

January 4, 1994

Docket No. 50-341

Mr. Douglas R. Gipson  
Senior Vice President  
Nuclear Generation  
Detroit Edison Company  
6400 North Dixie Highway  
Newport, Michigan 48166

Dear Mr. Gipson:

SUBJECT: FERMI-2 - ISSUANCE OF AMENDMENT RELATED TO TORUS TO DRYWELL VACUUM BREAKER SURVEILLANCE TESTING (TAC NO. M86062)

The Commission has issued the enclosed Amendment No. 96 to Facility Operating License No. NPF-43 for the Fermi-2 facility. The amendment consists of changes to the Technical Specifications (TS) in response to your letter dated March 23, 1993.

The amendment revises the TS surveillance frequency for periodic cycling of the suppression chamber - drywell vacuum breakers from once per 31 days to once per cold shutdown if not performed within the previous 92 days. The amendment also revises the TS operability requirement for vacuum breakers now requiring all, vice 10 of 12, vacuum breakers be operable.

We understand, per discussions with your staff, that rather than submit an inservice testing relief request under separate cover as indicated in your March 23, 1993, submittal, you now intend to document a "cold shutdown justification" for impracticality of cycling these valves at power. This is addressed in the enclosed safety evaluation. We also understand that you have requested full implementation be within 45 days rather than 30 days as originally stated in your submittal.

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,

Original signed by  
Timothy G. Colburn, Sr. Project Manager  
Project Directorate III-1  
Division of Reactor Projects - III/IV/V  
Office of Nuclear Reactor Regulation

050008

Enclosures:

1. Amendment No. 96 to NPF-43
2. Safety Evaluation

cc w/enclosures:

See next page

\*SEE PREVIOUS CONCURRENCE

*CP-1*

*RF01*  
*11*

OFFICE	LA:PD31	PM:PD31 <i>See</i>	BC:EMEB	OTSB	OGC	(A)D:PD31
NAME	CJamerson*	TColburn:jkd	JNorberg*	CGrimes*	CMarco*	ARBlough
DATE	12/7/93	1/3/94	12/15/93	12/21/93	12/30/93	1/3/94

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The amendment revises the TS surveillance frequency for periodic cycling of the suppression chamber - drywell vacuum breakers from once per 31 days to once per cold shutdown if greater than 92 days since the last surveillance. The amendment also revises the TS operability requirement for vacuum breakers now requiring all, vice 10 of 12, vacuum breakers be operable.

We understand, per discussions with your staff, that rather than submit an inservice testing relief request under separate cover as indicated in your March 23, 1993, submittal, you now intend to document a "cold shutdown justification" for impracticality of cycling these valves at power. This is addressed in the enclosed safety evaluation. We also understand that you have requested full implementation be within 45 days rather than 30 days as originally stated in your submittal.

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Timothy G. Colburn, Sr. Project Manager  
Project Directorate III-1  
Division of Reactor Projects - III/IV/V  
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. [redacted] to NPF-43
- 2. Safety Evaluation

cc w/enclosures:  
See next page

OFFICE	LA:PD31	PM:PD31 <i>pac</i>	BC:EMEB <i>EMEB</i>	OTSB #93-192 <i>CG</i>	OGC <i>OGC</i>	(A)D:PD31
NAME	CJamerson <i>CG</i>	TColburn:jkd	JNorberg	CGrimes <i>CG</i>	<i>subject to change</i>	ARBlough
DATE	12/7/93	12/9/93	12/15/93	12/21/93	12/30/93	1/93

Mr. Douglas R. Gipson  
Detroit Edison Company

Fermi-2

cc:

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Detroit Edison Company  
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DATED: January 4, 1994

AMENDMENT NO. 96 TO FACILITY OPERATING LICENSE NO. NPF-43-FERMI-2

Docket File

NRC & Local PDRs

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cc: Plant Service list



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

DETROIT EDISON COMPANY

DOCKET NO. 50-341

FERMI-2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 96  
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 March 23, 1993, 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. 96 , 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 the date of its issuance with full implementation within 45 days.

FOR THE NUCLEAR REGULATORY COMMISSION



A. Randolph Blough, Acting Director  
Project Directorate III-1  
Division of Reactor Projects - III/IV/V  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: January 4, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 95

FACILITY OPERATING LICENSE NO. NPF-43

DOCKET NO. 50-341

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

REMOVE

3/4 6-48

3/4 6-49

3/4 6-50\*

INSERT

3/4 6-48

3/4 6-49

3/4 6-50\*

\*Overleaf page provided to maintain document completeness. No changes contained on these pages.

## CONTAINMENT SYSTEMS

### 3/4.6.4 VACUUM RELIEF

#### SUPPRESSION CHAMBER - DRYWELL VACUUM BREAKERS

##### LIMITING CONDITION FOR OPERATION

---

3.6.4.1 All suppression chamber - drywell vacuum breakers shall be closed and OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

- a. With one of the above required vacuum breakers inoperable for opening but known to be closed, restore the inoperable vacuum breaker to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With one or more suppression chamber - drywell vacuum breakers open, close the open vacuum breaker(s) within 2 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- c. With one of the position indicators of any suppression chamber - drywell vacuum breakers inoperable, verify that all other vacuum breakers are closed within 2 hours and:
  1. Verify the vacuum breaker(s) with the inoperable position indicator to be closed by demonstrating the other indicator to be OPERABLE within 2 hours and at least once per 14 days thereafter, or
  2. Verify the vacuum breaker(s) with the inoperable position indicator to be closed by conducting a test which demonstrates that the drywell-to-suppression chamber  $\Delta P$  is maintained at greater than or equal to 0.5 psi for one hour without makeup within 24 hours and at least once per 14 days thereafter.

Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

- d. With one of the closed position indicators of one or more suppression chamber - drywell vacuum breaker(s) indicating open and the redundant closed position indicator indicating closed after a suppression chamber - drywell vacuum breaker opening as a result of a steam release, within 24 hours, cycle the applicable valve(s) to determine which of the redundant indicators is OPERABLE.

## CONTAINMENT SYSTEMS

### SURVEILLANCE REQUIREMENTS

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4.6.4.1 Each suppression chamber - drywell vacuum breaker shall be:

- a. Verified closed at least once per 7 days.
- b. Demonstrated OPERABLE:
  1. During each COLD SHUTDOWN, if not performed within the previous 92 days, and within 12 hours after any discharge of steam to the suppression chamber from the safety/relief valves by:
    - a) Cycling each vacuum breaker through at least one complete cycle of full travel.
    - b) Verifying both position indicators OPERABLE by observing expected valve movement during the cycling test.
  2. At least once per 18 months by;
    - a) Verifying the opening setpoint, from the closed position, to be less than or equal to 0.5 psid, and
    - b) Verifying both position indicators OPERABLE by performance of a CHANNEL CALIBRATION.
    - c) Verify the opening gap for switch actuation to be less than or equal to 0.03 inches.

## CONTAINMENT SYSTEMS

### REACTOR BUILDING - SUPPRESSION CHAMBER VACUUM BREAKERS

#### LIMITING CONDITION FOR OPERATION

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3.6.4.2 All Reactor Building - suppression chamber vacuum breakers shall be OPERABLE and closed.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

- a. With one Reactor Building - suppression chamber vacuum breaker inoperable for opening but known to be closed, restore the inoperable vacuum breaker to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With one Reactor Building - suppression chamber vacuum breaker open, isolate the associated vacuum breaker line by closing the isolation valve within 2 hours; restore the open vacuum breaker to the closed position within 72 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- c. With the position indicator of any Reactor Building-suppression chamber vacuum breaker inoperable, restore the inoperable position indicator to OPERABLE status within 14 days or verify the vacuum breaker to be closed at least once per 24 hours by visual inspection. Otherwise, declare the vacuum breaker inoperable or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

#### SURVEILLANCE REQUIREMENTS

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4.6.4.2 Each Reactor Building - suppression chamber vacuum breaker shall be:

- a. Verified closed at least once per 7 days.
- b. Demonstrated OPERABLE:
  1. At least once per 31 days by:
    - a) Cycling vacuum breaker through at least one complete test cycle of full travel.
    - b) Verifying the position indicator OPERABLE by observing expected valve movement during the cycling test.
  2. At least once per 18 months by:
    - a) Demonstrating that the force required to open each vacuum breaker does not exceed the equivalent of 0.5 psid.
    - b) Visual inspection.
    - c) Verifying the position indicator OPERABLE by performance of a CHANNEL CALIBRATION.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 96 TO FACILITY OPERATING LICENSE NO. NPF-43

DETROIT EDISON COMPANY

FERMI-2

DOCKET NO. 50-341

1.0 INTRODUCTION

By letter dated March 23, 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 revise the TS surveillance requirements for the suppression chamber (wetwell) to drywell vacuum breakers (VBs).

The licensee's application states that approval of the application would enhance safety due to the fact that the nitrogen-actuated stroking devices used to test the VBs are prone to failure in a manner that can cause the VBs to fail open. An open VB renders the suppression chamber inoperable due to the creation of a suppression pool steam bypass pathway.

2.0 DISCUSSION AND EVALUATION

2.1 Background Information and Discussion

Vacuum Breaker Design: The VB is a swing-check device having a 20-inch flapper or "pallet" which self actuates to open under a differential pressure of 0.5 psi. The VB vendor is GPE Controls. The VBs are located in the suppression chamber air space attached to the drywell vent system. Resilient seals are used in the pallet-seat interface. Magnetic latches are provided to prevent chattering and vibration. The VBs were modified (strengthened) as a result of a finding during Full Scale Test Facility tests that the VBs are subject to chugging and condensation oscillation loads (Ref: Generic Letter 83-08, "Modification of Vacuum Breakers on Mark I Containments"). Unlike later BWR series facilities, at Fermi-2, a Mark I facility, the drywell VBs are not installed in series-pair configurations for single-failure capability. Failure of any one of the 12 VBs creates a bypass pathway.

Each VB is fitted with a pneumatically powered stroke-test actuator enabling control room personnel to remotely stroke it as a demonstration of operability. Redundant safety-grade limit switches are provided to indicate when the pallet is in the fully closed position. Another limit switch (not redundant or safety-grade) is provided to indicate when the pallet is in the fully open position. In order that a VB not be rendered inoperable by testing, the test actuator is intentionally designed to have insufficient power to hold the pallet open against LOCA dynamic forces. However, the test actuators are considered non-safety-related devices and have not been tested under LOCA stresses. There are at least three recorded cases, one at Fermi-2,

where a VB failed to reclose during testing. These failures were due to test actuator problems. In the Fermi-2 case, the actuator jammed preventing VB reclosure.

Drywell VBs are relatively simple devices. Not counting its test actuator and limit switches, each VB has only a single moving part. A VB is capable of performing its blowdown function (to prevent suppression pool bypass), and post blowdown function (to relieve differential pressure), with no active power source. In its normal position it is already closed and is thus capable of performing the blowdown safety function with no physical movement.

Basis for Current Stroke Test Frequency: A monthly frequency has been specified for drywell VBs since the earliest suppression pool containment facilities were licensed. The Inservice Testing requirements of ASME Section XI have historically specified a 3-month stroke test interval for vacuum breakers and other valves. However, the staff has maintained that the drywell VB stroke testing frequency should continue to be at monthly intervals, due to the important safety function, inaccessibility, significant number of failures which have been reported, and harsh environment in which they are located. However, in at least two safety evaluations for TS amendments (i.e., Browns Ferry 1/2 and Vermont Yankee) the staff has accepted the ASME Section XI requirements for a 3-month vacuum breaker stroke test frequency.

Flow-Checking and Vacuum Relief Functions: The purpose of the drywell VBs is to protect the containment drywell from excessive negative pressures. Should a loss-of-coolant accident (LOCA) occur, most of the noncondensable gases in the drywell would be blown into the suppression chamber as the drywell became pressurized with steam. Subsequent to the blowdown, a vacuum would form in the drywell as the steam condensed. A severe negative pressure could also occur due to an inadvertent spray actuation during normal operation. If the vacuum were not relieved, the drywell could buckle (implode). The containment design negative pressure is 2.0 psid. If 9 of the 12 VBs are operable (i.e., free to open and pass rated flow from the suppression chamber to the drywell under reverse differential pressure), the noncondensable gases in the suppression chamber can pass back into the drywell to restore pressure. Another function of the VBs is to minimize the elevation of the water column in the vent system during normal operation. This is necessary to assure that vent clearing loads are not exceeded during a LOCA. Accordingly, a TS Limiting Condition of Operation (LCO) for the vacuum relief function requires at least 10 VBs to be capable of opening under 0.5 psid pressure differential. Now that testing will be performed during plant shutdown, the licensee proposes to change this LCO to require all 12 VBs to be capable of vacuum relief to ensure the repair of inoperable valves prior to startup.

If a VB is open, a suppression pool bypass path is present. During a LOCA, steam from the drywell could bypass the submerged vents in the suppression pool. This could result in containment overpressurization beyond its structural capability (if wetwell spray was not manually initiated promptly). The maximum allowable amount of equivalent bypass leakage area is that of a 7-inch diameter line. An LCO/action statement is provided for the vacuum relief function requiring all VBs to be closed or a shutdown begun within

2 hours. If position indicators are inoperable, closure of all VBs can be verified during power operation by a low pressure decay test on the drywell with nitrogen. Repair of a drywell VB requires that the drywell and suppression chamber be deinerted to permit entry.

During post-LOCA recovery operations, the VBs would serve to maintain desired flow paths during recombiner operation or nitrogen vent/purge operations.

## 2.2 Evaluation

The staff has reviewed the licensee's proposed TS changes and determined that there is sufficient technical basis for approval. The staff's approval is based on the following findings:

1. A Nuclear Plant Reliability Data System search and telephone survey of similar plants by the licensee indicates that although there has been a considerable number of cases of failures of VBs to reclose during stroke testing, for GPE Controls VBs, there is no history of failures to open during testing.
2. With respect to the vacuum relief safety function, the drywell vacuum relief system has triple failure redundancy. Only 9 of 12 VBs are needed for vacuum relief for the limiting negative pressure event (i.e., 4 VBs must fail to open before the safety function would be compromised). This provides an extremely high level of assurance that the drywell is protected from buckling and thus supports extended surveillance intervals.
3. It is critical that all VBs be closed during the blowdown phase of a LOCA. However, the VBs are normally closed. No motion is needed for them to perform their reverse-flow (flow-check) safety function. During the blowdown phase of a LOCA, the VBs are thus "passive" devices. Regulatory criteria do not postulate passive failures during the short-term phase of a LOCA.
4. Each VB has redundant safety-grade position indicators for the CLOSED position. There is thus a high degree of assurance that an open VB would not go undetected during plant operation and that no steam bypass pathway would exist due to an open VB should a LOCA occur.
5. Unlike typical swing-check valves for which ASME Section XI authorizes a 3-month stroke test interval (or testing during cold shutdown if impractical to test at power), the drywell VBs are located in an inert environment which minimizes corrosion. Also unlike typical VBs, the VBs are provided with magnetic latching to minimize vibrational wear. These factors further support extended surveillance intervals.

Based on the considerations described in Section 2.2 above, the staff has determined that, for Fermi-2, an extended interval for cycling each drywell vacuum breaker through at least one cycle of full travel is acceptable. The extension from a monthly cycling to cycling on a cold shutdown frequency provides an adequate means to assess the operational readiness of the vacuum

breakers. The requirements for verifying the opening setpoint on a refueling outage frequency are maintained. Together, these surveillance requirements ensure an acceptable level of quality and safety and are therefore acceptable.

The Fermi 2 inservice testing program was developed to the 1980 Edition, with addenda through the Winter 1980 Addenda. Per IWV-3521 and IWV-3522, full-stroke exercising of check valves is required every 3 months, unless exercising is impractical during power operations. For the reasons given in the licensee's justification for the TS change, and as approved by the NRC, a determination was made that exercising the vacuum breakers during power operations is impractical. Therefore, the licensee may document a "cold shutdown justification" in its inservice testing program. As indicated in response to Question 102 of the "Minutes of the Public Meetings on Generic Letter 89-04," NRC review of cold shutdown justifications is not required. Per telephone conversation with the licensee, the licensee has indicated its intention to document the cold shutdown justification prior to implementation of this TS change.

### 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 requirements with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and the related surveillance requirements. 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 30191). 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.

### 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.

Principal Contributor: W. Long

Date: January 4, 1994