NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Perry Nuclear Power Plant, Unit 1	0 5 0 0 0 4 4 0	1 OF 0 4

TITLE (4) Improper Maintenance Results In The B Main Steam Line Penetration Exceeding Technical Specification Leakage Limit

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 0 0
0 9	2 6	8 7	8 7	— 0 6 7	— 0 1	0 7	1 5	8 8		0 5 0 0 0

OPERATING MODE (9): 4

POWER LEVEL (10): 0 0 0

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

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	X 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)	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)
Gregory A. Dunn, Compliance Engineer, Extension 6484	2 1 6 2 5 9 - 3 7 3 7

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
X	S B	I S V	A 5 8 5	Y					
X	S B	I S V	R 3 4 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 September 26, 1987 it was identified that the primary containment leakage rate through the isolation valves for Main Steam Line (MSL) B as defined by Technical Specification 3.6.1.2 had been exceeded, however, the leakage path had not been determined. The inboard Main Steam Isolation Valve (MSIV) stem and actuator had previously separated on September 22 causing it to be inoperable. On September 29 the outboard MSIV was verified to be the leakage path having excessive seat leakage.

The cause of the stem and actuator separation on the inboard MSIV was the stem plate set screw not being properly installed during previous maintenance allowing the stem to rotate and become detached from the actuator stem plate. Leakage through the outboard MSIV was due to deformation in the lower part of the valve seating surface which was not removed by lapping during previous maintenance. As the valve was stroked the seat contact point moved further down on the seat surface into the deformation allowing excessive leakage.

Both MSIVs were disassembled and inspected. There was no poppet or seat damage to the inboard MSIV. The outboard MSIV seat was relapped to remove all indications of the deformation. A review of MSIV work packages will be conducted to identify improvements for future MSIV maintenance and a Generic Maintenance Instruction will be developed to implement the identified improvements. Upon completion of the repairs, a Local Leak Rate Test was performed on the MSL B with an overall leak rate of 6.05 scfh at 11.8 psig.

1572
1/1

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	PAGE (3)
Perry Nuclear Power Plant, Unit 1	0 5 0 0 0 4 4 0	8 7	— 0 6 7	— 0 1	0 2 OF 0 4

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

On September 26, 1987 it was identified that the primary containment leakage rate through the isolation valves for Main Steam [SB] line (MSL) B as defined by Technical Specification 3.6.1.2 had been exceeded. At the time of the discovery the plant was in Operational Condition 4 (Cold Shutdown). Reactor coolant temperature was approximately 130 degrees and reactor vessel [RPV] pressure was atmospheric.

On September 22 at 1412 the inboard Main Steam Isolation Valve (MSIV) [ISV], 1B21-F022B, stem and actuator separated during the performance of Surveillance (SVI)-C71-T0039, "MSIV Closure Functional", allowing the valve poppet to close. The steam flow in MSL B decreased to zero. Following verification of the valve indicating open and no steam flow, reactor power was reduced from 80 to 75 percent of rated at 1423. At 1736 the outboard MSIV, 1B21-F028B, was closed and deactivated in accordance with Technical Specifications. A voluntary plant shutdown was commenced at 1750 to facilitate inspection of the MSIV. On September 23 at approximately 0630 the Mechanical System Lead Engineer and the Nuclear Steam Supply Systems Lead Engineer entered the drywell to investigate the condition of the inboard MSIV. The inspection revealed that the poppet had reopened. Later it was determined that steam pressure trapped between the inboard and outboard MSIVs forced the poppet open and was held there by only a few threads on the stem. On September 24 the inboard MSIV was disassembled to determine the extent of damage. The only damage was minor deformation of the bottom thread of the actuator stem plate and the spring holder pin for the pilot valve had come out due to vibration of the poppet after the stem started unscrewing.

On September 26 a Local Leak Rate Test (LLRT) on MSL B failed, with an estimated leak rate of approximately 610 standard cubic feet per hour (scfh). However, the leakage path had not been determined. On September 29 the outboard MSIV, 1B21-F028B, was verified to have excessive seat leakage causing the LLRT to fail. Technical Specification 3.6.1.2.c provides a limit per MSL of 25 scfh when tested at 11.31 psig. The valve was disassembled and the body seat was relapped. Both inboard and outboard MSIVs were reassembled and an LLRT performed on October 5. The LLRT failed due to seat leakage on MSIV Leakage Control System (LCS) Steam Tunnel Isolation Valve, 1E32-F001E. The LCS valve was disassembled and the seating surfaces lapped. On October 7, the LCS valve was reassembled. A satisfactory LLRT was performed for MSL B on October 8. The MSIV LCS valve was manufactured by Rockwell International, Model Number FIG#12511BDDFMPQTY. The MSIVs were manufactured by Atwood and Morrill Company, Model Number 13560-01-H.

The cause of the stem and actuator separating was failure to perform a step during previous maintenance on the inboard MSIV. Tightening the set screw and bending the lock tabs for the stem to actuator connection was included in one step. This was signed off when the lock taps were bent. Since both parts of the step had not been performed when the step was signed off, the set screw was never tightened. This allowed the stem to rotate and come unscrewed from the stem plate.

IE22
1/1

The cause of seat leakage on the outboard MSIV was a result of incomplete machining of the valve seating surface and failure to recognize that the seating contact point would move when the valve was cycled. During previous maintenance an old seat lapping tool developed a worn bearing and lapped the seat unevenly. The lapping tool was removed and a stone grinding tool was used to correct the deformation on the seat. Removal of the defect on the upper portion of the seat, including the seat contact area, was verified by a poppet to seat blue check. Subsequently, a successful LLRT was performed on the MSL. Based on the satisfactory tests, no further lapping was considered necessary. As the valve was cycled, the seat contact point moved further down on the seat surface and after several cycles reached a depressed area of the valve seat allowing leakage.

The cause of the LCS Isolation Valve leakage was debris between the disc and seat preventing a leak tight seal. During the repair of the outboard MSIV dust from lapping entered the drain line leading to the LCS Isolation Valve. Some of the fine particle debris was located on the LCS Isolation Valve. When the valve was stroked the debris was wedged into the seating surfaces causing damage.

Primary containment integrity ensures that the release of radioactive materials from the containment atmosphere will be restricted to those leakage paths and associated leak rates at the peak pressure of 11.31 psig assumed in the accident analyses limiting the site boundary radiation dose to within the limits of 10 CFR Part 100. As an added conservatism, the allowable overall integrated leakage is limited to less than or equal to 75 percent of the analyzed value to account for possible degradation of containment barriers between leakage tests. Since the MSL leakage was greater than allowable this event is considered to be of potential safety significance.

One previous similar event was identified. On July 5, 1987 it was identified that the primary containment leakage rate through the inboard and outboard (MSIVs) for MSLs A and B, and through the inboard MSIV and the LCS Steam Tunnel Isolation Valve for MSL D was in excess of Technical Specification limit. The cause of the MSIV leakage is not attributable to previous maintenance but due to seat wear based on service seen during the power ascension program. The cause of the MSIV LCS valves leaking has been attributed to the difficulty in obtaining adequate mating and sealing of the bonnet pressure seal ring when assembling the valve body to bonnet.

As a result of this event all MSIVs stem plate set screws were checked and tightened as required. The outboard MSIV in MSL B seating surface was relapped, using a newer seat lapping tool to ensure entire seat was free of deformations. A review of previous maintenance indicated that all other MSIV seats had been properly lapped. All four inboard MSIVs and the A and C outboard MSIVs received a final lapping using the newer Dexter. The D

outboard MSIV did not leak beyond acceptable criteria and therefore, did not require seat lapping. The LCS Isolation Valve seat and disc seating surfaces were relapped. Upon completion of the repairs, an LLRT was performed on the MSL B with an overall leak rate of 6.05 scfh at 11.8 psig.

To prevent recurrence a review of the recent work packages on the MSIVs will be conducted to develop a comprehensive package concerning the lessons learned. The identified improvements for maintenance of MSIVs will be incorporated into a Generic Maintenance Instruction for future MSIV maintenance. A quality assurance hold point has been placed on the step for set screw tightening and lock tab bending to ensure a quality assurance inspector verifies the performance of both evolutions. A requirement for a satisfactory "blue check" of the entire seat surface upon completion of final lapping has been established. Although this is a normal maintenance practice, it will be more closely monitored by the quality assurance inspectors. The engineering staff has been made aware of movement of the seating contact area during valve operation and will utilize the information in any future evaluation. A method will be devised to prevent debris on the LCS Isolation Valves seats, such as installing a plug in the drain line during future MSIV seat lapping or flushing of the line with the LCS Isolation Valve open to ensure the line is clear of all debris.

Energy Industry Identification System Codes are identified in the text as [XX].