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FACIL: 50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
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SUBJECT: LER 87-030-00: on 870528, ESF actuation occurred due to power loss to gas radiation monitors. Caused by procedural violation resulting in inadequate control of quality related mod. Personnel counseled. W/870629 ltr.

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

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	RES DEPY GI	1	1	RES TELFORD, J	1	1
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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 4 1 1 0	1 OF 0 6

TITLE (4) ESF Actuations due to Power Loss to Gaseous Radiation Monitor Caused by Procedural Violation

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
0 5	2 8	8 7	8 7	0 3 0	0 0	0 6	2 9	8 7	N/A	0 5 0 0 0

OPERATING MODE (9)	2	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 1	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
Robert G. Randall, Supervisor Technical Support	3 1 5 — 3 4 9 - 2 4 4 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	

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)

Between May 28, 1987 at 1705 hours and May 29, 1987 at 1358 hours, Nine Mile Point Unit 2 (NMP2) experienced six separate Engineered Safety Feature (ESF) actuations. The ESF actuations were primary containment isolation signals to the Primary Containment Vent and Purge isolation valves due to spurious power losses to the Standby Gas Treatment gaseous radiation monitor. At the time of the events, NMP2 was in its initial startup phase with the mode switch in the "STARTUP/HOT STANDBY" position (Mode 2). Reactor power during the events was less than one percent.

The root cause of the events was a procedural violation which resulted in a lack of adequate control of a quality related temporary modification. A temporary power supply was placed inside the microcomputer cabinet of the radiation monitor without performance of a safety evaluation. The extra heat load it generated caused an intermittent heat related failure of a circuit card within the cabinet.

Corrective actions included steps to troubleshoot the system and return it to normal operational status by removing the temporary power supply from inside and placing it on top of the microcomputer cabinet. Personnel who are responsible for assuring that the procedure which was violated is administered correctly will be notified that a safety evaluation is required for all quality related and safety related temporary modifications.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 2	0 5 0 0 0 4 1 0	8 7	— 0 3 0	— 0 0	0 2 OF 0 6

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

I. DESCRIPTION OF EVENTS

Between May 28, 1987 at 1705 hours and May 29, 1987 at 1358 hours, Nine Mile Point Unit 2 (NMP2) experienced six separate Engineered Safety Feature (ESF) actuations. The ESF actuations consisted of a primary containment isolation signal for the Primary Containment Vent and Purge isolation valves (Group 9) and were all caused by temporary loss of power to the Standby Gas Treatment (GTS) gaseous radiation monitor (2GTS-CAB105). For the duration of the events, NMP2 was in its initial startup phase with the mode switch in the "STARTUP/HOT STANDBY" position (Mode 2). Reactor power during the events was less than one percent.

Nine Mile Point Unit 2 utilizes a single gaseous radiation monitor, 2GTS-CAB105, to monitor the exhaust gases from the Standby Gas Treatment system as they are released to the Main Stack. The function of 2GTS-CAB105 is to monitor noble gas releases through the GTS exhaust and to provide an isolation signal to the Group 9 valves to cease such releases if they exceed predetermined limits. The current design of this system utilizes a positive displacement sample pump to withdraw a representative air sample from a 20 inch GTS exhaust pipe at the base of the Main Stack, monitor it for radioactive noble gases, and return the sample back to the exhaust pipe. An automatic flow control system measures sample flow through the monitor, compares that value to the required value present in the systems' microcomputer (2GTS-RU105) memory and, if necessary, modulates a sample flow control valve to maintain sample flow proportional to the GTS process flow.

On May 25, 1987 it was discovered that 2GTS-CAB105 was not operational during Primary Containment venting operation. The sample pump had tripped off on a low GTS process flow and was not sampling upon initiation of the GTS system. This condition is not acceptable per plant Technical Specifications and a temporary modification (Index No. 1974) was issued and documented in the Temporary Modification Log Book in the Control Room to maintain the sample pump in a continuously operable status until a permanent resolution could be completed per Niagara Mohawk modification package PN2Y87MX100. To maintain 2GTS-CAB105 in continuous operation, a temporary power supply was connected to the microcomputer to provide a constant simulated process flow signal from the GTS system to the sample flow control valve, thus preventing a sample pump trip due to low flow.

The Niagara Mohawk Instrument and Control (I&C) technician who performed the work connected the temporary power supply to 2GTS-RU105 to simulate a GTS flow rate and maintain a constant sample flow through 2GTS-CAB105. He then proceeded to place the temporary power supply within the microcomputer cabinet to assure that it would not be disturbed. This work was completed on May 25, 1987 per Work Request (WR) 120721.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 2	0 5 0 0 0 4 1 0	8 7	— 0 3 0	— 0 0	0 3 OF 0 6

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

On May 28, 1987 at 1705 hours, operators in the Control Room noted that a Group 9 Primary Containment Isolation System (PCIS) isolation signal had occurred. The Group 9 isolation signal was attributed to a power failure of 2GTS-CAB105. The cause of the failure could not be determined at the time. Operators in the Control Room reset and restored 2GTS-CAB105 to operable status and initiated an investigation via WR 120186 to determine the cause of the failure. The Group 9 primary containment isolation valves were closed prior to receiving the isolation signal. The isolation signal was also reset by operators in the Control Room. The total duration of the event was approximately 20 minutes.

Later that same day at 2132 hours, a second Group 9 isolation signal occurred with the isolation valves already closed. The Group 9 isolation signal was attributed to a power failure in 2GTS-CAB105. The investigation into the cause of the first event had not yet been concluded. The reason for the power failure could not be determined. The work request written after the first event was still being processed and actual troubleshooting had not yet begun. Operations verified that the power supply breaker and fuse to 2GTS-CAB105 were in a good operating condition. The gaseous radiation monitor was placed back in service and the Group 9 isolation signal was reset from the Control Room. The total duration of the event was approximately 28 minutes.

The third Group 9 isolation signal occurred on May 29, 1987 at 0029 hours. The Group 9 isolation valves were in the closed position. The Group 9 isolation signal was attributed to a power failure in 2GTS-CAB105. Instrument and Control technicians were investigating the two previous events but had not yet determined a cause when this event occurred. Power was restored to the gaseous radiation monitor and the Group 9 isolation signal was reset from the Control Room. The total duration of the event was approximately 10 minutes.

At 0220 hours on May 29, 1987 the Station Shift Supervisor was informed by an I&C technician that he had found loose connections at a temporary power supply which had been connected to the gaseous radiation monitor and that he had tightened them down. This was thought to have been the reason for the spurious actuations and 2GTS-CAB105 was noted as functional.

The fourth Group 9 isolation signal occurred on May 29, 1987 at 0401 hours. The Group 9 isolation valves were closed prior to receiving the signal. The Group 9 isolation signal was attributed to a power failure in 2GTS-CAB105. The power restored itself within one minute and the cause could not be determined. I&C resumed troubleshooting the system as the tightening of the loose connections at the temporary power supply did not solve the problem. The Group 9 isolation signal was reset from the Control Room. The total duration of the event was approximately 26 minutes.

The fifth Group 9 isolation signal occurred on May 29, 1987 at 0825 hours. All Group 9 isolation valves were closed. The cause of this event was an I&C technician cycling the power supply to 2GTS-CAB105 while replacing a power supply circuit card in the system. Power was immediately restored and the Group 9 isolation signal was reset by operators from the Control Room.

The sixth Group 9 isolation signal occurred on May 29, 1987 at 1358 hours. All Group 9 isolation valves were closed. The cause of the event was a power failure in 2GTS-CAB105. I&C continued troubleshooting the system, since the power supply circuit card replacement did not correct the power failure problem. The power was restored and the Group 9 isolation signal was reset from the Control Room. Sometime around 1400 hours on May 29, 1987, an I&C technician removed the temporary power supply from the microcomputer cabinet and placed it on top, on the premise that the intermittent power failures in 2GTS-CAB105 might be related to the extra heat load that it generated inside the cabinet. The power failure did not recur within an 18 hour period so post maintenance testing was done per N2-RSP-RMS-M103, "Channel Functional Test of the Standby Gas Treatment System Exhaust Process Radiation Monitor", thus ending the events.

No further power failures to 2GTS-CAB105 have been noted at NMP2.

II. CAUSE OF EVENT

A root cause analysis for this event has been completed per Site Supervisory Procedure S-SUP-1, "Root Cause Analysis Program". The result of this analysis has shown that the root cause of this event was a procedural violation. Administrative Procedure AP-3.3.2, "Control of Equipment - Temporary Modifications" was in effect to establish the administrative controls applicable to the installation and removal of temporary modifications which may be required for testing and maintenance of safety related and non-safety related mechanical and electrical plant process systems at NMP2. In accordance with AP-3.3.2 the introduction of temporary modifications into safety related and quality related (Q-class) systems or components shall be performed only in accordance with procedures approved and administered according to AP-2.0, "Production and Control of Procedures", and as further detailed in AP-6.0, "Procedure for Modification and Addition" or AP-6.1, "Procedure for Modification and Addition - Unit 2". AP-6.1 states that a safety evaluation is required for any modification, temporary or permanent, to facilities described in the NMP2 Final Safety Analysis Report. 2GTS-CAB105 is described in the FSAR and is a Q-Class piece of equipment. AP-2.0 describes the generation, approval, publication and control of procedures issued at NMP2.

The procedural violation led to a lack of adequate control of this Q-Class temporary modification when the temporary power supply was placed inside the microcomputer cabinet without performance of a safety evaluation or preparation of a temporary procedure to perform the work. This temporary power supply was in place per WR 120721 to maintain 2GTS-CAB105 in continuous operation until a permanent modification could be performed to correct design deficiencies noted during pre-operational tests. The WR specified that the equipment was Q-Class. The temporary power source was connected to the radiation monitor microcomputer by a Niagara Mohawk I&C technician and was placed inside the microcomputer cabinet. The heat that this temporary power source generated raised the temperature within the cabinet to a level which caused intermittent failure of the circuit card associated with the power supply to 2GTS-CAB105.

Potentially contributing to this event is a lack of adequate heat removal capability from the microcomputer cabinet and/or the base of the Main Stack. A lack of adequate heat removal capability in these areas could potentially lead to future heat related failures of 2GTS-CAB105 on hot days or during periods of release of warm gases through the Main Stack.

III. ANALYSIS OF EVENT

Although the GTS gaseous radiation monitor was inoperable for short periods of time, offsite releases through the Main Stack were still monitored continuously via the Main Stack Gaseous Effluent Monitoring System. Based on operating histories at other nuclear power plants there is a very low probability that effluent releases in excess of Technical Specification limits would have occurred since normal expected release rates from the GTS are well below these limits.

The Group 9 primary containment isolation signals are designed to limit the potential release of radioactive materials from primary containment. A Group 9 isolation signal constitutes an automatic safety function and resulted in no adverse safety consequences at any reactor power level. Group 9 isolation valves are open during power operation only at infrequent intervals to allow injection of nitrogen into Primary Containment to maintain an inert atmosphere or to maintain Primary Containment at a desired pressure by venting operations. The GTS gaseous radiation monitor has no redundant system to supply the Group 9 isolation signal.

IV. CORRECTIVE ACTIONS

Immediate Corrective action was to initiate a work request (WR 120186) to troubleshoot 2GTS-CAB105 and find the cause of the intermittent power failures. I&C technicians identified and corrected the problem when they removed the temporary power source from inside the microcomputer cabinet and placed it on top.

To prevent similar events from recurring in the future a Training Modification Recommendation (TMR) will be issued to train plant personnel in the proper use of AP-3.3.2. A memo will be issued to all NMP2 site personnel giving instruction as to the proper use of AP-3.3.2 with respect to safety related and quality related temporary modification. A TMR will be issued to assure that all plant personnel who might be involved in the placement of temporary sources of heat in and around electrical cabinets are aware of the potential consequences which could result.

An Engineering evaluation will be initiated in the form of a problem report to determine if the heat removal capabilities of the microcomputer cabinet and the base of the Main Stack are adequate to assure that future heat related failures in these areas do not occur. Further corrective measures will be implemented as needed based on the results of this design review.

V. ADDITIONAL INFORMATION

The GTS effluent radiation monitor is a Model KMG Group 5 Offline Gas Monitor manufactured by Kaman Instrument Corporation.

There has been one previous event at NMP2 which involved the unavailability of 2GTS-CAB105. The event resulted in a Technical Specification violation. Details are available in LER 87-27. However, the circumstances associated with that event differ to the extent that the two events are not considered similar.

Identification of Components Referred to in this LER

Component	IEEE 803 EIIS Funct	IEEE 805 System ID
Standby Gas Treatment System	N/A	BH
Main Stack	N/A	VL
Gaseous Radiation Monitor	N/A	IL
Flow Element	FE	IL
Flow Transmitter	FFT	IL
Temporary Power Source	RJX	N/A
Circuit Card	ECBD	IL
Microcomputer	CPU	IL

NMP26415

NIAGARA MOHAWK POWER CORPORATION

NIAGARA MOHAWK

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SYRACUSE, NY 13212

THOMAS E. LEMPGES
VICE PRESIDENT—NUCLEAR GENERATION

June 29, 1987

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

RE: Docket No. 50-410
LER 87-30

Gentlemen:

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

LER 87-30 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). However, actuation of an ESF, including the RPS, that resulted from and was part of the preplanned sequence during testing or reactor operation need not be reported."

10 CFR 50.72 reports were made at 1905 and 2224 hours on May 28, 1987 and 0200, 0601, 1145, and 1515 hours on May 29, 1987.

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

Very truly yours,

Thomas E. Lempges

Thomas E. Lempges
Vice President
Nuclear Generation

TEL/CDS/mjd

Attachments

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

IE22
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