

**CATEGORY 1**

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ACCESSION NBR:9707240111    DOC.DATE: 97/07/14    NOTARIZED: NO    DOCKET #  
 FACIL:50-220 Nine Mile Point Nuclear Station, Unit 1, Niagara Powe    05000220  
 AUTH.NAME    AUTHOR AFFILIATION  
 RANDALL,R.G.    Niagara Mohawk Power Corp.  
 ABBOTT,R.B.    Niagara Mohawk Power Corp.  
 RECIP.NAME    RECIPIENT AFFILIATION

SUBJECT: LER 97-005-00:on 970612,determined that pressure locking condition could occur during surveillance testing core spray valves.Caused by original design deficiency.Modified valves to preclude pressure locking.W/970714 ltr.

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NIAGARA MOHAWK  
GENERATION  
BUSINESS GROUP

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

July 14, 1997  
NMP1L 1234

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

RE: LER 97-005  
Docket No. 50-220

Gentlemen:

In accordance with 10 CFR 50.73(a)(2)(ii)(B), we are submitting LER 97-005, "Potential Pressure Locking of Core Spray Valves During Surveillance Testing."

Very truly yours,

Richard B. Abbott  
Plant Manager - NMP1

RBA/GJG/cmk  
Enclosure

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



9707240111 970714  
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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 1	DOCKET NUMBER (2) 05000220	PAGE (3) 1 OF 4
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TITLE (4)  
Potential Pressure Locking of Core Spray Valves During Surveillance Testing

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)	
06	12	97	97	005	00	07	14	97	N/A	05000	
									N/A	05000	

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)	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(e)	<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(e)(1)	<input checked="" 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(e)(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 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 R. G. Randall - Manager Engineering NMP1	TELEPHONE NUMBER (315) 349-2445
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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)

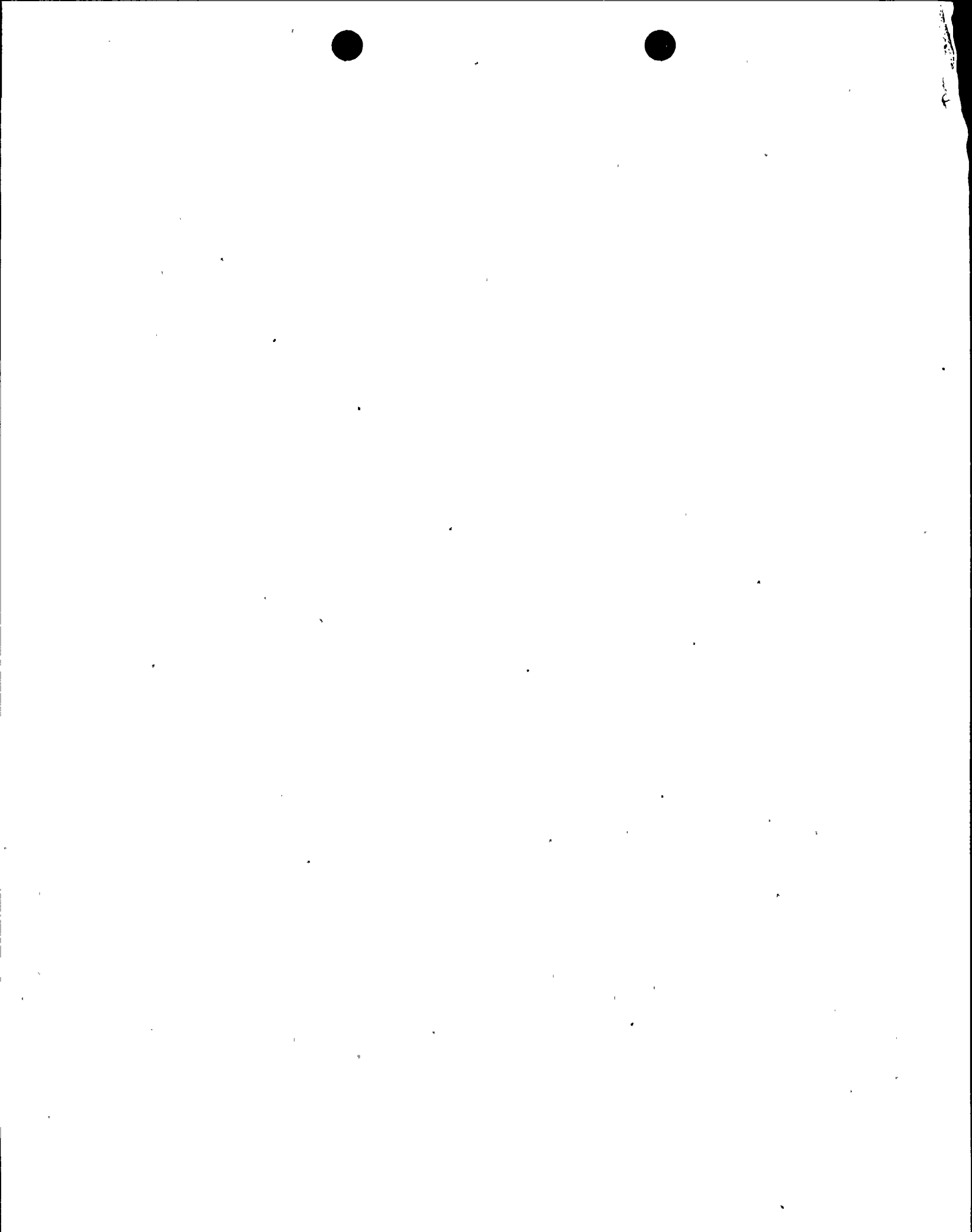
MONTH	DAY	YEAR

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

On June 12, 1997, Niagara Mohawk Power Corporation (NMPC) determined that during surveillance testing of the core spray system containment isolation valves, a pressure locking condition could occur which would prevent the core spray system from performing its safety function. This discrepancy was discovered during NMPC's review of design documents for closure of the Nine Mile Point Unit 1 (NMP1) Generic Letter (GL) 89-10 Program.

This reportable condition was caused by an original design deficiency in that the design did not consider this failure mode. Additionally, previous evaluations of pressure locking susceptibility performed in response to NRC Information Notice (IN) 92-26, "Pressure Locking of Motor Operated Flexible Wedge Gate Valves" and GL-95-07, "Pressure Locking and Thermal Binding of Safety Related Power Operated Gate Valves," failed to reconcile this design deficiency.

Corrective actions included modification of the valves to preclude pressure locking.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 1	05000220	97	05	00	02 OF 04

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

## I. DESCRIPTION OF EVENT

On June 12, 1997, Niagara Mohawk Power Corporation (NMPC) determined that the Nine Mile Point Unit 1 (NMP1) core spray isolation valves (IV 40-02 and 40-12) had not been properly analyzed for pressure locking. The original design of NMP1 did not consider bonnet pressurization of motor operated valves (MOVs). In 1994, NMPC performed evaluations of MOVs in response to NRC Information Notice (IN) 92-26, "Pressure Locking of Motor Operated Flexible Wedge Gate Valves." The evaluation of core spray isolation valves IV 40-02 and IV 40-12 only considered valve bonnet pressurization due to pump testing (i.e. approximately 365 psig), and failed to consider the potential pressurization to reactor pressure when the inboard isolation valves (IV 40-01, 40-09, 40-10, and 40-11) are opened for stroke time testing.

On February 13, 1996, NMPC responded to Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety Related Power Operated Gate Valves." NMPC did not properly verify the adequacy of the previous evaluation performed for IN 92-26 for the core spray valves IV 40-02 and IV 40-12 in preparing that response. Subsequently, on June 20, 1996, in response to an NRC request for additional information, NMPC stated that valves which are normally open, but are closed for testing and must re-open to perform their design function in the event of an initiation signal, had been evaluated. The faulty assumptions regarding pressure locking susceptibility utilized in the 1994 evaluations had not been questioned or otherwise revisited.

Since the 10CFR50 Appendix K analysis for NMP1 assumes that both trains of core spray provide injection in response to a loss of coolant accident (LOCA), a pressure locking failure mode on one train would prevent the core spray system from responding to a design basis LOCA as analyzed in the NMP1 UFSAR.

## II. CAUSE OF EVENT

The cause of this reportable condition is that the original design of NMP1 did not consider pressure locking of MOVs as a potential failure mode.

In 1994, NMPC performed evaluations of pressure locking susceptibility, in response to IN 92-26. The individuals who prepared, reviewed and approved those evaluations failed to recognize that the quarterly surveillance test on the inboard isolation valves had the potential to subject the outboard isolation valve bonnets to reactor pressure, and that if a LOCA occurred during this brief period, the outboard valves could become pressure locked. Therefore, the cause of this missed opportunity is inadequate technical evaluation of worst case conditions.

There were two additional missed opportunities to identify this discrepancy, the first was during the preparation of NMPC's initial response to GL 95-07 and the second was when NMPC responded to the associated NRC request for additional information. As described above the assumptions regarding worst case conditions for the 1994 evaluations were not questioned or revisited during the responses to GL 95-07.





LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATIONESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION  
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

**III. ANALYSIS OF EVENT**

This event is reportable in accordance with 10CFR50.73(a)(2)(v), "Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to: (D) mitigate the consequences of an accident". Although historically surveillance testing of the inboard isolation valves had been performed within Technical Specification 3.1.4.d action statement time limits (however, LCO entry was not acknowledged), the identification of potential pressure locking of the outboard isolation valves is a condition which could have prevented the core spray system from performing its function, if the system had received an initiation signal during the surveillance testing.

The NMPC Probabilistic Risk Assessment Group has evaluated the risk significance of performance of the inboard isolation valve stroke time testing with the outboard isolation valves closed. Based upon the assumption that under these conditions the outboard valves would fail to open if a loss of coolant accident occurred during performance of this testing due to pressure locking, the core damage frequency (CDF) increases from  $5.5E-6$  to  $3.9E-5$  per year based on the IPE model, and from  $9.9E-5$  to  $7.0E-4$  per year based on considering IPEEE insights. This increase is the same as the increase caused by taking an Emergency Diesel Generator (EDG) out of service which, per NMP1 Technical Specifications, is allowed for up to 7 days. In addition, since the outboard valves are closed for less than 5 minutes per test, the overall increase in risk (i.e., core damage probability (CDP)), is  $5E-9$  for each year of operation based upon the IPE model and  $9E-8$  based upon the IPEEE model, which is well below  $1E-6$  and is therefore considered low-risk significant.

In addition, the NMP1 UFSAR Chapter XV, Section C.2.4.4 discusses a coping analysis performed for a recirculation line break and resultant core spray line damage as a result of pipe whip. This damage could result in the core spray system being reduced to one sparger. To evaluate pipe whip, SAFRR/GESTR nominal calculations have been performed which demonstrated that for single core spray sparger injection 10CFR50.46 limits are satisfied.

Therefore, the consequences of performing the required surveillance testing in the past were minimal.

**IV. CORRECTIVE ACTIONS**

1. The design deficiency was resolved when Isolation Valves 40-02 and 40-12 were modified during forced outage 97-04 in June 1997 to prevent pressure locking.



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TEXT CONTINUATION

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IV. CORRECTIVE ACTIONS (Cont'd)

2. The NMPC personnel responsible for preparing, reviewing, approving, and accepting the evaluations have been counseled to reinforce the following:
  - a. Evaluations of this type require thorough questioning and consideration of all possible modes of operation including testing of any frequency/duration.
  - b. Evaluation of new industry information should not assume that previous evaluations are correct. In such cases previous evaluations should be validated for correctness.
3. The lessons learned from this event will be shared with other Nuclear Engineering personnel during standdown meetings by August 31, 1997. Additionally, the event will be reviewed during Technical Staff Continued Training by December 31, 1997.
4. The response to GL 95-07 will be revised and resubmitted by August 31, 1997.
5. All pressure locking evaluations have been reviewed during the closure of the GL 89-10 program. The review included reverification of each valve's safety related function with the current safety class determination and reverification of the surveillance and test modes that could subject the valves to pressure locking conditions. This evaluation identified four emergency cooling (EC) valves which had also not previously been properly evaluated for pressure locking during surveillance testing. When evaluated based upon test data from 1994, these valves would not have become pressure locked. However, based upon 1997 test data for unwedging forces, the valves could become pressure locked. As a result of the evaluations of 1997 test data for these valves, the requirement to enter the appropriate Technical Specification 3.1.3 action statement whenever these valves are closed during conditions when ECs are required has been imposed. No other discrepancies were identified.

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
IV 40-02 and IV 40-12	ISV	BM

