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 5

Title (4)

INCONCLUSIVE CHECK VALVE TESTING METHODOLOGY - VOLUNTARY REPORT

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)
1 2	0 9	9 2	9 2	--- -	0 1 1 3	--- -	0 0	0 6	0 9	9 3	SONGS, Unit 3	0 5 0 0 0 3 6 2
												0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)							
POWER LEVEL (10)	1 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)	X Other (Specify in Abstract below and in text)
//////////////////////////		___ 20.405(a)(1)(iii)	___ 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)	
					Voluntary

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER
R. W. Krieger, Station Manager	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	///////
B	K G	V	C 6 3 0	N	///////						///////
					///////						///////

SUPPLEMENTAL REPORT EXPECTED (14)		Expected Submission Date (15)	Month	Day	Year
___ Yes (If yes, complete EXPECTED SUBMISSION DATE)	XX NO				

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

This voluntary Licensee Event Report (LER) is intended to inform the industry of information related to a check-valve-testing methodology utilized at the San Onofre Nuclear Generating Station (SONGS) which led to inconclusive results. The test relied on determining check valve operability by verifying system flow rate while opening an upstream vent valve which itself was subject to blockage. With a blocked vent valve there would be no true indication that the check valve had seated on reverse flow as required. The check valves and vent valves are located in a domestic water system that is susceptible to material deposits and blockage. Applicable SONGS valve testing procedures will be evaluated to determine which other procedures are deficient by not first requiring verification of flow through the vent valves utilized to verify proper check valve position.

Plant: San Onofre Nuclear Generating Station
Units: Two and Three
Reactor Vendor: Combustion Engineering
Event Date: 12/9/92
Time: 0906

A. CONDITIONS AT TIME OF THE EVENT:

Unit 2 & 3: Mode 1, Power Operations at 100%

B. BACKGROUND INFORMATION:

This is a voluntary Licensee Event Report (LER) intended tc inform the industry of a check valve testing methodology deficiency identified at the San Onofre Nuclear Generating Station (SONGS) that may be applicable to other plants. The test determined check valve operability by verifying system flow rate while opening an upstream vent valve which itself was subject to blockage.

Saltwater Cooling (SWC) System:

The SWC system [BS] provides saltwater from the Pacific Ocean to the component cooling water (CCW) [CC] heat exchangers [HX] for cooling during normal power generation, normal and emergency shutdown and cooldown of the reactor, and during the design basis loss-of-coolant accident (LOCA). The SWC system for each unit consists of two trains. Each train contains two 100% capacity pumps [P]; one pump is located in the Unit 2 intake structure, and the other is located in the Unit 3 intake structure.

The SWC pump seals [SEAL] and bearings are normally cooled and lubricated by the service water system [KG] (domestic water). In the event that the service water system becomes inoperable due to maintenance or in the unlikely event of a design basis earthquake (DBE), the SWC system is equipped with emergency recirculation water lines to cool and lubricate the pump seals and bearings (refer to Figure 1).

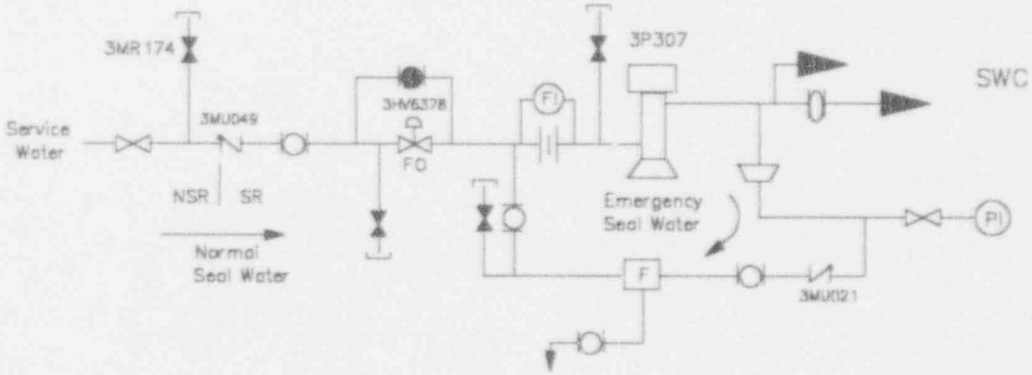

Figure 1: SWC Pump Seal Water Supply

The normal service water seal supply (nonsafety-related) is isolated from the safety-related emergency seal water flow by the normal service water seal supply check valves [V] (e.g., 3MU049) and air operated isolation valves [SHV] (e.g., 3HV6378). The normal service water seal supply check valve is a redundant boundary valve for the emergency recirculation seal water flow, and is checked for proper seating on reverse flow.

It has been demonstrated through analysis and actual testing that a functional normal service water seal supply check valve in the domestic water line is not a required component. Under postulated accident conditions with an upstream pipe break and a stuck open check valve (e.g., 3MU049), sufficient emergency seal water flow is provided for long-term SWC pump operation. The quantity of emergency seal water flow to the bearing system would be sufficient to keep the bearings cool and to prevent the intrusion of abrasive particles even with the postulated flow diversion through a non-functional check valve and out a postulated break in upstream piping.

C. DESCRIPTION:

During Unit 2 SWC pump service water supply design modification work (piping and vent valve replacement), it was noted that several vent valves were blocked with debris. In this condition, it was questionable as to whether previous testing had adequately determined that the normal service water seal supply check valves were capable of reverse flow seating during a postulated DBE event requiring emergency seal water recirculation flow. Therefore, on December 7, 1992, the applicable check valve test procedure was modified to require verification of flow out the vent valves first, prior to isolating normal service water and checking for check valve closure.

Subsequent to the Unit 2 vent valve blockage discovery, this condition was also confirmed to have existed at Unit 3. An example was the vent valve blockage (debris) discovered in 3MR174 (the upstream vent valve for 3MU049). Upon removing the vent valve 3MR174 blockage, subsequent testing on December 9, 1992, indicated that 3MU049 would not seat.

The procedure for testing check valves did not specifically require verification that the upstream vent valve (e.g., 3MR174), which is opened when verifying check valve leak tightness (refer to Figure 1), would pass flow. Instead, the instructions were to open the vent valve with upstream normal service water isolated and verify that seal water flow to the SWC pump was still greater than or equal to the manufacturers recommended minimum flow. With a blocked vent valve there was no positive indication that the normal seal water system supply check valve had seated on reverse flow as required to verify valve operability

The vent valve flow blockage was attributed to a build-up of sediment (from untreated domestic water) and corrosion products from upstream nonsafety-related thick wall carbon steel service water (domestic water) piping.

Check valve 3MU049 was not able to seat on reverse flow due to a similar corrosion product buildup in low flow areas within the valve body (refer to Figure 2). Upon flow reversal during emergency recirculation flow path testing, the debris became trapped between the ball and seat preventing closure.

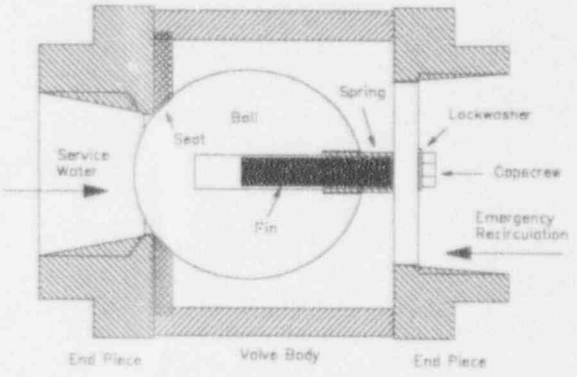

Figure 2: Seal Water Supply Check Valve

D. CORRECTIVE ACTIONS:

1. Corrective Actions Taken:

   a. The applicable check valve procedure was modified to require verification of flow out the vent valves prior to isolating normal service water and checking for proper check valve closure.

   b. The normal service water SWC pump seal supply just down-stream of the seal supply isolation valve up to and including the associated seal water supply vent valve has been modified for all Unit 2 SWC pumps to minimize corrosion product buildup. The associated piping and vent valves have been replaced with stainless steel components, and Y-strainers have been added.

2. Planned Corrective Actions:

   a. Applicable SONGS Unit 2 and 3 IST implementing procedures will be evaluated to determine if other tests contain the same deficiency. As appropriate, the significance of each occurrence will be evaluated and appropriate procedures modified as required.

   b. The Unit 3 normal service water SWC pump seal supply piping will be modified as was done for Unit 2.

E. SAFETY SIGNIFICANCE OF THE EVENT:

This occurrence had no safety significance since it has been demonstrated through analysis and actual testing that a functional check valve in the domestic water line is not a required component. This a voluntary LER and is being provided for NRC and industry information only.

F. ADDITIONAL INFORMATION:

1. Component Failure Information:

Check Valve Service Water Supply to SWC Pump 3P307
Rating: 180 lb / 300 degrees F
Size/Type: One inch ball check
Mfg.: Contromatics Division, Litton Industrial Products, INC.
Mfg. Code: C630
Model: 598-00-07
Part No.: 86231-1-2-3

2. Previous LERs for Similar Events:

LER 90-018, Rev. 1, Docket No. 50-206 reported that the Unit 2 and 3 normal service water seal supply check valves had not been previously tested as required by the ASME Code. On August 14, 1991, prior to the initial IST, the Unit 3 service water supply check valve 3MU050 for SWC pump 3P114 was found to be blocked with corrosion products and missing internal pieces (lock washer and cap screw).