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Ref. Voluntary

May 10, 1991

William J. Cahill, Jr.  
Executive Vice President

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D. C. 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)  
DOCKET NO. 50-445  
REPORT OF EVENT WITH GENERIC INTEREST  
LICENSEE EVENT REPORT 91-006-01 (SUPPLEMENTAL)

Gentlemen:

Enclosed is Supplemental Licensee Event Report 91-006-01 for Comanche Peak Steam Electric Station Unit 1, "Inadvertent Operation of the Containment Sump Section Isolation Valves Caused by Personnel Error."

Sincerely,

William J. Cahill, Jr.

JAA/bm

c - Mr. R. D. Martin, Region IV  
Resident Inspectors, CPSES (2)

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NRC FORM 305				U.S. NUCLEAR REGULATORY COMMISSION				APPROVED OMB NO. 3150-0104 EXPIRES 4/30/92			
<b>LICENSEE EVENT REPORT (LER)</b>								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 1</b>								Docket Number (2) <b>015101010141415</b>		Page (3) <b>1</b> OF <b>017</b>	
Title (4) <b>INADVERTENT OPERATION OF THE CONTAINMENT SUMP SUCTION ISOLATION VALVES CAUSED BY PERSONNEL ERROR</b>											
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
02	28	91	91	006	01	05	10	91	N/A		0151010101
									N/A		0151010101
Operating Mode (9) <b>1</b> This report is submitted pursuant to the requirements of 10 CFR 50. (Check one or more of the following) (11):											
Power Level (10) <b>01916</b>			<input type="checkbox"/> 20.402(b) <input type="checkbox"/> 20.405(a)(1)(i) <input type="checkbox"/> 20.405(a)(1)(ii) <input type="checkbox"/> 20.405(a)(1)(iii) <input type="checkbox"/> 20.405(a)(1)(iv)			<input type="checkbox"/> 20.405(c) <input type="checkbox"/> 50.36(a)(1) <input type="checkbox"/> 50.36(a)(2) <input type="checkbox"/> 50.73(a)(2)(i) <input type="checkbox"/> 50.73(a)(2)(ii)			<input type="checkbox"/> 50.73(a)(2)(iv) <input type="checkbox"/> 50.73(a)(2)(v) <input type="checkbox"/> 50.73(a)(2)(vi)(A) <input type="checkbox"/> 50.73(a)(2)(vi)(B) <input type="checkbox"/> 50.73(a)(2)(x)		
									<input type="checkbox"/> 73.71(b) <input type="checkbox"/> 73.71(c) <input checked="" type="checkbox"/> Other (Specify in Abstract below and in Text, NRC Form 305A) <b>Voluntary Report</b>		
Licensee Contact For This LER (12)											
Name <b>T. A. HOPE</b>								Telephone Number <b>8117 819171-16131710</b>			
Complete One Line For Each Component Failure Described in This Report (13)											
Cause	System	Component	Manufacturer	Reportable To NRCDS	Cause	System	Component	Manufacturer	Reportable To NRCDS		
Supplemental Report Expected (14)										Expected Submission Date (15)	
<input type="checkbox"/> Yes (If yes, complete Expected Submission Date)										<input checked="" type="checkbox"/> No	
Abstract (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)											
<p>On February 28, 1991, a reactor operator and an Instrument &amp; Control technician were performing quarterly surveillance testing on safeguards slave relays required for automatic operation of the containment sump suction valves. The multimeter being used to measure voltage at points in the control circuit was incorrectly set up to measure current rather than voltage. When the first reading was attempted, the containment sump suction valve received an open signal allowing water to drain from the Refueling Water Storage Tank to the containment sump. The cause of the event was personnel error. Corrective action included event review, training, and procedure enhancement. A voluntary report is being submitted because of the significance and generic interest of the event.</p>											

NRC FORM 360A		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92	
<b>LICENSEE EVENT REPORT (LER)</b> <b>TEXT CONTINUATION</b>				ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-500), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC, 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.	
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Text (if more space is required, use additional NRC Form 360A's) (17)

# **I. DESCRIPTION OF THE REPORTABLE EVENT**

## **A. PLANT CONDITIONS PRIOR TO THE EVENT**

On February 28, 1991, at approximately 1345 CST, Comanche Peak Steam Electric Station (CPSES) Unit 1 was in Mode 1, Power Operation, with the reactor at 96 percent of rated thermal power.

## **B. 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.

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

On February 28, 1991, just prior to the event, a reactor operator (utility, licensed) and an Instrument & Control (I&C) technician (utility, non-licensed) were performing a quarterly surveillance test on the Train A safeguards slave relays (EIS:(RLY)(BP)) required for automatic initiation of Emergency Core Cooling System switchover to the containment sump. The operations test procedure verifies the operability of the slave relays by sequentially energizing each relay and verifying contact closure by voltage measurement. The reactor operator directs the test and the I&C technician performs the measurements. The first measurement is taken to verify the contacts are open, and resulted in a reading lower than expected. It was determined that the multimeter was in the current mode rather than the voltage mode. The multimeter was reset and the measurement was taken again.

NRC FORM 360A

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 9150-0104

EXPIRES: 4/30/92

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-500), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (9150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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At approximately 1345 CST, a Containment Sump Hi-Hi Level alarm was received in the Control Room. The on-duty reactor operator (utility, licensed) verified the alarm by observing sump level indication. The Unit Supervisor (utility, licensed), aware of the slave relay testing in progress, checked the Control Board position indication for the containment sump suction valve (E1IS:(V)(BP)) and observed the valve to be in the open position, allowing water from the Refueling Water Storage Tank (RWST) (E1IS:(TK)(BP)) to gravity drain to the containment sump. The valve was immediately closed and testing activities terminated.

As the containment sump suction valve was closing, the RWST Low-Level alarm was received, and action was initiated to restore the tank to a level greater than the minimum level specified in CPSES Unit 1 Technical Specifications 3.5.4 and 3.1.2.6. This was accomplished within the 1 hour time limit specified in the Action statement. The event resulted in 15,000 to 20,000 gallons of borated water being drained from the RWST to the containment. A containment entry made at approximately 1900 CST identified no adverse effects on equipment from the event.

## **D. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE OR PROCEDURAL OR PERSONNEL ERROR**

The incorrect position of the containment sump suction valve was discovered during a review of the Control Board prompted by receipt of a Containment Sump Hi-Hi Level alarm.

## **II. COMPONENT OR SYSTEM FAILURES**

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

No failed components contributed to this event.

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

No failed components contributed to this event.

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION  <b>LICENSEE EVENT REPORT (LER)</b> <b>TEXT CONTINUATION</b>		APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503							
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<p><b>C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS</b></p> <p>No failed components contributed to this event.</p> <p><b>D. FAILED COMPONENT INFORMATION</b></p> <p>No failed components contributed to this event.</p> <p><b>III. ANALYSIS OF THE EVENT</b></p> <p><b>A. SAFETY SYSTEM RESPONSES THAT OCCURRED</b></p> <p>There were no safety system responses associated with this event.</p> <p><b>B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY</b></p> <p>At 1439 CST, 56 minutes after initiation of the event, actions were completed for restoration of the limiting conditions for operation for RWST level as required by CPSES Unit 1 Technical Specifications 3.5.4 and 3.1.2.6.</p> <p><b>C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT</b></p> <p>CPSES Unit 1 Technical Specification requires that a minimum level of 95 percent be maintained in the RWST. The minimum level ensures that (1) sufficient water is available within containment to permit recirculation cooling to the core, (2) sufficient time is available for the operator to take manual action and complete switchover of ECCS and containment spray suction to the containment sump without emptying the RWST or losing suction, and (3) the long-term pH value is between 8.5 and 10.5 for the solution recirculated within containment after a LOCA. Because the RWST drained to the containment sumps, that water was still available for recirculation cooling. The RWST water drained to the containment sump would, however, affect the time before ECCS switchover begins. The lowest RWST level recorded was 92.3 percent. The low RWST level alarm provides ten minutes before operator action is required for ECCS switchover. This level corresponds to a setpoint of 92.83 percent. Using the worst case design instrument accuracy, RWST level did not decrease more than 1 percent below the design minimum. This results in a small decrease in</p>									

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the time available before operator action is required for ECCS switchover. Because of the relatively small magnitude of the RWST volume loss, and because RWST level was restored in a short period of time (within the one hour action requirement), it is concluded that the event did not adversely affect safe operation of the CPSES Unit 1 or the health and safety of the public.

Consideration of the reasonable and credible alternative operating conditions under which the event could have occurred suggests more severe consequences if the event had occurred in a plant shutdown mode. The procedure in use at the time of the event allows performance of the test in any mode. During Mode 4, Hot Shutdown, Mode 5, Cold Shutdown, and Mode 6, Refueling, a typical system alignment consists of one train of RHR aligned to the reactor coolant system hot legs providing shutdown cooling, and the other train in standby, aligned either to the RWST or the reactor coolant system hot legs to provide shutdown cooling or emergency core cooling if required. Inadvertent operation of a containment sump suction valve could result in the discharge of primary coolant to the containment sump. If the event occurred in Mode 4 or Mode 5 with the reactor coolant system pressurized, the flow rate from the pressurized reactor coolant system would be significantly greater than the gravity drain flow rate from the RWST. If the event occurred in Mode 5 or Mode 6 during reduced inventory operations, the loss of inventory could result in the temporary loss of shutdown cooling due to the reduction in Net Positive Suction Head available to the operating pump. The likelihood of one of these events occurring is reduced however, by a plant operating philosophy which discourages testing activities on an operating train of equipment. While no administrative control exists to prohibit such testing, sensitivity to the importance of maintaining shutdown cooling capability would influence any operational decision to allow testing of a component associated with an operating train of RHR. A more thorough evaluation of the consequences of the event is being addressed by the Westinghouse Owner's Group in the resolution of the generic issue of Mode 4 loss of coolant accident.



NRC FORM 306A		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92	
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<p><b>IV. CAUSE OF THE EVENT</b></p> <p><b>IMMEDIATE CAUSE</b></p> <p>Automatic operation of the containment sump suction valve occurs on Lo Lo RWST level coincident with a safety injection signal. The coincidence is provided by placing slave relay contacts in series in the control circuit. This event occurred when the multimeter probes were placed across the portion of the circuit containing those two relay contacts. With the multimeter in the current mode, a path was provided for current flow around the slave relay contacts.</p> <p><b>ROOT CAUSE</b></p> <p>The technician performing the measurements failed to verify proper setup of the multimeter. Following completion of this routine task, the technician focused his attention on properly placing the meter leads across the correct contact terminals.</p> <p><b>CONTRIBUTING FACTOR</b></p> <p>Industry Operating Experience Report (IOER) O&amp;MR 354 is related to the correct use of multimeters during testing activities. O&amp;MR 354 was distributed to the Instrument &amp; Control (I&amp;C) Department, and as a result, I&amp;C reviewed calibration procedures for situations which could result in undesirable plant transients if a low resistance multimeter mode was inadvertently selected for voltage measurements. The IOER was not distributed to the organization with responsibility for developing slave relay test procedures, however. As a result, actions were not taken to include the industry experience in the preparation of slave relay test procedure in use at the time of the event.</p>					

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**V. CORRECTIVE ACTIONS****Root Cause:** Less than adequate self checking.

**Corrective Action:** Meetings have been held throughout the Comanche Peak organization stressing the importance of minimizing mistakes and management's expectations for self-verification. The I&C Training Program will add a qualification item on communications and self-verification. Formal qualification will take place as on-the-job training.

**Contributing Factor:** Limited distribution of industry experience

**Corrective Action:** The event will be reviewed with the IOER program coordinator to ensure proper dissemination of industry experience.

**Additional Corrective Action:** As an added enhancement, the slave relay test procedure in use at the time of the event is being changed to preclude inadvertent valve movement by removing power to the valve during the test.

**VI. PREVIOUS SIMILAR EVENTS**

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

**VII. ADDITIONAL INFORMATION**

Although the event does not meet the reporting criteria of 10CFR50.73, a voluntary report is being submitted because of the significance and generic interest of the event.