NRC Form 366 (9/83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 2	0 5 0 0 0 3 6 1	1 OF 0 4

TITLE (4)
18 MONTH SNUBBER SURVEILLANCE DEFICIENCIES

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQ. NUMBER	REV. NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
										0 5 0 0 0
1 2	2 6	8 4	8 4	0 7 9	0 1	0 3	1 2	8 5		0 5 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

OPERATING MODE (9): N
POWER LEVEL (10): 0 0 0

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	X 50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	X 50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER	
	AREA CODE	
J. G. HAYNES, STATION MANAGER	7 1 4	4 9 2 - 7 7 0 0

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
C	B Q	S N B	P 0 2 9	Y	C	A W	S N B	P 0 2 9	Y
C	B P	S N B	P 0 2 9	Y	C	C C	S N B	P 0 2 9	Y

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-space typewritten lines) (16)

On November 20, 1984, with Unit 2 defueled, the routine 18-month surveillance of Pacific Scientific Mechanical Snubbers (EIIS Component Code SNB) was initiated. As a result of these surveillance tests, a total of 90 deficient snubbers were identified, approximately an 8% failure rate out of the total inspected snubber population. These deficiencies for small snubbers are categorized as being caused by improper installation (13 snubbers), environmental degradation (5 snubbers), vibration (20 snubbers), hydraulic transients (25 snubbers), wear related degradation (25 snubbers), or manufacturing defect (1 snubber).

As corrective action all deficient snubbers have been replaced and an engineering evaluation of the effects of these snubber failures on their piping systems and supports has been performed. All affected systems have had thermal analyses performed and for systems identified to require it, hydraulic transient analysis was performed. As a result, no damage, other than to the snubbers, was found and after snubber replacement all systems remain capable of performing their function under the FSAR design basis.

There are no reasonable or credible circumstances under which this event would have been more severe.

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NRC Form 366B
(9-83)

LICENSEE EVENT REPORT (LER) FAILURE CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
C	CB	SNB	P029	Y							
C	SB	SNB	P029	Y							
C	KN	SNB	P029	Y							
C	BE	SNB	P029	Y							

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

On November 20, 1984, with Unit 2 defueled, the routine 18-month surveillance of Pacific Scientific Mechanical Snubbers (EIIS Component Code SNB) was initiated. On December 26, 1984, eight snubbers were determined to have been damaged during installation and were rendered inoperable contrary to Technical Specification Section 3.7.6. As a result of our continued surveillance testing, a total of ninety snubbers have been identified as deficient. These deficiencies for small snubbers have been categorized as being caused by improper installation (13 snubbers), environmental degradation (5 snubbers), vibration (20 snubbers), hydraulic transients (25 snubbers), wear related degradation (25 snubbers), or manufacturing defect (1 snubber).

As the functional surveillance testing program uncovered the failures, the size of the test sample of the affected type of snubber was increased per Technical Specification Section 4.7.6.e. The failure rate of the small size snubbers (PSA 1/4, 1/2) was about 18 percent, which required the inspection sample to be expanded to 100 percent for this size. For both the medium (PSA 1, 3, 6, 10) and the large (PSA 35, 100) snubbers, no failures occurred in the sample population.

Where potentially damaging transients were suspected, snubbers within the transient boundary were visually inspected and freedom of motion was verified in accordance with Technical Specification Section 4.7.6.c. As part of this expanded inspection, three medium size snubber failures were identified. In addition to the Technical Specification inspection, physical walkdowns of these postulated transient pathways were performed to visually inspect for damage to other pipe supports or the piping itself. Selected snubbers, which were found damaged due to these hydraulic transients, were destructively tested to determine ultimate failure loads for transient analysis purposes.

All snubbers that failed to meet the functional testing acceptance criteria were removed for further testing and/or physical examination and were replaced with operable snubbers. Ultimately, all the inoperable snubbers (with the exception of three which were radiologically unavailable) were disassembled and inspected to determine the failure mode. Upon completion of this examination, thermal stress analysis was performed for all lines associated with the inoperable snubbers. Fatigue analysis was performed for all Class I lines involved. In addition, transient stress analysis was performed on all lines having undergone a potentially damaging transient by postulating a transient path and using loading values based on physical evidence and operational data. As a result of these analyses, it has been determined that for all affected systems, no damage was sustained and all of the systems remain functionally operable.

Corrective actions are being taken as follows: (1) where transients have been identified, operational procedures are being reviewed, and equipment redesign is being pursued to minimize or accommodate future transients; (2) to minimize environmental degradation, the addition of protective coverings for snubbers which are susceptible to this phenomenon is being evaluated; (3) to minimize vibration failures, measurement of the operational system vibration frequencies will be made where possible and compared to vendor supplied data to more accurately determine approximate life span of snubbers operating in these conditions and, where appropriate, supports less susceptible to vibration damage will be evaluated; (4) to preclude installation errors, maintenance procedures for installation and repair of snubbers are being revised to ensure proper installation; and, (5) the one identified manufacturing defect is not considered

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

generic in nature, as it is one failure found in over 500 small snubbers tested and is being considered an isolated incident with no further action planned.

In addition to the other engineering analyses, seismic analysis has been performed on all affected piping systems to ensure that in a Design Bases Earthquake, these systems would have been capable of performing their intended safety function to achieve safe shutdown. The analyses showed that, although in some cases not meeting FSAR criteria (i.e., meeting code stress limits based upon FSAR criteria for damping), adequate margin existed in the original system's design to preclude damage to the affected piping systems. Those systems not meeting FSAR criteria were analyzed to a modified criteria which included Pressure Vessel Research Council recommended damping (ASME Code Case N-411) and an allowable stress of two times the yield stress. This type of analysis had previously been approved for San Onofre Unit 1 Return to Service Hot Shutdown Systems and is only being used to establish the operability of a system with damaged snubbers.

Based on the fact that all systems would have been capable of performing their intended safety functions, there are no reasonable or credible circumstances under which this event would have been more severe.