

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3										DOCKET NUMBER (2) 0 5 0 0 0 3 6 2 1 OF 0 4				PAGE (3) 0 4		
TITLE (4) HIGH PRESSURE SAFETY INJECTION (HPSI) PUMP BYPASS VALVE FOUND NOT FULLY CLOSED																
EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)							
MONTH	DAY	YEAR	EAR	SEQ. NUMBER	REV. NUMBER	MONTH	DAY	YEAR	FACILITY NAMES				DOCKET NUMBER(S)			
0 6	2 4	8 7	8 7	0 1 3	0 0	0 7	2 4	8 7					0 5 0 0 0 0			
OPERATING MODE (9) 3		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)														
POWER LEVEL (10) 0 0 0		20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)								
		20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)								
		20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER (Specify in Abstract below and in Text, NRC Form 366A)								
		20.405(a)(1)(iii)		X 50.73(a)(2)(i)		50.73(a)(2)(viii)(A)										
		20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)										
		20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)										
LICENSEE CONTACT FOR THIS LER (12)																
NAME H. E. MORGAN, STATION MANAGER										TELEPHONE NUMBER 7 1 4 3 6 8 - 6 2 4 1						
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC						
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 fifteen single-space typewritten lines) (16)																
<p>06/24/87, with the Unit in Mode 3, an Inservice Test (IST) of High Pressure Safety Injection (HPSI) Pump 3P018 indicated a high bypass flow to the Refueling Water Storage Tank. A visual inspection of the manually operated bypass valve revealed that the bypass valve was partially open due to interference with the limit switch actuation assembly, which had loosened. An inspection of all remaining Unit 2 and 3 HPSI bypass valves revealed that the valve associated with 3P019 was also found partially open, although to a lesser degree. The lack of a limit switch actuating assembly collar retaining device is considered to be the root cause of this event.</p> <p>3P018 had been aligned to HPSI Train "B" during the period its bypass valve was not in its fully closed position. Since this condition is contrary to Surveillance Requirement 4.5.2.b, the Unit was considered to have been operating in a condition not permitted by Technical Specifications. An evaluation of HPSI flow with the bypass valve partially open confirmed that 3P018 would have been able to provide sufficient flow to the Reactor Coolant System in the event of the most limiting small break Loss of Coolant Accident. Therefore, there was no loss of safety function as a result of this event.</p> <p>The limit switch assemblies were returned to their original configuration and the valves were properly closed and locked. Corrective actions which will be taken include providing a positive locking mechanism to lock the collar in position on the valve stem, re-adjusting the limit switch such that the control panel status light will be illuminated as the valve disc leaves the seat, and revising appropriate procedures to ensure that the bypass valves are closed at the end of the test or evolution.</p>																

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06/24/87, with the Unit in Mode 3, an Inservice Test (IST) of High Pressure Safety Injection (HPSI) Pump 3P018 (EIIS Component Code P)(EIIS System Code BQ) was initiated. Upon starting the pump, low discharge pressure (1455 psig) and high indicated bypass flow (235 gpm) to the Refueling Water Storage Tank (RWST) (EIIS Component Code TK)(EIIS System Code BP) were noted. These parameters are expected to be approximately 1500 psig and 35 gpm (orifice controlled miniflow) with the pump aligned in the test configuration.

A visual inspection of the manually operated bypass valve (MU186) (EIIS Component Code ISV), revealed that the limit switch actuation assembly retaining collar had backed down the valve stem, preventing full closure of the valve while permitting actuation of the closed position indication in the control room. The limit switch assembly was restored to the proper configuration, the valve was fully closed and a successful test of the pump completed.

An inspection of the limit switch assemblies (EIIS Component Code 33) on bypass valves associated with Unit 3 HPSI pumps 3P017 and 3P019, as well as the 3 HPSI pumps in Unit 2, revealed the following:

3P017 bypass - limit switch properly secured/valve fully closed.

3P019 bypass - limit switch collar partially disengaged/valve 3/4 turn open. At a discharge pressure of 1480 psig, total bypass flow indicated 130 gpm.

2P017 bypass - limit switch collar partially disengaged/valve fully closed.

2P018 bypass - limit switch properly secured/ valve fully closed.

2P019 bypass - limit switch properly secured/ valve fully closed.

The HPSI pump bypass valves are two-inch, manually operated globe valves, fitted with a mechanically actuated remote position indicating switch, as shown in the sketch below. The switch actuating arm (25) fits over a collar (30), which is threaded to the valve stem and retains the actuating arm between the collar shoulder and the spacer (17) as the spacer makes contact with the valve handle. The collar turns with the valve stem and handle when the valve is operated. The actuating arm is intended to move vertically with the valve stem in a guide (23) attached to the yoke (11). An oversized hole in the arm retaining ring prevents the arm from rotating with the collar and stem. With the valve in the fully closed position, approximately 1/2 inch clearance should exist between the bottom of the collar and the top of the yoke.

On the bypass valve for HPSI pump 3P018, the collar was found to have backed out of the spacer and was making contact with the top of the yoke. The actuating arm had shifted laterally, along with the spacer, and the valve handle was compressing all three parts against the yoke. The valve stem could not be moved further in the closed direction.

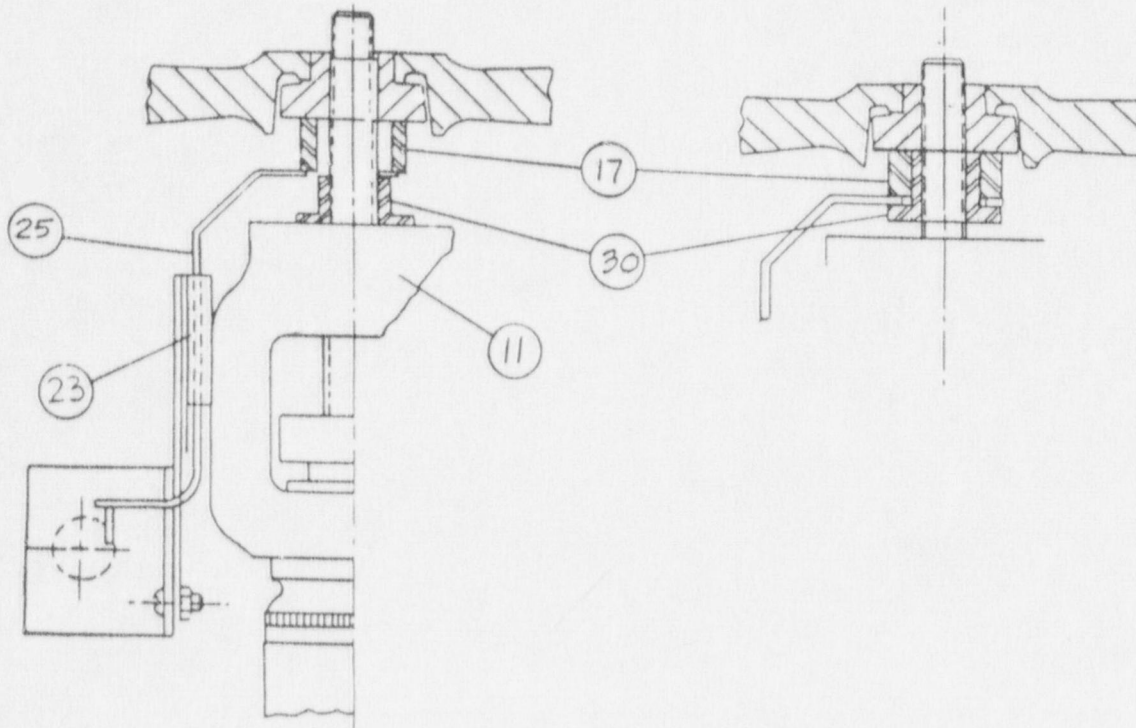
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It was apparent that the collar had loosened either by friction with the guided actuating arm during valve opening operations or due to flow induced vibrations when the valve was in the open position. The collar had become loosened and threaded its way down the stem, preventing further valve closure once the collar made contact with the yoke. The limit switch arm continued to move in the guide, however, the existing design allowed the limit switch to actuate before the valve was fully closed. As a result, control room indication showed the valve closed while in fact the valve disc was off the seat. The lack of a collar retaining device and the limit switch actuation sequence are considered to be design deficiencies and the root cause of failure to recognize the valve was not fully closed.

HPSI 3P018 (AS FOUND 6/24/87)

NORMAL CONFIGURATION



Technical Specification Surveillance Requirement 4.5.2.b requires ECCS manual valves be verified monthly to be in their required position if they are not locked. The HPSI pump bypass valves are required by procedure to be in the locked closed position during normal operation. Surveillance procedures require that these valves be checked monthly to be in the locked closed position. In addition, during performance of the quarterly or post maintenance inservice test of the pumps, pursuant to Surveillance Requirement 4.5.2.f, the pump is started and the "as found" shut off head pressure is recorded with the bypass valve closed. The bypass valve is then opened to establish a 650 gpm flow rate to the RWST and discharge head at that flow rate is verified. The inservice test procedures require that upon completion of the test, the valve be closed and verified closed by visual inspection and restarting the pump to confirm that discharge pressure is no less than that recorded at the start of the test. Lower discharge pressure readings at the end of the test would indicate that the bypass valve was not fully closed.

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Review of IST records indicates the bypass valves for HPSI 3P018 and 3P019 were in the partially opened position since 05/21/87 and 05/29/87, respectively, until discovery on 06/24/87, when the condition was corrected. During this time period, HPSI 3P018 was aligned to Train B while HPSI 3P019 was not relied upon for automatic safety injection actuation. For the same period, HPSI Train A was operable using HPSI 3P017 except for a one-hour and a two-hour period when HPSI 3P017 was intentionally inoperable during Inservice Tests. Since the bypass valves associated with HPSI 3P018 and 3P019 were not in their fully closed position as required by Surveillance Requirement 4.5.2.b and, thereby, permitted diversion of additional flow to the RWST, the Unit was considered to be operating in a condition not permitted by Technical Specifications.

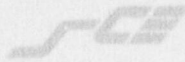
An evaluation of HPSI flow under accident conditions, relying solely on Train B HPSI 3P018, with its bypass valve partially opened, was performed. This evaluation confirmed that HPSI 3P018, if actuated with its bypass valve partially opened, would have been able to provide sufficient flow to the Reactor Coolant System (RCS) in the event of the most limiting small break Loss of Coolant Accident (LOCA). Since the bypass valve associated with HPSI P019 was opened less than the HPSI P018 valve, both pumps were considered to have remained operable throughout the period in question. Based on this evaluation, it is concluded that the partially open condition of the bypass valves did not result in a loss of safety function.

The limit switch assemblies were returned to their original configurations and the valves were properly closed and locked. Other HPSI pump bypass valves were inspected and found to be fully closed. In addition to the HPSI system, which is unique as the only system having bypass lines and valves installed to facilitate IST of HPSI pumps, safety related valves with similar position indication in other systems were also inspected and no problems which could have rendered these systems inoperable were identified.

A positive locking mechanism to lock the collar in position on the valve stem will be incorporated during the next refueling outage in both Units 2 and 3.

The limit switch will be re-adjusted such that the control panel status light will be illuminated as the valve disc leaves the seat, and will remain lighted until the disc is seated.

In addition to existing criteria and requirements for visual inspection of the valves, appropriate procedures which involve manipulation of the bypass valves (e.g. the HPSI pump IST procedure and the operating instruction for RWST recirculation) will be revised to add a requirement to ensure that the bypass valves are closed at the end of the test or evolution by observing actual bypass flow.



Southern California Edison Company

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July 24, 1987

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

Subject: Docket No. 50-362
30-Day Report
Licensee Event Report No. 87-013
San Onofre Nuclear Generating Station, Unit 3

Pursuant to 10 CFR 50.73(a)(2)(i), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving the High Pressure Safety Injection System. Neither the health and safety of plant personnel nor the health and safety of the public was affected by this occurrence.

If you require any additional information, please so advise.

Sincerely,

HE Morgan

Enclosure: LER No. 87-013

cc: F. R. Huey (USNRC Senior Resident Inspector, Units 1, 2 and 3)
J. B. Martin (Regional Administrator, USNRC Region V)
Institute of Nuclear Power Operations (INPO)

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