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William J. Cahill, Jr.  
Executive Vice President

December 5, 1990

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION  
DOCKET NO. 50-445  
MANUAL OR AUTOMATIC ACTUATION OF ANY ENGINEERED SAFETY FEATURE  
LICENSEE EVENT REPORT 90-037-00

Gentlemen:

Enclosed is Licensee Event Report 90-037-00 for Comanche Peak Steam Electric Station Unit 1, "Blackout Sequencer Actuation Due to Personnel Error."

Sincerely,

William J. Cahill, Jr.

By:   
Roger D. Walker  
Manager of Nuclear Licensing

DEN/daj

Enclosure

c Mr. R. D. Martin, Region IV  
Resident Inspectors, CPSES (3)

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NRC FORM 966		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>015101010141415</b>			Page (3) <b>1 OF 018</b>		
Title (4) <b>BLACKOUT SEQUENCER ACTUATION DUE TO PERSONNEL ERROR</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 Names	Docket Numbers
11	05	90	90	0317	010	11	20	05	N/A	0151010101
This report is submitted pursuant to the requirements of 10 CFR § (Check one or more of the following) (11)										
Operating Mode (9)	20.402(b)		20.405(a)(1)(i)		20.405(a)(1)(ii)		20.405(a)(1)(iii)		20.405(a)(1)(iv)	
5	20.405(a)(1)(i)		50.36(c)(1)		50.36(c)(2)		50.73(a)(2)(i)		50.73(a)(2)(ii)	
Power Level (10)	20.405(a)(1)(ii)		50.73(a)(2)(i)		50.73(a)(2)(ii)		50.73(a)(2)(iii)		50.73(a)(2)(iv)	
01010	20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(ii)		50.73(a)(2)(iii)		50.73(a)(2)(v)	
	20.405(a)(1)(iv)		50.73(a)(2)(i)		50.73(a)(2)(ii)		50.73(a)(2)(iii)		50.73(a)(2)(v)	
	20.405(a)(1)(v)		50.73(a)(2)(i)		50.73(a)(2)(ii)		50.73(a)(2)(iii)		50.73(a)(2)(v)	
Licensee Contact For This LER (12)										
Name <b>T. A. HOPE</b>							Telephone Number <b>8117 81971-16131710</b>			
Area Code <b>8117</b>							Telephone Number <b>81971-16131710</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	
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>At approximately 0300 on November 5, 1990, Electrical Maintenance personnel were conducting a test of the nuclear safety related Train B 6.9 KV switchgear undervoltage (UV) relays. At 0443, while attempting to re-land a wire, the electrician inadvertently made contact with an energized point on the UV relay, resulting in a UV actuation. As a result of the UV actuation, the Reactor Operator (RO) observed the transfer of Train B 6.9 KV switchgear to the alternate power supply, and actuation of the Train B Blackout Sequencer (BOS). At 0454, the RO reset the BOS, and restored actuated components to their original configuration. At 0652 on November 5, 1990, with restoration complete, the RO restored the normal power supply to Train B 6.9 KV switchgear.</p> <p>The root cause was determined to be personnel error. A contributing factor was determined to be the UV relay test procedure not written to minimize the risk of human error. Corrective actions include a memo to Electrical Maintenance personnel addressing these concerns, and a procedure change.</p>										

NRC FORM 366A		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92	
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<small>Text (If more space is required, use additional NRC Form 366A's) (17)</small>					
<b>I. <u>DESCRIPTION OF THE REPORTABLE EVENT</u></b>					
<b>A. <u>REPORTABLE EVENT CLASSIFICATION</u></b>					
An event or condition that resulted in the manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS) (EIS:(JC)).					
<b>B. <u>PLANT OPERATING CONDITIONS BEFORE THE EVENT</u></b>					
At 0443 on November 5, 1990, Comanche Peak Steam Electric Station (CPSES) Unit 1 was in Mode 5, Cold Shutdown, for a planned outage. The Reactor Coolant System (RCS) (EIS:(AB)) was at a temperature of 125 degrees Fahrenheit and pressure of 111 pounds per square inch. Residual Heat Removal Pump -01 (RHRP-01) (EIS:(P)(BP)) was in service providing shutdown cooling to the RCS.					
<b>C. <u>STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT</u></b>					
There were no inoperable structures, systems, or components that contributed directly to the event.					
<b>D. <u>NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES</u></b>					
At approximately 0300 on November 5, 1990, Electrical Maintenance personnel (utility, nonlicensed) were conducting a test of the nuclear safety related Train B 6.9 Kilovolt (KV) switchgear (EIS:(SWGR)(EA)) undervoltage (UV) relays (EIS:(27)(EA)). An Operator (utility, licensed) was assisting the electricians. As required by procedure, wire "AQ1" was removed from point 2 on the UV relay, and taped.					

<p>NRC FORM 366A</p> <p style="text-align: center;"><b>LICENSEE EVENT REPORT (LER) TEXT CONTINUATION</b></p>	<p style="text-align: center;">U.S. NUCLEAR REGULATORY COMMISSION</p> <p style="text-align: right;">APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92</p> <p style="font-size: small;">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-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC. 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC. 20503.</p>																
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At 0443 on November 5, 1990, while attempting to re-land wire "AQ1" to point 2 on the UV relay, the electrician inadvertently made contact with point 3 of the UV relay, which was energized. As a result, a UV actuation occurred. The electrician working on the UV relay immediately secured wire "AQ1" from touching anything and stopped further testing. The Operator assisting the electricians immediately notified the Control Room of the event.

At 0443 on November 5, 1990, as a result of the UV actuation, the Reactor Operator (RO) (utility, licensed) observed the transfer of Train B 6.9 KV switchgear to the alternate power supply, and actuation of the Train B Blackout Switcher (BOS)(EHS:(34)(EA)). At 0454 on November 5, 1990, the RO reset the BOS, and restored actuated components to their original configuration. At 0652 on November 5, 1990 with restoration complete, the RO restored the normal power supply to Train B 6.9 KV switchgear.

An event or condition that results in a manual or automatic actuation of any ESF, including the RPS, is reportable within 4 hours under 10CFR50.72(b)(2)(ii). At 0603 on November 5, 1990, the Nuclear Regulatory Operations Center was notified of the event via the Emergency Notification System.

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

At 0443 on November 5, 1990, the Operator assisting the electricians performing the UV relay test, notified the Control Room that an inadvertent UV actuation may have occurred. The RO in the Control Room confirmed that a UV actuation had occurred. The RO observed the transfer of Train B 6.9 KV switchgear to the alternate power supply, and actuation of the Train B BOS and related components.

At 0454 on November 5, 1990, the RO reset the BOS, and began restoring actuated components to their original configuration. At 0652 on November 5, 1990, with restoration complete, the RO restored the normal power supply to Train B 6.9 KV switchgear.

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Text (if more space is required, use additional NRC Form 366A's) (17)

**II. COMPONENT OR SYSTEM FAILURES**

**A. FAILURE MODE, MECHANISM AND EFFECT OF EACH FAILED COMPONENT**

Not applicable - there were no component failures associated with this event.

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

Not applicable - there were no component failures associated with this event.

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

Not applicable - there were no failures of components with multiple functions associated with this event.

**D. FAILED COMPONENT INFORMATION**

Not applicable - there were no component failures associated with this event.

**III. ANALYSIS OF THE EVENT**

**A. SAFETY SYSTEM RESPONSES THAT OCCURRED**

The following safety systems actuated automatically as a result of the event. The appropriate components within these systems operated as designed, upon receipt of the start signal from the Train B BOS.

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- Chemical and Volume Control (EIS:(CB))
- Component Cooling Water (EIS:(CC))
- Station Service Water (EIS:(BI))
- Control Room Heating, Venting and Air Conditioning (EIS:(VI))
- Safety Chilled Water (EIS:(KM))
- Containment Ventilation Isolation (EIS:(BK))

Due to plant configuration and procedural prerequisites, no safety injection or actual flow to the reactor core occurred.

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

Not applicable - there were no safety systems which were rendered inoperable due to a failure.

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

Operability of the Engineered Safety Features Actuation System (ESF) (EIS:(JE)) is required to provide the overall reliability, redundancy, and diversity assumed available in the facility design, for the protection and mitigation of accident and transient conditions. The surveillance requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards.

As a prerequisite to the UV test being performed, CPSES Unit 1 was required to be in Mode 5 with the RCS loops filled, or in Mode 6, Refueling, with at least 23 feet of water over the reactor vessel flange (EIS:(RPV)(AB)), or the core off loaded. During this event the Train A Residual Heat Removal (RHR) (EIS:(BP)) System was in service providing cooling to the RCS. The Train B RHR System remained operable during the event.

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As a prerequisite to the UV test being performed, Train A 6.9 KV switchgear, the train not being tested, and its associated Diesel Generator (EIS:(DG)(EK)) were operable, satisfying Technical Specification 3.8.1.2. Furthermore, the Train B 6.9 KV and 480 volt switchgear were required to be energized and in a normal configuration. The alternate power supply to Train B 6.9 KV switchgear was available during this event.

Based on the above discussion, the event did not adversely affect the safe operation of CPSES Unit 1, or the health and safety of the public.

**IV. CAUSE OF THE EVENT**

**A. ROOT CAUSE**

The root cause of this incident was the failure of a person to perform a physical action without error. Landing a lead to a specific point on a relay without touching anything around it requires caution, concentration, and manual dexterity. In this case, the individual landing the lead to the relay did not avoid touching the lead to another contact approximately one inch away. When the lead touched the other contact it initiated an automatic transfer of the Train B 6.9 KV switchgear to the alternate power supply and actuated the Train B BOS.

**B. CONTRIBUTING FACTOR**

The UV relay test procedure could have been accomplished in a less confined area of the cabinet. There would have been less risk performing this test if the wire to be isolated was lifted at the terminal block instead of at the relay. Wire "AQ1" is the only wire landed at point 14 on terminal block "RC". Terminal block "RC" is more accessible to all individuals because it is located in the center of the right side of the cabinet. The terminal block also has barriers between the terminals that aid in preventing a stray wire from inadvertently touching another terminal. The procedure did not adequately take into account these human factors when directing personnel to lift and land wire "AQ1" at the relay instead of at the terminal block.

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**V. CORRECTIVE ACTIONS**

**A. IMMEDIATE**

The RO responded appropriately to the BOS actuation. The RO reset the BOS and then restored the actuated components to their original condition.

**B. CORRECTIVE ACTIONS TAKEN TO PREVENT RECURRENCE**

**ROOT CAUSE**

The root cause of this event was personnel error.

**CORRECTIVE ACTION**

Although the UV relay test had been successfully previously performed, the possibility of statistical human error still existed. A memo describing this event will be distributed to Electrical Maintenance personnel. To further prevent recurrence, the corrective action to the contributing factor will eliminate the action personnel were performing that caused the event.

**CONTRIBUTING FACTOR**

The UV relay test procedure could have been written to minimize risk.

**CORRECTIVE ACTION**

The UV relay test procedure will be revised, directing personnel to lift and land the wires required to isolate the subject relays at the terminal blocks instead of at the relays.



NRC FORM 360A  <b>LICENSEE EVENT REPORT (LER) TEXT CONTINUATION</b>	U.S. NUCLEAR REGULATORY COMMISSION  APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92  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. 20585, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC. 20503.																
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**C. CORRECTIVE ACTION TAKEN ON GENERIC CONCERNS IDENTIFIED AS A DIRECT RESULT OF THE EVENT**

**GENERIC CONSIDERATION**

The possibility exists for this event to occur in other systems in which lifting and landing leads near energized contacts/terminals is required to perform a test or to isolate a component for other purposes.

**CORRECTIVE ACTION**

A review of all surveillance procedures will be conducted to identify steps requiring the lifting and landing of leads to perform a test or replace a component or circuit vital to the control logic of a safety related system. For those cases where the wire is lifted/landed at a component with exposed contacts, and the other end of the wire is the only lead terminated at a point on a terminal block, and the terminal block is more accessible than the component, the procedure will be revised to lift/land the lead at the terminal block. This action will serve as a preventive measure to reduce the probability of inadvertently touching a lifted lead to an exposed contact.

**VI. PREVIOUS SIMILAR EVENTS**

Although there have been several previous events, due to personnel error, the root causes of those events were unrelated to the root cause of this event. The corrective actions taken to resolve the root causes of the previous events would not have prevented this event. Therefore, no previous similar events have been reported pursuant to 10CFR50.73.

**VII. ADDITIONAL INFORMATION**

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