U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-341/84-53(DRS)

Docket No. 50-341 License No. CPPR-87

Licensee: Detroit Edison Company
2000 Second Avenue
Detroit, MI 48224

Facility Name: Enrico Fermi Nuclear Power Plant, Unit 2

Inspection At: Enrico Fermi 2 Site, Monroe, Michigan

Inspection Conducted: November 16, 26-30 and December 1-2, 1984 (Report No. 50-341/84-53(DRS))

Inspector(s): F. Maura — Date: 12/24/84

S. Hare — Date: 12/21/84

Approved By: L. A. Reyes, Acting Chief
Operational Programs Section — Date: 12/24/84

Inspection Summary

Inspection on November 16, 26-30 and December 1-2, 1984 (Report No. 50-341/84-52(DRS))
Areas Inspected: Routine announced inspection by Region based inspectors of the containment integrated leak rate test (CILRT) procedure, witness the CILRT and the suppression pool bypass test, and review the local leak rate test results. The inspection involved 108 inspector-hours on site by two NRC inspectors, including 53 inspector-hours onsite during off-shifts.
Results: Of the three areas inspected no items of noncompliance or deviations were identified in two areas. On the remaining area two items of noncompliance were identified (failure to follow procedure, Paragraphs - 3.c. and f; failure to take adequate corrective action to prevent recurrence, Paragraph - 3.d).

DETAILS

1. Persons Contacted

Detroit Edison Company

*F. Agosti, Manager, Nuclear Operations
V. Bosamia, Startup Test Engineer
R. Breymaier, Startup Test Engineer
R. Close, Startup Test Engineer
P. Espositio, Startup Test Engineer
#*J. Hughes, Plant Engineer
*R. Lenart, Superintendent Nuclear Production
R. Lowbenstein, NSO
J. Matley, Supervisor, Turnover Group
W. Miller, Operations Assurance Supervisor
#*F. Mulcahy, Startup Staff Consultant
G. Overbeck, Assistant Superintendent
#*F. Reimann, Startup Staff Consultant
*G. Ripley, Startup Engineer
H. Skip, Startup Test Engineer
G. Trahey, Manager, Quality Assurance

Volumetrics, Inc.

J. Carp
L. Gibson

*Denotes persons attending the exit meeting of December 2, 1984.

#*Denotes persons attending the Region III meeting of November 16, 1984.

The inspectors also contacted other licensee personnel including members of the startup, operation, and quality assurance departments.

2. Containment Integrated Leak Rate Preoperational Test Procedure Review

The inspector reviewed procedure PRET. T2304.001, Revision 1, "Primary Containment Integrated Leakage Rate Test". The inspector's comments were discussed with the licensee at a meeting held in the Region III office on November 16, 1984. The inspector verified that his concerns had been satisfactorily resolved by Test Change Notice (TCN) #2326 dated November 26, 1984.

In addition to other areas already covered in this report the following requirements of Appendix J were discussed with the licensee to ensure his understanding of the regulations during the November 16, 1984 meeting:

a. The test length must be 24 hours or longer in order to use the mass point method of data reduction. If tests of <24 hour duration are planned the Bechtel's Topical Report BN-TOP-1 must be followed in its entirety except for any section which conflicts with other Appendix J requirements.

b. Future periodic Type A, B and C tests must include as found results as well as left. In order to perform Type B and C tests prior to a Type A an exemption from the Appendix J requirement must be obtained from NRR. The exemption request must state how the licensee plans to determine the as found condition of the containment since local leak rate tests are being performed ahead of the CILRT. An acceptable method is to commit to add any improvements in leakage rates, which are the results of repairs and adjustments (R&A), to the Type A test results.

c. Whenever the valve configurations during a CILRT deviate from the ideal valve lineup requirement the results of local leak rate tests for such penetrations must be added (substraction is never permitted) as a penalty to the CILRT test results. The penalty is determined using the "minimum pathway leakage" for that penetration (do not assume a single failure). This same method is used in determining the Type A as found condition when R&A's are performed ahead of the CILRT as a result of Type B and C testing.

d. For determining if the sum of Type B & C test exceed the 0.6 La Appendix J limit an acceptable method is to utilize the "maximum pathway leakage" method. In this case a single failure criteria is applied to each penetration.

e. The size of the superimposed leak rate must be between 0.75 and 1.25 La. The higher the value the better. The supplemental test must be of enough duration to demonstrate the accuracy of the test. We look for stable results, not just being within the acceptance criteria. Whenever BN-TOP-1 is being used the length of the test can not be less than approximately equal to half the length of the CILRT.

No items of noncompliance or deviations were identified.

3. Containment Integrated Leak Rate Test Witnessing

a. Instrumentation

The inspector reviewed the calibration data and determined all the instruments used in the CILRT had been properly calibrated and that the correct weighting factors had been placed into the computer program as required. The following instrumentation was used throughout the test:

Type	Quantity
RTD's	26
Dewcells	11
Pressure Gauges	2
Flowmeter	1

b. Temperature Survey

The inspector reviewed the results of the temperature/humidity survey performed by the licensee prior to containment pressurization.

Four readings were taken throughout each subvolume with the average compared to the detector reading. The largest deviation noted for the 26 RTD's was 0.8°F, and for a dewcell it was 2.7°F. The licensee's acceptance criteria for the survey was 2°F for the RTD's and 3°F for the dewcells. Although the survey was done with the drywell cooler fans operating the CILRT was performed with the fans off.

c. Personnel Access Hatch

Just prior to containment pressurization (during zero pressure testing) the licensee found that the personnel access hatch inner door interlocks were disabled by wood blocks which had been installed during construction. As a result the equalizing valve remained open at all times. The inspector questioned how the access hatch had been able to pass all previous Type B tests with a disabled equalizing valve. Interviews of testing personnel and a review of the records showed that:

(1) All previous access hatch Type B tests had been performed with a manual valve and flange connection installed over the door equalizing valve which invalidated the test results.

(2) Preoperational test procedure PRET. T2305.001, Revision 2 covers the local leak rate testing of the personnel access hatch. Step 6.6.2.b. requires that the penetration be jurisdictionally tansferred to Detroit Edison from construction prior to testing. Step 6.6.2.g. requires that all design changes and field modifications affecting the test be documented in the test procedure. No abnormal configurations were noted in the procedure.

(3) Procedure 7.1, "Preparation and Issue of System Scope Packages and Punchlist", controls the preparation and issue of the punchlist prior to jurisdictional transfer of components from construction to Detroit Edison's System Completion Organization. Step 4.1 requires that prior to jurisdictional transfer the system be walked down and all known outstanding work items be incorporated in the punchlist.

(4) Turnover Number 31-1542P dated September 21, 1982 covers the personnel access hatch as part of the primary containment turnover. A review of the punchlist fails to indicate the fact that the interlocks were being bypassed with wood blocks and a temporary flange and valve were installed in the equalizing valve line.

Failure to note in the preoperational test procedure that the access hatch was being tested in an abnormal configuration, and failure to include in the punchlist, at turnover time, that the access hatch was being accepted with outstanding work items (removal of the wood blocks and temporary flange with valve) is considered an item of noncompliance (341/84-53-01A) with 10 CFR 50, Appendix B, Criterion V.

d. Target Rock One Inch Air Operated Valves

Prior to containment pressurization (during zero pressure testing) it was noted that the torus pressure instrument was not tracking the drywell pressure instrument. The investigation revealed that valve E41-F402 was closed although its control room indication showed the valve to be open. Valve E41-F402 isolates the torus level instrumentation line to which the torus pressure instrumentation for the CILRT was connected. Valve E41-F402 is a one inch totally enclosed, air operated, Target Rock valve (Model # 81M-001) which uses reed switches to monitor valve position. The operator must depend on the valve position indication since the valve position can not be physically determined. The inspector conducted a review of the history of this valve, and similar safety related valves, in an effort to determine why the position indication of E41-F402 was reversed. The findings were:

(1) Valve E41-F402 was tested satisfactorily on May 11, 1984 in accordance with Checkout and Initial Operations Test Procedure CAIO.000.059, Revision 7.

(2) On May 17, 1984 Operating and Maintenance Order No. 610284 was written to investigate why valve E41-F402 failed to close or indicate closed. The electrical checkout of the valve showed no discrepancies.

(3) Results of Type C testing for penetration X-206A (E41-F402) dated May 24, 1984 showed acceptable leakage. A note stated that the valve was tested to 56.9 psig although its control room indication showed the valve to be open. There was no indication that the noted discrepancy was investigated.

(4) A similar valve, E11-F415, installed in penetration X-47b and used to isolate instruments B21-N984C and G and C71-N050B, experienced similar problems on May 23, 1984. NCR No. 84-0806 describes the problem as an improperly mounted reed switch mounting bracket which due to vibration slips causing the control room position indication to be the opposite of the actual valve position. As a result of the NCR the vendor came to the site and showed the I&C shop personnel how to mount the bracket correctly. The NCR was closed on November 26, 1984 as an isolated case requiring no additional corrective action to prevent recurrence.

(5) During interviews with startup group personnel the inspector was informed that the design of the mounting bracket is defective in that it is extremely difficult to properly tighten the bracket locknuts. In addition, even when properly adjusted slippage of the mounting brackets and reversal of the indicating lights has been experienced.

(6) Although the startup group engineers have no confidence in the design of the position indicating lights they have failed to properly document those concerns to ensure appropriate corrective

action is taken At the time of the inspection no corrective action was being planned by Detroit Edison Company to correct the valve position indication problem.

(7) During the performance of the CILRT it was discovered that the position indication for valve E11-F415 was reversed. That was the valve which earlier had been the subject of NCR No. 84-0806 and which the vendor had correctly adjusted to "prevent recurrence."

In light of all the evidence available to the licensee concerning the generic problem associated with the position indicators of the Target Rock air operated, 1 inch valves, failure to take appropriate measures to determine the cause, and take corrective action to prevent recurrences, is considered to be an example of an item of noncompliance against 10 CFR 50, Appendix B, Criterion XVI (341/84-53-02B).

e. Witness of Test

The inspector witnessed portions of the CILRT on November 30 through December 1, 1984 and noted that test prerequisites were being met and that the appropriate revision to the procedure was being followed by test personnel. Valve lineups for the following systems were verified correct to ensure that no fluid could enter the containment atmosphere and that proper venting was provided:

- Nitrogen inerting and supply
- Standby gas treatment and primary containment purge
- Post accident sampling
- Main steam and MSIV leakage control
- Primary containment monitoring
- Primary containment pneumatic supply
- Station air
- Demineralized service water
- Combustible gas control (Post-LOCA)

During the valve lineup verification the inspector noted that one penetration test connection (T46-F009) was not capped. The licensee was informed that test connections must be administratively controlled to ensure their leak tightness or otherwise be subject to Type C testing. One way to ensure their leak tightness is to cap, with a good seal, the test connection after its use, and control the cap installation within the testing procedure. The licensee plans to cap all test connections and to use a qualified sealing tape with the cap. In addition it will include the requirement for sealing the test connection in its local leak rate testing procedures. This is an open item (341/84-53-03) pending review of the licensee's local leak rate testing surveillance procedures.

f. Misvalved Instrumentation During CILRT

To ensure that instrumentation which is exposed to the containment atmosphere during a LOCA is in service during the CILRT the procedure

valve lineup included each instrument line isolation valve. To ensure proper valve lineup at the instrument rack the licensee depended on a TMI action item which required the verification that the instruments were tracking containment pressure during the pressurization phase of the CILRT. A mixup in communications caused some tracking verifications to be missed during containment pressurization. The licensee processed a Test Change Notice (TCN), as a minor change requiring minimum review, to perform the TMI action item during the depressurization phase following completion of the CILRT. The TCN (#2350) ignored the fact that one of the objectives was to verify that the instruments were correctly valved in service for the CILRT. The deletion of this objective constituted a major change to the procedure. As a result the following instruments remained isolated during the CILRT:

Penetration No.	Instrument	Cause
X-47a	B21-N094 A&E C71-N050 A	Valved out at instrument rack
X-47b	B21-N094 C&G C71-N050 B	Instrument line valve E11-F415 closed (See paragraph 3.d.)
X-47c	T48-N469	Valved out at instrument rack

Startup Instruction 4.5.1.01, Administrative Controls of Startup Originated Procedures and Test Change Notices, defines a major change as one in which the functional intent of the procedure or portion thereof is changed. Steps 4.4.2.1 and 5.3. require that the test be stopped until review and approval from the Test Review Committee is received. Failure to process TCN #2350 as required by Startup Instruction 4.5.1.01 is considered an example of an item of noncompliance (341/84-53-02B) against 10 CFR 50, Appendix B, Criterion V.

No other items of noncompliance or deviations were identified.

4. Test Results Evaluation

a. CILRT Data Evaluation

A 24 hour CILRT was performed during November 30-December 1, 1984 with data being collected and reduced by the licensee every 15 minutes. The inspector independently monitored and evaluated leak rate data every half hour using the ANSI 56.8 (mass point) and the BN-TOP-1, Revision 1 (total time) formulas, to verify the licensee's calculations of the leak rate, and instrumentation performance. There was excellent agreement between the inspector's and licensee's results as indicated by the following summary (units are in weight percent per day).

Measurement	Licensee (Mass Point)	Inspector (Mass Point)	Inspector (BN-TOP-1)
Leakage rate measured during CILRT (Lam)	0.250	0.249	0.268

Lam at upper 95% confidence level (does not reflect penalties - See Paragraph 4.c.)	0.251	0.251	0.330

Appendix J acceptance criteria at 95% of UCL = 0.75 La = (0.75)(0.50 wt %/day) = 0.375 wt %/day.

The closeness of the BN-TOP-1 results to the mass point results are indicative of good instrumentation performance, instrument location, and temperature stabilization during the test.

b. Supplemental Test Data Evaluation

After the satisfactory completion of the 24 hour CILRT on December 1, 1984 a known leakage of 4.99 scf/min, equivalent to 0.506 weight percent per day was induced. The inspector independently monitored and evaluated leak rate data, using the ANSI 56.8 mass point formulas, to verify the licensee's test results. There was excellent agreement between the licensee's and the inspector's leak rate calculations as indicated by the following summary (units are in weight percent per day).

Measure	Licensee	Inspector
Measured leakage rate Lc, during supplemental test	0.675	0.677
Induced leakage rate, Lo	0.506	0.506
Lc-(Lo + Lam)	-0.081	-0.078

Appendix J acceptance criteria = $-0.125 \leq [Lc - (Lo + Lam)] \leq + 0.125$

c. CILRT Valve Lineup Penalties

Due to valve configurations which deviated from the ideal valve lineup requirement for the CILRT, the results of local leak rate tests for such penetrations must be added as a penalty to Lam at the 95 percent UCL. The following penalties must be added using the minimum pathway leakage method:

Penetration	Local Leak Rate Test Value Based on Latest Test, (Units are in scf/day)
X-9A, feedwater check	1.12
X-9B, feedwater check	1.12
X-18, drywell floor drain pump	3.48
X-19, drywell equipment drain pump	1.12
X-23, RBCCW supply Division I	1.12
X-24, RBCCW return Division I	1.12

X-34A, RBCCW supply Division I	1.12
X-34B, RBCCW return Divison I	5.49
X-47a, instruments B21-N094 A and E and C71-N050A	To be determined
X-47b, instruments B21-N094 C and G and C71-N050B	To be determined
Relief valve E11-F001B (Type B & C)	To be determined
X47c, instrument T48-N469	To be determined

In order for the CILRT to be acceptable the total leakage rate from these penetrations can not exceed 0.124 wt %/day or 1762 scf/day. This is an open item (341/84-53-04) pending inspector review of the test results.

d Type B and C Test Results

The inspector reviewed the results of preoperational test procedures PRET. T2305.001 and PRET. T2306.001 which covers all Type B and C testing. According to the data sheets four penetrations remained to be tested, X-39B, X-210A for valve V22-2575, X-210A for valve V22-2642, and X-210B. The total Type B and C leakage, not including the four penetrations listed above, was 860.0 scf/day using the maximum pathway leakage or approximately 0.12 La. The leakage is well within the maximum allowable limit of 0.6 La. Final results will be reviewed when the licensee submits the Type A, B, and C test report in accordance with 10 CFR 50, Appendix J, paragraph V.

e. Suppression Pool Bypass Test

The initial effort to perform the bypass suppression pool test following the CILRT failed because the post LOCA combustible gas control system had been left valved-in, thus connecting the drywell to the torus. After correcting the valve lineup problem the licensee performed a satisfactory suppression pool bypass test. The drywell to torus ΔP ranged between 1.042 to 1.033 psi for the 10 minutes of data recording. The maximum pressure differential decrease per minute was 0.05 inches of water. Temperature effects were negligible during the period. The results are well within the maximum allowable pressure drop of 0.2 inches of water per minute.

No items of noncompliance or deviations were identified.

5. Open Items

Open items are matter which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Paragraphs 3.e. and 4.c.

6. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on December 2, 1984 and summarized the scope and findings of the inspection. With regards to noncompliance item 341/84-53-02 the inspector stated he was concerned that other equipment needed to safely operate the plant could also have problems which the startup engineers may be aware of, but have failed to properly document and initiate corrective action or which DECo Engineering and Quality Assurance may have failed to recognize. The licensee must address this concern in their response to the item of noncompliance. The licensee acknowledged the inspectors statements.