LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3	0 5 0 0 0 3 6 2	1 of 0 4

Title (4)

Reactor Coolant System Pressure Boundary Weepage

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
Month	Day	Year	Year	Sequential Number	Revision Number	Month	Day	Year	Facility Names	Docket Number(s)
0 7	2 2	9 5	9 5	0 0 0	0 0	0 8	2 3	9 5	NONE	

OPERATING MODE (9)	3	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)					
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)	___ 50.36(c)(2)	___ 50.73(a)(2)(vii)	___ Other (Specify in Abstract below and in text)		
		___ 20.405(a)(1)(iii)	_X_ 50.73(a)(2)(i)	___ 50.73(a)(2)(viii)(A)			
		___ 20.405(a)(1)(iv)	___ 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
R. W. Krieger, Vice President, Nuclear Generation	AREA CODE 7 1 4 3 6 8 - 6 2 5 5

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

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 July 22 1995, with the Unit in Mode 3, Edison began the Unit 3 cycle 8 refueling outage inspection of the alloy 600 and 690 instrument nozzles. One pressurizer (PZR) level instrumentation nozzle was found with a small amount of boric acid crystals and oxidation present, indicating RCS weepage. On July 26, a radio-chemistry evaluation confirmed that RCS weepage had occurred. Two similar indications were found on RCS hot leg instrument nozzles on July 27, 1995. Based on radionuclide analysis, these RCS leaks were minute and had been inactive for more than a year. These inactive weeps are estimated to have occurred about 500 days prior to discovery at the beginning of Cycle 7 operation, when the unit was in Mode 4 or above. Therefore, Edison is reporting this in accordance with 50.73(a)(2)(i).

Edison has concluded that primary water stress corrosion cracking of alloy 600 type materials was the cause of all three RCS pressure boundary leaks.

As a precautionary measure, the four PZR vapor space instrument nozzles will be replaced with alloy 690 material. The accessible exterior of the two existing RCS hot leg nozzles will be cut off half way through the RCS hot leg material. New alloy 690 nozzles will be welded to the exterior of the RCS pipe. All repair work is being performed in accordance with ASME Section XI.

The leakage area introduced by the complete failure of an instrument nozzle is substantially less than the smallest area evaluated in the UFSAR for small break LOCAs. Thus, the consequences of a failure of an instrument nozzle is bounded by the small break LOCA analyzed in the UFSAR. Edison has concluded that the existence of the RCS leaks noted had minimal safety significance.

Plant: San Onofre Nuclear Generating Station, Unit 3
Reactor Vendor: Combustion Engineering
Event Date: July 22, 1995
Mode: Mode 3
Pressure: Approximately 2200 psia
Temperature: Approximately 550 degrees F

BACKGROUND:

Technical Specification (TS) 3.4.5.2(a) requires Edison to ensure that there is no Reactor Coolant System (RCS)[AB] pressure boundary leakage while in Modes 1 through 4. In response to previous minor leakage of Alloy 600 nozzles at SONGS and elsewhere in the industry, Edison developed the "Susceptibility of Reactor Coolant System Alloy 600 Nozzles To Primary Water Stress Corrosion Cracking and Replacement Program Plan" which has been in effect since 1993. This plan requires visual inspection of most RCS pressure boundary alloy 600 and 690 nozzles [AB,NZL] every refueling outage.

DESCRIPTION OF THE EVENT:

On July 22 1995, with the Unit in Mode 3, Edison began the Unit 3 cycle 8 refueling outage inspection of the alloy 600 and 690 instrument nozzles. One pressurizer (PZR) level instrumentation nozzle was found with a small amount of boric acid crystals and oxidation present, indicating RCS weepage. On July 26, a radio-chemistry evaluation confirmed that RCS weepage had occurred. Two similar indications were found on RCS hot leg instrument nozzles on July 27, 1995. Based on radionuclide analysis, these RCS weeps were minute and had been inactive for more than a year. These inactive weeps are estimated to have occurred about 500 days prior to discovery at the beginning of Cycle 7 operation, when the unit was in Mode 4 or above. Therefore, Edison is reporting this in accordance with 50.73(a)(2)(i).

CAUSE OF THE EVENT:

Edison has concluded that Primary Water Stress Corrosion Cracking (PWSCC) of alloy 600 type materials was the cause of all three RCS pressure boundary leaks.

Although the PZR instrument nozzles had been replaced in March 1992 with a material less susceptible to PWSCC (alloy 690), the welding material used was equivalent to alloy 600 (AWS Class ENiCrFe-3), the most suitable weld material available to Edison at the time.

Dye penetrant testing (PT) performed on the inside surface of the PZR surrounding the nozzle penetration indicated a crack initiation point in the heat affected zone of the weld butter. The alloy 690 PZR nozzle piece interior did not have indication of PWSCC.

The RCS hot leg instrument nozzles with leakage indications were alloy 600 nozzles, Edison believes the cause of the identified leaks to be PWSCC as well. Inaccessibility to the interior of the RCS hot legs precluded confirmatory inspections.

CORRECTIVE ACTIONS:

All Unit 3 PZR vapor nozzles were inspected from inside the PZR verifying that PWSCC had not occurred on any of the other vapor space nozzles.

As a precautionary measure, the four PZR vapor space instrument nozzles will be replaced with alloy 690 material prior to the end of the current outage. This repair will use filler material recommended by the developer of the alloy 690 base metals (INCO 52). The welding will be performed by the machine Gas Tungsten Arc Welding (GTAW) process, which will ensure a uniform and controlled weld.

The accessible exterior of the two RCS hot leg nozzles will be replaced with new alloy 690 nozzles. Access to the interior of the RCS hot leg piping prevents welding from the

interior of the RCS. Therefore, the existing nozzles will be cut off half way through the RCS hot leg material and the new nozzles welded to the exterior of the RCS pipe (see attached diagram). All repair work is being performed in accordance with ASME Section XI.

Edison completed the alloy 600 and 690 nozzle inspection with no other indications of leakage found.

SAFETY SIGNIFICANCE OF THE EVENT:

Calculations and analyses performed by the Combustion Engineering Owners Group (CEOG) indicate that cracks resulting from PWSCC propagate slowly in an axial direction and do not propagate circumferentially. Industry experience with PWSCC supports this conclusion. A complete circumferential failure is not considered to be credible.

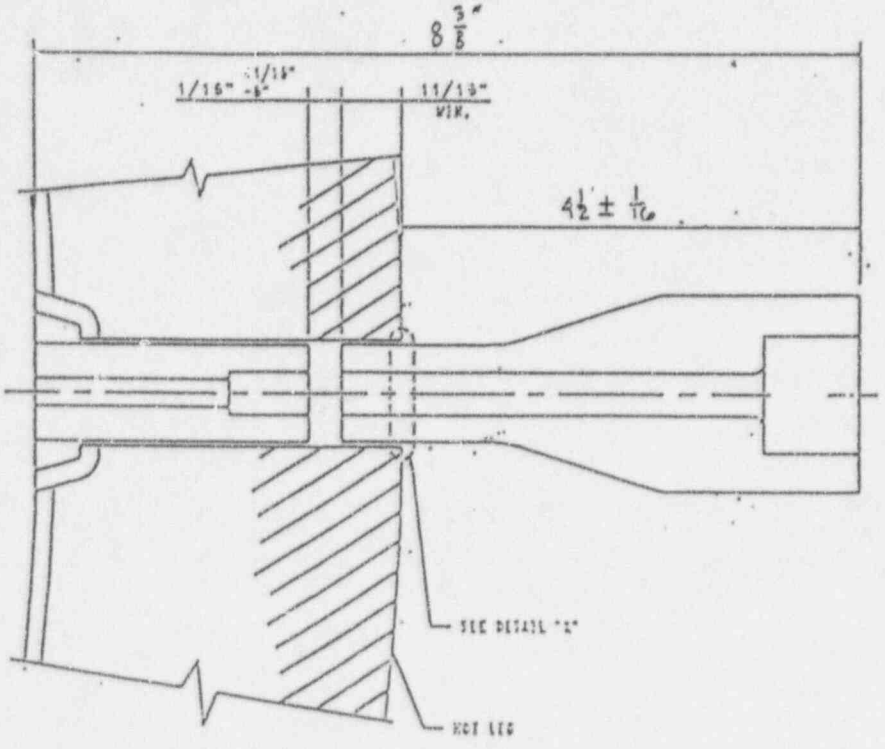
Even though a circumferential failure is not considered credible; the consequences of such a failure are bounded by the small break LOCA analyzed in the UFSAR. The leakage area introduced by the complete failure of an instrument nozzle is substantially less than the smallest area evaluated in the UFSAR for small break LOCAs. Therefore, Edison has concluded that the existence of the RCS leaks noted had minimal safety significance.

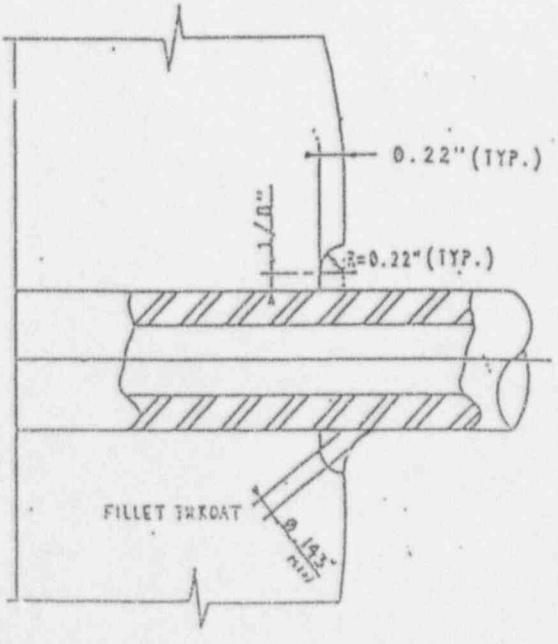
ADDITIONAL INFORMATION:

LER 86-003, Revision 1, (Docket No. 50-362) reported a small RCS pressure boundary leak in a 3/4 inch diameter PZR level instrument nozzle. The cause was attributed to PWSCC and the nozzle was cut out and replaced. Further evaluation determined that two other vapor space nozzles and one water space nozzle at SONGS 3, as well as one water space nozzle at SONGS 2, were fabricated from the same heat of material as the failed nozzle. These nozzles were all subsequently replaced with new Alloy 600 nozzles.

LER 92-004, (Docket No. 50-362) reported small pressure boundary leaks on both the Unit 2 and Unit 3 PZR vapor space nozzles. The unit 3 nozzles were replaced with Alloy 690 material as discussed above. The Unit 2 PZR vapor space nozzles were initially repaired with partial nozzle replacements, with full nozzle replacement occurring during the Unit 2 cycle 7 refueling outage, June 6, 1993, to August 8, 1993. The materials and methods being used for the current nozzle replacement had become available and were used for the Unit 2 cycle 7 nozzle repair.

New Hot Leg Nozzle Design





DETAIL "X"