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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**  
**STEAM GENERATOR MINIMUM TUBE WALL THICKNESS**

**REF: 1) NRC Letter from D.H. Jaffe to C. L. Terry dated**  
**September 22, 1999**

Gentlemen:

Attached are revisions to the FSAR which have been approved for issuance with the next Amendment. In addition, a discussion regarding the application of WCAP-7832, "Allowable Tube Wall Thinning Under Accident Conditions" is provided below.

WCAP-7832 is an evaluation of the steam generator tube, tubesheet, and divider plate under combined LOCA plus SSE conditions. The analysis addressed both 0.75 inch and 0.875 inch OD tubes for Model D and Model 51 steam generators, respectively. As part of the evaluation, a parametric study was performed, varying the tube wall thickness to determine a minimum required wall thickness for the subject loads. The tube wall thickness was varied until the maximum tube stress was equal to the corresponding ASME Code stress limit. The report does not define the location along the tube length where the maximum stress occurred in the tube, but based on subsequent plant specific analyses for these loads, it is judged that the maximum tube stress occurs at the top tube support plate for in-plane bending of the tube.

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In performing the analysis documented in WCAP-7832, the in-plane bending stress at the top tube support plate is considered as a primary stress, as defined in the ASME Code. However, as also defined in the ASME Code, only stresses required to satisfy equilibrium need to be classified as primary stress. In-plane bending stresses induced in the tubes at the top tube support plate are not required to satisfy equilibrium. Thus, the consideration of the combined stress at the top tube support plate in the WCAP-7832 analysis as a primary stress was a conservative evaluation. Current Westinghouse analysis methodology of the U-bends is to classify the in-plane bending stresses at the top tube support plate as secondary stresses as identified in the ASME code which is consistent with RG 1.121.

The analysis performed in WCAP-7832 is for a large break LOCA loading. Because Comanche Peak is licensed for leak-before-break for primary piping, the large pipe break events (primary inlet and outlet) are no longer the limiting pipe break events. Westinghouse analyses of other similar plants have shown a significant reduction in tube stress with the elimination of large break events.

Based on previous analyses, the limiting minimum tube wall requirement ( $T_{min}$ ) is typically governed by the allowable primary membrane stress intensity limits under the maximum through-wall pressure loading during either the normal full power operation or transient (normal and upset) conditions. The approach for determining the minimum required wall thickness is typically to establish  $T_{min}$  based on pressure stress requirements, and then to verify that when this  $T_{min}$  value is used, all other strength requirements are satisfied.

Recently, conditions that have been previously shown to be limiting were evaluated to determine and confirm acceptability of the  $T_{min}$  value for Comanche Peak Unit 2. As such, this evaluation did not include an analysis of combined LOCA plus SSE loads. Based on the licensing of leak-before-break for Comanche Peak, as well as prior experience, it is judged that the bounding loads have been analyzed, and the LOCA plus SSE stress limits remain acceptable.

FSAR changes for Section 5.4.2.5.4 have been approved (refer to the attachment to this letter) to clarify that the minimum tube wall thickness identified does not establish the limiting minimum wall thickness, but rather is an acceptable value. The referenced FSAR discussion, although not clearly identified as a bounding value, remains accurate. However, the clarification provides reference to the appropriate section of the FSAR (1A(N)) which identifies the criteria by which the limiting minimum tube wall thickness is determined. Section 1A(N) of the FSAR has additionally been clarified to address the recently approved Amendment to the Technical Specifications (Amendment 71) allowing use of the alternate repair criteria (Reference 1).

TXX-00103

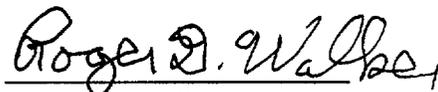
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Should you have any questions regarding this submittal, please call Obaid Bhatti at (254) 897-5839.

This communication contains no new licensing basis commitments regarding CPSES Units 1 and 2.

Sincerely,

  
C. L. Terry

By:   
Roger D. Walker  
Regulatory Affairs Manager

OAB/oab

Attachment

cc: E. W. Merschoff, Region IV  
J. I. Tapia, Region IV  
D. H. Jaffe, NRR  
Resident Inspectors, CPSES

#### 5.4.2.5.4 Allowable Tube Wall Thinning Under Accident Conditions

An evaluation is performed to determine the extent of tube wall thinning that can be tolerated under accident conditions. Under such a postulated design basis accident, vibration is of short enough duration that there is no endurance problem. The results of a study made on "D series" (0.75 inch nominal diameter, 0.043 inch nominal thickness) tubes under accident loading are discussed in Reference [3] and show that a minimum wall thickness of 0.026 inches would have a maximum faulted condition stress (i.e., due to combined LOCA and Safe Shutdown Earthquake loads) that is less than the allowable limit. This thickness is 0.010 inches less than the minimum steam generator tube wall thickness 0.039 reduced to 0.036 inches by the assumed general corrosion and erosion loss of 0.003 inches. *However, 0.026 inches is not the limiting minimum wall thickness but rather is a more conservative value. For tube plugging, the criteria is found in Section I(A)N.*

## 1(A)N

### Regulatory Guide 1.121

#### Bases for Plugging Degraded PWR Steam Generator Tubes

##### Discussion

The plugging criteria for the steam generator U-tubes, as specified in the plant Technical Specifications, is based on the more conservative limit required by paragraph IWB-3521.1, Section XI of the ASME Boiler and Pressure Vessel Code, than the plugging criteria derived from the Regulatory Guide 1.121 (dated August, 1976) analysis. *Alternate repair criteria which may exceed the plugging limit specified by IWB-3521.1 are defined in the plant Technical Specifications.*