LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Diablo Canyon Unit 1	0 5 0 0 0 2 7 5	1 OF 13

TITLE (4)

Technical Specification 3.6.1.1 Not Met Due to Misinterpretation of Containment Isolation Valve Surveillance Requirements for Certain Test, Vent, and Drain Valves

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
07	25	1997	1997	- 0 1 3 -	0 2	04	10	1998	Diablo Canyon Unit 2	0 5 0 0 0 3 2 3

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (11)		
1	X	10 CFR	50.73(a)(2)(i)(B)
POWER LEVEL (10)		OTHER	
1 0 0	(SPECIFY IN ABSTRACT BELOW AND IN TEXT, NRC FORM 366A)		

LICENSEE CONTACT FOR THIS LER (12)

	TELEPHONE NUMBER	
	AREA CODE	
Vickie A. Backman - Senior Regulatory Services Engineer	805	545-4289

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED	MON	DAY	YR
[ ] YES (If yes, complete EXPECTED SUBMISSION DATE)	[X] NO	SUBMISSION DATE (15)			

ABSTRACT (16)

On February 20, 1984, and on July 19, 1985, respectively, Technical Specification (TS) 3.6.1.1, "Containment Integrity," was not met when Units 1 and 2 entered Mode 4 (Hot Shutdown) during plant heatup. Certain containment penetration test, vent, and drain valves were not periodically surveilled in accordance with TS 4.6.1.1.a. "Containment Integrity."

On July 9, 1997, an NRC inspector questioned if Instrumentation Root Valve SI-1-8964 was included in the 31 day surveillance required by TS 4.6.1.1.a. for containment isolation valves (CIVs). PG&E verified that this valve was not included. On July 25, 1997, NRC staff indicated all test, vent, and drain valves between penetration inner and outer CIVs should be included in the surveillance requirements. On August 28, 1997, during a prudent action inspection, a threaded plug was discovered to be missing from many of the manifolds used in the steam generator level and flow transmitters. On March 18, 1998, it was determined that test connections at the personnel airlock should also be surveilled.

This event was caused by a misinterpretation of TS 4.6.1.1.a. by PG&E non-licensed personnel. Reviews and inspections were completed for all containment penetrations required to be closed during accident conditions to ensure TS 4.6.1.1.a. requirements are met. Surveillance procedures have been revised to include the additional CIVs.

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TEXT

I. Plant Conditions

Units 1 and 2 have been in various modes and at various power levels with the conditions described below.

II. Description of Problem

A. Summary

On February 20, 1984, and on July 19, 1985, respectively, Technical Specification (TS) 3.6.1.1, "Containment Integrity," was not met when Units 1 and 2 entered Mode 4 (Hot Shutdown) during plant heatup. Some containment penetration test, vent, and drain valves (BP)(ISV) were not periodically surveilled in accordance with TS 4.6.1.1.a.

On July 9, 1997, an NRC inspector questioned if Instrumentation Root Valve SI-1-8964 (BP)(ISV) was included in the 31 day surveillance required by TS 4.6.1.1.a. Investigation by PG&E verified that this valve was not included in the 31 day Surveillance Test Procedure (STP) I-1D, "Routine Monthly Checks Required by Licenses."

In a discussion on July 25, 1997, NRC staff indicated all test, vent, and drain valves off lines between penetration inner and outer containment isolation valves (CIVs) (ISV) are also considered CIVs and should be included in TS 4.6.1.1.a. surveillance requirements.

In a discussion on July 29, 1997, the NRC provided additional clarification as to the applicability of TS 4.6.1.1.a. in relation to which penetrations were considered "in service" during accident conditions.

On August 28, 1997, during an inspection initiated as a prudent action following the above findings, a one-eighth inch threaded plug (SB)(PSF) was discovered to be missing from many of the four valve manifolds (SB)(V) used in the steam generator (SB)(SG) level and flow transmitters (seven per SG).

On March 18, 1998, it was determined that test connections (NH)(PSF) at the personnel airlock (NH)(AL) should also be surveilled in accordance with the TS.

B. Background

TS 4.6.1.1.a. requires containment integrity to be demonstrated at least once per 31 days by verifying that all penetrations not capable of being closed by operable containment automatic isolation valves and required to be closed during accident conditions are closed by valves, blind flanges, or deactivated automatic valves secured in their positions, except for valves that are open under administrative control as permitted by TS 3.6.3, "Containment Isolation Valves." Exceptions are valves, blind flanges, and deactivated automatic valves which are located inside containment and are locked, sealed, or otherwise secured in the closed position. These are verified during each cold shutdown.

Standard Review Plan (SRP), Section 6.2.6, states:

> *"Leak testing, to assure that containment integrity is restored following the test, vent and drain (TVD) connections that are used to facilitate local leak rate testing and the performance of the containment integrated leak rate test, should be under administrative control, and should be subject to periodic surveillance, to assure their integrity and verify the effectiveness of administrative controls."*

Procedures

STP I-1D is used to verify that a condition or parameter meets TS requirements. This STP verifies most valve positions outside containment every 31 days.

STP I-1F, "Routine Monthly Checks Required by Licenses Behind Rad Doors," is used to verify that a condition or parameter meets TS requirements. This STP verifies certain valve positions outside containment that are located behind radiation doors every 31 days.

STP V-6, "Verification of Proper Alignment of Penetration Test Connection Valves, Spare Instrument Lines and Equipment Hatch For Containment Integrity," is used to verify that all valves, blind flanges, and deactivated automatic valves located inside containment which are required for containment integrity by TS 3.6.1.1 are locked, sealed, or otherwise secured in the closed position.

Type C Testing

Type C Tests are intended to measure CIV leakage rates. The CIVs included are those that:

1. Provide a direct connection between the inside and outside atmosphere of the containment under normal operation such as purge, ventilation, vacuum relief, and instrument valves,

2. Are required to close automatically on receipt of a containment isolation signal,

3. Are required to operate intermittently under post-accident conditions,

4. Are in main steam and feedwater piping of direct cycle boiling water power reactors.

PG&E Position on CIVs (February 1984 - July 1997)

PG&E considered only those penetrations required to be Type C tested and their associated test, vent, and drain valves to require TS 4.6.1.1.a. surveillances.

PG&E understands that the positions of manual valves located between non-Type C CIVs are important to the maintenance of containment integrity and are part of the containment boundary. However, based on the following, PG&E did not include these valves in the TS 4.6.1.1.a. surveillances:

- The valves were not considered CIVs by definition according to ANSI N271-1976. CIVs and test, vent, and drain valves have separate and distinct definitions.

- The Final Safety Analysis Report (FSAR) does not list these valves as CIVs in Table 6.2.3.

- SRP, Section 6.2.6, recommends that there should be clearly imposed administrative controls and surveillance requirements on test, vent, and drains used for local leak rate testing (LLRT). These valves are located between CIVs.

SI-1-8964

Containment Penetration 51B contains a safety injection (SI) system line used to test check valve leakage and to fill the SI accumulators. Outside containment, a branch off this line has a Pressure Indicator, PI-942, with a normally closed manual isolation valve, SI-8964.

Airlocks

The surveillance of TS 4.6.1.1.b. specifically directs each containment airlock to be in compliance with the requirements of TS 3.6.1.3, "Containment Airlocks." PG&E did not consider TS 4.6.1.1.a to be applicable to the airlocks or any of the airlock appurtenances. Following discussions with NRR personnel, PG&E has changed its position and has included the airlocks in its review for compliance with TS 4.6.1.1.a.

C. Event Description

On February 20, 1984, and on July 19, 1985, respectively, TS 3.6.1.1 was not met when Units 1 and 2 entered Mode 4 during plant heatup. Some containment penetration test, vent, and drain valves were not periodically surveilled in accordance with TS 4.6.1.1.a. Administrative controls were not in place to meet the TS surveillance requirements.

PG&E's understanding of TS 3.6.1.1 at that time was that it applied only to Type C tested main process line CIVs. Additionally, in accordance with SRP Section 6.2.6, PG&E had applied the surveillance requirements to test vents and drains used for LLRT.

On July 9, 1997, an NRC inspector questioned if instrumentation root valve SI-1-8964 was included in the 31 day surveillance required by TS 4.6.1.1.a. Investigation by PG&E verified that this valve was not included in surveillance procedure STP I-1D. A plant action request was initiated to track evaluation of the concern. The subject valves on both Units were verified closed by Operations even though it was not clear that it was required by the TS since they were not test, vent, or drain valves used for containment LLRT.

A review of penetrations that are required to be closed following an accident was conducted to identify any additional valves similar to

SI-1-8964 that could require administrative controls and/or be subject to additional surveillance requirements.

On July 24, 1997, two inside containment valves in the component cooling water (CCW) system were identified that were not included in the TS 4.6.1.1.a. surveillance. The valves were LLRT valves for CCW supply and return for the excess letdown heat exchanger. PG&E believes these valves were left out because: (1) they are in a closed system inside of containment, (2) indications of mispositioning would be readily detected by the containment leakage detection instrumentation, and (3) they were subject to normal alignment checklists. A containment entry was made and the two valves were verified closed and capped.

On July 25, 1997, a conference call was initiated with the NRC to discuss the applicability of TS 4.6.1.1.a. The NRC indicated that all valves, including test, vent, and drain valves which are part of the containment boundary and associated with a containment penetration, are CIVs and the requirements of TS 3.6.1.1 apply.

The NRC also clarified that a cap downstream of a closed valve was equivalent to a blind flange and met the TS requirement for manual valves being "otherwise secured," and therefore did not require a lock or seal inside containment.

The NRC indicated that valve SI-1-8964 is part of the containment isolation barrier for a penetration that is required to be closed during accident conditions. Therefore, it should be verified to be in its closed position at least once per 31 days as required by containment integrity TS 4.6.1.1.a. This valve had not been previously identified as a manual CIV and was not verified as part of STP I-1D. However, the operating crew had previously verified the valves on both Units to be closed on July 9, 1997; thereby, meeting the TS 4.6.1.1.a. surveillance requirement.

The NRC also indicated that not only the two test, vent, and drain valves on the CCW supply and return to the excess letdown HX required surveillance, but also two HX vents and drains located in the HX room. These valves are located in containment in a locked high radiation area.

On July 25 and 26, 1997, TS 4.0.3, "Surveillance Requirements," was entered and the CCW HX vent and drain valves on both Units were verified closed and capped.

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PG&E initiated an orderly review of all penetrations required to be closed during accident conditions and entered TS 4.0.3 for additional penetrations that were determined to require additional surveillance in accordance with the NRC position for TS 4.6.1.1.a.

On July 29, 1997, another conference call was initiated with the NRC to present PG&E's methodology and sequence of review of the penetrations. PG&E also discussed the applicability of TS 4.6.1.1.a. to the non-Type C main feedwater (MFW) and main steam system (MSS) penetrations. It was determined that the MFW penetrations were "in service" during accident conditions based on being common penetrations for auxiliary feedwater (AFW) supply. However, it was determined that MSS penetrations should be included in the surveillance requirements, even though two of the MSS lines supply the steam-driven AFW pump. This determination led to the inclusion of all the main steam instrumentation (pressure, level, and flow) root valves and various test, vent, and drain valves in the surveillance.

PG&E reviewed all applicable penetrations outside containment and entered TS 4.0.3 each time a surveillance deficiency was found. In each case, the manual valves were physically verified closed and/or caps were installed. This review determined that the following test, vent, drain, and instrument isolation valves/plugs on penetrations not in service after a loss of coolant accident should be treated as CIVs.

System	Valves and/or Plugs
CCW supply and return from excess letdown HX	4 per Unit
Regenerative HX RCS letdown	1 for Unit 1 and 2 for Unit 2
SI pressure indicator	1 per Unit
Equipment and personnel hatches	9 per Unit
Deadweight pressure tester	2 per Unit

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Additionally, MSS components inside and outside of containment, that are part of the containment boundary, were not previously included as part of the surveillance procedures. Vents, drains, and instrumentation valves that could become part of the containment boundary inside of containment; and vents, drains, and instrumentation valves located outside of containment, upstream of the main steam isolation valves (MSIVs) were added.

A review of signed system alignment checklists was performed for all applicable penetrations inside containment to ensure that the required manual valves had been verified closed and that caps were installed coming out of the last refueling outage for each Unit. All remaining manual isolation valves inside containment were verified in this manner.

On August 28, 1997, an inside containment inspection for installed caps of a sample of the test, vent, and drain valves being added to STP V-6 was initiated as a prudent action. All of the inspected caps were found to be installed as expected. This provided additional assurance that the review of signed alignment checklist was an adequate means of verifying that the caps were in place in the inside containment locations.

During this inspection, a PG&E engineer noticed that many of the instrument line four-valve manifold blocks had a one-eighth inch threaded plug missing. The engineer determined that the plug is integral with the manifold and isolates the vent associated with the equalizing line. PG&E entered TS 4.0.3 and installed the plug in those manifold blocks that were missing the plug. All 28 Unit 1 and 13 of 28 Unit 2 four-valve manifolds used in the SG level and flow transmitters (seven per SG) were found to have been missing the plug. The plug is installed in a threaded hole not readily visible during an inspection of the manifold.

The airlocks had not previously been thought to be part of TS 4.6.1.1.a. On March 18, 1998, the determination was made that five test connections associated with the personnel airlock should be surveilled in accordance with the requirements of TS 4.6.1.1a. A review of the penetrations inside and outside of containment associated with the airlock identified that the test connection for Unit 1 PI-175, located outside of containment, was not current with respect to the surveillance requirements. TS 4.0.3 was entered at 1252 PST to perform the surveillance within 24 hours. The cap was verified in place and TS 4.0.3 was exited at 1500 PST. The remaining

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caps on test connections were previously verified to be installed and the surveillance was current.

D. Inoperable Structures, Components, or Systems that Contributed to the Event

None.

E. Dates for Major Occurrences

1. February 20, 1984: Event date - Unit 1 entered Mode 4 without meeting requirements of TS 4.6.1.1.a.

2. July 19, 1985: Event date - Unit 2 entered Mode 4 without meeting requirements of TS 4.6.1.1.a.

3. July 9, 1997: NRC inspector raises question on applicability of TS 4.6.1.1.a. to valve SI-1-8964.

4. July 25, 1997: Discovery date - PG&E determined that valve SI-1-8964 should be classified as a CIV.

5. August 28, 1997: Discovery date - a one-eighth inch threaded plug was discovered to be missing from many of the four valve manifolds.

6. March 18, 1998: Discovery date - PG&E determined that the test connections associated with the personnel airlock should be included in the surveillance requirements of TS 4.6.1.1.a.

F. Other Systems or Secondary Functions Affected

None.

G. Method of Discovery

On July 25 and July 29, 1997, the NRC indicated that manual test vent and drain valves as well as instrumentation isolation valves, no matter how small, are considered CIVs. Therefore, the manual test, vent, and drain valves that are normally closed during operation are CIVs and should be considered to fall under TS 4.6.1.1.a.

H. Operator Actions

TS 4.0.3 was entered and the required surveillance performed for valve SI-8964 on both Units. As the review of containment penetrations identified additional manual test, vent, and drain valves not previously surveilled, TS 4.0.3 was entered and the required surveillance performed.

I. Safety System Responses

None required.

III. Cause of the Problem

A. Immediate Cause

TS 3.6.1.1 was not met when a surveillance was not performed.

B. Root Cause

This event was caused by a misinterpretation of the applicability of CIV surveillance requirements to certain manual test, vent, and instrument isolation valves.

PG&E engineers believed that test, vent, and drain valves and instrument root valves were not CIVs. PG&E believed that these requirements only applied to test, vent, and drain valves and to instrumentation valves used in LLRT that might form part of the containment penetration boundary between Type C test CIVs. PG&E test personnel also believed that valves or components that are not credited for satisfying containment integrity requirements should not be included in the surveillance requirements. Therefore, the valves and components of the main steam and feedwater system outside of containment were not included. PG&E engineers also

believed that only the surveillance requirements of TS 4.6.1.3 applied to the airlocks and did not apply the surveillance requirements of TS 4.6.1.1.a to the airlock appurtenances.

IV. Analysis of the Event

Although the test, vent, and drain valves and instrument root valves recently identified as being CIVs were not surveilled as required by TS, they are included in other administrative programs that control their position. PG&E's administrative programs for controlling CIV position consist of system alignment checklists, the sealed components program, and the LLRT program.

Plant procedures identify plant systems whose valve lineups are required to be in a known condition prior to beginning a plant heatup following an outage. Any system which has undergone system maintenance or whose lineup is in question due to an extended outage, is walked down, realigned, and verified using a system alignment checklist. Lineup verification is performed on safety-related and nonsafety-related systems unless the system was maintained in controlled status throughout the outage. If a system has remained in operation or has been shut down with only minor maintenance performed, a valve lineup need not be reperformed on the system.

There are three types of system alignment checklists: alignment verification checklist, root valve alignment checklist, and technical maintenance (TM) valve alignment verification checklist. The alignment verification checklist is performed by plant Operations to verify that plant systems are properly aligned for safe plant startup. The root valve alignment checklist is also performed by Operations to ensure that plant instrumentation is properly aligned for safe plant startup. The TM valve alignment verification checklist is performed by Instrument and Control Maintenance to ensure that plant instruments are aligned for proper operation. Each of these checklists is performed using the same operations procedure format which requires a sign off check for proper position followed by an independent sign off verification check for each individual valve.

The sealed components program provides an additional level of assurance that valves will remain in their required position. This procedure is applied to any component having a regulatory or design basis required position. For CIVs required to be closed, a "red seal" is applied after a valve is placed in the proper position, and independently verified. The seals are attached in such a manner as to require the seal to be broken in order to reposition the valve. Operation of these valves would require obtaining formal written permission to break the seal

and reposition the valve. Further verification of the position of the valves within the program is accomplished by visually observing that the seal remains intact, or by verifying that a valve remains under the jurisdiction of the sealed valve checklist program.

The LLRT program provides verification and sealing of those valves associated with penetrations undergoing 10 CFR 50, Appendix J, Type C testing. This program provides the same requirements as found in the sealed valve checklist procedure.

Valves outside containment were physically inspected to verify valve position. The checklists noted above provide a reasonable degree of assurance that the valves inside containment were placed and remain in their required position. Required surveillances were performed within 24 hours of discovery of the missed surveillance as required by TS 4.0.3.

All valves were verified to already be in the correct position. The missing plugs were isolated by at least one closed valve. The caps on the test connections associated with the airlock were in place. Thus, the health and safety of the public were not affected by this condition.

V. Corrective Actions

A. Immediate Corrective Actions

A thorough review verified the required valves and plugs on both Units were closed, meeting the TS 4.6.1.1.a. surveillance requirement.

Following conference calls with the NRC, PG&E began a thorough review of the containment penetrations to identify any additional valves that had not been included in procedures STPs I-1D, I-1F, or V-6. The penetrations were prioritized, with those penetrations most likely to have excluded valves reviewed first. Penetrations which receive LLRT were reviewed last, since the valves associated with them were already included. The review also included valves inside containment, which are exempted from the 31-day requirement of SR 4.6.1.1.a, if they are locked, sealed, or otherwise secured in the closed position. Valves outside containment that had not been verified closed were physically checked by Operations or Engineering personnel and verified closed. Valves inside containment were either physically checked or verified by Operations alignment checklists. Where applicable, downstream pipe caps were also verified to be in place.

B. Corrective Actions to Prevent Recurrence

STPs I-1D, I-1F, and STP V-6 have been revised to include the additional valves and test connections determined to be included in the surveillance requirement of TS 4.6.1.1.a.

VI. Additional Information

A. Failed Components.

None.

B. Previous LERs on Similar Problems.

None.