

REGULATOR INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9701210455 DOC.DATE: 97/01/13 NOTARIZED: NO DOCKET #
 FACIL:50-220 Nine Mile Point Nuclear Station, Unit 1, Niagara Powe 05000220
 AUTH.NAME AUTHOR AFFILIATION
 YAEGER,W. Niagara Mohawk Power Corp.
 RADEMACHER,N.L. Niagara Mohawk Power Corp.
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 96-013-00:on 961213,potential overpressurization of
 containment penetrations occurred due to thermal expansion.
 Administrative controls have been implemented to assure
 penetrations X139 & X238 drained.W/970113 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

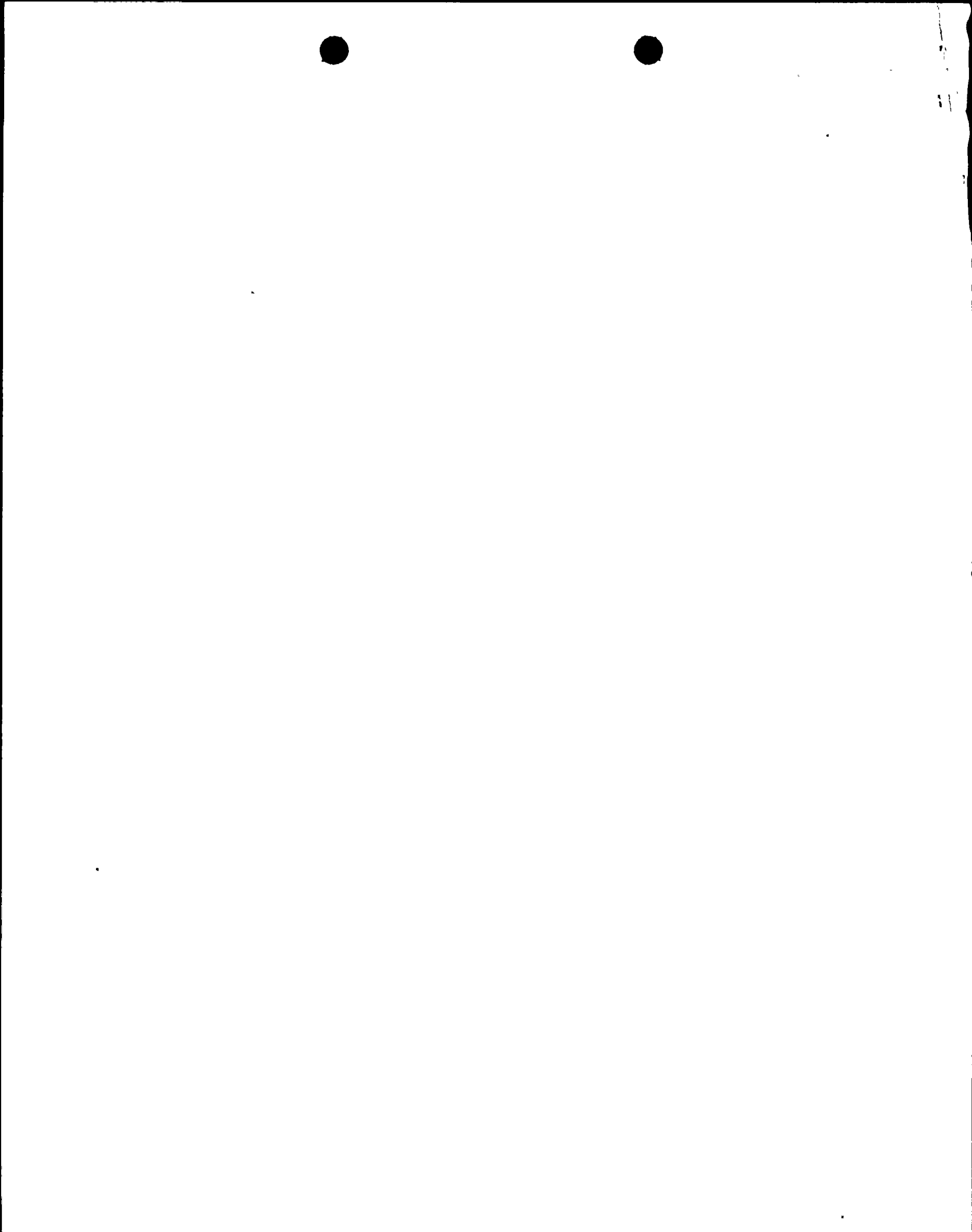
NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTR ENCL
	PD1-1 PD	1 1	HOOD,D	1 1
INTERNAL:	ACRS	1 1	AEOD/SPD/RAB	2 2
	AEOD/SPD/RRAB	2 2	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
	NRR/DRCH/HQMB	1 1	NRR/DRPM/PECB	1 1
	NRR/DSSA/SPLB	1 1	NRR/DSSA/SRXB	1 1
	RES/DET/EIB	1 1	RGN1 FILE 01	1 1
EXTERNAL:	L ST LOBBY WARD	1 1	LITCO BRYCE,J H	1 1
	NOAC MURPHY,G.A	1 1	NOAC POORE,W.	1 1
	NRC PDR	1 1	NUDOCS FULL TXT	1 1

C
A
T
E
G
O
R
Y
1
D
O
C
U
M
E
N
T

NOTE TO ALL "RIDS" RECIPIENTS:
 PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK,
 ROOM OWFN 5D-5(EXT. 415-2083) TO ELIMINATE YOUR NAME FROM
 DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED
 TOTAL NUMBER OF COPIES REQUIRED: LTR 26 ENCL 26





NIAGARA MOHAWK

GENERATION
BUSINESS GROUP

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

January 13, 1997
NMP1L 1172

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

RE: LER 96-13
Docket No. 50-220

Gentlemen:

In accordance with 10CFR50.73(a)(2)(ii), we are submitting LER 96-13, "Potential Overpressurization of Containment Penetrations Due to Thermal Expansion."

Very truly yours,

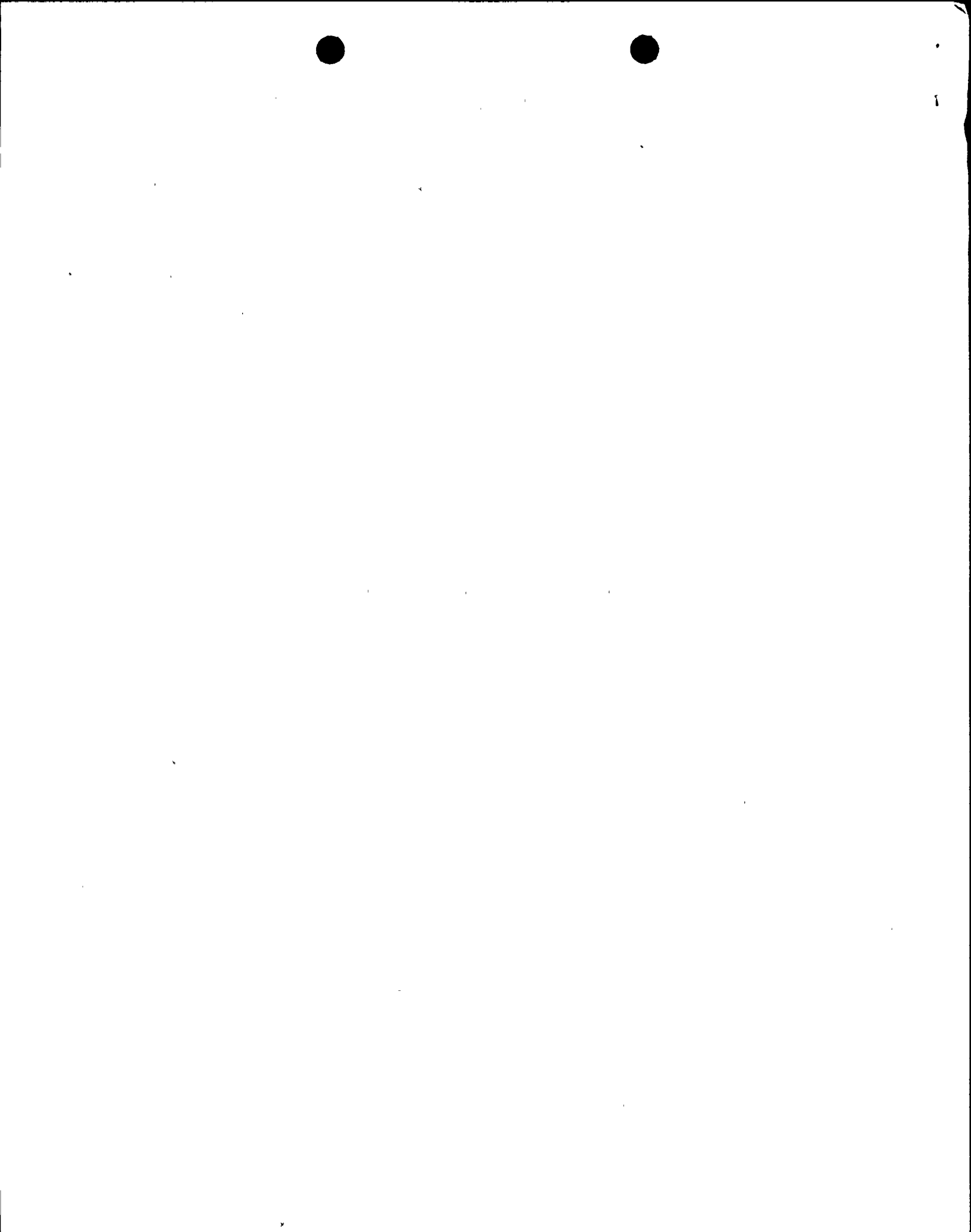
Norman L. Rademacher
Plant Manager - NMP1

NLR/GJG/kap
Enclosure

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

IE22/1

9701210455 970113
PDR ADDCK 05000220
S PDR



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)

5 0 0 0 2 2 0

PAGE (3)

1 OF 6

TITLE (4)

Potential Overpressurization of Containment Penetrations Due to Thermal Expansion

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	13	96	96	013	00	01	13	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

Mr. William Yaeger, Manager Engineering NMP1

TELEPHONE NUMBER

(315) 349-7834

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)

Between December 13, 1996 and December 20, 1996, Niagara Mohawk identified six penetrations at Nine Mile Point Unit 1 (NMP1) which could have been overpressurized during post-accident (large break LOCA and LOOP) conditions. This was discovered during Niagara Mohawk's evaluations in accordance with GL 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Bases Accident Conditions."

The cause of this event is that the piping code of record used during the original design of NMP1 did not explicitly require analysis for thermal expansion due to entrapped fluids for accidents. The extent to which heatup and pressurization of penetrations was considered during the original design is not known. There was a lack of clear design criteria for NMP1 for the specific heat sources that needed to be analyzed. Thus, the apparent cause of this event is an original design error.

Operability determinations have been performed on the affected penetrations to verify operability in accordance with station procedures and guidance provided in GL 91-18 "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability." Longer term corrective actions are being considered and will be reported in accordance with GL 96-06.



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)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 1	05000220	96	13	00	02 OF 06

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

I. DESCRIPTION OF EVENT

In October 1996, Niagara Mohawk began an evaluation of NMP1 containment penetrations in accordance with GL 96-06, "Assurance of Equipment Operability and Containment Integrity During Design Basis Accident Conditions." As a result of that review, six penetrations were identified between December 13, 1996 and December 20, 1996, as being subjected to temperatures following a Loss of Coolant Accident (LOCA) which could cause pressurization in excess of design pressure. Operability determinations of the penetrations were completed on December 23, 1996 in accordance with station procedures and guidance provided in GL 91-18.

Following are the affected penetrations, the systems affected, and the design pressures.

<u>PENETRATION</u>	<u>SYSTEM</u>	<u>DESIGN PRESSURE (psi)</u>
X7	Shutdown Cooling (to the Reactor)	1200
X8	Shutdown Cooling (from the Reactor)	1200
X25	Drywell Equipment Drain	150
X26	Drywell Floor Drain	150
X139	Post-Accident Sampling	1200
X238	Core Spray High Point Vent	1200

II. CAUSE OF EVENT

The piping code of record for NMP1 is the B31.1 1955 edition including some nuclear interpretations. The 1955 edition of the code does not explicitly identify the need to consider the effects of heating of fluid trapped in an isolated section of piping. However, in general terms it requires that the expected variations in pressure be analyzed and references the ASME boiler and pressure vessel code for conditions which exceed corresponding requirements. The ASME Section VIII 1965 edition is the code of record. Section VIII requires that the effects of external heat sources be considered with regard to the need for safety or relief devices. Therefore, the GL 96-06 conditions are design basis requirements for NMP1. The extent to which heatup and pressurization of penetrations was considered during the original design is not known. There was a lack of clear design criteria for NMP1 for the specific heat sources that needed to be analyzed. Thus, the apparent cause of this event is an original design error.

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 at a nuclear power plant, including principle safety barriers, being seriously degraded, or that resulted in a nuclear plant being: (B) in a condition that is outside the design basis of the plant."



4

5

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 1	05000220	96	13	00	03 OF 06

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

III. ANALYSIS OF EVENT (Cont'd)

We have utilized a conservative estimate to calculate the penetration pressurization transient. The conditions to analyze expansion of penetrations conservatively combines design basis LOCA with Emergency Operating Procedure (EOP) actions which exacerbate the overpressurization. Specifically, the analysis was performed in accordance with Section XV, 5.2 and 5.3 of the NMP1 SAR and the most limiting case was used to draw our conclusion, for the penetrations described herein.

The following is a discussion of each penetration.

Penetration X7: Shutdown cooling returned to the reactor

The heatup transient for the penetration increases from an assumed initial fluid temperature of 120°F to 160°F within 10 minutes and slowly increases to 180°F as the drywell heats up during long-term torus cooling following the EOP required actions. The result of the heatup would cause stresses in excess of piping yield stress (i.e., deformation), if there were no leakage past the isolation valves. However, 10CFR50, Appendix J measured leakage in the penetration is 3 gpm and the required evaluated leakage to maintain the pressure below yield is 0.3 gpm. Our review of available leakage data did not reveal any period where leakage was below 0.3 gpm. Finally, even in a worst case, stresses would not have exceeded ultimate hoop stress (i.e., failure). Therefore, while the penetration was not designed for this condition, the existing configuration would not have been overstressed after a LOCA.

Penetration X8: Shutdown Cooling from the reactor

The heatup transient for the penetration increases from an assumed initial fluid temperature of 120°F to 160°F within 10 minutes and slowly increases to 180°F as the drywell heats up during long-term torus cooling following EOP required actions. The results of the heatup would cause stresses in excess of piping yield stress (i.e., deformation), if there were no leakage past the isolation valves. However, measured leakage in the penetration is 0.672 gpm and the required evaluated leakage to maintain the pressure below yield is 0.3 gpm. Our review of available historic leakage data did not indicate any data below 0.3 gpm. Finally, even in a worst case, stresses would not have exceeded ultimate hoop stress (i.e., failure). Therefore, while the penetration was not designed for this condition, the existing configuration would not have been overstressed after a LOCA.

Penetration X25 and X-26: Drywell Equipment and Floor Drain

The heatup transient for these penetrations increases the temperature from an assumed initial fluid temperature of 120°F to 160°F within 10 minutes and slowly increases to 180°F as the drywell heats up during long-term torus cooling following the EOP required actions. This heatup would cause stresses in excess of the piping yield stress, but below ultimate stress, if there were no leakage paths



c

b

-

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 20535, 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 1	05000220	96	13	00	04 OF 06	

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

III. ANALYSIS OF EVENT (Cont'd)

through the isolation valves. For these lines the outside isolation valves are globe valves with an air operator. These isolation valve operators are air to open - spring to close. The pressure under the seat required to lift the valves off their seat is approximately 100 to 150 psi and the valves are oriented such that the pressurization is under the seat. This configuration will limit the peak pressure to approximately the initial lift pressure of 150 psi for this heatup transient which would maintain the piping stresses to less than design allowable. In addition, the latest 10CFR50 Appendix J leakage data shows that adequate leakage exists to maintain the stresses below yield for the piping. Therefore, while the penetration was not designed for this condition, the existing configuration would not have been overstressed after a LOCA.

Penetration X139: Post-Accident Sampling

The calculated maximum temperature for this penetration is 255°F. This maximum temperature occurs within the initial 300 seconds of the design basis accident. The calculated leakage to maintain piping below yield stress (i.e., deformation) is .112 gpm which is equivalent to 1.6 scfh. The 10CFR50 Appendix J leak rate data for the penetration is approximately .05 scfh. Consequently, adequate leakage does not exist for this penetration to assure that yield does not occur. However, an evaluation shows that the stress remains below the ultimate for hoop stress (i.e., failure). Therefore, pipe functional integrity can be assured.

Penetration X238: Core Spray High Point Vent

The calculated maximum temperature of this penetration is 255°F. This maximum temperature occurs in the initial 300 seconds of the design basis accident. The required leakage to maintain the pressure within yield stress (i.e., deformation) is .15 gpm which is equivalent to 4 scfh. The 10CFR50 Appendix J leak rate for this penetration is .05 scfh. Consequently, adequate leakage does not exist for this penetration to assure that yield does not occur. However, analysis has shown that the pipe stress remains below the ultimate hoop stress (i.e., failure). Therefore, pipe functional integrity can be assured.

Based upon the above analysis, the structural integrity of the containment was assured. Further had a failure occurred of only one side of the containment penetration with both isolation valves closed (normal position), primary containment integrity would have been assured. This single failure would relieve pressure and prevent further failure in that penetration. Finally, had both sides of the containment penetration failed (with both isolation valves closed normal position) significant margin exists prior to exceeding 10CFR100 releases.

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 1	05000220	96	13	00	05 OF 06

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

III. ANALYSIS OF EVENT (Cont'd)

As described in the Bases of the NMP1 Technical Specifications Section 3.3.3/4.3.3, the allowable test leak rate limit could be raised to about 3.0 weight percent per day before the 10CFR100 guideline thyroid dose limit would be exceeded. The NMP1 maximum allowable test leakage rate (L_a) has been conservatively established at 1.5 weight percent per day to maintain an adequate safety margin to assure the health and safety of the public. The NMP1 Technical Specification combined leak rate test limit is 0.6 (L_a) for penetrations and valves subject to Type B and C testing. The NMP1 allowable value for 0.6 L_a is 388.4 SCFH. The total NMP1 measured leakage is now 130.322 SCFH. Therefore, even if the penetrations failed on both sides, significant leakage as described above would be required before exceeding the 10CFR100 guideline thyroid dose limit.

Based upon the preceding discussion of each of the penetrations, structural integrity assuming valve leakage would have been maintained in the event of a design base accident. In addition, even in the worst event of a penetration failure and subsequent release, it is unlikely that 10CFR100 guideline thyroid dose limits would have been exceeded. Therefore, there were no adverse consequences to the general public or plant personnel as a result of this event.

IV. CORRECTIVE ACTIONS

Corrective Actions for this event are:

- Administrative controls have been implemented to assure that penetrations X139 and X238 are drained to provide an expansion volume. This precludes the potential for overstressing the piping beyond code allowable stress in the unlikely event of a design basis accident. The remaining four penetrations have either measured leakage or relief capability which precludes the need for additional administrative controls.
- An operability determination for the affected penetrations has been completed in accordance with GL 91-18 and station procedures.
- Longer term resolution of these overpressurization concerns are being evaluated (such as design modifications) and will be corrected in accordance with our response to GL 96-06. Niagara Mohawk is committed to respond to this generic letter by January 28, 1997. This response will provide details of the analyses performed for these penetrations.



5
.
}

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 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 1	05000220	96	13	00	06 OF 06

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

IV. CORRECTIVE ACTIONS (Cont'd)

4. The appropriate containment penetration design temperature will be incorporated into design criteria documents by May 31, 1997.
5. The root cause of this problem was a failure to include appropriate design requirements into the penetration(s) by the original designers. A Training lesson plan will be developed to address the requirements for containment penetration pressurization and provided in continuing training. Mechanical Design Engineers will receive specific training on this LER and the code requirements by December 31, 1997.
6. An Engineering evaluation will be performed to determine if other safety-related design(s) did not appropriately include pressure buildup in isolated piping due to surrounding area temperature increases by December 31, 1997.

V. ADDITIONAL INFORMATION

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

COMPONENT	IEEE 803 EHS FUNCTION	IEEE 805 SYSTEM ID
X7 and X8	PEN	BO
X139	PEN	IP
X238	PEN	BM
X25 and X26	PEN	VB



1
2
3