March 27, 2003

Mr. William T. O'Connor, Jr.
Vice President - Nuclear Generation
Detroit Edison Company
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: FERMI 2 - ISSUANCE OF AMENDMENT RE: A ONE-TIME DEFERRAL OF THE PRIMARY CONTAINMENT INTEGRATED LEAK RATE TEST (TAC NO. MB5171)

Dear Mr. O'Connor:

The Commission has issued the enclosed Amendment No. 153 to Facility Operating License No. NPF-43 for the Fermi 2 facility. The amendment consists of changes to the Technical Specifications in response to your application dated May 23, 2002, as supplemented December 20, 2002, and February 27, 2003.

The amendment revises the Fermi 2 Technical Specifications (TSs) to allow a one-time deferral of the Type A primary containment integrated leak rate test. Specifically, TS 5.5.12, "Primary Containment Leakage Rate Testing Program," would be revised to extend the current interval for performing the containment Type A test to 15 years.

A copy of our safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

John F. Stang, Senior Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-341

Enclosures: 1. Amendment No. 153 to NPF-43
2. Safety Evaluation

cc w/encls: See next page

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*Safety Evaluation input provided by memos dated

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Fermi 2

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DETROIT EDISON COMPANY

DOCKET NO. 50-341

FERMI 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 153
License No. NPF-43

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by the Detroit Edison Company (the licensee) dated May 23, 2002, as supplemented December 20, 2002, and February 27, 2003, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. NPF-43 is hereby amended to read as follows:

   Technical Specifications and Environmental Protection Plan

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 153 , and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. DECo shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

L. Raghavan, Chief, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: March 27, 2003

ATTACHMENT TO LICENSE AMENDMENT NO. 153

FACILITY OPERATING LICENSE NO. NPF-43

DOCKET NO. 50-341

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

REMOVE	INSERT
5.0-18	5.0-18

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 153 FACILITY OPERATING LICENSE NO. NPF-43

DETROIT EDISON COMPANY

FERMI 2

DOCKET NO. 50-341

1.0 INTRODUCTION

By application dated May 23, 2002, as supplemented December 20, 2002, and February 27, 2003, the Detroit Edison Company (DECo or the licensee) requested changes to the Technical Specifications (TSs) for Fermi 2. The proposed changes would revise the Fermi 2 TSs to allow a one-time deferral of the Type A primary containment integrated leak rate test. Specifically, TS 5.5.12, "Primary Containment Leakage Rate Testing Program," would be revised to extend the current interval for performing the containment Type A test to 15 years.

The supplemental letters contained clarifying information and did not change the initial no significant hazards consideration determination and did not expand the scope of the original *Federal Register* notice.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix J, Option B requires that a Type A test be conducted at a periodic interval based on historical performance of the overall containment system. Fermi 2 TS 5.5.12 requires that leakage rate testing be performed as required by 10 CFR Part 50, Appendix J, Option B, as modified by approved exemptions, and in accordance with the guidelines contained in Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995. This RG endorses, with certain exceptions, Nuclear Energy Institute (NEI) Report 94-01, Revision 0, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," dated July 26, 1995.

A Type A test is an overall (integrated) leakage rate test of the containment structure. NEI 94-01 specifies an initial test interval of 48 months, but allows an extended interval of 10 years, based upon two consecutive successful tests. There is also a provision for extending the test interval an additional 15 months in certain circumstances. The most recent two Type A tests at Fermi 2 have been successful, so the current interval requirement is 10 years.

The licensee is requesting additions to TS 5.5.12, "Primary Containment Leakage Rate Testing Program," which would indicate that they are allowed to take an exception from the guidelines

of RG 1.163 regarding the Type A test interval. Specifically, the proposed TS states that the first Type A test after the October 1992 test shall be performed no later than October 2007.

3.0 TECHNICAL EVALUATION

The licensee performed a risk impact assessment of extending the Type A test interval to 15 years. The assessment was provided to the Nuclear Regulatory Commission (NRC) staff in the May 23, 2002, application for license amendment. Additional analysis and information were provided by the licensee in letters dated December 20, 2002 and February 27, 2003. In performing the risk assessment, the licensee considered the guidelines of NEI 94-01, the methodology used in Electric Power Research Institute (EPRI) TR-104285, "Risk Impact Assessment of Revised Containment Leak Rate Testing," and RG 1.174, "An Approach For Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."

The basis for the current 10-year test interval is provided in Section 11.0 of NEI 94-01, Revision 0, and was established in 1995 during development of the performance-based Option B to Appendix J. Section 11.0 of NEI 94-01 states that NUREG-1493, "Performance-Based Containment Leak-Test Program," provided the technical basis to support rulemaking to revise leakage rate testing requirements contained in Option B to Appendix J. The basis consisted of qualitative and quantitative assessments of the risk impact (in terms of increased public dose) associated with a range of extended leakage rate test intervals. To supplement the NRC's rulemaking basis, NEI undertook a similar study. The results of that study are documented in EPRI Research Project Report TR-104285.

The EPRI study used an analytical approach similar to that presented in NUREG-1493 for evaluating the incremental risk associated with increasing the interval for Type A tests. The EPRI study estimated that relaxing the test frequency from 3 in 10 years to 1 in 10 years will increase the average time that a leak detectable only by a Type A test goes undetected from 18 to 60 months. Since Type A tests only detect about 3 percent of leaks (the rest are identified during local leak rate tests based on industry leakage rate data gathered from 1987 to 1993), this results in a 10 percent increase in the overall probability of leakage. The risk contribution of pre-existing leakage for the pressurized-water reactor and boiling-water reactor (BWR) representative plants confirmed the NUREG-1493 conclusion that a reduction in the frequency of Type A tests from 3 in 10 years to 1 in 20 years leads to an "imperceptible" increase in risk on the order of 0.2 percent and a fraction of one person-rem per year.

Building upon the methodology of the EPRI study, the licensee assessed the change in the predicted person-rem/year frequency. The licensee quantified the risk from sequences that have the potential to result in large releases if a pre-existing leak were present. Since the Option B rulemaking in 1995, the NRC staff has issued RG 1.174 on the use of probabilistic risk assessment (PRA) in risk-informed changes to a plant's licensing basis. The licensee has proposed using RG 1.174 to assess the acceptability of extending the Type A test interval beyond that established during the Option B rulemaking. RG 1.174 defines very small changes in the risk-acceptance guidelines as increases in core damage frequency (CDF) less than 10^{-6}/year and increases in large early release frequency (LERF) less than 10^{-7}/ year. Since the Type A test does not impact CDF, the relevant criterion is the change in LERF. The licensee has estimated the change in LERF for the proposed change and the cumulative change from the original 3 in 10 year interval. RG 1.174 also discusses defense-in-depth and encourages

the use of risk analysis techniques to help ensure and show that key principles, such as the defense-in-depth philosophy, are met. The licensee estimated the change in the conditional containment failure probability for the proposed change to demonstrate that the defense-in-depth philosophy is met.

The licensee provided an analysis that estimated all of these risk metrics and whose methodology is consistent with previously approved submittals. The following conclusions can be drawn from the analysis associated with extending the Type A test frequency:

1. A slight increase in risk is predicted when compared to that estimated from current requirements. Given the change from a 3 in 10 year test interval to a 1 in 15 year test interval, the increase in the total integrated plant risk, in person-rem/year, is estimated to be less than 0.1 percent. This increase is comparable to that estimated in NUREG-1493, in which it was concluded that a reduction in the frequency of tests from 3 in 10 years to 1 in 20 years leads to an "imperceptible" increase in risk. Therefore, the increase in the total integrated plant risk for the proposed change is considered small and supportive of the proposed change.

2. The increase in LERF resulting from a change in the Type A test interval from the original 3 in 10 years to 1 in 15 years is estimated to be 1.7×10^{-8}/year. However, there is some likelihood that the flaws in the containment estimated as part of the Class 3b (Small Pre-Existing Failures) frequency would be detected as part of the IWE/IWL visual examination of the containment surfaces (as identified in American Society of Mechanical Engineers [ASME] Boiler and Pressure Vessel Code, Section XI, Subsections IWE/IWL). The most recent visual examination of the Fermi 2 containment was performed in Spring 2000. The next scheduled IWE/IWL containment visual examination is spring 2003. Visual examinations are expected to be effective in detecting large flaws in the visible regions of the containment, and would reduce the impact of the extended test interval on LERF. The licensee performed additional risk analysis to consider the potential impact of corrosion in inaccessible areas of the containment shell on the proposed change. The risk analysis considered the likelihood of an age-adjusted flaw that would lead to a breach of the containment. The risk analysis also considered the likelihood that the flaw was not visually detected but could be detected by a Type A test. When possible corrosion of the containment surfaces is considered, the increase in LERF resulting from a change in the Type A test interval from the original 3 in 10 years to 1 in 15 years, is estimated to be 3.8×10^{-8}/year. The NRC staff concludes that increasing the Type A interval to 15 years results in only a small change in LERF and is consistent with the acceptance guidelines of RG 1.174.

3. RG 1.174 also encourages the use of risk analysis techniques to help ensure and show that the proposed change is consistent with the defense-in-depth philosophy. Consistency with the defense-in-depth philosophy is maintained if a reasonable balance is preserved among prevention of core damage, prevention of containment failure, and consequence mitigation. The licensee estimates the change in the conditional containment failure probability to be an increase of 0.5 percentage points for the cumulative change of going from a test interval of 3 in 10 years to 1 in 15 years. The NRC staff finds that the defense-in-depth philosophy is maintained based on the change in the conditional containment failure probability for the proposed amendment.

Based on these conclusions, the NRC staff finds that the increase in predicted risk due to the proposed change is within the acceptance guidelines while maintaining the defense-in-depth philosophy of RG 1.174 and, therefore, is acceptable.

Fermi 2 utilizes a General Electric BWR Mark I primary containment consisting of a drywell, a torus, eight vents connecting the drywell and torus, and several penetrations used for access into the containment and for other process piping and electrical service. The integrity of the primary containment penetrations and isolation valves are verified through Type B and Type C local leak rate tests (LLRTs) as required by 10 CFR Part 50, Appendix J, and the overall leak tight integrity of the primary containment through an integrated leak rate test (ILRT). These tests are performed to verify the essentially leak-tight characteristics of the containment at the design-basis accident pressure. The last ILRT for Fermi 2 was performed in October 1992. With an extension of the ILRT time interval, the next overall verification will be performed no later than October 2007. Because the ILRT, LLRTs, and inservice inspection (ISI) of the containment collectively ensure the leak-tight and structural integrity of the containment, information regarding the licensee's program for containment ISI and to address potential areas of weakness in the containment that may not be apparent in the risk assessment are essential. The following is a discussion of the pertinent information the licensee provided in its original May 23, 2002, application, and through its responses to the NRC staff's Request for Additional Information (RAI) dated December 20,2002.

The licensee is using the 1992 Edition and the 1992 Addenda of Subsections IWE of Section XI of the ASME Boiler and Pressure Vessel Code (the Code) for conducting the ISI of the Fermi 2 containment, with certain approved relief from some Code requirements. The current containment ISI 10-year interval began in 2000, and will end in 2010. The licensee states that the expedited examination of containment required by 10 CFR 50.55a(g)(6)(ii)(B), completed in the spring of 2000, revealed several minor degradations using visual inspection methods. These included a small pit at the interface of an I-beam with the containment steel shell, minor material loss on a single tie-down eyebolt on the north equipment hatch, a small crack in the rubber seal for the outer drywell airlock door, and some localized protective coating degradation. The licensee notes that all identified conditions have been repaired or dispositioned. The licensee also identified (1) the moisture seal at the interface between the drywell concrete floor and steel shell, and (2) the torus interior as primary areas susceptible to degradation. The licensee states that inspection of the moisture seal and subsequent reinspection have shown no signs of degradation, and that only minor coating degradation has been identified in the torus through inspections made every two refueling outages (about every three years). The information provided by the licensee indicates that the accessible areas of the containment pressure boundary will be periodically monitored for signs of degradation.

In reference to the issue of transgranular stress corrosion cracking of stainless steel bellows, the licensee states that its bellows are Type B testable. The licensee justifies this based upon a review of the purchase specifications and a discussion with the manufacturers. The licensee explains that the bellows at Fermi 2 have a wire mesh between the plies that ensures an air gap for the adequate performance of Appendix J, Type B testing. Under Option B of Appendix J leak rate testing, these bellows will be pressure-tested every 10 years.

In reference to the issue of potential degradation in inaccessible areas of the drywell liner that cannot be identified by visual examination, the licensee explains that the area most susceptible to degradation is the sand cushion area near the bottom of the drywell shell. The licensee

states that work was performed to clean the drain lines in the sand cushion area and to perform a video probe inspection for any moisture trapped in the sand cushion region. This work was completed in 1994, and the licensee states that no signs of moisture in the sand cushion area were identified. The licensee states that since the initial inspection, all four drain lines in the sand cushion region were inspected for moisture on a quarterly basis, and that no signs of moisture have been found since the initial inspection.

In its response to the NRC staff's RAI, the licensee further discussed the issue of potential degradation in inaccessible areas of the drywell liner. Operating experience data indicates that primary containment design in plants which have experienced degradation in the upper areas of the drywell has concrete in direct contact with the steel liner. It was determined that foreign objects left in the concrete were in physical contact with the liner, allowing moisture to collect and cause degradation of the liner. The licensee noted that the design of the Fermi 2 primary containment includes an air gap between the drywell steel liner and the concrete shield wall. Leakage through the refueling bellows, or any other source that could result in potential moisture in the inaccessible exterior liner surface area, will drain down directly to the sand cushion region.

In reference to how the potential leakage under high pressures during severe accidents are factored into the risk assessment related to the extension of the integrated leak rate test, the licensee stated that based on previously approved ILRT interval extension submittals and NEI guidance, the Fermi 2 ILRT interval extension risk assessment was performed using a methodology that divides the spectrum of severe accidents into nine accident categories (defined in EPRI TR-104285 report, "Risk Impact Assessment of Revised Containment Leak Rate Testing," dated Augusst 1994). The issue of potential containment shell degradation and leakage is accounted for by the following two accident categories: (1) Category 3b - Small Pre-Existing Failures and (2) Category 3a - Large Pre-Existing Failures. The frequencies of these accident categories are calculated, using NEI guidance and operating experience data, assuming a linear relationship between the length of the ILRT interval and the likelihood of a pre-existing containment leak pathway at the time of a core damage accident. Therefore, the potential leakage under high pressures during severe accidents is factored into the risk assessment for the ILRT interval extension.

In reference to the issue of maintaining a positive pressure in the Fermi 2 primary containment, the licensee explains: (1) the primary containment is typically maintained at an average positive pressure between 5 and 19 inches of water (approx. 0.2 to 0.7 psig) to ensure that no external sources of oxygen are introduced into the nitrogen inerted primary containment; (2) that administrative procedures require maintaining a positive pressure between 5 and 19 inches of water (approx. 0.2 to 0.7 psig); (3) that primary containment pressure is continuously monitored by a control room recorder, and according to surveillance procedures is additionally recorded once every 12 hours; and (4) if pressure is thought to be escaping the primary containment, plant management would be notified to provide an evaluation of whether plant shut down is required to address the problem. The NRC staff finds that this continuous monitoring of slight positive pressure will help detect areas of containment degradation that could result in large unacceptable leakage rates.

Based on the licensee's procedures discussed above to preclude excessive degradation of the primary containment components, the NRC staff finds that granting the requested ILRT extension will not adversely affect the leak tight integrity of the primary containment. It should

be noted that Subarticle IWE-5000 of the ASME Code, Section XI requires leak rate testing following repair, modification, or replacement of containment components. An ILRT might be required to confirm that these activities are adequate and that further degradation does not exist in other areas of the containment. The licensee is required to report serious degradation of the containment pressure boundary pursuant to 10 CFR 50.72 or 10 CFR 50.73

4.0 SUMMARY

Based on the foregoing evaluation, the NRC staff finds that the interval until the next Type A test at Fermi, Unit 2, may be extended to 15 years, and that the proposed changes to Section 5.5.12 of the TSs are acceptable.

5.0 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.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, or which changes an inspection or a surveillance rquirement. The NRC 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 (67 FR 42817). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

7.0 CONCLUSION

The Commission 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.

Principal Contributors: GKlein
RPalla
RPulsipher

Date: March 27, 2003