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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COMANCHE PEAK STEAM ELECTRIC STATION 1	05000445	1 OF 10

TITLE (4)
ALLOWED OUTAGE TIME WAS EXCEEDED ON TURBINE DRIVEN AUXILIARY FEEDWATER PUMP WHICH TRIPPED ON OVERSPEED

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
06	14	95	95	-- 004 --	01	09	08	95	CPSES-UNIT 2	05000446
									FACILITY NAME: N/A	DOCKET NUMBER: 05000

OPERATING MODE (9)	3
POWER LEVEL (10)	000

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

20.2201(b)	20.2203(a)(2)(v)	X	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)		50.73(a)(2)(iv)	X	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)
R. FLORES, SYSTEM ENGINEERING MANAGER	(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)			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 June 11, 1995, at approximately 12:01 CDT, while performing a slave relay actuation test on Unit 1, a non-safety related inverter transferred from its normal inverter AC power supply to its bypass (alternate) AC power supply, which was deenergized per the slave relay test procedures. This resulted in loss of both condensate pumps. The loss of the condensate pumps resulted in the trip of both Main Feedwater (MFW) pumps. A manual reactor trip of CPSES Unit 1 was initiated due to a loss of feedwater to the steam generators. The trip of both MFW pumps initiated an Auxiliary Feedwater actuation signal which started the Motor Driven Auxiliary Feedwater (MDAFW) pumps. Following a LO-LO level signal in Steam Generators 1-01 and 1-02, the Unit 1 Turbine Driven Auxiliary Feedwater (TDAFW) pump started as designed but tripped on overspeed.

The Unit 1 TDAFW pump overspeed was caused by a failure of the governor to control turbine speed. The required repairs/replacements were made, the pump has been successfully tested and declared Operable. On June 21, 1995, a TDAFW pump overspeed trip was experienced on CPSES Unit 2 in an event unrelated to the Unit 1 event. TU Electric believes that the event was caused by water in the steam line which resulted from a warm-up run which was performed prior to the trip. The steam traps and the governor valve linkage were inspected, the appropriate equipment was reworked, and the TDAFWP declared operable.

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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

Unit 1
Any operation or condition prohibited by the plant's Technical Specifications, i.e., the event was considered reportable because the time requirements for the action statement were not met.

Unit 2
The Unit 2 event is being submitted on a voluntary basis, due to recognition of the significance and generic interest of the event .

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

Unit 1
On June 11, 1995, Comanche Peak Steam Electric Station (CPSES) Unit 1 was in Mode 1, Power Operation, and operating at 100 percent power.

Unit 2
On June 21, 1995, Comanche Peak Steam Electric Station (CPSES) Unit 2 was in Mode 1, Power Operation, and operating at 100 percent power.

C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

Not applicable - no structures, systems or components were inoperable at the start of the event that contributed to the event.

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

Unit 1

On June 11, 1995, at approximately 1201 CDT, the CPSES Unit 1 Balance of Plant (BOP) Reactor Operator (utility, licensed) was performing the Train A slave relay test for the K601A relay (EIIS:(RLY)). While performing the test, a non-safety related inverter transferred from its normal inverter AC power supply to its bypass (alternate) AC power supply, which was deenergized per the slave relay test procedure. This resulted in loss of power to auxiliary relays 1-PY/2111 & 2112 which caused a MFW pump (EIIS:(P)(SJ)) low oil pressure signal which tripped both condensate pumps. The

loss of the condensate pumps resulted in a trip of both MFW pumps. A manual reactor trip of CPSES Unit 1 was initiated due to the loss of feedwater to the steam generators (EIIS:(SG)(SB)).

The trip of both MFW pumps initiated an Auxiliary Feedwater (EIIS:(BA)) actuation signal for the MDAFW pumps. MDAFW pump 1-02 started and supplied feed to Steam Generator's (SG) 1-03 and 1-04. MDAFW pump 1-01 was aligned to its test header as required for the slave relay testing. Following a LO-LO level signal in SG's 1-01 and 1-02, the Turbine Driven Auxiliary Feedwater pump started, but tripped on overspeed. MDAFW pump 1-01 was re-aligned to SG's 1-01 and 1-02 within approximately 8 minutes after the reactor trip. Control room personnel responded in accordance with emergency operating procedures, and the plant was stabilized in Mode 3, Hot Standby.

On June 14, 1995, at approximately 11:00 a.m. (CDT), during a teleconference with NRC Region IV Staff, TU Electric requested and was granted a Notice of Enforcement Discretion (NOED). The NOED was requested for additional time necessary to perform repairs and retesting, which would have exceeded the allowed outage time for remaining in Mode 3 and thus would not be in compliance with Technical Specification 3.7.1.2 (refer to NOED Tracking No. 95-4-0005).

Unit 2

On June 16, 1995, at approximately 1.00 p.m. a routine quarterly surveillance on the Unit 2 TDAFWP was performed. Operation's Test Crew (Utility, Licensed/Non Licensed) reported an abnormal noise coming from the pump which could indicate pump cavitation. Additionally, the Condensate Storage Tank (CST) was observed to be at the 67 percent level. Engineering (Utility, Non Licensed) was requested to evaluate the noise. While the evaluation was in progress, the CST was filled to the 85 percent level. A second cold start test was completed at approximately 9:30 p.m. on June 16, 1995, with no abnormal noise heard and the system was declared Operable. However, since these tests were run at different CST levels, and the pump performance was somewhat lower than normal, it was conservatively decided to schedule additional testing for June 21, 1995. The June 21,1995 test was to be a warm start in order to minimize turbine wear. The objective of the June 21, 1995 test was to observe any indication of degraded hydraulic performance (if present), which would indicate cavitation or internal pump wear and to investigate the source of the noise which occurred during the original test. The steam admission bypass valves were opened for four minutes to warmup the system. The pump remained aligned to the steam generators. The Control Room speed controller remained at the maximum speed setting. The bypass valves supplied enough steam to roll the turbine at approximately 3200 rpm and flow to the steam generators. Upon noticing flow to the steam generators, Operations Crew closed the steam generator

flow control valves thus isolating flow to the generators. The bypass valves were th closed and the warmup terminated. Approximately thirteen (13) minutes after the bypass valves were closed, a quick start was performed. The Unit 2 TDAFWP was aligned in the test mode to recirculate to the CST. When the steam admission valves (2-HV-2452-1 & 2) were opened , the turbine tripped on overspeed. Unusual amounts of water were observed coming from the exhaust stack, the sentinel valve and the governor valve stem packing. The System Engineer (Utility, Non Licensed) who was observing the governor valve, noted no movement of the valve linkage during the trip. This trip occurred after warming up the steam lines. The TDAFWP was declared INOPERABLE.

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

Unit 1

The BOP RO identified that the TDAFW pump had tripped on overspeed.

Unit 2

Failure was discovered during a pump run, which was being performed to acquire pump data.

II. COMPONENT OR SYSTEM FAILURES

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

Not applicable - for Unit 1,this report is being generated due to exceedance of the specified allowed outage time requirement. However, the failure modes, mechanism, and effects of the failed component are better described in the cause of the event and the safety consequences section(s) in this LER. Unit 2 is being submitted on a voluntary basis.

B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

Not applicable - for Unit 1,this report is being generated due to exceedance of the specified allowed outage time requirement. However, the cause of the component/system failure is described in the cause of the event section of the LER. Unit 2 is being submitted on a voluntary basis.

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

Not applicable - for Unit 1,this report is being generated due to exceedance of the specified allowed outage time requirement. However, systems/secondary functions are described in the safety consequences section of this LER. Unit 2 is being submitted on a voluntary basis.

D. FAILED COMPONENT INFORMATION

Manufactured by: Dresser Rand
Part Name : Horizontal Valve Assembly with cam crank-Remote Governor servo linkage

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

Unit 1

No Safety system responses occurred due to this event.

Unit 2

No Safety system responses occurred due to this event.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

The Unit 1 TDAFW pump was inoperable for approximately 4 days 10 hours and 2 minutes. The allowed Technical Specification outage time is 3 days.

The Unit 2 TDAFW system inspections and corrective actions were completed within the allowed outage time i.e..the Unit 2 TDAFW pump was inoperable for approximately 69 hours.

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C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The Auxiliary Feedwater (AFW) System is designed to supply an independent source of water to the steam generators during accident and transient conditions in the event of a loss of main feedwater. The major components of the CPSES AFW System are three essential safety-grade pumps, one turbine-driven pump (TDAFWP) and two motor-driven pumps (MDAFWPs). The AFW supply is provided by the condensate storage tank. The backup supply for the AFW system is the service water system.

The AFW System is designed to accommodate a single failure in any active system component without loss of function. Each of the two MDAFWPs supplies two of the four steam generators. The TDAFWP supplies all four steam generators. The MDAFWP and the TDAFWP are connected together downstream of the AFW valves before the connection to the feedwater bypass line. The MDAFWPs are also cross connected, through normally closed manual valves in series, to allow either MDAFWP to supply any of the steam generators after operator action to open the valves. The two MDAFWPs are provided with one suction connection to the condensate storage tank. The TDAFWP is provided with a separate suction connection to this tank. Steam supply to the TDAFWP is provided from two of four steam generators through separate air-operated valves which fail open on loss of the air supply. Thus, adequate feedwater is assured to at least two steam generators in the event of a high-energy pipe break or other postulated design-basis accident concurrent with a single failure.

The TDAFWP provides a diverse means of assuring feedwater supply to the steam generator independent of all offsite or onsite AC power sources.

The AFW System is required to function after any plant trip described in FSAR Chapter 15. With few exceptions, the initiating event does not affect the capability of the AFW System to perform its intended safety function; therefore, these events are unaffected by the status of the TDAFWP.

The TDAFWP is required to be operable in the analysis of the Feedwater Line Break presented in FSAR Section 15.2.8. In this analysis, one MDAFWP is assumed to be the single failure. The second MDAFWP is assumed to deliver its entire contents to the faulted steam generator, and the TDAFWP is assumed to deliver 430 gpm to the three intact steam generators. (In reality, one would expect the second MDAFWP to deliver somewhat more than half of its capacity to the affected steam generator (an intact steam generator would receive the remaining fluid). This American Nuclear Society (ANS) Condition IV event is assumed to be initiated from full power and is analyzed to ensure that the core remains in a coolable geometry. This condition is satisfied by demonstrating that no voiding occurs in the hot leg.

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The TDAFWP is also assumed to be operable in the analyses of the Loss of Non-emergency Power to the Station Auxiliaries and Loss of Normal Feedwater transients presented in FSAR Sections 15.2.6 and 15.2.7. These events are assumed to be initiated from full power and are analyzed to demonstrate that the AFW system can remove enough heat to prevent the pressurizer from filling to the point where water relief through a safety or relief valve occurs. For these ANS Condition II events, water relief is equated with valve failure to close, thereby allowing the event to progress to a more serious accident. In this analysis, a minimum of 860 gpm is assumed to be provided by any combination of AFW pumps.

In addition, the AFW System would be used to provide a source of AFW following any plant trip. The TDAFWP is also the sole source for AFW following a station blackout.

The intended safety function of the AFW System is to provide adequate AFW to an adequate number of steam generators such that, when considering a single failure, all events are shown to meet their relevant event acceptance criteria.

Event 1, Unit 1 Turbine Driven Auxiliary Feedwater Pump Overspeed Trip

The actual event resulted in less auxiliary feedwater initially available than is assumed in the analysis of the "Loss of Normal Feedwater" transient presented in FSAR Section 15.2.7. This ANS Condition II event is analyzed to demonstrate the adequacy of the Auxiliary Feedwater System. The relevant event acceptance criterion is that the pressurizer should not completely fill with water, which could potentially lead to a more severe event. In this analysis, 860 gpm of auxiliary feedwater is assumed to be delivered by a combination of the two motor-driven auxiliary feedwater pumps and the turbine driven auxiliary feedwater pump, depending on the assumed single failure.

However, in the actual event, the reduction in the delivered auxiliary feedwater flow was initially offset by the effects of the early manual reactor trip, which occurred when there was more fluid remaining in the steam generators than is assumed in the FSAR analysis. The realignment of the second motor driven auxiliary feedwater pump assured that sufficient heat removal capability was available. Even with the reduced initial supply of auxiliary feedwater, the pressurizer did not completely fill with water.

Even if the reactor operator had not tripped the reactor, an automatic reactor trip would have occurred soon after the loss of main feedwater on Steam Generator Lo-Lo level. The introduction of a single train of auxiliary feedwater to two steam generators along with the availability of the steam dumps and/or ARVs, is sufficient to prevent overfilling the pressurizer prior to reactor trip. After the reactor trip, the single train of AFW is sufficient to maintain cooling of the RCS until such time

that the operator can realign the second MDAFWP flow to begin an RCS cooldown. Thus, even without operator action in the short term, the ANS Condition II event acceptance criterion was not exceeded and the safety and health of the public was unaffected.

Event 2, Unit 2 Turbine Driven Auxiliary Feedwater Pump Overspeed Trip

Upon the overspeed trip of the TDAFW pump, a 72 hour Tech Spec action statement was entered. Repair activities and testing were completed and the system was returned to OPERABLE status.

Based on this discussion, it is concluded that the event did not adversely affect the safe operation of CPSES Unit 2 or the health and safety of the public.

IV. CAUSE OF THE EVENT

Unit 1

This event was considered reportable because the time requirement for the action statement was not met. An NOED was requested and received before a violation of the Technical Specification occurred.

The Turbine Driven Auxiliary Feedwater Pump(TDAFWP) overspeed trip was caused by a failure of the Governor Valve to control turbine speed. . A Task Team was established by TU Electric management to determine probable causes, the contributing causes and to recommend actions to correct and minimize issues surrounding this event. The findings of the Task Team are stated below:

PROBABLE CAUSES

1) The Governor Valve stem was discovered corroded and was binding with the packing.

2) Investigation following the overspeed trip found the operation of governor valve cam linkage assembly to be binding slightly. This binding may have been sufficient, when combined with stem corrosion to prevent the governor from adequately controlling the TDAFWP.

Unit 2

The Task Team concluded that the Unit 2 TDAFWP overspeed trip was caused by a failure of the governor valve to control turbine speed. The findings of the Task Team are stated below:

PROBABLE CAUSES

TU Electric believes that the event was caused by water in the steam lines which resulted from a warm up run performed 13 minutes earlier. This water restricted movement of the governor which left the governor incapable of controlling speed during this start. Additionally, degraded traps and slight binding in the governor valve cam linkage were potential contributors to the event.

V. CORRECTIVE ACTIONS

On June 14, 1995, at approximately 11:00 a.m. (CDT), during a teleconference with NRC Region IV Staff, TU Electric requested and was granted a Notice of Enforcement Discretion (NOED). The NOED was requested for additional time necessary to perform repairs and retesting, which would have exceeded the allowed outage time for remaining in Mode 3 and thus would not be in compliance with Technical Specification 3.7.1.2 (refer to NOED Tracking No. 95-4-0005). TU Electric was cognizant of the Technical Specification requirements; therefore, no corrective actions for this issue were required.

Unit 1 TDAFWP

Subsequent to initial trouble shooting, the valve stem was changed out to a new inconel stem. During valve reassembly some stickiness was noted in the cam follower assembly. Parts were disassembled, cleaned, inspected and reassembled and freedom of movement was verified. Insulation was removed from selected drain lines so that water levels could be monitored. Water level in the drain pot upstream of the turbine was at the level of the drain line tap each time it was checked with the system shutdown for various lengths of time, indicating the steam traps were functioning properly.

TU Electric has repaired/replaced the defective parts. The TDAFW pump had been successfully tested and was declared Operable on June 15, 1995, at approximately 10:05 p.m.

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Unit 2 TDAFWP

The degraded steam traps and the governor valve cam linkage were reworked. Disassembly and replacement of the Unit 2 governor valve stem with inconel was subsequently accomplished. The TDAFW pump was successfully tested and was declared Operable on June 24, 1995, at approximately 4:00 p.m.

Additionally, TU Electric is evaluating the contributing causes and the recommendations as determined by the Task Team in order to implement additional corrective actions if warranted.

VI. PREVIOUS SIMILAR EVENTS

There has been one other previous event which resulted in exceeding of Technical Specification action statement (refer to LER 445/95-001-00). However, the causes for the aforementioned event were significantly different than the subject event. Corrective actions taken to resolve the root causes of the previous event would not have prevented this event.