U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 77-24

Docket No. 50-289

License No. DPR-50 Priority -- Category C

Licensee: Metropolitan Edison Company

P. O. Box 542

Reading, Pennsylvania 19603

Facility Name: Three Mile Island Nuclear Station, Unit 1

Inspection at: Middletown, Pennsylvania

Inspection conducted: August 23-25, 1977

Inspectors: J. Higgins, Reactor Inspector — 9/16/77 date signed

J. Streeter, Reactor Inspector — 9/16/77 date signed

date signed

Approved by: D. L. Caphton, Chief, Nuclear Support Section No.1, RO&NS Branch — 9/16/77 date signed

Inspection Summary:

Inspection on August 23-25, 1977 (Report No. 50-289/77-24)
Areas Inspected: Routine, unannounced inspection of a licensee event report, containment leak rate testing report and locked valve status. The inspection involved 31 inspector hours onsite by two NRC inspectors.
Results: Of the three areas inspected, no Items of Noncompliance were found in one area, two Items of Noncompliance in the second area (infraction-failure to use absolute values corrected for instrument error in calculating leakage rates-paragraph 5.b.(1); infraction-failure to prevent inadvertant operation of nuclear power plant components - paragraph 5.c(7)(b) and one Item of Noncompliance in the third area (infraction-failure to implement locked valve procedure - paragraph 6).

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Region I Form 12
(Rev. April 77)

DETAILS

1. Persons Contacted

The below technical and supervisory level personnel were contacted.

Mr. K. Bryan, Shift Foreman
Mr. E. Fuhrer, Engineer
Mr. G. Kunder, Supervisor of Operations
Mr. E. Lawerence, I&C Foreman
Mr. R. McCann, Radiation Protection Foreman
*Mr. J. O'Hanlon, Unit 1 Superintendent
Mr. M. Shatto, Nuclear Engineer
Mr. H. Shipman, Operations Engineer II
*Mr. R. Summers, Nuclear Engineer

*denotes those present at the exit interview.

2. Previous Inspection Item Update

(Open) Unresolved Items (289/77-11-02 and 289/77-11-03): These items relate to venting reactor building weld channels and the TMI-Unit 1 future CILRT schedule, respectively, and have been forwarded to NRC management for review and evaluation.

3. In Office Review of Licensee Event Report (LER)

The inspector reviewed LER 77-19/3L, "Miscellaneous Waste Evaporator Leakage Showed Abnormal Degradation of a System," to verify that details of the event were clearly reported including the accuracy of the description of cause and adequacy of corrective action; and whether further information was required from the licensee, whether generic implications were involved, and whether the event warranted site followup.

Except as noted in Paragraph 4 below, the inspector had no further questions on this item.

4. On Site Licensee Event Followup

LER 77-19/3L was selected for on site followup by the inspector to verify that reporting requirements of the Technical Specification and Regulaotry Guide 1.16 had been met, that appropriate corrective

action had been taken, that the event was reviewed by the licensee as required by Technical Specification 6.6.1.a. and that continued operation of the facility was conducted in accordance with Technical Specification limits.

The inspector did not identify any Items of Noncompliance associated with LER 77-19/3L. Licensee representatives provided the inspector with the following information on corrective measures which are either supplemental or more specific than corrective measures described in LER 77-19/3L:

a. Gross β/γ measurements will be made each shift on steam bundle condensate whenever the Miscellaneous Waste Evaporator is operating. These measurements will be terminated after the steam bundle is replaced.

b. The emersion heater will be examined every six months. The first examination will be accomplished in January 1978. The examination will be terminated when an emersion heater is installed which has been modified to remove the heater temperature element.

c. The steam bundle is expected to be replaced in approximately 26 weeks. (The change modification and associated purchase order is expected to be approved in approximately 6 weeks and it is estimated the equipment will be delivered and installed 20 weeks after approval of the purchase order.)

The inspector had no further questions on this event.

5. Containment Leak Rate Testing

a. Background

On July 19, 1977, the licensee submitted the "Three Mile Island Nuclear Station Unit I - Reactor Containment Building Integrated Leak Rate Test" report as required by Appendix J to 10 CFR 50 (Appendix J) and by Three Mile Island Technical Specifications (T.S.). The inspector reviewed licensee records held on site to verify the accuracy of the subject report and to independently evaluate its conclusions. With the exception of the below listed items, the inspector had no further questions on the report.

b. Containment Integrated Leak Rate Test (CILRT)

(1) Test Data

The inspector checked each of the 66 data sets for accuracy of transcription to the computer inputs, accuracy of individual instrument calibration corrections, accuracy of computed averages and accuracy of the computed contained air mass. The inspector noted that raw temperature, pressure and vapor pressure data was used for the calculations without correcting each value for individual instrument calibration error, even though calibration data was available for each instrument. This is contrary to paragraph III.A.3.(c) of Appendix J and is an Item of Noncompliance at the Infraction Level (289/77-24-01). The licensee stated the leakage rates would be recalculated using absolute values of temperature, pressure and vapor pressure, obtained by correcting each raw data value to the calibration curve for its instrument.

(2) Local Leak Rate Additions

The inspector reviewed the Local Leak Rate Test on RB-V2A and RB-V7 to determine the magnitude of correction to apply to the CILRT as a result of operating the Reactor Building Industrial Cooling System during the CILRT. Results are summarized in Table 1.

(3) Test Results

The inspector independently calculated the containment leak rates, the 95% upper confidence levels and the instrumentation figure of merit. Results as summarized in Table 1 indicate compliance with regulatory requirements. These results do not include the individual instrument calibration corrections discussed in 5.b(1) above, however, the inspector evaluated this and determined that the test results were not invalidated based on the instrumentation in use, the instrumentation figure of merit, the 95% upper confidence level and the supplemental verification test.

c. Local Leak Rate Test (LLRT) Results

(1) 1977 Totals

The inspector independently calculated the 1977 Type B and C LLRT totals to verify that results were accurately reported and that the leakage was less than 0.60 La.. Results are summarized in Table 1. During the review the inspector questioned several of the licensee's methods These are discussed below.

(2) Acceptance Criteria

Appendix J and the licensee's T.S. require that the Type B and C LLRT totals be less than 0.60 La. The licensee has converted this to 111,899 standard cubic centimeters (SCCM) in his procedure. The inspectors independent calculations indicate that the acceptance criteria should be 104,824 SCCM. This item is unresolved (289/77-24-02).

(3) Flowmeter Graphs

SP 3103-11-18 (Reactor Building Local Leakage - Air/Nitrogen Type Tests) was used to conduct LLRT's and contained several graphs used to convert flowmeter field readings to SCCM. The licensee stated that in some cases the flowmeter tubes or floats had been changed since the calibration, but that the meters had been calibration checked against their laboratory grade flowmeters to ± 5% accuracy. In these cases, the licensee is using graphs to obtain LLRT results in SCCM that no longer apply. This item is unresolved pending inclusion of the proper conversion graphs into the procedure (289/77-24-03).

(4) Nonconservative Practices

The licensee's method of selecting the value of leakage to assign to each particular penetration is not formalized in his LLRT procedure. This resulted in several different methods being utilized, some of which are nonconservative as described below:

(a) In some instances, downstream boundary valve leakage was not added to the downstream flowmeter reading (e.g., CA-V1 and IC-V3).

(b) In some instances the downstream flowmeter value was used vice the upstream flowmeter value with no check of downstream boundary valve tightness. (e.g., CA-V5B, DH-V64, CA-V189).

(c) In one case, (IC-V2) where the downstream flowmeter read higher than the upstream flowmeter, the lower vice the higher reading was used.

These items are all designated as unresolved items (289/77-24-04).

(5) Temperature and Pressure Corrections

The licensee did not make the required correction to flowmeter readings when the metered conditions differed from the calibrated conditions of temperature and pressure. This resulted in some nonconservative values and is designated as an unresolved item (289/77-24-05).

(6) Penetration Pressurization (PP) System

(a) Addition Into Type B and C Total

The licensee currently tests several containment isolation valves and penetrations via the PP system in lieu of separate Type B or C tests, as permitted by Appendix J. The licensee does not add these values into the Type B and C total, which is required unless the system qualifies as a "seal system" per Section III.C(3) of Appendix J. Inspector reviewed information did not support the claim that the PP system is a "seal system." This item is unresolved pending correction of the licensee's leakage accounting to include all required leakage paths (289/77-24-07).

(b) Isolated PP Manifolds

The inspector toured the plant in company with the licensee representatives and observed the 16 PP system flowmeters. During the tour PP-V8 and PP-V64 (designated as locked open on the Locked Valve List) were found unlocked and shut thus isolating manifolds A and H of the PP system. The Locked Valve Log was then checked and there was no record of these valves being either unlocked or shut. This is contrary to 10 CFR 50, Appendix B, Criterion XIV, which requires that measures be established for indicating the operating status of structures, systems and components to prevent inadvertent operation. This is an Item of Noncompliance at the Infraction level (289/77-24-08).

(c) High Manifold Flows

SP 1303-11-24 specifies that each PP system manifold air flow must be less than 3 SCFH. During the inspector's tour manifold J flowmeter read 7 SCFH. Additionally, manifolds A and H were isolated, as discussed above. After placing manifolds A and H in service, A read ≈ 0 SCFH and H read >9 SCFH. The high flows to manifolds J and H are unresolved (289/77-24-09).

6. Locked Valve Audit

As a result of finding two normally locked open valves in the shut position, the inspector selected several valves from the Locked Valve List in several different systems to determine their status. The inspector then toured the plant and found the following valves without the required locks or locking devices:

LR-V1	not locked
LR-V6	not locked
LR-V49	not locked
EG-V1006	no locking device or collar installed
EG-V1007	no locking device or collar installed

This is contrary to T.S. 6.8.1, which requires that written procedures be established, implemented and maintained, and is an item of non-compliance at the infraction level (289/77-24-10).

7. Unresolved Items

Items about which more information is required to determine acceptability are considered unresolved. Paragraphs 5.C.(2), 5.C.(3), 5.C.(4), 5.C.(5), 5.C.(6)(a), and 5.C.(6)(C) of this report contain unresolved items.

8. Exit Interview

At the inspection's end the inspector held a meeting (see Detail 1) for attendees) to discuss the inspection scope and findings. The Items of Noncompliance and Unresolved Items were identified.

TABLE I

April 1977 - Containment Integrated Leak Rate Test Results (Pa = 50.6 psig)

Item		Acceptance Criteria	Reported Results	Inspectors Findings
1.	CILRT Leak Rate by Mass Point Technique	N. A.	0.042%/day	0.041%/day
2.	Local Leak Rate Test Additions (Type B&C)	N. A.	0.007%/day	0.007%/day
3.	Containment Leak Rate (Mass Point)	0.075%/day (75% La)	0.049%/day	0.048%/day
4.	Upper 95% Confidence Level on Leak Rate Mass Point)	0.075%/day	0.059%/day	0.057%/day
5.	Supplemental Verification Test Difference	≤ 25% la	1.0% La	1.7% La
6.	Instrumentation Figure of Merit	≤ 25% La	11% La	5.4% La
7.	Total Type B and C Leakage - 1977	< 0.60 La	0.23 La	0.30 La