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TUELECTRIC

July 10, 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
 MANUAL OR AUTOMATIC REACTOR PROTECTION
 SYSTEM ACTUATION
 LICENSEE EVENT REPORT 92-014-00

Gentlemen:

Enclosed is Licensee Event Report 92-014-00 for Comanche Peak Steam Electric Station Unit 1, "Manual Reactor Trip Following a Loss of Both Main Feedwater Pumps".

Sincerely,

William J. Cahill, Jr.

OB/tg
 Enclosure

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

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NRC FORM 306		U.S. NUCLEAR REGULATORY COMMISSION				APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92									
LICENSEE EVENT REPORT (LER)										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) COMANCHE PEAK-UNIT 1										DocId Number (2) 05000445			Page (3) 1 of 106		
Title (4) MANUAL REACTOR TRIP FOLLOWING A LOSS OF BOTH MAIN FEEDWATER PUMPS															
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		DocId Number				
06	11	92	92	014	00	07	10	92	N/A		050000				
Operating Mode (9)		This report is submitted pursuant to the requirements of 10 CFR 50. (Check one or more of the following) (11)													
1		20.402(b)			20.405(c)			<input checked="" type="checkbox"/> 50.73(a)(2)(iv)			73.71(b)				
Power Level (10)		20.405(a)(1)(F)			50.36(c)(1)			50.73(a)(2)(v)			73.71(c)				
100		20.405(a)(1)(H)			50.36(c)(2)			50.73(a)(2)(vi)			Other (Specify in Abstract below and in Text NRC Form 306A)				
		20.405(a)(1)(R)			50.73(a)(2)(i)			50.73(a)(2)(viii)(A)							
		20.405(a)(1)(W)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)							
		20.405(a)(1)(V)			50.73(a)(2)(iii)			50.73(a)(2)(x)							
Licensee Contact For This LER (12)															
Name D. E. BUSCHBAUM, COMPLIANCE SUPERVISOR								Area Code		Telephone Number					
								817		897-5851					
Complete One Line For Each Component Failure Described in This Report (13)															
Cause	System	Component	Manufacturer	Reportable To NRRDS		Cause	System	Component	Manufacturer	Reportable To NRRDS					
X	J/E	X/C	W120	Y		X	J/E	X/C	W120	Y					
X	J/E	X/C	W120	Y		B	J/E	94	W120	Y					
Supplemental Report Expected (14)										Expected Submission Date (15)		Month	Day	Year	
<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 0528, on June 11, 1992, a loss of main feedwater resulted in a manual reactor trip due to rapidly lowering steam generator levels. Initially, the cause of the trip was unknown; however, troubleshooting determined that train A Solid State Protection System (SSPS) had produced a spurious signal which simulated a 2 out of 3 low pressure signal for Steam Generator 4. This resulted in a trip of both main feedwater pumps, closure of all feed regulating valves, and closure of the feedwater isolation valve for Steam Generator 4. Troubleshooting did not reveal the source of the problem. After discussions with the SSPS vendor it was concluded that the root cause could not be positively determined because the actuation was caused by an intermittent problem. It was determined, however, that the spurious signal could only have come from one of three possible circuit cards. These three cards were replaced. In addition, a detailed inspection of the termi-points on the circuit cards and a test switch associated with the cards eliminated the possibility that a short to ground had caused the actuation. The three circuit cards were sent to the vendor, and no discrepancies with cards were found. After the cards were replaced, no further spurious signals have been received.</p>															

NRC FORM 096A LICENSEE EVENT REPORT (LER) TEXT CONTINUATION		U.S. NUCLEAR REGULATORY COMMISSION APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92 ESTIMATE BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 80.0 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) COMANCHE PEAK-UNIT 1	Docket Number (2) 051000445	LER Number (6) Year: 92 Sequential Number: 014 Revision Number: 00	Page (3) 02 OF 06

Text (if more space is required, use additional NRC Form 306-A's) (17)

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

An event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF) including the Reactor Protection System.

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

On June 11, 1992, just prior to the event, 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

At 0528, on June 11, 1992, a loss of main feedwater resulted in a manual reactor trip. Initially, the cause of the trip was unknown; however, troubleshooting determined that train A Solid State Protection System (SSPS) (EIS:(JE)) had produced a spurious signal which simulated a 2 out of 3 low pressure signal for Steam Generator (SG) 4 (EIS:(SG)(SB)). This resulted in a trip of all main feedwater pumps (MFPs) (EIS:(P)(SJ)), closure of all feed regulating valves (FRVs) (EIS:(FCV)(SJ)), and closure of the feedwater isolation valve (FWIV) (EIS:(ISV)(SJ)) for SG 4. The Reactor Operator (RC) (licensed, utility) manually tripped the reactor 32 seconds later due to rapidly decreasing SG levels. The LO-LC Level set point was reached in all four SGs which resulted in an Auxiliary Feedwater System (AFW) (EIS:(BA)) actuation.

An actual low pressure condition in SG 4 did not exist. It was concluded therefore, that the SSPS actuation was caused by equipment malfunction. Further troubleshooting narrowed the probable cause of the malfunction to logic card A304 (EIS:(XC)(JE)). This could not be verified, however, since testing did not reveal any discrepancies within SSPS. The problem was discussed with the SSPS vendor and it was concluded that the root cause could not be positively determined because the actuation was caused by an intermittent problem. It was determined, however, that

<p style="font-size: small;">NRC FORM 966A</p> <p style="text-align: center;">LICENSEE EVENT REPORT (LER) TEXT CONTINUATION</p>	<p style="font-size: x-small; text-align: center;">U.S. NUCLEAR REGULATORY COMMISSION</p> <p style="font-size: x-small; text-align: right;">APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92</p> <p style="font-size: x-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-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.</p>		
Facility Name (1)	Docket Number (2)	LER Number (6)	Page (3)
COMANCHE PEAK-UNIT 1	0 5 0 0 0 4 4 5	9 2 - 0 1 4 - 0 0 0 3	0 3 OF 0 6

Text (if more space is required, use additional NRC Form 966A's) (17)

the spurious signal could only have come from one of three different circuit cards. These three cards were replaced. In addition, a detailed inspection of the terminals on the circuit cards and a test switch associated with the cards eliminated the possibility that a short to ground had caused the actuation. A SG LO-LO Level input relay (EIS:(RLY94)(JE)) failed to reset when SG level was restored. The relay was replaced. This relay did not contribute to the actuation of the slave relays that initiated the event.

Control Room personnel (utility, licensed) responded in accordance with emergency operating procedures, and the plant was stabilized in Mode 3, Hot Standby. At 0855, the NRC was notified of the event via the Emergency Notification System in accordance with 10CFR50.72.

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

Control board (EIS:(MCBD)(JE)) indicators and alarms alerted the RO that there was a loss of feedwater. The RO acknowledged the loss of feed indications and manually tripped the reactor.

ii. COMPONENT OR SYSTEM FAILURES

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

The failure within SSPS was narrowed to three possible logic cards. This was determined through troubleshooting which included determining the source of the signal based on which relay had been actuated. This isolated the source of the problem to the three logic cards that were replaced. It was determined that these logic cards were the only ones possible to actuate that combination of relays.

B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

The cause of the actuation or nature of the failure is unknown. Testing the three replaced logic cards by TU Electric and the SSPS vendor did not reveal any discrepancies. The failure is believed to have been intermittent and has not been duplicated in testing.

NRC FORM 366A		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: 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)		Docket Number (2)		LER Number (6)		Page (7)	
COMANCHE PEAK-UNIT 1		05000445		92	-	014	-	00	04	OF	06
Text (If more space is required, use additional NRC Form 366A's) (17)											

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

The failure in SSPS tripped both MFPs, closed all FRVs, and closed the FWIV for SG 4. This, in turn, forced a manual reactor trip due to rapidly lowering SG levels.

During troubleshooting a failed input relay was discovered in train A SSPS. The failed relay did not contribute to the actuation of the slave relays that initiated the event.

D. FAILED COMPONENT INFORMATION

Westinghouse
Solid State Protection System
Universal Logic Circuit Cards A304 and A415
Safeguards Driver Circuit Card A511
These components could not be verified as the root cause of the actuation.

Westinghouse
Part Number GP1R61D2000
1/4 SG LO-I O Level input relay

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

As a result of the SSPS signal both MFPs tripped, all FRVs closed, and the FWIV for SG 4 closed. As a result of low SG water levels, AFW automatically initiated.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

Train A SSPS was declared inoperable several times for approximately 6 hours total between June 11 and June 12, 1992, for troubleshooting on SSPS to determine the cause of the actuation.

U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER) TEXT CONTINUATION		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.							
Facility Name (1) COMANCHE PEAK-UNIT 1	Docket Number (2) 05000445	LER Number (6) <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 style="text-align: center;">92</td> <td style="text-align: center;">- 014</td> <td style="text-align: center;">- 00</td> </tr> </table>	Year	Sequential Number	Revision Number	92	- 014	- 00	Page (3) 05 of 06
Year	Sequential Number	Revision Number							
92	- 014	- 00							

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

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The function of SSPS is to automatically provide a reactor trip or safeguards equipment actuation to prevent a breach of fission product boundaries. In this event, train A SSPS produced a spurious signal which simulated a 2 out of 3 low pressure signal for SG 4. An actual low pressure condition in SG 4 did not exist, but the signal did cause an automatic feedwater isolation. This event is completely bounded by the accident analysis within Chapter 15.2.7 of the Final Safety Analysis Report for a Loss of Normal Feedwater. A reactor trip on low SG water level in any SG and the initiation of AFW provides the necessary heat removal capability. The RO manually tripped the reactor before the automatic trip for LO-LO SG Level was reached and AFW flow initiated as required. The event was an unnecessary actuation of a safety system and it is concluded from troubleshooting that SSPS would still have performed its intended safety functions. This 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

ROOT CAUSES

The cause to the reactor trip was a spurious actuation within train A SSPS. The actuation tripped both MFPs. The RO responded by manually tripping the reactor.

V. CORRECTIVE ACTIONS

Troubleshooting and consultation with the SSPS vendor concluded that one of the three circuit cards identified above was the probable cause of the actuation. As a result, all three circuit cards were replaced. In addition, a detailed inspection of the termi-points on the circuit cards and a test switch associated with the cards eliminated the possibility that a short-to-ground caused the actuation.

The replaced circuit cards were sent to the SSPS vendor for further testing. No discrepancies were found with any of the cards.

<p>NRC FORM 366A</p> <p style="text-align: center;">LICENSEE EVENT REPORT (LER) TEXT CONTINUATION</p>	<p>U.S. NUCLEAR REGULATORY COMMISSION</p>	<p>APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92</p> <p>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.</p>															
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LER Number (6)			Page (3)														
Year	Sequential Number	Revision Number															
92	014	00	06	of 06													

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

VI. PREVIOUS SIMILAR EVENTS

There have been no previous similar events at CPSES.

VII. ADDITIONAL INFORMATION

All times listed in this report are approximate and in Central Daylight Time (CDT).