

January 12, 2000

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

Template No. 058

SUBJECT: FERMI 2 - ISSUANCE OF AMENDMENT RE: REPLACEMENT OF THE
DIVISION I 130/260-VOLT DC BATTERY (TAC NO. MA6735)

Dear Mr. Gipson:

The Commission has issued the enclosed Amendment No. 136 to Facility Operating License No. NPF-43 for the Fermi 2 facility. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated September 10, 1999 (NRC-99-0072), as supplemented November 19, 1999 (NRC-99-0107).

The amendment revises the TS surveillance requirements for the Division I 130/260-volt dc battery to accommodate the design of the replacement battery.

Because full implementation of this amendment may not take place until the spring of 2000, 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 also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Andrew J. Kugler, 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. 136 to NPF-43
2. Safety Evaluation

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Fermi 2

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November 1999



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.1 36
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 September 10, 1999, as supplemented November 19, 1999, 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.

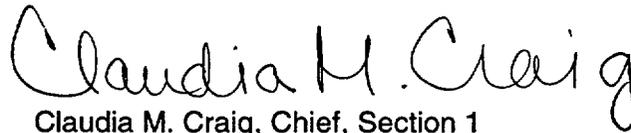
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. NPF-43 is hereby amended to read as follows:

Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 136 , 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 prior to the startup from the seventh refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION



Claudia M. Craig, 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: January 12, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 136

FACILITY OPERATING LICENSE NO. NPF-43

DOCKET NO. 50-341

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

REMOVE

3.8-17
3.8-24
B 3.8.6-3

INSERT

3.8-17
3.8-24
B 3.8.6-3

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ 125.7 V on float charge.	7 days
SR 3.8.4.2	Verify no visible corrosion at battery terminals and connectors. <u>OR</u> Verify each battery cell-to-cell and terminal connection resistance is $\leq 1.5E-4$ ohm.	92 days
SR 3.8.4.3	Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration that could degrade battery performance.	18 months
SR 3.8.4.4	Remove visible corrosion and verify battery cell to cell and terminal connections are coated with anti-corrosion material.	18 months
SR 3.8.4.5	Verify each battery cell-to-cell and terminal connection resistance is $\leq 1.5E-4$ ohm.	18 months
SR 3.8.4.6	Verify each required battery charger supplies ≥ 100 amps at ≥ 124.7 V for ≥ 4 hours.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.6.2 Verify battery cell parameters meet Table 3.8.6-1 Category B limits.</p>	<p>92 days</p> <p><u>AND</u></p> <p>Once within 24 hours after battery discharge < 105 V</p> <p><u>AND</u></p> <p>Once within 24 hours after battery overcharge > 145 V</p>
<p>SR 3.8.6.3 Verify average electrolyte temperature of representative cells is > 60°F.</p>	<p>92 days</p>

BASES

ACTIONS (continued)

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. Taking into consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable for operation prior to declaring the DC batteries inoperable.

B.1

When any battery parameter is outside the Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not ensured and the corresponding DC electrical power subsystem must be declared inoperable. Additionally, other potentially extreme conditions, such as not completing the Required Actions of Condition A within the required Completion Time or average electrolyte temperature of representative cells falling below 60°F, also are cause for immediately declaring the associated DC electrical power subsystem inoperable.

SURVEILLANCE
REQUIREMENTS

SR 3.8.6.1

This SR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 3), which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte temperature of pilot cells.

SR 3.8.6.2

The quarterly inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3). In addition, within 24 hours of a battery discharge < 105 V or a battery overcharge > 145 V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to ≤ 105 V, do not constitute a battery discharge provided the battery terminal voltage and float current



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 136 FACILITY OPERATING LICENSE NO. NPF-43

DETROIT EDISON COMPANY

FERMI 2

DOCKET NO. 50-341

1.0 INTRODUCTION

By application dated September 10, 1999, as supplemented November 19, 1999, the Detroit Edison Company (the licensee) requested changes to the Technical Specifications (TSs) for Fermi 2. The licensee plans to replace the Division I 130/260-volt direct current (Vdc) battery during the seventh refueling outage. The proposed changes would revise TS Surveillance Requirements (SRs) 3.8.4.1, 3.8.4.6, and 3.8.6.2 for the battery to accommodate the design of the replacement battery. The November 19, 1999, letter provided clarifying information that was within the scope of the original *Federal Register* notice and did not change the staff's initial proposed no significant hazards consideration determination. Because the implementation date for this amendment is tied to the outage, the NRC requests that the licensee submit a letter informing the staff when this 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 I 260-volt battery (1PA) consists of two 130-volt batteries (1A-1 and 1A-2) connected in series.

The present Division I 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. 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 I 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 seventh

refueling outage. The staff notes that the same modification was made to the Division II battery during the sixth refueling outage, as approved in Amendment No. 121, issued July 9, 1998. The battery replacement will not change the existing battery system configuration (other than adjustments for the smaller number of cells). The new Division I 260-Vdc battery will remain located in the auxiliary building Division I 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 I 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 I battery chargers on high voltage shutdown by reducing the equalizing charge voltage.

When the licensee submitted this proposed TS change, the staff had not yet approved the conversion of the TSs to the improved standard TSs. Therefore, the licensee submitted the proposal with the TS pages marked "DRAFT." The NRC staff approved the conversion on September 30, 1999 (Amendment No. 134). The SRs affected by this proposal remained unchanged by the conversion amendment. The November 19, 1999, letter provided TS pages that reflected the converted TSs.

3.0 EVALUATION

As a first step in evaluating this 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:

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

For the replacement battery, the minimum cell voltage is:

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

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 (amp)-hours, the cumulative product of discharge current over the discharge period. For the Division I battery, the plant design requires a discharge period of 4 hours. The existing battery had a capacity of 560 amp-hours for a 4-hour discharge with a minimum cell voltage of 1.75 V. The replacement battery will have a capacity of 1200 amp-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 amp-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 and the new setpoints (which match those in effect for the Division II battery) are listed in the table below:

Division I 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 I battery charger setpoints, SRs 3.8.4.1, 3.8.4.6, and 3.8.6.2 will be revised. The revisions change voltage values in the SRs. However, the purposes and frequencies of the SRs are unchanged.

SR 3.8.4.1 is performed at least once per 7 days. The current SR 3.8.4.1 requires the licensee to:

Verify battery terminal voltage is ≥ 130 volts for Division I and ≥ 125.7 volts for Division II on float charge.

The revised SR 3.8.4.1 would require the licensee to:

Verify battery terminal voltage is ≥ 125.7 volts on float charge.

For Division I, 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, SR 3.8.6.2 is performed at least once per 92 days and within 24 hours after a battery discharge with battery terminal voltage less than 105 Vdc or battery overcharge with battery terminal voltage greater than 150 Vdc for Division I or 145 Vdc for Division II. The revised value of overvoltage at which action would be required for Division I would be 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.

SR 3.8.4.6 is performed at least once per 18 months. The current SR 3.8.4.6 requires the licensee to:

Verify each required battery charger supplies for Division I: ≥ 100 amps at ≥ 129 volts for ≥ 4 hours; and Division II: ≥ 100 amps at ≥ 124.7 volts for ≥ 4 hours.

The revised SR 3.8.4.6 would require the licensee to:

Verify each required battery charger supplies ≥ 100 amps at ≥ 124.7 volts for ≥ 4 hours.

For Division I, 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 3.8.6-1, "Battery Cell Parameter 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 TS Table 3.8.6-1 are unaffected by the replacement of the batteries.

Therefore, the staff concludes that the changes to SRs 3.8.4.1, 3.8.4.6, and 3.8.6.2 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 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 and changes 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 (64 FR 59800). 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: A. Kugler

Date: January 12, 2000