NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Nine Mile Point Unit 2	0 5 0 0 0 4 1 0	1 OF 0 4

TITLE (4)

Quarter Core Scram

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
1 1	2 3	8 6	8 6	— 0 1 0	— 0 2	0 7	0 7	8 7	N/A	0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
5	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 0 0 0	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	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
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

On November 23, 1986 Nine Mile Point Unit 2 was in its initial fuel load with the mode switch in "REFUEL". At approximately 1108 25% of the control rods received a full scram signal when all the group 2 control rod scram solenoid valves de-energized.

At the time of the one-quarter scram, channel B of the RPS was de-energized per surveillance procedure N2-ISP-NMS-W@007, "APRM Channel Functional Test". Thus, all the rods in the core were in a "half scram" condition with channel B scram solenoid valves in the de-energized open condition. At 1108 the group 2 channel A scram solenoid valves suddenly de-energized creating a full scram condition for that group of rods. Group 2 rods represent 25% of the total number of rods in the core. All other groups remained in the "half scram" condition with channel B scram solenoid valves de-energized.

The one quarter scram condition lasted approximately one minute and ended when the group 2 channel A scram solenoid valves suddenly re-energized.

The cause of the event can not be positively determined. An investigation in the form of Supervisory Procedure S-SUP-1, "Root Cause Evaluation Program", has been completed and followed up with a problem analysis per Kepner-Tregoe's problem solving and decision making program with no positive results.

I. DESCRIPTION OF EVENT

On November 23, 1986 Nine Mile Point Unit 2 was in its initial fuel load stage with all rods fully inserted and the mode switch in "REFUEL". At approximately 1108, 25% of the control rods received a full scram signal when all of the group 2 control rod scram solenoid valves de-energized. The group 2 control rods are approximately evenly distributed across the core.

At the time of the event channel B of the Reactor Protection System (RPS) was tripped per surveillance procedure N2-ISP-NMS-W@007, "APRM Channel Functional Test". Thus a half scram condition existed with all channel B scram solenoids in the de-energized condition. At 1108 the group 2 channel A scram solenoids de-energized creating a full scram situation for those particular rods in group 2 (A and B channel solenoids must both de-energize to cause the pilot valve to change state.) The power loss to the group 2 channel A scram solenoids was verified when the white indicating light for that solenoid group extinguished in the control room. The group 1, 3, and 4 channel A scram solenoids were all verified as remaining in the energized state as the indicating lights associated with them remained lit. With both channels of the group 2 scram solenoid valves de-energized, all of the group 2 rods (one quarter of all rods in the core) were in a full scram condition.

The one-quarter core scram situation lasted approximately one minute and ended when the group 2 channel A scram solenoid valves re-energized. During the one minute period following the start of the event the following expected actions occurred:

The control rod drive system pumps automatically initiated and started to run out in an attempt to recharge the charging header which was being depressurized by the open group 2 scram solenoid valves, as expected.

The Scram Discharge Volume (SDV) vent and drain valves closed as they normally do in a scram situation. The closure could not be timed because the event had no initiation scram signal.

A Scram Air Header low pressure alarm was received at 65 psig due to the header being depressurized by the opening of the group 2 air solenoid valves.

All backup scram valves remained in the normal closed and energized state for the duration of the event.

At approximately 1110 the one-quarter scram condition automatically cleared as evidenced by the re-opening of the SDV vent and drain valves. The event ended at 1112 when the Scram Air Header pressure returned to normal and its alarm was cleared. The event caused no transients as all rods were in before it occurred. The SDV did not receive a great enough water volume from the group 2 scram solenoid valves to actuate backup rod blocks or activate a full core scram on SDV high level.

II. CAUSE OF EVENT

The cause of the event cannot be positively identified. An investigation in the form of Supervisory Procedure S-SUP-1, "Root Cause Evaluation Program", has been completed with no positive results. A follow-up analysis was also performed per a problem solving and decision making program designed by Kepner-Tregoe (K-T Analysis). The K-T Analysis also yielded no positive results as to the root cause of the event but did yield two probable causes for the event.

The first suspected probable cause of the event was analyzed to be personnel error during the placement of a markup written to satisfy the pre-test conditions required for a particular Main Steam Isolation Valve (MSIV) actuator. The markup called for the de-energization of circuit breaker number 2 in electrical panel 2VBS*PNLA106. Electrical panel 2VBS*PNLA106 houses six functional circuit breakers, numbered 1 through 6. Circuit breakers numbers 1 through 5 supply power to the MSIV trip logic and number 6 supplies power to the circuits associated with the particular Reactor Protection System (RPS) trip logic which, if de-energized, would have caused the one-quarter core scram which occurred. Circuit number 2 of electrical panel 2VBS*PNLA106 was officially de-energized at 1100 hours and verified as de-energized at 1123 hours on November 23, 1986. The operator who performed this particular markup has been repeatedly questioned about the possibility that he made a mistake and de-energized the wrong circuit breaker while performing the markup. The operator has confirmed that he did not de-energize the wrong circuit breaker nor did he mistakenly bump or manipulate any other devices within 2VBS*PNLA106. Thus the suspected probable cause could not be substantiated.

The second suspected probable cause was analyzed to be the interruption of power through one of two particular fuses (K14P or K14K) in control room panel 2CEC*PNL611A. At the time of the event two other fuses in 2CEC*PNL611A (F3B and F3P) were in the process of being pulled as part of the same markup as above which was written to satisfy the pre-test conditions required to test an MSIV actuator. Fuses F3B and F3P are located in close proximity to fuses F14K and F14P in panel 2CEC*PNL611A. Interruption of power through either fuse F14K or F14P would have caused the one-quarter core scram which occurred. Conversations with the operator who was performing the markup on fuses F3B and F3P verified that the proper fuses were indeed pulled. Attempts to duplicate the event by purposely disturbing all of the fuses involved proved unsuccessful. A Work Request was initiated to trouble shoot fuses F14P and F14K for loose or worn fuse contacts or any other condition which might cause spurious interruption of power through either fuse. The Electrical Department performed the trouble shooting and found that the suspected components were in perfect operating condition and that no corrective action was required. Thus, the cause of the event could not be positively identified as the interruption of power through fuses F14K or F14P.

III. ANALYSIS OF EVENT

Since the reactor was in shutdown mode with all rods inserted at the time of the event, no rod movement occurred and there were no safety consequences. If an event of this nature occurred during power operation one quarter of the control rods would have inserted upon loss of power to the channel A group 2 scram solenoid valves. Insertion of rods in this manner could potentially lead to operation in a condition significantly outside the established rod pattern but would not inhibit the operators ability to scram all the rods and achieve safe shutdown. Operators are aware that they should scram the reactor when an event results in rod positions significantly different from the established rod pattern.

IV. CORRECTIVE ACTION

A training modification request will be issued to assure that operators will be trained to respond properly should a situation such as this occur during power operation. The operating procedures have been revised to reflect the operator actions to be taken in an event when the rod positions differ significantly from the established rod pattern, which will include instructions for immediate manual scram.

Completion of Supervisory Procedure S-SUP-1, "Root Cause Evaluation Program" and the follow-up K-T Analysis did not identify any additional corrective actions that needed to be initiated.

V. ADDITIONAL INFORMATION

No previous similar events have occurred at Nine Mile Point Unit 2.

Identification of Components Referred to in this LER

Component	IEEE 803 EIIS Funct	IEEE 805 System ID
Control Rod Drive Pumps	P	AA
Scram Pilot Solenoid Valves	FSV	AA
SDV Drain Valves	ISV	AA
SDV Vent Valve	VTV	AA
Scram Air Header Low Pressure Alarm	PA	AA
Light Indicator	IL	AA