NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(MMM-YYYY)

LICENSEE EVENT REPORT (LER)

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

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FACILITY NAME (1)	Docket Number (2)	Page (3)
San Onofre Nuclear Generating Station (SONGS) Unit 3	05000-362	1 of 6

TITLE (4): CCW Relief Valve Inoperable - Wrong Set Spring Installed Due to Vendor Data Error

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	02	1987	1998	-- 012 --	01	09	29	1998	SONGS Unit 2	05000-361
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check One or More) (11)					
		20.2201(b)	20.2203(a)(2)(v)	x	50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER LEVEL (10)	100	20.2203(a)(1)	20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)		50.73(a)(2)(iv)	x	OTHER - 10CFR21
		20.2203(a)(2)(iii)	50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
R.W. Krieger, Vice President, Nuclear Generation	949-368-6255

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 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-spaced typewritten lines (16)

On July 1, 1998 (the discovery date), SCE recognized that between March 2, 1987 and February 21, 1992, an incorrect spring installed in a relief valve could have prevented the Train A CCW system from venting during a CCW over-pressure transient caused by a postulated seismic event. The additional nitrogen pressure, from a failed pressure regulator valve, would cause the systems to exceed its 150 psig design pressure rating when combined with the maximum system operating pressure. Consequently, SCE considers Unit 3 train "A" of CCW to have been inoperable during that period. Because Unit 3 train A of CCW was inoperable for more than its TS allowed outage time of 72 hours, SCE is reporting this occurrence in accordance with 10CFR50.73(a)(2)(i)(B).

This event occurred because the wrong spring had been installed in PSV-6356 and the lift pressure was set to the incorrect pressure of 150 psig. Following a "failed" valve test, the spring was replaced. The test personnel tested and subsequently set the lift pressure at 150 psig because a valve N-stamp label specified 150 psig as the design pressure. At that time, there was no procedural requirement to verify valve setpoints against design documents, and other valve tags that did identify the correct set pressure (45.5 psig) were not checked. Also, in 1983, Crosby provided SCE with an incorrect spring part number for this valve which allowed installation of an incorrect valve spring and enabled the valve lift pressure to be set at 150 psig.

This condition had minimal safety significance.

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Plant: San Onofre Nuclear Generating Station (SONGS) Units 2 & 3
Reactor Vendor: Combustion Engineering
Event Date: March 2, 1987
Mode: Not Applicable
Power: Not Applicable

Background:

The component cooling water (CCW) (CC) system for Units 2 and 3 consists of two independent trains, each train equipped with a 6,658 gallon (approximate) surge tank (TK). See Figure 1. As originally designed, each surge tank is pressurized to about 32 pounds per square inch gauge (psig) with nitrogen gas to prevent void formation at high points in the system and to minimize the potential for water hammer in the event of a rapid drawdown in surge tank level together with a CCW pump trip and restart transient. Each surge tank is equipped with a nitrogen back pressure control valve (PCV) (Unit 3 valves 3PCV-6358 or 3PCV-6361) designed to vent the tank if pressure increases above the control valve set point of approximately 41 psig. This back pressure control valve can modulate nitrogen pressure without requiring the pressure safety relief valve (RV)(3PSV-6356 or 3PSV-6359) to open. However, its relief capacity is not sufficient to prevent system overpressurization.

When CCW system leakage causes surge tank level to decrease, nitrogen gas expands into the tank to maintain system pressure. During makeup, the nitrogen gas is compressed by the rising water level, and is vented by the back pressure control valve. The surge tank is also provided with a pressure safety relief valve to prevent CCW train failure by venting the surge tank at 45.5 psig. This setpoint will prevent the CCW system downstream of the pump discharge from exceeding its system design pressure of 150 psig. Although the CCW system has thermal relief valves located within the critical and non-critical piping loops, the relief capabilities of these valves are not sufficient to prevent overpressurization by failure of the nitrogen pressure regulator valve (PCV).

To ensure availability of nitrogen pressure following a seismic event, in 1992 the surge tank design was upgraded to include a safety-related, seismically qualified backup nitrogen system (LK). During this upgrade, in February 1992, a second safety relief valve on each CCW surge tank (3PSV-5403 or 3PSV-5404) was added with a pressure setting of 56 psig.

The Technical Specifications (TS) for SONGS 2 and 3 require both trains of CCW to be operable in Modes 1 through 4. Prior to implementation of improved TS on August 5, 1996, with one train of CCW inoperable, TS 3/4.7.3 required Southern California Edison (SCE) to restore the inoperable train to operable status within 72 hour, or be in hot standby within the following 6 hours and in cold shutdown within the following 30 hours. These TS requirements were transferred, unchanged, to the improved TS on August 5, 1996, and renumbered to TS 3.7.7.

Description of Event:

On April 27, 1997, during the Unit 3, Cycle 9 refueling outage, 3PSV-6356 was removed from the plant for setpoint testing. On May 29, 1997, SCE shipped the valve to the vendor (Crosby C710) and, on August 13, 1997, 3PSV-6356 failed its inservice testing. On October 24, 1997, after disassembling the valve, Crosby informed SCE that the wrong set-spring (150 psig) was in the

valve instead of the spring for a set pressure of 45.5 psig. At that time, SCE believed the CCW system operability was unaffected because redundant safety relief valves had been installed on each surge tank in February of 1992.

While investigating this "wrong spring" issue, SCE determined the wrong spring had been installed in 3PSV-6356 on March 2, 1987, when it was the only relief valve on the surge tank. Also note that, as originally designed, prior to February 21, 1992, the nitrogen pressure control valve 3PCV 5403 was not seismically qualified.

On July 1, 1998 (the discovery date), SCE recognized that between March 2, 1987 and February 21, 1992, this condition could have prevented the Train A CCW system from venting during a CCW over-pressure transient caused by a postulated seismic event. The additional nitrogen pressure, from a failed pressure regulator valve (PCV), would cause the systems to exceed its 150 psig design pressure rating when combined with the maximum system operating pressure. Consequently, SCE considers Unit 3 train "A" of CCW to have been inoperable during that period. Because Unit 3 train A of CCW was inoperable for more than its TS allowed outage time of 72 hours, SCE is reporting this occurrence in accordance with 10CFR50.73(a)(2)(i)(B).

Cause of the Event:

Train A of the CCW system was inoperable between March 2, 1987 and February 21, 1992 because (1) the wrong spring had been installed in PSV-6356 and (2) the lift pressure was set to the incorrect pressure of 150 psig. Following a "failed" valve test, the spring was replaced. The test personnel (utility, non-licensed) tested and subsequently set the lift pressure at 150 psig because a valve N-stamp label specified 150 psig as the design pressure. At that time, there was no procedural requirement for test personnel to verify valve setpoints against design documents, and other valve tags that did identify the correct set pressure (45.5 psig) were not checked. SCE also determined that in 1983, Crosby personnel (non-utility, non-licensed) provided SCE with an incorrect spring part number for this valve; the spring was purchased by SCE and maintained in inventory. This error allowed installation of an incorrect valve spring and enabled the valve lift pressure to be set at 150 psig.

Corrective Actions:

The CCW system valves for both Units 2 and 3, PSVs 6356, 6359, 6414, 6420, 5403 and 5404, were tested by the manufacturer and confirmed to lift at their set pressure.

SCE reviewed other safety related relief valves for which the setpoint was modified from the original relief pressure and confirmed the correct setpoints and the correct springs are installed.

SCE corrected the Vendor-supplied spring part number error.

Unrelated to this event, SCE had revised the test procedure on August 9, 1993 to require valve setpoints to be obtained from design documents (the consolidated setpoint manual).

Safety Significance:

While SCE considers Unit 3 CCW Train A to have been inoperable, it remained functional and was available to perform its intended safety function during accident conditions.

Between March 2, 1987 and February 21, 1992, SCE did remove Unit 3 CCW train B from service (i.e., for maintenance, surveillance testing, system modification). Consequently, during these brief periods, the CCW system may not have been available if the nitrogen pressure regulator valve failed as a result of a seismic event. Even though the nitrogen pressure regulator valve was not seismically qualified, this same make, model and size valve has been seismically qualified for other applications at San Onofre. Therefore, SCE believes 3PCV-5403 would have remained operable following a postulated seismic event. Additionally, the back pressure valve (3PCV-6358) and other small relief valves in the CCW flow path would have provided the CCW system with some pressure relief.

The increase in core damage risk associated with a random failure of the nitrogen pressure control valve coincident with a Loss of Coolant Accident was negligible (less than 5E-8 per year). The risk assessment of this event included the average time the Train B CCW train was out of service during the period and the potential for spurious failure of the nitrogen pressure regulator valve following an accident. The risk assessment is conservative because it did not credit the design margin in CCW system nor accounts for the relief capability of the backup pressure control valve (3PCV-6358) and other small relief valves in the CCW system. The likelihood of nitrogen pressure regulator valve failure due to a seismic event was assumed negligible based on the seismic qualification of this type and model valve in other applications at San Onofre. Consequently, SCE believes this condition had minimal safety significance.

Additional Information:

In the past two years, there have been no other occurrences, events or conditions that involve the same generic underlying concern or reason as this event (such as root cause, failure, or sequence of events).

Lift Stops:

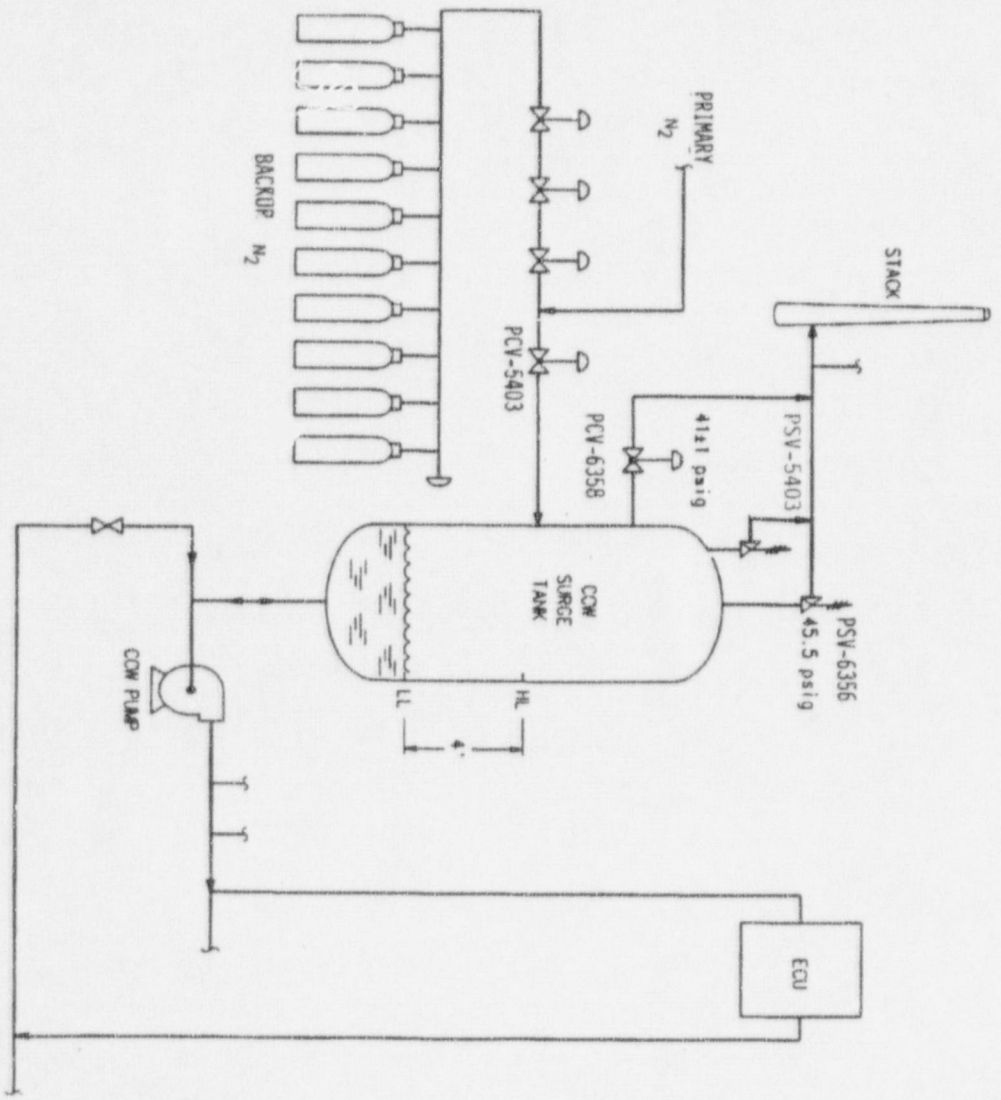
While refurbishing 3PSV-6356, valve model JO-25, Crosby informed SCE that the lift stop had not been cut to the proper length and that the length of the lift-stop effects the valve's rated relief capacity. Crosby stated that when a lift stop is shipped as spare part or as part of a pressure conversion kit, the lift stop is shipped at a nominal length and the correct length is determined by calculation. However, the vendor manual supplied to SCE by Crosby does not contain installation instructions or cautions for the lift stop. On August 31, 1998, Crosby confirmed that instructions were not provided to SCE for modifying the length of a lift stop. SCE has determined this condition impacted valve model types JO and JO-WR. On September 8, 1998, SCE issued a letter to Crosby on this issue.

SCE had installed the lift stop for 3PSV-6356 on December 1, 1993. Lacking complete lift stop installation instructions, SCE did not cut the lift stop to the correct length. In this case, however, because the CCW surge tanks had a second pressure relief valve installed on February 21, 1992, the

incorrect lift stop length, and hence the inoperable valve, did not cause the CCW train to be inoperable (only PSV 6356 and 6359 have a lift stop).

SCE determined that the lift stop problem applied only to valves manufactured by Crosby. An extent of condition review by SCE determined that lift stops replaced on other safety related Crosby valves were properly cut to size. SCE revised the appropriate maintenance procedure on July 31, 1998 to incorporate directions for sizing of lift stops in specific Crosby relief valve models.

Figure 1


BACKUP N_2
PRIMARY N_2
PCV-5403
PCV-6358
411 psig
STACK
PSV-5403
CCW SURGE TANK
LL
HL
45.5 psig
PSV-6356
CCW PUMP
ECU