

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

July 9, 1998

SUBJECT: FERMI 2 - ISSUANCE OF AMENDMENT RE: REPLACEMENT OF THE
DIVISION II 130/260-VOLT DC BATTERY (TAC NO. MA0717)

Dear Mr. Gipson:

The Commission has issued the enclosed Amendment No. 121 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 application dated January 28, 1998 (NRC-98-0002).

The amendment revises the TS surveillance requirements for the Division II 130/260-volt dc battery to accommodate the design of the replacement battery. During the review of this amendment, the NRC staff raised two issues, unrelated to the amendment, involving the current TS 18-month SRs for the batteries. NRC understands that Detroit Edison plans to address these issues in a revision to the April 3, 1998, submittal for the improved standard TSs.

Because full implementation of this amendment may not take place until the fall of 1998, until full implementation Detroit Edison should submit two sets of TS pages for any pages affected in future amendments by the issuance of this amendment. The TS pages should reflect the conditions before and after full implementation of this amendment so that the correct TS pages may be issued in any future amendments. The NRC also requests that you submit a letter informing the staff when this amendment is fully implemented.

A copy of our Safety Evaluation is enclosed. The notice of issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,
ORIGINAL SIGNED BY

Andrew J. Kugler, Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-341

Enclosures: 1. Amendment No. 121 to NPF-43
2. Safety Evaluation

cc w/encl: See next page

DISTRIBUTION: See attached page

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PDR

Mr. Douglas R. Gipson
Detroit Edison Company

Fermi 2

cc:

John Flynn, Esquire
Senior Attorney
Detroit Edison Company
2000 Second Avenue
Detroit, Michigan 48226

Drinking Water and Radiological
Protection Division
Michigan Department of
Environmental Quality
3423 N. Martin Luther King Jr Blvd
P. O. Box 30630 CPH Mailroom
Lansing, Michigan 48909-8130

U.S. Nuclear Regulatory Commission
Resident Inspector's Office
6450 W. Dixie Highway
Newport, Michigan 48166

Monroe County Emergency Management
Division
963 South Raisinville
Monroe, Michigan 48161

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4351

Norman K. Peterson
Director, Nuclear Licensing
Detroit Edison Company
Fermi 2 - 280 TAC
6400 North Dixie Highway
Newport, Michigan 48166

DATED: July 9, 1998

AMENDMENT NO. 121 TO FACILITY OPERATING LICENSE NO. NPF-43 - FERMI 2

Docket File (50-341)

PUBLIC

E. Adensam (EGA1)

C. Jamerson

A. Kugler

OGC

G. Hill, IRM (2)

W. Beckner

S. Saba, EELB

ACRS

B. Burgess, RIII

SEDB (TLH3)



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

DETROIT EDISON COMPANY

DOCKET NO. 50-341

FERMI 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 121
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 January 28, 1998 (NRC-98-0002), 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. 121 , 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 prior to startup from the sixth refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION



Andrew J. Kugler, Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: July 9, 1998

ATTACHMENT TO LICENSE AMENDMENT NO. 121

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 8-9
3/4 8-10
3/4 8-11
3/4 8-12

INSERT

3/4 8-9*
3/4 8-10
3/4 8-11
3/4 8-12*

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

ELECTRICAL POWER SYSTEMS

A.C. SOURCES - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and the onsite Class 1E distribution system, and
- b. One onsite A.C. electrical power source, Division I or Division II, consisting of two emergency diesel generators, each diesel generator with:
 1. A day fuel tank containing a minimum of 210 gallons of fuel.
 2. A fuel storage system containing a minimum of 35,280 gallons of fuel.
 3. A fuel transfer pump.

APPLICABILITY: OPERATIONAL CONDITIONS 4, 5, and *.

ACTION:

- a. With less than the above required A.C. electrical power sources OPERABLE, suspend CORE ALTERATIONS, handling of irradiated fuel in the secondary containment, operations with a potential for draining the reactor vessel and crane operations over the spent fuel storage pool when fuel assemblies are stored therein. In addition, when in OPERATIONAL CONDITION 5 with the water level less than 20 feet 6 inches above the reactor pressure vessel flange, immediately initiate corrective action to restore the required power sources to OPERABLE status as soon as practical.
- b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.8.1.2 At least the above required A.C. electrical power sources shall be demonstrated OPERABLE per Surveillance Requirements 4.8.1.1.1 and 4.8.1.1.2, except for the requirement of 4.8.1.1.2.a.5.

*When handling irradiated fuel in the secondary containment.

ELECTRICAL POWER SYSTEMS
3/4.8.2 D.C. SOURCES
D.C. SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.8.2.1 As a minimum, the following D.C. electrical power sources shall be OPERABLE:

- a. Division I, consisting of:
 1. 130 VDC Battery 2A-1.
 2. 130 VDC Battery 2A-2.
 3. Two 130 VDC full capacity chargers.
- b. Division II, consisting of:
 1. 130 VDC Battery 2B-1.
 2. 130 VDC Battery 2B-2.
 3. Two 130 VDC full capacity chargers.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

- a. With a battery charger in either Division I or Division II of the above D.C. electrical power sources inoperable, restore the inoperable battery charger to OPERABLE status or replace with the spare battery charger within 4 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.
- b. With either Division I or Division II of the above required D.C. electrical power sources otherwise inoperable, restore the inoperable division to OPERABLE status within 2 hours or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.*

SURVEILLANCE REQUIREMENTS

4.8.2.1 Each of the above required 130-volt batteries and chargers shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying that:
 1. The parameters in Table 4.8.2.1-1 meet the Category A limits, and
 2. Total battery terminal voltage is greater than or equal to 130 volts for Division I and greater than or equal to 125.7 volts for Division II on float charge.
- b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage less than 105 volts, or battery overcharge with battery terminal voltage greater than 150 volts for Division I and greater than 145 volts for Division II, by verifying that:
 1. The parameters in Table 4.8.2.1-1 meet the Category B limits,

*This ACTION may be delayed for up to 16 hours for battery chargers made inoperable due to loss of EECW cooling provided the ACTIONS of Specification 3.7.1.2 are taken.

ELECTRICAL POWER SYSTEMS
SURVEILLANCE REQUIREMENTS (Continued)

2. There is no visible corrosion at either terminals or connectors, or the connection resistance of these items is less than 150×10^{-6} ohm, and
 3. The average electrolyte temperature of ten of the connected cells is above 60°F.
- c. At least once per 18 months by verifying that:
1. The cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration,
 2. The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anticorrosion material,
 3. The resistance of each cell-to-cell and terminal connection is less than or equal to 150×10^{-6} ohm, and
 4. The battery charger will supply at least 100 amperes at a minimum of 129 volts for Division I and at a minimum of 124.7 volts for Division II for at least 4 hours.
- d. At least once per 18 months by verifying that either:
1. The battery capacity is adequate to supply and maintain in OPERABLE status all of the actual emergency loads for the design duty cycle (4 hours) when the battery is subjected to a battery service test, or
 2. The battery capacity is adequate to supply a dummy load of the following profile while maintaining the battery terminal voltage greater than or equal to 105 or 210 volts, as applicable:
 - a) Batteries 2PA and 2PB greater than or equal to 710 amperes during the initial 6 seconds of the test.
 - b) Batteries 2PA and 2PB greater than 182 amperes during the next 42 seconds of the test.
 - c) Batteries 2PA and 2PB greater than or equal to 54 amperes during the next 4 hours of the test.
 - d) Batteries 2PA and 2PB greater than or equal to 480 amperes during the last 6 seconds of the test.
- e. At least once per 60 months during shutdown by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. At this once per 60-month interval, this performance discharge test may be performed in lieu of the battery service test.
- f. At least once per 18 months performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

TABLE 4.8.2.1-1

BATTERY SURVEILLANCE REQUIREMENTS

Parameter	CATEGORY A ⁽¹⁾	CATEGORY B ⁽²⁾	
	Limits for each designated pilot cell	Limits for each connected cell	Allowable ⁽³⁾ value for each connected cell
Electrolyte Level	>Minimum level indication mark, and < ¼" above maximum level indication mark	>Minimum level indication mark, and < ¼" above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 volts	≥ 2.13 volts ⁽⁴⁾	> 2.07 volts
Specific Gravity ⁽⁵⁾	≥ 1.195 ⁽⁶⁾	≥ 1.190 Average of all connected cells > 1.200	Not more than 0.020 below the average of all connected cells Average of all connected cells ≥ 1.190 ⁽⁶⁾

(1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next 6 days.

(2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.

(3) Any Category B parameter not within its allowable value indicates an inoperable battery.

(4) May be corrected for average electrolyte temperature.

(5) Corrected for electrolyte temperature and level.

(6) Or battery charging current is less than 2 amperes when on float charge.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 121 TO FACILITY OPERATING LICENSE NO. NPF-43

DETROIT EDISON COMPANY

FERMI 2

DOCKET NO. 50-341

1.0 INTRODUCTION

By letter dated January 28, 1998 (NRC-98-0002), 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 licensee plans to replace the Division II 130/260-volt direct current (Vdc) battery during the sixth refueling outage. The proposed amendment would revise TS surveillance requirements (SRs) 4.8.2.1.a.2, 4.8.2.1.b, and 4.8.2.1.c.4 for the battery to accommodate the design of the replacement battery. Because the implementation date for the amendment is tied to the outage, the NRC requests that you submit a letter informing the staff when the amendment is implemented.

2.0 BACKGROUND

The dc electrical power system at Fermi 2 provides dc emergency power via the 130/260-Vdc systems and the 24/48-Vdc system. The function of the Class 1E 130/260-Vdc system is to provide dc power to Class 1E dc loads and for the control and switching of Class 1E systems. This power is provided through two sets (Divisions I and II) of 130/260-Vdc Category 1 station batteries with full capacity battery chargers. The Division II 260-volt battery (2PB) consists of two 130-volt batteries (2B-1 and 2B-2) connected in series.

The present Division II batteries are designed with sufficient capacity to support the Fermi design-basis accident load profile. However, the licensee has identified a decreasing trend in battery capacity during battery performance discharge testing. A recent battery performance test indicated increased signs of degradation in battery capacity of approximately 7 percent for the 130-Vdc battery 2B-1 and over 2 percent for the 130-Vdc battery 2B-2. The licensee has indicated that, even with this degradation, the existing batteries meet the present design requirements for assuring the batteries are capable of performing their functions and will be maintained above the criteria for battery replacement until they are replaced.

The current Division II 260-Vdc battery is furnished by C&D Power Systems, Inc. (C&D). This battery is a KC-17 type, lead calcium battery containing 120 cells (includes two 130-Vdc batteries containing 60 cells each) with a 1.215 specific gravity. This battery will be replaced with a higher capacity battery furnished by C&D. The new battery will be an LCR-21 type, lead calcium battery containing 116 cells (includes two 130-Vdc batteries containing 58 cells each)

with a 1.215 specific gravity. The battery is scheduled to be replaced during the sixth refueling outage (RF06).

The battery replacement will not change the existing battery system configuration (other than adjustments for the smaller number of cells). The new Division II 260-Vdc battery will remain located in the Auxiliary Building Division II Battery Room and will continue to supply dc power through a set of 130-Vdc station batteries. The battery replacement will change the battery capacity and number of cells per battery system.

The licensee has indicated that the replacement of the Division II 130/260-Vdc battery will provide benefits for the dc power system. The benefits include providing more capacity than the present batteries and reducing the potential of tripping the Division II battery chargers on high voltage shutdown by reducing the equalizing charge voltage.

3.0 EVALUATION

As a first step in evaluating the amendment request, the staff performed a comparison of the replacement battery to the old battery. One key parameter that the replacement battery must satisfy is that the minimum battery voltage at the end of discharge must be greater than or equal to 210 Vdc. The discharge would occur if the associated chargers were not available to supply the dc loads. For the old battery, 210 Vdc translated to a minimum cell voltage of:

$$210 \text{ Vdc} + 120 \text{ cells} = 1.75 \text{ volts per cell (V/cell)}$$

For the replacement battery, the minimum cell voltage is:

$$210 \text{ Vdc} + 116 \text{ cells} = 1.81 \text{ V/cell}$$

Maintaining the same minimum system voltage at the end of discharge ensures that the new battery will have sufficient capacity to power essential loads if power to the battery chargers is lost.

Battery capacity is measured in ampere-hours, the cumulative product of discharge current over the discharge period. For the Division II battery, the plant design requires a discharge period of 4 hours. The existing battery had a capacity of 560 ampere-hours for a 4-hour discharge with a minimum cell voltage of 1.75 V. The replacement battery will have a capacity of 1200 ampere-hours for a 4-hour discharge with a minimum cell voltage of 1.81 V. Therefore, the new battery provides a higher capacity, in terms of ampere-hours, for the 4-hour discharge.

When the new battery is installed, the licensee proposes to change a number of the setpoints associated with the battery. The existing setpoints (which would remain in effect for the Division I battery) and the new setpoints are listed below:

Division II Battery Charger Setpoints

Setpoint Description	Existing Setpoint	New Setpoint
High Voltage Shutdown	138.5 Vdc (2.31 V/cell)	138.5 Vdc (2.39 V/cell)
Equalize Charge Voltage	137.5 Vdc (2.29 V/cell)	135.5 Vdc (2.34 V/cell)
High Voltage Alarm	136.0 Vdc (2.27 V/cell)	134.0 Vdc (2.31 V/cell)
Float Voltage	133.0 Vdc (2.22 V/cell)	129.0 Vdc (2.22 V/cell)
Low Voltage Alarm	128.5 Vdc (2.14 V/cell)	124.2 Vdc (2.14 V/cell)

The lower value for the equalize charge voltage increases the margin between that voltage and the high voltage shutdown, decreasing the likelihood of an unnecessary battery charger shutdown.

Because of the changes in the Division II battery charger setpoints, SRs 4.8.2.1.a.2, 4.8.2.1.b, and 4.8.2.1.c.4 will be revised. The SRs under 4.8.2.1.a are performed at least once per 7 days. The current SR 4.8.2.1.a.2 requires the licensee to verify that:

Total battery terminal voltage is greater than or equal to 130 volts on float charge.

The revised SR 4.8.2.1.a.2 would require the licensee to verify that:

Total battery terminal voltage is greater than or equal to 130 volts for Division I and greater than or equal to 125.7 volts for Division II on float charge.

For Division II, the revised minimum voltage provides the same cell voltage (2.167 V/cell) for the new battery as the current minimum voltage provides for the current batteries. Maintaining the battery voltage at or above this value provides assurance that the battery charger is working effectively and that the batteries are capable of performing their design function. Therefore, this change is acceptable.

Currently, the SRs under 4.8.2.1.b are performed at least once per 92 days and within 7 days after a battery discharge with battery terminal voltage less than 105 Vdc or battery overcharge with battery terminal voltage greater than 150 Vdc. The revised version of 4.8.2.1.b would require the same SRs to be performed. However, the value of overvoltage at which action would be required for Division II would be reduced to 145 Vdc. This lower battery voltage corresponds to the same cell voltage (2.5 V/cell) as the current overvoltage limit for the current batteries. A voltage of 2.5 V/cell is slightly greater than the maximum continuous recommended equalize charge voltage (for both the old and new batteries) of 2.38 V/cell. No immediate damage would be expected at this cell voltage. Therefore, this change is acceptable.

The SRs under 4.8.2.1.c are performed at least once per 18 months. The current SR 4.8.2.1.c.4 requires the licensee to verify that:

The battery charger will supply at least 100 amperes at a minimum of 129 volts for at least 4 hours.

The revised SR 4.8.2.1.c.4 would require the licensee to verify that:

The battery charger will supply at least 100 amperes at a minimum of 129 volts for Division I and at a minimum of 124.7 volts for Division II for at least 4 hours.

For Division II, the revised minimum voltage provides the same cell voltage (2.15 V/cell) for the new battery as the current minimum voltage provides for the current batteries. This value of the cell voltage is greater than the minimum cell float voltage of 2.13 V/cell required by TS Table 4.8.2.1-1, "Battery Surveillance Requirements." Maintaining the battery voltage at or above this value provides assurance that the battery charger can maintain the batteries. Therefore, this change is acceptable.

Because of similarities between the old and the new batteries (e.g., same specific gravity (1.215), similar physical configuration), the balance of the SRs and the parameters in Table 4.8.2.1-1 are unaffected by the replacement of the batteries.

Therefore, the staff concludes that the changes to SRs 4.8.2.1.a.2, 4.8.2.1.b, and 4.8.2.1.c.4 proposed by the licensee are acceptable for the replacement batteries.

4.0 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.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes TS 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 (63 *FR* 9597). 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.

6.0 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 Contributor: Andrew Kugler

Date: July 9, 1998