

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>South Texas, Unit 2</b>	DOCKET NUMBER (2) <b>0 5 0 0 0 4 9 9 1</b>	PAGE (3) <b>1 OF 0 3</b>
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TITLE (4) **Technical Specification Required Shutdown Due to Primary Coolant System Leakage**

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	5	0	8	9	0	0	0	8	0	1	0	1	1	7	9	1	0	5	0	0	0	0	5	0	0	0

OPERATING MODE (9) <b>6</b>	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more of the following) (11)																			
POWER LEVEL (10) <b>0 0 0</b>	20.402(b)	20.405(a)(1)(iii)	20.405(a)(1)(iii)	20.405(a)(1)(iii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(iv)	20.405(a)(1)(iv)	20.405(a)(1)(iv)	20.405(a)(1)(iv)	50.73(a)(2)(i)	50.73(a)(2)(i)	50.73(a)(2)(i)	50.73(a)(2)(i)(ii)(A)	50.73(a)(2)(i)(ii)(B)	50.73(a)(2)(i)	73.71(b)	73.71(c)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)	

LICENSEE CONTACT FOR THIS LER (12)									
NAME <b>C. A. Ayala - Supervising Licensing Engineer</b>								TELEPHONE NUMBER <b>5 1 2 9 7 2 - 8 6 2 8</b>	

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFAC TURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFAC TURER	REPORTABLE TO NRPDS	

SUPPLEMENTAL REPORT EXPECTED (14)								EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO												

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

On May 8, 1990, Unit 2 was in Mode 1 at 100 percent power. At approximately 0030 hours, it was determined that a small pressure boundary leak (approximately 10 ml/minute) existed on the ASME Class 2 Steam Generator C lower head drain line. A Notification of Unusual Event was declared and Technical Specification required shutdown was initiated to Mode 5. The cause of this event was high cycle fatigue failure of the weld on the upstream side of the drain valve. The drain valves on both units' steam generators have been replaced with threaded and welded caps which are not expected to develop high alternating stresses. The design of the drain valve piping has been reviewed to assure no cyclic fatigue stress concerns exist. An evaluation of the high cycle fatigue experienced on the Steam Generator drain line has been performed for potential generic implications.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 0	0 1 6	0 0	0 2	OF 0 3

TEXT (if more space is required, use additional NRC Form 3054's) (17)

DESCRIPTION OF EVENT:

On May 8, 1990, Unit 2 was in Mode 1 at 100 percent power. At approximately 0030 hours, it was determined that a small Reactor Coolant System (RCS) pressure boundary leak (approximately 10 ml/minute) existed on the Steam Generator C lower head drain line. Action A of Technical Specification 3.4.6.2 requires a plant shutdown in the event of any unisolable pressure boundary leakage. A Notification of Unusual Event (NOUE) was declared and a shutdown initiated to Mode 5. The NRC was notified of the event at 0045 hours on May 8, 1990.

On April 22, 1990 the Containment Atmosphere Particulate and Gaseous Radiation Monitors indicated an increase in the containment atmosphere radiation level. An investigation was performed to determine the source of the increased activity. On May 8, 1990 the source of the radiation was determined to be primary coolant leakage from the Steam Generator C lower head drain line where it connected to the drain valve. The weld on the upstream side of the valve had cracked. Metallurgical examination of the weld concluded that the crack was due to high cycle fatigue. Ultrasonic examination of the remaining seven pipe to drain valve welds on both units detected the presence of partial linear indications in three other locations. The drain valve on each steam generator was replaced with a threaded and welded cap to minimize the mass of unsupported pipe, change the natural frequency substantially and prevent subsequent fatigue failures. Repairs were completed and the plant restarted on May 19, 1990.

CAUSE OF EVENT:

The cause of this event was high cycle fatigue failure of the pipe to valve weld on the upstream side of the Steam Generator C drain line isolation valve. The forcing function is believed to be vibration induced by Steam Generator flow. This, in combination with the slender configuration of the drain with unsupported suspended masses (valve and flange) appears to have caused resonant excitation leading to unexpected high cycle fatigue failure at the point of severe transition.

ANALYSIS OF EVENT:

Completion of a shutdown required by Technical Specification is reportable pursuant to 10CFR50.73(a)(2)(i)(A). The pressure boundary leak occurred in a Class 2 line which is downstream of a 3/8" flow restricting orifice. The leakage rate was estimated at 10 ml/minute. In the event of a complete failure of the weld, the resulting leakage is an analyzed condition which would not exceed the capacity of the charging system. There were no adverse safety or radiological consequences as a result of this event.

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		0	16	0	0	3	OF

TEXT (If more space is required, use additional NRC Form 306A's) (17)

CORRECTIVE ACTION:

The following corrective actions are being taken as a result of this event:

1. The steam generator valves on both units have been replaced with threaded and welded pipe caps. The associated welds and extensions have been cut out resulting in a configuration with a substantially different natural frequency which is not likely to be subject to fatigue failure.
2. An evaluation of the high cycle fatigue experienced on the Steam Generator drain lines has been performed for potential generic implications. The generic implication of this failure is limited to the drain lines on the Steam Generators for both Units.

ADDITIONAL INFORMATION:

There have been no previous events reported regarding high cycle fatigue of RCS pressure boundary piping.