

April 12, 2005

U.S. Nuclear Regulatory Commission
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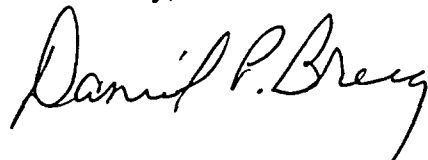
Subject: **Docket No. 50-361**
Licensee Event Report No. 2005-002
San Onofre Nuclear Generating Station, Unit 2

Gentlemen:

This submittal provides Licensee Event Report (LER) 2005-002, in accordance with 10 CFR 50.73(a)(2)(i)(A) to report the completion of a Technical Specification required shutdown. This shutdown was required to repair the Component Cooling Water outlet valve for the Train "B" Shutdown Cooling Heat exchanger.

If you require any additional information, please contact me.

Sincerely,



Unit 2 LER No. 2005-002

cc: B. S. Mallett, NRC Regional Administrator, Region IV
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 & 3

IE22

| | | |
|---------------------------------------------------------------------------------|--------------------------------------|--------------------------|
| 1. FACILITY NAME San Onofre Nuclear Generating Station (SONGS) Unit 2 | 2. DOCKET NUMBER 05000-361 | 3. PAGE 1 OF 4 |
|---------------------------------------------------------------------------------|--------------------------------------|--------------------------|

4. TITLE
Missing Taper Pins on CCW Valve Cause Technical Specification Required Shutdown

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | | |
|--------------------------|-----|------|------------------------------------------------------------------------------------------------------|-------------------|--------|-------------------------------------------------------|-----|------|------------------------------|-------------------------------------------------------------------------------------------------------------|--|
| MO | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO | MO | DAY | YEAR | FACILITY NAME | DOCKET NUMBER | |
| 02 | 15 | 2005 | 2005-002-00 | | | 04 | 12 | 2005 | None | | |
| 9. OPERATING MODE | | 3 | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR *: (Check all that apply) | | | | | | | | |
| 10. POWER LEVEL | | 000 | 20.2201(b) | | | 20.2203(a)(3)(ii) | | | 50.73(a)(2)(ii)(B) | 50.73(a)(2)(ix)(A) | |
| | | | 20.2201(d) | | | 20.2203(a)(4) | | | 50.73(a)(2)(iii) | 50.73(a)(2)(x) | |
| | | | 20.2203(a)(1) | | | 50.36(c)(1)(i)(A) | | | 50.73(a)(2)(iv)(A) | 73.71(a)(4) | |
| | | | 20.2203(a)(2)(i) | | | 50.36(c)(1)(ii)(A) | | | 50.73(a)(2)(v)(A) | 73.71(a)(5) | |
| | | | 20.2203(a)(2)(ii) | | | 50.36(c)(2) | | | 50.73(a)(2)(v)(B) | <input checked="" type="checkbox"/> OTHER Specify in Abstract below or in NRC Form 366A 10 CFR 21 | |
| | | | 20.2203(a)(2)(iii) | | | 50.46(a)(3)(ii) | | | 50.73(a)(2)(v)(C) | | |
| | | | 20.2203(a)(2)(iv) | | | <input checked="" type="checkbox"/> 50.73(a)(2)(i)(A) | | | 50.73(a)(2)(v)(D) | | |
| | | | 20.2203(a)(2)(v) | | | 50.73(a)(2)(i)(B) | | | 50.73(a)(2)(vii) | | |
| | | | 20.2203(a)(2)(vi) | | | 50.73(a)(2)(i)(C) | | | 50.73(a)(2)(viii)(A) | | |
| | | | 20.2203(a)(3)(i) | | | 50.73(a)(2)(ii)(A) | | | 50.73(a)(2)(viii)(B) | | |

12. LICENSEE CONTACT FOR THIS LER

| | |
|-----------------------------------------------------------------|-------------------------------------------------------------|
| NAME D. P. Breig, Station Manager, Nuclear Generation | TELEPHONE NUMBER (Include Area Code) 949-368-9263 |
|-----------------------------------------------------------------|-------------------------------------------------------------|

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 |
|-------|--------|-----------|---------------|--------------------|-------|--------|-----------|---------------|--------------------|
| B | CC | V | F130 | Y | | | | | |

14. SUPPLEMENTAL REPORT EXPECTED

| | |
|-------------------------------------------------|----------------------------------------|
| YES (If yes, complete EXPECTED SUBMISSION DATE) | <input checked="" type="checkbox"/> NO |
|-------------------------------------------------|----------------------------------------|

15. EXPECTED SUBMISSION DATE

| | | |
|-------|-----|------|
| MONTH | DAY | YEAR |
| | | |

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

On 02/14/2005, at 2155 PST, with Unit 2 at 96 percent power, plant operators manually initiated a plant shutdown to repair 2HV6500, a Component Cooling Water (CCW) valve.

In accordance with 10 CFR 50.72(b)(2)(i), SCE reported initiation of the shutdown to the NRC on 02/14/2005 (Log No. 41410) at 2213 PST. The plant reached Mode 5 at 1804 PST on 02/15/2005. SCE is submitting this report in accordance with 10 CFR 50.73(a)(2)(i)(A).

2HV6500 is the Train "B" CCW outlet isolation valve for the Shutdown Cooling (SDC) heat exchanger. The Containment Spray (CS) system depends on SDC heat exchanger availability for system operability. In response to an abnormal reduced flow condition in 2HV6500, plant operators declared the valve inoperable on 02/10/2005 at 2315 PST and entered the 7-day allowed outage time to restore the CS system. SCE conservatively decided to shutdown the plant to repair the valve.

Upon disassembling 2HV6500, the two taper pins securing the valve disc to the stem were missing. New pins were installed and staked to the disc and the valve was returned to service. SCE will screen similar valves to determine which valves require follow-up inspection. Safety significance was minimal. The CS system has two independent trains. During the time Train "B" CS was declared inoperable, Train "A" remained operable and available to fulfill its safety function.

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| | | | | | |

Plant: San Onofre Nuclear Generating Station (SONGS) Unit 2
 Event Date: February 15, 2005
 Reactor Vendor: Combustion Engineering
 Mode: Mode 3, Shutdown
 Power: 0 percent

Description of Event

Valve 2HV6500 [V] is the Train "B" Component Cooling Water (CCW)[CC] outlet isolation valve for the Shutdown Cooling (SDC)[BP] heat exchanger [HX]. The Containment Spray (CS)[BE] system depends on SDC heat exchanger availability for system operability.

San Onofre Unit 2 Technical Specification (TS) 3.6.6.1 for "Containment Spray and Cooling Systems" requires two trains of CS and two containment cooling trains to be operable in Modes 1 through 3. With one train of CS inoperable, action "A" requires SCE to restore the inoperable train within 7 days. If not completed within that time, action "B" requires SCE to place the plant in Mode 3 within the following 6 hours and in Mode 4 in 84 hours.

On February 10, 2005 at 2315 PST, plant operators declared valve 2HV6500 inoperable in response to an abnormal reduced flow condition. Operators also declared Train "B" of CS inoperable and entered the 7-day allowed outage time to restore the system.

SCE was uncertain whether 2HV6500 could be repaired within the allowed outage time of TS 3.6.6.1 (7 days) and conservatively decided to shutdown the plant. Therefore to repair 2HV6500, on February 14, 2005, at 2155 PST plant operators (utility, licensed) manually initiated a plant shutdown in accordance with procedures. Plant equipment performed as expected. In accordance with 10 CFR 50.72(b)(2)(i), SCE reported initiation of the shutdown to the NRC Operations Center (Log No. 41410) at 2213 PST on February 14, 2005.

The Unit reached Mode 3 at 0241 PST on February 15, 2005 and Mode 5 at 1804 PST that same day. In accordance with 10 CFR 50.73(a)(2)(i)(A), SCE is submitting this Licensee Event Report for completion of the TS required plant shutdown.

Cause of Event

SCE disassembled 2HV6500 and determined the abnormal flow was caused by the valve disc not being fully connected to the valve stem. 2HV6500 is an 18-inch Fisher Controls (model no. 9211) butterfly valve that uses two taper pins to secure the valve disc to the stem. By design, the pins are impact-driven into holes drilled in the disc and stem, and are held in place solely by the resulting interference fit. SCE concluded the interference-fit taper pins had come free and no longer attached the valve disc to the stem and this condition prevented the valve from fully opening.

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SCE was not able to conclusively determine why the taper pins lost their interference fit. (see "Generic Considerations" discussion below).

Corrective Actions

SCE reattached and secured the 2HV6500 valve disc to its stem with new taper pins and staked the pins to the disc. SCE leak tested the valve and performed post-maintenance Air Operated Valve diagnostic testing prior to return to service.

It should be noted that SCE is also implementing corrective actions for taper pins on Fisher Controls butterfly valves in critical plant applications. (See Additional Information section below).

Safety Significance

The SONGS Unit 2 containment spray system has two independent trains. During the time Train "B" containment spray was declared inoperable, Train "A" remained operable and available to fulfill its safety function.

An assessment of the incremental core damage probability (ICDP) and the incremental large early release probability (ILERP) for the 2HV6500 failure event determined that the Unit 2 ICDP and ILERP were 2.1E-7 and 5.5E-9, respectively. Therefore the safety significance of this event was minimal. The assessment was based on the reported actual system alignments, component unavailability (including 2HV6500) and operating conditions that existed from the time of discovery on February 10, 2005 through the plant shutdown on February 15, 2005.

Additional Information

Previous events:

In the past three years, SCE submitted one other LER involving initiation of a TS-required plant shutdown. Unit 3 LER 2003-001, dated February 15, 2004, reported the initiation of a TS 3.0.3 shutdown when two trains of safety related equipment became inoperable. That event was caused by a failure of a load center feeder breaker at the same time the redundant safety related equipment was out of service for planned maintenance. Corrective actions for that event focused on breaker-related issues and could not have prevented the failure of valve 2HV6500 reported above.

Ongoing Taper Pin Related Corrective Actions:

In 1993, SCE discovered two 28-inch Fisher Controls butterfly valves (model no. 9200) in Unit 2, each with a missing a taper pin. These valves were associated with CCW Pump 2P025. At that time, SCE contacted Fisher Controls regarding the missing taper pins and Fisher Controls concluded these were isolated occurrences.

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In 1998, SCE observed leakage at two other 28-inch Fisher Controls butterfly valves (also model no. 9200) in Unit 3. These valves were subsequently scheduled for inspection during the Unit 3 Cycle 13 refueling outage (September 27, 2004 – December 28, 2004). Just before the refueling outage, a third butterfly valve developed a leak. All three valves were associated with the CCW Pump 3P025 suction or discharge. Inspections found that one taper pin was missing from each valve disc-stem assembly. (There are five taper pins in each 28-inch valve and not all pins are required for valve operability.)

As a result of the findings, SCE expanded its inspection scope during the Unit 3 2004 refueling outage. At the time, SCE believed that only Fisher Controls butterfly valves associated with the suction and discharge of CCW Pump 2(3)P025 were susceptible to loss of taper pins. The inspection scope screened all butterfly valves in critical safety related applications and inspected those valves where leakage through a missing taper pin could not be tolerated. This resulted in the inspection of sixteen other Fisher Controls butterfly valves of which a few had improperly seated taper pins. SCE staked the taper pins in each inspected valve.

After the failure of 2HV6500 (the CCW discharge valve for the Train "B" SDC heat exchanger), SCE revised its screening criteria to include all butterfly valves in critical safety related applications where loss of valve function or leakage through a missing taper pin could not be tolerated. Based on this screen, SCE will determine which valves require inspection. The inspections are planned for upcoming Unit 2 and 3 refueling outages. SCE intends to stake all taper pins in the valves inspected during the outages.

Generic Considerations:

Since 1993, SCE has discovered five 28-inch butterfly valves that had a single missing taper pin. Fisher Controls does not specify any required inspections for the taper pins and SCE had not disassembled the valves prior to discovery of the missing taper pins. During discussions with SCE, in both 1993 and 2004, Fisher Controls indicated that similar taper pin failures were not being reported from other licensees.

With the recent 2HV6500 (18-inch model 9211) butterfly valve issue, missing taper pins do not appear to be isolated to the specific hydraulic conditions surrounding CCW Pump 2(3)P025 and may indicate broader manufacturing issues.

Due to the nature and extent of the taper pin failures, other licensees using Fisher Controls butterfly valves with interference fit taper pins may experience similar failures at their facilities.