



TU ELECTRIC

Log # TXX-91009
File # 10200
910.4
Ref. # 50.73(a)(2)(iv)

February 3, 1991

W. J. Cahill
Executive Vice President

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 91-001-00

Gentlemen:

Enclosed is Licensee Event Report 91-001-00 for Comanche Peak Steam Electric Station Unit 1, "Inadvertent Actuation of Control Room Air Conditioning Engineered Safety Feature Caused by Sensitivity of Radiation Monitoring Device to Overcurrent Conditions."

Sincerely,

William J. Cahill, Jr.

JAA/daj

Enclosure

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

NRC FORM 386 U.S. NUCLEAR REGULATORY COMMISSION <h2 style="text-align: center;">LICENSEE EVENT REPORT (LER)</h2>	APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 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.
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Facility Name (1) COMANCHE PEAK - UNIT 1	Docket Number (2) 0151010101415	Page (3) 1 of 1016
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Title (4) **INADVERTENT ACTUATION OF CONTROL ROOM AIR CONDITIONING ENGINEERED SAFETY FEATURE CAUSED BY SENSITIVITY OF RADIATION MONITORING DEVICE TO OVERCURRENT CONDITIONS**

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
01	03	91	91	001	0	02	04	91	N/A 015101010111

Operating Mode (9) **1**

This report is submitted pursuant to the requirements of 10 CFR 50. (Check one or more of the following) (11)

20.402(b) 20.405(a)(1)(i) 20.405(a)(1)(ii) 20.405(a)(1)(iii) 20.405(a)(1)(iv) 20.405(a)(1)(v)	20.405(c) 50.36(e)(1) 50.36(e)(2) 50.73(a)(2)(i) 50.73(a)(2)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv) 50.73(a)(2)(v) 50.73(a)(2)(vi) 50.73(a)(2)(vii)(A) 50.73(a)(2)(vii)(B) 50.73(a)(2)(ix)	73.71(b) 73.71(c) Other (Specify in Abstract below and in Text, NRC Form 966A)
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Licensee Contact For This LER (12)

Name T.A. HOPE SUPERVISOR, COMPLIANCE	Telephone Number Area Code 81117 819171-16131710
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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
X	ILL	IIIL	XI91919	N					

Supplemental Report Expected (14)

Yes (If yes, complete Expected Submission Date) No

Expected Submission Date (15)	Month	Day	Year

Abstract (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On January 3, 1991, at approximately 2348 CST, an Auxiliary Operator was attempting to change a burned-out bulb on the local microprocessor associated with one of the radiation monitors in the Control Room air conditioning air intake. When the bulb was unscrewed, a short piece of the bulb's loop filament fell across the two terminal posts inside the bulb. The momentary current surge exceeded the capacity of the power supply output fuse, resulting in a loss of power to the monitor. The Control Room air conditioning system automatically realigned to the emergency recirculation mode. The cause of the event was determined to be equipment sensitivity to overcurrent conditions. Corrective actions included training and administrative controls over bulb replacement in monitors with automatic ESF functions.

NRC FORM 300A		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92	
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION				ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 800 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.	
Facility Name (1)		Docket Number (2)		LER Number (3)	
COMANCHE PEAK - UNIT 1		015101010141415		911 - 01011 - 010	
				012 OF 016	
<small>Text (if more space is required, use additional NRC Form 300A's) (17)</small>					
I. DESCRIPTION OF THE REPORTABLE EVENT					
A. REPORTABLE EVENT CLASSIFICATION					
An event or condition that resulted in an automatic actuation of any Engineered Safety Feature (ESF).					
B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT					
On January 3, 1991, at approximately 2348 CST, Comanche Peak Steam Electric Station (CPSES) Unit 1 was in Mode 1, Power Operations, with reactor power at approximately 96 percent.					
C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT					
The status light (EIS:(IL)(IL)) was burned out on the locally mounted RM-80 microprocessor (EIS:(DCC)(IL)) for the radiation monitor (EIS:(MON)(IL)) in the Control Room air intake duct (EIS:(DUCT)(VI)).					
D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES					
On January 3, 1991, just prior to the event, an Auxiliary Operator (utility, non-licensed) was performing normal rounds in the Control Room Heating, Ventilation, and Air Conditioning (HVAC) equipment area. The Auxiliary Operator observed a de-energized light bulb on the local microprocessor associated with one of the radiation monitors in the Control Room air intake duct. The light indicates the monitor is in a normal operating condition. The Auxiliary Operator suspected that the bulb had burned out. At approximately 2348 CST the Auxiliary Operator unscrewed the burned-out bulb, whereupon the bulb flashed, the monitor deenergized, and the Control Room HVAC system automatically realigned to the emergency recirculation mode.					

NRC FORM 895A LICENSEE EVENT REPORT (LER) TEXT CONTINUATION	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, 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC, 20503.
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LER Number (6)	
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Revision Number 010	Page (3) 013 OF 016

Text (If more space is required, use additional NRC Form 895A's) (17)

Control Room personnel responded in accordance with the applicable abnormal operating procedure, placing the unit in a configuration allowed by the associated Technical Specifications. On January 4 at approximately 0217 CST, the Nuclear Regulatory Commission was notified of the event via the Emergency Notification System line in accordance with 10CFR50.72.

A work request was initiated to troubleshoot the cause of loss of power to the monitor. Initial investigation revealed that the power supply output fuse (EHS:(FU)(IL)) had blown during bulb removal resulting in loss of power to the monitor. The normally energized high alarm relay (EHS:(74)(IL)) inside the microprocessor deenergized causing an input to the Control Room HVAC control logic and realignment of the system to the emergency recirculation mode. The realignment is a design feature of the system and the expected result of a loss of power to the monitor.

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

The Control Room HVAC system realignment was annunciated by several alarms in the Control Room. The blown power supply output fuse was discovered during troubleshooting shortly after the event. The cause of the blown power supply output fuse was determined during engineering evaluation several days later.

II. COMPONENT OR SYSTEM FAILURES

A. FAILED COMPONENT INFORMATION

Component description: Lamp, screw base, 125V
 Manufacturer: Dialco
 Manufacturer's part number: 656/7

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

The capacity of the radiation monitor power supply output fuse was exceeded, causing the fuse to blow and deenergize the monitor.

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C. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

The status light for the radiation monitor contains a single loop filament connected to two terminal posts and supported by several thin wire stalks. As the burned-out light bulb was being unscrewed from its socket, a section of the filament fell across the two terminal posts. The decreased filament length resulted in a reduced electrical resistance and a momentary increase in current which exceeded the capacity of the power supply output fuse.

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

There were no other systems or secondary functions affected by the event.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

Upon de-energization of the affected radiation monitor the Control Room HVAC system automatically realigned to the emergency recirculation mode; all associated dampers (EHS:(DMP)(VI)) and fans (EHS:(FAN)(VI)) responded as designed.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

There were no safety systems rendered inoperable as a result of this event.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The engineered safety feature associated with the Control Room HVAC system is the ability of the system to automatically realign into the emergency recirculation mode in response to a loss of offsite power, a safety injection, or a high radiation condition at any one of four radiation monitors located in the Control Room air intake ducts. Loss of power to any one of the four radiation monitors in the Control Room air intake also results in automatic realignment of the system into the emergency recirculation mode. This design feature is intended to preclude unidentified loss of ESF function in the event of a loss of power to the monitor, and is not considered an Engineered Safety Feature actuation signal, but rather the effect of a component failure.

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During the system realignment occurring on January 3, all equipment functioned as designed - the operating makeup air supply fan shut down, the Control Room exhaust fan and the kitchen and toilet exhaust fans shut down, the emergency pressurization units started, the emergency filtration units started, and all associated dampers positioned as required. The successful realignment demonstrated that the system would have performed its intended function if the actuation had been in response to one of the accident conditions for which it was designed. It is concluded that 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

The root cause of the event was determined to be equipment design which failed to anticipate the conditions encountered. The radiation monitor control power circuit has a relatively high sensitivity to overcurrent; however, no circuit design feature exists to prevent de-energization of the monitor as a result of a current surge of the type leading to this event.

V. CORRECTIVE ACTIONS

A. IMMEDIATE

Control Room personnel responded to the event in accordance with the abnormal operating procedure, placing the system in a configuration required to comply with the applicable Action requirement of CPSES Unit 1 Technical Specifications. A work request was initiated to identify and correct the source of the problem.

B. ACTIONS TAKEN PREVENT RECURRENCE

Root Cause: Equipment sensitivity to overcurrent

Corrective Action : Because of the low probability of recurrence of this event, no immediate design changes are currently planned. However, a Lessons Learned memo and a Shift Order were issued with interim precautions to be taken while changing light bulbs in radiation monitors with automatic ESF control functions. The interim precautions require that the system operating procedure for the digital

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		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:10%;">Year</th> <th style="width:10%;">Sequential Number</th> <th style="width:10%;">Revision Number</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>	Year	Sequential Number	Revision Number				
Year	Sequential Number	Revision Number							
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<p style="text-align: center;">radiation monitoring system be used to block the automatic ESF functions prior to changing bulbs. The appropriate procedures will be revised to assure adherence to this administrative control. The details of this event and the resultant lessons learned will be included in future operator training.</p> <p>VI. <u>PREVIOUS SIMILAR EVENTS</u></p> <p>LER 90-007-00 described an event in which the Control Room HVAC system automatically realigned to the emergency recirculation mode as a result of a loss of power to one of the radiation monitors in the Control Room air intake. However, the details of that event and the resultant corrective actions are sufficiently different from the details of this event to conclude that the previous corrective actions could not be expected to prevent the actuation described in this report.</p>									