

TU ELECTRIC

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October 9, 1992

William J. Cahill, Jr.  
Group Vice President

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)  
DOCKET NO. 50-445  
CONDITION PROHIBITED BY TECHNICAL SPECIFICATIONS  
LICENSEE EVENT REPORT S2-021-00

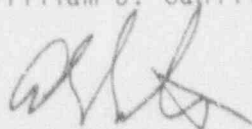
Gentlemen:

Enclosed is Licensee Event Report (LER) 92-021-00 for Comanche Peak Steam Electric Station Unit 1, "Main Turbine Trip Device Inoperable Longer Than Allowed by Technical Specifications Due to a Loose Wire".

Sincerely,

William J. Cahill, Jr.

By:

  
A. B. Scott, Jr.  
Vice President Nuclear  
Operations

JET/tg

c - Mr. J. L. Milhoan, Region IV  
Resident Inspectors, CPSES (2)

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NRC FORM 366		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92	
<b>LICENSEE EVENT REPORT (LER)</b>				ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.	
Facility Name (1) <b>COMANCHE PEAK-UNIT 1</b>				Docket Number (2) <b>05000445</b>	Page (3) <b>1</b> of <b>107</b>
Title (4) <b>MAIN TURBINE TRIP DEVICE INOPERABLE LONGER THAN ALLOWED BY TECHNICAL SPECIFICATIONS DUE TO A LOOSE WIRE</b>					
Event Date (5)		LER Number (6)		Report Date (7)	
Month	Day	Year	Year	Sequential Number	Revision Number
05	16	92	92	021	00
				Month Day Year	
				101292	
				N/A	
				N/A	
Operating Mode (9) 1		This report is submitted pursuant to the requirements of 10 CFR § (Check one or more of the following) (11)			
Power Level (10) 100		20.402(b)		20.405(c)	
		20.405(a)(1)(i)		50.36(c)(1)	
		20.405(a)(1)(ii)		50.36(c)(2)	
		20.405(a)(1)(iii)		<input checked="" type="checkbox"/> 50.73(a)(2)(i)	
		20.405(a)(1)(iv)		50.73(a)(2)(ii)	
		20.405(a)(1)(v)		50.73(a)(2)(iii)	
				50.73(a)(2)(iv)	
				50.73(a)(2)(v)	
				50.73(a)(2)(vi)	
				50.73(a)(2)(vii)	
				50.73(a)(2)(viii)	
				50.73(a)(2)(ix)	
				73.71(b)	
				73.71(c)	
				Other (Specify in Abstract below and in Text NRC Form 366A)	
Licensee Contact For This LER (12)					
Name <b>D. E. BUSCHBAUM, COMPLIANCE SUPERVISOR</b>				Area Code Telephone Number <b>817897-5851</b>	
Complete One Line For Each Component Failure Described in This Report (13)					
Cause	System	Component	Manufacturer	Reportable To NPRDS	
Supplemental Report Expected (14)					Expected Submission Date (15)
<input type="checkbox"/> Yes (If yes, complete Expected Submission Date)					
<input checked="" type="checkbox"/> No					
Abstract (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)					
<p>During a biweekly turbine overspeed surveillance test, faults annunciated on the Automatic Turbine Tester (ATT). The problem was believed to be with the ATT; therefore, the surveillance was performed using the manual test method and the surveillance was performed satisfactorily. During the first available outage, troubleshooting determined that the problem was a loose wire in a turbine generator control cabinet. When the wire was tightened to the terminal the circuit operated properly.</p> <p>The System Engineer, while performing a post-work review of the event, determined that the loose wire supplied trip voltage to the train A turbine trip vacuum switch. It was determined that the train A P-4 interlock actuation relay that trips the turbine on a reactor trip and the train A P-14 interlock actuation relay that trips the turbine on high steam generator level were disabled during this condition. It was evident that the turbine trip portion of the P-4 and P-14 interlocks were inoperable greater than their allowed outage times and that the condition was a violation of the Technical Specifications. The root cause was the loose wire and the corrective action is additional preventive maintenance to check the turbine generator control cabinet terminals for tightness.</p>					

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Text (If more space is required, use additional NRC Form 305A's) (17)

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

Any operation or condition prohibited by the plant's Technical Specifications.

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

On May 16, 1992, Comanche Peak Steam Electric Station (CPSES) Unit 1 was in Mode 1, Power Operation, with reactor power at 100 percent.

**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 inoperable structures, systems or components that contributed to the event.

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

On May 16, 1992, a biweekly turbine overspeed surveillance test was being attempted from the Unit 1 Control Room utilizing the Automatic Turbine Tester (ATT)(EISS:(34)(JC)). While performing pretest checks, the electric overspeed protection circuits tested satisfactory, but the electric low vacuum trip device (EISS:(5)(JC)) did not respond and several faults annunciated at the ATT. The problem was believed to be with the ATT; therefore, the surveillance was performed using the manual test method and the surveillance was performed satisfactorily.

Troubleshooting determined that the probable cause was a vacuum switch (EISS:(PS)(JC)) which could not be tested or replaced until the turbine was shutdown. The repair was scheduled for the next plant shutdown. In the meantime, the surveillance was performed satisfactorily on May 30, 1992, in the manual mode with the same problems occurring with the ATT.

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On June 3, 1992, a plant trip allowed troubleshooting of the vacuum switch. On June 11, 1992, the vacuum switch was determined not to be the problem. The problem was isolated to a loose wire that was supposed to supply trip voltage. When the terminal was tightened the circuit operated properly. The rest of the terminals in the cabinet were checked for tightness and a second terminal was found loose and corrected. All other terminals in the turbine generator control cabinet (EIS:(CAB)(JC)) were then inspected and no other problems were found. The next surveillance performed with the ATT was successful.

On September 11, 1992, the System Engineer (utility, non-licensed), while reviewing the event, determined that the loose wire supplied trip voltage to the train A turbine trip vacuum switch. From this it was determined that the train A P-4 interlock actuation relay (EIS:(94)(JE)) that trips the turbine on a reactor trip and the train A P-14 interlock actuation relay (EIS:(94)(JE)) that trips the turbine on high steam generator level were disabled during this condition. These interlocks are described in the Engineered Safety Features (ESF) tables of the Technical Specifications. The P-4 interlock has an allowed outage time of 48 hours and the P-14 actuation relays have an allowed outage time of 12 hours. Since the inoperability of both these interlocks can be tied directly to the inoperability of the ATT, it is evident that the turbine trip portion of the P-4 and P-14 interlocks were inoperable greater than their allowed outage times and that the condition was a violation of the Technical Specifications.

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

The initial problem was discovered on May 16, 1992, during pretest checks of the ATT. There was no evidence at that time that suggested there was a problem with anything but the turbine test circuit. All manual tests of the turbine overspeed trip were satisfactory.

Weeks later, the problem was determined to be a loose wire at a terminal. Reconnecting the wire to the terminal corrected the condition.

On September 11, 1992, during a review of the event, the System Engineer determined that the loose wire had also disabled one train of the P-4 and P-14 interlock actuation relays that trip the turbine on a reactor trip and steam generator high level, respectively.

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

The turbine trip on reactor trip function of the train A P-4 interlock was disabled due to a loose wire in cabinet 1-JC71.

The turbine trip on high steam generator level function of the train A P-14 interlock was disabled due to the same loose wire in cabinet 1-JC71.

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

The cause of the wire becoming loose is unknown.

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

The loose wire also disabled the Automatic Turbine Tester so that the turbine overspeed tests were required to be performed manually.

**D. FAILED COMPONENT INFORMATION**

The loose wire in cabinet 1-JC71 was connected to a SAK series Weidmuller terminal block (EHS:(BLK)(JC)).

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

No safety systems responded, or were expected to respond, during this event.

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

The first evidence that the turbine trip function of the train A P-4 and P-14 interlocks were disabled was during the turbine overspeed surveillance test on May 16, 1992. The ATT was used successfully two weeks previously. The loose wire was discovered and reterminated on June 11, 1992.

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

The P-4 interlock is described in the Engineered Safety Features (ESF) tables of the Technical Specifications. The P-4 actuates on a reactor trip and provides the following functions:

- actuates turbine trip,
- closes main and bypass feedwater valves on Tavg below setpoint,
- prevents opening of main and bypass feedwater valves which were closed by safety injection or high steam generator water level,
- prevents reactivation of safety injection after a manual reset of safety injection, and
- blocks steam dump control via load rejection Tavg Controller.

During this event, only the train A turbine trip function of the P-4 interlock was disabled.

The P-14 interlock is described in the Engineered Safety Features (ESF) tables of the Technical Specifications. The P-14 actuates on a high steam generator level and provides the following functions:

- actuates turbine trip,
- trips all feedwater pumps,
- closes main and bypass feedwater control valves, and
- closes feedwater isolation valves in series with main and bypass feedwater control valves.

During this event, only the train A turbine trip function of the P-14 interlock was disabled.

There are two channels of the P-4 and P-14 interlocks that provide a turbine trip signal. When train A was disabled, the turbine trip function of P-4 and P-14 was still available from train B. The train B turbine trip was operable for a P-4 or P-14 generated signal during the entire time the train A turbine trip was inoperable. A turbine trip signal, if needed, would have still tripped the turbine; therefore, this event did not adversely affect the safe operation of CPSES Unit 1 or the health and safety of the public.

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**IV. CAUSE OF THE EVENT****ROOT CAUSE**

A loose wire in cabinet 1-JC71 caused the train A P-4 and P-14 turbine trip to be inoperable. The cause of the wire becoming loose is unknown.

**GENERIC CONSIDERATION**

Other wires in turbine generator control cabinets could become loose.

**V. CORRECTIVE ACTIONS****CORRECTIVE ACTIONS TO PREVENT RECURRENCE****ROOT CAUSE**

A loose wire in cabinet 1-JC71 caused the train A P-4 and P-14 turbine trip to be inoperable.

**CORRECTIVE ACTION**

The loose wire was located and tightened.

**GENERIC CONSIDERATION**

Other wires in turbine generator control cabinets could become loose.

**CORRECTIVE ACTION**

All terminals in the turbine generator control cabinet 1-JC71 were checked. One other wire was loose and was tightened.

The preventive maintenance item to inspect and clean the turbine generator control cabinets was revised to add a verification that terminal connections are snug tight.

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**VI. PREVIOUS SIMILAR EVENTS**

There have been no previous similar events.

**VII. ADDITIONAL INFORMATION**

The times listed in the report are approximate and Central Daylight Time.