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Ref. # 10CFR50.73(a)(2)(ii)(A).

CPSES-200100916  
Log # TXX-01067  
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NR-24

April 16, 2001

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

**SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)**  
**DOCKET NOS. 50-445**  
**THE CONDITION OF THE NUCLEAR POWER PLANT,**  
**INCLUDING ITS PRINCIPAL SAFETY BARRIERS, BEING**  
**SERIOUSLY DEGRADED**  
**LICENSEE EVENT REPORT 445/01-004-00**  
**SPECIAL REPORT 445/01-001-00**

Enclosed is Licensee Event Report (LER) 01-004-00 for Comanche Peak Steam Electric Station Unit 1, "Steam Generator Tube Plugging due to Stress Corrosion Cracking."

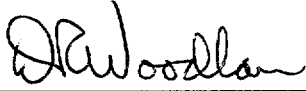
IE22

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This report also meets the requirements of Special Report as specified in CPSES Technical Specification 5.6.10.a. Additionally, this communication contains no new licensing basis commitments regarding CPSES Units 1 and 2.

Sincerely,

C. L. Terry

By:   
\_\_\_\_\_  
D. R. Woodlan  
Docket Licensing Manager

OAB/ob  
Enclosure

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

NRC FORM 366 (1-2001)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2>		Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

Facility Name (1) <b>COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1</b>	Docket Number (2) <b>05000445</b>	Page (3) <b>1 OF 5</b>
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Title (4)  
**STEAM GENERATOR TUBE PLUGGING DUE TO STRESS CORROSION CRACKING**

Event Date (5)			LER Number (6)		Report Date (7)			Other Facilities Involved (8)	
Month	Day	Year	Year	Sequential Number	Revision Number	Month	Day	Year	Docket Numbers
04	02	01	01	004	00	04	16	01	05000446 05000

Operating Mode (9)	6	This report is submitted pursuant to the requirements of 10 CFR : (Check all that apply) (11)							
Power Level (10)	0	20.2201(b)	20.2203(a)(3)(i)	50.73(a)(2)(i)(C)	50.73(a)(2)(vii)				
		20.2201(d)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(A)	<input checked="" type="checkbox"/>			
		20.2203(a)(1)	20.2203(a)(4)	50.73(a)(2)(ii)(B)	50.73(a)(2)(viii)(B)				
		20.2203(a)(2)(i)	50.36(c)(2)(i)(A)	50.73(a)(2)(iii)	50.73(a)(2)(ix)(A)				
		20.2203(a)(2)(ii)	50.36(c)(1)(ii)(A)	50.73(a)(2)(iv)(A)	50.72(a)(2)(x)				
		20.2203(a)(2)(iii)	50.36(c)(2)	50.73(a)(2)(v)(A)	73.71(a)(4)				
		20.2203(a)(2)(iv)	50.46(a)(3)(ii)	50.73(a)(2)(v)(B)	73.71(a)(5)				
		20.2203(a)(2)(v)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(C)	OTHER	<input checked="" type="checkbox"/>			
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(B)	50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A				

Licensee Contact For This LER (12)

Name <b>R. Ben Mays, Engineering Programs Manager</b>	Telephone Number (Include Area Code) <b>254-897-6816</b>
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Complete One Line For Each Component Failure Described in This Report (13)

Cause	System	Component	Manufacturer	Reportable To EPIX	Cause	System	Component	Manufacturer	Reportable To EPIX
				N					

Supplemental Report Expected (14)				EXPECTED SUBMISSION DATE (15)		Month	Day	Year
YES <small>(If YES, complete EXPECTED SUBMISSION DATE)</small>	<input checked="" type="checkbox"/>	NO						

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On April 2, 2001, with Comanche Peak Steam Electric Station (CPSES) Unit 1 in Mode 6 (Refueling with core offloading), analysis of eddy current plus point testing data on Steam Generators (SG) (EIS: (AB)(SG)) indicated that greater than 1 percent of the total tubes inspected in SG 1-2, SG 1-3 and SG 1-4 were defective. The majority of the tube defects are attributed to outer diameter stress corrosion cracking at the hot leg top of tubesheet transition.

TXU Electric has plugged all defective tubes identified during the current refueling outage. All defective tubes met the criteria of Draft Regulatory Guide 1.121 for structural integrity. TXU Electric maintains a comprehensive program to minimize SG tube degradation.

This report also meets the requirements of Special Report as specified in CPSES Technical Specification 5.6.10.a.

**LICENSEE EVENT REPORT (LER)**

Facility Name (1) COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1	Docket 05000445	LER Number (6)			Page(3) 2 OF 5
		Year 01	Sequential Number 004	Revision Number 00	

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

**I. DESCRIPTION OF REPORTABLE EVENT****A. REPORTABLE EVENT CLASSIFICATION**

The subject event is reportable pursuant to the requirements of TS 5.6.10, specifically 10CFR50.73(a)(2)(ii)(A).

**B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT**

Comanche Peak Steam Electric Station (CPSES) Unit 1 was in its eighth refueling outage (1RFO8).

**C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT**

Not Applicable – There were no structures, systems, or components that were inoperable at the start of the event which contributed to this event.

**D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES**

CPSES Technical Specification (TS) 5.5.9, "Steam Generator (SG) Tube Surveillance Program," requires that the results of each SG tube inspection be classified as Category C-3 if more than 1 percent of the total tubes inspected are defective.

Additionally, if the results of the SG tube sample inspections are classified as Category C-3, then prompt NRC notification is required in accordance with TS 5.5.9 Table 5.5-2 and TS 5.6.10c. During this eighth refueling outage, results of 3 steam generator inspections went into Category C-3 at separate times. Each of these events is listed below.

**Event 1**

On April 2, 2001, at approximately 4:02 a.m., CPSES Unit 1 was in its eighth refueling outage. Analysis of eddy current testing data on Steam Generator (SG) (EHS: (AB)(SG)) 1-3 indicated that greater than 1 percent of the total tubes inspected in SG 1-3 were defective.

On April 2, 2001 at approximately 6:53 a.m., CPSES made notification of the event via the emergency notification system (ENS) pursuant to the requirements of 10CFR50.72(b)(3)(ii)(A) and TS 5.5.9. (Refer to NRC event number 37880)

**LICENSEE EVENT REPORT (LER)**

Facility Name (1) COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1	Docket 05000445	LER Number (6)			Page(3) 3 OF 5
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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

**Event 2**

On April 3, 2001, at approximately 5:00 a.m., CPSES Unit 1 was in its eighth refueling outage. Analysis of eddy current testing data on Steam Generator (SG) (EIIS: (AB)(SG)) 1-4 indicated that greater than 1 percent of the total tubes inspected in SG 1-4 were defective.

On April 2, 2001 at approximately 6:00 a.m., CPSES made notification of the event via the emergency notification system (ENS) pursuant to the requirements of 10CFR50.72(b)(3)(ii)(A) and TS 5.5.9. (Refer to NRC event number 37880)

**Event 3**

On April 3, 2001, at approximately 10:37 p.m., CPSES Unit 1 was in its eighth refueling outage. Analysis of eddy current testing data on Steam Generator (SG) (EIIS: (AB)(SG)) 1-2 indicated that greater than 1 percent of the total tubes inspected in SG 1-2 were defective.

On April 2, 2001 at approximately 11:15 a.m., CPSES made notification of the event via the emergency notification system (ENS) pursuant to the requirements of 10CFR50.72(b)(3)(ii)(A) and TS 5.5.9. (Refer to NRC event number 37880)

**E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR PROCEDURAL OR PERSONNEL ERROR**

The defective tubes were found during scheduled eddy current testing of CPSES Unit 1 SG tubing.

**II. COMPONENT OR SYSTEM FAILURES****A. FAILURE MODE, MECHANISM, AND EFFECTS OF EACH FAILED COMPONENT**

TXU Electric believes that top of tube support (TTS) outside diameter stress corrosion cracking (ODSCC) was caused by the temperature, chemistry and residual stress effects on the tubing material (Inconel 600 MA).

**B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY**

Not Applicable – No safety system train was rendered inoperable.

**LICENSEE EVENT REPORT (LER)**

Facility Name (1) COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1	Docket 05000445	LER Number (6)			Page(3) 4 OF 5
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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

**C. SAFETY CONSEQUENCES AND IMPLICATIONS**

The outside diameter stress corrosion cracking (ODSCC) associated with the hot leg rolled transition was found to be the predominant degradation mechanism seen during the CPSES 1RFO8 inspection. A total of 179 tubes were taken out of service (plugged) for this mode of degradation. SG 1-1 had 2 tubes plugged, SG 1-2 had 47 tubes plugged SG 1-3 had 79 tubes plugged, and SG 1-4 had 51 tubes plugged as a result of hot leg top of tubesheet ODSCC. An additional 30 tubes were plugged due to loose parts, preheater wear, ODSCC at a freespan ding, Primary Water Stress Corrosion Cracking at the hot leg top of tubesheet roll transition, and data quality issues. The total plugs installed to-date remain well below the 10 percent tube plugging allowance provided by the accident analysis. There were no instances of ODSCC tube degradation identified in the cold leg hard rolled transition based upon 20 percent eddy current (MRPC/Plus Point) inspection performed for SGs 2, 3, and 4. One of the indications reported met the nondestructive examination (NDE) screening criteria for insitu pressure testing. Additionally, the largest voltage indication was tested. These tubes were insitu pressure tested with no leakage or burst. Growth rates based on consecutive inspection data associated with tubes exhibiting baffle plate and anti-vibrations bar (AVB) wear were within expected progression. The condition of the tubes at the end of Cycle 8 meets all NRC accepted integrity levels. The planned operating length for Cycle 9 is 498 effective full power days (EFPD) compared to 506 EFPD (actual) for Cycle 8. This represents a decrease in operating length. There are no planned changes of significance neither in operating temperatures and steam pressure nor in the operating secondary side chemistry. Therefore, the structural and leakage integrity condition of the CPSES Unit 1 SGs is bounded by the acceptable Cycle 8 performance. Based on the aforementioned, it was concluded that the event had no impact on the health and safety of the public

**III. CAUSE OF THE EVENT**

TXU Electric believes that the top of tube sheet (TTS) outside diameter stress corrosion cracking (ODSCC) was caused by the temperature, chemistry and residual stress effects on the tubing material (Inconel 600 MA).

**IV. CORRECTIVE ACTIONS**

Chemical cleaning was performed during the CPSES Unit 1 fifth refueling outage (1RFO5) to remove the chemical contaminants at the TTS and tube supports (TSPs). Prior to commercial operation, 124 tubes in each steam generator were expanded at the B and D baffle plate to reduce wear.

NRC FORM 366A  
(1-2001)**LICENSEE EVENT REPORT (LER)**

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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

A total of 179 tubes were plugged for ODSCC at TTS. SG 1-1 had 2 tubes plugged, SG 1-2 had 47 tubes plugged, SG 1-3 had 79 tubes plugged, and SG 1-4 had 51 tubes plugged as a result of hot leg top of tubesheet ODSCC. An additional 30 tubes were plugged due to loose parts, preheater wear, ODSCC at a freespan ding, primary water stress corrosion cracking (PWSCC) at the hot leg top of tubesheet roll transition, and data quality issues. TXU Electric believes that it has removed all known defective tubes from service as required by CPSES Technical Specification

**V. PREVIOUS SIMILAR EVENTS**

There has been two other previous similar event of this type at CPSES, which occurred during the 1RFO6 and 1RFO7 SG tube inspection. Corrective actions taken for the previous event would not have prevented this event.

**VI. ADDITIONAL INFORMATION**

The following information meets the requirements of Special Report as specified in CPSES Technical Specification 5.6.10.a. Total tubes plugged during this outage:

**CPSES UNIT 1 STEAM GENERATOR 1**

11 tubes were plugged in this generator  
0 tubes were designated as an F\* tube.

**CPSES UNIT 1 STEAM GENERATOR 2**

58 tubes were plugged in this generator  
0 tubes were designated as an F\* tube.

**CPSES UNIT 1 STEAM GENERATOR 3**

85 tubes were plugged in the generator  
0 tubes were designated as an F\* tube.

**CPSES UNIT 1 STEAM GENERATOR 4**

55 tubes were plugged in this generator  
0 tubes were designated as an F\* tube.