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ACCESSION NBR: 9108070251 DOC. DATE: 91/08/01 NOTARIZED: NO DOCKET #
 FACIL: 50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha .05000410
 AUTH. NAME AUTHOR AFFILIATION
 CONWAY, J.T. Niagara Mohawk Power Corp.
 FIRLIT, J.F. Niagara Mohawk Power Corp.
 RECIPIENT NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-009-01: on 910503, ESF actuation occurred due to spurious high radiation level signal. Caused by inadequate welder training program content. Procedure change evaluation initiated. W/910801 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 8
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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	AEOD/ROAB/DSP	2 2	NRR/DET/ECMB 9H	1 1
	NRR/DET/EMEB 7E	1 1	NRR/DLPQ/LHFB10	1 1
	NRR/DLPQ/LPEB10	1 1	NRR/DOEA/OEAB	1 1
	NRR/DREP/PRPB11	2 2	NRR/DST/SELB 8D	1 1
	NRR/DST/SICB8H3	1 1	NRR/DST/SPLB8D1	1 1
	NRR/DST/SRXB 8E	1 1	REG FILE 02	1 1
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EXTERNAL:	EG&G BRYCE, J.H	3 3	L ST LOBBY WARD	1 1
	NRC PDR	1 1	NSIC MURPHY, G.A	1 1
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Joseph F. Firlit
Vice President
Nuclear Generation

NMP 80566

August 1 , 1991

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

RE: Docket No. 50-410
LER 91-09, Supplement 1

Gentlemen:

In accordance with 10CFR50.73, we hereby submit the following Licensee Event Report:

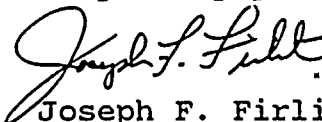
LER 91-09 Supplement 1 Is being submitted in accordance with 10CFR50.73 (a)(2)(iv), "Any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)".

This Supplement is being issued to: (1) Provide a root cause; and (2) Provide additional corrective actions.

A 10CFR50.72 (b)(2)(ii) report was made at 1017 hours on May 3, 1991.

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

Very truly yours,



Joseph F. Firlit
Vice President - Nuclear Generation

JFF/RM/lmc
ATTACHMENT

xc: Thomas T. Martin, Regional Administrator Region I
Wayne L. Schmidt, Sr. Resident Inspector

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Nine Mile Point Unit 2	DOCKET NUMBER (2) 05000410	PAGE (3) 1 OF 07
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TITLE (4)
Engineered Safety Feature Actuation due to a Spurious High Radiation Level Signal

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		
									N/A		
05	03	91	19	1009	01	08	01	91	N/A		
OPERATING MODE (9) 1			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)								

POWER LEVEL (10) 100	20.402(b)	20.405(c)	<input checked="" type="checkbox"/>	60.73(a)(2)(iv)	73.71(b)
	20.405(a)(1)(i)	60.36(c)(1)		60.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(ii)	60.36(c)(2)		60.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	60.73(a)(2)(i)		60.73(a)(2)(viii)(A)	
	20.405(a)(1)(iv)	60.73(a)(2)(ii)		60.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	60.73(a)(2)(iii)		60.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME		TELEPHONE NUMBER	
John T. Conway, Manager Technical Support NMP2		AREA CODE 315	349-2698

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)

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 May 3, 1991, at 0831 hours, Nine Mile Point Unit 2 experienced an actuation of an Engineered Safety Feature (ESF). Specifically, the Secondary Containment (Reactor Building) isolated and the Reactor Building Emergency Recirculation Unit Cooler and Standby Gas Treatment System (GTS) started automatically. The ESF actuation was initiated by a high radiation level signal in the Reactor Building Ventilation System (HVR). At the time of the event, the reactor mode switch was in the "RUN" position (Mode 1) with the reactor operating at 100% rated thermal power.

The root cause of the event has been determined to be inadequate welder training program content.

The Control Room operators implemented the Emergency Operating Procedure (EOP) for Secondary Containment control until Reactor Building radiation was verified at normal operating levels and the cause for the ESF actuation was determined to be a spurious high radiation level trip. Other corrective actions included: 1) returning the HVR system to a normal line up after welding was complete; 2) issuing guidance to welders to route their welding cables away from instrument cables; 3) discussing the grounding and routing of cables with Maintenance and Building Services welders; 4) enhancing the corporate and site welding programs; and 5) writing a site welding procedure.



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 2	DOCKET NUMBER (2) 0 5 0 0 0 4 1 0 9 1 - 0 0 9 - 0 1	LER NUMBER (6)		PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
						0 2 OF 0 7

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

I. DESCRIPTION OF EVENT

On May 3, 1991, at 0831 hours, Nine Mile Point Unit 2 experienced an actuation of an Engineered Safety Feature (ESF). Specifically, the Secondary Containment (Reactor Building) isolated and the Reactor Building Emergency Recirculation Unit Cooler and Standby Gas Treatment System (GTS) started automatically. The ESF actuation was initiated by a high radiation level signal in the Reactor Building Ventilation System (HVR). At the time of the event, the reactor mode switch was in the "RUN" position (Mode 1) with the reactor operating at 100% rated thermal power.

The high radiation level trip signal was generated by the Division II "above refuel floor" radiation monitor which responded as though a high radiation level condition existed. The circuitry functioned per its design initiating a Secondary Containment isolation, and automatic starts of the Division II Emergency Recirculation Unit Cooler (2HVR*UC413B) and Division I and II trains of GTS.

Immediately, the Control Room operators implemented the Emergency Operating Procedure (EOP) for Secondary Containment Control (N2-EOP-Secondary Containment Control), verified the Secondary Containment did isolate, verified the automatic start of the Emergency Recirculation Unit Cooler and Division I and II trains of GTS, and noted the indication for process radiation monitor 2HVR*CAB14B to be above the alarm setpoint (indicated level 1.46 E-2 micro ci/cc; alarm level 1.00 E-4 micro ci/cc).

At 0833 hours, the Control Room operators noted the indication for other radiation monitors in the Reactor Building were normal including 2HVR*CAB14A which indicated 3.60 E-7 micro ci/cc. A radiation survey of the Reactor Building was commenced and at 0844 hours, radiation levels were verified normal allowing the operators to exit the EOP for Secondary Containment Control.

An investigation into the cause of the spurious actuation revealed Direct Current (DC) Shielded Metal Arc Welding (SMAW) was in progress four feet above the radiation monitoring microprocessor 2HVR*RUW14B. Several attempts to duplicate the initial radiation trip signal were unsuccessful, but the radiation indication was affected to a lesser degree when a SMAW arc was drawn near the pipe weld. It was determined from Digital Radiation Monitoring System (DRMS) memory and discussions with the welder that electrical noise was being detected by the radiation monitoring microprocessor during the same time frame as welding was in progress.



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)

I. DESCRIPTION OF EVENT (cont.)

During the investigation into the spurious trip, it was noted that a low flow alarm existed for the process radiation monitor 2HVR*CAB14B. Investigation of the alarm found a blown fuse in the junction box supplying power to the motor operated flow control valve for sample flow to the process radiation monitor. It was determined that the already shut valve received a false shut signal which caused an overload of the valve operating motor and the blown fuse.

The fuse was replaced and welding was completed by 1600 hours on the same day and a functional test (N2-RSP-RMS-M108) of the process radiation monitor was commenced. During this test, a failed check source positioning solenoid was discovered, and the functional test of the process radiation monitor was aborted. The source check positioning solenoid was replaced, and the functional test of the process radiation monitor was then completed satisfactorily.

On May 4, 1991, at 2112 hours, the Control Room operators returned the GTS system and Emergency Recirculation Unit Coolers to standby and restored the Reactor Building Ventilation System to its normal line up per operating procedure N2-OP-52 "Reactor Building Ventilation System".

II. CAUSE OF EVENT

The immediate cause of the event was a Division II "above refuel floor" high radiation level signal. The root cause evaluation for this event has been completed per Nuclear Division Procedure NDP-16.01, "Root Cause Evaluations."

The root cause of this event has been determined to be inadequate welder training program content. Specifically, the investigation revealed the individuals involved were not adequately trained in how to properly ground their welding equipment or how to run their welding leads. Welders are taught to ground their equipment physically close to the weld but no emphasis is placed on evaluating for electrical continuity to welding equipment ground. Also, the proper routing of welding leads and the reasons for this routing are not stressed in training.

The omission of proper welding setup techniques extends to the welding procedures. The lack of a setup procedure was a contributing cause to this event.

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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)

II. CAUSE OF EVENT (cont.)

The intermediate cause of this event has been determined to be improper setup of welding equipment. First, the hot and ground leads were run side-by-side and routed near 2HVR*CAB14B instrument cables. A magnetic field built up around the parallel welding leads and induced a voltage in the instrument cabling. Secondly, the welder grounded the welding equipment to the pipe to be welded, but did not consider the ground path after the pipe was cut. The ground was physically close to the pipe being welded, but electrically, it presented a high impedance path from the hot lead to the ground lead (see attached diagram). The result of either or both of these routing problems caused the electrical noise induced spiking and trip of 2HVR*CAB14B. The electrical noise was localized and did not affect identical radiation monitoring equipment six feet away from 2HVR*CAB14B.

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III. ANALYSIS OF EVENT

This event is reportable per 10CFR50.73 part (a)(2)(iv), "Any event or condition that results in manual or automatic actuation of any Engineered Safety Feature (ESF)".

Secondary Containment isolation, Reactor Building Emergency Recirculation Unit Cooler automatic start, and GTS automatic starts are conservative actions having no adverse safety consequences, for the general public or the plant, at any reactor power level. The event in no way adversely affected any other safety system nor the operators ability to achieve safe reactor plant conditions.

The duration of the event was 1 day, 12 hours, 41 minutes.

IV. CORRECTIVE ACTIONS

The immediate corrective actions were to determine the validity and cause of the high radiation level trip signal.

Follow-up corrective actions for this event included:

1. Radiation monitor 2SWP*CAB14B was returned to service, and GTS and the Reactor Building Emergency Recirculation Unit Coolers were returned to standby at the completion of welding operations.

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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.

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

IV. CORRECTIVE ACTIONS (cont.)

2. The current welding instructions provide specific guidance and Engineering evaluation for high frequency AC TIG welding to ensure instrumentation is not impacted. No such controls exist for DC welding. Therefore, until the procedure in action 6 is written, a memo has been written to the Maintenance Managers from Nine Mile Point Units 1 and 2 emphasizing caution when performing any welding near instrumentation. This memo directs that welding cables are routed away from instrumentation cables.
3. A meeting between the welding engineer, NMP2 welders, and the Construction Services supervisor was held to discuss this LER and the proper setup of welding equipment in close proximity to instrumentation.
4. A Training Review Request has been initiated to have proper welding equipment setup included in the corporate welder training program.
5. The concerns raised by this event will be covered with the welders in continued training. Enhancement of the training program is also being evaluated.
6. A Procedure Change Evaluation has been initiated to write a procedure for welding on site. This procedure will include precautions necessary to prevent recurrence of this event.

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V. ADDITIONAL INFORMATION

A. Failed component identification:

Component description	-	check source positioning solenoid
Mark number	-	CS01
Manufacturer	-	Kaman Instrumentation Corp.
Part Number	-	823779-026A
Symbol Number	-	9311296
Niagara Mohawk Drawing	-	1.73L-801-055
Niagara Mohawk Spec	-	P281F



LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 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)

V. ADDITIONAL INFORMATION (cont.)

B. Previous similar events:

There have been several Reactor Building isolations with emergency ventilation starts, caused by spurious high radiation level signals. Only one of these was attributed to welding, LER 89-26, "Engineered Safety Feature Initiation Due to Spurious Trip Signals Caused By High Frequency Welding". The investigation for LER 89-26 included the effects of DC SMA welding. One of the corrective actions, a Lessons Learned Transmittal, addressed grounding of DC SMA welding equipment. Had this corrective action been incorporated into a permanent program, it may have prevented this event.

C. Identification of components referred to in this LER:

COMPONENT	IEEE 803 EIS FUNCTION	IEEE 805 SYSTEM ID
Secondary Containment (Rx Bldg)	N/A	NG
Reactor Building Unit Coolers	CLR	VA
Standby Gas Treatment System	N/A	BH
Reactor Building Ventilation System	N/A	VA
Above Refuel Floor Process Radiation Monitor and Microprocessor	MON	IL
Digital Radiation Monitoring System	MON	IL
Flow Control Valve	FCV	IL
Check Source Positioning Solenoid	SOL	IL



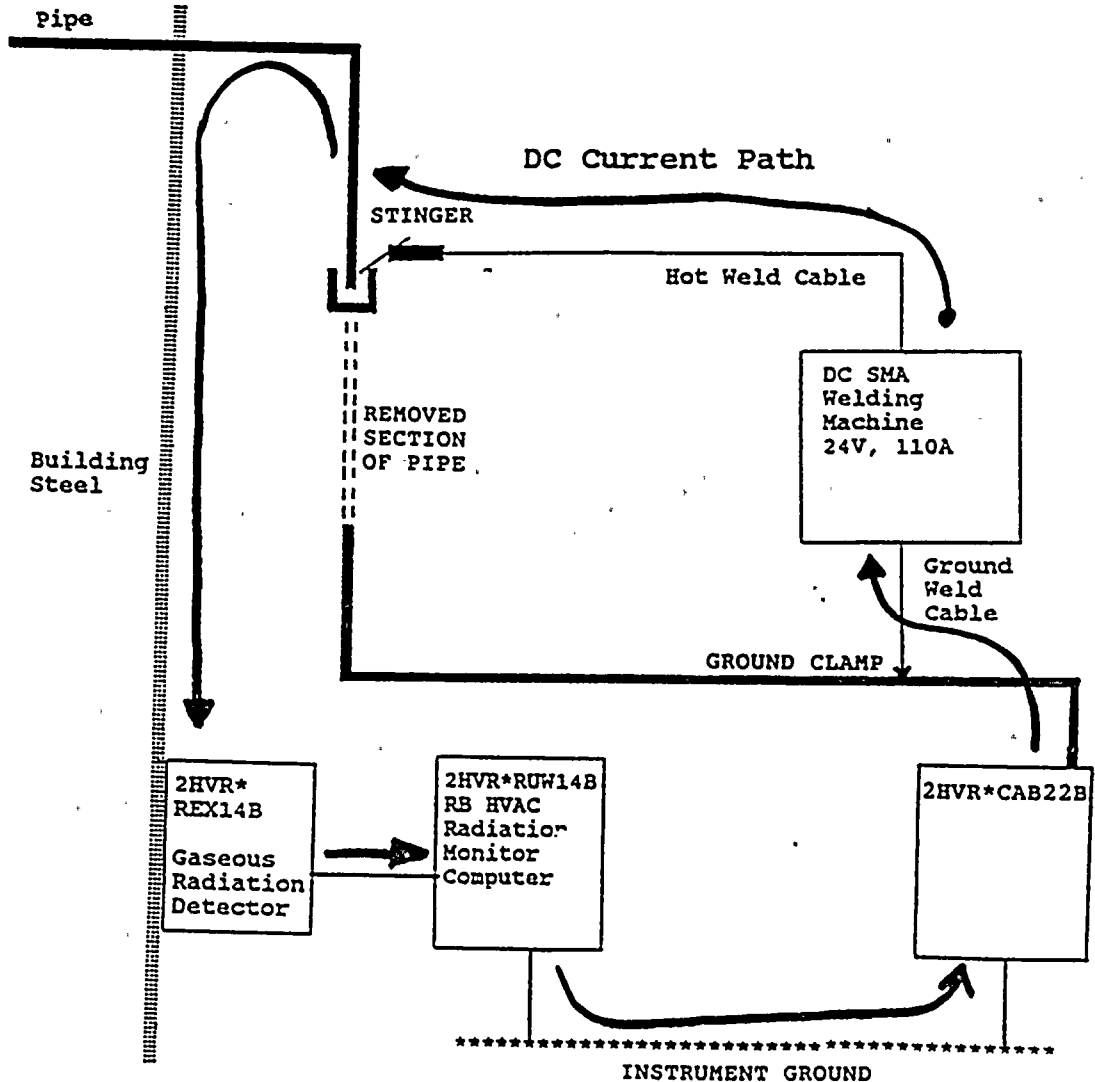
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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The electrical routing between the welding hot cable (Stinger) and the welding ground lead (ground) influences the exposed detector cable signals by providing a path to ground.



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