

# CATEGORY 1

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ACCESSION NBR: 9703210302    DOC.DATE: 97/03/13    NOTARIZED: NO    DOCKET #  
 FACIL: 50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha    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 96-016-02: on 961220, potential overpressurization of containment penetrations occurred due to thermal expansion. Operability determinations were completed. W/970313 ltr.

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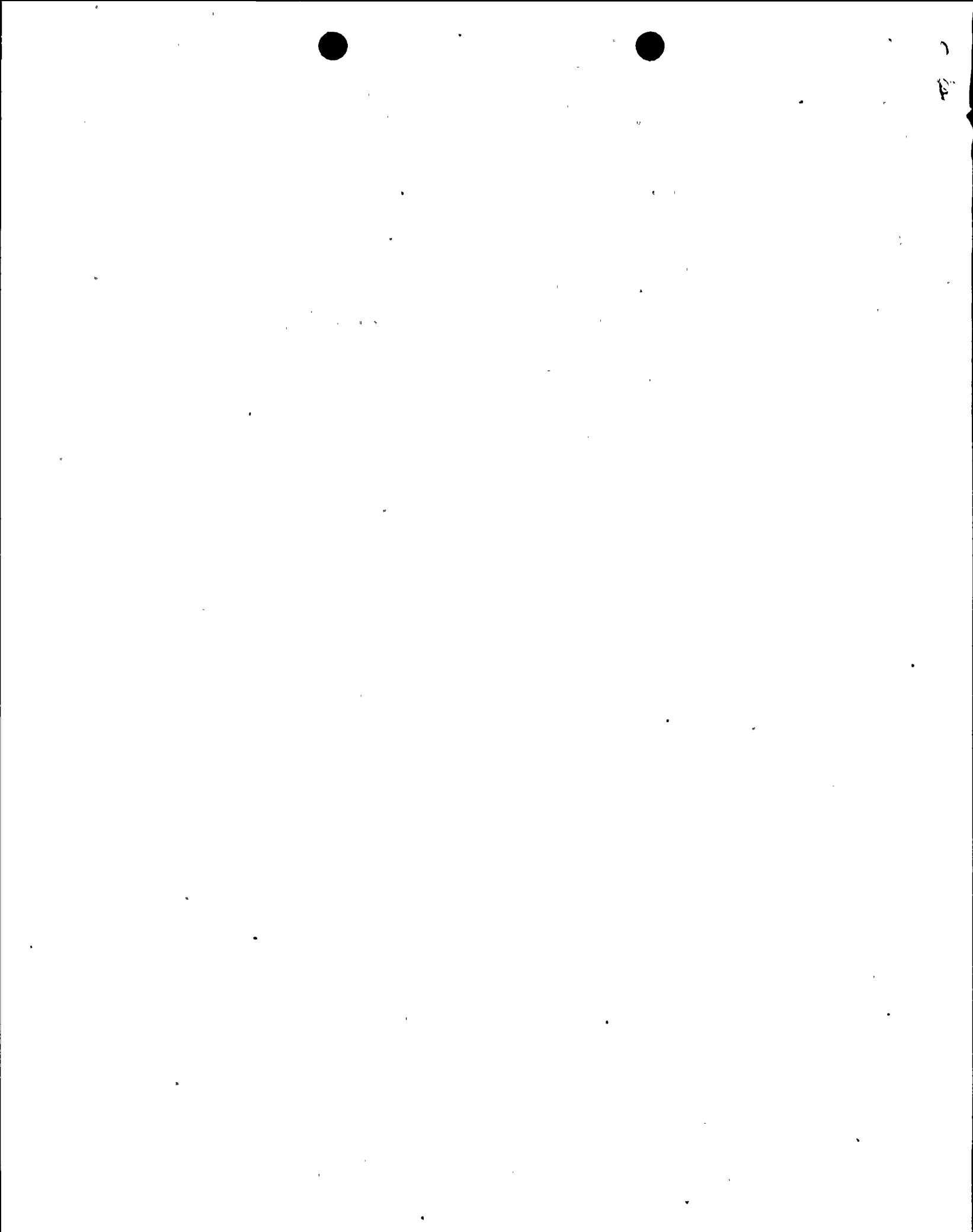
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NIAGARA MOHAWK

GENERATION  
BUSINESS GROUP

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

March 13, 1997  
NMP2L 1694

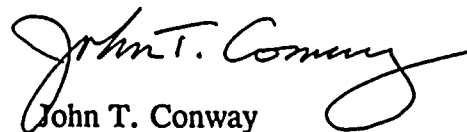
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RE: LER 96-16, Supplement 2  
Docket No. 50-410

Gentlemen:

In accordance with 10CFR50.73 (a)(2)(ii), we are submitting LER 96-16, Supplement 2, "Potential Overpressurization of Containment Penetrations due to Thermal Expansion." This supplement contains information concerning vents, drains, and test connections which have been determined to be susceptible to overpressurization due to thermal expansion.

Very truly yours,

  
John T. Conway  
Plant Manager - NMP2

JTC/GJG/kap  
Enclosure

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

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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)

5000410

PAGE (3)

1 OF 5

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             | 20  | 96   | 96             | 016               | 02              | 03             | 13  | 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)<br>100% | <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(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<br>Raymond J. Dean, Manager Engineering NMP2 | TELEPHONE NUMBER<br>(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)

As a result of GL 96-06, Niagara Mohawk, on December 20, 1996, identified four containment penetrations which could be subjected to overpressurization due to thermal expansion of the entrapped water during design basis accidents when the penetrations are isolated. The four penetrations (2CCP\*Z46A, 2CCP\*Z47, 2CCP\*Z33A, and 2CCP\*Z34A) allow flow of reactor building closed loop cooling (CCP) water into and out of the drywell. On January 23, 1997, eight hydraulic fluid penetrations (2RCS\*Z99A, \*Z99B, \*Z99C, \*Z99D, \*Z100A, \*Z100B, \*Z100C, and \*Z100D) were identified as being susceptible to the same potential overpressurization as water penetrations. On January 31, 1997, one additional water-filled penetration (2WCS\*Z23) was identified as being susceptible. On February 11, 1997, various vents, drains, and test connections were determined to be susceptible to overpressurization.

The cause of this event is that pressurization of these penetrations due to thermal expansion of entrapped fluid between the containment isolation valves was not considered during the design of Nine Mile Point Unit 2 (NMP2).

Operability determinations have been completed in accordance with Station Procedures and Generic Letter 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Non-Conforming Conditions and on Operability" to verify operability. Long-term corrective actions are planned in response to Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design Basis Accident Conditions."



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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|                        |                   | YEAR           | SEQUENTIAL NUMBER | REVISION NUMBER |          |
| Nine Mile Point Unit 2 | 05000410          | 96             | - 16              | - 02            | 02 OF 05 |

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 the NMP2 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, four penetrations were identified on December 20, 1996, as potentially being subjected to temperatures which could cause water pressurization in excess of design pressure during a design basis accident when the penetrations are isolated. An operability determination of the penetrations was completed on December 22, 1996 in accordance with station procedures and the guidance provided in GL 91-18.

The four penetrations (2CCP\*Z46A, 2CCP\*Z47, 2CCP\*Z33A, and 2CCP\*Z34A) allow flow of reactor building closed loop cooling (CCP) water into and out of the drywell. The design pressure of these penetrations is 150 psi. The penetrations are designed in accordance with ASME III Class 2 and piping away from the penetrations is designed in accordance with ANSI/ASME B31.1.

On January 23, 1997, eight penetrations (2RCS\*Z99A, \*Z99B, \*Z99C, \*Z99D, \*Z100A, \*Z100B, \*Z100C, and \*Z100D) which provide flow of hydraulic fluid between the Reactor Recirculation System (RCS) Hydraulic Power Units (HPUs) and the Recirculation Flow Control valves (2RCS\*HYV17A and B) were identified as being susceptible to the same thermal expansion overpressurization potential as the water filled penetrations. On January 31, 1997, a penetration (2WCS\*Z23) which provides flow to the reactor water cleanup system (WCS) was also determined to be susceptible. These penetrations are described in our response to GL 96-06 dated February 7, 1997.

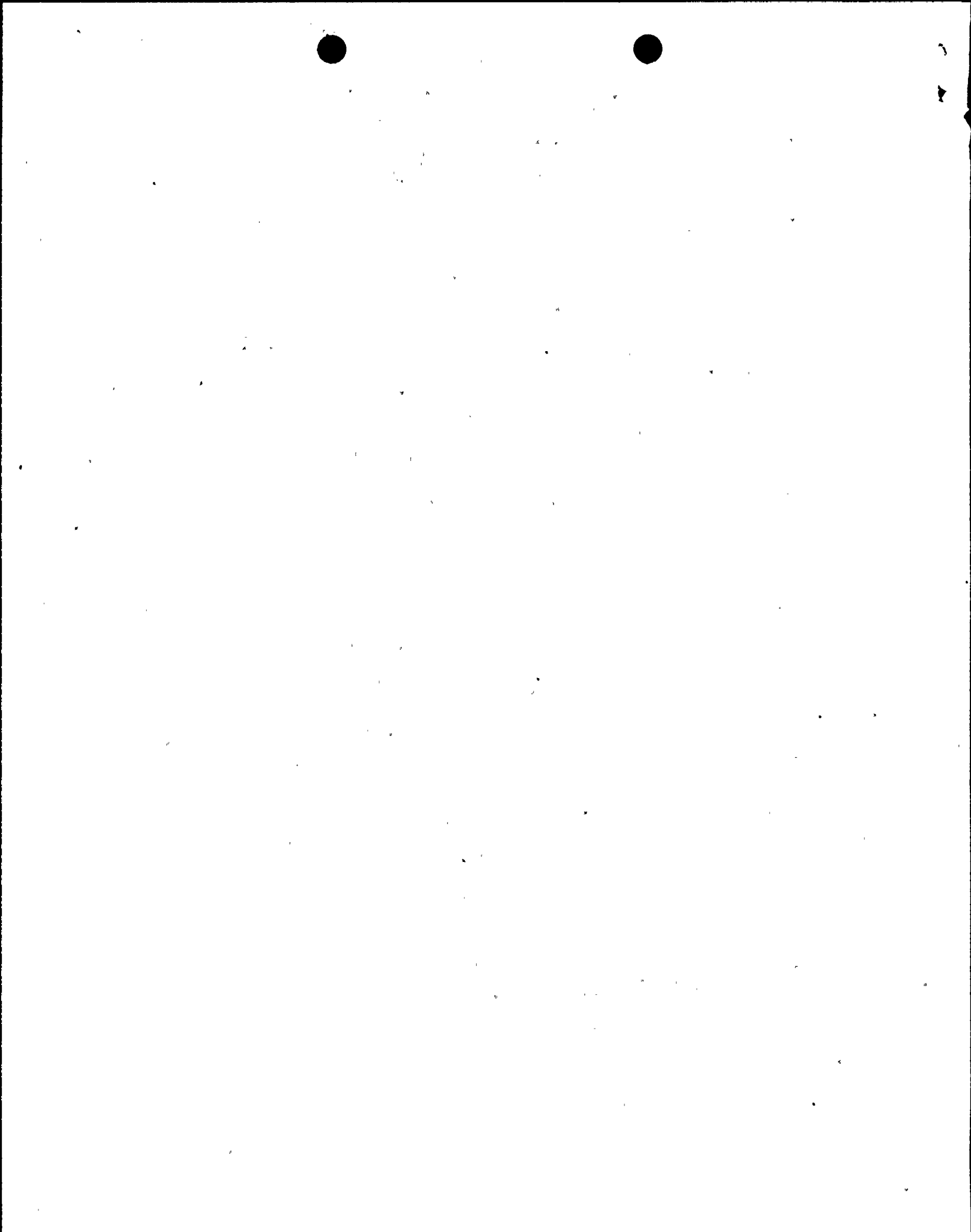
During our continuing review of GL 96-06, various vents, drains, and test connections were determined to be susceptible to overpressurization on February 11, 1997. Since an evaluation of the piping segments and valves in vents, drains, and test connections was not specifically within the scope of GL 96-06, those items were not discussed in our February 7, 1997 response to GL 96-06.

## II. CAUSE OF EVENT

Pressurization of these penetrations due to thermal expansion of entrapped fluid between the isolation valves was not considered in the design of NMP2.

## 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."





LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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| Nine Mile Point Unit 2 | 05000410          | 96             | 16                | 02              | 03 OF 05 |

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

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

A thermal transient analysis of the water-filled penetrations and piping was initiated by NMPC to determine the maximum pressure, temperature and required relief capability in the isolated segments after containment isolation. The purpose of this analysis was to determine the maximum expected pressure and temperature in the isolated segments with a relief capacity equal to the expected valve leakage. This analysis takes credit for the isolation valve leakage which has been identified through the 10CFR50, Appendix J Program testing.

The design limiting conditions for this scenario are those which result in the maximum heatup rate of the entrapped fluid in the isolated segments. The result of this analysis predicts a maximum pressure that is reached before the rate of increase in volumetric expansion is offset by leakage through the isolation valves.

The associated piping and penetration stress analyses were updated to determine the maximum pressure that could be accommodated without exceeding the applicable ASME Code Allowables. The associated isolation valves were also evaluated to determine the maximum pressure that could be accommodated during this scenario. The evaluation shows that the peak pressures experienced do not exceed the maximum pressures that can be accommodated within the allowable stresses.

The hydraulic fluid penetrations have spring-loaded solenoid valves on the inboard and outboard side of the penetration. Engineering calculations determined that a pressure differential of approximately 15 psi would lift the solenoid valve disk and relieve the pressure from the penetrations towards the inboard piping. Therefore, the pressure in the penetrations could be no more than 15 psi higher than the pressure in the inboard piping. Since no thermal relief is provided, the pressure in the penetration and the inboard piping will increase until the "weakest link" on the inboard side of the system leaks/fails and relieves the overpressure condition. This weak link has been determined to be the outside seals (stem packing) of the reactor recirculation flow control valve actuator which are designed to seal against a differential pressure of 150 psid. The seal leakage would prevent further pressurization of the penetrations. The amount of oil leakage needed to relieve the overpressurization is minimal, the containment is inerted and the ignition temperature of the oil is 400°F. Therefore, leakage outside of the seals is not a concern, since the containment design temperature is 340°F.

Operability determinations were developed for the affected penetrations. Based on the results of the supporting analysis, it was concluded that the piping, penetrations, and associated isolation valves are operable and that there were no adverse consequences to the general public or plant personnel as a result of this design deficiency.

An operability determination for vents, drains and test connectors has also been completed which shows that even in the unlikely event that vents, drains, and test connections failed, there would be no impact on plant systems, structures or components. If piping between vent, drain, or test connection valves failed, it is expected that the failure would be longitudinal rather than circumferential which precludes any concern with missile impact. The limited volume of fluid contained in vent, drain, or test connection piping segments eliminates any jet impingement concerns. Finally, the impact of leakage on safety-related electrical



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| Nine Mile Point Unit 2 | 05000410          | 96             | 16                | 02              | 04 OF 05 |

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

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

equipment is insignificant since components inside the primary containment are designed for protection against water intrusion. Since the weak link is the piping between the vent, drain, and test connection isolation valves, the inside isolation valve will remain closed preventing system leakage. The amount of leakage from the piping segment between the two valves, in the event of a piping failure, is insignificant. Therefore, there is no operability concern with regard to failure of vents, drains, or test connections.

Operability Determinations have been developed for the affected penetrations and vents, drains, and test connections. Based on the results of the supporting analysis, it was concluded that the equipment is operable and that there were no adverse consequences to the general public or plant personnel as a result of this design deficiency.

### IV. CORRECTIVE ACTIONS

1. Operability determinations were completed which showed that the penetrations maintained their structural integrity. These were completed in accordance with station procedures and GL 91-18.
2. Long-term corrective actions are being addressed in our planned actions for Generic Letter 96-06. NMPC has committed to resolve these issues in our February 7, 1997 letter to the NRC. Although not discussed in our response to GL 96-06, NMPC plans to resolve the vents, drains, and test connections design deficiency concurrent with deficiencies discussed in our February 7, 1997 letter.
3. NMPC will review applicable engineering procedures to evaluate the need for enhancements to ensure thermal transients of isolated piping segments are considered in future design activities by NMPC or its contractors by April 30, 1997.
4. An operability determination has been completed in accordance with station procedures and GL 91-18 for vents, drains, and test connections, which concluded that there was no detrimental impact on safety related equipment.

### V. ADDITIONAL INFORMATION

- A. Failed components: none.
- B. Previous similar events: none.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATIONESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION  
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|   |                                   |                |                             |                           |                          |
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| FACILITY NAME (1)<br><br>Nine Mile Point Unit 2 | DOCKET NUMBER (2)<br><br>05000410 | LER NUMBER (6) |                             |                           | PAGE (3)<br><br>05 OF 05 |
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

V. **ADDITIONAL INFORMATION** (cont'd)

## C. Identification of components referred to in this LER:

| COMPONENT  | IEEE 803 FUNCTION | IEEE 805 SYSTEM ID |
|--|-------------------|--------------------|
| 2CCP*Z46A, *Z47, *Z33A, and *Z34A                                | PEN               | CC                 |
| 2RCS*Z99A, Z99B, *Z99C, *Z99D, *Z100A, Z100B, *Z100C, and *Z100D | PEN               | AD                 |
| 2WCS*Z23   | PEN               | CE                 |
| Drains   | DRN               | Various            |
| Vents  | V7V               | Various            |
| Test Connection  | TV                | Various            |

