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FACIL:50-220 Nine Mile Point Nuclear Station, Unit 1, Niagara Powe 05000220
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SUBJECT: LER 90-011-00:on 900530,reactor scram & RBEVS initiation during surveillance test due to design deficiency.
W/9 ltr.

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NMP67595

June 28 , 1990

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

RE: Docket No. 50-220
LER 90-11

Gentlemen:

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

LER 90-11 Which 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). 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".

A 10CFR50.72 report was made at 2345 hours on May 30, 1990.

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

Very truly yours,

J. L. Willis
General Superintendent
Nuclear Generation

JLW/GB/lmc

ATTACHMENT

cc: Thomas T. Martin, Regional Administrator, Region I
W. A. Cook, Sr. Resident Inspector

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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 1	0 5 0 0 0 2 2 0	1 OF 0 5

TITLE (4) Reactor Scram And Reactor Building Emergency Ventilation System Initiation During Surveillance Test Due To Design Deficiency

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	3 0	9 0	9 0	0 1 1	0 0	0 6	2 8	9 0	N/A	0 5 0 0 0

OPERATING MODE (9): N

POWER LEVEL (10): 0 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)
P. Finnerty, Electrical Design	3 1 5 4 2 8 - 7 1 0 2

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) [ ] X NO

EXPECTED SUBMISSION DATE (15): MONTH | DAY | YEAR

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

On May 30, 1990, Nine Mile Point Unit One (NMP1) was in a refueling outage with fuel in the vessel and the mode switch in the REFUEL position. At approximately 2220 hours, while performing Surveillance Test N1-ST-R2, "Loss of Coolant Accident and Emergency Diesel Generator Simulated Automatic Initiation Test", a full scram signal was received and a Reactor Building Emergency Ventilation System (RBEVS) initiation occurred due to a loss of power to Reactor Protection System (RPS) Bus 12.

The cause of this event is the manual opening of Motor Generator Set 172 (MG 172) drive motor contactor causing loss of power to RPS Bus 12.

The most probable root cause for this event is a design deficiency in the transfer logic for MG Sets from AC to DC power.

The immediate corrective actions taken included resetting the scram, placing RPS Bus 12 on Instrumentation and Control Bus 130A, securing RBEVS and restoring normal Reactor Building ventilation. Additionally, plant modification N1-90-005, "MG Sets Speed Control", has been completed, culminating in the successful completion of N1-ST-R2 on June 16, 1990.

I. DESCRIPTION OF EVENT

On May 30, 1990, Nine Mile Point Unit One (NMP1) was in a refueling outage with fuel in the vessel and the mode switch in the REFUEL position. At approximately 2220 hours, while performing Surveillance Test N1-ST-R2, "Loss of Coolant Accident and Emergency Diesel Generator Simulated Automatic Initiation Test", a full scram signal was received and a Reactor Building Emergency Ventilation System (RBEVS) initiation occurred due to a loss of power to Reactor Protection System (RPS) Bus 12. During the section of the test that verifies automatic startup and loading of Emergency Diesel Generator (EDG) 103, Motor Generator Sets 171 and 172 (MG 171) (MG 172) transfer from their normal AC power supply to their backup DC power supply. Due to excessive current observed at MG 172, an operator, under the direction of a test engineer, opened the MG 172 drive motor contactor to prevent possible motor damage. The tripping of MG 172 caused a loss of power to RPS Bus 12. A loss of power to RPS Bus 12 will generate a full scram signal in both RPS trip channels due to a design non-coincident logic relay configuration when the mode switch is in SHUTDOWN, REFUEL, or STARTUP and reactor pressure is less than 600 psig. In addition, non-coincident logic will initiate RBEVS during all operating modes when power is lost to RPS Bus 12.

II. CAUSE OF EVENT

The immediate cause of this event is the manual opening of MG 172 drive motor contactor causing the loss of power to RPS Bus 12. The loss of power to RPS Bus 12 will generate a full scram signal in both RPS channels due to a design non-coincident logic relay configuration when the mode switch is in SHUTDOWN, REFUEL, or STARTUP and reactor pressure is less than 600 psig.

This event was caused by the instability of the DC speed control circuit for MG Set 171 subsequent to the simultaneous trip of AC Motors for three MG Sets.

The most probable root cause of this event is a design deficiency in the transfer logic for MG Sets from AC to DC power. Pre-operational Test Procedure POT-87, "Motor Generator Sets 162, 167 and 172 Continuous Supplies and Spare Battery Chargers," performed in August 1969, has an acceptance criteria; recovery to conditions of +/- 1% for both voltage and frequency being completed within six seconds of transfer initiation. This acceptance criteria was part of the original design specification submitted to General Electric.

During performance of POT-87, an exception was taken in that MG Sets 167, 162 and 172 did not recover to within 1% of nominal frequency within the specified time frame. This exception was approved in part due to the Engineering Department opinion that the additional time

required to restore frequency to within 1% of nominal would not adversely affect the operation of any equipment connected to the MG Sets.

During the 1984 refueling outage, protective relaying instrumentation was installed on the RPS continuous power MG Sets 162 and 172 which causes a trip of the MG Set on an overvoltage, undervoltage, or underfrequency condition (with appropriate time delay). This protective relaying instrumentation, and the maintenance required by the age of the equipment, make the RPS MG Sets susceptible to an underfrequency trip following the simultaneous tripping of AC Motors for three MG Sets aligned to the same station battery.

As a result of the investigation following events described in Licensee Event Report (LER) 89-12, Special Test Procedure, N1-STP-6, "MG Set 172 Speed Control" was prepared. On March 1-2, 1990, N1-STP-6 was performed which tested for the first time a simultaneous parallel trip of three MG Sets powered from the same battery. The results of this test showed that when the AC Motors of three MG Sets were tripped simultaneously, the battery charging MG Set (MG 171) experienced severe speed and DC current oscillations.

MG 171 oscillations were sensed via Battery Bus 12 at the DC speed control for MG 172, initiating speed and DC current oscillations in MG 172. Following replacement of the voltage regulator/speed controller for MG Set 171, N1-STP-6 was completed successfully on May 25, 1990, Thus, it was believed that the simultaneous trip of three MG AC Motors would be acceptable during performance of N1-ST-R2.

III. ANALYSIS OF EVENT

This event is reportable 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)".

There were no significant safety consequences as a result of this event since the plant was in cold shutdown with all control rods fully inserted. Had the operator not tripped MG 172, the protective relaying installed would have caused the trip of MG 172 due to an underfrequency condition. Therefore, the health and safety of plant personnel and the general public were not affected.

Had this event been experienced during power operation, there also would not have been any adverse safety consequences. The Reactor Protection System would not have generated a full scram signal because the non-coincident logic is defeated when the mode switch is in the RUN position, thus only a half scram signal would be received. Had this event been experienced during an actual Loss of Coolant Accident

(LOCA) coincident with a Loss of Offsite Power (LOOP), safe shutdown of NMP1 would have been achieved by systems aligned to EDG 102. As a result of this event, only the battery charging capability of MG 171 would have been lost had an actual LOOP/LOCA occurred. As the station batteries are designed to provide DC power to all essential loads for a full eight hours with appropriate operator load shedding action, the loss of MG 171 would not, by itself, have had any adverse safety consequences. In addition, the initiation of RBEVS during any mode of operation is a conservative action. The duration of this event was twenty-one minutes.

IV. CORRECTIVE ACTION

The immediate corrective actions taken by the operators included resetting the scram, placing RPS Bus 12 on Instrumentation and Control Bus 130A, securing RBEVS and restoring normal Reactor Building ventilation to service.

Additionally, plant modification N1-90-005, "MG Sets Speed Control", has been completed. This modification prevents the transfer of battery charging MG Sets 161 and 171 to DC drive by tripping the DC breakers on a sensed undervoltage condition at Powerboards 16B and 17B, respectively. AC power to MG Sets 161 and 171 is automatically restored in approximately two minutes, following the automatic start and load sequencing of the EDG's. The DC breakers then automatically reclose on time delay to restore the battery charging. Pre-operational Test N1-POT-292, "Battery Charger MG Sets DC Breaker Logic Functional Test", was successfully completed on June 12, 1990. Surveillance Test N1-ST-R2 was successfully completed on June 16, 1990. Power Ascension Test N1-PAT-10-1, "Loss of Offsite Power", was successfully completed on June 19, 1990.

V. ADDITIONAL INFORMATION

This LER is similar to events described in LER 84-10 and LER 89-12. The events described in LER 84-10 occurred during a 1984 restart Surveillance Test, N1-ST-R2. The events described in LER 89-12 involved a malfunction of the voltage regulator/speed control circuit.

However, the corrective actions taken as a result of these LERs would not have precluded the occurrence of this event.

An additional plant modification request has been generated to review the possibility of removing existing Motor Generator Sets 161, 162, 171, and 172 and replacing with state of the art devices. This work is anticipated to be completed during the 1992 refueling outage.

COMPONENT	IEEE 805 SYSTEM	IEEE 803 COMPONENT
Reactor Protection System (RPS)	JC	N/A
Emergency Diesel Generator (EDG)	EK	DG
Reactor Building Emergency Ventilation System (RBEVS)	BH	N/A
Voltage Regulator	EF	EC (90)
Motor Generator Set	EF	MG
Electrical Bus	EF	BU