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August 5, 2010

PG&E Letter DCL-10-086

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyons Unit 1 & Unit 2
Licensee Event Report 2-2010-002-00
Diablo Canyon Power Plant Unit 2 SI Test Line Unanalyzed Condition

Dear Commissioners and Staff:

Pacific Gas and Electric Company submits the enclosed Licensee Event Report (LER) regarding the Unit 2 design change deficiency for Safety Injection check valve testing conditions that placed the system in a temporary unanalyzed condition. This LER is submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B).

There are no new or revised regulatory commitments in this report.

This event did not adversely affect the health and safety of the public.

Sincerely,

James R. Becker

swh/2246/50316384
Enclosure
cc/enc: Elmo E. Collins, NRC Region IV
Michael S. Peck, NRC Senior Resident Inspector
Alan B. Wang, NRR Project Manager
INPO
Diablo Distribution

IE22
NRR

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Diablo Canyon Unit 2	05000323	1 OF 6

4. TITLE
DCPP Unit 2 SI Test Line Unanalyzed Condition

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
6	14	2010	2010	- 002 -	00	08	05	2010	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE: 1

10. POWER LEVEL: 100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☒ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Steven W. Hamilton – Senior Regulatory Services Supervisor	(805) 545-3449

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED		15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)*	☒ NO				

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On May 14, 2010, a design deficiency was discovered during the final preparation of the Diablo Canyon Power Plant (DCPP) Unit 1 design change package (DCP) for the safety injection (SI) test line optimization modification. The DCP lacked the required flow restrictors for the reactor coolant pressure boundary isolation valves, resulting in the potential to create loss of reactor coolant system (RCS) inventory which would exceed normal charging system makeup capability. On June 14, 2010, it was determined that this design deficiency impacted the DCPP Unit 2 SI test line optimization modification package, implemented during the most recent refueling outage on Unit 2 (2R15).

The Unit 2 design deficiency was only an issue during RCS check valve testing in Mode 4 operation during 2R15. The SI piping system and its associated components are fully qualified to perform their design basis functions when the test line isolation valves are in their normally-closed position above Mode 4. During the testing the valves were opened on each loop creating an unanalyzed condition which is reportable under 10 CFR 50.73(a)(2)(ii)(B).

TEXT

I. Plant Conditions

At the time of discovery, Unit 2 was in Mode 1 (Power Operation) at approximately 100 percent reactor power with normal operating reactor coolant temperature and pressure.

During 2R15 startup activities, the design deficiency created a concern only when testing the safety injection system (SIS) check valves during Mode 4 operation.

II. Description of Problem

A. Background

The function of the DCPP emergency core cooling system (ECCS) is to provide core cooling and negative reactivity addition to ensure that the reactor core is protected after a loss of coolant accident (LOCA), rod ejection accident, loss of secondary coolant accident, or steam generator tube rupture. The ECCS consists of three separate subsystems: centrifugal charging [BQ], safety injection (SI), and residual heat removal (RHR) [BP]. Each subsystem consists of two trains that are interconnected and redundant such that either train is capable of supplying 100 percent of the flow required to mitigate the accident consequences. Each of the two trains, A and B, consist of a RHR pump, an SI pump (SIP), and a centrifugal charging pump (CCP).

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the refueling water storage tank (RWST) can be injected into the RCS following an accident. Pairs of check valves were installed in each of the injection flow paths to the RCS to prevent flow from the RCS to the injection sources. These check valves must be tested during refueling outages to ensure that the leakage from the RCS is within its design limits. An SI leak test system is installed to test the SI check valves for back leakage from the RCS and to provide a fill header from either the SIPs or the CCPs to the Accumulators. The original design of the leak test system used remotely actuated air operating valves to perform the test.

During the most recent refueling outage on Unit 2 (2R15), changes were made to the Unit 2 leak test system. The air operated valves (AOVs) were replaced with two manual valves in series, in order to improve system flow isolation. The original AOVs had flow restrictors with 3/8" port size, limiting the flow from the AOV when opened during testing. This ensured that a line-break downstream could be mitigated by normal operation of the charging system. During the development of the design change package for Unit 2, the manual valves to be installed were

TEXT

specified to meet all the design criteria for the safety related application, but the requirement for a maximum of 3/8" port size was overlooked. The absence of this flow restriction in the valves or the line resulted in the design deficiency.

B. Event Description

On May 14, 2010, a design deficiency was identified during the final preparation of the DCPP Unit 1 design change package for SI test line optimization modification. On June 14, 2010, it was determined that this design deficiency impacted the DCPP Unit 2 SI test line following an optimization modification package implemented during the most recent refueling outage on Unit 2 (2R15). Note that the deficient condition only applies to the RCS check valve testing conditions in mode 4. The SI piping system and its associated components are fully qualified to perform their design basis functions in their normally-closed position.

The design deficiency was introduced during a replacement of the SI Test line AOVs (containing internal 3/8" port size restriction) with two normally closed manual valves in series. The requirement for a maximum 3/8" port size as in the original AOVs was overlooked, due to a lack of understanding of the applicability of licensing basis requirements. The manual valve design, with a 3/4" globe valve, was sufficient for their normally closed state; however, because the manual valves are opened during Mode 4 for SI check valve testing, the design should have restricted the opening through the valves to no more than that permitted by the 3/8" port size of the AOVs. Therefore, the Unit 2 SI leak test system in its current condition is insufficient for testing conditions.

The Unit 2 modification package also replaced several non-reactor coolant pressure boundary (RCPB) SI Test Line AOVs (also containing internal 3/8" port size) with one normally closed Piping Code Class B manual valve. These Unit 2 SI test valves will also require a modification to install travel stops to limit the flow capacity in order to be acceptable for SI check valve testing.

C. Status of Inoperable Structures, Systems, or Components that Contributed to the Event

The SI piping system and its associated components are fully qualified to perform their design basis functions. However, the Unit 2 SI Test System in its current condition can place the plant in a non-conforming configuration during testing and will require corrective action to limit the opening to less than the permitted 3/8" port size of the AOVs that replaced the AOVs.

D. Other Systems or Secondary Functions Affected

No additional safety systems were adversely affected by this event.

E. Method of Discovery

The design deficiency was identified during the final preparation of the Unit 1 design change package for SI test line optimization. It was concluded that this design deficiency also applied to the Unit 2 SI test line optimization modification package that had previously been implemented and tested during the most recent refueling outage (2R15).

F. Operator Actions

None

G. Safety System Responses

None

III. Cause of the Problem

A. Immediate Cause

None

B. Cause

The design deficiency was caused by a limited understanding of the applicability of licensing basis requirements for small break analysis and shutdown operating modes. This resulted in the omission of the required flow limiting feature in the manual valves after the AOVs were replaced.

IV. Assessment of Safety Consequences

When the plant is at normal operating temperature and pressure, the maximum break size for which the normal makeup system can maintain the pressurizer level is obtained by comparing the calculated flow from the RCS through the postulated break against the charging system flow capability when aligned for maximum charging at normal RCS pressure. The small pipe break analysis is used to evaluate the initial core thermal transient for a spectrum of pipe ruptures, which bounds breaks corresponding to the smallest break size, typically a 3/8 inch diameter opening, up to and including a break size of 1.0 square foot. For a break

opening 3/8 inch or smaller, the makeup flow rate from either CCP is adequate to allow time for an orderly plant shutdown without automatic ECCS actuation.

The design deficiency was installed in Unit 2 only and impacted Unit 2 during ECCS check valve testing in Mode 4. The testing kept three loops closed while one RCS loop was being tested. The opening and closing of the test valves was controlled by an approved surveillance test procedure. With testing in Mode 4, the RCS pressure was less than normal operating pressure. Any postulated leak would only come from the RCS loop being tested through either a first-off or second-off ECCS check valve and the two open SI test line valves. With Unit 2 in Mode 4, the ECCS would be capable of making up for any postulated leakage. As such, this possible unanalyzed condition did not pose a significant safety consequence.

V. Corrective Actions

A. Immediate Corrective Actions

1. Plant staff was directed to maintain SI Test Line valves in their closed position via an administrative clearance.

2. Surveillance Test Procedures (STP) V-5A2, "Emergency Core Cooling System Check Valve Leak Test, Post-Refueling/Post-Maintenance Valves 8948 A-D, 8818A-D and 8819 A-D" and V-5C, "Emergency Core Cooling System Hot Leg Check Valve Leak Test" for Unit 2 have been placed on Administrative Hold until travel stops can be installed.

B. Corrective Actions to Prevent Recurrence (CAPR)

1. Travel limiting stops will be installed on the valve stems on all of the new SI Test Header RCPB manual valves to limit the opening to less than a 3/8" port size prior to any check valve testing. This will correct the lack of a flow limiting design feature as implemented in the design modification.

2. Design engineering personnel are required to obtain a qualification for 10 CFR 50.59 evaluations and maintain this qualification through recurring training which includes training on searching the DCPP licensing basis for applicability to change being considered.

TEXT

VI. Additional Information

A. Failed Components

None

B. Previous Similar Events

None.

C. Industry Reports

None.