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SUBJECT: LER 90-010-00:on 900525,two reactor scrams due to personnel error & equipment deficiency.

W/9 ltr.

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NMP67582

June 25, 1990

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

RE: Docket No. 50-220
LER 90-10

Gentlemen:

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

LER 90-10 Which 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 2210 hours on May 25, 1990, and at 1515 hours on May 29, 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

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

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1/1

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 7

TITLE (4)

Two Reactor Scrams Due To Personnel Error And Equipment 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	2 5	9 0	9 0	— 0 1 0	— 0 0	0 6	2 5	9 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 0	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
R. Randall, Superintendent of Operations	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
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 8	2 5	9 0

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

On May 25, 1990, Nine Mile Point Unit 1 experienced two scrams and a Reactor Building Emergency Ventilation System (RBEVS) initiation while in the cold shutdown condition with the core loaded and the mode switch in the REFUEL position. The first scram and associated RBEVS initiation occurred when Reactor Protection System (RPS) Bus 12 experienced a loss of power while being manually transferred from Instrument and Controls (I&C) Bus 130A to Motor Generator (MG) Set 172. The second scram occurred 51 seconds later due to a Scram Discharge Volume high water level trip when the operator failed to bypass this scram function prior to resetting the first scram.

Preliminary assessment indicates that both operator performance and MG Set deficiencies were contributing causes to this first event. The root cause for the first event is continuing to be investigated. The root cause for the second event is failure to follow procedures.

Immediate corrective action for the first event was to assign a System Engineer to be present during future bus transfers. Additional corrective actions include revising the Operating Procedure and completing a formal root cause investigation. Corrective actions taken for the second event include generation of a Lessons Learned Transmittal and counseling of Control Room personnel concerning their post-event response and subsequent actions.

I. DESCRIPTION OF FIRST EVENT

On May 25, 1990, Nine Mile Point Unit 1 (NMP1) was in a refueling outage with the mode switch in the REFUEL position with the core loaded. A reactor scram and associated Reactor Building Emergency Ventilation System (RBEVS) and Control Room Emergency Ventilation System (CREVS) initiations were received due to a loss of power to Reactor Protection System (RPS) Bus 12. RPS Bus 12 was being transferred from Instrument and Control (I&C) Bus 130A back to Motor Generator Set 172 (MG 172). This is a "live bus" transfer that is performed locally by an operator using breakers and a synchroscope at the local panel. The operator was performing this task in accordance with the recently revised Operating Procedure N1-OP-48, "Motor Generator Sets"; the procedural revisions were those instituted as a result of corrective actions from Licensee Event Report (LER) 90-04. After closing the output breaker from MG 172, the operator paused to check the MG 172 generator amps meter on the local panel adjacent to the synchronization panel. This "delay" most likely resulted in the MG 172 generator picking up too much load (amps) while paralleled with the I&C Bus. He then opened the output breaker for RPS Bus 12 from I&C Bus 130A. A fluctuation in MG 172 AC generator output occurred that was sufficient to actuate the protective relaying and trip the MG 172 output breaker. Since the protective relay flags had not been reset yet (in accordance with the operating procedure), it could not be determined which protective device tripped (i.e. underfrequency, undervoltage, or overcurrent). Consequently, a full scram signal, RBEVS initiation (an Engineering Safety Feature actuation), and CREVS initiation signal were received at 20:50.06 hours.

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 either the SHUTDOWN, REFUEL, or STARTUP position, and reactor pressure is less than 600 pounds per square inch gauge (psig). Additionally, non-coincident logic will initiate RBEVS and CREVS during all operating modes if their Channel 12 radiation monitors experience a loss of power.

No immediate corrective actions were necessary at the local MG control cabinet as the MG 172 behavior was observed to be stable and the protective relaying reset after 15 seconds (per design), resulting in re-closure of the MG 172 output breaker. The operator proceeded with transferring the MG set from its DC drive back to its AC drive in accordance with the operating procedure.

I. DESCRIPTION OF SECOND EVENT

Fifty-one seconds after the first scram was received due to loss of RPS Bus 12, a second scram occurred due to a high water level in the scram discharge volume (SDV). The reactor was in the same condition as described above, with the mode switch in the REFUEL position.

Following the first scram, the corrective actions taken in the Control Room were to: 1) confirm that a full scram had occurred; 2) verify the RBEVS and CREVS initiations; and 3) prepare to reset the RPS Trip Channels 11 and 12. When an RPS Bus (12) powerloss is experienced, the operators must reset the Drywell High Pressure relays at the control room back panel prior to resetting the RPS trip channels. These relays were reset at 33 and 34 seconds, respectively, after the initial scram signal was received. The Chief Shift Operator (CSO) then reset the scram 5 seconds later. In doing so, he failed to follow Special Operating Procedure N1-SOP-1, "Reactor Scram", which directs the operator to bypass the SDV high water level scram (via the keylock switches at F Panel) prior to resetting the scram.

During the time prior to scram reset, the SDV was slowly filling as a result of the scram inlet and outlet valves being open. Both the 3 gallon and the 18 gallon alarms were present in the alarm log, but the 45 gallon scram point had not been reached when the operator went to reset the first scram. When he did reset the first scram, the SDV continued to fill due to the time delay associated with: 1) repressurizing the scram air header; 2) closing of the scram inlet and outlet valves; and 3) opening of the SDV vent and drain valves. At 20:50.57 hours (12 seconds after resetting the first scram), the second full scram signal was received.

Immediate corrective action was to bypass the SDV high water level scram signal and reset the reactor scram. The operators then secured RBEVS/CREVS and restored normal ventilation to the Reactor Building and Control Room. Telephone notification to the NRC was made at 22:10 hours. This notification only reported the first scram event (and RBEVS initiation) as the second scram was initially treated as part of the first event. During the post scram analysis, the Reactor Analyst Supervisor determined that the second scram event should have been reported separately. This telephone notification was made on 5/29/90 (Tuesday following the Friday event) at 15:15 hours.

II. CAUSE OF EVENT

The immediate cause for the first event was the loss of power to RPS Bus 12. This resulted in a full reactor scram in both RPS trip channels due to a design noncoincident logic relay configuration when the mode switch position is in SHUTDOWN, REFUEL, or STARTUP and reactor pressure is less than 600 psig. Additionally, the loss of RPS Bus 12 de-energizes one of two reactor building exhaust ventilation radiation monitors, which results in an RBEVS initiation due to one-out-of-two logic for that system.

A root cause evaluation for this event is presently ongoing. MG Set test results are being collected and data analyzed. A formal root cause will be presented in a supplement to this LER. Preliminary assessments indicate that both operator performance and MG Set design deficiencies contributed to this event's occurrence.

A root cause evaluation was performed in accordance with Site Supervisory Procedure S-SUP-1, "Root Cause Evaluation Program", for the second event. The root cause for the second scram event was failure to follow procedures. The operator's failure to operate the SDV high water level scram bypass switches per the scram procedure, N1-SOP-1, was a cognitive error due to the SDV high water level scram signal not being present at the time he decided to reset the scram.

III. ANALYSIS OF EVENT

Both of the 5/25/90 events are reportable in accordance with 10CFR50.72 (b)(2)(ii) and 10CFR50.73 (a)(2)(iv), "Any event or condition that results 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 these events since the plant was in the cold shutdown condition and all systems functioned as designed. All control rods were fully inserted prior to the event. The health and safety of plant personnel and the general public were not affected.

If an RPS Bus was de-energized during power operation, there would not have been any adverse consequences. The Reactor Protection System would have generated a half scram instead of a full scram signal by design. Initiation of RBEVS and CREVS during any mode of operation is a conservative action.

A failure to bypass the SDV high water level scram function per the scram procedure following a scram from full power would, at worst, result in an inability to reset the reactor scram until this action was taken, if it is assumed that the SDV high water level was already present (The SDV will fill much quicker under operating reactor conditions due to water displaced from the CRD mechanisms). If the sequence occurred as per this event (reset, then subsequent scram), the CRD hydraulic system transient would not be significant, as all rods would already be full in from the first scram.

IV. CORRECTIVE ACTIONS

Immediate corrective action taken as a result of the first event included: The Station Superintendent assigned a System Engineer to be present for any future normal RPS bus power supply transfers involving MG 162 or 172 to assist and help prevent future transfer difficulties.

Additional corrective actions include:

1. Issuing a Temporary Change Notice (TCN) to Operating Procedure N1-OP-48, "Motor Generator Set", to implement a requirement to have a System Engineer available during normal bus transfers until all shifts have completed a transfer using the revised procedure.

2. Completing a formal investigation, an Engineering evaluation, and root cause analysis to assess operator performance and MG Set behavior.

3. The submittal of a supplement to this Licensee Event Report (LER) to provide a root cause analysis and associated corrective actions for this event.

The following are corrective actions taken for the second event:

1. A Lessons Learned Transmittal (LLT) is being issued describing this event and its immediate cause. This transmittal includes a review of similar Nine Mile Point Unit 2 LLTs associated with Unit 2 LERs 86-01 and 86-19. In addition, it discusses the importance of thorough post-event review and accurate event notifications per 10CFR requirements.

2. The Station Shift Supervisor, Assistant Station Shift Supervisor, and the Chief Shift Operator for the shift on duty at the time of the event have been admonished for their actions with respect to scram recovery.

3. A Training Modification Recommendation has been submitted to evaluate simulator SDV vent and drain valve opening times and SDV fill times to better simulate actual plant responses under both operating and cold shutdown conditions.

V. ADDITIONAL INFORMATION

A. Previous similar events:

The first event is similar to the event described in LER 90-04, which describes a reactor scram and RBEVS initiation while performing a local manual transfer of RPS Bus 11 from I&C Bus 130A back to MG 162.

The fourth event described in LER 89-12 is also similar to the first event in this LER insofar as it was a scram/RBEVS initiation that was also initiated during a local manual transfer of the RPS Bus power supply. The corrective actions that have been or will be taken related to 89-12 are hardware/design changes to improve automatic transfer reliability of the RPS Continuous Power MGs (162 and 172) from their AC drives to their DC drives. These improvements could have an indirect effect on the operator evolutions that this LER (and LER 90-04) deals with.

An evaluation of the present and past RBEV System actuation is being completed by the Independent Safety Engineering Group (ISEG). This assessment will determine the best overall corrective actions to prevent future actuations. This information will be provided in a supplement to LER 90-08.

The second event described in this LER has not previously occurred at NMP Unit 1. NMP Unit 2 has experienced two events where the control room operator reset a scram under cold shutdown conditions prior to bypassing the SDV high water level scram function, which resulted in a subsequent scram (LERs 86-01 and 86-19). Corrective actions taken included reviewing their Control Room Simulator SDV models (to verify that SDV fill rates reflect both operating and cold shutdown

reactor conditions), revising their scram recovery procedure and issuing a Lessons Learned Transmittal.

The Unit 1 Special Operating Procedure, N1-SOP-1, was reviewed to determine if there might be a human factors problem and it was determined to be acceptable.

B. Failed components: none.

C. Identification of components referred to in this LER:

COMPONENT	IEEE 805 SYSTEM	IEEE 803 COMPONENT
Motor Generator	EF	MG
Reactor Building Emergency Ventilation System	VA	N/A
Reactor Protection System	JC	N/A
Scram Discharge Volume System	AA	LS
Control Room Emergency Ventilation System	VI	N/A
Breaker	EF	72
Relays	EF	94