



**CENTERIOR
ENERGY**

PERRY NUCLEAR POWER PLANT

10 CENTER ROAD
PERRY, OHIO 44031
(216) 259-3737

Mail Address:
PO. BOX 97
PERRY, OHIO 44081

Donald C. Shelton
SENIOR VICE PRESIDENT
NUCLEAR

June 9, 1995
PY-CEI/NRR-1963L

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
LER 95-004

Gentlemen:

Enclosed is Licensee Event Report 95-004 concerning the potential for
containment airlock leakage to exceed the design basis limit.

If you have questions or require additional information, please contact
Mr. James D. Kloosterman, Manager - Regulatory Affairs at (216) 280-5833.

Very truly yours,

GSC:sc

Enclosure: LER 95-004

cc: NRC Project Manager
NRC Resident Inspector Office
NRC Region III

9506130097 950609
PDR ADDCK 05000440
S PDR

Operating Companies
Cleveland Electric Illuminating
Toledo Edison

TF22
11

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Perry Nuclear Power Plant, Unit 1

DOCKET NUMBER (2)

05000 440

PAGE (3)

1 OF 5

TITLE (4)

Potential for Containment Airlock Leakage to Exceed Design Limits

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	10	95	95	004	00	06	09	95		05000
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)							
POWER LEVEL (10)										
1			20.402(b)							
100			20.405(a)(1)(i)							
			20.405(a)(1)(ii)							
			20.405(a)(1)(iii)							
			20.405(a)(1)(iv)							
			20.405(a)(1)(v)							
			50.73(a)(2)(iv)							
			50.73(a)(2)(v)							
			50.73(a)(2)(vi)							
			50.73(a)(2)(vii)(A)							
			50.73(a)(2)(vii)(B)							
			50.73(a)(2)(x)							
			OTHER							
			(Specify in Abstract below and in Text, NRC Form 366A)							

LICENSEE CONTACT FOR THIS LER (12)

NAME

K. R. Jury, Supervisor-Compliance

TELEPHONE NUMBER (Include Area Code)

(216) 280-5594

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)

YES	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
(If yes, complete EXPECTED SUBMISSION DATE)	X				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On May 10, 1995, at 1730 hours, it was determined that the potential existed for secondary containment bypass leakage through the upper containment airlock to exceed the design basis leakage limit. An inadequately supported local leak rate test (LLRT) connection flexible hose on the upper containment airlock was determined to be susceptible to failure during a seismic event. If this hose were to fail coincident with a Loss of Coolant Accident (LOCA) and the upper containment airlock inner door open or the airlock seal inoperable, the leakage rate through the airlock could exceed the design basis limit. The cause of this condition was an inadequate original design, in which the properties for copper tubing were improperly utilized. Contributing to this condition was an inadequate design review in April 1985, of a modification made on June 1, 1985, that replaced hard-piped unions with quick disconnect fittings to facilitate performance of the airlock LLRT. Corrective actions included modifying a support on the upper airlock leak rate test piping to prevent rotation of the flexible hose. A similar concern had existed with the lower containment airlock prior to a modification that was performed in 1994. A review has been performed to determine the extent of copper tubing use in piping designs and to determine whether the properties of the tubing have been properly accounted for in the applicable design calculations. This report is submitted in accordance with 10CFR50.73(a)(2)(v).

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)
Perry Nuclear Power Plant, Unit 1		05000 440		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	OF 2 5
				95	004	00	

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

I. Introduction

On May 10, 1995, at 1730 hours, it was determined that the potential existed for secondary containment bypass leakage through the upper containment airlock to exceed the Technical Specification 3.6.1.2.b limit, as well as, the design basis limit. A local leak rate test (LLRT) connection flexible hose on the upper containment airlock was evaluated to be susceptible to failure during a seismic event. If this hose were to have failed coincident with a Loss of Coolant Accident (LOCA) and the upper containment airlock inner door open or its seal inoperable, a one-half inch leakage path from containment to atmosphere would have been created. Notification was made to the NRC via the Emergency Notification System (ENS) on May 10, 1995, at 2012 hours in accordance with 10CFR50.72(b)(2)(iii)(C), as a condition that alone could have prevented the fulfillment of the safety function of the containment to control the release of radioactive material. This condition is being reported in accordance with 10CFR50.73(a)(2)(v), as a condition that alone could have prevented the fulfillment of the safety function of the containment to control the release of radioactive material.

II. Description of Event

Condition Report (CR) 94-0319 identified a discrepant condition associated with the support of a one-half inch flexible hose used to pressurize the lower containment airlock barrel for the airlock LLRT. A modification performed in 1985 permanently removed a section of piping and the attached pipe unions, and replaced them with quick disconnect fittings to facilitate performance of the airlock LLRT. This modification effectively removed the restraint preventing rotation of the piping and the flexible hose. The flexible hose is designed for flexure, but not for rotation. The piping and flexible hose did rotate under the eccentric weight of the attached isolation valves, causing the hose to twist which damaged the outer protective metal wire mesh; however, the line did not fail.

An immediate corrective action taken for this condition was to inspect and evaluate the upper containment airlock and the drywell airlock for similar problems. The drywell airlock does not utilize the flexible hose arrangement for barrel testing; therefore, it was determined not to have a similar problem. The upper containment airlock, which does utilize a similar flexible hose arrangement, was initially evaluated as not being susceptible to rotation. It was concluded at that time, that for the upper containment airlock, the vertical orientation of the attached piping would effectively prevent rotation of the piping and the flexible hose.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Perry Nuclear Power Plant, Unit 1	05000 440	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	OF 3 5
		95	- 004 -	00	

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

On May 10, 1995, while evaluating a longer term corrective action associated with CR 94-0319, it was determined that although the upper airlock flexible hose arrangement was not subject to rotation from strictly a dead weight, non-seismic loading consideration, it was susceptible to rotation, and thus to failure, with seismic loads applied. A Potential Issue Form (PIF 95-0980) was initiated and the NRC was notified as described above. The upper containment airlock inner door was verified closed and was locked within 24 hours as required by Technical Specification 3.6.1.3.

Evaluation of this PIF concluded that although the modification performed in 1985 removed the apparent restraint to rotation, the original design itself was inadequate to prevent rotation which could result from a seismic event. The piping from the flexible hose to the second isolation valve is American Society of Mechanical Engineers (ASME) Safety Class 2. The piping beyond the class break is Non-Safety Class 4. The material used for the non-safety portion is copper tubing. Design errors occurred in the use of copper tubing in the original design. These errors included use of the wrong American Society for Testing and Materials (ASTM) standard for copper tubing, an excessive support span for copper tubing, and an incorrect safety class designation for one of the pipe supports. These errors led to the conclusion that there was no effective anchor at the class break boundary. Loss of the non-safety copper tubing during a seismic event would have resulted in the loss of restraint for the safety class portion in one direction, thus allowing rotation of the safety class piping and the flexible hose. A similar problem was determined to have existed on the lower airlock prior to its repair in 1994. The repairs made to the pipe supports on the lower airlock in 1994 and to the upper airlock in 1995, will prevent rotation of the safety class piping and the flexible hoses under both seismic, as well as, dead weight loading.

III. Cause of Event

The cause of this condition was an inadequate original design. Contributing to this condition was an inadequate design review of the modification implemented in 1985. The cause of the inadequate original design, as well as, the cause of the inadequate design modification performed in 1985, was the lack of proper design interface review. The original design interface review process was not evaluated during this investigation because an extensive length of time has expired since the original design completion, and because the design interface was largely controlled by the architect engineer at that time. However, in reviewing the modifications made in 1985, it was identified that the Pipe Support group was not involved in the review of the design change. As a result, seismic loading forces on these piping configurations were apparently not properly considered.

LICENSEE EVENT REPORT (LER) **TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Perry Nuclear Power Plant, Unit 1	05000 440	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	OF 4 OF 5
		95	- 004 -	00	

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

The identification of a similar concern on the lower airlock in 1994 (CR 94-0319) provided an opportunity to correct the design errors. A review of the upper airlock piping arrangement was conducted by the System Engineering Section at that time. Seismic loading was not considered during this review and an incorrect determination was made regarding its acceptability. A Design Engineering Section design interface review would have included a seismic review, which could have led to an earlier resolution of this issue. The CR program at that time did not generally require a Design Engineering Section review prior to closure of an issue.

Although the initial determination of the overall adequacy of the upper airlock flexible hose for CR 94-0319 was incorrect, one of the corrective actions resulting from CR 94-0319 was to evaluate the effect of the modification performed in 1985 on the original design. This evaluation identified the lack of appropriate seismic restraint within the original design, as well as, with the 1985 modification.

IV. Safety Analysis

The containment personnel airlocks are welded steel assemblies with double pressure seating doors, designed to allow passage into and out of containment and to prevent leakage from containment to the atmosphere following a design basis accident. The piping and flexible hose arrangement described in this report are used for pressurizing the barrel of the airlock during the performance of the overall airlock leakage test described in Technical Specification 4.6.1.3.c. Damage to the flexible hose could result in a maximum one-half inch diameter hole in the airlock near the outer door. A one-half inch leakage path from containment during certain design basis conditions, could result in exceeding the design basis containment leakage limit.

The combination of events required to reach this failed condition is considered extremely unlikely. A seismic event resulting in failure of the flexible hose, coincident with a design basis LOCA would have to occur at a time when the inner containment airlock door was open or with its double seal inoperable. Technical Specifications limit the opening of these doors and the length of time that a door seal may remain inoperable. Additionally, the postulated effective leak size may be much less than an equivalent one-half inch diameter hole depending upon the actual failures experienced by the flexible hose and the airlock door seals. Therefore, with the low probability of occurrence and the high probability that a complete rupture of the flexible hose would not have occurred, it is unlikely that the design basis leakage limit would have been exceeded.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)
				YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	OF
Perry Nuclear Power Plant, Unit 1		05000 440		95	004	00	5 5

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

V. Similar Events

Five LERs have been written to document original design deficiencies which have resulted in potential losses of safety system function; 94-005, 94-015-01, 94-019, 95-001 and 95-003. LER 95-003, "Loss of Safety System Function Caused by Inoperable RHR System Snubbers" was the only one of these which involved an inadequate design interface review. LER 95-003 and the current LER (95-004) were both identified through the special Condition Report Corrective Action closeout review being conducted by the Design Engineering Section.

VI. Corrective Actions

1. The support on the upper containment airlock leak rate test piping was modified on May 16, 1995, to prevent rotation of the piping and the flexible hose.
2. A review was performed to determine the extent of copper tubing use in piping designs and to determine whether the properties of the tubing have been properly accounted for in the applicable design calculations. Three drawings, involving five design calculations, were identified in which copper tubing properties were improperly used. Two of these calculations are associated with the upper and the lower airlock piping, and have been reviewed as discussed in this report. The remaining three calculations are also being reviewed. The affected penetrations have been evaluated and it has been preliminarily determined that no operability concerns exist. All five calculations will be revised, as necessary.
3. Improvements made to the corrective action program, which combine the Non-Conforming Condition determination with the PIF investigation, in conjunction with the existing guidance contained in Nuclear Engineering Instruction (NEI)-330, "Interface Reviews and Evaluations", will strengthen design interface reviews.