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FACIL:50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
AUTH.NAME AUTHOR AFFILIATION
COATES,K. Niagara Mohawk Power Corp.
CARNS,N.S. Niagara Mohawk Power Corp.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-021-00:on 921029,RCIC isolation occurred,resulting from false RB high area temp due to cracked thermocouple wire.Training review request submitted to training dept to maintain proper reinforcement.W/921130 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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Neil S. "Buzz" Carns
Vice President
Nuclear Generation

November 30, 1992
NMP88314

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

RE: Docket No. 50-410
LER 92-21

Gentlemen:

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

LER 92-21 Is being submitted in accordance with 10CFR 50.73 (a)(2)(iv), "any event or condition that results in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)."

A 10CFR 50.72 (b)(2)(ii) report was made at 1106 hours on October 29, 1992.

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

Very truly yours,

Mr. N. S. Carns
Vice President - Nuclear Generation

NSC/GB/lmc
ATTACHMENT

pc: Mr. Thomas T. Martin, Regional Administrator Region I
Mr. Wayne L. Schmidt, Senior Resident Inspector

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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Nine Mile Point Unit 2	0 5 0 0 0 4 1 0	1 OF 0 6

TITLE (4) Reactor Core Isolation Cooling System Isolation Resulting From False Reactor Building High Area Temperature Due to Broken Thermocouple Wire

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)
									N/A	0 5 0 0 0
1 0	2 9	9 2	9 2	— 0 2 1	— 0 0	1 1	3 0	9 2	N/A	0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 1 0 0

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)
Mr. Ken Coates, Manager Maintenance NMP2	3 1 5 3 4 9 - 2 4 9 7

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	B N	C O N		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)

On October 29, 1992 at 0941 hours, Nine Mile Point Unit 2 (NMP2) experienced an Engineered Safety Feature (ESF) actuation. Specifically, a Division I Reactor Core Isolation Cooling System (ICS) isolation occurred when a Reactor Building Elevation 261' High General Area Temperature signal was received causing an ICS outboard steam isolation valve to close (a Group 10 Primary Containment Isolation function). At the time of the event, the plant was operating at 100 percent rated thermal power with reactor pressure at 1004 pounds per square inch gauge (psig), and reactor temperature at 535 degrees Fahrenheit.

Post-event testing has shown that the false high area temperature signal was caused by an open circuit condition resulting from a cracked thermocouple wire.

Immediate corrective actions taken included: 1) entering Secondary Containment Emergency Operating Procedure; 2) verifying no abnormal radiation levels, leaks or high temperatures existed in the Reactor Building; and 3) restoring ICS to an operable/standby condition. Additional actions included: 1) issuing a Work Request to troubleshoot/repair the circuit; and 2) issuing a Lessons Learned Transmittal.

I. DESCRIPTION OF EVENT

On October 29, 1992 at 0941 hours, Nine Mile Point Unit 2 (NMP2) experienced an actuation of an Engineered Safety Feature (ESF) System. Specifically, a Division I Reactor Core Isolation Cooling System (ICS) isolation occurred when a Reactor Building Elevation 261' High General Area Temperature signal was received, causing an ICS outboard steam isolation valve to close (a Group 10 Primary Containment Isolation function). At the time of the event, the reactor mode switch was in the "RUN" position (Operational Condition 1), with the plant operating at 100 percent rated thermal power.

Immediately prior to the isolation signal, Instrument and Control (I&C) technicians were performing Instrument Surveillance Procedure N2-ISP-LDS-M009, "Main Steam Line Tunnel Differential Temperature Instrument Channel Functional Test," at Main Control Room Termination Panel 2CEC*PNL707. A technician had just completed lifting leads in Termination Module Bay F in accordance with step 7.2.2 of the surveillance procedure. At the conclusion of this work evolution, the first technician exited the cabinet and a second technician entered to complete a verification check of the first technician's work. As the second technician looked down at the procedure to verify termination points as specified by procedure, his screwdriver and/or hand inadvertently brushed/pulled against adjacent wires. At that moment, the Control Room received an ICS isolation initiation from a Reactor Building elevation 261' Residual Heat Removal System (RHS) High General Area temperature signal.

Immediately following the event, an investigation was performed to establish the cause for the false high area temperature alarm and subsequent ICS isolation initiation. This investigation determined that thermocouple wire E31A-W019, the signal source from temperature switch 2RHS*TS81A, High General Area Temperature Reactor Building Elevation 261', was terminated in a close proximity to the area where the I&C technicians were working. Initial evaluation concluded that contact with, or shorting of a screwdriver with this termination could have resulted in a false high temperature signal initiation.

Post-event briefings with the Control Room by the I&C Department relayed the results of their preliminary investigation. Based on this event summary and the fact that temperature switch 2RHS*TS81A was functioning after reset, Operations made the decision to consider the switch operable.

II. CAUSE OF EVENT

I&C Support commenced a review of the system initiation scenario for assurance that all possible causes for the high temperature alarm were evaluated. One tentative conclusion was that in order to initiate this false high temperature signal, an open circuit condition would need to have been created. At that point, this information was passed on to the Control Room where the Station Shift Supervisor (SSS) established control of the access to panel 2CEC*PNL707 so that individuals needing access to the panel would be counseled

II. CAUSE OF EVENT (cont.)

concerning the suspect cable. The continued operability of the temperature switch was not in question due to the successful performance of Instrument Surveillance Procedure N2-ISP-LDS-M010, "Reactor Building General Area Temperature Instrument Channel Functional Test," on November 2, 1992. This test verified the continuity of the suspect cable.

I&C Support continued troubleshooting efforts in an attempt to validate the open circuit conclusion. A simulated test condition was established to try and reproduce a duplicate alarm signal by shorting contacts on a similar Riley temperature switch. On November 11, 1992, following unsuccessful attempts to duplicate the false signal, a Work Request (WR #201644) was initiated to troubleshoot the potential existence of a cracked thermocouple wire. On November 12, 1992, I&C readdressed station management with their concern that cable E31A-W019 may have a potential defective condition.

An operability review was then conducted on the suspect circuit. Based on the facts that the I&C conclusions were speculative, the successful performance of N2-ISP-LDS-M010 on November 2, 1992, and no abnormal circuit conditions had appeared since the surveillance test incident, the instrument remained operable. The WR was prioritized as an urgent work item and troubleshooting activities would begin on November 17, 1992, the first available date to commence the required ICS outage.

During the outage troubleshooting efforts, with circuit energized, technicians applied pressure to the cable at its termination point, causing an interruption in the circuit continuity. The thermocouple wire (size #20 gauge) insulation had been partially engaged under the termination lug, allowing the wire to remain in contact with the lug and leaving circuit closed until external pressure was applied.

A review of test procedures identified that the failed termination lead is not lifted during surveillance activities and therefore is not subject to repeated handling. Subsequently, the exact cause for the cracked thermocouple wire could not be determined. However, the break location was at the termination area and most likely occurred during termination screw tightening.

Contributing causes to this event were:

Material Installation

The cable configuration and condition appeared tightly drawn, which may have attributed to an overstressed condition.

Poor Work Practices

The I&C technician who entered the rear panel area to perform a verification check of the leads lifted by the first I&C technician, did not take the necessary precautions for working

II. CAUSE OF EVENT (cont.)

near or on electrically energized equipment. Specifically, with the surveillance procedure in the right hand and screwdrivers in the left hand, the technician lifted his left hand to locate a termination point as he looked down to the procedure. At that instant, the technician's screwdriver or hand inadvertently brushed and/or pulled against adjacent wires that initiated a momentary open circuit condition and caused 2RHS*TS81A, High General Area Temperature Reactor Building Elevation 261', to alarm.

III. ANALYSIS OF EVENT

This event is reportable in accordance with 10 CFR 50.73 (a)(2)(iv), which requires the Licensee to report "any event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)."

The Reactor Core Isolation Cooling System main steam supply Primary Containment inboard and outboard isolation valves are included in the Primary Containment and Reactor Vessel Isolation Control System. These valves are classified as Nuclear Steam Supply Shutoff System (NSSSS) Group 10 isolation valves.

The ICS is designed to supply makeup water to the reactor vessel when the reactor is in a hot shutdown condition and is isolated from the Main Condenser with the reactor Feedwater System not in operation. By adding low temperature makeup water to the reactor, core cooling is assured. Isolation of the outboard Primary Containment Isolation System valve 2ICS*MOV121 is a conservative action designed to prevent significant releases of radioactive materials from the Primary Containment to the environment in the event of a significant ICS steam line break.

No adverse safety consequences to the general public or plant resulted from this event. The isolation of the ICS is a conservative action and an alternate method of core cooling was available from the High Pressure Core Spray System.

The duration of this event, from the time of the isolation to the time the ICS was returned to an operable/standby condition was approximately 41 minutes.

IV. CORRECTIVE ACTIONS

As initial corrective actions, Operations:

1. Entered Emergency Operating Procedure N2-EOP-SC, "Secondary Containment Control on an Area Temperature Above Isolation Setpoint."

IV. CORRECTIVE ACTIONS (cont.)

2. Verified that no abnormal radiation levels, leaks, or high area temperatures existed in the Reactor Building.

3. Restored the ICS to an operable standby condition.

Additional corrective actions include:

1. A Deviation Event Report (DER #2-92-3868), "Suspect Thermocouple Wire," was initiated to verify that the cable was indeed the source of the open circuit condition which caused the alarm of temperature switch 2RHS*TS81A (E31A-N638A), High General Area Temperature Reactor Building Elevation 261'.

2. A Work Request (WR #201644) was written on November 12, 1992, to troubleshoot and repair cable E31A-W019, which runs between terminal TH405 on panel 2CEC*PNL707, and terminal E31-N638A on panel 2CEC*PNL632.

3. Prior to the repairs initiated by WR #201644, access to Control Room panel 2CEC*PNL707 was controlled by Operations to prevent entry without counseling from the Station Shift Supervisor (SSS) concerning the suspect cable.

4. A review was performed of other same sized cables at their panel termination locations to verify potential similar tightly drawn cable configurations did not exist. No conditions were identified.

5. The verification technician involved has received counseling on attention-to-detail from the General Supervisor of I&C Maintenance.

6. A Lessons Learned Transmittal will be issued describing the event.

7. A Training Review Request (TRR #92-137) has been submitted to the Training Department. This will include a review of past events associated with inadvertent equipment contact/initiation while working in confined spaces and will include a review of safe work practices around energized electrical equipment. Subject matter will be included in I&C skills training and will be presented annually to maintain proper subject reinforcement.

V. ADDITIONAL INFORMATION

A. Failed components: none.

B. Previous similar events:

The plant has experienced previous Reactor Core Isolation Cooling System isolations due to invalid high Reactor Building General Area temperature signals. However, no previous initiation signals were a result of failed termination leads.

Prior ESF actuations have occurred as a result of poor work practices in and around energized control panels (reference LER 88-059).

Previously implemented corrective actions from a similar event included expanding progressive maintenance skills training courses to ensure that both Electrical and I&C personnel received extensive instructions pertaining to precautions to be used when working near or in energized equipment.

Although this training was adequate, it was found to have been presented only at initial technician core training classes. This excluded existing technicians from receiving the subject training and did not allow subject reinforcement at required intervals.

C. Identification of components referred to in this LER:

COMPONENT	IEEE 803A EIIS FUNCTION	IEEE 805 SYSTEM ID
Reactor Core Isolation Cooling System	N/A	BN
Residual Heat Removal System	N/A	BO
Primary Containment and Reactor Vessel Isolation Coolant System	N/A	JM
Temperature Switch	TS	BO
Termination Panel	PL	JL
Isolation Valve	ISV	BN
Reactor Building	N/A	NG
Primary Containment	N/A	NH