TXU Energy
Comanche Peak Steam
Electric Station
P.O.Box 1002 (E01)
Glen Rose,TX 76043
Tel: 254 897 5209
Fax: 254 897 6652
mike.blevins@txu.com

Mike Blevins
Senior Vice President & Principal Nuclear Officer

Ref: 10 CFR 2.790

CPSES-200401308
Log # TXX-04091

May 10, 2004

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445
REDACTED DRAFT – COMANCHE PEAK STEAM ELECTRIC STATION, UNIT 1 – REVIEW OF STEAM GENERATORS' 90-DAY REPORT AND OPERATIONAL PERFORMANCE REPORT
(TAC MB8456)

REF: 1. NRC Letter from Mohan C. Thadani to M. R. Blevins dated March 8, 2004.

2. TXU Energy letter, logged TXX-04074, from Mike Blevins to USNRC dated April 8, 2004 (TAC)

Gentlemen:

By letter dated March 8, 2004 (Reference 1), the NRC requested licensee's assistance in the identification of any proprietary information contained within the enclosed draft letter. TXU Energy's response was submitted via Reference 2, however, subsequent discussions with NRC staff have identified a need to modify the redacted information provided. To prevent inadvertent disclosure of vendor proprietary information, TXU Energy hereby requests the NRC to withdraw our earlier response from ADAMS (Accession number ML041060610) and replace it with this letter.

The latest redacted pages of the draft NRC letter are provided as an enclosure to this letter.

D030

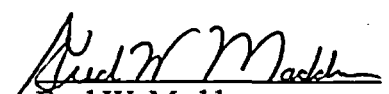
This communication contains no new licensing basis commitments. If you have any questions regarding this matter, please contact Bob Kidwell at (254) 897-5310.

Sincerely,

TXU Generation Company LP

By: TXU Generation Management Company LLC,
Its General Partner

Mike Blevins

By: 
Fred W. Madden
Regulatory Affairs Manager

RJK/rk
Enclosure

c - B. S. Mallett, Region IV
W. D. Johnson, Region IV
M. C. Thadani, NRR
Resident Inspectors, CPSES

Redacted copy of

COMANCHE PEAK STAEAM ELECTRIC STATION, UNIT 1 – REVIEW OF STEAM GENERATORS' 90-DAY REPORT AND OPERATIONAL PERFORMANCE REPORT (TAC MB8456)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

COMANCHE PEAK STEAM ELECTRIC STATION, UNIT 1
DRAFT STAFF REVIEW OF STEAM GENERATORS' 90-DAY REPORT
AND OPERATIONAL PERFORMANCE REPORT

1.0 INTRODUCTION

By letters dated February 17 and March 18, 2003 (References 1 and 2), TXU Generation Company LP (the licensee) submitted reports, as required by the plant technical specifications, pertaining to steam generator (SG) inspections performed at Comanche Peak Steam Electric Station (CPSES), Unit 1, during the ninth refueling outage (1RF09). Reference 1 is the 90-day report discussing implementation during 1RF09 of the Generic Letter (GL) 95-05, "Voltage-Based Repair Criteria for Westinghouse [Westinghouse Electric Company] Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking," alternate repair criteria for outer diameter (OD) stress corrosion cracking (ODSCC) at the tube support plate (TSP) intersections. The report also discusses the operational assessment for the degradation mechanism during Cycle 10 operation. Reference 2 is the twelve-month report documenting the SG inspections performed during 1RF09. Reference 2 also enclosed the licensee's operational assessment for degradation mechanisms other than ODSCC at the TSPs, supporting Cycle 10 operation.

The January 9, 2003, special team inspection report for CPSES, Unit 1 (Reference 3), committed the staff to reviewing the results of the licensee's examinations of pulled tube specimens removed from the CPSES, Unit 1, SGs during 1RF09 in 2002. In addition, Reference 3 committed the staff to reviewing the licensee's operational assessment performed to support full term operation of the CPSES, Unit 1, SGs to the next refueling outage (1RF10) scheduled for 2004. The staff has completed these reviews and the results are documented herein.

2.0 THE STAFF REVIEW

The staff's review of the 1RF09 inspection results, the pulled tube examinations, and the Cycle 10 operational assessments is described herein.

2.1 The Staff Review of Pulled Tube Examination

Sections of two tubes were pulled from CPSES, Unit 1, during 1RF09: R25C30 and R11C42. The results of the tube pull examinations were described in Westinghouse Report SG-SGDA-03-9, Revision 1, dated June 2003. This report is proprietary and was not submitted to the NRC. A copy of the report was made available for NRC staff inspection at the Westinghouse office in Rockville, Maryland.

Tube Section R25C30 was found by field bobbin and +Point inspection to contain a short axial indication (<0.3 inches) in a less than 1 volt ding. The +Point voltage response was small, [redacted] volts, which translates to approximately a 60% deep flaw. Burst testing of the pulled tube specimen yielded a burst pressure of 10989 pounds per square inch (psi) which is near its virgin strength of 12178 psi. Examination of the fracture surface indicated the crack to have a

than 0.2 inches. Flaws which are significantly longer than 0.2 inches, such as the 0.9 inch long flaw for R41C71, would be expected to exhibit a larger voltage response at a given depth than those with lengths less than 0.2 inches. Longer flaws would be expected to exhibit higher PODs as a function of depth than would shorter flaws. Thus, the staff concludes that a relatively long flaw should be reliably detectable with a maximum depth of 60% or greater.

Making the very conservative assumption that there was an undetected long flaw just below the detection threshold during 1RF09, the maximum flaw depth at the end of the current eighteen-month operating cycle for an undetected long flaw would not be expected to exceed 80%. Whereas the ratio of average depth over the burst effective length to maximum depth is generally less than 0.9 based on industry pulled tube data, 72% is a conservative estimate of average depth given a bounding maximum depth estimate of 80%. As discussed earlier, such a flaw with a burst effective length of 0.9 inches would be expected to meet the 3 delta P criterion using a best estimate burst model. The earlier discussion regarding uncertainties applies equally to this estimate.

2.3 Freespan ODSCC (Not Influenced by Detectable Dings or Dents)

A total of six tubes were found during 1RF09 to contain freespan ODSCC indications in the absence of dents. For four of the tubes, multiple indications were found. Each indication was pressure tested and satisfied the 3 delta P criterion and did not leak at MSLB pressure. One of these tubes was pulled for laboratory examination. For one section of tube between support plates, the ODSCC was found to exist at least at low levels (5% to 20%) along the entire span. Destructive examination indicated a maximum depth of 48% in that span. Depth profiles from +Point correlated fairly well (and somewhat conservatively) with the destructive examination when based on signal amplitude. The depth profile from phase angle analysis overestimated flaw depth, particularly at locations where the signal amplitudes were small (less than .15 volts at 300 kilo Hertz (KHz)). Portions of the crack that were less than 20% deep were generally not detectable with the +Point.

The most significant of the freespan indications found by inspection was for tube R7C112. This tube contained a flaw measuring 2.5 inches in length with +Point, a relatively large +Point voltage response of [redacted] volts, and a maximum measured depth of 62% based on +Point phase angle analysis and 85% based on +Point voltage amplitude. Based on the amplitude-based depth measurements, the licensee estimated that the remaining burst pressure capacity was 4788 psi, exceeding the 3 delta P criterion of 4100 psi. As previously noted, in-situ pressure testing was successfully conducted to the 3 delta P pressure with no leakage or burst.

Look back analyses of the bobbin data indicate that the R7C112 indication was present since at least 1RF07 in 1999. The licensee estimates the maximum flaw depth at that time of 66%. The licensee's estimate is based on bobbin voltage amplitude at 130 KHz, using a relationship between bobbin voltage amplitude and maximum depth developed from pulled tube freespan crack data from McGuire Nuclear Station (McGuire).

The licensee's operational assessment was performed using a variety of different methods which considered bobbin detection thresholds or POD functions to estimate the maximum flaw sizes that could potentially have escaped detection during 1RF09. The licensee estimates a bobbin POD of 0.95 for freespan flaws with a maximum depth of 50%. The staff did not review the basis for this estimate in detail. However, the staff believes that the detection threshold was

The licensee calculated a structural PDA limit of 82% corresponding to 3 delta P using mean material properties. Allowing for material strength at a lower 0.95 probability/0.95 confidence value and for +Point measurement error at a 0.95 probability bound, the licensee estimates the allowable measured PDA to be 56%. Thus, the licensee concluded the measured maximum PDA of 42% satisfied the 3 delta P criterion. In addition, the licensee in-situ pressure tested eight tubes with circumferential indications at the TTS, including three tubes with the largest PDA indications and three tubes with the largest +Point voltage amplitudes. Each of these tubes was successfully pressure tested to 3 delta P without burst or leakage.

The total number of indications has increased rather rapidly in recent inspections; 86 indications in 1RF06, 96 indications in 1RF07, 178 indications in 1RF08, and 667 indications in 1RF09. The maximum reported +Point amplitude increased from 0.39 volts in 1RF08 to 0.56 volts in 1RF09. No information was provided on the maximum PDA measured during 1RF08 versus the maximum 42% measured during 1RF09.

The staff did not review the licensee's operational assessment in detail; however, a cursory, qualitative review of the licensee's assessment did not reveal any significant concern with respect to whether the tube integrity performance criteria will continue to be met at 1RF10. Pulled tube data presented by the licensee indicates that a +Point voltage on the order of 4 volts is needed to reduce the burst pressure, evaluated at a lower 90% probability/50% confidence level (90/50), to 3 delta P. The licensee performed a variety of estimates of maximum +Point voltage and corresponding burst pressure for the upcoming 1RF10 using different assumptions. The most limiting estimate was a +Point voltage of 0.78 volts with a corresponding lower 90/50 burst pressure of 6700 psi. With respect to accident induced leakage, the licensee provided data (in-situ, pulled tubes) indicating that such leakage would not be expected for +Point voltages less than 2 volts.

2.5 Axial ODSCC at the TTS

Only seven indications of this type were reported during 1RF09. These indications were plugged or repaired. All were measured to be relatively short, 0.27 inches maximum, compared to the critical flaw length of 0.42 inches. Reported crack depths (62% maximum) were well below the licensee's screening criteria for performing in-situ leak testing. The licensee's operational assessment indicates that the structural and accident leakage performance criteria will continue to be met at 1RF10. The staff did not review the licensee's operational assessment in detail; however, a cursory, qualitative review of the licensee's assessment did not reveal any significant concern with respect to whether the tube integrity performance criteria will continue to be met at 1RF10.

2.6 Axial Pressurized Water Stress Corrosion Cracking (PWSCC) at the TTS

Two axial PWSCC indications were found during 1RF09 at the expansion transition region and were plugged or repaired. One measured [redacted] volts with the +Point, with a length of 0.16 inches and a depth (based on voltage amplitude) of 82%. The other measured 0.42 volts, with a length 0.16 inches and depth (based on phase) of 40% to 45% through wall (TW). The licensee's operational assessment predicts that the maximum flaw length and depth for currently undetected PWSCC will not exceed 0.33 inches in length and 70% TW in depth at 1RF10. The 0.33-inch length is less than the licensee's estimate of critical crack length of 0.43 at 3 delta P. In addition, the licensee estimates no leakage from this flaw under accident