NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Duane Arnold Energy Center	0 5 0 0 0 3 3 1	1 OF 0 4

TITLE (4)
Temporary Loss of Primary Containment Integrity During TIP Maintenance

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)
											None	0 5 0 0 0
0 8	0 9	8 5	8 6	—	0 0 3	—	0 0	0 2	2 0	8 6		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
N		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
0 8 4		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
William Miller, Technical Services Superintendent	3 1 9 8 5 1 - 7 2 1 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	
X	TI G	I I S V	G 1 1 8 2	No							

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)

During an Operations Committee review conducted in January, 1986 for a planned maintenance activity on the 'C' Transverse Incore Probe (TIP) line, it was determined that the Updated Final Safety Analysis Report (UFSAR) incorrectly identified the system as a closed system within containment, without direct communication with primary containment atmosphere.

It was also determined that consistent with this UFSAR analysis, maintenance was performed on the 'C' TIP ball valve on 8/09/85, which could have resulted in a loss of primary containment integrity in the event of design basis events.

With the plant at approximately 84% power on 8/09/85, the 'C' TIP ball valve was sticking. The TIP indexer inside the drywell was turned to a blank position to separate the tubing outside containment from the in-vessel TIP guide tubes. The ball valve was then replaced, resulting in the approximately .3 inch ID tubing outside primary containment being open for approximately 1 minute. During the August maintenance activities, there was no demand for containment isolation. Therefore, there was no effect on the safe operation of the plant or health and safety of the public. Subsequent maintenance on the TIP lines was performed in a manner to ensure continued containment integrity. The UFSAR is being reviewed for amendment and appropriate controls (10 CFR 50, Appendix J, Type B and C testing to the extent practical, etc.) will be observed in support of future TIP maintenance.

IE22
1/1

During an Operations Committee review conducted in January, [redacted] for a planned maintenance activity on the 'C' Transverse Incore Probe (TIP) (EIIS System IG) line, it was determined that the system analysis in the plant Updated Final Safety Analysis Report (UFSAR) seemed to incorrectly identify the system as a closed system within containment. It was also determined that maintenance performed on the isolation ball valve (EIIS Component Code ISV-C) on 8/09/85 was potentially performed improperly because of this UFSAR analysis. This maintenance would have resulted in a loss of primary containment isolation capability in the event of a design basis event.

Duane Arnold UFSAR Section 7.6.1.9.2 states, "A ball valve and a cable shearing valve are mounted in the guide tubing just outside the primary containment. They prevent the loss of reactor coolant in the event a guide tube ruptures inside the reactor vessel." UFSAR Table 3.1-1 states, "Since the TIP system lines do not communicate freely with the containment atmosphere and since they do not comprise a portion of the reactor coolant pressure boundary [10 CFR 50, Appendix A, General Design Criteria] GDC 55 and 56 are not directly applicable to this specific class of lines."

Inside the primary containment, the TIP tubing (approximately .3 inch ID) is equipped with an indexer, which is a revolver-like mechanism used for selecting multiple guide tubes leading into the reactor vessel. The indexer is mounted inside a housing equipped with a pressure relief valve which communicates with primary containment atmosphere. The indexer has a slip fitting with the guide tubes leading to the vessel. Several of the indexer positions are blanked off and not open to guide tubes.

On 8/09/85, with the plant at approximately 84% power, the TIP machine could not be moved from the indexer and was blowing fuses. The ball valve, which is inboard to the shear valve, was sticking. This valve sticking was causing the fuses to blow when power was applied to cycle the ball valve. After reviewing the design and consulting the UFSAR, it was decided that the ball valve could be changed out with the plant on-line due to the closed system configuration. It was also decided that the indexer could be positioned on a blank to provide additional assurance against coolant leakage outside primary containment in the unlikely event of a failed guide tube inside the reactor vessel. During the valve changeout, the guide tube was open for approximately 1 minute with the TIP system in this configuration.

In January, 1986, the replacement ball valve appeared to be sticking and would not fully open. While reviewing the design before performing maintenance, it was concluded that the UFSAR analysis was not correct. In the event of a Loss of Coolant Accident (LOCA) and primary containment pressurization, the indexer assembly pressure relief valve would open. The housing containing the indexer is not designed to withstand significant differential pressure. The TIP guide tubing leaving primary containment would then be in communication with primary containment atmosphere through the slip fit between the indexer and the guide tubes that lead to the reactor vessel.

The Operations Committee review surmised that since the TIP system could be considered in communication with primary containment, General Design Criteria (GDC) 56 appeared applicable. It was also concluded that the TIP system appeared to meet the requirements of GDC 56 in its normal configuration in that the ball and squib valve provided redundant and diverse dual isolation capability function. However, further review of the adequacy of these isolation provisions is in progress.

Based on this review, corrective actions for the faulty ball valve were initiated which assumed that the ball valve provided a primary containment isolation function. On 1/04/86, a minor design modification was performed. The existing ball valve was closed by hand and leak-tested from the outboard side. A new ball valve was installed outboard of the existing ball and squib valves. After maintenance was completed, the configuration from the old ball valve to the new valve was successfully Type B and C leak-tested. Since the old ball valve had not been removed or disassembled, the root cause for its failure was not determined. Following changeout of the original ball valve, inspection was performed to determine cause of the valve sticking. The results to date are inconclusive as to cause and efforts are continuing in conjunction with General Electric.

It is our current intent to restore the system to its original configuration during the next outage of sufficient duration. The UFSAR is under review as to the classification of the TIP system regarding communication with primary containment atmosphere. Final root cause determination of the ball valve failure will be made following disassembly of the second ball valve.

While researching the validity of the Operations Committee review conclusions, it was decided that the maintenance activities performed on 2/09/85 could have resulted in a momentary loss of primary containment integrity. The root cause of this event is considered to be the stated inadequacy as documented in the UFSAR.

Duane Arnold Technical Specification 3.7.A.2 requires, "Primary containment integrity shall be maintained at all times when the reactor is critical". Technical Specification 3.7.D requires that isolation valves identified in Table 3.7-3 be operable and, in the event of inoperable dual valves, that the reactor be brought to cold shutdown within 24 hours. Although the TIP valves are not included in this listing (due to an apparent fault similar to that in the UFSAR), the performance of maintenance on the TIP ball valve performed in August created an equivalent situation to that encompassed by these Technical Specification action statements (dual isolation inoperability).

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Duane Arnold Energy Center	0 5 0 0 0 3 3 1	8 6	— 0 0 3	— 0 0	0 4 OF 0 4

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

The internal diameter of the TIP tubing was insufficient to cause a loss of coolant in excess of the normal makeup capability (if the dry tube was to rupture within the reactor pressure vessel). Therefore, a dry tube rupture would not have created a loss of coolant accident. However, the integrity of the containment would be compromised because the resultant containment leak rate, under design basis conditions, would have exceeded 10 CFR 50, Appendix J Design Basis Containment Leak Rate (L_a) during the time in which the maintenance was performed.

The corrective maintenance program has been modified since these maintenance activities was performed. The new program requires a more extensive review of Corrective Maintenance Action Requests (CMARs) for safety consequences, procedural adequacy and post-testing requirements.

Further review is in progress to determine necessary Technical Specification and UFSAR revisions. Maintenance activities in the interim will conservatively recognize the containment isolation significance of this class of lines.

Iowa Electric Light and Power Company

February 20, 1986
DAEC-86-0131

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Subject: Duane Arnold Energy Center
Docket No. 50-331
Op. License DPR-49
Licensee Event Report No. 86-003

Gentlemen:

In accordance with 10 CFR 50.73 please find attached a copy of the subject Licensee Event Report.

Very truly yours,

Daniel L. Mineck
Plant Superintendent - Nuclear
Duane Arnold Energy Center

DLM/WJM/kp

Attachment - LER 86-003

cc: Mr. James G. Keppler
Regional Administrator
Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

NRC Resident Inspector - DAEC

File A-118a

IE22
1/1