


TU ELECTRIC

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June 27, 1991

William J. Cahill, Jr.
Executive Vice President

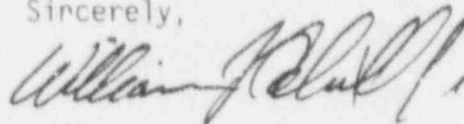
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NO. 50-445
CONDITION PROHIBITED BY THE PLANT'S TECHNICAL SPECIFICATIONS
LICENSEE EVENT REPORT 91-018-00

Gentlemen:

Enclosed is Licensee Event Report 91-018-00 for Comanche Peak Steam Electric Station Unit 1, "Technical Specification Violations Due to a Safety Chiller Being Inoperable Greater than the Allowed Outage Time of the Supported Systems."

Sincerely,


William J. Cahill, Jr.

JAA/bm

c - Mr. R. D. Martin, Region IV
Resident Inspectors, CPSES (2)

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NRC FORM 386				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 (7-530), 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) 0151010101415		Page (3) 1 OF 017	
Title (4) TECHNICAL SPECIFICATION VIOLATIONS DUE TO A SAFETY CHILLER BEING INOPERABLE GREATER THAN THE ALLOWED OUTAGE TIME OF THE SUPPORTED SYSTEMS											
Event Date (5)			ER Number (6)			Report Date (7)			Other Facilities Involved (8)		
Month	Day	Year	Year	Sequential Number	Revision Number	Month	Day	Year	Facility Names	Docket Numbers	
05	28	91	91	0118	0	06	27	91	N/A	015101010111	
									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)											
Power Level (10) 01310			20.402(b)			20.405(c)			50.73(a)(2)(iv)		
			20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)		
			20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)		
			20.405(a)(1)(iii)			<input checked="" type="checkbox"/> 50.73(a)(2)(i)			50.73(a)(2)(viii)(A)		
			20.405(a)(1)(iv)			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)			73.71(b) 73.71(c) Other (Specify in Abstract below and in Text, NRC Form 366A)		
Licensee Contact For This LER (12)											
Name T. A. HOPE								Area Code 81117			
COMPLIANCE SUPERVISOR								Telephone Number 819171-16131710			
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-spaced typewritten lines) (16)											
<p>On May 28, 1991, after a review of maintenance and operations history, it was determined that the Train A Safety Chiller may have been inoperable for periods of time between October, 1989, and April, 1991, in excess of that allowed by the supported systems. On October 11, 1989, an oil sump level switch was replaced on the Train A Safety Chiller. The switch incorrectly closed on high sump level and opened on low level; consequently, some of the oil did not return to the chiller sump. As a result, the Train A Safety Chiller could not be guaranteed to perform its design function on an automatic signal due to overload and low oil pressure trips during chiller startup. The problem was masked by other related problems during this period, but on April 18, 1991, troubleshooting the oil return system revealed that the oil sump level switch functioned inversely. A new switch was checked and installed.</p> <p>The root causes were manufacturing defect and post-installation testing less than adequate. Corrective actions include replacing the switch, verifying no other bad switches exist and incorporating recommendations from a post work test task team.</p>											

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Text (If more space is required, use additional NRC Form 366A'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 October 11, 1989, Comanche Peak Steam Electric Station (CPSES) Unit 1 was under construction with no fuel in the core. The oil sump level switch was replaced on the Train A Safety Chiller.

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 October 11, 1989, the oil sump level switch (EIS:(LIS)(KM)) for the Train A Safety Chiller (EIS:(CHU)(KM)) was replaced. This oil sump level switch is an essential part of the oil return system inside the chiller. Oil will tend to accumulate in the chiller condenser (EIS:(COND)(KM)) and evaporator (EIS:(EVP)(KM)) because the oil circulates as mist with the refrigerant throughout the chiller. When the oil level in the upper sump decreases, the oil sump level switch will actuate to open a solenoid valve (EIS:(LSV)(KM)) to educt oil from the evaporator and back to the sump. The oil sump level switch which was installed on October 11, 1989, was defective. The switch would close on high level and open on low level; consequently, some of the oil did not return to the sump.

The problems experienced on the Train A Safety Chiller from October, 1989, through May, 1991, were manifested as intermittent overload and low oil pressure trips during chiller startup. The overload trip is the result of excess oil in the evaporator being carried over to the compressor (EIS:(CMP)(KM)) and causing surging of the

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compressor motor (EIS:(MO)(KM)). The low oil pressure trip results when the oil in the upper sump is drained down during chiller start, resulting in insufficient oil available to pressurize the system. Oil was added each time to enable restart of the chiller. Troubleshooting difficulties occurred over extended periods because multiple subcomponent problems such as heater (EIS:(EHTR)(KM)) burnout, oil foaming, accelerated degradation of some chiller parts and successful post work testing masked the underlying cause. Also, the problem was intermittent, as several successful chiller starts were performed during this period. On April 18, 1991, troubleshooting the oil return system revealed that the oil sump level switch functioned inversely. A new switch was obtained, checked and installed. On May 2, 1991, the remaining oil sump level switches in the warehouse were inspected and functionally checked. No other defective switches were found. Neither the Train B Safety Chiller (EIS:(CHU)(KM)) nor any of the Non-Safety Chillers (EIS:(CHU)(KM)) have experienced any of the symptoms of the Train A Safety Chiller.

On May 28, 1991, after a review of the maintenance history and operations logs starting at the time of the installation of the defective oil sump level switch, it was determined that the Train A Safety Chiller may have been inoperable because an automatic start of the chiller could not be assured. The safety chillers are designated as support equipment needed for the OPERABILITY of Technical Specification systems; therefore, the Train A Safety Chiller may have been inoperable for greater than allowed by the Technical Specification Action Statements for systems supported by the chiller (typically 72 hours) due to an inadequate amount of oil in the oil sump to assure that the chiller would start on demand.

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

Repeated problems with the Train A Safety Chiller resulted in troubleshooting the oil return system to reveal that the oil sump level switch functioned inversely to its design.

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II. COMPONENT OR SYSTEM FAILURES

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

The oil sump level switch that was installed on October 11, 1989, acted inversely to its design due to a manufacturing defect. The problems were experienced intermittently on the Train A Safety Chiller from October, 1989, through May, 1991, manifested as low oil pressure or overload trips during chiller startup. The low oil pressure trip results when the oil in the upper sump is drained down during chiller start, resulting in no oil available to pressurize the system. The overload trip is the result of excess oil in the evaporator being carried over to the compressor and causing surging of the compressor motor.

B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

The cause of the component failure was a manufacturing defect. Three other switches received from the vendor were tested satisfactorily. The oil sump level switch was installed as received from the vendor.

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

The supported systems affected by the Train A Safety Chiller being inoperable were the Emergency Fan Coil Units for rooms containing:

- Residual Heat Removal Pump
- Centrifugal Charging Pump
- Safety Injection Pump
- Auxiliary Feedwater Pump
- Component Cooling Water Pump
- Containment Spray Pump
- Electrical Area (Safety Related Switchgear)
- Spent Fuel Pool Cooling Pump

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D. FAILED COMPONENT INFORMATION

Oil Float Switch

Manufactured by Rochester Gauges Inc. of Texas, Part Number L6253-35
York Part Number 025-16523

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

There were no safety system responses that occurred as a result of this event.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

The Train A Safety Chilled Water System (EHS:(KM)) may have been inoperable for periods between October 11, 1989, when the defective switch was installed, to April 18, 1991, when the switch was replaced. The problem was that once placed in standby, the chiller could not always be counted on to start automatically. Station procedures require rotation of the Safety Chillers biweekly, and once running, the Train A Safety Chiller functioned properly.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The Safety Chilled Water System is designed to remove heat dissipated from Engineered Safety Feature (ESF) equipment and to maintain the ambient temperature within serviced rooms below the maximum design temperature. Safety Chilled Water is a support system required for operability of the Emergency Core Cooling System (ECCS) pumps and ESF fan coil units in the Class 1E switchgear rooms. The inability of the Train A Safety Chiller to start upon demand would require an operator (utility, non-licensed) to manually start the chiller; therefore, there would be a potential for reduced reliability for the equipment inside the serviced rooms cooled by Train A Safety Chilled Water. Train B components would be unaffected and able to fulfill their intended safety functions.

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IV. CAUSE OF THE EVENTS

ROOT CAUSE

1. The Oil Sump Level Switch was not manufactured per design. The switch installed on October 11, 1989, would close on high level and open on low level when installed in the chiller. Consequently, some of the oil did not return to the chiller sump.
2. The Oil Sump Level Switch post-installation testing was less than adequate. The post work test specified in the work order was incorrect. Technicians (utility, non-licensed) use the low oil pressure light to verify the function of the level switch. The level switch only operates the oil return system solenoid valve and would not have an immediate impact on oil pressure following maintenance. A different post work test should have been specified to test the switch.

V. CORRECTIVE ACTIONS

A. CORRECTIVE ACTIONS TO PREVENT RECURRENCE

ROOT CAUSE

1. The Oil Sump Level Switch was not manufactured per design.

CORRECTIVE ACTION

1. The defective Oil Sump Level Switch was replaced on April 18, 1991. The new switch was functionally checked before installation. On May 2, 1991, the remaining oil sump level switches in the warehouse were inspected and functionally checked. No other bad switches were found. It was concluded that the defective part was an isolated event and that no other defective parts exist at CPSES.
2. The Oil Sump Level Switch post-installation testing was less than adequate. The post work test specified in the work order was incorrect. A different post work test should have been specified to test the switch.

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CORRECTIVE ACTION <p>A Post Work Test Task Team was formed to investigate problems with post work tests. As a result, training will be provided to personnel who may be required to specify testing or verify that the correct testing has been specified. This will include personnel involved with design modifications as well as maintenance. This event will be incorporated into the training program.</p>							
VI. PREVIOUS SIMILAR EVENTS <p>There have been no previous similar events involving inadequate post work testing, and there have been no previous similar events related to the defective component specified in this report.</p>							