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FACIL:50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
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SUBJECT: LER 88-038-01:on 880802,partial primary containment isolation due to equipment failure/design deficiency.
W/8 ltr.

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TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

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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)
Nine Mile Point Unit 2	0 5 0 0 0 410	1 OF 05

TITLE (4)
Partial Primary Containment Isolation due to an Equipment Failure/Design Deficiency

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)
08	02	88	88	038	01	09	02	88	N/A	0 5 0 0 0
									N/A	0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 055

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)	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	
	AREA CODE	
Peter A. Mazzaferro, Supervisor Technical Support	315	349-2190

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	BN	PIS	R369	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 August 2, 1988 at 2152 hours with the reactor operating at a power level of approximately 55% rated thermal capacity, Nine Mile Point Unit 2 (NMP2) experienced an Engineered Safety Feature actuation, specifically a Division 1 isolation of the Reactor Core Isolation Cooling (RCIC) system. The NMP2 operators declared the RCIC system inoperable and verified compliance with applicable Technical Specification action statements. The isolation was reset by the NMP2 operators by 2345 hours that same day.

The immediate cause for this event is an equipment malfunction. The most probable root cause for the malfunction is a vendor related design deficiency. Additionally, two human performance problems were identified as contributing factors to this event.

The corrective actions for this event are: (1) the failed equipment was replaced, (2) a lessons learned transmittal has been prepared concerning this event, (3) the failed equipment will be sent to the manufacturer for a failure mode analysis, (4) the audible alarm for control room panel 2CEC*PNL601 has been restored to an operable status, and (5) General Electric Service Information Letter 468 will be reviewed.

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1/1

NRC Form 366
(9-83)

I. DESCRIPTION OF EVENT

On August 2, 1988 at 2152 hours, with the reactor mode switch in RUN (Operational Condition 1) and at a power level of approximately 55% rated thermal capacity, Nine Mile Point Unit 2 (NMP2) experienced a Division 1 isolation of the Reactor Core Isolation Cooling (RCIC) system. (This is called a Group 10 isolation of the Primary Containment.) The isolation, initiated by a Division 1 RCIC Turbine Exhaust Diaphragm High Pressure signal, occurred during performance of surveillance test N2-ISP-ICS-M003, "Monthly Functional Test and Trip Unit Calibration of Group 10 Isolation on RCIC Turbine Exhaust Diaphragm Pressure High Instrument Channels".

The sequence of events was as follows:

At 2130 hours, an Instrument and Control (I&C) technician was performing surveillance on RCIC pressure switch 2ICS*PIS2A. During performance of this test, 2ICS*PIS2A was brought into a tripped state. As expected, various control room alarms were activated. (Specifically, an annunciator window on panel 2CEC*PNL601 and a computer alarm.) The alarms were cleared and were verified clear by test personnel by 2133 hours at the completion of the surveillance activities on 2ICS*PIS2A. Also at this time, the Chief Shift Operator (CSO) granted permission to start the next surveillance on RCIC pressure switch 2ICS*PIS2C.

At 2135 hours, pressure device 2ICS*PIS2A malfunctioned and spontaneously went into a tripped state, actuating the alarms mentioned above. However, the audible alarm on panel 2CEC*PNL601 was inoperable and the NMP2 operators did not respond.

At 2150 hours, the I&C technician received permission from the Station Shift Supervisor to start the surveillance on 2ICS*PIS2C; additionally, he notified the CSO of the start of the test. Prior to bringing 2ICS*PIS2C into a tripped condition, he verified that the other RCIC pressure switches were not in a tripped condition. This verification was done by observing that the trip indicating lamps located on the associated trip/calibration units were extinguished. However, due to the equipment malfunction with 2ICS*PIS2A, its trip lamp was not lit even though that device was in a tripped state. At 2152 hours, the I&C technician brought 2ICS*PIS2C into a tripped condition per the surveillance procedure. With 2ICS*PIS2A and 2ICS*PIS2C both in a tripped state, the logic was satisfied for the Division 1 RCIC isolation.

As a result of the Group 10 isolation, the RCIC system was temporarily out of service due to the closure of the steam supply line outboard isolation valve. The NMP2 operators declared the RCIC system inoperable and verified that the High Pressure Core Spray (HPCS) system was operable in accordance with the applicable Technical Specification action statement.

A work request was initiated to troubleshoot 2ICS*PIS2A, and at 2345 hours, the control room operators reset the isolation. This action ended the event.

The involved systems and components functioned as designed. There were no other inoperable systems, other than those discussed, which contributed to this event. No other plant system or component failure resulted from this event.

II. CAUSE OF EVENT

A root cause analysis for this event has been completed per Site Supervisory Procedure S-SUP-1, "Root Cause Evaluation Program". Additionally, the Institute of Nuclear Power Operations Human Performance Evaluation System (HPES) was used in the investigation of this event.

The immediate cause for this event was a defective Rosemount Model 510DU trip/calibration unit. This defective unit caused pressure switch 2ICS*PIS2A to be in a tripped state which generated a spurious isolation signal. The most probable root cause for the equipment failure is a vendor design error discussed in General Electric Service Information Letter (SIL) 468. SIL 468 states that trip/calibration units manufactured prior to November 1987 are prone to failure due to parts susceptible to corrosion or intrusion of contaminants. (Trip/calibration units manufactured after November 1987 have been upgraded with parts resistant to these forms of degradation.) The failed trip/calibration unit was manufactured prior to November 1987.

Per the HPES process, two human performance problems concerning equipment interface and work practices were also identified as contributing factors to this event.

When 2ICS*PIS2A failed, the NMP2 operators did not address the resultant alarm on 2CEC*PNL601. This human performance deficiency was caused by other work which was requiring the operators attention and the inoperability of the audible alarm on Panel 2CEC*PNL601. Additionally, when the operators noticed the alarm, they assumed that the alarm was the result of surveillance activities (which were bringing in that alarm and similar alarms on 2CEC*PNL601 several times that evening); as a result, they did not take any corrective action for the alarm. If the instrument failure was identified, before the I&C technician tripped the second Division I RCIC channel, this event could have been avoided.

III. ANALYSIS OF EVENT

This event is reportable via 10CFR50.73(a)(2)(iv) because the Group 10 isolation (which is part of the Primary Containment and Reactor Vessel Isolation Control System) is an Engineered Safety Feature (ESF) function.

The RCIC system is required to be operable by Technical Specification (TS) Section 3.7.4 when the reactor is in Operational Condition 1. But a Group 10 isolation makes the RCIC system inoperable until the isolation is manually reset. However, per TS Section 3.7.4 power operation is allowed to continue if the HPCS system is operable. (The HPCS system was operable during this event.)

The isolation function is a conservative ESF response. It is conservative since the primary objective of the isolation function is to protect the plant and public by preventing releases of radioactive materials to the environment. Additionally, the RCIC isolation function operated as designed with no other transients or inoperable systems contributing to this event. Therefore, there was not an adverse impact on plant or public safety as a result of this event.

The elapsed time for the event, from the isolation initiation to it being reset, was approximately 2 hours and 10 minutes.

IV. CORRECTIVE ACTIONS

Immediately after the RCIC isolation the NMP2 operators declared the RCIC system inoperable and verified the HPCS system was operable according to TS action statement 3.7.4. The isolation was reset and a work request was initiated to troubleshoot 2ICS*PIS2A.

Other corrective actions for this event include:

1. The malfunctioning trip/calibration unit for 2ICS*PIS2A was replaced. This work was done under Work Request 136728.

2. A lessons learned document for the NMP2 Operations Department has been prepared concerning this event. Specifically, this document emphasizes the need for increased shift awareness of control room panels having reduced alarm functions.

3. The failed trip/calibration unit will be sent back to the manufacturer for a determination of its failure mode. Additional corrective actions shall be implemented, as necessary, based on the results of the vendor's analysis.

4. The audible alarm feature for control room panel 2CEC*PNL601 has been restored to an operable status subsequent to this event.

5. SIL 468, issued on August 10, 1988, discusses Rosemount trip/calibration unit failures. The recommendations of SIL 468 will be reviewed for applicability to NMP2. This action will be completed by October 31, 1988.

V. ADDITIONAL INFORMATION

A. Failed Component Identification: Trip/Calibration Unit for RCIC Pressure Switch 2ICS*PIS2A
Component Model Number: 510DU
Component Serial Number: 2559
Component Manufacturer: Rosemount, Incorporated
Equipment Vendor: General Electric (GE)
GE Master Parts List Number: 164C5150P137154

B. Previous Similar Events

There has been one previous event where a Rosemount Model 510DU trip/calibration unit failure caused an ESF actuation. This event is discussed in LER 88-11. The corrective actions for the event in LER 88-11 were to replace the failed transmitter with an operable unit and to send the failed unit back to the vendor for a failure mode analysis. The vendor's response has not been received at this date; therefore, it is indeterminate if any additional corrective actions resulting from the analysis would have prevented the event discussed in this report.

Identification of Components Referred to in this LER

Component	IEEE 803 EIIS Funct	IEEE 805 System ID
Pressure Switch	PIS	BN
Trip/Calibration Unit	RLY	BN
Isolation Valve	ISV	BN
Control Panel	PL	JE
Reactor Core Isolation Cooling System	N/A	BN
High Pressure Core Spray System	N/A	BG
Primary Containment and Reactor Vessel Isolation Control System	N/A	JM

NIAGARA MOHAWK

NMP39085

NINE MILE POINT—UNIT 2/P.O. BOX 63, LYCOMING, NY 13093/TELEPHONE (315) 343-2110

September 2, 1988

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

RE: Docket No. 50-410
LER 88-38 - Revision 1

Gentlemen:

In accordance with 10 CFR 50.73, we hereby submit the following Licensee Event Report:

LER 88-38 Revision 1 — Is being submitted in accordance with 10 CFR 50.73 (a) (2) (iv), "Any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)."

This revision is being submitted to include information that was inadvertently omitted in the original LER.

A 10CFR50.72 (b)(2)(ii) report was made at 0033 hours on August 3, 1988.

This report was completed in the format designated in NUREG-1022, Supplement 2, dated September 1985.

Very truly yours,

T.J. Perkins

T. J. Perkins
Vice President
Nuclear

TJP/POB/mjd

Attachments

cc: Regional Administrator, Region 1
Sr. Resident Inspector, W. A. Cook

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