

NRC FORM 366
(4/75)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 4/30/98

LICENSEE EVENT REPORT (LER)
(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST 500 HRS REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 P33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

Facility Name (1) **COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2** Docket Number (2) **05000446** Page (3) **01 OF 06**

Title (4) **AUXILIARY FEEDWATER STEAM ADMISSION VALVE FAILED OPEN DUE TO A RUPTURED DIAPHRAGM**

Event Date (15)			LER Number (6)			Report Date (7)			Other Facilities Involved (8)																												
Month	Day	Year	Year	Sequential Number	Revision Number	Month	Day	Year	Facility Name		Docket Numbers																										
0	4	1	5	9	7	9	7	-	0	0	1	-	0	0	0	5	1	5	9	7	CPSES UNIT 1		0	5	0	0	0	4	4	5							
N/A											0			5			0			0			0			0			4			4			5		

Operating Mode (9) **1** This report is submitted pursuant to the requirements of 10 CFR 5. (Check one or more) (11)

<input type="checkbox"/> 20.2201 (b)	<input type="checkbox"/> 20.2203 (a) (2) (v)	<input type="checkbox"/> 50.73 (a) (2) (i)	<input type="checkbox"/> 50.73 (a) (2) (viii)
<input type="checkbox"/> 20.2203 (a) (1)	<input type="checkbox"/> 20.2203 (a) (3) (i)	<input type="checkbox"/> 50.73 (a) (2) (ii)	<input type="checkbox"/> 50.73 (a) (2) (x)
<input type="checkbox"/> 20.2203 (a) (2) (i)	<input type="checkbox"/> 20.2203 (a) (3) (ii)	<input type="checkbox"/> 50.73 (a) (2) (iii)	<input type="checkbox"/> 73.71
<input type="checkbox"/> 20.2203 (a) (2) (ii)	<input type="checkbox"/> 20.2203 (a) (4)	<input checked="" type="checkbox"/> 50.73 (a) (2) (iv)	<input checked="" type="checkbox"/> OTHER
<input type="checkbox"/> 20.2203 (a) (2) (iii)	<input type="checkbox"/> 50.36 (c) (1)	<input type="checkbox"/> 50.73 (a) (2) (v)	Specify in Abstract below
<input type="checkbox"/> 20.2203 (a) (2) (iv)	<input type="checkbox"/> 50.36 (c) (2)	<input type="checkbox"/> 50.73 (a) (2) (vii)	or in NRC Form 365A

Name **RAFAEL FLORES - SYSTEM ENGINEERING MANAGER** Telephone Number (Include Area Code) **(817)897-5590**

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
				N					

Supplemental Report Expected (14)

YES (If yes, completed EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

Month	Day	Year

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On April 15, 1997, at approximately 12:37 a.m., while CPSES Unit 2 was in Mode 1 at 100% reactor power, the auxiliary feedwater turbine steam admission valve, 2-HV-2452-2, failed open due to leakage through the valve diaphragm, starting the Turbine Driven Auxiliary Feedwater Pump (TDAFWP) 2-01. Water flowed from the TDAFWP to all four steam generators for approximately 30 - 40 seconds until the flow control valves were closed. On April 20, 1997, at approximately 12:03 p.m., 2-HV-2452-2 came off its closed seat due to leakage through a newly replaced diaphragm. No water flowed into the steam generators. The TDAFWP speed control annunciator alerted the Control Room Staff to a start of the TDAFWP for both the events.

TU Electric believes that the cause of this condition was that new "thick" replacement diaphragms developed by the valve vendor were susceptible to under torquing (pullout) and over torquing (crush). The auxiliary feedwater system remained capable of performing its intended safety function throughout the event. A replacement "thin" diaphragm (original design) has been obtained and installed in the auxiliary feedwater turbine steam admission valve, 2-HV-2452-2.

This report also includes reporting data pursuant to the requirements of 10CFR21.

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

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

Any event or condition that results in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)(EIIS:(JC)). Additionally, this report satisfies the reporting criteria of 10CFR21.

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

- a) On April 15, 1997, at 0037, Comanche Peak Steam Electric Station (CPSES) Unit 1 and Unit 2 were in Mode 1 at 100% reactor power.
- b) On April 20, 1997, at 1203, Comanche Peak Steam Electric Station (CPSES) Unit 1 and Unit 2 were in Mode 1 at 100% reactor power.

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 these events. Additionally, there were no related activities in progress which contributed to this event.

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

- a) At approximately 12:37 a.m., on April 15, 1997, auxiliary feedwater turbine steam admission valve 2-HV-2452-2 failed open, starting Turbine Driven Auxiliary Feedwater Pump (TDAFWP) 2-01. Water flowed from the TDAFWP to all four steam generators for approximately 30 - 40 seconds until the flow control valves were closed. Steam supply manual isolation valve 2MS-0128 was closed manually to stop the turbine. The system was placed in a 7 day Limiting Condition of Operations (LCO) due to one of the steam supplies to the CPSES Unit 2 TDAFWP being isolated.
- b) On April 20, 1997, CPSES Unit 2 was in Mode 1 at 100% reactor power. At approximately 12:03 p.m., 2-HV-2452-2 came off its closed seat due to leakage through the newly replaced diaphragm.

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This caused TDAFWP 2-01 to accelerate to 490 rpm. No water was injected into the steam generators. The TDAFWP was tripped, the number 2 steam supply was manually isolated and the TDAFWP was manually reset. The system was placed in a 7 day LCO due to one of the steam supplies to the Unit 2 TDAFWP being isolated.

An event or condition that results in an automatic or manual actuation of any ESF, including the RPS, is reportable within 4 hours under 10CFR50.72(b)(2)(ii). At 1:12 a.m., on April 15, 1997, the Nuclear Regulatory Commission Operations Center was notified of the event via the Emergency Notification System for event a). For the event b), the Nuclear Regulatory Commission Operations Center was notified of the event via the Emergency Notification System on April 20, 1997 at approximately 1:35 p.m.

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

TDAFWP speed control annunciator alerted the Control Room Staff to a start of the TDAFWP for both the events.

II. COMPONENT OR SYSTEM FAILURES

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

A ruptured "thick" diaphragm was determined to be the cause of the valve failing open.

B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

On April 11, 1997, the original "thin" diaphragm installed in 2-HV-2452-2 was replaced because the diaphragm developed a leak. The original diaphragm had been in service for approximately five years.

The new "thick" replacement diaphragms were developed by the valve vendor to withstand higher pressures. However, the thicker diaphragm appears to be susceptible to under torquing (pullout) and over torquing (crush).

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

Not applicable - No failures of components with multiple functions have been identified.

D. FAILED COMPONENT INFORMATION

Manufactured by: Fisher Valve
Part Name: Valve Diaphragm
Part No.: 1R6375X0022

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

Not Applicable- No Safety System responses occurred.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

Not Applicable- No safety system trains were inoperable during this event.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The inadvertent delivery of cold auxiliary feedwater to the steam generators will result in a slight increase in the heat removal by the secondary system, such as described in FSAR Section 15.1. This event is bounded in severity by the "decrease in feedwater temperature" event presented in FSAR Section 15.1.1 and the "increase in feedwater temperature" event presented in FSAR Section 15.1.2; both transients are significantly more severe than the actual event. In any case, all relevant event acceptance criteria continue to be satisfied. Based on this discussion it is concluded that this event did not adversely affect the safe operation of CPSES Unit 2 or the health and safety of the public.

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IV. CAUSE OF THE EVENT

On April 11, 1997, the original "thin" diaphragm installed in 2-HV-2452-2 was replaced because the diaphragm developed a leak. The original diaphragm had been in service for approximately five years.

The new "thick" replacement diaphragms were developed by the valve vendor to withstand higher pressures. However, the thicker diaphragm appears to be susceptible to under torquing (pullout) and over torquing (crush).

EVENT a)

On April 15, 1997, auxiliary feedwater turbine steam admission valve 2-HV-2452-2 failed open, starting TDAFWP 2-01. The turbine driven auxiliary feedwater pump flowed water to all four steam generators, for approximately 30 - 40 seconds, until the flow control valves were closed.

The investigation indicated a ruptured diaphragm as the cause of the valve failing open.

EVENT b)

On April 20, 1997, CPSES Unit 2 was in Mode 1 at 100% reactor power. On April 20, 1997, at approximately 12:03 p.m., 2-HV-2452-2 came off its closed seat due to leakage through the newly replaced diaphragm. This caused TDAFWP 2-01 to accelerate to 490 rpm. No water was injected into the steam generators.

The investigation indicated that the newly installed diaphragm had ruptured and caused the valve to fail open.

V. CORRECTIVE ACTIONS

The actuator for 2-HV-2452-2 has been disassembled and the individual components examined. Fisher Valve representatives have examined the installation process, and have determined that installation was in accordance with their methodologies used in the laboratory while developing the thicker

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diaphragms. A replacement "thin" diaphragm (original design) has been obtained and installed in 2-HV-2452-2.

There are four of these model valve actuators in service in safety related applications at CPSES. All four of these valves were monitored for leakage after installation. The remaining valves of this model are installed in non-safety applications.

The Unit 1 "thick", valve diaphragms have been in service for several months. The early failure rate on these diaphragms is indicated as being less than three weeks. Therefore, these valves can continue in service until replacement of the thick diaphragms with newly manufactured "thin" diaphragms can be scheduled.

VI. PREVIOUS SIMILAR EVENTS

There have been no other previous LERs, which had similar causes that resulted in TDAFW Pump operation. Previous failures are being reviewed by the Task Team, which has been established to evaluate this event.

VII. ADDITIONAL INFORMATION

All times noted are Central Day light Times.

Additionally, this report satisfies the reporting criteria of 10CFR21.