

# CATEGORY

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9704080123      DOC. DATE: 97/03/27      NOTARIZED: NO      DOCKET #  
 FACIL: 50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moho      05000410  
 AUTH. NAME      AUTHOR AFFILIATION  
 DEAN, R.J.      Niagara Mohawk Power Corp.  
 CONWAY, J.T.      Niagara Mohawk Power Corp.  
 RECIP. NAME      RECIPIENT AFFILIATION

SUBJECT: LER 96-015-01: on 961217, app R fire induced hot shorts in remote shutdown sys valves occurred. Caused by design inadequacy. SDC valves deenergized in closed position. W/ 970327 ltr.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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NIAGARA MOHAWK

GENERATION  
BUSINESS GROUP

NINE MILE POINT NUCLEAR STATION/LAKE ROAD, P.O. BOX 63, LYCOMING, NEW YORK 13093

March 27, 1997  
NMP2L 1697

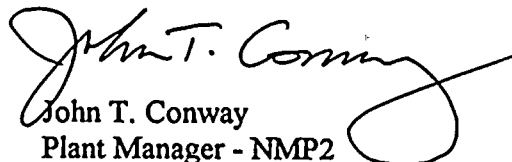
U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

RE: LER 96-15, Supplement 1  
Docket No. 50-410

Gentlemen:

In accordance with 10CFR50.73(a)(2)(ii), we are submitting LER 96-15, Supplement 1, "Appendix R Fire Induced Hot Shorts in Remote Shutdown System Valves." In my February 27, 1997 letter, I stated that additional valves were identified as being potentially susceptible to mechanical damage from hot shorts. After further review, it has been determined that the susceptibility of these additional valves does not constitute a reportable condition, therefore, this supplement has only been revised to include the results of our root cause analysis and associated corrective actions.

Very truly yours,

  
John T. Conway  
Plant Manager - NMP2

JTC/GJG/kap  
Enclosure

xc: Mr. H. J. Miller, Regional Administrator  
Mr. B. S. Norris, Senior Resident Inspector

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LICENSEE EVENT REPORT (LER)

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)

5 0 0 0 4 1 0

PAGE (3)

1 OF 4

TITLE (4)

Appendix R Fire Induced Hot Shorts In Remote Shutdown System Valves

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)	
12	17	96	96	015	01	03	27	97	N/A	0 5 0 0 0	
									N/A	0 5 0 0 0	

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	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<i>(Specify In Abstract below and In Text, NRC Form 366A)</i>
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

Raymond J. Dean, Manager Engineering NMP2

TELEPHONE NUMBER

(315) 349-4240

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 December 17, 1996, at approximately 1600 hours, with Nine Mile Point Unit 2 (NMP2) in the "RUN" mode and reactor thermal power at approximately 100 percent, NMP2 management determined that a potential fire induced hot short in the control circuits of three residual heat removal system (RHS) valves may have rendered the valves unable to perform their intended Appendix R cold shutdown functions. On January 15, 1997, Reactor Core Isolation Cooling (RCIC) valves were also identified as being subjected to similar conditions. This condition existed for the time period from initial plant operation through January 15, 1997.

A postulated hot short, as described in Information Notice 92-18, "Potential for Loss of Remote Shutdown Capability During a Control Room Fire," may effectively bypass a motor-operated valve's (MOV) torque and control switches, causing spurious operation. This identified condition postulates valve maloperation resulting in valve damage. This was not previously evaluated because postulation of valve damage was considered to be beyond the Licensing and design basis for NMP2 during a control room fire.

The immediate corrective action for the subject RHS valves was to administratively control the MOV power supply circuit breakers open, to preclude spurious operation of the valves, and consequential mechanical failure. On January 15, 1997, LCO 3.3.7.4 was entered until an analytical basis was confirmed for an alternate shutdown train for scenarios which render the RCIC system unavailable. A root cause evaluation has been performed and the results indicate that the plant design organizations responsible for the initial plant design failed to fully evaluate hot short vulnerability of safe shutdown valves.



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LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATIONESTIMATED 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)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 2	05000410	96	- 15	- 01	02 OF 04

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

**I. DESCRIPTION OF EVENT**

On December 17, 1996, at 1600 hours, with Nine Mile Point Unit 2 (NMP2) in the "RUN" mode and reactor thermal power at approximately 100 percent, NMP2 management determined that a potential fire induced hot short in the control circuits of three shutdown cooling (SDC) associated valves (2RHS\*MOV112, 2RHS\*MOV142, and 2RHS\*MOV149) could have rendered the valves unable to perform their intended Appendix R cold shutdown functions. In addition, on January 15, 1997, it was determined that Reactor Core Isolation Cooling (RCIC) valves (2ICS\*MOV121, 2ICS\*MOV124, 2ICS\*MOV126, 2ICS\*MOV128, 2ICS\*MOV149, and 2ICS\*MOV164) could have been subjected to a similar failure. This condition existed for the time period from the plant initial operation to January 15, 1997.

NRC Information Notice 92-18 (Potential for Loss of Remote Shutdown Capability During a Control Room Fire) alerts licensees of conditions found at several reactors that could result in a loss of capability to maintain the reactor in a safe shutdown condition in the unlikely event that a control room fire forced reactor operators to evacuate the control room. The information notice gives examples of plants where hot shorts were postulated which, in the absence of thermal overload protection, could have caused valve damage before the operator shifted control of the valves to the remote/alternate shutdown panels at those facilities. The information notice provides information with regard to the design which would preclude these types of malfunctions.

Niagara Mohawk's initial evaluation of NRC Information Notice 92-18 excluded the evaluation of remote shutdown system associated valves because the NMP2 design was believed to be in compliance with the requirements of 10CFR50 Appendix R as interpreted in Generic Letter (GL) 86-10, Implementation of Fire Protection Requirements. The NMP2 design basis assumes valve functional failure (i.e., valve repositioning) but not irrecoverable valve damage. As described in the NMP2 SAR, the worst case assumption is spurious actuation of one main steam system (MSS) Safety Relief Valve (SRV) opening during the control room fire until closed by the operator from the remote shutdown panel (RSP) rooms. NMPC initially believed that the failure of any of the remote shutdown valves was bounded by this worst case single failure, in part because some sections of the NMP2 SAR appear to take credit for other success paths. However, upon further review, it appears that the alternate shutdown trains have not been fully evaluated and they are not adequately reflected in current applicable implementing procedures. Therefore, if one of the subject MOVs were previously damaged during a control room fire, achievement of safe shutdown as described in Section 9B.8.2 of the USAR may not have been fully assured.

**II. CAUSE OF EVENT**

The cause of this event has been determined to be that the architect/engineering firm that designed the plant and the NMPC design organization that accepted the design failed to fully evaluate hot short vulnerability of safe shutdown valves. Subsequently, when NMPC reviewed IN 92-18 for applicability to NMP2, a mind set existed that the information contained in the IN was outside the design basis of the plant.





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 20535, 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)  05000410	LER NUMBER (6)			PAGE (3)  03 OF 04
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		96	- 15	- 01	

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

**III. ANALYSIS OF EVENT**

This condition is reportable in accordance with 10CFR50.73(a)(2)(ii), "any event or condition that resulted in a condition of the nuclear power plant, including its principle safety barriers, being seriously degraded, or that resulted in the nuclear plant being: (B) in a condition that was outside the design basis of the plant."

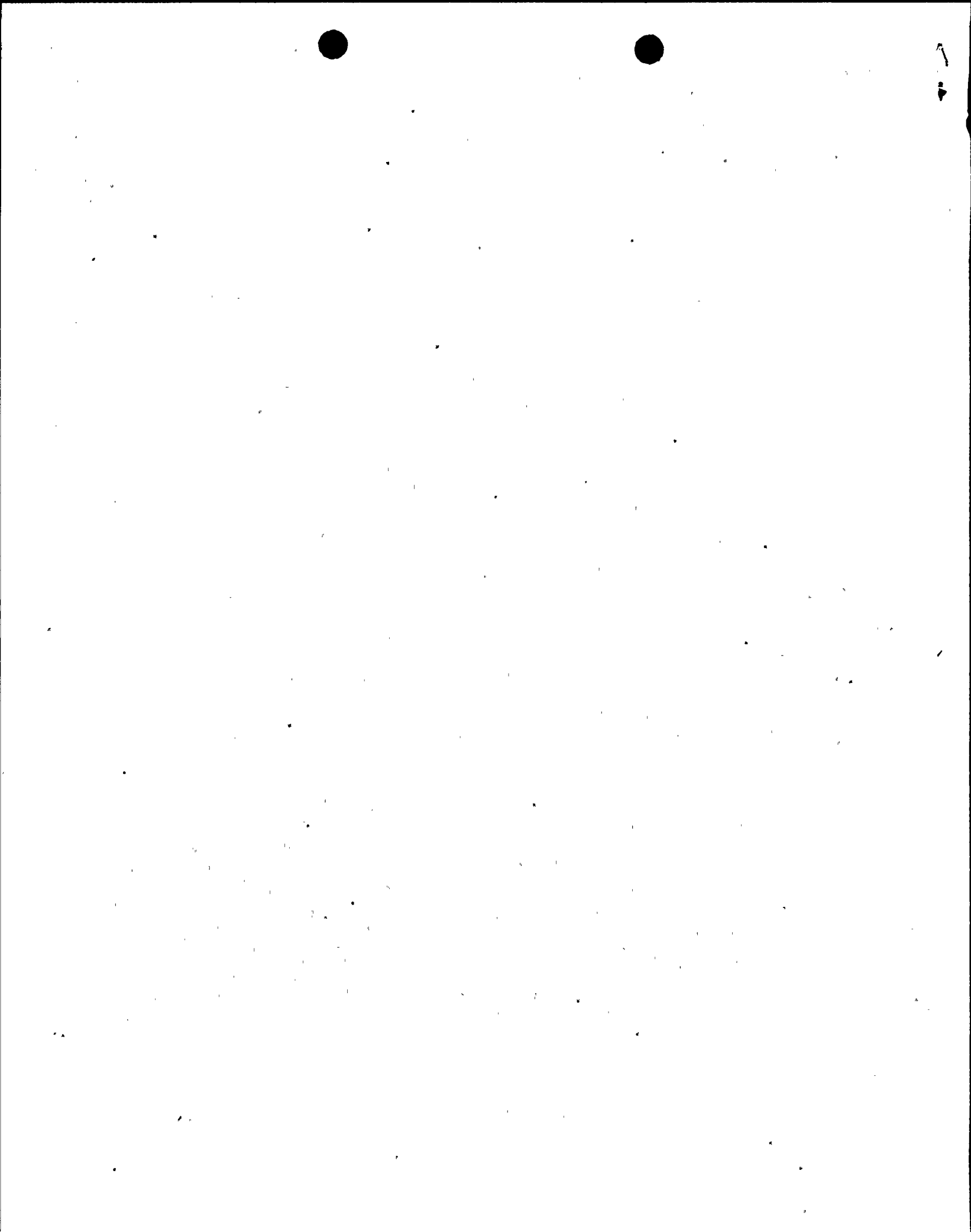
The original Safe Shutdown Analysis (SSA) for a control room fire evaluated the control circuits of equipment needed to achieve safe shutdown for hot short vulnerability and transferred the controls of this equipment from the control room to the Remote Shutdown Panel (RSP) rooms by operating the disconnect switches (2CES\*PNL415, 416, and 417) and transfer switches in RSP 2CES\*PNL405. Operation of the disconnect and transfer switches isolate the control room completely. Special Operating Procedure N2-SOP-78, "Control Room Evacuation" and Operating Procedure N2-OP-78, "Remote Shutdown System" are entered in the unlikely event of a control room fire to achieve and maintain safe shutdown of the reactor.

The SSA postulated a single spurious actuation causing maloperation of one component in addition to the loss of automatic signals for components controlled from the control room. The currently postulated worst case spurious actuation for a control room fire is one MSS SRV remaining open until corrected by operator action from the RSP rooms. The SSA, however, may not have considered mechanical damage due to spurious operation since GL 86-10 which provides guidance on implementation of the 10CFR50 Appendix R requirements did not specifically discuss consideration of irrecoverable damages to a valve due to a hot short created by a control room fire.

In an unlikely event of a control room fire and coincident hot short, it is anticipated that the remote shutdown system valves could have experienced stalled motor running conditions. This stalled condition will not be prevented by the torque switch and thermal overload protection because these features are bypassed. Because the stall thrust for the subject valves exceed its weak link rating during motor stalled conditions, the valve may be damaged beyond recovery for remote manual actions. Thus the valves could be disabled preventing achievement of safe shutdown by its associated safe shutdown train as described in the NMP2 USAR. Alternative trains existed which could be used to achieve safe shutdown but the appropriate supporting analysis did not exist to support those system alignments. During the period in which this condition existed, it is believed the reactor could have been shutdown and maintained in a safe condition in the event of a fire utilizing existing controls at the RSP despite the fact that specific procedural guidance was not in place. Therefore, it is believed that there were no adverse safety consequences as a result of this condition.

**IV. CORRECTIVE ACTIONS**

- SDC valves 2RHS\*MOV112, 2RHS\*MOV142, and 2RHS\*MOV149 have been de-energized in the closed position and their power supply circuit breakers administratively controlled open during normal



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 30.0 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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Nine Mile Point Unit 2	05000410	96	- 15	- 01	04 OF 04

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

**IV. CORRECTIVE ACTIONS (Cont'd)**

plant operating conditions, to preclude spurious operation due to a control room fire. This was performed in accordance with 10CFR50.59.

2. On January 15, 1997, LCO 3.3.7.4 was entered, due to the potential that the remote shutdown panels may not provide for a safe shutdown path without a functional RCIC system.
3. LCO 3.3.7.4 was exited on January 22, 1997, after completion of an analysis for an alternate success path using SRVs in conjunction with the RHS system and implementation of this alternate success path.
4. Applicable procedures have been issued to incorporate the use of SRVs and the RHS system and station operators have been appropriately trained.
5. NMPC has completed a review of Appendix R safe shutdown valves required for remote shutdown. This review has determined that although other valves are susceptible to the postulated damage, the achievement of safe shutdown in accordance with the requirements of 10CFR50, Appendix R and as described in NMP2 USAR Appendix 9B is not adversely affected.
6. The Nine Mile Point engineering support staff will be trained on this LER by September 30, 1997, to preclude improper evaluation of NRC Information Notices in the future.

**V. ADDITIONAL INFORMATION**

- A. Failed components: none.
- B. Previous similar events: none
- C. Identification of components referred to in this LER:

COMPONENT	IEEE 803 FUNCTION	IEEE 805 SYSTEM ID
Valves	ISV	BO
Valves	ISV	BN
Valves	ISV	BI

