendment to implement an alternate steam generator tube plugging criterion for the tubesheet region of the Comanche Peak Unit 1 steam generators, designated as the F* distance criterion.

These changes to the plant Technical Specifications are specific to CPSES Unit 1, and are needed to reduce any unnecessary tube plugging for the Unit 1 steam generators.

II. DESCRIPTION OF TECHNICAL SPECIFICATIONS CHANGE REQUEST

The proposed amendment modifies Technical Specification 4.0.6, "Steam Generator Surveillance Requirements" which provides tube inspection requirements and acceptance criteria to determine the level of degradation for which the tube may remain in service. The proposed amendment would add definitions required for the F* distance alternate plugging criterion and it identifies the portion of the tube subject to the criterion.

Additionally, the Westinghouse improved Technical Specifications (NUREG-1431, Revision 1) are impacted; therefore, revised pages to the improved Technical Specifications are also provided.

III. ANALYSIS

The proposed change to the Technical Specifications designates a criterion that identifies a portion of the tube for which tube degradation does not necessitate remedial action (F^* distance). The area subject to this change is in the roll expanded portion of the tube within the tubesheet of the steam generators. The F^* distance for Comanche Peak Unit 1 has been determined to be 1.13 inches (plus an allowance for eddy current measurement uncertainty). Sound roll expansion of 1.13 inches below the bottom of the roll transition or the top of the tubesheet (whichever is lower in elevation) will satisfy all applicable recommendations of Regulatory Guide 1.121 including all safety factors defined by RG 1.121, with regard to tube burst (pullout) capability. Also, sound roll expansion of this length would preclude the potential for unacceptable primary-to-secondary leakage during all plant conditions.

The existing tube plugging limit does not take into account the effect of the tubesheet on the external surface of the tube. The presence of the tubesheet enhances the integrity of potentially degraded tubes in that region by precluding tube deformation beyond the expanded outside diameter. Structural (burst) integrity of tubes with significant throughwall axial penetration length is provided in the roll expanded area. An axial length of roll expansion equal to the F^* length at the top of the roll expansion of the tube into the tubesheet provides sufficient structural integrity to preclude any axial translation or pull out of the tube due to pressure effects, even after assuming that the tube has experienced a complete circumferential separation at or below the bottom of the F^* distance. This same axial length of roll expansion of the tube into the tubesheet provides a barrier to leakage during normal operation and feedline break (FLB) conditions for throughwall cracking of the tube in the expanded region below the F^* distance.

The proposed amendment minimizes the loss of margin in the reactor coolant flow through the steam generator due to plugging that would otherwise need to be addressed in the existing LOCA analyses. The proposed amendment avoids an unnecessary loss of margin in reactor coolant system flow and therefore assists in assuring that minimum flow rates are maintained in excess of that required for operation at full power. Reduction in the amount of tube plugging required can reduce the length of plant outages and reduce the time that the steam generator is open to the containment environment during an outage. Additionally, the proposed amendment precludes occupational radiation exposure that would otherwise be incurred by plant workers involved in tube plugging operations. Furthermore, the acceptable leakage is based on the primary to secondary leakage limit in the Technical Specifications and the leakage assumptions used in the FSAR accident analyses. Compliance with these technical specifications ensures that the radiological consequences remain bounded by previously accepted limits, including the main steam line break.

The limiting consequence of the occurrence of steam generator tube degradation occurring below the F^* distance in the tubesheet region of the Comanche Peak Unit 1 steam generators is negligible primary-to-secondary leakage during all plant conditions. Steam generator tube burst cannot occur due the presence of the tubesheet. Additionally, the presence of the sound roll expansion within the F^* distance precludes pullout of the tube from the tubesheet should a complete circumferential separation of the tube occur. This same axial length of roll expansion of the tube into the tubesheet provides a barrier to leakage during all plant operating conditions. No leakage occurred from any of the hydraulic proof tests specimens for pressures up to and exceeding faulted condition events.

The design basis accident steam generator tube rupture event in the Comanche Peak FSAR assumes that a complete separation of the tube occurs and primary coolant is discharged through the SG tube break. Therefore, the consequences of a SG tube rupture event described in the FSAR bound the effects of steam generator tube degradation occurring below the F* distance. No mechanism exists to postulate consequences equivalent to either a single or multiple steam generator tube rupture event as a result of the implementation of the F* alternate plugging criterion..

Evaluation against the F* criterion shows that the Comanche Peak Unit 1 steam generator tubing will not rupture should degradation occur below the F* distance. Even if it is postulated that a circumferential separation of a F* tube were to occur below the F* distance, tube structural and leakage integrity will be maintained consistent with the assumptions of all the design basis accidents during all plant conditions. Verification of the F* distance of non-degraded tube roll expansion prevents a postulated separated tube from lifting out of the tube during all plant conditions.

The steam generator component is designed and constructed in accordance with the ASME Code. The steam generator tubes will continue to satisfy the criteria specified in Section III of the ASME Code for Class 1 components following implementation of the F* criterion during subsequent plant operation.

The supporting technical evaluation of the subject criterion [Westinghouse WCAP-15004, listed as Reference 1 (Proprietary)] demonstrates that the presence of the tubesheet enhances the tube integrity in the region of the hardroll by precluding tube deformation beyond its initial expanded outside diameter. The resistance to both tube rupture and tube collapse is strengthened by the presence of the tubesheet in that region. The result of hardrolling of the tube into the tubesheet is an interference fit between the tube and the tubesheet. A tube rupture cannot occur because the contact between the tube and tubesheet does not permit sufficient movement of tube material. The radial preload developed by the rolling process also secures a postulated separated tube end within the tubesheet during all plant conditions. In a similar manner, the tubesheet does not permit sufficient movement of tube material to permit buckling collapse of the tube during postulated LOCA loadings. Analysis and testing has been done to determine the resistive strength of roll expanded tubes within the tubesheet. This evaluation provides the basis for the acceptance criteria for tube degradation subject to the F* criterion. The F* distance of roll expansion is sufficient to preclude tube axial translation or pullout from tube degradation located below the F* distance, regardless of the extent of the tube degradation. Leakage testing of roll expanded tubes indicates that for roll lengths approximately equal to the F* distance, that any postulated faulted condition primary to secondary leakage from F* tubes would be insignificant.

The consequences of a steam generator tube rupture event have been analyzed as one of the postulated accidents in Chapter 15 of the FSAR. Steam generator tube integrity is determined not to be affected by subsequent operation of Comanche Peak Unit 1 using the F* criteria.

The consequences of the occurrence of steam generator tube degradation below the F* distance are bounded by the consequences of a single tube rupture event. To address the potential for tubesheet corrosion in the event that a crack occurred within the hardroll region of the tubesheet, only a very small volume of primary fluid would be involved in the small crevice. Any oxygen present in this very small

volume of fluid would be quickly consumed by surface reactions, i.e., any corrosion that would occur would tend to cause existing crevices to narrow due to oxide expansion and, without mode for replenishment, would result in a very benign corrosion condition. In any event, the high temperature corrosion rate of the carbon steel in this very local region would be extremely low (significantly less than 1 mil per year). The implementation of the F* alternate plugging criterion does not affect any other system or component important to safety. Accident mitigation functions will not be adversely following a postulated steam generator tube rupture event.

Analyses results show that steam generator tube burst and leaktightness integrity will remain consistent with the original steam generator design basis upon implementation of the F* criterion should degradation occur below the F* distance.

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 as discussed below:

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

The supporting technical evaluation of the subject criterion [Westinghouse WCAP-15004, listed as Reference 1 (Proprietary)], demonstrates that the presence of the tubesheet enhances the tube integrity in the region of the hardroll by precluding tube deformation beyond its initial expanded outside diameter. The result of hardrolling of the tube into the tubesheet is an interference fit between the tube and the tubesheet. A tube rupture cannot occur because the contact between the tube and tubesheet does not permit sufficient movement of tube material. In a similar manner, the tubesheet does not permit sufficient movement of tube material to permit buckling collapse of the tube during postulated LOCA loadings. Analysis and testing have been done to determine the resistive strength of roll expanded tubes within the tubesheet. This evaluation provides the basis for the acceptance criterion for tube degradation subject to the F* criterion. The F* distance of roll expansion is sufficient to preclude tube axial translation or pullout from tube degradation located below the F* distance, regardless of the extent of the tube degradation. The necessary engagement length applicable to the Comanche Peak Unit 1 steam generators is determined to be 1.13 inches, plus an allowance for eddy current measurement uncertainty, based on preload analyses. Verification that this value is significantly conservative was demonstrated by both pullout and hydraulic proof testing. Application of the F* criterion provides a level of protection for tube degradation in the tubesheet region commensurate with that afforded by RG 1.121. Leakage testing of roll expanded tubes indicates that for roll lengths approximately equal to the F* distance, any postulated faulted condition primary to secondary leakage from F* tubes would be insignificant. No leakage occurred from any of the hydraulic proof test specimens for pressures up to and exceeding faulted condition events. The existing Technical Specification leakage rate requirements and accident analysis assumptions remain unchanged.

Based on the above, it is concluded that the proposed F* criterion does not adversely impact any other previously evaluated design basis accidents and operation of Comanche Peak Unit 1 in accordance with the proposed license amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Implementation of the proposed F* criterion does not introduce any significant changes to the plant design basis. Use of the F* criterion does not provide a mechanism to result in an accident initiated outside of the region of the tubesheet expansion. Even if it is postulated that a circumferential separation of a F* tube were to occur below the F* distance, tube structural and leakage integrity will be maintained consistent with the assumptions of the design basis accidents during all plant conditions. Verification of the F* distance of non-degraded tube roll expansion prevents a postulated separated tube from lifting out of the tubesheet during all plant conditions. The F* criterion does not create a possibility for simultaneous failures of multiple tubes. Any other hypothetical accident as a result of any degradation in the expanded portion of the tube would be bounded by the existing steam generator tube rupture accident analysis.

Therefore, it is concluded that the proposed license amendment does 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?

The use of the F* criterion has been demonstrated to maintain the integrity of the tube bundle commensurate with the requirements of RG 1.121 (intended for indications in the free span of tubes) and the primary to secondary pressure boundary under normal and postulated accident conditions. Acceptable tube degradation for the F* criterion is any degradation indication in the tubesheet region, more than the F* distance below the bottom of the transition between the roll expansion and the unexpanded tube or the bottom of the tubesheet (whichever is lower). The safety factors used in the verification of the strength of the degraded tube are consistent with the safety factors in the ASME Boiler and Pressure Vessel Code used in steam generator design. The F* distance has been verified by pullout and hydraulic proof testing of tubes in tubesheet simulating collars to be greater than the length of roll expansion required to preclude both tube pullout and significant leakage during normal and postulated accident conditions. Resistance to tube pullout is based upon the primary to secondary pressure differential as it acts on the surface area of the tube, which includes the tube wall cross-section, in addition to the inner diameter based area of the tube. The leak testing acceptance criteria are based on the primary to secondary leakage limit in the Technical Specifications and the leakage assumptions used in the FSAR accident analyses.

Implementation of the F* criterion will decrease the number of tubes which must be taken out of service with tube plugs. Plugged tubes reduce the RCS flow margin, thus implementation of the F* alternate plugging criterion will maintain the margin of flow that would otherwise be reduced in the event of increased plugging.

Therefore, it is concluded that the proposed change does not result in a significant reduction in margin to plant safety as defined in the Final Safety Analysis Report or the bases of the Technical Specifications.

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 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 the proposed changes is not required.

VI. REFERENCES

1. WCAP-15004, "F* Tube Plugging Criterion for Tubes with Degradation in the Tubesheet Region of the Comanche Peak Unit 1 Steam Generators," December 1997
2. Comanche Peak Steam Electric Station Final Safety Analysis Report (FSAR), Section 5.4.2.2.2, "Program for Inservice Inspection of Steam Generator Tubing",
3. Comanche Peak Steam Generator Station Final Safety Analysis Report (FSAR); Section 15.6.3

ATTACHMENT 3 TO TXX-98196
AFFECTED TECHNICAL SPECIFICATION PAGES

Pages: 3/4 0-4
3/4 0-5
3/4 0-6
3/4 0-6 (continued)
3/4 0-7
B 3/4 0-7