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FACIL: 50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
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RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-069-00: on 871023, numerous ESF actuation occurred due to loss of power to Non-Class 1E uninterruptible power supply. Caused by design deficiency, personnel error & equipment failure. Sys isolation signals reset. W/871120 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 8
TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: 21 05000410

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	NRR/DRIS/SIB	1	1	NRR/PMAS/ILRB	1	1
	REG FILE 02	1	1	RES DEPY GI	1	1
	RES-TELFORD, J	1	1	RES/DE/EIB	1	1
	RGN1 FILE 01	1	1			
EXTERNAL:	EG&G GROH, M	5	5	H ST LOBBY WARD	1	1
	LPDR	1	1	NRC PDR	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 0 410	1 OF 07

TITLE (4) Loss of Power to a Non-Class 1E Uninterruptible Power Supply Results in ESF Actuations due to Design Deficiency and Personnel Error

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)
10	23	87	87	— 069	— 00	11	20	87	Not Applicable (N/A)	0 5 0 0 0
									N/A	0 5 0 0 0

OPERATING MODE (9)	3	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	000	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	315	349-2445

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
B	EE	FU	S156	N					

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)

While in Mode 3 on October 23, 1987 at 1436 hours, a loss of power to a Non-Class 1E Uninterruptible Power Supply (UPS) resulted in numerous Engineered Safety Feature (ESF) actuations. A Niagara Mohawk Licensed Operator was responding to a UPS3B trouble alarm and unknowingly transferred power from the normal to the alternate power supply. The alternate supply was inoperable due to a blown fuse. Thus, UPS3B momentarily lost power, resulting in various system isolations. The causes of this event are design deficiency, personnel error, and equipment failure. Contributing causes are lack of training and procedural and human-factors deficiencies.

Immediate corrective actions were to restore power, to reset system isolation signals and to begin returning isolated systems back to service. While attempting to restore the Reactor Water Cleanup System (WCS), the system isolated again on high differential flow. The cause for this isolation and corrective actions are given in LER 87-63. All isolated systems were restored at 1516 hours. Further corrective actions taken were to replace the blown fuse, to counsel the individual involved, and to place operator aids on the local UPS control panels. The operating procedure will be revised and operators will be trained via continued training and the Lessons Learned program. Additionally, the UPS circuits will be modified to prevent blowing fuses during transfers and additional labels will be placed on the UPS panels.

IE 22

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

I. DESCRIPTION OF EVENT

While in Mode 3 (Hot Shutdown) on October 23, 1987 at 1436 hours, a loss of power to a Non-Class 1E Uninterruptible Power Supply (UPS) resulted in numerous Engineered Safety Features (ESF) actuations listed below. An additional ESF actuation occurred at 1504 hours when a Reactor Water Cleanup (WCS) pump tripped on high differential flow upon return to service. Reactor pressure was approximately 479 psig, and coolant temperature was approximately 465°F. A turbine trip and reactor scram from 36% power had occurred at 1142 hours, and cooldown was in progress. The reactor scram is discussed in LER 87-64.

At 1144 hours a "system trouble" alarm was received in the control room for UPS3B. (Refer to Attachment 1 for power supply configuration.) Scram recovery activities were in progress. Consequently, a Niagara Mohawk Licensed Operator was dispatched three hours later to investigate the cause for the alarm at UPS3B. The operator found that the UPS was being fed through its normal supply, but a "sync loss" alarm was in at the local control panel. This alarm normally indicates that the alternate supply is not present. (It was later determined that the alternate supply was not available due to a blown fuse.) He proceeded to push one of the two pushbuttons on the control panel, thinking they were lamp test buttons. These buttons are actually Forward and Reverse Transfer pushbutton switches. By pushing the Reserve Transfer button, the operator unknowingly transferred UPS3B to an inoperable alternate power supply which caused the downstream Electrical Protection Assemblies (EPAs) to trip on undervoltage. The tripping of the EPAs resulted in a loss of power to the Division 2 Reactor Protection System (RPS)/Nuclear Steam Supply Shutoff System (NS^4) logic and subsequent ESF actuations as follows:

1. Secondary Containment Isolation.
2. Auto initiation of an Emergency Reactor Building Ventilation (HVR) recirculation unit and both Standby Gas Treatment System (GTS) trains.
3. Isolation of inboard primary containment isolation valves (groups 2 through 4, 7 through 9 and main steam line drains).
4. Isolation of inboard and outboard Shutdown Cooling (SDC) System valves.

In addition to these actuations, a half scram signal was generated due to the loss of power to RPS B logic.

Immediate corrective actions were to reset the EPAs at 1441 hours, reset the RPS/NS^4 isolations and to begin restoring the isolated systems to normal. Additionally, a work request was generated to investigate the cause for the "sync loss" alarm at UPS3B. All isolated systems were successfully returned to service by approximately 1516 hours.

The WCS system had isolated as a result of the EPA trip, and operators were attempting to startup the system. While in the process of doing this, the operators observed erratic flow indications on the system's instrumentation. The operators attempted to make adjustments to compensate for the flow oscillations, when a system isolation on high differential flow was automatically initiated at 1504 hours. Immediate corrective actions were to verify that system flow had stabilized and to reset the isolation signal. At 1506 hours, the WCS pump was restarted and the system returned to service.

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A 10 CFR 50.72 (b)(2)(ii) report for the second WCS isolation was made a week after the event when technical staff discovered that this event was not included in the original notification due to miscommunication among supervision.

II. CAUSE OF EVENT

The root causes for the event are design deficiency and personnel error. An intermediate cause was equipment failure. Contributing factors were lack of training and procedural and human-factors deficiencies.

The intermediate cause was determined to be a blown fuse in the alternate supply which caused the input breaker to trip. Because the normal supply will not synchronize unless the alternate supply is available, the "sync loss" alarm was generated. The most probable cause for blowing the fuse was the voltage transient experienced when in-house loads were fast-transferred from the normal station transformer to the reserve transformers upon tripping the turbine at 1142 hours that day. During this fast-transfer, the UPS was operating from its normal power supply so no output interruption occurred.

A root cause is design deficiency. This type of equipment failure (i.e. blown fuse) has occurred on other occasions, primarily whenever power supplies upstream of the UPS's are transferred. Although the UPS power is not interrupted by the blown fuse, it results in an inoperable alternate power source and creates the potential for operator errors when operating this equipment. Thus, a design change can prevent repeated UPS equipment failures and personnel errors. It should be noted that the UPS can operate indefinitely without the alternate source. Therefore, the alternate source is not required to be operable. Its primary purpose is for maintenance.

Another root cause is personnel error. This event would not have occurred if the operator had not mistakenly pushed the transfer switches on the control panel. Meter indications would have alerted the operator that the alternate supply was not present. Then, Operations could have requested Maintenance to investigate the cause for the inoperable alternate supply.

Contributing to the personnel error is a lack of training on the purpose for the pushbutton switches located on the local control panel and the significance of the "sync loss" alarm. In addition, no guidance is provided in the applicable operating procedure for responding to the "sync loss" or other alarms at the UPS panels. It was also noted that the UPS control panels were not adequately labeled so that all components were clearly identified. Therefore, a better human-factors design of the control panels could have prevented improper operation of the switches.

The root cause for the WCS isolation on high differential flow is a combination of design and construction deficiencies that result in air entrapment in the instrument sensing lines. A complete discussion of this cause is presented in LER 87-63.

The root cause for failing to make the required 10 CFR 50.72 notification for the second WCS isolation is communication deficiency. The Station Shift Supervisor was aware that the isolation had occurred but forgot to notify his assistant, who was preparing to make the required notification for the first event. A contributing factor was significant activity in the control room due to shift turnover and scram recovery activities in progress during these events.

III. ANALYSIS OF EVENT

There were no adverse safety consequences. A loss of power to a single division of RPS/NS4 logic power supplies created unnecessary ESF actuations, but did not impair the station's capability to achieve a safe shutdown. Power was restored within 5 minutes by resetting the EPAs. Isolated systems were returned to normal within 40 minutes of the event. During power operation, a loss of power to these power supplies can create a serious transient. However, the consequences of these events are previously analyzed and are bounded by the "LOCA Inside Primary Containment" spectrum of events (FSAR 15.6.5) and "Inadvertent HPCS Startup" (FSAR 15.5.1).

The WCS system is not safety-related. A WCS system isolation does not impact plant or public safety. The purpose for the high differential flow isolation is to detect possible leakage through the reactor coolant pressure boundary and to initiate protective actions (i.e. system isolations). Thus, the WCS system functioned as designed throughout the event.

IV. CORRECTIVE ACTIONS

Immediate corrective actions were to reset the EPAs at 1441 hours, reset the RPS/NS4 isolations and to begin restoring the isolated systems to normal. Additionally, a work request was generated to investigate the cause for the "sync loss" alarm at UPS3B. WCS was returned to service after a second system isolation at 1506 hours. All isolated systems were successfully returned to service by approximately 1516 hours. Further corrective actions are as follows:

1. The blown fuse in the alternate supply was replaced and the input breaker reset to restore the inoperable alternate supply that same day.

2. Operator aids (signs) were placed on the UPS control panels (3A and 3B), advising personnel that the pushbuttons are actually transfer switches and not lamp test buttons.

3. The individual who caused the power supply transfer was counseled and participated in preparing the operator aids that were placed on the control panels.

4. A memo was issued to all Operations personnel addressing this event and other events involving personnel error as well as corrective actions to prevent recurrence of these events.

5. Details of this event will be included in the Operations Department Lessons Learned book for review by all Operations personnel.

6. Training Modification Recommendation (TMR) 02-87.252 has been initiated to discuss this LER with Operations personnel in continued training. The purpose of the pushbutton switches and the significance of the "sync loss" alarm will be emphasized.

7. The UPS fuse sensing circuits will be modified to minimize the potential of blowing fuses when voltage transients are experienced during transfers. This modification will be implemented in accordance with station modification priorities.

8. Additional labels will be added to UPS control panels to properly identify the various components, such as switches, lamps, meters and breakers. Estimated date of completion is December 31, 1987.

9. The alarm response section for applicable UPS operating procedure will be revised to ensure the appropriate operator response is provided for each alarm condition. Estimated date of completion is December 15, 1987.

10. A discussion of this LER will be included in Communications Training to prevent recurrences of failure to make required notifications as a result of miscommunications. Per LER 87-50, a verbal communication training program is being developed for operators and technicians. A completion date for this corrective action item has not been determined at this time, since the logistics for this training have not been finalized. However, it is anticipated that this training will be completed by June, 1988.

Corrective actions for the cause of repeated WCS isolations on high differential flow are discussed in LER 87-63.

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V. ADDITIONAL INFORMATION

A. Identification of Components Referred to in this LER

Component	IEEE 803 EIIS Funct	IEEE 805 System ID
Synchronism Check Device	25	EE
Uninterruptible Power Supplies (UPS)	UJX	EE
Electrical Protection Assemblies (EPA)	92	ED
Reactor Protection System (RPS)	N/A	JC
Nuclear Steam Supply Shutoff System (NS^4)	N/A	JM
Reactor Water Cleanup System (WCS)	N/A	CE
Standby Gas Treatment System (GTS)	N/A	BH
Reactor Building Ventilation System (HVR)	N/A	VA
Transfer Switches	89	EE
Fuse	FU	EE
Breaker	52	EE
Pump	P	CE
Transformer	XFMR	EE
Reactor	RCT	N/A
Turbine	TRB	N/A
Isolation Valve	ISV	JM

B. Previous similar events - LER 86-07 describes a spurious EPA trip. LER 86-15 describes a loss of power to UPS 3A and UPS 3B and a subsequent EPA trip. The causes of these events are not related to each other or to this event. WCS system isolations on high differential flow have occurred five times and are discussed in LER 87-32-01, LER 87-47, LER 87-53 and LER 87-63.

C. Failed components - 500 Volt, 200 Amp fuse manufactured by Shawmut, Part No. A50P200.

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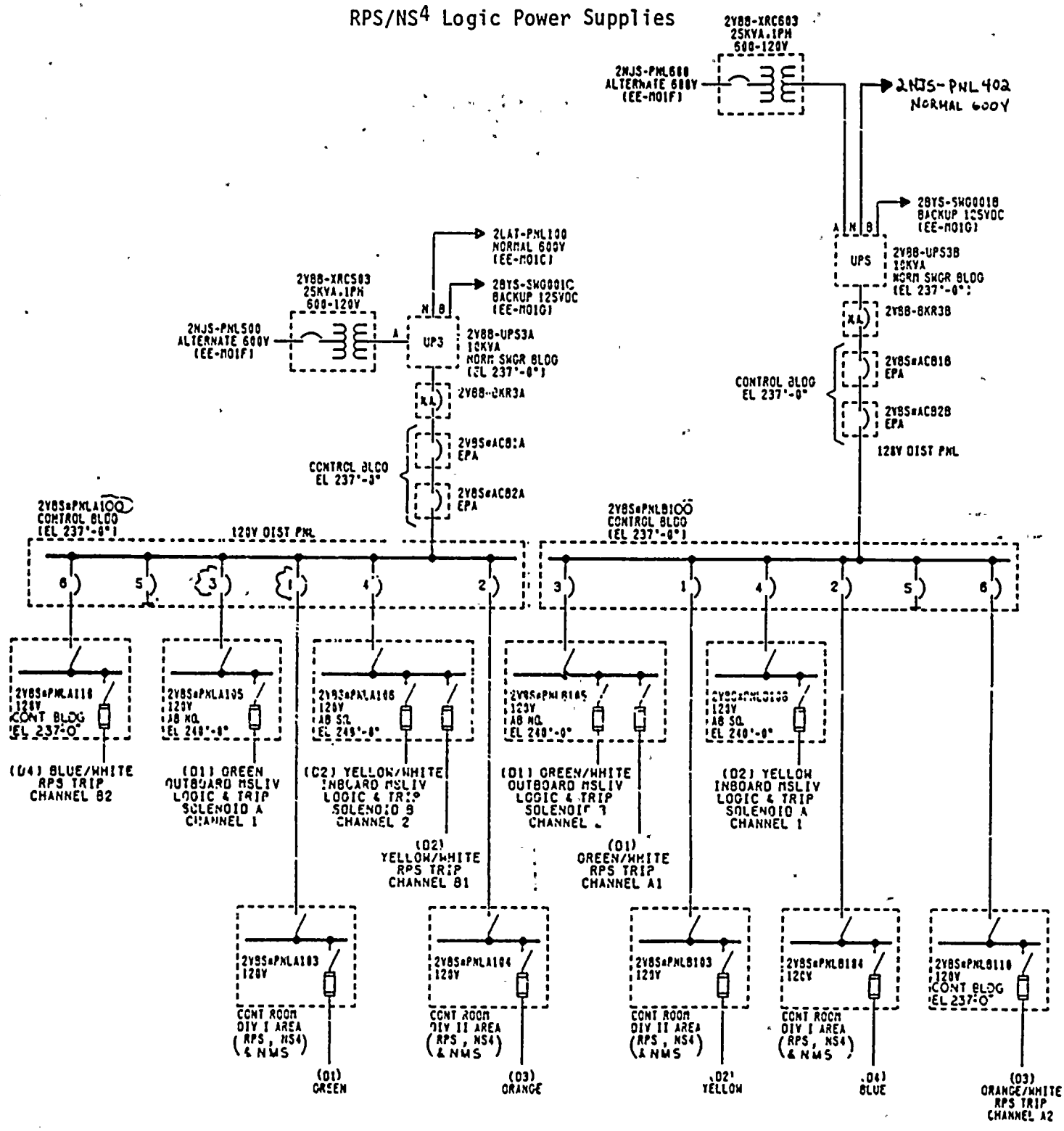
ATTACHMENT 1

RPS/NS4 Logic Power Supplies



NMP29804

NIAGARA MOHAWK POWER CORPORATION

NIAGARA MOHAWK

301 PLAINFIELD ROAD
SYRACUSE, NY 13212

THOMAS E. LEMPGES
VICE PRESIDENT—NUCLEAR GENERATION

November 20, 1987

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

RE: Docket No. 50-410
LER 87-69

Gentlemen:

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

LER 87-69 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 (b) (2) (ii) reports were made at 1532 hours on October 23, 1987 and at 1527 hours on October 30, 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/PB/mjd

Attachments

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

IE22
1/1