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**TU**ELECTRIC

June 17, 1994

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) - UNIT 2  
 DOCKET NO. 50-446  
 EVENT OR CONDITION THAT COULD HAVE PREVENTED FULFILLMENT  
 OF THE SAFETY FUNCTION OF STRUCTURES OR SYSTEM  
 LICENSEE EVENT REPORT 446/94-005-00

Gentlemen:

Enclosed is Licensee Event Report 94-005-00 for Comanche Peak Steam Electric Station Unit 2, "Continued Vibration Induced Fatigue Led to Failures of Additional Welds in the Containment Spray System."

TU Electric has implemented corrective actions which are designed to substantially reduce the effects of vibration. The corrective and preventive actions will be submitted in a supplement to this Licensee Event Report (LER).

Sincerely,

*William J. Cahill, Jr.*

William J. Cahill, Jr.

By: *Roger D. Walker*  
 Roger D. Walker  
 Regulatory Affairs Manager

OB:tg

ENCLOSURE

cc: Mr. L. J. Callan, Region IV  
 Mr. T. Reis, Region IV  
 Resident Inspectors, CPSES

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NRC FORM 366  <h2 style="text-align: center;">LICENSEE EVENT REPORT (LER)</h2>		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							
Facility Name (1) <b>COMANCHE PEAK-UNIT 2</b>		Docket Number (2) <b>05000446</b>	Page (3) 1 OF 5						
Title (4) <b>CONTINUED VIBRATION INDUCED FATIGUE LED TO FAILURES OF WELDS IN THE CONTAINMENT SPRAY SYSTEM</b>									
Event Date (5) Month: 05, Day: 19, Year: 94		LER Number (6) Sequential Number: 005, Revision Number: 00	Report Date (7) Month: 06, Day: 17, Year: 94						
Operating Mode (8) 5		Other Facilities Involved (8) Facility Names: N/A Docket Numbers: 050000							
Power Level (10) 01010		This report is submitted pursuant to the requirements of 10 CFR 50.73 (Check one or more of the following) (11) <input checked="" type="checkbox"/> 20.402(b) <input type="checkbox"/> 20.406(a)(1)(ii) <input type="checkbox"/> 20.406(a)(1)(iii) <input type="checkbox"/> 20.406(a)(1)(iv) <input type="checkbox"/> 20.406(a)(1)(v) <input type="checkbox"/> 20.406(c) <input type="checkbox"/> 50.36(c)(1) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.73(a)(2)(i) <input type="checkbox"/> 50.73(a)(2)(ii) <input type="checkbox"/> 50.73(a)(2)(iii)							
Licensee Contact For This LER (12) Name: <b>J. C. FINNERAN, MANAGER, CIVIL ENGINEERING</b>		Area Code: <b>817</b> Telephone Number: <b>-897-8521</b>							
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: 09, Day: 30, Year: 94					
<input checked="" type="checkbox"/> Yes (if yes, complete Expected Submission Date) <input type="checkbox"/> No									
Abstract (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)									
<p>On May 12, 1994, Comanche Peak Steam Electric Station (CPSES) was in Mode 5 during its midcycle outage, when a weld leak was identified in the Containment Spray System. The immediate corrective actions were to repair the weld and inspect for additional leaks. On May 19, 1994, additional leaks were discovered on the second train. Based on the discovery of the leak in the second train, this event was deemed reportable pursuant to 10CFR50.73.</p> <p>The cause of the leak was deemed to be vibration induced fatigue. TU Electric has implemented corrective actions which includes configuration changes which will substantially reduce the level of vibration in the system.</p>									

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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COMANCHE PEAK-UNIT 2	05000446	Year	Sequential Number	Revision Number	2	OF 5
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Text of more space is required, use additional NRC Form 368A's (17)

### I. DESCRIPTION OF REPORTABLE EVENT

#### A. REPORTABLE EVENT CLASSIFICATION

Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shutdown the reactor and maintain it in a safe condition, or mitigate the consequences of an accident.

#### B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

On May 19, 1994, Comanche Peak Steam Electric Station (CPSES) was in Mode 5 (cold shutdown) during its midcycle outage.

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

Due the discovery of weld cracks both trains of the Containment Spray (CT) System (EIIIS:(BE)) were declared inoperable.

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

On May 12, 1994, a pinhole leak in the Unit 2 Containment Spray (CT) System (EIIIS:(BE)) was discovered. The leak was from a field weld connecting a 3/4 inch relief line to the 12 inch suction header for Containment Spray Pump 2-02 (EIIIS:(P)(BE)).

On May 17, 1994, while running the Containment Spray Pump 2-02 for taking vibration measurements [after the repairs to the weld leak discovered on May 12, 1994], an auxiliary operator (utility, non-licensed) observed an additional pinhole leak at the weld connecting a pressure transmitter (EIIIS:(PT)) sensing line to the CT pump 2-02 discharge header.

On May 19, 1994, another small weld leak was identified. The May 19, 1994 leak impacted the second train, and the event was then declared to reportable pursuant to the requirements of 10CFR50.73(a)(2)(v)(D). On May 19, 1994, at approximately 3:30 p.m., the Nuclear Regulatory Commission was notified of the event via Emergency Notification System in accordance with 10CFR50.72.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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

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

The various weld leaks were discovered by personnel performing duties associated with the Containment Spray System.

**II. COMPONENT OR SYSTEM FAILURES**

**A. FAILURE MODE, MECHANISM, AND EFFECTS OF EACH FAILED COMPONENT**

The failure of the welds occurred due to excessive vibration. The cracks that occurred were only applicable to the Containment Spray System and did not have any effect on any other system.

**B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE**

A preliminary evaluation determined that; the weld cracks were caused by excessive system vibration resulting in high cycle fatigue.

**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**

The welds in the CT system were installed in the field by TU Electric's contractor Brown and Root Inc.

**III. ANALYSIS OF THE EVENT**

**A. SAFETY SYSTEM RESPONSES THAT OCCURRED**

Not applicable - There were no safety system actuations associated with this event.

**LICENSEE EVENT REPORT (LER)  
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**B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY**

The duration of safety system train inoperability will be provided in the supplement to the LER.

**C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT**

The Containment Spray System is a safety related redundant system utilized to spray water into containment in the event of an accident inside containment. This water is mixed with NaOH as it is first being delivered. Initially, the pumps inject water into containment from the Refueling Water Storage Tank (RWST) and then the pumps switch to a recirculation mode of operation and draw water from the containment sumps to continue the spray through the Containment Spray headers.

The low flows from the cracks would not have prevented the pumps from being energized and performing their design function for accident mitigation.

The engineering review of accident considerations with respect to these leaks indicate that the system would be operable to perform it's safety function for the required period of time during the accident, and that the analysis would allow the system to be turned off well before any concern for dose rates from the leak would occur.

It was concluded that these incidents would not jeopardize the safe shutdown of CPSES Unit 2 or impact the safety and health of the public.

**IV. CAUSE OF THE EVENT**

TU Electric concluded that the cause was insufficiently restricted vibration levels leading to high cycle fatigue cracking.

TU Electric will provide additional details in a supplement to this Licensee Event Report (LER).

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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### V. CORRECTIVE ACTIONS

Corrective actions which are in progress include; replacement of the welds, metallurgical evaluation, and configuration changes with respect to piping supports and undesired piping connections. TU Electric believes that the configuration changes will substantially reduce the level of vibration.

TU Electric will provide details of the corrective and preventive actions in the supplement to this LER.

### VI. PREVIOUS SIMILAR EVENTS

There were two other events which occurred during construction/startup phase at CPSES Unit 2 and one during the operating phase. These events were reported to the NRC pursuant to 10CFR50.55(e) and 10CFR50.73, as Significant Deficiency Analysis Report (SDAR) - Comanche Peak (CP)-92-010, SDAR-CP-92-020 and LER 446/93-009-00. These reports were logged via TXX-92509 dated October 30, 1992, TXX-93010 dated January 7, 1993 and TXX-93383 dated November 22, 1994.