NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 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 F33), 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.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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TITLE (4)

AUTOMATIC REACTOR TRIP CAUSED SUBSEQUENT TO A TURBINE TRIP DUE TO LOSS OF TURBINE PLANT COOLING WATER

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	DOCKET NUMBER
									NOT APPLICABLE	
03	08	98	98	002	00	04	06	98	FACILITY NAME: NOT APPLICABLE	DOCKET NUMBER

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
20.2203(a)(2)(ii)	20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
William G. Guldemond, Operations Manager	(254)-897-8739

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/A										

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

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

On March 8, 1998, Comanche Peak Steam Electric Station Unit 2 was in Mode 1 and had commenced feed and bleed operations on the Turbine Plant Cooling Water (TPCW) system. At approximately 11:01 p.m., both Turbine Plant Cooling Water Pumps (TPCWP) tripped due to lo lo level indication in the TPCW head tank. Shortly thereafter the turbine tripped on high primary water temperature. The reactor automatically tripped on turbine trip as designed. All rods fully inserted when the Reactor Trip Breakers opened. Both the motor driven and the turbine driven auxiliary feedwater pumps (TDAFWP) started due to steam generator shrink following the trip. The turbine driven auxiliary feedwater pump was conservatively shutdown to prevent an excessive cool down of the reactor coolant system (EIIS:(AB)) and a potential safety injection. However, the turbine driven auxiliary feedwater pump restarted. The plant was stabilized in mode 3 and all systems functioned as designed.

TU Electric concluded that the event was a result of a low level switch failure in the TPCW makeup valve. The cause of the failure could not be determined. The level switch was tested and the system was determined to be operable, functional, and working. The procedure for performing a feed and bleed of the system was changed to preclude inadvertently draining the tank in the future. All corrective actions are complete.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

ABSTRACT (Contd.)

The cause of the second start of the TDAFWP was that inventory had not been sufficiently restored in multiple steam generators to allow the pump to be stopped. The operators checked steam generator levels prior to attempting to stop the pump and believed the levels to be sufficient; however, based on pump restart, level was not sufficient in at least two steam generators.

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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

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

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

On March 8, 1998, Comanche Peak Steam Electric Station (CPSES) Unit 2 was in Mode 1, Power Operation, operating at 100 percent power. A feed and bleed of the Unit 2 Turbine Plant Cooling Water (TPCW) system was in progress as the result of a Chemistry action request.

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 March 8, 1998, at approximately 4:00 p.m., Chemistry Department personnel (utility, nonlicensed) requested a feed and bleed of the Unit 2 Turbine Plant Cooling Water (TPCW) system due to high conductivity. The feed and bleed procedure was expected to last for the next 48 hours, and the procedure was not considered to be a difficult evolution. Therefore, no additional compensatory measures were judged to be necessary.

At approximately 11:01 p.m. on March 8, 1998, both Turbine Plant Cooling Water Pumps (EIIS:(P)(JJ)) tripped due to lo lo level indication in the TPCW head tank. The makeup valve to the tank should have opened at a tank lo level condition but did not. The Unit Supervisor (US) (utility, licensed) directed the Balance of Plant Operator (utility, licensed) to start the standby pump. The standby pump failed to start. The Shift Manager (utility, licensed) noted the lo lo tank level and informed the crew. The US directed the makeup valve to be opened. Shortly thereafter both TPCW pumps automatically started. The US directed the operators to be ready for a turbine and plant trip because of experience with loss of cooling to the main generator primary water system. Shortly thereafter the turbine tripped on high primary water temperature. The reactor automatically tripped on turbine trip as designed.

Both the motor driven and the turbine driven auxiliary feedwater pumps started due to steam generator shrink following the trip. The turbine driven auxiliary feedwater pump was conservatively shutdown to prevent an excessive cool down of the reactor coolant system (EIIS:(AB)) and a potential safety injection. However, the turbine driven auxiliary feedwater pump restarted. The plant was stabilized in mode 3 and all systems functioned as designed.

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 approximately 1:15 a.m. on March 9, 1998, the Nuclear Regulatory Commission Operations Center was notified of the reactor trip and second TDAFWP autostart via the Emergency Notification System.

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

The Control Room was alerted to the TPCW inventory problem by the pump trip alarm. The Control Room Staff received a reactor trip greater than 50 percent power turbine trip alarm which alerted it to the reactor trip. The second TDAFWP start was discovered by observation of the steam admission valves reopening and control board indications of the pump running.

II. COMPONENT OR SYSTEM FAILURES

A. FAILED COMPONENT INFORMATION

The low level switch which automatically opens the makeup valve for the TPCW head tank failed.

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

The low level switch was deemed to be stuck above the low level setpoint, and did not send a signal to the makeup valve to open. Additionally, the sticking of the low level switch impaired the alarms prior to reaching the lo lo level setpoint. This resulted in a primary water high temperature turbine electric trip and a corresponding reactor trip.

C. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

The cause of the level switch failure could not be determined. Troubleshooting of the switch after the trip showed it to be functioning normally.

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

The low level switch was deemed to be stuck above the low level setpoint, and did not send a signal to the makeup valve to open. Additionally, the sticking of the low level switch impaired the alarms prior to reaching the lo lo level setpoint. This resulted in a primary water high temperature turbine electric trip and a corresponding reactor trip.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

The failure of the low level switch in the TPCW system prevented the makeup valve for the TPCW head tank from automatically opening on low level in the tank. As a result, the operating TPCW pump tripped on low tank level and the standby pump was prevented from automatically starting. This interrupted cooling to serviced components. This resulted in high temperature of the primary water, causing the turbine to trip and a subsequent reactor trip. Both the motor driven (EIIS:(P)(BA)) and the turbine driven auxiliary feedwater pumps (EIIS:(P)(BA)) started due to steam generator level shrinks after the trip. The turbine driven pump was stopped; however, since more than one steam generator was indicating lo lo level, the turbine driven pump started again. The plant was stabilized in mode 3 and all systems functioned as required.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

Not applicable - there was no safety system train inoperability that resulted from this event.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

This event is bounded by the analysis of the turbine trip presented in Section 15.2.3 of the CPSES Final Safety Analysis Report (FSAR). The analysis uses conservative assumptions to demonstrate the capability of pressure relieving devices and to demonstrate core protection margins. The event of March 8, 1998 occurred at 100 percent reactor power, and all systems and components functioned as designed. The event is bounded by the FSAR accident analysis which assumes an initial power level of 102 percent and conservative assumptions which reduce the capability of safety systems to mitigate the consequences of the transient.

The second start of the TDAFWP is likewise bounded by existing accident analysis. The pump started on a legitimate demand. Operator actions to secure the pump were likewise acceptable and in accordance with procedures. An adequate heat sink was being provided by the two operating Motor Driven Auxiliary Feedwater pumps.

Based on the above, it is concluded that the event of March 8, 1998, did not adversely affect the safe operation of CPSES Unit 1 or the health and safety of the public.

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IV. CAUSE OF THE EVENT

The event was a result of a low level switch failure in the TPCW makeup valve. The cause of the failure could not be determined.

The cause of the second start of the TDAFWP was actual lo lo levels in at least two steam generators. While the operators checked the indications of steam generator levels immediately available to them, those indications lacked sufficient accuracy to assure levels were above the automatic start setpoints.

V. CORRECTIVE ACTIONS

The level switch was tested and the system was determined to functional. Additionally, the procedure for performing a feed and bleed of the system was changed to preclude inadvertently draining the tank in the future. With regard to the second start of the TDAFWP, the operators involved were reminded to exercise caution when stopping equipment in the vicinity of automatic start setpoints.

VI. PREVIOUS SIMILAR EVENTS

There have been previous events that resulted in reactor trips following a turbine trip. However, the causes of those events are sufficiently different such that the corrective actions taken for the previous events would have not prevented this event.