

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3										DOCKET NUMBER (2) 0 5 0 0 0 3 6 2				PAGE (3) 1 OF 0 4		
TITLE (4) PRESSURIZER INSTRUMENT NOZZLE PRESSURE BOUNDARY LEAK																
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)			
									SAN ONOFRE, UNIT 2				0 5 0 0 0 3 6 1			
0 2	2 7	8 6	8 6	0 0 3	0 2	0 1	2 9	8 7					0 5 0 0 0 1 1			
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)														
3		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)		
POWER LEVEL (10)		0 0 0				20.405(a)(1)(i)				50.73(a)(2)(v)				73.71(c)		
		20.405(a)(1)(ii)				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)				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						
H. E. MORGAN, STATION MANAGER										7 1 1 4 3 6 8 - 1 6 2 4 1						
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs						
B	A/B	N/Z/L	C/4/9/0	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 February 27, 1986, with Unit 3 in Hot Standby, a small Reactor Coolant System (RCS) pressure boundary leak was observed in a 3/4 inch diameter pressurizer level instrument nozzle. An Unusual Event was declared and cooldown to Cold Shutdown was accomplished within the limitations of the Technical Specification using normal operating procedures.

It was determined by dye penetrant testing that a crack extended from the end of the nozzle inside the pressurizer, 5/8 of an inch outward through the RCS pressure boundary. Subsequent independent investigation by both Combustion Engineering and Southern California Edison has determined that the nozzle material, its installation and subsequent operation, contributed to pure water intergranular stress corrosion (IGSCC) attack and resulted in crack origination and propagation through the wall of the nozzle.

The affected nozzle was completely cut out, including the weld, and replaced with a new nozzle having metallurgical properties less susceptible to IGSCC.

There are two additional vapor space nozzles and one water space nozzle on Unit 3 and one water space nozzle on Unit 2 from the same heat of material. As discussed in Revision 1 of this LER, these vapor space nozzles are being replaced during the current refueling outage. On January 21, 1987, pre-removal dye penetrant examination on one of the two remaining Unit 3 vapor space nozzles of the same material heat revealed an indication. Replacement of Units 2 and 3 water space nozzles is pending further evaluation.

The leakage was identified by normally monitored RCS leak rate detection parameters and subsequent investigation. All plant systems performed as designed to bring the Unit to Cold Shutdown. Therefore, neither the health and safety of plant personnel nor the health and safety of the public was affected by this event.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQ. NUMBER	REV. NUMBER			
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3	0 5 0 0 0 3 6 2	8 6	- 0 0 3	- 0 2	0 2	OF	0 4

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

On February 27, 1986, with Unit 3 in Hot Standby, a Reactor Coolant System (RCS) pressure boundary leak was observed (EIIS SYSTEM CODE AB) in a 3/4 inch diameter Pressurizer (EIIS Component Code PZR) level instrument nozzle. The Unit was in Mode 3, at an RCS temperature of 545°F and an RCS pressure of 2250 psi.

The discovery was made during an inspection being performed to locate the source of a suspected vapor space leak from the Pressurizer. The inspection was initiated after observing a higher than expected RCS leak rate and a concurrent increase in the noble gas activity in the containment atmosphere, both of which are normally monitored parameters. This combination alerted operations personnel to a potential vapor space leak from the Pressurizer.

A containment entry was made and subsequent inspection identified a pressure boundary leak located on the Pressurizer head at a 3/4 inch diameter level instrument nozzle. The leak appeared to be located between the nozzle and the Pressurizer Vessel wall, in the annulus area of the nozzle assembly, and was estimated at approximately 0.15 gallons per minute. Engineers checked for possible vibration of the instrument piping, but none was noted.

Based on these findings an Action statement was entered pursuant to Technical Specification Limiting Condition for Operation (LCO) 3.4.5.2, which required the Unit to be in Cold Shutdown within the next thirty hours.

At 1250, an Unusual Event was declared and cooldown was initiated. At 1445, the Unusual Event was terminated. The Unit entered Cold Shutdown at 1655 on February 28, 1986.

On March 6, 1986, with Unit 3 in Cold Shutdown, dye penetrant tests (PT) were performed on the instrument nozzle. As a result, a crack was identified in the nozzle, extending into the pressure boundary weld. The crack was axial to the nozzle starting from the end of the nozzle inside the pressurizer, extending outward approximately 5/8 inch (see attached sketch). At the point of the crack the weld is approximately 1/2 inch in depth. The crack extended beyond the weld approximately 1/8 inch into the annulus area of the nozzle assembly.

To ensure that the other instrument nozzles on the Pressurizer were not similarly affected, a PT was performed on the nozzle closest to the leaking nozzle. The results of the PT showed no defects in the other nozzle. In addition, this adjacent nozzle and the other two instrument nozzles on the head of the Pressurizer were visually inspected from outside of the Pressurizer. This inspection was performed with the RCS pressurized and again following depressurization, and no evidence of leakage was observed.

The affected nozzle was completely cut out including the entire weld. The new nozzle was installed by the NSSS vendor (Combustion Engineering) in accordance with the vendor's fabrication specifications. The installation of the new nozzle was completed on March 10, 1986.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (5)			PAGE (3)		
		YEAR	SEQ. NUMBER	REV. NUMBER			
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3	0 5 0 0 0 3 6 2	8 6	- 0 0 1 3	- 0 2	0 3	OF	0 4

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

Subsequent metallurgical examination of the affected nozzle and weld joint material in the area of the crack by Combustion Engineering (CE) determined that intergranular stress corrosion cracking (IGSCC) of the nozzle material had occurred. Since the cracking has occurred only in the subject nozzle and not in any of the nine other nozzles fabricated from the same heat of Inconel-600 raw material (which includes five in another CE plant), CE concluded that the San Onofre Unit 3 cracking was the result of an isolated case involving a unique set of conditions.

Subsequent to the CE analysis and findings, SCE confirmed by independent analysis, that the weld joint cracking was due to Pure Water IGSCC. SCE analysis, however, concluded that two other nozzles from the same heat of material, which are located in the vapor space of the Unit 3 pressurizer, could be susceptible to similar cracking. Therefore, SCE decided to replace these nozzles during the January 1987 refueling outage.

During the January 1987 outage, a dye penetrant examination was performed on the two remaining Unit 3 vapor space nozzles, of the same material heat as the failed nozzle, prior to their removal. On January 27, 1987, one of these two nozzles was found to have linear indications which did not exist when it was examined in February 1986. CE has been informed of these inspection results. The one remaining Unit 3 vapor space pressurizer nozzle, which was not from the same material heat, was similarly examined and no defect indications were found.

Two pressurizer nozzles from the same heat of material are also located in water space locations. In these locations, they are not subjected to the same environment as the nozzles in the vapor space. The potential for these water space nozzles for Pure Water IGSCC is less than for the vapor space nozzles and the need for their replacement continues under evaluation. If indicated by the results of this evaluation, SCE will replace the water space nozzles at a later date, yet to be determined.

Any potential nozzle cracking would result in the development of very small leaks, similar to the one seen initially. Such leakage would be detected at very low leak rates by containment airborne monitors and other reactor coolant leakage monitoring. Until replaced, or otherwise resolved, all suspect nozzles will be verified to not be leaking at normal operating conditions following each cold shutdown and they will be carefully inspected at refueling outages.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)

SAN ONOFRE NUCLEAR GENERATING STATION,
UNIT 3

DOCKET NUMBER (2)

0 5 0 0 0 3 6 2

LER NUMBER (6)

YEAR SEQ. NUMBER REV. NUMBER

8 6

-

0 0 3

-

0 2

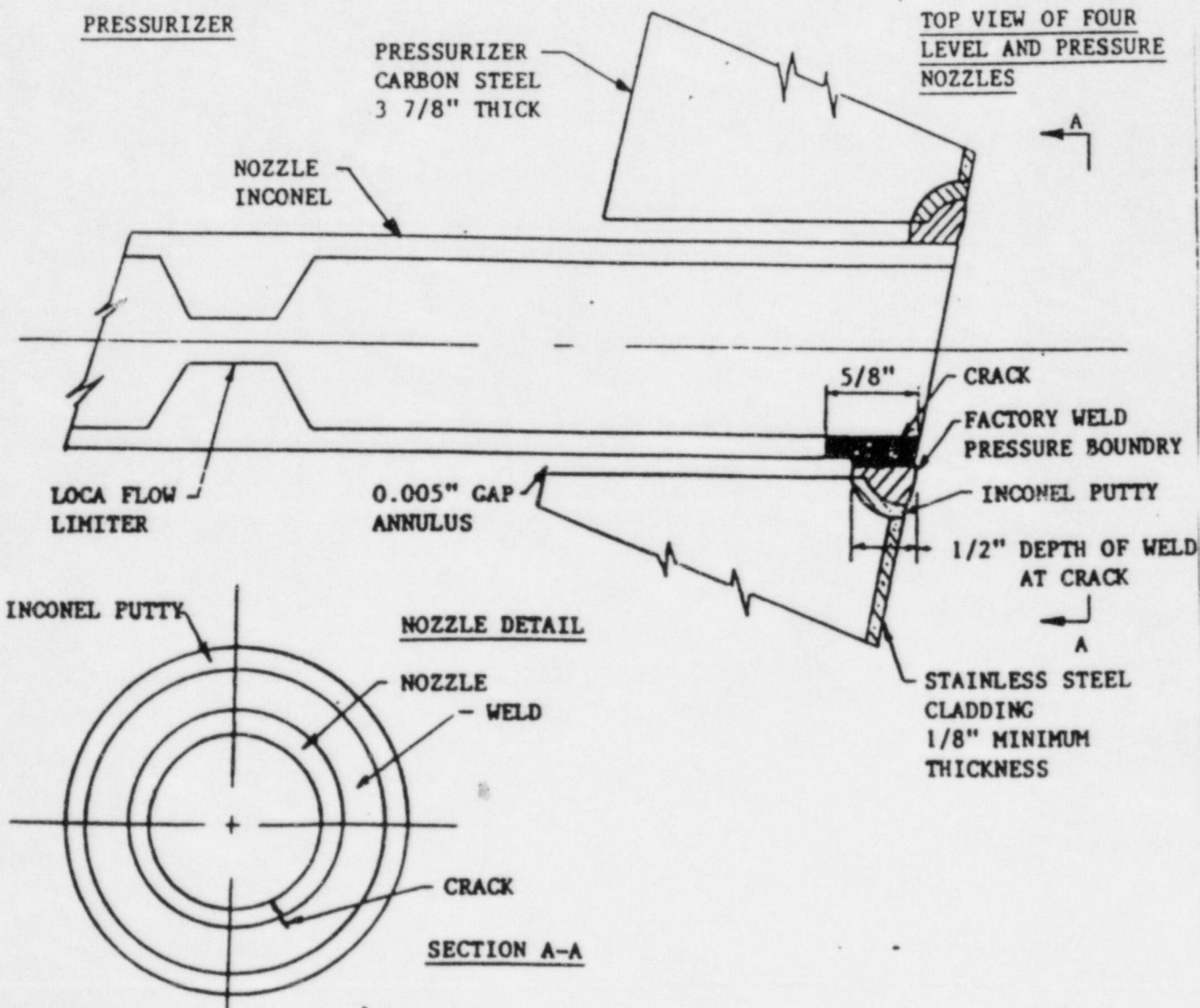
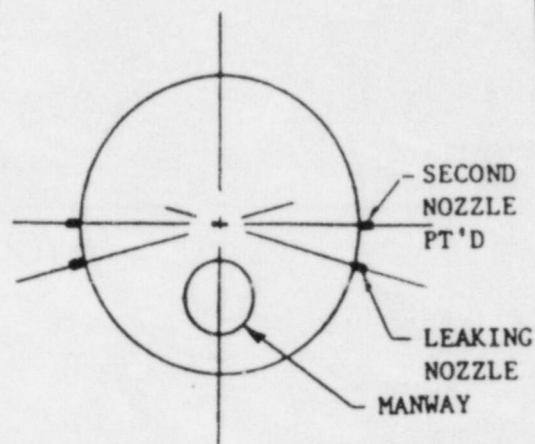
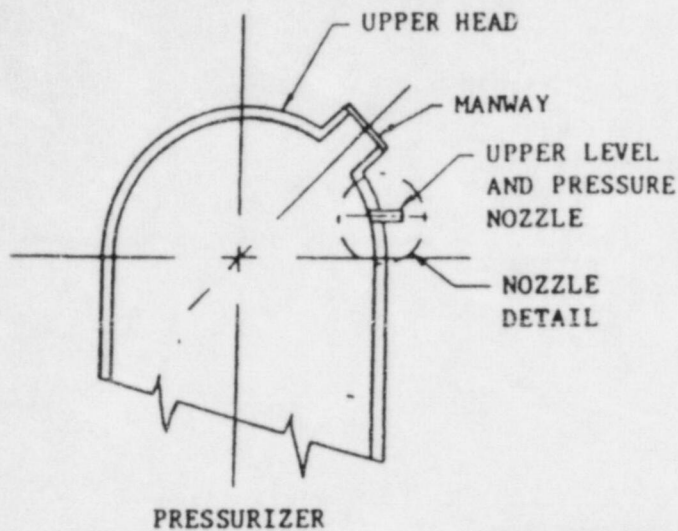
PAGE (3)

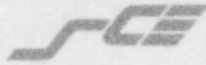
0 4

OF

0 4

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





Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

P. O. BOX 128

SAN CLEMENTE, CALIFORNIA 92672

H. E. MORGAN
STATION MANAGER

TELEPHONE
(714) 368-6241

January 29, 1987

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Docket No 50-362
Licensee Event Report No. 86-003, Rev. 2
San Onofre Nuclear Generating Station, Unit 3

Reference: 1) Letter H. E. Morgan (SCE) to USNRC Document Control Desk,
dated March 28, 1986
2) Letter H. E. Morgan (SCE) to USNRC Document Control Desk,
dated November 13, 1986

Reference 1) provided the required 30-day written Licensee Event Report (LER) for an occurrence involving the Reactor Coolant System pressure boundary. Reference 2) provided additional information, applicable to Units 2 and 3, regarding the cause and corrective action for the event. This submittal provides additional information, applicable to Unit 3, regarding non-destructive examination results and corrective action.

If you require any additional information, please so advise.

Sincerely,

H E Morgan

Enclosure: LER No. 86-003

cc: F. R. Huey (USNRC Senior Resident Inspector, Units 1, 2 and 3)

J. B. Martin (Regional Administrator, USNRC Region V)

Institute of Nuclear Power Operations (INPO)

LE22
11