



**TXU Electric**  
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**C. Lance Terry**  
Senior Vice President & Principal Nuclear Officer

Log # TXX-00061  
File # 10200  
Ref. # 10CFR50.73(a)(2)(vii)

April 17, 2000

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)  
DOCKET NO. 50-445  
POTENTIAL COMMON CAUSE FAILURE  
LICENSEE EVENT REPORT 445/99-005-01

REF: TXU Electric letter logged TXX-99228 from C. L. Terry to US Nuclear  
Regulatory Commission dated September 29, 1999

Enclosed is supplement 01 to Licensee Event Report (LER) 99-005-00 for  
Comanche Peak Steam Electric Station Unit 1, "A Potential Common Cause  
Failure Identified in the JRAK Relief Valves Due to Pressure Surges in the  
Primary Sampling System."

This supplement to the LER is being issued to clarify the corrective actions, which  
were implemented to reduce failures in the JRAK Relief Valves due to pressure  
surges in the primary sampling system. Initially TXU Electric had stated that  
metering valves were installed to mitigate pressure surges in both Units at CPSES.  
TXU Electric wishes to append to the existing corrective actions to clarify that  
metering valves were not installed for all the affected relief valves. In addition to  
the installation of the metering valves for certain relief valves, applicable  
procedures have been enhanced with respect to operation of the primary sampling  
system. This results in greatly reducing the pressure surges, which could cause  
repeated actuations of the relief valves which in turn could cause the relief valves  
to function erratically.

The information regarding the enhancement of the procedure was inadvertently  
not addressed in the original LER.

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Should you require additional information please contact Obaid Bhatti at  
(254) 897-5839 to coordinate this effort.

There are no new licensing-based commitments in this communication.

Sincerely,

*C. L. Terry*

C. L. Terry

By: *Roger D. Walker*

Roger D. Walker  
Regulatory Affairs Manager

OAB/oab  
Enclosure

cc: E. W. Merschoff, Region IV  
J. I. Tapia, Region IV  
Resident Inspectors, CPSES

NRC FORM 366 (4-95)				U.S. NUCLEAR REGULATORY COMMISSION				APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-8 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.			
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2>											
Facility Name (1) <b>COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1 &amp; 2</b>								Docket Number (2) <b>05000445</b>		Page (3) <b>1 OF 5</b>	
Title (4) <b>A POTENTIAL COMMON CAUSE FAILURE IDENTIFIED IN THE JRAK RELIEF VALVES DUE TO PRESSURE SURGES IN THE PRIMARY SAMPLING SYSTEM</b>											
Event Date (5)			LER Number (6)			Report Date (7)			Other Facilities Involved (8)		
Month	Day	Year	Year	Sequential Number	Revision Number	Month	Day	Year	Facility Name	Docket Numbers	
08	30	99	99	005	01	04	17	00	CPSES UNIT 2	05000446	
										05000	
Operating Mode (9)		This report is submitted pursuant to the requirements of 10 CFR: (Check one or more) (11)									
1		20.2201 (b)		20.2203 (a) (2) (v)		50.73 (a) (2) (i)		50.73 (a) (2) (viii)			
Power Level (10)		20.2203 (a) (1)		20.2203 (a) (3) (i)		50.73 (a) (2) (ii)		50.73 (a) (2) (x)			
100		20.2203 (a) (2) (i)		20.2203 (a) (3) (ii)		50.73 (a) (2) (iii)		73.71			
		20.2203 (a) (2) (ii)		20.2203 (a) (4)		50.73 (a) (2) (iv)		OTHER			
		20.2203 (a) (2) (iii)		50.36 (c) (1)		50.73 (a) (2) (v)		Specify in Abstract below			
		20.2203 (a) (2) (iv)		50.36 (c) (2)		X 50.73 (a) (2) (vii)		or in NRC Form 366A			
Licensee Contact For This LER (12)											
Name <b>R. B. Mays, Manager Engineering Programs</b>								Telephone Number (Include Area Code) <b>254-897-6816</b>			
Complete One Line For Each Component Failure Described in This Report (13)											
Cause	System	Component	Manufacturer	Reportable To NPRDS		Cause	System	Component	Manufacturer	Reportable To NPRDS	
				N							
Supplemental Report Expected (14)						EXPECTED SUBMISSION DATE (15)			Month	Day	Year
YES (If YES, complete EXPECTED SUBMISSION DATE)						X NO					
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)											
<p>On August 30, 1999 after reviewing the CPSES Unit 2 refueling outage (2RF04) ASME Section XI Inservice Test (IST) results, the Inservice Test Engineer conservatively concluded that the Crosby JRAK series relief valves in the Primary Sampling (PS) system may have a potential common cause failure.</p> <p>The design of the PS system is such that normal sampling operation caused pressure surges in the system (water hammer), which resulted in repeated lifts of the valve. Repeated lifting of a relief valve can introduce wear and erosion, which if allowed to continue, could cause the valve to function erratically.</p> <p>Corrective actions for the pressure surges (water hammer) in the PS system have been implemented.</p>											

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

### I. DESCRIPTION OF THE REPORTABLE EVENT

#### A. REPORTABLE EVENT CLASSIFICATION

This Licensee Event Report describes a potential common cause failure, and is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(vii).

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

On August 30, 1999, when this potential issue was discovered Comanche Peak Steam Electric Station (CPSES) Unit 1 and Unit 2 were in Mode 1, power operation.

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

There were no inoperable structures, systems or components that contributed to event.

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

On August 30, 1999, after reviewing 2RF04 relief valve testing results and evaluation of previous tests, the Inservice Test (IST) Engineer (utility, non-licensed) conservatively concluded that recurring IST failure of PS system Crosby JRAK relief valves (EIS:(RV)) to meet the ASME Section XI as found set pressure criteria, might indicate a common cause failure. This conclusion was based on the knowledge that pressure surges during normal operations of the PS causes the PS JRAKs to lift. Relief valves are not designed to lift as a part of normal operation and repeated lifts may cause the valves to degrade. Review of performance history of both CPSES Unit 1 and Unit 2 PS relief valves illustrates that the PS JRAKs have been more problematic than the other JRAKs.

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### E. METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE OR PROCEDURAL ERROR

This issue was discovered by the Inservice Test Engineer while reviewing the test data for valves tested during the previous refueling outage (2RF04) for CPSES Unit 2.

## II. COMPONENT OR SYSTEM FAILURES

### A. FAILED COMPONENT INFORMATION

PS system Crosby JRAK relief valves which have failed the ASME Section XI IST acceptance criteria - 1PS-0500; 1PS-0501; 1PS-0502; 1PS-0503; 2PS-0500; 2PS-0501; 2PS-0502; 2PS-0503.

### B. FAILURE MODE, MECHANISM, AND EFFECT OF EACH FAILED COMPONENT

The JRAK series of relief valves are designed to be thermal relief valves for the PS lines between the containment isolation valves. These relief valves are not designed to be pressure regulating devices for normal system pressure variations. As a result, when the valves are cycled frequently two mechanisms are potentially introduced that could cause the valve to not meet the ASME Section XI IST acceptance criteria:

- 1) System impurities if present could be drawn through the valve nozzle and disk seat area when the valve disk lifts. When the valve disk closes again, it has the potential to trap the debris between the valve seat and disk. A buildup of this debris can cause the disk to stick. Disassembly and inspection of these valves did show some debris inside the valves.
- 2) Repeated lifting of a relief valve disk can introduce wear and erosion, which if allowed to continue, could cause the valve to function erratically. A properly set relief valve is designed to "pop" open and slam shut. Many cycles of this type exercise (especially with any impurities from the system in the valve) can cause premature wear. The teardown inspection of several PS relief valves supports these conclusions.

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### C. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

There were no failed components associated with this event. The design of the PS system is such that normal sampling would cause pressure surges in the system (water hammer) which would result in repeated actuation of the relief valve. Repeated actuation of a relief valve can introduce wear and erosion, which if allowed to continue, could cause the valve to function erratically.

### D. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS

Not applicable – there were no failed components associated with this event.

## III. ANALYSIS OF THE EVENT

### A. SAFETY SYSTEMS THAT RESPONDED

Not applicable – there were no safety system responses associated with this event.

### B. DURATION OF SAFETY SYSTEM INOPERABILITY

Not applicable – there were no safety systems rendered inoperable due to this event.

### C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The JRAK series of valves that indicated appearance of common cause failures are installed to be thermal relief valves for the PS system between the containment isolation valves. These valves are not designed to mitigate accidents analyzed in Chapter 15 of the FSAR. The size of the inlet lines for these valves is 3/4 inch nominal diameter and the leakage flow through a line this size is within the makeup capacity of the chemical and volume control system. Moreover, these valves can be isolated from the reactor coolant system via the redundant isolation valves. Additionally, leakage from the reactor coolant system has not occurred. Therefore, it was concluded that this event did not adversely impact the safe operation of CPSES or the health and safety of public.

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**IV. CAUSE OF THE EVENT**

Inservice testing of JRAK type relief valves in the PS system at CPSES has produced inconsistent results since commercial operations of both units. This is typically due to the design of the PS system, where normal sampling operation would cause pressure surges (water hammer) in the system. Repeated actuation of a relief valve can introduce wear and erosion, which if allowed to continue, could cause the valve to function erratically.

**V. CORRECTIVE ACTIONS**

Corrective actions for the pressure surges (water hammer) in the PS system have been implemented. Metering valves have been installed in the PS system to mitigate pressure surges for certain relief valves in each unit. Additionally, applicable procedures have been enhanced with respect to operation of the PS system that have greatly reduced the pressure surges, which were causing these valves to lift. Since installation of the metering valves and revising the procedures, the JRAK relief valves no longer lift as they did during sampling operation. The metering valves and revised procedures have successfully reduced the pressure surges to below the set point of the relief valves. This action should greatly reduce the number of failures of JRAK series relief valves to meet ASME Section XI IST acceptance criteria.

**VI. PREVIOUS SIMILAR EVENTS**

There have been other previous events which resulted in reportability of matters relating to the results of the ASME Section XI Inservice Testing. However, the causes of those events are sufficiently different from subject event (pressure surges in the PS system) such that the corrective actions taken for the previous events would have not prevented this event.