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 3

TITLE (4)
Reactor Core Isolation Cooling Isolation Due to Temperature Switch Design Problem

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 3	1 5	8 6	8 6	0 0 7	0 0	0 4	1 4	8 6	None	0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	X 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)	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
James R. Probst, Technical Support Engineer	AREA CODE 3 1 9 — 8 5 1 - 7 3 0 8

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	I J	T D S	P 0 5 5	YES							

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 March 15, 1986, with the reactor shutdown for maintenance, the Reactor Core Isolation Cooling System (RCIC) isolated following a signal from the RCIC Steam Leak Detection System (SLDS). Concurrent with the isolation, an Operator was placing a temperature differential switch (TDS) in the RCIC SLDS to READ in order to take data for a daily STP. The annunciator received in the Control Room at the time of the isolation receives inputs from SLDS instrumentation other than the TDS being tested.

The isolation was promptly reset. Testing was unable to reproduce the isolation signal. The TDS is a Riley Pan Alarm Model 86. Previously this model has shown some susceptibility to spurious signals, and the manufacturer had indicated it may generate a spurious signal when taken to the read position which can influence other instrumentation within the circuitry. The root cause of this event is a design problem in the internal switch circuitry of the TDS. Recommendations previously made by a plant task force examining RCIC reliability to place a short time delay in the HPCI and RCIC steam leak detection circuitry will be implemented at the next opportunity.

IE22
1/1

NRC Form 366
(9-83)

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 7	— 0 0	0 2 OF 0 3

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

On March 15, 1986, at 1723 hours, with the reactor in shutdown mode at 0% power with the plant having just begun a maintenance outage, the Reactor Core Isolation Cooling System (RCIC, EIIS System BN) isolated. This event is being reported pursuant to 10 CFR 50.73 (a)(2)(iv), automatic actuation of an Engineered Safety Feature. At the time of the isolation, the portion of the daily Surveillance Test Procedure which monitors air temperatures and temperature differentials in the Steam Leak Detection System (SLDS, EIIS System JM) was in progress. Temperature Switches and Temperature Differential Switches (TDS) in the SLDS are tested by means of a switch on the instrument itself, which when taken to the READ position, will provide a signal to a remote indicator on the same panel. A RCIC system isolation occurred concurrent with taking RCIC Area Temperature Differential Switch TDS-2445A (JM-TDS-2445A) to the READ position. The simultaneous trip of a relay in the SLDS cabinet containing TDS-2445A was noted by the Operator when TDS-2445A was placed to READ. The Steam Leak Detection System Ambient Hi Temperature annunciator was received in the Control Room. This annunciator will activate on signals from some RCIC SLDS instruments, but not TDS-2445A (which provides an input to the Steam Leak Detection System High Differential Temperature annunciator). A process computer point indicated the RCIC system had isolated. However, other computer points indicating a RCIC Steam Leak Detection System isolation signal were not present. These process computer points are sampled at a once per second rate. The RCIC isolation was promptly reset and investigation into the cause of the isolation initiated.

TDS-2445A was examined on 3/18/86, and no problems were found. The READ switch was cycled numerous times, with no Steam Leak Detection System annunciator, RCIC system isolation alarm, or RCIC isolation computer point resulting. (The examination was performed with the RCIC logic in TEST to prevent possible unnecessary challenges to this safety function).

TDS-2445A is a Riley Pan Alarm Model 86. This instrument model provides an input to actuation or isolation functions in the RCIC and High Pressure Coolant Injection System (HPCI, EIIS System BJ) SLDS, and in Reactor Water Cleanup System (EIIS System CE) logic. It has in the past demonstrated some susceptibility to spurious signals, although there have been no similar events at the Duane Arnold Energy Center involving placing a switch in the READ position and few problems within the RCIC and HPCI SLDS systems (see LERs 84-028, Revision 1, 85-001, 85-023). The manufacturer has indicated it is aware of problems with spurious signals upon Model 86 being switched to the READ position due to an

internal design problem. The signal can occur due to a difference in the ground potentials of the Model 86 and the remote indicator and can influence other instrumentation within the circuitry. The spurious actuation may or may not be repeatable. The intermediate cause of the RCIC isolation on March 15, 1986 was therefore the generation of a short, spurious signal by TDS-2445A upon being placed in the READ position. The root cause of the event is an internal design problem within the switch which has been identified by the manufacturer. Iowa Electric initiated a presently ongoing design study of this problem in October, 1985, following receipt of General Electric documentation on the subject.

The HPCI/RCIC Task Force formed to study system reliability (see LER 85-044) has recommended placing a short (approximately one second) time delay within the RCIC and HPCI SLDS circuitry. The Reactor Water Cleanup System already has a short time delay in place. A time delay would eliminate isolations of HPCI and RCIC due to short, spurious signals in the Steam Leak Detection System, such as the one generated by placing a Riley Pan Alarm Model 86 to read, but would not prevent the system from responding to a real event within the necessary time. As a corrective action for this event, a Design Change Package is being prepared to install this time delay. As this will require declaring HPCI or RCIC inoperable per Technical Specifications due to lack of SLDS instrumentation, the time delay will be installed at the next opportunity, when HPCI or RCIC is either inoperable for other reasons, or not required to be operable.

Iowa Electric Light and Power Company

April 14, 1986
DAEC-86-0255

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. 86-007

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/JRP/pl

Attachment - LER 86-007

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