TU ELECTRIC

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February 19, 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 NOS. 50-445
INOPERABLE TRAIN/CHANNEL IN SAFETY RELATED SYSTEM
LICENSEE EVENT REPORT 91-025-01

Gentlemen:

Enclosed is a supplement to Licensee Event Report 91-025-00 for Comanche Peak Steam Electric Station Unit 1, "Component Cooling Water Stop Check Valves Inoperable due to Less Than Adequate Preventive Maintenance."

This report is being provided to supplement the safety consequences and implications of the event, which were addressed during various discussions with your staff.

Sincerely,

William J. Cahill, Jr.

OB/tg

c - Mr. R. D. Martin, Region IV
Mr. T. A. Bergman, NRR
Mr. L. A. Yandell, Region IV
Resident Inspectors, CPSES (2)

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P. O. Box 1002 Glen Rose, Texas 76043-1002

Enclosure to TXX-92046

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION

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.

LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
COMANCHE PEAK - UNIT 1	0 5 0 0 0 4 4 5	1 OF 0 7

Title (4)

COMPONENT COOLING WATER STOP CHECK VALVES INOPERABLE DUE TO LESS THAN ADEQUATE PREVENTIVE MAINTENANCE

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 Names	Docket Numbers
1 0	2 9	9 1	9 1	- 0 2 5	- 0 1	0 2	1 9	9 2	N/A	0 5 0 0 0
									N/A	0 5 0 0 0

Operating Mode (9): 6

Power Level (10): 0 0 0

This report is submitted pursuant to the requirements of 10 CFR §: (Check one or more of the following) (11)

- [ ] 20.402(b)
- [ ] 20.405(a)(1)(i)
- [ ] 20.405(a)(1)(ii)
- [ ] 20.405(a)(1)(iii)
- [ ] 20.405(a)(1)(iv)
- [ ] 20.405(a)(1)(v)
- [ ] 20.405(c)
- [ ] 50.36(c)(1)
- [ ] 50.36(c)(2)
- [ ] 50.73(a)(2)(i)
- [ ] 50.73(a)(2)(ii)
- [ ] 50.73(a)(2)(iii)
- [ ] 50.73(a)(2)(iv)
- [ ] 50.73(a)(2)(v)
- [X] 50.73(a)(2)(vii)
- [ ] 50.73(a)(2)(viii)(A)
- [ ] 50.73(a)(2)(viii)(B)
- [ ] 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	Telephone Number: Area Code
D.E. BUSCHBAUM COMPLIANCE SUPERVISOR	8 1 1 7 8 1 9 7 1 - 1 5 8 5 1 1

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	
BF	C C	V A M E	R 3 4 0	Y							

Supplemental Report Expected (14)

- [ ] Yes (If yes, complete Expected Submission Date)
- [X] No

Expected Submission Date (15): Month | Day | Year

Abstract (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 1215 on October 29, 1991, the stop check valves (SCV) in the Component Cooling Water lines to the Reactor Coolant Pump thermal barriers were being tested to satisfy inservice testing requirements. During the test, five of the eight SCVs failed to stroke closed. The five SCVs were subsequently manually exercised, after which they operated as designed. On November 6, 1991, two of the SCVs were inspected. A small accumulation of corrosion products between the plug and stem of the valves, and a slight scaling along the bore, were found. Larger accumulations of corrosion products that may have been present were flushed out when the valves were manually exercised. At approximately 0215 on November 23, 1991, all five SCVs were in service and determined to be capable of performing their intended function.

The root cause of this event is believed to be the accumulation of corrosion products in the SCVs due to less than adequate preventive maintenance (PM). Corrective action includes the development of a PM procedure to manually exercise these valves and monitoring of the effectiveness of the PM.

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Facility Name (1)	Docket Number (2)	LER Number (6) Year	Sequential Number	Revision Number	Page (3)		
COMANCHE PEAK - UNIT 1	0 5 0 0 0 4 4 5	9 1	- 0 2 5	- 0 1	0 2	OF	0 7

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

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

Any event where a single cause or condition caused at least one independent train or channel to become inoperable in multiple safety related systems or two independent trains or channels to become inoperable in a single safety related system.

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

On October 29, 1991, Comanche Peak Steam Electric Station (CPSES) Unit 1 was in Mode 6, Refueling, with the Reactor Coolant System (RCS)(EIIS:(AB)) at a temperature of 100 degrees Fahrenheit and approximately atmospheric pressure.

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 directly to the event.

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

At CPSES, the Reactor Coolant Pump (RCP) thermal barriers (EIIS:(HX)(AB)) are cooled by the Component Cooling Water (CCW) System (EIIS:(CC)). With the plant in operation, pressure in the RCP thermal barriers is approximately 2250 pounds per square inch-gage (psig) while CCW pressure is approximately 150 psig. In the event of an RCP thermal barrier tube rupture, CCW system overpressurization protection is provided by: 1) two motor operated valves (MOV) (EIIS:(ISV)(CC)) in series, downstream of the RCP thermal barriers, which automatically close on high flow/high temperature; 2) eight, two inch, stop check valves (SCV) (EIIS:(V)(CC)), two per line, in series upstream of the RCP thermal barriers; and 3) CCW piping between the MOVs and the SCVs rated at RCS pressure. The eight SCVs are full-stroke exercised during each refueling outage to satisfy inservice testing requirements.

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION

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		Year		Sequential Number		Revision Number			
COMANCHE PEAK - UNIT 1	0 5 0 0 0 4 4 5	9 1	-	0 2 5	-	0 1	0 1 3	OF	0 1 7

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At 1215 on October 29, 1991, the SCVs were being reverse flow tested. During the test, five of the eight SCVs failed to stroke closed. The five SCVs were subsequently manually exercised, after which they operated as designed. On November 6, 1991, two of the SCVs were inspected. The plug, stem, seating surface, and bore of the valves were inspected for roughness, burrs, and sharp edges. No deficient conditions were found. The valves were also inspected for the presence of foreign material, as well as cleanliness of the sliding surfaces. A small accumulation of corrosion products between the plug and stem of the valves, and a slight scaling along the bore, were found. Subsequent valve movement showed no evidence of interference. Larger accumulations of corrosion products that may have been present were flushed out when the valves were manually exercised. At approximately 0215 on November 23, 1991, all five SCVs were in service and determined to be capable of performing their intended function.

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

The SCVs were being tested to satisfy inservice testing requirements. Five of the eight SCVs were discovered to be inoperable as a result of this test.

II. COMPONENT OR SYSTEM FAILURES

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

Five of the eight SCVs failed to stroke closed during testing. The five SCVs are believed to have failed due to corrosion product accumulation between the plug and bore during long periods of valve inactivity. In the event of an RCP thermal barrier tube rupture, failure of these five SCVs could lead to the overpressurization of the CCW system. No actual overpressurization occurred.

B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

The five SCVs are believed to have failed due to corrosion product accumulation between the plug and bore during long periods of valve inactivity.

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION

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		Year	Sequential Number	Revision Number			
COMANCHE PEAK - UNIT 1	0 5 0 0 0 4 4 5	9 1	- 0 2 5	- 0 1	0 4	OF	0 7

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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 occurred during this event.

D. FAILED COMPONENT INFORMATION

SCV 1CC-0657
Manufacturer: Rockwell-Edward
Model Number: D3664T1

SCVs 1CC-1075, 1076, 1077, 1078
Manufacturer: Rockwell-Edward
Model Number: B36164T3

These stop check valves, although different models, are different generations of the same design. Each valve has a carbon steel body with a cobalt alloy plug which slides down the bore to seat on a loss of forward flow. These valves do not have a spring assist.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

Not applicable - no safety system responses occurred as a result of this event.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

On October 29, 1991, the five SCVs were declared inoperable. On November 23, 1991, the five SCVs were returned to operable status. The five SCVs were inoperable for twenty-four days, fourteen hours.

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION

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		Year	Sequential Number	Revision Number	
COMANCHE PEAK - UNIT 1	0 5 0 0 0 4 4 5	9 1	- 0 1 2 5	- 0 1	0 5 OF 0 1 7

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C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

Operability of the CCW systems ensures that sufficient cooling capacity is available for continued operation of safety-related equipment during normal and accident conditions. Operability of the SCVs is required to prevent overpressurization of the CCW system due to a postulated RCP thermal barrier tube rupture. Two SCVs in series are provided in each CCW to RCP thermal barrier line for single failure consideration.

SCV operability is determined using a low capacity demineralized water header to create a reverse differential test pressure of not greater than 100 pounds per square inch (psi) across the valve. Based on the lack of significant deficient conditions found during the visual inspection of two SCVs, and the lack of noticeable binding or resistance during manual valve cycling, engineering judgement concludes that the SCVs would likely have performed their function if challenged at higher differential pressure.

In this event, five of the eight SCVs failed to stroke closed during testing. Three of the four CCW to RCP thermal barrier lines were still protected by the redundant, OPERABLE, SCVs.

If an RCP thermal barrier tube rupture would have occurred during this event, only one CCW to RCP thermal barrier line would have been unprotected. The consequences of this event are dependent upon the actual break size. Small leaks cause no automatic action and are detectable by the CCW radiation monitors or routine Technical Specification monitoring of RCS leakage. These leaks do not challenge the SCVs. Larger leaks would cause the two MOVs, in series, downstream of the RCP thermal barriers, to isolate on high temperature or high flow. When this occurs, RCS leakage would flow in reverse through the non-functioning SCV into the CCW lines, to all four RCP motor and bearing coolers. Ultimately, RCS pressure and flow relieves to the CCW surge tank (EIIS:(TK)(CC)) which is designed to withstand the full insurge of the RCP thermal barrier rupture without damage.

These events are detectable when the two downstream RCP thermal barrier MOVs isolate and the CCW surge tank level rises and alarms. For analysis purposes it is assumed that no action is taken to manually isolate the SCV for thirty minutes, and that the SCV did not close at the elevated differential, pressure. For RCP thermal barrier breaks resulting in RCS leak rates up to 190 gallons per minute (gpm), the dose consequences are bounded by the Chemical and Volume Control System (EIIS:(CB)) letdown line rupture outside containment analysis (CPSES Final Safety Analysis Report, Chapter 15.6.2). For larger breaks, up to the worst case RCP thermal barrier rupture resulting in a 433 gpm leak rate, offsite and control room doses may exceed the previously analyzed values, but estimates of the doses do not exceed the guidelines of 10CFR100 or General Design Criteria 19.

IV. CAUSE OF THE EVENT

ROOT CAUSE

The root cause of this event is believed to be the accumulation of corrosion products in the SCVs due to less than adequate preventive maintenance. Valves which remain in one position for a long period of time may be subject to some degree of reduction of operability as the result of surface corrosion of moving parts, or accumulation of deleterious solids. These SCVs were last exercised in October, 1989.

V. CORRECTIVE ACTIONS

A. CORRECTIVE ACTIONS TO PREVENT RECURRENCE

ROOT CAUSE

Less than adequate SCV preventive maintenance.

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION

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		Year		Sequential Number		Revision Number			
COMANCHE PEAK - UNIT 1	0 5 0 0 0 4 4 5	9 1	-	0 1 2 5	-	0 1	0 1 7	OF	0 1 7

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

CORRECTIVE ACTION

A preventive maintenance (PM) procedure will be developed to periodically manually exercise these valves. This process will help to avoid any accumulation of corrosion products. PM effectiveness will be monitored and the frequency in which the valves are exercised changed as necessary.

VI. PREVIOUS SIMILAR EVENTS

There have been no previous similar events reported pursuant to 10CFR50.73.

VII. ADDITIONAL INFORMATION

The times listed in the report are approximate and Central Standard Time.