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February 22, 1995

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Document Control Desk

Subje Surveillance Frequency Requirement for Testing of the Emergency Battery, License No. R-37, Docket No. 50-20

Gentlemen:

The Massachusetts Institute of Technology hereby submits an application to amend Facility Operating License No. R-37. The requested amendment is for a modification from weekly to monthly of the surveillance frequency requirement concerning measurement of the voltage and specific gravity of one cell of the emergency battery system. The reason for the request is that the emergency battery was recently replaced in its entirety and the proposed modification to the Technical Specifications is necessary in order to bring the specification into compliance with the manufacturer's recommended surveillance frequency.

This request has been reviewed and approved by the MIT Reactor Safeguards Committee.

Sincerely,

Thomas H. Newton, Jr., PE
Asst. Superintendent for Operations
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Asst. Superintendent for Engineering
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EL/gw

Enclosure: Safety Review #0-95-4

cc: MITRSC (with enclosure)
USNRC - Senior Project Manager, NRR/ONDD
USNRC - Region I - Project Scientist, Effluents Radiation Protection Section (ERPS) FRSSB/DRSS

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Safety Review #-0-95-4

Description of Change

The MIT Research Reactor's (MITR's) original emergency battery bank was replaced on January 13, 1995. The new emergency battery bank consists of sixty lead-calcium storage cells. The battery bank is rated for 577 ampere-hours at an eight-hour discharge rate. It meets the minimum one-hour requirement to provide selected instrument and pump power following a loss of off-site electrical power as required by Technical Specification #3.7.3.

MITR Technical Specification #4.3.5 requires that the voltage and specific gravity of one cell of the emergency battery bank be measured weekly. The manufacturer of the new battery bank recommends that such tests be performed monthly. A copy of the manufacturer's specifications on maintenance of the batteries is attached. The manufacturer recommends against a more frequent testing because of (a) potential safety hazards, e.g., acid spills that may cause damage to the battery system; and (b) the requirement for removal of the protective cover of the battery bank each time such a test is performed. As a result, the weekly surveillance frequency requirement concerning measurement of the voltage and specific gravity of one cell of the emergency battery bank in Technical Specification #4.3.5 is to be modified to monthly. The proposed modification to the Technical Specifications is necessary in order to bring the specification into compliance with the manufacturer's recommended surveillance frequency.

Proposed Wording of Change

Technical Specification #4.3.5 in Appendix A of Facility Operating License No. R-37 should be amended to read:

> 5. The voltage of the emergency batteries shall be measured weekly whenever the reactor is scheduled to operate any day of that week. The voltage and specific gravity of one cell shall be measured monthly whenever the reactor is scheduled to operate any day of that month. Specific gravity of all batteries shall be measured at any time a significant change is noted in the pilot cell and at least every two years. Discharge tests shall be performed once every two years. Operability of the inverter motor generator set and associated switches shall be verified quarterly.

All other provisions of Technical Specification #4.3 remain unchanged.

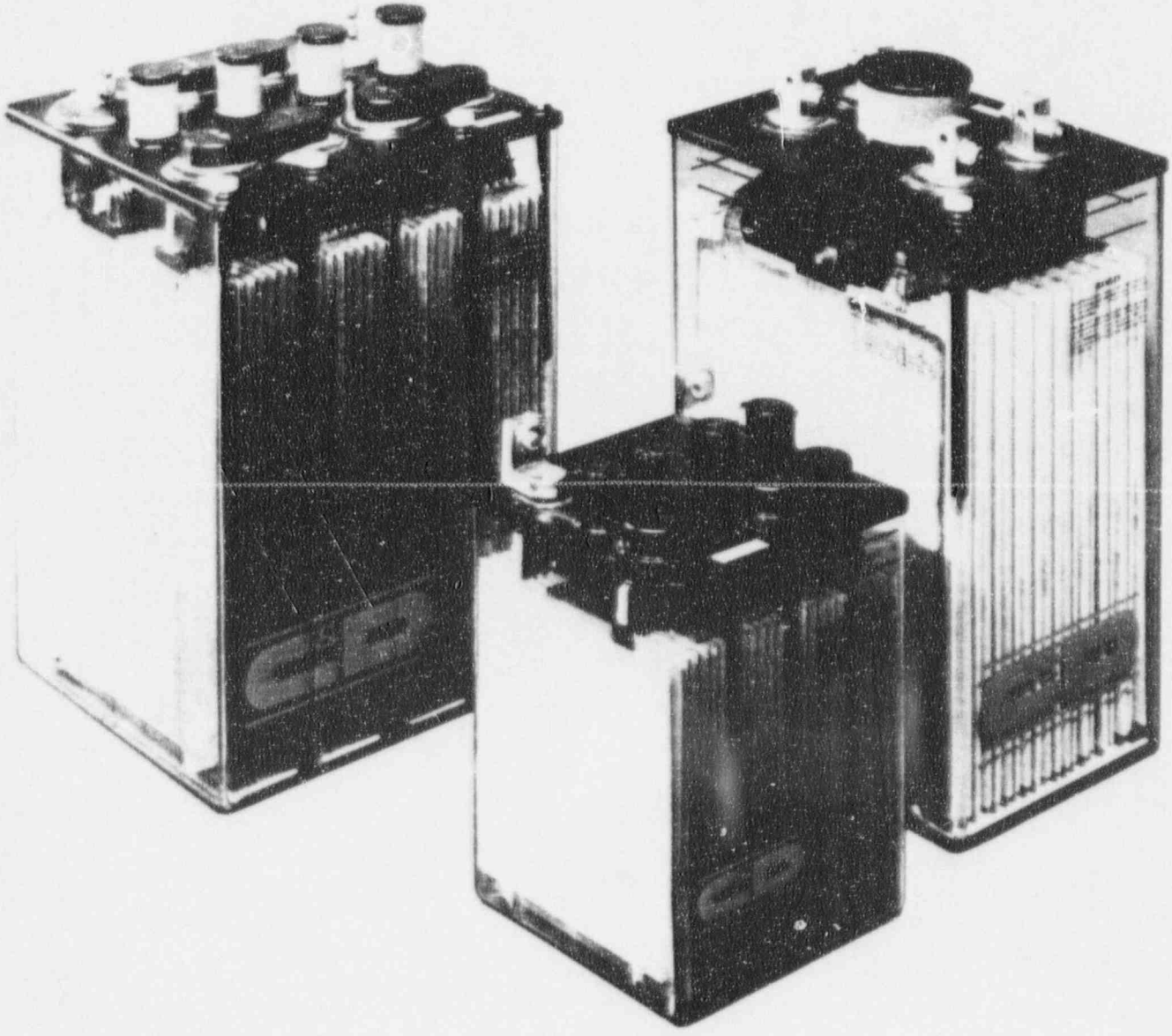
Safety Analysis

Safety is improved because the testing frequency is brought into compliance with the manufacturer's recommendation.

RS-966

CHARTER POWER SYSTEMS®

CONDENSED INSTALLATION AND OPERATING INSTRUCTIONS C&D STANDBY BATTERIES (FLOODED)



NOTE: This manual is a condensed version of installation and operation instructions. For specific instructions, the user **must** consult 12-800, Standby Battery, Flooded Cell, Installation and Operating Instructions, which is packed with the battery.

6. MAINTENANCE

Proper maintenance will prolong the life of a battery and will aid in ensuring it is capable of satisfying its design requirements. A good battery maintenance program will serve as a valuable aid in determining the need for battery replacement.

Monthly battery inspection should include the following:

- charge voltage measured at battery terminal
- general appearance and cleanliness of battery, battery rack and battery area
- charger output current and voltage
- electrolyte levels
- cracks in the cell container or leakage of electrolyte
- any evidence of corrosion at terminals, connectors or racks
- ambient temperature and condition of ventilation equipment
- pilot-cell voltage, specific gravity and electrolyte temperature
- recorded findings with clear, dated copies

Quarterly battery inspection should include:

- specific gravity of each cell
- voltage of each cell and battery terminal voltage
- temperatures of electrolyte in representative cell

Annual battery inspection should include the following:

- detailed inspection of the appearance of the battery
- integrity of the battery rack
- intercell/interunit connection integrity
- recorded findings with clear, dated copies

NOTE: If the battery has experienced an abnormal condition, such as severe discharge or overcharge, an inspection should be made to ensure the battery has not been damaged.

Periodic inspections, as outlined above, and the subsequent corrective actions are intended to provide a properly maintained battery that will meet its performance requirements. In addition, yearly performance tests can be used to demonstrate the adequacy of the maintenance practices. Each of these inspections and tests should be used as best suited for the particular needs of the application. It is the user's responsibility to format a maintenance inspection and testing program to optimize the benefit available.

Operational characteristics

Battery performance is rated at 77F (25C). Operation at higher temperature will increase capacity but reduces life approximately 50 percent for every 15F (-9C) rise. Operation at lower temperatures reduces capacity but extends life.

During the last half of the battery service life, capacity will begin to fall slowly at first, then with increasing rapidity. Lead-acid batteries have reached the end of their useful life when capacity has fallen to 80 percent of published ratings.

NOTE: Frequent charge/discharge cycles accelerate capacity degradation.

To insure adequate performance it is recommended a battery be sized with additional margin for operation at minimum expected temperature and for loss of capacity as the battery ages.

Environmental requirements

Recommended operating temperature: 60F (15C) minimum, 90F (32C) maximum; 77F (25C) yearly average

Operating temperature limits: 32F (0C) minimum, 120F (49C) maximum; pressure = atmospheric

Ventilation: Flooded lead-acid batteries generate explosive gas (hydrogen), which is vented to the environment. Although normal ventilation is sufficient for dispersion, accumulation must be limited to 2 percent or less of room volume.

NOTE: This manual is a condensed version of installation and operation instructions. For specific instructions, the user **must** consult 12-800, Standby Battery, Flooded Cell, Installation and Operating Instructions, which is packed with the battery.

a. plenum monitor,

b. stack monitor,

c. particulate monitor,

d. water monitor,

e. area monitor.

5. The voltage of the emergency batteries and the voltage and specific gravity of one cell shall be measured weekly. Specific gravity of all batteries shall be measured at any time a significant change is noted in the pilot cell and at least every two years. Discharge tests shall be performed once every two years. Operability of the inverter motor generator set and associated switches shall be verified quarterly.

Bases

An MITR operating cycle begins with an initial startup and closes with shutdown procedure. Each time before startup of the reactor, scrams and important safety devices and interlocks are checked in accordance with a startup checklist. The shutdown checklist turns off all instruments not needed for shutdown cooling and safety parameters. Since some instrumentation is deenergized and other instrumentation may drift over a shutdown of several days, it is deemed prudent to apply the specification above.

The 16-hour limit is established to permit restart after a shutdown for maintenance without the necessity to recalibrate all of the instruments. The limit of 16 hours was chosen on the basis of experience which indicates that the instrumentation used does not drift significantly or malfunction during that period if left energized and operating. In view