

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Duane Arnold Energy Center DOCKET NUMBER (2) 050003311 PAGE (3) 1 OF 03

TITLE (4) Temperature Switch Design Problem Causes Isolation of Reactor Core Isolation Cooling

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		
04	19	86	86	013	00	05	19	86	None		
									DOCKET NUMBER(S)		
									05000		

OPERATING MODE (9) N

POWER LEVEL (10) 100

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

20.402(b)	20.406(e)	<input checked="" type="checkbox"/>	50.73(e)(2)(iv)	73.71(b)
20.406(a)(1)(i)	50.38(e)(1)	<input checked="" type="checkbox"/>	50.73(e)(2)(vi)	73.71(e)
20.406(a)(1)(ii)	50.38(e)(2)		50.73(e)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.406(a)(1)(iii)	50.73(e)(2)(i)		50.73(e)(2)(viii)(A)	
20.406(a)(1)(iv)	50.73(e)(2)(ii)		50.73(e)(2)(viii)(B)	
20.406(a)(1)(v)	50.73(e)(2)(iii)		50.73(e)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME James R. Probst, Technical Support Engineer TELEPHONE NUMBER 319 851-7308

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS
B	JM	TDS	P1055	YES					

SUPPLEMENTAL REPORT EXPECTED (14) YES (if yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15) MONTH DAY YEAR

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

On April 19, 1986, at 1551 hours with the reactor at 100% power, 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 surveillance test. The isolation was promptly reset. This event is identical to one which occurred on March 15, 1986 (see LER 86-007). The root cause of both events is a design problem within the TDS, a Riley Panalarm Model 86. This problem does not effect normal monitoring capabilities but can result in a spurious signal when the switch is placed in READ. This model is used to provide input for actuation or isolation functions in the RCIC, High Pressure Coolant Injection (HPCI), and Reactor Water Cleanup (RWCU) systems' circuitry. Corrective actions for the March 15, 1986 event were awaiting implementation at the next opportunity at the time of the April 19, 1986 event. These involved placing a short time delay in the HPCI and RCIC SLDS circuitries to prevent short, spurious signals from resulting in isolations. (RWCU already contains such a time delay). These time delays have since been installed.

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

On April 19, 1986, at 1551 hours with the reactor in run mode at 100% power, the Reactor Core Isolation Cooling System (RCIC, EIIS System BN) was isolated due to closure of the RCIC outboard steam supply isolation valve (BN-ISV-2401). 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 used to take surveillance data 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 an Operator taking RCIC Area Temperature Differential Switch TDS-2445A (JM-TDS-2445A) to the READ position. After investigation revealed no actual high temperature or temperature differential existed, the RCIC isolation was promptly reset at 1555 hours. The effect of RCIC inoperability with the reactor in run mode, the worst case, is to lose this system's ability to maintain reactor vessel water inventory after small line breaks which do not depressurize the vessel. The High Pressure Coolant Injection System (HPCI, EIIS System BJ) provides full redundancy during RCIC inoperability.

This isolation was identical to one which occurred on March 15, 1986 due to a spurious signal from the TDS (See LER 85-007). TDS-2445A is a Riley Panalarm Model 86. This instrument model provides an input to actuation or isolation functions in the RCIC and HPCI SLDS, and in Reactor Water Cleanup System (RWCU, EIIS System CE) logic. The manufacturer has indicated they are aware of problems with spurious signals upon Model 86 being switched to the READ position. The cause is an internal design problem. The signal can occur due to a difference in the ground potentials of the Model 86 and remote indicator. The spurious actuation may or may not be repeatable. This problem does not effect normal temperature monitoring capabilities. The intermediate cause of the RCIC isolation on April 19, 1986 was the generation of a short, spurious signal by TDS-2445A upon being placed in the READ position. The root cause of the event on April 19, 1986, is an internal design problem within the switch which has been identified by the manufacturer. Although in the past the Model 86 has shown some susceptibility to spurious signals (see LERs 84-028, Revision 1, 85-001, 85-023), no other occurrences due to this internal design problem have been noted.

A field upgrade of the internals of the Model 86 based on information provided by the manufacturer and General Electric is currently under consideration. As a corrective action for the March 15, 1986 spurious RCIC isolation, the Duane Arnold Energy Center initiated a design change to install a short time delay (by means of time delay relays) within the RCIC and HPCI SLDS circuitry. (A time delay was previously installed in the RWCU

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TEXT (If more space is required, use additional NRC Form 386A's) (17)

circuitry.) The approximately one second delay had been recommended by the HPCI/RCIC Task Force formed to study system reliability (see LER 85-044). It will eliminate isolations of the HPCI and RCIC systems due to short, spurious signals such as those which can be generated when placing the Riley Panalarm Model 86 to READ, but would not prevent the system from responding to a real event within the necessary time. These time delays, which also constitute the corrective action for the April 19, 1986 RCIC isolation, have been installed. As installation of the time delay relays required declaring HPCI or RCIC inoperable per Technical Specifications due to a lack of SLDS instrumentation, the time delay was installed when HPCI or RCIC were next inoperable for other reasons. The time delay was installed in the HPCI SLDS logic while the HPCI system was inoperable as part of a planned maintenance sequence from April 30 to May 2, 1986 (see LER 86-014). The time delay was installed in the RCIC SLDS circuitry while the RCIC system was inoperable as part of a planned maintenance sequence from April 28 to 29, 1986, (see LER 86-014). Documentation to support seismic qualification of the time delay relays installed in the RCIC SLDS logic was unavailable, therefore the relays will be upgraded in the future to full seismic qualification. The current configuration was judged acceptable due to system redundancy, inspection of the installed relays and their similarity to qualified relays.

This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv) as an automatic actuation of an Engineered Safety Feature. The event is also being reported pursuant to 10 CFR 50.73(a)(2)(v) as a condition which could have prevented the fulfillment of a safety function needed to mitigate the consequences of an accident. The RCIC system remained isolated and inoperable for approximately 5 minutes. The root cause was a known internal design problem in the RCIC SLDS temperature monitoring instrumentation, for which corrective actions were in the process of being implemented. Modification of the RCIC and HPCI SLDS circuitry to eliminate unnecessary trips caused by short, spurious signals has since been accomplished.

Iowa Electric Light and Power Company

May 19, 1986
DAEC-86-366

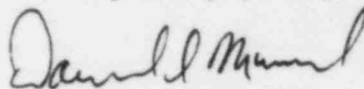
U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Subject: Duane Arnold Energy Center
Docket No. 50-331
Op. License DPR-49
Licensee Event Report No. 86-013

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 86-013

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

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