



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 97 TO FACILITY OPERATING LICENSE NO. NPF-43  
DETROIT EDISON COMPANY  
FERMI-2  
DOCKET NO. 50-341

1.0 INTRODUCTION

By letter dated May 24, 1993, the Detroit Edison Company (DECo or the licensee) requested an amendment to the Technical Specifications (TS) appended to Facility Operating License No. NPF-43 for Fermi-2. The proposed amendment would allow a one-time relief from the accelerated Type A containment integrated leak rate test (ILRT) frequency required by TS 4.6.1.2 when two consecutive Type A tests have failed to meet the acceptance criteria. The licensee also requested an exemption from the related requirements of Appendix J to 10 CFR Part 50.

Appendix J to 10 CFR Part 50, Paragraph III.A.6.(b), requires, in part, that if two consecutive periodic Type A tests fail to meet the applicable acceptance criteria in III.A.5.(b), a Type A test shall be performed at each plant shutdown for refueling or approximately 18 months, whichever occurs first, until two consecutive Type A tests meet the acceptance criteria in III.A.5.(b), after which time the normal retest schedule specified in III.D. (three tests in 10 years) may be resumed.

Information Notice (IN) No. 85-71, "Containment Integrated Leak Rate Tests," states that if Type B and C local leakage rates constitute an identified contributor to the failure of the "As-Found" Type A test, the licensee may submit a Corrective Action Plan (CAP) with an alternate leakage test program proposal as an exemption request. If the submittal is approved and an exemption granted, the licensee may implement the corrective action and alternate leakage rate test program in lieu of the required increase in Type A test frequency incurred after the failure of two successive Type A tests.

Fermi 2 experienced failures of the "As-Found" Type A tests in 1989 and 1992. In both instances, Type C local leakage rates (of containment isolation valves) were the reason for the "As-Found" failures. Due to the failure of two consecutive periodic Type A tests, Fermi 2 is subject to the increased Type A test frequency requirements of both Appendix J and the plant's TS. These accelerated testing requirements require that Type A tests be performed at approximately 18-month intervals. The last failed Type A test was performed on October 28, 1992; therefore, a Type A test is currently required to be performed at the next Refueling Outage, RFO 4, currently in progress. The licensee indicated that performance of the Type A test in RFO 4 after the performance of Local Leak Rate Testing would result in a significant increase in occupational radiation exposure, in addition to consuming significant

resources and vital outage time, with no contribution towards safety. Therefore, the licensee requested an exemption to gain relief from the accelerated testing requirements of Appendix J, Paragraph III.A.6.(b), and return to the normal test schedule of three tests in 10 years. With the normal test schedule, the next Type A test would be performed during Refueling Outage, RFO 5.

The plant's TS 4.6.1.2.a.9 repeats the requirement of Appendix J, so the licensee has also proposed a change to the TS in order to provide the same relief being requested in the exemption. The licensee's CAP with an alternative leakage test program as the basis of the exemption request is evaluated below.

## 2.0 EVALUATION

The licensee's justification for the proposed exemption is that the Type A tests failed in the "As-Found" condition in 1989 and 1992 because of a few specific penetrations which have been demonstrably corrected. The following paragraphs provide details of the problems experienced and the corrective actions in-place and planned.

### 2.1 Analysis of 1989 and 1992 Type A Test Results

The licensee, in a May 24, 1993, exemption request, provided the table below which lists the "As-Left" leak rates for the 1989 and 1992 Type A tests. These are the integrated containment leak rates after corrective maintenance on the problem penetrations. Also listed are the calculated "As-Found" leak rates if the problem penetrations had been excluded (or assumed to be leaking a negligible amount.) Both sets of data are compared to 0.75 L<sub>a</sub> (0.375 wt.% per day), the acceptance criterion for Type A tests. Both sets of data indicate that, after repair of the problem penetrations, the Type A containment leak rates in 1989 and 1992 were acceptable. Thus, it is not necessary to perform more frequent Type A tests as required by Appendix J because the failures in the last two Type A tests were caused by failures that could be found by Type C testing.

	"As-Left" Leak Rate (wt./day)	"As-Found" Leak Rate minus problem penetrations (wt./day)	0.75 L <sub>a</sub> (wt./day)
1989	0.313	0.362	0.375
1992	0.243	0.253	0.375

### 2.2 Corrective Action Plan

#### 2.2.1 Corrective Action Taken to Address 1989 "As-Found" Type A Test Failure

The 1989 "As-Found" Type A test failed due to excessive leakage from Penetrations X-7A through D (Main Steam Line), X-37/38 (Scram Discharge Volume Vent and Drains), and X-47C (Nitrogen Inserting Drywell Pressure Sensing Line

Isolation Valve) during the performance of Type C testing. During the "As-Found" local leak rate test (LLRT) testing all eight of the main steam isolation valves (MSIVs) and Division I MSIV leakage control system isolation valve failed because of excessive leakage. The licensee indicated that all four inboard MSIVs, B21-F022A through D, were modified to improve leak tightness during this refueling outage. This modification included new bonnets, large stems, anti-rotation nose-cone, and improved tolerance on the valve rib guides. Subsequent to these modifications all four valves passed their leak rate testing in both 1991 and 1992 with no repair work required. Also, during 1989 the MSIV leakage control (B21-F434) solenoid valve was replaced with an air-operated gate valve, a valve design more appropriate for the system service. This valve has also been tested twice, subsequent to its replacement and has passed both leak rate tests in 1991 and 1992. During the non-ILRT outage in 1991, three of the outboard MSIVs were modified with the same modification as the inboards. The remaining outboard MSIV has not failed in leak rate tests in 1991 and 1992. The licensee indicated that the 1989 Type A test results included MSIV leakage in the total leakage. This is unnecessary based on the exemption granted in Supplement 5 to the Fermi 2 Safety Evaluation Report, page 6-3. The leakage through X7A-D was thus addressed by replacement of B21-F434 and the exclusion of MSIV leakage. The licensee indicated that the results for Penetrations X-7A through D, during the 1991 and 1992 were only 0.05 scfh [standard cubic foot per hour] for both years for the "As-Found" condition (0.00008 wt.%/day). This shows the acceptance criterion has been met and that the corrective action taken for these penetrations' "As-Found" failure in 1989 has been demonstrated to be successful.

Penetration X-37/38 has containment isolation valves C11-F010 and C11-F180 (control rod drive (CRD) scram discharge volume vent valves) and C11-F011 and C11-F181 (CRD scram discharge volume drain valves). The licensee indicated that due to repeated failures and this penetration's major contribution to the "As-Found" Type A failure in 1989, an Engineering Design Package (EDP) was prepared and implemented in 1991. Before this EDP, the test boundary required pressurization against all 185 CRD's, as well as testing one vent and drain valve together. This allowed for many potential leak paths. The EDP installed test boundary valves and test connections to allow individual testing of each valve and also replaced the two drain valves C11-F011 and C11-F181. Since the addition of the block valve the two vent valves have passed both their "As-Found" tests. Also, the two replaced new drain valves have passed their "As-Found" tests in 1991 and 1992. No subsequent maintenance was performed for leak tightness. Results for these penetrations during 1991 and 1992 LLRTs were 3.14 scfh and 2.03 scfh for the "As-Found" conditions (0.005 wt.%/day and 0.003 wt.%/day) which are well below the acceptance criterion of 10 scfh (0.017wt.%/day). The staff agrees that the corrective action taken for the failure of the 1989 "As-Found" LLRT demonstrates the success of the corrective actions implemented for valves C11-F010, F180, F011 and F181.

Penetration X-47C is an instrument line with a single isolation valve T48-F451. This valve failed its LLRT in 1989 and 1992 and passed in 1991. During 1989 the valve was found to be not fully closing. The corrective action was to rework the air operator and increase the closing force. After

the failure in 1992, it was found that there was a misalignment between the operator and valve causing a side load on the stem. The error in the valve's operator was corrected during the performance of the LLRT. Results for this valve during the 1991 and 1992 LLRTs were 0.05 scfh and 0.247 scfh for the "As-Found" condition (0.00008 wt.%/day and 0.0004 wt.%/day, respectively). This shows an improvement from the 1989 "As-Found" results of 10.28 scfh (0.017 wt.%/day). The licensee believes that the corrective action of operator alignment in 1992 taken for this valve has corrected all previous problems.

### 2.2.2 Corrective Action Taken to Address 1992 "As-Found" ILRT Failure

The 1992 "As-Found" ILRT failed due to excessive leakage through penetrations X-9B (feedwater check valve B21-F010B) and X-206D (instrument line which indicates torus level with single isolation valve E41-F400). The licensee indicated that the failure of penetration X-9B was an administrative failure based on maintenance being performed before "As-Found" test data were obtained. During "As-Found" condition leakage testing of inboard containment isolation valve B21-F010B, a significant leak was observed. Initial troubleshooting indicated that nearly all of the test leakage was through a valve body flange that is on the containment side of the test boundary and not through the valve seat. Since this leak would not be a contributor to the penetration leakage during a design-basis accident (DBA), attempts were made to isolate the valve body flange leak to permit proper measurement of valve seat leakage. Due to physical design/contour of the valve body, these attempts failed. Feedwater Check valve B21-F010B was then repaired by building up the affected areas of both the flange and valve body and re-machining. The valve was retested with an "As-Left" result of 1.78 scfh. No more corrective action is necessary and B21-F010B is expected to return to being a good performer as in past local leakage rate tests. Identical sister valve B21-F010A was "As-Found" tested with good results (0.26 scfh).

Penetration X-206D is an instrument line with a single containment isolation solenoid operated globe valve E41-F400. This valve has been a good performer in the past with "As-Found" leakage rates in 1989 and 1991 of 0.154 scfh and 0.113 scfh. During the refurbishment of this valve it was found to be containing water, rust, and scale. The valve internals were cleaned and the valve was retested. The single failure of this valve would not have resulted in excessive leakage from the primary containment because the line is designed to serve as a closed system outside containment (extended containment boundary). Further, the single CIV E41-F400 is normally open and receives no automatic closure signal and is required to be open post-LOCA to monitor torus level.

### 2.2.3 Alternative Leakage Test Program

The two "As-Found" Type A failures were caused by the addition of Type C penalties. The licensee indicated that to date all containment deficiencies have been identified during Type C testing and; therefore, it is proposed that Type C testing be relied upon in lieu of the increased frequency Type A test. Fermi 2 has established stringent LLRT administrative leak rate acceptance criteria on a per valve basis, based on ASME Code guidance, individual valve



test maintenance history, design, function, and service. Test acceptance criteria range from 0.20 scfh to 15.00 scfh. This ensures valve leak tight integrity is maintained from Type A test to Type A test. The licensee indicated that if valves are repaired when they exceed their individual administrative acceptance criteria, and corrective modifications or replacement are implemented, the overall containment integrity will be assured with future ILRTs meeting their "As- Found" acceptance criteria. The licensee indicated that the implementation of the proposed Corrective Action Plan and continued Type C leakage testing provide reasonable assurance that the underlying purpose of Appendix J is being met. The staff concurs with the above evaluation.

Based on the foregoing evaluation, the staff finds that the licensee has identified the problem penetrations that caused the Type A test failures in 1989 and 1992 and has instituted an effective Corrective Action Plan to address these problems. There is reasonable assurance that the containment leakage-limiting function will be maintained and the staff finds that a Type A test during next refueling outage RFO 4 is not necessary. Also, the normal Appendix J Type A test schedule (three tests in 10 years) will require Type A tests during refueling outage RFO 5. Therefore, the staff finds that the requested exemption and associated TS changes are acceptable and that the plant may resume the normal Type A test schedule (three tests in 10 years) given in Section III.D of Appendix J.

### 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Michigan State official was notified of the proposed issuance of the amendment. The State official had no comments.

### 4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (58 FR 43925). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Pursuant to 10 CFR 51.32, an environmental assessment of the exemption from certain requirements of 10 CFR Part 50, Appendix J, related to these actions was published in the Federal Register on February 14, 1994 (59 FR 6977). Accordingly, the Commission has determined that the issuance of this exemption will not result in any environmental impacts beyond those evaluated in Fermi-2's Final Environmental Statement.

## 5.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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