



**TXU Energy**  
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Ref: 10CFR50.73(a)(2)(iv)(A)

CPSES- 200202602  
Log # TXX-02114  
File # 10200

August 5, 2002

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

**SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)  
DOCKET NO. 50-446  
ACTUATION OF REACTOR PROTECTION SYSTEM  
LICENSEE EVENT REPORT 446/02-001-00**

Enclosed is Licensee Event Report (LER) 02-001-00 for Comanche Peak Steam  
Electric Station Unit 2, "Reactor Trip due to Primary Water Pump Vibration High  
Signal."

IE22

TXX-02114

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This communication contains the following new commitment which will be completed as noted:

Commitment Number

27270

Commitment

Engineering will evaluate other turbine/generator protection cabinets to determine if similar circuit designs exist.

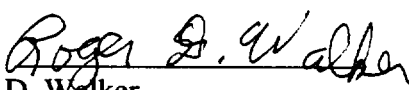
The Commitment number is used by TXU Generation Company LP for the internal tracking of CPSES commitments.

Sincerely,

TXU Generation Company LP

By: TXU Generation Management Company LLC,  
Its General Partner

C. L. Terry  
Senior Vice President and Principal Nuclear Officer

By:   
Roger D. Walker  
Regulatory Affairs Manager

GLM/gm  
Enclosures

c - E. W. Merschoff, Region IV  
W. D. Johnson, Region IV  
D. H. Jaffe, NRR  
Resident Inspectors, CPSES

<b>NRC FORM 366</b> (7-2001)				<b>U.S. NUCLEAR REGULATORY COMMISSION</b>				<b>APPROVED BY OMB NO. 3150-0104</b> <b>EXPIRES 07/31/2004</b> 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.			
<b>LICENSEE EVENT REPORT (LER)</b>											
Facility Name (1) <b>COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2</b>								Docket Number (2) <b>05000446</b>		Page (3) <b>1 OF 5</b>	
Title (4) <b>REACTOR TRIP DUE TO PRIMARY WATER PUMP VIBRATION HIGH SIGNAL</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
06	06	02	02	001	00	08	05	02			05000
Operating Mode (9)		This report is submitted pursuant to the requirements of 10 CFR : (Check all that apply) (11)									
1		20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(i)(C)		50.73(a)(2)(vii)			
Power Level (10)		20.2201(d)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(A)			
100		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)		X 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			
		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>Ben Mays, Smart Team 1 Systems Manager</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 EPIX	Cause	System	Component	Manufacturer	Reportable To EPIX		
				N							
Supplemental Report Expected (14)								EXPECTED SUBMISSION DATE (15)		Month	Day
YES (If YES, complete EXPECTED SUBMISSION DATE)				X NO							
<b>ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)</b>  <p>On June 6, 2002, Comanche Peak Steam Electric Station (CPSES) Unit 2 was in Mode 1, Power Operation, operating at 100 percent power. At 1924 hours, while Maintenance personnel were investigating a "Generator Electronic Protection Failure" alarm, a "Turbine Generator Channel 1 Primary Water Pump Vibration High" signal was received. This resulted in a Main Generator trip which caused a trip of the Unit 2 Main Turbine. The Unit 2 reactor automatically tripped on a "Turbine Trip &gt;50% Power" signal. All control rods fully inserted, and all Auxiliary Feedwater pumps automatically started on Lo-Lo Steam Generator level as expected.</p> <p>TXU Generation Company LP (TXU Energy) believes that the event was caused by a Primary Water Pump Vibration Expansion Measuring cabinet circuit breaker failing open which caused a spurious "Turbine Generator Channel 1 Primary Water Pump Vibration High" signal. Corrective actions include replacement of the failed breaker, failure analysis on the failed breaker, and evaluation of potential circuit design changes or modifications.</p> <p>All times in this report are approximate and Central Daylight Standard Time unless noted otherwise.</p>											

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

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

Any event or condition that resulted in manual or automatic actuation of the Reactor Protection System (RPS) including reactor trip or reactor scram.

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

On June 6, 2002, CPSES Unit 2 was in Mode 1, Power Operation, at 100 percent power.

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

There were no structures, systems, or components that were inoperable at the start of the event that contributed to the event.

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

On June 6, 2002, CPSES Unit 2 was in Mode 1, Power Operation, operating at 100 percent power. At 1858 hours, Operators (utility, licensed) in the Unit 2 Control Room received a "Generator Electronic Protection Failure Alarm." Maintenance personnel (utility, non-licensed) investigated and found faults indicated in Electronic Generator Protection cabinet 2-JC52 (EIS: (CAB)), which contains the Channel 1 Primary Water Pump (EIS:(P)) 2-01 Shaft Vibration Detector (EIS:(DET)). The Primary Water Pump Shaft Vibration trip uses a 2 out of 2 channel logic with a trip setpoint of 6.3 volts. Voltage readings were taken on both vibration detector channels (EIS:(CHA)), and the voltages measured on both channels were normal (3.6 volts and 3.5 volts), indicating that there was not an actual problem with pump vibration.

At 1910 hours, the Maintenance personnel returned to cabinet 2-JC52 and found that the conditions had changed. Channel 1 at that time was showing additional alarms and the voltage measured was zero. Maintenance and Operations personnel were evaluating the next course of action when, at 1924 hours, a "Turbine Generator Channel 1 Primary Water Pump Vibration High" signal was received. This resulted in a Unit 2 Turbine Generator (EIS:(TG)) trip which caused a trip of the Unit 2 Main Turbine (EIS:(TRB)). The Unit 2 reactor (EIS:(RCT)) automatically tripped on a "Turbine Trip >50% Power" signal. All control rods (EIS: (AA)) fully inserted, and all Auxiliary Feedwater (EIS:(BA)) pumps started automatically on Steam Generator (EIS:(SG)) Lo-Lo level.

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

Operators (utility, licensed) in the Unit 2 Control Room received a "Turbine Trip >50% Power" alarm.

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

A circuit breaker (EIS:(BKR)) in Vibration Expansion Measuring cabinet 2-JM03 (EIS:(CAB)) failed open during this event. The failure mode, mechanism, and effects of the circuit breaker failure have not yet been determined. The breaker failure is being analyzed at a testing laboratory.

**B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE**

The cause of the circuit breaker failure has not yet been determined. The cause of the breaker failure is being determined through failure analysis techniques at a testing laboratory.

**C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS**

Not applicable – No failures of components with multiple functions have been identified.

**D. FAILED COMPONENT INFORMATION**

Siemens Power Group  
Model Number 340/032  
Circuit Breaker

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**III. ANALYSIS OF THE EVENT****A. SAFETY SYSTEM RESPONSES THAT OCCURRED**

The Reactor Protection System and The Auxiliary Feedwater System actuated during the event. The Unit 2 reactor automatically tripped on a "Turbine Trip >50% Power" signal, and all three Auxiliary Feedwater pumps automatically started on "Steam Generator Lo-Lo water level" signals.

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

Not applicable - no safety system train was deemed inoperable.

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

This event is specifically bounded by the Final Safety Analysis Report (FSAR) accident analysis of the turbine trip presented in Section 15.2.3 of the CPSES FSAR. The analysis uses conservative assumptions to demonstrate the capability of pressure relieving devices and to demonstrate core protection margins. The event of June 6, 2002, occurred at 100 percent reactor power, and all systems and components functioned as designed. There were no safety system functional failures associated with this event.

Based on the above, it is concluded that the event of June 6, 2002, did not adversely affect the safe operation of CPSES Unit 2 or the health and safety of the public.

**IV. CAUSE OF THE EVENT**

TXU Energy believes that a circuit breaker (EIS:(BKR)) in Vibration Expansion Measuring cabinet 2-JM03 (EIS: (CAB)) failed open which caused a spurious "Turbine Generator Channel 1 Primary Water Pump Vibration High" signal. Post trip troubleshooting using a replacement breaker revealed that when the channel 1 vibration detector circuit breaker is opened a voltage spike enters the channel 2 circuit, and this voltage spike on Channel 2 satisfies the "2 of 2" logic trip on the Primary Water Vibration Detector circuit.

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**V. CORRECTIVE ACTIONS**

The failed breaker has been replaced. The cause of the breaker failure is being determined through failure analysis techniques at a testing laboratory. Maintenance personnel received instruction related to blocking the Primary Water Pump vibration detector trip prior to working on the circuit, and Operations personnel were provided information on the trip via a lessons learned.

Engineering will evaluate other turbine/generator protection cabinets to determine if similar circuit designs exist. Digital upgrades planned for this equipment eliminate this circuitry thereby minimizing the probability of a single component failure generating a Turbine Generator trip signal. The Turbine Generator vendor (Siemens) has provided potential equipment modifications which could be implemented prior to the digital upgrade.

**VI. PREVIOUS SIMILAR EVENTS**

There have been other previous events which resulted in a turbine trip followed by an automatic reactor trip. However, the causes of those events were sufficiently different such that the corrective actions taken for the previous events would not have prevented this event.