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REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9405170193 DOC. DATE: 94/05/09 NOTARIZED: NO DOCKET #
 FACIL: 50-220 Nine Mile Point Nuclear Station, Unit 1, Niagara Powe 05000220
 AUTH. NAME AUTHOR AFFILIATION
 SWEET, K.J. Niagara Mohawk Power Corp.
 ABBOTT, R.B. Niagara Mohawk Power Corp.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 94-004-00: on 940411, automatic reactor scram initiation signal resulted in full scram due to spiking electrical noise. Noise suppression circuits installed to correct probable causes. W/940509 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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	AEOD/DSP/TPAB		1	1	AEOD/ROAB/DSP	2	2	
	NRR/DE/EELB		1	1	NRR/DE/EMEB	1	1	
	NRR/DORS/OEAB		1	1	NRR/DRCH/HHFB	1	1	
	NRR/DRCH/HICB		1	1	NRR/DRCH/HOLB	1	1	
	NRR/DRIL/RPEB		1	1	NRR/DRSS/PRPB	2	2	
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EXTERNAL:	EG&G BRYCE, J.H		2	2	L ST LOBBY WARD	1	1	
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**N IAGARA
M MOHAWK**

NINE MILE POINT NUCLEAR STATION/P.O. BOX 63, LYCOMING, NEW YORK 13093/TELEPHONE (315) 343-2110

Richard B. Abbott
Plant Manager - Unit #1

(315) 349-1812
(315) 349-4417 (FAX)

May 9 , 1994
NMP1L 0816

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

RE: Docket No. 50-220
LER 94-04

Gentlemen:

In accordance with 10 CFR 50.73 (a)(2)(iv), we are submitting LER 94-04, "Reactor Scram on Intermediate Range Monitor High Flux Caused by Spiking Electrical Noise."

Very truly yours,



Richard B. Abbott
Plant Manager - NMP1

RBA/AFZ/lmc
Attachment

xc: Mr. Thomas T. Martin, Regional Administrator
Mr. Barry S. Norris, Senior Resident Inspector

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PDR ADOCK 05000220
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Nine Mile Point Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 2 0	PAGE (3) 1 OF 0 5
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TITLE (4)
Reactor Scram on Intermediate Range Monitor High Flux Caused by Spiking Electrical Noise

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	4	1 9 4	9	4	0 0 4	0	5	0 9 4	N/A			0 5 0 0 0		
									N/A			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 1	20.402(b)			20.405(c)			<input checked="" type="checkbox"/> 50.73(a)(2)(iv)			73.71(b)		
	20.405(a)(1)(i)			50.38(c)(1)			50.73(a)(2)(v)			73.71(c)		
	20.405(a)(1)(ii)			50.38(c)(2)			50.73(a)(2)(vii)			OTHER (Specify in Abstract below and in Text, NRC Form 365A)		
	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)(ix)					

LICENSEE CONTACT FOR THIS LER (12)

NAME Mr. Kenneth J. Sweet, Manager Technical Support NMP1	TELEPHONE NUMBER AREA CODE 3 1 5 3 4 9 - 2 4 6 2
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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
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)			<input checked="" type="checkbox"/> NO				

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

On April 11, 1994, at 1920 hours, Nine Mile Point Unit 1 (NMP1) received an automatic reactor scram initiation signal resulting in a full scram. While performing a reactor startup, a spurious Intermediate Range Monitor (IRM) "high-high" neutron flux trip occurred. At the time of the event, the plant was being started up with the mode switch in the "STARTUP" position; a reactor heat up was in progress, and reactor pressure was 810 pounds per square inch gauge (psig).

The apparent cause of this event was determined to be IRM spiking caused by electrical noise generated from actuation of relays external to the neutron monitoring system.

Immediate operator actions included commencing scram recovery activities. Additional corrective actions included determining the cause for the IRM spiking and installing noise suppression circuits to correct the probable causes.



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2

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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) Nine Mile Point Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 2 0	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		9 4	— 0 0 4	— 0 0	0 2	OF	0 5

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

I. DESCRIPTION OF EVENT

On April 11, 1994, at 1920 hours, Nine Mile Point Unit 1 (NMP1) received an automatic reactor scram initiation signal resulting in a full scram. At the time of the event, the plant was being started up with the mode switch in the "STARTUP" position; a reactor heat up was in progress, and reactor pressure was 810 pounds per square inch gauge (psig).

During the startup, Intermediate Range Monitor (IRM) channels 11 and 16 were bypassed because of a history of spiking. With the IRMs on range 8 and 9, normal control rod withdrawal manipulations were being performed. When control Rod 42-15 was selected and the control rod withdrawal switch was taken to "notch out," a full reactor scram occurred. The auto reactor trip annunciators were received. Personnel observing the IRM drawers in the Control Room observed the "high-high" alarm light illuminate on one or more of the IRMs. A subsequent review of the IRM chart recorders showed prominent spikes on channels 13, 14, 17 and 18, sufficient to cause a "high-high" neutron flux trip.

The Control Room operators commenced scram recovery actions. Reactor water level and pressure remained constant during the event.

II. CAUSE OF EVENT

The apparent cause of the scram was an electrical noise spike transmitted to the IRMs. The noise signal was sufficient to cause IRM channel 13, 14, 17 and 18 to trip on "high-high" neutron flux level.

The scram occurred simultaneously with the movement of rod 42-15. Post-incident testing revealed that IRM noise spikes are induced by operation of the Control Rod Drive (CRD) pressure control valve and the Reactor Manual Control System (rod movement). Additional discussions with operators revealed that CRD drive pressure was also adjusted immediately preceding the scram. Both rod movement and operation of the pressure control valve result in relay actuations which generate electro-magnetic interference (EMI). It is concluded that noise induced spikes from one or a combination of these sources caused the scram.

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)."



**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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.

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

III. ANALYSIS OF EVENT (cont.)

The IRM rod block and scram functions provide for reactor protection during startup, shutdown, and low power operations. Because the IRM "high-high" neutron flux trips were spurious, no actual over power event occurred. There were no safety consequences as a result of this event. The reactor scram was bounded by the NMP1 Final Safety Analysis Report (FSAR), Section 15, "Safety Analysis." There were no systems or components inoperable during the event that could have contributed to the event. The reactor scram posed no safety consequences to the health and safety of the general public or plant personnel.

IV. CORRECTIVE ACTIONS

The immediate corrective actions were for operators to perform scram recovery actions and place the plant in a stable condition.

Additional corrective actions include:

1. A Deviation/Event Report (DER 1-94-0691) was generated to track the event, the LER, and corrective actions.
2. Resistance/capacitance (RC) networks were installed across selected relay coils for the reactor manual control system in accordance with Simple Design Change SCI-0061-93. The purpose of these networks is to dissipate electrical energy more slowly which reduces the amplitude of the noise spike. Post-installation testing prior to restart and observation of IRM instruments during the subsequent startup showed noise spikes of a much lower amplitude.
3. Operating procedures were revised to allow for manual, local handwheel operation of the control rod drive pressure control valve. This action prevents noise generation from this source until such time as further design changes are implemented.
4. Niagara Mohawk is continuing to evaluate further corrective actions, with consideration being given to selected component shielding, cable rerouting and a time delay in system response, which will be completed by the end of the 1995 refueling outage.



**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 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) Nine Mile Point Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 2 0 9 4	LER NUMBER (8)			PAGE (3)	
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		9 4	0 0 4	0 0	0 4	OF 0 5

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

V. ADDITIONAL INFORMATION

A. Failed components: None

B. Previous similar events:

LER 93-06 "Reactor Scram on Intermediate Range Monitor High Flux Caused by Spiking Electrical Noise"

LER 91-08 "Reactor Scram due to Neutron Monitoring Trip While Performing a Controlled Shutdown"

LER 91-03 "Reactor Scram due to Spurious Trips of Neutron Monitor Caused by Noise and Inadequate Procedural Controls"

LER 90-19 "Reactor Scram due to Spurious Trip of Neutron Monitor Caused by Noise"

LER 87-25 "Reactor Scram due to Spurious Trip of Neutron Monitor Caused by Noise (cold shutdown)"

LER 87-16 "Reactor Scram, Turbine Trip, High Pressure Coolant Injection Mode of Feedwater Signals due to Spurious Trip of Neutron Monitor Caused by Noise (cold shutdown)"

LER 86-21 "Reactor Scram and HPCI Mode of Feedwater Initiation due to IRM Spike"

LER 84-05 "Scram Resulting from Spurious IRM Trips on Different Channels of RPS"

As evidenced by the above previous events, NMP1 has experienced multiple problems with IRM spiking. Although detector, connector and cable upgrades have improved the system performance, the chief cause of spiking, EMI noise, is yet to be completely resolved. The original installation of the electronic hardware and associated cabling renders the system vulnerable to EMI intrusion and consequent spurious actuations. Numerous design changes have been implemented in past years in attempts to reduce the noise signals and/or suppress their effects on the IRM system.



LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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) Nine Mile Point Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 2 0 9 4	LER NUMBER (6)			PAGE (3)	
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

V. ADDITIONAL INFORMATION (cont.)

C. Identification of components referred to in this LER:

COMPONENT	IEEE 803 EIS FUNCTION	IEEE 805 SYSTEM ID
Reactor Protection System	N/A	JC
Reactor Pressure Vessel	N/A	SJ
IRM Neutron Monitoring System	N/A	IG
Control Rod Position Indication	N/A	JD
IRM Channel	MON	IG
Bypass Switch	HS	IG
Bypass Relay Coil	RLY	IG
Trip Indicating Light	IL	JC

