

# CATEGORY 1

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9803230118 DOC.DATE: 98/03/13 NOTARIZED: NO DOCKET #  
FACIL:50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410  
AUTH.NAME AUTHOR AFFILIATION  
WARD,K.D. Niagara Mohawk Power Corp.  
DAHLBERG,K.A. Niagara Mohawk Power Corp.  
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 97-006-01:on 970804,plant shutdown due to rising  
unidentified leakage was noted.Caused by failed flexible  
hose connection in RRS.Mod was installed which eliminated  
flexible connection.W/980313 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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	AEOD/SPD/RRAB	1 1	FILE CENTER	1 1
	NRR/DE/ECGB	1 1	NRR/DE/EELB	1 1
	NRR/DE/EMEB	1 1	NRR/DRCH/HHFB	1 1
	NRR/DRCH/HICB	1 1	NRR/DRCH/HOLB	1 1
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	NRR/DSSA/SPLB	1 1	NRR/DSSA/SRXB	1 1
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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 13, 1998  
NMP2L 1762

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

RE: Docket No. 50-410  
LER 97-06, Supplement 1

Gentlemen:

In accordance with 10CFR50.73 (a)(2)(i), we are submitting LER 97-06, Supplement 1,  
"Plant Shutdown due to Rising Unidentified Leakage".

Very truly yours,

Kim A. Dahlberg  
Plant Manager - NMP2

KAD/GJG/cm  
Attachment

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

9803230118 980313  
PDR ADOCK 05000410  
S PDR



*Handwritten initials/signature*



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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 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

PAGE (3)

1 OF 4

TITLE (4)

Plant Shutdown due to Rising Unidentified Leakage

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)
08	04	97	97	006	01				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)

95

- 20.402(b)
- 20.405(a)(1)(i)
- 20.405(a)(1)(ii)
- 20.405(a)(1)(iii)
- 20.405(a)(1)(iv)
- 20.405(a)(1)(v)

- 20.405(c)
- 50.36(c)(1)
- 50.36(c)(2)
- 50.73(a)(2)(i)
- 50.73(a)(2)(ii)
- 50.73(a)(2)(iii)

- 50.73(a)(2)(iv)
- 50.73(a)(2)(v)
- 50.73(a)(2)(vii)
- 50.73(a)(2)(viii)(A)
- 50.73(a)(2)(viii)(B)
- 50.73(a)(2)(x)

- 73.71(b)
- 73.71(c)
- OTHER

(Specify in Abstract below and in Text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

NAME

K. D. Ward - Technical Support Manager NMP2

TELEPHONE NUMBER

(315) 349-1043

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs
B	AD	PSX	M270	No					

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 August 4, 1997, while operating at 95 percent power, Nine Mile Point Unit 2 (NMP2) experienced a rapid rise in unidentified drywell leakage. Operators immediately commenced an orderly shutdown.

The cause of the excessive leakage was determined to be a failed flexible hose connection in the Reactor Recirculation System. The cause of the failed flexible hose connection has been determined to be Intergranular Stress Corrosion Cracking (IGSCC).

A modification was installed which eliminated the flexible connection. The remaining 26 hoses susceptible to IGSCC will be removed and capped, or replaced with stainless steel tubing during refueling outage 6.



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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (5)				PAGE (3)
Nine Mile Point Unit 2	05000410	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	02 OF 04	
		97	- 06	- 01		

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

**I. DESCRIPTION OF EVENT**

On August 4, 1997, at 0557 hours, while operating at 95 percent power, operators of Nine Mile Point Unit 2 (NMP2) noted a rise in drywell pressure with an unidentified leakage rate of 7.2 gallon per minute (gpm). At 0615 hours, reactor shutdown was initiated and at approximately 0715 hours the reactor was placed in hot shutdown. At 0728 hours, an Unusual Event was declared after the drywell unidentified leak rate increased above 10 gpm.

Subsequently, the reactor was placed in cold shutdown, and the drywell entered to determine the cause of the unidentified leakage. On August 4, 1997, flex hose (2RCS\*HOSE40) was found to be leaking. This flex hose is a 3/4 inch drain line from the Reactor Recirculation System flow control valve 2RCS\*HYV17B. The leak was located at the end of the flexible portion of the hose farthest from 2RCS\*HYV17B adjacent to the end ferrule.

**II. CAUSE OF EVENT**

The cause of the excessive leakage was determined to be a failed flexible hose connection in the Reactor Recirculation System. The failed flex hose (2RCS\*HOSE40) and six new flex hoses have been metallurgically evaluated. The results of those evaluations indicated that the primary cause of the through-wall failure of the flex hose was Intergranular Stress Corrosion Cracking (IGSCC). The IGSCC mechanism initiated when the flex hose material was subjected to temperatures and pressures of the reactor coolant system environment. The variations in the supporting conditions such as minor fabrication flaws, installation stress and stress associated with thermal movement will change the absolute stress and possibly vary the IGSCC growth rate, however, the underlying failure mechanism that drives the cracks through-wall is IGSCC.

**III. ANALYSIS OF EVENT**

This event is reportable in accordance with 10CFR50.73 (a)(2)(i)(A), "The completion of any nuclear plant shutdown required by the plant's Technical Specifications." NMP2 Technical Specifications (TS) 3.4.3.2.b states Reactor Coolant System (RCS) leakage shall be limited to 5 gallons per minute (gpm) UNIDENTIFIED LEAKAGE and TS 3.4.3.2.e states that the rise in Reactor Coolant System (RCS) leakage shall be limited to 2 gpm in unidentified leakage within any 24 hour period in Mode 1. TS 3.4.3.2 Action Statements "b" and "f" both require "... or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours," if it is not IDENTIFIED or reduced.



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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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 2	05000410	97	06	01	03 OF 04

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

### III. ANALYSIS OF EVENT (cont'd)

Since the failed hose is a 3/4 inch inside diameter, the failure is similar to the Instrument Line Pipe Break accident discussed in the NMP2 USAR Section 15.6.2. The effects described in Section 15.6.2 indicate that this type of failure would not result in fuel damage or core uncovering. The radiological consequences of this type of failure are also comparable to those of an instrument line failure, which are significantly below 10CFR100 limits. Control room doses for such an event are a small fraction of the GDC 19 limit.

The only dose associated with this event was that which was received during the repair. This type of failure is within the spectrum considered in ECCS performance calculations described in USAR Section 6.3.3. For this event, there were no ECCS Systems initiations.

In summary, due to the rapid response of operators and the minimal impact of a small leak event such as the instrument line discussed above, the consequences of this event were minimal. There was no adverse impact on public or station personnel.

### IV. CORRECTIVE ACTIONS

1. Flex hose 2RCS\*HOSE40 has been removed. The valve body connection has been plugged and pipe connection sealed with a welded end cap.
2. Accessible flex hoses in the primary containment have been inspected for evidence of bulging, kinking or braid deterioration. Deficiencies noted were corrected and/or evaluated as acceptable prior to restart of the plant.
3. An evaluation was completed on the affect of water spray from 2RCS\*HOSE40 on adjacent equipment with results being satisfactory.
4. NMP2 has approximately 267 flex hoses installed in various systems. From this population, 26 hoses were identified as potentially susceptible to IGSCC. These 26 hoses will be removed and capped, or replaced with stainless steel tubing during refueling outage 6. Based upon Section III, Analysis of Event, and assessment of these 26 hoses, NMP2 has concluded that continued operation until refueling outage 6 is warranted.



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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 2	05000410	97	06	01	04 OF 04

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

V. **ADDITIONAL INFORMATION**

A. Failed component description:

Component description : Flexible Metallic Hose 3/4 Inch Stainless Steel  
 Component Manuf. No. : 2RCS\*HOSE40  
 Manufacturer : Metal Bellows Corporation  
 Material : SA 312 TP316L Schedule 80/Inconel 625

B. Previous similar events: NMP2 LER 91-006, Supplement 1, "Unusual Event Classification and Reactor Shutdown due to an Unisolable Reactor Coolant System Pressure Boundary Leak," describes the failure of 2RCS\*HOSE44 which is a similar component to that being reported in this LER. The results of the metallurgical evaluation performed on 2RCS\*HOSE44 and reported in Supplement 1 concluded that localized contamination of the weld seam produced a region of questionable material properties which, combined with the existence of elevated hardness, reduced the pitting resistance of the seam. Cracking probably initiated at a shallow pit in the welded seam and propagated by fatigue into the adjacent wrought metal. NMP2 has reevaluated the root cause reported in NMP2 LER 91-006, Supplement 1 in conjunction with the root cause evaluation of 2RCS\*HOSE40. The cause identified in LER 91-006, Supplement 1 was localized contamination, combined with elevated hardness and reduced pitting resistance of the seam weld. Subsequent to LER 91-006, Supplement 1, NMP2 received a report from Metal Bellows, which identified that physical damage (kinking) caused the failure of 2RCS\*HOSE44. In retrospect, the service conditions for 2RCS\*HOSE44 were similar to 2RCS\*HOSE40. Therefore, the IGSCC mechanism acting on the mechanically damaged area was likely to have contributed to the early failure of 2RCS\*HOSE44.

C. Identification of components referred to in this LER:

COMPONENT	IEEE 803 FUNCTION	IEEE 805 SYSTEM ID
Reactor Recirculation System (RCS)	NA	AD
2RCS*HOSE40	PSX	AD



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