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REGULATOR INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8901170242 DOC.DATE: 89/01/10 NOTARIZED: NO DOCKET #
 FACIL:50-323 Diablo Canyon Nuclear Power Plant, Unit 2, Pacific Ga 05000323
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 SHIFFER,J.D. Pacific Gas & Electric Co.
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 85-030-01:on 850725,ECCS safety injection sys flow
 balance test.W/890110 ltr.
 W/8 ltr.

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 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)												DOCKET NUMBER (2)						PAGE (3)			
DIABLO CANYON UNIT 2												05000323						1 OF 07			
TITLE (4)																					
ECCS SAFETY INJECTION SYSTEM FLOW BALANCE TEST																					
EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)												
MONTH	DAY	YEAR	YEAR	MONTH	DAY	YEAR	FACILITY NAMES						DOCKET NUMBER(S)								
													05000011								
07	25	85	85	03	00	01							05000011								
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (11)																		
3																					
POWER LEVEL (10)			<input checked="" type="checkbox"/> 10 CFR 50.73 (a)(2)(1)(b) <input type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 305A)																		
0100																					

LICENSEE CONTACT FOR THIS LER (12)

DAVID C. MARBURGER, REGULATORY COMPLIANCE ENGINEER

TELEPHONE NUMBER

AREA CODE: 805 595 7351

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC TURE	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFAC TURE	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)		<input checked="" type="checkbox"/> NO		EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR

ABSTRACT (16)

DCPP conservatively determined that when Unit 2 initially entered Mode 3 (Hot Standby) on July 25, 1985, the Safety Injection (SI) flow balance was not in compliance with section 4.5.2.h.2) of Technical Specification (TS) 3.5.2, "ECCS Subsystems-Tavg Greater Than or Equal to 350 degrees F".

SI System flow balance test specified by Surveillance Requirement (SR) 4.5.2.h.2) was initiated in accordance with Surveillance Test Procedure (STP) V-15, "ECCS Flow Balance Test" on November 18, 1988. The test showed a change in the SI injection flow from that of the 1985 flow balance test and a lower total flow than required by SR 4.5.2.h.2).a. DCPP determined conservatively that this flow condition may have existed since the 1985 test and thus exceeded the time period specified in the TS action statement. The flow difference effects were evaluated and found not to exceed any design or regulatory limit.

The flow balance valves have been adjusted and the flow balance is now in compliance with the TS.

The root cause was determined to be a deficiency in STP V-15 in that there were no instructions on how to operate these valves and no precautions to prevent the flow balance valve setting being altered when locking the valve stem in position. The above procedure is being revised to correct the deficiency.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO 3150-0104

EXPIRES 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (5)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
DIABLO CANYON UNIT 2	05000323	85	030	00	0	2	07

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

I. Initial Conditions

Unit 2 was in Mode 3 (Hot Standby)

II. Description of Event

A. Event:

While preparing Unit 2 for operation following refueling, Safety Injection (SI) pump (P) 2-2 was damaged during the process of filling the accumulators and was replaced with a new pump. DCPD determined that the installation of the new pump constituted a "modification" and consequently performed the SI System (BQ) injection line flow balance test as specified under Surveillance Requirement (SR) 4.5.2 h.2) of Technical Specification (TS) 3.5.2, "ECCS Subsystems-Tavg Greater Than or Equal to 350 degrees F."

The SI flow balance test was initiated in accordance with Surveillance Test Procedure (STP) V-15, "ECCS Flow Balance Test" on November 18, 1988. SI pump 2-1 was used to supply flow to all four cold legs. The flow to the four cold leg injection lines was measured and recorded before any changes were made to the flow adjusting valves. The "as found" results showed differences between these results and those from the last balance performed and recorded in 1985.

The as found recorded total cold leg flows for the three lowest readings was 455.5 gpm, 7.5 gpm less than the minimum TS flow of 463 gpm. The test flow difference was attributed to the flow in the cold leg injection to loop 3 being less and to the test conditions being different. The flow to loop 3 from the cold leg injection line, through flow balance valve 8822C, was 147.3 gpm during the 1988 test and 155.3 gpm during the 1985 test. The flow test results for the other three injection lines showed flow rates very close (1.1 gpm or less) to those recorded in the 1985 test.

The two tests were performed with different coolant levels in the Reactor Coolant System (RCS). The level for the 1985 test was at mid-loop whereas this test was done at 25% cold calibration pressurizer level. The higher back pressure would reduce the total flow from the SI pump. The test flow number was not adjusted to compensate for this effect as it is more conservative to evaluate the effects of the larger flow difference.

SR 4.5.2.h.2).a) requires a total flow from the three lowest flow lines of no less than 463 gpm. The above total is 7.5 gpm less than the specified minimum although some of this can be accounted for by the difference in the test conditions.

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TEXT (If more space is required, use additional NRC Form 386A's) (17)

Following the recording of the "as found" values, the flow balance valves were unlocked and adjusted to provide correct values, locked in position and then the flows were reverified and recorded. The cold legs flow balance is now in compliance with the TS. The reverification step was done to assure that the stem position had not been altered during the locking of the stem in place. Another set of readings were taken with SI pump 2-2 operating which also showed a satisfactory flow balance using that pump.

Flow balance procedure STP V-15 was completed with satisfactory results and recorded on November 20, 1988.

On December 15, 1988, a Technical Review Group (TRG) defined root cause and conservatively determined that the flow balance condition may have existed since the 1985 test which is a time period in excess of that specified in the TS action statement and constitutes a non-compliance with the Technical Specification.

B. Inoperable structures, components, or systems that contributed to the event:

None

C. Dates for major occurrences:

1. June 19, 1985: STP V-15 ECCS SI injection flow balance test completed on Unit 2 and results recorded.
2. July 25, 1985: Unit 2 made initial entry into Mode 3
3. Nov. 18, 1988: Initiated Performance of STP V-15 ECCS flow balance test on Unit 2. Record date for "as found" conditions.
4. Nov. 20, 1988: SI injection balance valves adjusted and STP V-15 is successfully completed.
5. Dec. 15, 1988: Discovery Date-TRG determined that the exact time of the misposition of the stem on the balance valve (8822C) in the cold leg injection to loop 3 line could not be established. The TRG conservatively concluded that it had happened during the stem locking step following the 1985 test. This is a time period in excess of that provided in the TS action statement and constitutes a non-compliance with the Technical Specification.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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APPROVED OMB NO 3150-0104

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

D. Other systems or secondary functions affected:

None

E. Method of discovery:

Performance of STP V-15.

F. Operator actions:

None

G. Safety system responses:

None

III. Cause of the Problem

A. Immediate Cause:

The immediate cause of the cold leg injection to loop 3 low flow was that flow balancing valve 8822C was closed too far, reducing the flow in that line to a value which brought the total for the three lowest lines to an amount below the TS 3.5.2 surveillance limit.

B. Root Cause:

Four possibilities were considered in the determination of the root cause for the low cold leg injection flow:

1. The possibility of valve manipulation did not prove to be credible. The lock wire and valve seal were found intact, indicating that the lock nut had not been moved. There is no discrepancy with regard to the seal number in the performance of STP V-14, "ECCS Throttle Valve Position Verification". The stem can not be moved once the lock nut is tightened.
2. There is a strong tendency for the stem to move while tightening the lock nut unless the stem is held tightly to counteract the torque from the lock nut. It is possible the flow data were recorded before the final locking of the stem and the stem moved while being locked in position. Investigation by the engineers showed that the operators were not familiar with this component and the way to adjust the valve position. Further investigation failed to identify a procedure for this operation. The lack of procedure and training for adjusting the balance valves was determined to be the most probable root cause.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO 3150-0104

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		8 5	0 3 0	0 0	0 5	OF	0 7

TEXT (If more space is required, use additional NRC Form 365A's) (17)

3. The differential pressure (dp) gauges would had to have been severely out of calibration (5% or more) to cause an error of this magnitude. Post test calibration did not substantiate abnormal error. However the engineers performing the test in 1985 indicated that the dp gauges vibrated excessively and that an average reading was necessary. This could have led to an error in reading of the gauges. The TRG concluded this was not a cause as there was little scatter in the as found readings in the other three lines.
4. During the 1985 test, RCS level was maintained about two feet below the vessel flange with the head removed. During the 1988 test a cold calibration pressurizer level of 25% was maintained with 1-2 psig gas pressure. This is equivalent to about 25 feet head difference. Using the SI pump curve, this increased back pressure corresponds to a flow reduction of about 5 gpm. Although the different test condition accounts for some of the shortage in total flow, it does not explain why one of the cold leg flows was low relative to the other three.

The root cause for this problem is a deficiency in the STP V-15 procedure in that instructions were not included on the operation of the balance valves and precautions were not included against the possibility of the valve stem position being moved when tightening the lock nut.

C. Contributory Cause:

Contributory causes for the low cold leg injection flow was determined to be the lack of a requirement in STP V-15 to lock the stem of the balance valves before recording the final flow results.

IV. Analysis of Event

A. Safety Analysis:

The surveillance flow requirements of TS 3.5.2 are established to assure that no less than minimum SI cold leg injection flow assumed in the LOCA analysis is maintained in the case of SR 4.5.2.h.2)a, and to assure that the SI cold leg injection flow is maintained below the maximum limits assumed in the containment pressure analysis in the case of SR 4.5.2.h.2)b. In the case of the as found readings for the total of the lowest three SI cold leg injection lines, the minimum flow was not satisfied. The as found total of all four cold leg injection line flows plus the recirculation line flow did not exceed the maximum pump flow and was in conformance with the SR 4.5.2.h.2).b.

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APPROVED OMB NO 3150-0104
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

The effect of the low cold leg safety injection flow was evaluated by Westinghouse. The cold leg safety injection functions as part of the ECCS in the mitigation of small, intermediate and large break LOCAs. For larger breaks most of the injection flow is delivered by the high flow, low head Residual Heat Removal (RHR) pumps but for smaller breaks the RHR pumps can not inject against RCS pressure and the injection is delivered by the SI pumps and by the charging pumps. The SI cold leg injection flow, in the case of a cold leg LOCA in RCS loops 1, 2 or 4 would have been lower than the value defined in the TS. A LOCA in the cold leg of loop 3 or a LOCA in any hot leg, would not have seen a reduction in SI cold leg injection flow from that assumed in the Safety Analysis.

For those cases where the reduced flow is applicable, the test injection flow reduction is small. The Westinghouse evaluation of the effects of the lower flow upon the ECCS analysis determined that there would be no impact for the larger breaks, and for smaller breaks the effect would be insignificant. In both cases, the current ECCS analysis will remain valid. Consequently the difference of 8 gpm in the SI cold leg injection test flow has no significant safety consequence.

The consequences of the above difference from the previous SI flow balance test have been evaluated and do not compromise the safe operation of the plant. Thus, the health and safety of the public were not affected by this event.

B. Applicability to Unit One.

The described problem with the SI injection flow rate is influenced by the current steps in STP V-15. As that procedure is also applicable to Unit One, its use on Unit One could have resulted in a similar discrepancy with the injection line flow balance on that unit. If so, the above safety analysis is also equally applicable as the design and analysis is the same. The STP V-15 will be performed on Unit One at the next refueling outage to reverify the flow rates.

C. Applicability to Other Valves.

This type of balance valve is also used for the charging pump injection to the RCS cold legs. STP V-15 was also used to initially adjust these valves. The initial test documentation (1985) and the documentation of the full flow injection test at the last refueling (1988) were reviewed and did not show any indication of abnormality. As a conservative measure, the charging line flow balance will be reverified at the next refueling of Unit 1 and Unit 2.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		8 5	0 3 0	0 0		

TEXT (If more space is required, use additional NRC Form 386A's) (17)

V. Corrective Action

A. Immediate Corrective Actions:

The flow balance valves on the cold leg injection lines were readjusted to provide flows which are in agreement with the values specified in the TS.

B. Corrective Actions to Prevent Recurrence:

A new procedure or an addition to STP V-15 will be written and implemented which will cover the steps and precautions involved in the adjusting, locking and sealing of the flow adjustment valves.

STP V-15 will be revised to require locking of the valve stems before the final readings are recorded.

VI. Additional Information

A. Failed Components:

None.

B. Previous LERs.

None

Pacific Gas and Electric Company

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James D. Shiffer
Vice President
Nuclear Power Generation

January 10, 1989

PG&E Letter No. DCL-89-009



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

Re: Docket No. 50-323, OL-DPR-82
Diablo Canyon Unit 2
Licensee Event Report 2-85-030-00 - Unit 2 ECCS Safety
Injection System Flow Balance Test

Gentlemen:

Pursuant to 10 CFR 50.73 (a)(2)(i)(b), PG&E is submitting the enclosed Licensee Event Report concerning a non-compliance with the action statement of Technical Specification 3.5.2., "ECCS Subsystems-Tavg Greater Than or Equal to 350 degrees F." When performing Safety Injection line flow balance Surveillance Test Procedure V-15, the Safety Injection flow was found to be slightly lower than the minimum specified in Technical Specification 3.5.2.h.2)a), and that condition was conservatively determined to have existed for a time period in excess of that specified in the action statement.

This event has in no way affected the public's health and safety.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,

A handwritten signature in cursive script, appearing to read 'J. D. Shiffer'.
J. D. Shiffer

cc: J. B. Martin
M. M. Mendonca
P. P. Narbut
B. Norton
H. Rood
B. H. Vogler
CPUC
Diablo Distribution
INPO

Enclosure

DC2-88-TN-N133

2472S/0067K/DY/2209

Handwritten initials 'JED' and the date '1/11'.

