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10CFR50.90

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Request for Amendment to Technical Specifications Associated With DC Electrical Power

Reference:
(1) Technical Specifications Task Force (TSTF) Traveler TSTF-360, Revision 1, DC Electrical Rewrite
(2) Letter from W. D. Becker (U.S. NRC) to A. R. Pietrangelo (Nuclear Energy Institute) dated December 18, 2000
(3) NUREG-1434, "Standard Technical Specifications, General Electric Plants, BWR/6," Revision 2, dated April 2001

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," AmerGen Energy Company, LLC (i.e., AmerGen), proposes changes to Appendix A, Technical Specifications (TS), of Facility Operating License No. NPF-62 for the Clinton Power Station (CPS).

The proposed changes are to TS Sections 3.8.4, "DC Sources – Operating," 3.8.5, "DC Sources – Shutdown," and 3.8.6, "Battery Cell Parameters." The proposed changes request new actions with increased completion times for an inoperable battery charger, as well as request alternate battery charger testing criteria for Limiting Condition for Operation (LCO) 3.8.4 and LCO 3.8.5. The proposed changes also include the relocation of a number of Surveillance Requirements (SRs) in TS Section 3.8.4, that perform preventive maintenance on the safety related batteries, to a licensee-controlled program. It is proposed that TS Table 3.8.6-1, "Battery Cell Parameter Requirements," be relocated to a licensee-controlled program, and specific actions with associated completion times for out-of-limits conditions for battery cell voltage, electrolyte level, and electrolyte temperature be added to TS Section 3.8.6. In addition, specific SRs are being proposed for verification of these parameters.

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A new program is being proposed for the maintenance and monitoring of station batteries based on the recommendations of Institute of Electrical and Electronics Engineers (IEEE) Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications." All of the items proposed to be relocated will be contained within this new program.

These proposed changes are consistent with TSTF-360, Revision 1 (Reference 1), submitted to the NRC by the Technical Specifications Task Force (TSTF). TSTF-360, Revision 1, was approved by the NRC on December 18, 2000 (Reference 2), and has been incorporated into Revision 2 of NUREG-1434, "Standard Technical Specifications, General Electric Plants, BWR/6," recently issued by the NRC (Reference 3).

To support the request for new actions and increased completion times for an inoperable battery charger, AmerGen commits to complete the design and installation of a new spare battery charger in the fourth quarter of 2001. AmerGen requests approval of these changes prior to December 31, 2001, in order to support preparation for the next refueling outage.

This request is subdivided as follows.

1. Attachment A gives a description and safety analysis of the proposed changes.

2. Attachment B includes the marked-up TS pages with the requested changes indicated. A marked-up copy of the affected TS Bases pages is provided for information only.

3. Attachment C describes our evaluation performed using the criteria in 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (a)(1) which provides information supporting a finding of no significant hazards consideration in accordance with 10 CFR 50.92, "Issuance of amendment," paragraph (c).

4. Attachment D provides information supporting an Environmental Assessment.

This proposed change has been reviewed by the CPS Plant Operations Review Committee and approved by the Nuclear Safety Review Board.

AmerGen is notifying the State of Illinois of this application for changes to the TS by transmitting a copy of this letter and its attachments to the designated State Official.

Should you have any questions concerning this letter, please contact Mr. J. L. Peterson at (217) 937-3418.

Respectfully,

J. M. Heffley
Vice President
Clinton Power Station

JLP/blf

Attachments:

Affidavit
Attachment A: Description and Safety Analysis for Proposed Changes
Attachment B: Marked-up Pages for Proposed Changes
Attachment C: Information Supporting a Finding of No Significant Hazards Consideration
Attachment D: Information Supporting An Environmental Assessment

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety - Illinois Department of Nuclear Safety

STATE OF ILLINOIS	)	
COUNTY OF DEWITT	)	
IN THE MATTER OF	)	
AMERGEN ENERGY COMPANY, LLC	)	**Docket Number**
CLINTON POWER STATION, UNIT 1	)	**50-461**

SUBJECT: **Request for Amendment to Technical Specifications Associated With DC Electrical Power**

AFFIDAVIT

I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.

M. J. Pacilio
Plant Manager
Clinton Power Station

Subscribed and sworn to before me, a Notary Public in and for the State above named, this 21st day of August, 2001.

" OFFICIAL SEAL "
CAROL E. FITZGERALD
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 12/2/2001

Carol E. Fitzgerald
Notary Public

DESCRIPTION AND SAFETY ANALYSIS FOR THE PROPOSED CHANGES

A. SUMMARY OF THE PROPOSED CHANGES

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," AmerGen Energy Company, LLC (i.e., AmerGen), proposes changes to Appendix A, Technical Specifications (TS), of Facility Operating License No. NPF-62 for the Clinton Power Station (CPS).

The proposed changes are to TS Sections 3.8.4, "DC Sources – Operating," 3.8.5, "DC Sources – Shutdown," and 3.8.6, "Battery Cell Parameters." The proposed changes request new actions with increased completion times for an inoperable battery charger, as well as request alternate battery charger testing criteria for Limiting Condition for Operation (LCO) 3.8.4 and LCO 3.8.5. The proposed changes also include the relocation of a number of Surveillance Requirements (SRs) in TS Section 3.8.4, that perform preventive maintenance on the safety-related batteries, to a licensee-controlled program. It is proposed that TS Table 3.8.6-1, "Battery Cell Parameter Requirements," be relocated to a licensee-controlled program, and specific actions with associated completion times for out-of-limits conditions for battery cell voltage, electrolyte level, and electrolyte temperature be added to TS Section 3.8.6. In addition, specific SRs are being proposed for verification of these parameters.

A new program is being proposed for the maintenance and monitoring of station batteries based on the recommendations of Institute of Electrical and Electronics Engineers (IEEE) Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications." This program will be described in new TS Section 5.5.14, "Battery Monitoring and Maintenance Program." All of the items proposed to be relocated will be contained within this new program that will be in the Updated Safety Analysis (USAR), either directly or in the Operations Requirements Manual, which is incorporated by reference in the CPS USAR. This will make all changes subject to review under 10 CFR 50.59, "Changes, tests, and experiments," to determine if the proposed changes will require prior NRC review and approval, and will require reporting of all changes to the NRC in accordance with 10 CFR 50.71(e), "Maintenance of records, making of reports."

These proposed changes are consistent with TSTF-360, Revision 1 (Reference 1), submitted to the NRC by the Technical Specifications Task Force (TSTF). TSTF-360, Revision 1, was approved by the NRC on December 18, 2000 (Reference 2), and has been incorporated into Revision 2 of NUREG-1434, "Standard Technical Specifications, General Electric Plants, BWR/6," recently issued by the NRC (Reference 3). The proposed changes are described in detail in Section E of this Attachment. The marked-up TS pages are provided in Attachment B of this submittal. In addition, the associated marked-upTS Bases pages are provided for information only in Attachment B of this submittal.

B. DESCRIPTION OF THE CURRENT REQUIREMENTS

TS Section 3.8.4, "DC Sources – Operating," requires that the Division 1, Division 2, Division 3, and Division 4 Direct Current (DC) electrical power subsystems shall be operable in Modes 1, 2, and 3. In the event that a Division 1 or Division 2 DC electrical subsystem becomes inoperable, the inoperable division of DC electrical subsystem must be restored back to operable status within 2 hours. If the Division 3 or Division 4 DC electrical power subsystem becomes inoperable, then the High Pressure Core Spray (HPCS) system must be declared inoperable immediately. If the inoperable Division 1 or Division 2 subsystem cannot be restored within 2 hours, or for the case of Division 3 or Division 4 DC power subsystem is inoperable and the HPCS system is not immediately declared inoperable, the plant must be in Mode 3 within 12 hours and then be in Mode 4 within 36 hours.

TS Section 3.8.4 has a number of Surveillance Requirements (SR) to demonstrate operability. The required SRs are as follows:

- SR 3.8.4.1 requires that the battery terminal voltage be verified to be greater than or equal to 129 Volts (V) on a float charge every 7 days.
- SR 3.8.4.2 requires that no visible corrosion at battery terminals or connectors or battery connection resistance is less than or equal to 150 E-6 ohm for inter-cell, inter-rack , inter-tier, and terminal connections be verified every 92 days.
- SR 3.8.4.3 requires that battery cells, cell plants, and racks show no visual indications of physical damage or abnormal deterioration are verified every 18 months.
- SR 3.8.4.4 requires removal of all visible corrosion and verification that the battery cell-to-cell and terminal connections are coated with anti-corrosion material every 18 months
- SR 3.8.4.5 requires verification of battery connection resistance to be less than or equal to 150 E-6 ohm for inter-cell, inter-rack, inter-tier, and terminal connections every 18 months.
- SR 3.8.4.6 verifies that each Division 1 and 2 battery charger supplies greater than or equal to 300 amps at greater than or equal to 125 V for greater than or equal to 4 hours, and each Division 3 and 4 battery charger supplies greater than or equal to 100 amps at greater than or equal to 125 V for greater than or equal to 4 hours every 18 months.
- SR 3.8.4.7 requires verification of battery capacity to be adequate to supply, and maintain in operable status, the required emergency loads for the design duty cycle by performance of a battery service test every 18 months.
- SR 3.8.4.8 requires verification that battery capacity is greater than or equal to 80 % of the manufacturer's rating when the battery is subjected to a performance discharge test. This test must be conducted every 60 months or if the battery performance shows degradation or the capacity reaches 85 % or less of capacity then the performance discharge test must be conducted every 18 months. The performance discharge test will satisfy the requirements of performing the service test of SR 3.8.4.7.

TS Section 3.8.5, "DC Sources – Shutdown," requires the following DC sources to be operable when in Modes 4, 5, and during the movement of irradiated fuel assemblies in the primary or secondary containment.

- One Class 1E DC electrical power subsystem capable of supplying one division of the Division 1 or Division 2 onsite Class 1E DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems – Shutdown."
- One Class 1E battery or battery charger, other than the DC electrical power subsystem in LCO 3.8.5.a, capable of supplying the remaining Division 1 or Division 2 onsite Class 1E DC electrical power distribution subsystem(s) when required by LCO 3.8.10.
- The Division 3 and 4 DC electrical power subsystems capable of supplying the Division 3 and 4 onsite Class 1E DC electrical power distribution subsystems, when the HPCS system is required to be operable for compliance with LCO 3.5.2, "ECCS-Shutdown."

With one or more of the required shutdown DC electrical power subsystems inoperable, the affected required feature(s) of the inoperable DC bus must be immediately declared inoperable or immediately suspend core alterations, suspend movement of irradiated fuel assemblies in both the primary and secondary containment, initiate actions to suspend operations with a potential for draining the reactor pressure vessel, and initiate actions to restore required DC electrical power subsystems to operable status.

The SRs for TS Section 3.8.4 are also applicable for demonstrating operability requirements for LCO 3.8.5.

TS Section 3.8.6, "Battery Cell Parameters," require that the battery cell parameters for the Division 1, 2, 3, and 4 batteries shall be maintained within the following limits any time an associated battery is required to be operable.

- Category A Limits: This category defines the normal parameter limits for each designated pilot cell. The electrolyte level must be greater than the minimum level indication mark, and less than or equal to 1/4 inch above the maximum level indication mark. The float voltage must be greater than or equal to 2.13 V. The specific gravity of the pilot cell must be greater than equal to 1.195.
- Category B Limits: This category defines the normal parameter limits for each connected battery cell. The electrolyte level must be greater than the minimum level indication mark, and less than or equal to 1/4 inch above the maximum level indication mark. The float voltage must be greater than or equal to 2.13 V. The specific gravity of the measured cell must be greater than equal to 1.190 and the average specific gravity of all connected cells must be greater than or equal to 1.200.
- Category C Limits: This category defines the minimum acceptable parameter limits for each connected cell. The electrolyte level must be above the top of plates and not overflowing. The float voltage must be greater than 2.10 V. The specific gravity of the measured cell must be not more than 0.020 below the average of all connected cells and the average specific gravity of all connected cells must be greater than or equal to 1.190.

If one or more batteries is discovered with one or more battery cell parameters not within the Category A or B limits, then the pilot cell electrolyte level and float charge must be measured to ensure that the pilot cell meets the Category C limits within 1 hour, and the connected cells must be measured to ensure that they meet the Category C limits within 24 hours. The battery must be restored to Category A or B limits within 31 days. During the recovery period the battery cell parameters must be measured every 7 days to ensure that the battery parameters meet the Category C limits. If these limits cannot be met, or one or more batteries have an average electrolyte temperature of less than 65°F, or if one or more batteries with one or more battery cell parameters are discovered not to meet Category C limits, then the affected battery must be immediately declared inoperable.

TS Section 3.8.6 has three Surveillance Requirements (SR) to demonstrate operability of the associated batteries. The required SRs are as follows:

- SR 3.8.6.1 requires that the battery cell parameters be verified to meet Category A limits every 7 days.
- SR 3.8.6.2 requires that the battery cell parameters be verified to meet Category B limits every 92 days and once within 72 hours after a battery overcharge of greater than 150 Volts
- SR 3.8.6.3 requires the verification that the average electrolyte temperature of representative cells is greater than or equal to 65°F every 92 days.

C. BASES FOR THE CURRENT REQUIREMENTS

The 125 VDC electrical power system consists of four independent Class 1E DC electrical power subsystems, Divisions 1, 2, 3, and 4. Each subsystem consists of a battery, associated battery charger, and all the associated control equipment and interconnecting cabling.

During normal operation, the DC loads are powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC loads are automatically powered from the Engineered Safety Feature (ESF) batteries.

Each of the Division 1 and 2 electrical power subsystems provides the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 480 V load centers. Also, these DC subsystems provide DC electrical power to the Division 1 and 2 inverters, which in turn power the respective uninterruptible AC buses. The Division 3 DC electrical power subsystem provides DC motive and control power as required for the High Pressure Core Spray (HPCS) System diesel generator (DG) set control and protection. The DC subsystem also provides power to the Division 3 inverter, which in turn powers the Division 3 uninterruptible AC bus. The Division 4 DC electrical power subsystem provides DC electrical power to the Division 4 inverter, which in turn powers the Division 4 uninterruptible AC bus.

Each Division 1, 2, 3, and 4 battery has adequate storage capacity to carry the required loads continuously for at least 4 hours as discussed in the Updated Safety Analysis Report (USAR), Section 8.3.2, "D-C Power System."

The batteries for a DC electrical power subsystem are sized to produce required capacity at 80% of nameplate rating. The voltage design limit is 105 V.

Each battery charger of Division 1, 2, 3, and 4 DC electrical power subsystems has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger has sufficient capacity to restore the battery bank from the design minimum charge to its fully charged state within 12 hours while supplying normal steady state loads.

The DC electrical power subsystems are required to be operable to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated design basis accident (DBA). Loss of any single DC electrical power subsystem does not prevent the minimum safety function from being performed.

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an AOO or a postulated DBA. Electrolyte limits are conservatively established, thus allowing continued DC electrical system function even with limits not met.

D. NEED FOR REVISION OF THE REQUIREMENTS

The current technical specifications limit restoration time for an inoperable battery charger to the same time as for an inoperable battery or a completely de-energized DC distribution subsystem. AmerGen is planning to install a spare (or swing) battery charger that can be connected to supply the Divisions 1, 2 or 4, 125 V DC Class 1E motor control centers (MCCs). This swing charger will be used as a means of supplying backup DC power during periods when maintenance is being performed on the normal divisional charger or in conditions that cause the normal charger to be inoperable. This change will allow additional time for maintenance and testing of the normal divisional charger based on the availability of the swing charger.

Relocation of the preventive maintenance SRs and battery cell parameter requirements to a licensee controlled program will provide for better control of these requirements, assure the battery is maintained at current levels of performance, allow flexibility to monitor and control these limits at values directly related to the battery ability to perform its assumed function, and allow the TS to focus on parameter value degradations that approach levels that may impact battery operability.

Description of spare (swing) battery charger

There are four Class 1E divisional battery chargers installed at CPS, one for each of the Class 1E divisions of DC electrical power. Each charger feeds the 125 V DC system bus of its respective division. A fifth Class 1E battery charger will be utilized as a common spare to feed the Division 1, 2 or 4 125 V DC bus. This spare charger is identical to the existing chargers. The output of the spare charger will be capable of being connected to any one of the Class 1E DC buses for Division 1, 2 or 4 using a 400 amp disconnect switch. The connection through this switch will be provided with interlocks such that connection to only one of the Class 1E divisions will be allowed at any time. The design of the spare charger uses fuse protection for breaker coordination for Division 1 and 2; and the input breakers for Divisions 1, 2 and 4 will be shunt tripped following a LOCA for electrical separation between safety and non-safety sources. This will prevent failures in one division from propagating to another. The spare charger and cabling are designed to Seismic Category I requirements.

E. DESCRIPTION OF THE PROPOSED CHANGES

The proposed TS changes are as follows.

1) Two conditions are added to LCO 3.8.4. These conditions with their associated required actions will provide compensatory actions for a specific component failure in a DC power division (e.g., battery charger and batteries).

   A) The new Condition A addresses the condition where the battery charger for Division 1 or 2 becomes inoperable. Required Actions are proposed that provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to operable status in a reasonable time. Required Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage within two (2) hours. Required Action A.2 requires verification that the battery float current be less than or equal to 2 amps once per 12 hours. The final required action, A.3, limits the restoration time for the inoperable battery charger to 7 days.
   B) The new Condition B addresses the condition where the Division 1 or 2 battery becomes inoperable. The associated required action is to restore the inoperable battery to operable status within 2 hours.
   C) The current Conditions A, B, and C are redesignated to reflect the addition of the two new conditions discussed above. In addition, current Condition A (i.e., new condition C) has been clarified by adding the stipulation "for reasons other than Condition A or B."
2) Revise SR 3.8.4.1 to state "Verify battery terminal voltage is greater than or equal to the minimum established float voltage," and deleting reference to the value of $\geq$ 129 V on a float charge.
3) Delete SR 3.8.4.2, SR 3.8.4.3, SR 3.8.4.4, and SR 3.8.4.5 from the CPS TS and relocate these tests to a licensee-controlled program. (See Change 11) These SRs

are also listed in SR 3.8.5.1 and will also be deleted from this surveillance requirement. This will require renumbering SR 3.8.4.6 as SR 3.8.4.2 and SR 3.8.4.7 as SR 3.8.4.3.

4) Provide alternative testing criteria to current SR 3.8.4.6 (i.e., revised SR 3.8.4.2) for battery charger testing.
5) Relocate SR 3.8.4.8 to SR 3.8.6.6. This SR is also listed in SR 3.8.5.1 and will be deleted from this surveillance requirement. This relocated SR will be modified to add an allowance to perform a modified performance discharge test. In addition, the SR Frequency will be modified to provide two tests to be completed in the event a battery has degraded or reached 85% of expected life. One test is to be performed every 12 months with battery capacity less than 100% of manufacturer's rating and the other is to be performed every 24 months if the battery capacity is greater than or equal to 100% of manufacturer's rating.
6) A new condition is added to LCO 3.8.5. This new Condition A, with its associated required actions, will provide compensatory actions for a battery charger failure in a DC power division provided that the redundant division is operable. The remaining condition will be renumbered and modified by adding the stipulation "for reasons other than Condition A."
7) The title of TS Section 3.8.6 will be revised to "Battery Parameters" and the LCO will be revised to read, "Battery parameters for the Division 1, 2, 3, and 4 batteries shall be within limits."
8) Relocate TS Table 3.8.6-1 battery cell parameters and Condition A, which provides the required actions to be taken when battery cell parameters are found to be outside of TS Table 3.8.6-1 values, to the proposed Battery Monitoring and Maintenance Program described in TS Section 5.5.14.
9) Five conditions are added to LCO 3.8.6. These conditions with their associated required actions will provide compensatory actions for a specific abnormal battery condition.
   A) Condition A addresses the condition where a battery on a specific division has one or more battery cells with a float voltage being less than 2.07 V.
   B) Condition B addresses the condition where a battery is found with a float current of greater than 2 amps.
   C) Condition C addresses the condition where a battery is found with the electrolyte level in one or more cells to be less than the minimum established design limits.
   D) Condition D addresses the condition where a battery is found with a pilot cell electrolyte temperature less than the minimum established design limits.
   E) Condition E addresses the condition where one or more batteries in redundant divisions are found with battery parameters not within established design limits.
   F) Current Condition B will be redesignated as Condition F. The current Condition B consists of three separate entry conditions. As part of this proposed change, the last two entry conditions, one or more batteries found with an average electrolyte temperature of less than 65°F, or one or more batteries found with battery cell parameters not within Category C limit, will be deleted. The deleted conditions will be replaced with a new condition requiring entry when one battery in a division is found with one or more battery cells with a float voltage of less than 2.07 V and float current greater than 2 amps.
10) Current SR 3.8.6.1, SR 3.8.6.2, and SR 3.8.6.3 will be deleted and will be replaced with the following SRs.

A) SR 3.8.6.1 will require verification of each battery float current to be less than or equal to 2 amps every 7 days.
B) SR 3.8.6.2 will require verification of each battery pilot cell voltage to be greater than or equal to 2.07 V every 31 days.
C) SR 3.8.6.3 will require verification of each connected battery cell electrolyte level to be greater than or equal to the minimum established design limits every 31 days.
D) SR 3.8.6.4 will require verification of each battery pilot cell temperature to be greater than or equal to the minimum established design limits every 31 days.
E) SR 3.8.6.5 will require verification of each connected battery cell voltage to be greater than or equal to 2.07 V every 92 days.

11) A new program will be added to TS Section 5.5, " Programs and Manuals." TS Section 5.5.14, "Battery Monitoring and Maintenance Program," will be added to provide for restoration and maintenance actions for station batteries that will be based on the recommendations of IEEE Standard 450-1995.

F. SAFETY ANALYSIS OF THE PROPOSED CHANGES

Change 1 and Change 6 – Addition of new Conditions to LCO 3.8.4 and LCO 3.8.5

These changes primarily add specific actions and increased completion times for an inoperable battery charger. The current technical specifications limit restoration time for an inoperable battery charger to the same time as for an inoperable battery or a completely de-energized DC distribution subsystem. The primary role of the battery charger is in support of maintaining operability of its associated battery. This is accomplished by the charger being of sufficient size to carry the normal steady state DC loads, with sufficient additional capacity to provide some minimal over-potential to the battery. The current 2-hour restoration time is based on Regulatory Guide 1.93, "Availability of Electric Power Sources," and has been applied equally to a minimal reduction in battery charger capacity.

These changes apply a more reasonable restoration time for an inoperable battery charger, while focusing efforts on retaining battery capabilities, and retaining the requirement for charger operability that is based on the margin afforded in the design capacity of the battery charger. The change will also allow the use of a spare charger that is capable of being connected to Division 1 or 2 DC MCCs in the event of an inoperable charger, or in the event of performing online maintenance or testing of a charger. This spare charger will also have the capability to be connected to the Division 4 DC MCC. However, the LCO still maintains the 2-hour restoration time for de-energized DC distribution subsystem.

This spare charger is identical to the existing chargers. The output of the spare charger will be capable of being connected to any one of the Class 1E DC buses for Division 1, 2 or 4 using a 400 amp disconnect switch. The connection through this switch will be provided with interlocks such that connection to only one of the Class 1E divisions will be allowed at any time. The design of the spare charger uses fuse protection for breaker coordination and the breakers will be shunt tripped following a LOCA for electrical separation between safety and non-safety sources. This will prevent failures in one

division from propagating to another. The spare charger and cabling are designed to Seismic Category I requirements.

The actions associated with an inoperable Division 1 or 2 battery charger provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to operable status in a reasonable time. The first Required Action is to restore the battery terminal voltage to greater than or equal to the battery minimum established float voltage within 2 hours. This time period allows for restoring the inoperable battery charger or for an alternate means of providing the battery charger function by use of a spare battery charger. Restoring the battery terminal voltage to a value greater than or equal to the minimum established float voltage will ensure that the battery can be restored to its fully charged condition within 12 hours, and that the battery can be restored from any discharge that may have occurred due to battery charger inoperability. Required Action A.2 verifies that the battery is in a fully charged condition by verifying the battery float current is less than or equal to 2 amps once per 12 hours. This float current value provides positive indication that if the battery had been discharged as the result of the inoperable battery charger, it has now been fully recharged.

Required Action A.3 will provide 7 days to restore the inoperable battery charger to operable status. This action is required if an alternate means of restoring the battery terminal voltage has been used. The 7-day completion time represents a reasonable amount of time to effect repairs.

Condition B was added to address the condition where a Division 1 or 2 battery is declared inoperable. With a battery inoperable, the affected DC bus is being supplied by the operable battery charger. Any event that results in a loss of the AC bus supporting the battery charger will also result in a loss of DC power to that division. Recovery of the AC bus, especially if it is due to a loss of offsite power, will be hampered by the fact that many of the components necessary for the recovery (e.g., diesel generator control and field flash, AC load shed, and diesel generator output circuit breakers, etc) likely rely upon the batteries. The 2-hour limit allows sufficient time to effect restoration of an inoperable battery given that the majority of the conditions that lead to battery inoperability (e.g., loss of battery charger or battery cell voltages less than 2.07 V) are identified in TS Sections 3.8.4, 3.8.5, and 3.8.6 together with additional specific completion times.

The changes made to the remaining conditions of LCO 3.8.4 are editorial, providing clarification and reflect renumbering. The clarification is provided to new Condition C by requiring the entry to the condition for issues not covered by Conditions A and B.

Change 2 – Removal of specific value for the minimum established float voltage

The specific limiting value for the minimum operating battery charging float voltage will be relocated to the Bases, which are under the change control of 10 CFR 50.59, "Changes, tests, and experiments." The TS will require the battery charger to supply battery terminal voltage "greater than or equal to the minimum established float voltage." The battery manufacturer establishes this voltage to provide the optimum charge on the battery. This voltage will maintain the battery plates in a condition that supports maintaining the grid

life. As such the "minimum established float voltage" can be adequately controlled outside of the Technical Specifications.

Change 3 –Relocation of preventive maintenance SRs to licensee-controlled programs.

In accordance with SR 3.0.1, when any SR is not met, the LCO is not met. This is based on the premise that SRs represent the minimum acceptable requirements for Operability of the required equipment. However, for SR 3.8.4.2, SR 3.8.4.3, SR 3.8.4.4, and SR 3.8.4.5, failure to meet the SR does not necessarily mean that the equipment is not capable of performing its safety function, and the corrective action is generally a routine or preventive maintenance-type activity. For example, the Bases of SR 3.8.4.4 identify removal of visible corrosion and tightening of terminal connections as a preventive maintenance activity. SR 3.8.4.3, requiring the visible inspection for physical damage or deterioration that could potentially degrade battery performance, is not required for the battery to perform its safety function, but again reflects ongoing preventive maintenance activities. These activities are inappropriate for Operability SRs and are generally better controlled under the maintenance programs for batteries. With regard to the resistance verifications of SR 3.8.4.2 and SR 3.8.4.5, the values are nominal values and represent values at which some action should be taken, not necessarily when the operability of the battery is in question. The safety analyses do not assume a specific battery resistance value, but typically assume the batteries will supply adequate power. Therefore, the key issue is the overall battery resistance. Between surveillances, the resistance of each connection varies independently from all the others. Some of these connection resistances may be higher or lower than others, and the battery may still be able to perform its function and should not be considered inoperable solely because one connector's resistance is high. Overall resistance is a direct impact on operability and is adequately determined as acceptable through completion of the battery service and discharge tests. Therefore, these activities are more appropriately controlled under the maintenance program for batteries. In addition, these surveillances are recommended by IEEE Standard 450-1995, and will be addressed by the new Battery Monitoring and Maintenance Program described in the proposed TS Section 5.5.14 and discussed below under change 11.

Change 4 – Provide alternate testing criteria for battery charger testing

Current SR 3.8.4.6, which is being renumbered as SR 3.8.4.2 requires specific parameters for battery charger performance testing. This test is intended to confirm the charger design capacity. Alternate acceptance criteria are proposed that would allow an actual in service demonstration that the charger can recharge the battery to the fully charged state within 12 hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design bases event discharge state. This accomplishes the objective of the existing test and allows for normal in-place demonstration of the charger capability thereby minimizing the time when the charger would be disconnected from the DC bus.

Change 5 - Relocation of SR 3.8.4.8 to SR 3.8.6.6 and addition of the allowance for a modified performance discharge test.

This relocation is considered editorial in that this SR demonstrates the operability of the battery and is therefore proposed to be included in TS Section 3.8.6 related to battery operability.

IEEE Standard 450-1995 states that it is permissible to perform a modified performance test if the battery discharge rate envelopes the duty cycle of the service test. A modified performance test is a test of the battery capacity and the battery's ability to provide a high-rate, short-duration load (i.e., usually the highest rate of the duty cycle). This will confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. It is recognized that a modified performance test can be used in lieu of a service test at any time.

The addition of two Frequency conditions provides more frequent testing in the event that the battery shows degradation, or if the battery has reached 85% of its expected life and capacity. The annual frequency for the case where the battery capacity is less than 100% of manufacturer's rating and the 24-month frequency for the case where the battery capacity is greater than or equal to 100% of manufacturer's rating are based on IEEE Standard 450-1995.

Change 7 – Delete reference to "Cell" in LCO 3.8.6.

This is an editorial change. This LCO is intended to require and define the operability requirements of the Division 1, 2, 3, and 4 batteries, and are not limited to Battery Cell Parameters or performance.

Change 8 – Relocate TS Table 3.8.6-1 to a licensee-controlled program.

TS Table 3.8.6-1 contains various levels (i.e., Categories) of limitations on battery cell voltage, electrolyte level, and specific gravity parameters. The Category A and B limits reflect nominal fully charged battery parameter values. Significant margin above that required for declaration of an operable battery is provided in these values. These Category A and B values represent appropriate monitoring levels and appropriate preventive maintenance level of long term battery quality and extended battery life. These values do not reflect the 10 CFR 50.36, "Technical specifications," criteria for LCOs of the "the lowest functional capability or performance levels of equipment required for the safe operation of the facility." It is proposed that these values and the actions associated with restoration be relocated to a licensee-controlled program that is under the control of 10 CFR 50.59. This licensee-controlled program is provided in Change 11.

Change 9 and 10 – Addition of specific actions and increased Completion Times for out-of-limit conditions for batteries and the associated SRs.

Specific Required Actions are proposed for parameters that have a unique impact on the battery and its continued operability. The proposed change provides specific Required Actions and increased Completion Times for out-of-limit conditions for cell voltage, electrolyte level, and electrolyte temperature. These allowed times recognize the margins available, the minimal impact on the battery capacity and the capability to perform its intended function, and the likelihood of effecting restoration in a timely fashion avoiding an

unnecessary plant shutdown. In addition, SRs are proposed to verify that the batteries are maintained within the established limitations.

The bases for the specific actions are as follows.

A. Condition A addresses a condition where a battery on a specific division has one or more battery cells with a float voltage being less than 2.07 V. If a battery cell is found to be less than 2.07 V, the battery cell must be considered degraded. Within 2 hours, verification of the required battery charger operability is made by monitoring the battery terminal voltage (i.e., performance of SR 3.8.4.1), and determining the overall battery state of charge by monitoring the battery float charge current (i.e., performance of SR 3.8.6.1). These actions assure that there is still sufficient battery capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of one or more cells in one or more batteries being less than 2.07 V, and continued operation is permitted for a limited period up to 24 hours. This is considered a reasonable time to effect restoration of the out-of-limit condition.

B. Condition B addresses a condition where a battery is found with a float current of greater than 2 amps, and indicates that a partial discharge of the battery capacity has occurred. This may be due to a temporary loss of a battery charger or possibly due to one or more battery cells in a low voltage condition reflecting some loss of capacity. Within 2 hours, verification of the required battery charger operability is made by monitoring the battery terminal voltage (i.e., performance of SR 3.8.4.1). If the terminal voltage is found to be less than the minimum established float voltage there are two possibilities, the battery charger is inoperable or is operating in the current limit mode. If the battery charger is found to be inoperable, LCO 3.8.4 Condition A would be entered. If the battery charger is operating in the current limit mode after 2 hours, that is an indication that the battery has been substantially discharged and likely cannot perform its required design functions.

   If the float voltage is found to be satisfactory but there are one or more battery cells with float voltage less then 2.07 V, the associated "OR" statement of Condition F is applicable and the battery must be declared inoperable. If float voltage is satisfactory and there are no cells less than 2.07 V, there is assurance that within 12 hours the battery will be restored to its fully-charged condition from any discharge that might have occurred due to a temporary loss of the battery charger.

C. Condition C addresses a condition where a battery is found with the electrolyte level in one or more cells to be less than the minimum established design limits. With the electrolyte level in one or more cells found above the top of the battery plates, but below the minimum established design limits, the battery still retains sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of electrolyte level not met. Within 31 days, the minimum established design limits for electrolyte level must be restored.

With electrolyte level below the top of the plates there is a potential for dryout and plate degradation. Required Actions C.1 and C.2 restore the level and ensure that the cause of the loss of electrolyte level is not due to a leak in the battery casing. These actions are only required if the level in the battery is found below the top of the battery plates.

In addition, the Battery Monitoring and Maintenance Program described in the proposed TS Section 5.5.14 and discussed below under Change 11 would require actions, based on IEEE Standard 450-1995, to equalize and test battery cells that have been discovered with an electrolyte level below the minimum established level limit.

D. Condition D addresses the condition where a battery is found with a pilot cell electrolyte temperature less than the minimum established design limits. A low electrolyte temperature limits the current and power available from the battery, however, since the battery is sized with margin, while battery capacity is degraded, sufficient capacity exists to perform the intended functions. Therefore, the affected battery is not required to be considered inoperable solely as a result of the pilot cell temperature not met, and that the 12 hours provides a reasonable time to restore the temperature within established limits.

E. Condition E addresses the condition where one or more batteries in redundant divisions are found with battery parameters not within established design limits. Given this condition, there is not sufficient assurance that battery capacity has not been affected to the degree that the batteries can still perform their required function. With redundant batteries involved, this potential could result in a total loss of function on multiple systems that rely upon the batteries. The longer completion times specified for battery parameters on non-redundant batteries not within limits are therefore not appropriate, and the parameters must be restored to within limits on at least one division within 2 hours.

SR 3.8.6.1 will require verification of each battery float current to be less than or equal to 2 amps every 7 days, and is used to determine the state of charge of the battery. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a charged state. The float current requirements are based on the float current indicative of a charged battery. The use of float current to determine the state of charge of the battery and the 7-day frequency for performance of this verification is consistent with IEEE Standard 450-1995.

SR 3.8.6.2 and SR 3.8.6.5 verifies that the float voltage of either pilot cells or all connected cells are equal to or greater than the short term absolute minimum voltage of 2.07 V, representing the point where battery operability is in question. Optimal long term battery performance is obtained by maintaining a float voltage greater than or equal to a minimum established float voltage, which is established and controlled in accordance with the proposed Battery Monitoring and Maintenance Program provided in TS Section 5.5.14. The Battery Monitoring and Maintenance Program will provide necessary actions if the battery is found at a float voltage less than the minimum established float voltage but

greater than the short term absolute minimum voltage of 2.07 V. The Frequency for cell voltage verification every 31 days for pilot cell and 92 days for each connected cell is consistent with IEEE Standard 450-1995.

SR 3.8.6.3 verifies the connected cell electrolyte level of each battery to be greater than or equal to minimum established design limits established in the proposed Battery Monitoring and Maintenance Program provided in TS Section 5.5.14. Operation of the batteries at electrolyte levels greater than the minimum established design limit ensures that the plates do not suffer physical damage and continue to maintain adequate electron transfer capability. The Frequency of every 31 days is consistent with IEEE Standard 450-1995.

SR 3.8.6.4 verifies the temperature of each battery pilot cell to be greater than or equal to the minimum established design limits established in the proposed Battery Monitoring and Maintenance Program provided in TS Section 5.5.14. Maintaining the electrolyte temperature above this level ensures that the battery can provide the required current and voltage to meet the design requirements, since temperatures lower than assumed in the battery sizing calculations act to inhibit or reduce the overall battery capacity. The Frequency of every 31 days is consistent with IEEE Standard 450-1995.

Change 11 – Addition of licensee-controlled program for maintenance and monitoring of batteries.

This program is to be based on the recommendations of IEEE Standard 450-1995. This program will contain the elements relocated from the affected TS LCOs. The parameter values will continue to be controlled at their current level, and actions will be implemented in accordance with the plant corrective action program. Furthermore, the battery and its preventive maintenance and monitoring are under the regulatory requirements of the maintenance rule. This relocation will continue to assure the battery is maintained at current levels of performance, and allows the Technical Specifications to focus on parameter value degradations that approach values that may impact battery operability.

All of the items proposed to be relocated will be contained within this new program that will be contained in the Updated Safety Analysis (USAR), either directly or in the Operations Requirements Manual, which is incorporated by reference in the CPS USAR. This will make all changes subject to review under 10 CFR 50.59, "Changes, tests, and experiments," to determine if the proposed changes will require prior NRC review and approval, and will require reporting of all changes to the NRC in accordance with 10 CFR 50.71(e), "Maintenance of records, making of reports."

G. IMPACT ON PREVIOUS SUBMITTALS

We have reviewed the proposed changes regarding impact on any previous submittals, and have determined that there is no impact on any outstanding license amendment requests.

H. SCHEDULE REQUIREMENTS

AmerGen plans to complete the design and install a new spare battery charger in the fourth quarter of 2001. We request approval of these proposed changes prior to December 31, 2001, to allow operation of the spare charger during normal operations to support preparation for the next refueling outage.

I. REFERENCES

(1) Technical Specifications Task Force (TSTF) Traveler TSTF-360, Revision 1, "DC Electrical Rewrite"
(2) Letter from W. D. Beckner (U.S. NRC) to A. R. Pietrangelo (Nuclear Energy Institute) dated December 18, 2000
(3) NUREG-1434, "Standard Technical Specifications, General Electric Plants, BWR/6," Revision 2, April 2001

Attachment B
Proposed Technical Specification Changes
Clinton Power Station, Unit 1

MARKED-UP TS PAGES FOR PROPOSED CHANGES

REVISED TS PAGES

3.8-24
3.8-25
3.8-26
3.8-27
3.8-28
3.8-29
3.8-30
3.8-31
3.8-32
3.8-33
5.0-16b

REVISED BASES PAGES
(PROVIDED FOR INFORMATION ONLY)

B 3.8-49
B 3.8-50
B 3.8-52
B 3.8-53
B 3.8-54
B 3.8-55
B 3.8-57
B 3.8-57a
B 3.8-58
B 3.8-59
B 3.8-60
B 3.8-61
B 3.8-62
B 3.8-63
B 3.8-64
B 3.8-65
B 3.8-66
B 3.8-67
B 3.8-68

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources—Operating

LCO 3.8.4 The Division 1, Division 2, Division 3, and Division 4 DC electrical power subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One battery charger on Division 1 or 2 inoperable.	**A.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage.** **AND** **A.2 Verify battery float current $\leq$ 2 amps.** **AND** **A.3 Restore battery charger to OPERABLE status.**	**2 hours** **Once per 12 hours** **7 days**
B. One battery on Division 1 or 2 inoperable.	**B.1 Restore battery to OPERABLE status.**	**2 hours**
~~C~~A. Division 1 or 2 DC electrical power subsystem inoperable **for reasons other than Condition A or B.**	~~C~~A.1 Restore Division 1 and 2 DC electrical power subsystems to OPERABLE status.	2 hours
~~D~~B. ~~One or more~~ Division 3 or 4 DC electrical power subsystem~~(s)~~ inoperable.	~~D~~B.1 Declare High Pressure Core Spray System inoperable.	Immediately
~~E~~C. Required Action and associated Completion Time not met.	~~E~~C.1 Be in MODE 3. AND ~~E~~C.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ~~≥ 129 V on float charge.~~ **greater than or equal to the minimum established float voltage.**	7 days
~~SR 3.8.4.2~~	~~Verify no visible corrosion at battery terminals and connectors.~~ ~~OR~~ ~~Verify battery connection resistance is ≤ 150 E-6 ohm for inter-cell connections, for inter-rack connections, for inter-tier connections, and for terminal connections.~~	~~92 days~~
~~SR 3.8.4.3~~	~~Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration.~~	~~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 battery connection resistance is ≤ 150 E-6 ohm for inter-cell connections, for inter-rack connections, for inter-tier connections, and for terminal connections.~~	~~18 months~~
SR 3.8.4.~~2~~6	Verify each Division 1 and 2 battery charger supplies ≥ 300 amps at ~~≥ 125 V~~ **greater than or equal to the minimum established float voltage** for ≥ 4 hours and each Division 3 and 4 battery charger supplies ≥ 100 amps at ~~≥ 125 V~~ **greater than or equal to the minimum established float voltage** for ≥ 4 hours. (continued)	18 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.4.2 (continued) OR **Verify each battery charger can recharge the battery to the fully charged state within 12 hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state.**	
SR 3.8.4.3~~7~~	----------NOTES---------- 1. **The modified performance discharge test in** SR 3.8.**6.6**4~~.8~~ may be performed in lieu of SR 3.8.4.3~~4.7 once per 60 months~~. 2. This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	18 months
~~SR 3.8.4.8~~	~~NOTE~~ ~~This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR.~~ ~~Verify battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test.~~	~~60 months~~ ~~AND~~ ~~NOTE~~ ~~Only applicable when battery shows degradation or has reached 85% of expected life.~~ ~~18 months~~

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.5 The following shall be OPERABLE:

a. One Class 1E DC electrical power subsystem capable of supplying one division of the Division 1 or 2 onsite Class 1E DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems - Shutdown";

b. One Class 1E battery or battery charger, other than the DC electrical power subsystem in LCO 3.8.5.a, capable of supplying the remaining Division 1 or Division 2 onsite Class 1E DC electrical power distribution subsystem(s) when required by LCO 3.8.10; and

c. The Division 3 and 4 DC electrical power subsystems capable of supplying the Division 3 and 4 onsite Class 1E DC electrical power distribution subsystems, when the High Pressure Core Spray System is OPERABLE for compliance with LCO 3.5.2, "ECCS-Shutdown."

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the primary or secondary containment.

ACTIONS

NOTE
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One battery charger on one division inoperable.	**A.1**	**Restore battery terminal voltage to greater than or equal to the minimum established float voltage.**	**2 hours**
	AND		
	A.2	**Verify battery float current $\leq$ 2 amps.**	**Once per 12 hours**
	AND		
	A.3	**Restore battery charger to OPERABLE status.**	**7 days**

(continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~BA~~. One or more required DC electrical power subsystems inoperable **for reasons other than Condition A.** OR **Required Action and associated Completion Time of Condition A not met.**	~~BA~~.1 Declare affected required feature(s) inoperable. OR	Immediately
	~~BA~~.2.1 Suspend CORE ALTERATIONS. AND	Immediately
	~~BA~~.2.2 Suspend movement of irradiated fuel assemblies in the primary and secondary containment. AND	Immediately
	~~BA~~.2.3 Initiate action to suspend operations with a potential for draining the reactor. AND	Immediately
	~~BA~~.2.4 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	----------NOTE---------- The following SRs are not required to be performed: ~~SR 3.8.4.4,~~ SR 3.8.4.2**6**~~,~~ **and** SR 3.8.4.3**7**~~, and SR 3.8.4.8~~. ---------- For DC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.4.1 ~~SR 3.8.4.4~~ ~~SR 3.8.4.7~~ SR 3.8.4.2 ~~SR 3.8.4.5~~ ~~SR 3.8.4.8.~~ SR 3.8.4.3. ~~SR 3.8.4.6~~	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery ~~Cell~~ Parameters

LCO 3.8.6 Battery ~~cell~~ parameters for the Division 1, 2, 3, and 4 batteries shall be within ~~the~~ limits ~~of Table 3.8.6-1~~.

APPLICABILITY: When associated battery is required to be OPERABLE.

ACTIONS

---NOTE---
Separate Condition entry is allowed for each battery.

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A. One or more batteries with one or more battery cell parameters not within Table 3.8.6-1 Category A or B limits.~~	~~A.1 Verify pilot cell's electrolyte level and float voltage meet Table 3.8.6-1 Category C limits.~~	~~1 hour~~
	~~AND~~	
	~~A.2 Verify battery cell parameters meet Table 3.8.6-1 Category C limits.~~	~~24 hours~~ ~~AND~~ ~~Once per 7 days thereafter~~
	~~AND~~	
	~~A.3 Restore battery cell parameters to Category A and B limits of Table 3.8.6-1.~~	~~31 days~~
A. One battery on one division with one or more battery cells float voltage < 2.07 V	**A.1 Perform SR 3.8.4.1**	**2 hours**
	AND	
	A.2 Perform SR 3.8.6.1	**2 hours**
	AND	
	A.3 Restore affected cell voltage ≥ 2.07 V	**24 hours**

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One battery on one division with float current > 2 amps	B.1 Perform SR 3.8.4.1. AND B.2 Restore battery float current to ≤ 2 amps.	2 hours 12 hours
--------- NOTE ---------- Required Action C.2 shall be completed if electrolyte level was below the top of plates. ----------	---------- NOTE ---------- Required Actions C.1 and C.2 are only applicable if the electrolyte level was below the top of plates. ----------	
C. One battery on one division with one or more cells electrolyte level less than minimum established design limits.	C.1 Restore electrolyte level to above top of plates. AND C.2 Verify no evidence of leakage. AND C.3 Restore electrolyte level to greater than or equal to minimum established design limits.	8 hours 12 hours 31 days
D. One battery on one division with pilot cell electrolyte temperature less than minimum established design limits.	D.1 Restore battery pilot cell temperature to greater than or equal to minimum established design limits.	12 hours
E. One or more batteries in redundant divisions with battery parameters not within limits.	E.1 Restore battery parameters for batteries in one division to within limits.	2 hours
~~F~~B. Required Action and associated Completion Time of Condition A, B, C, D, or E not met. (continued)	~~F~~B.1 Declare associated battery inoperable.	Immediately

F. (continued) OR ~~One or more batteries with average electrolyte temperature of the representative cells < 65 F.~~ ~~OR~~ ~~One or more batteries with one or more battery cell parameters not within Category C limits.~~ **One battery on one division with one or more battery cells float voltage < 2.07 V and float current > 2 amps.**		

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.8.6.1~~	~~Verify battery cell parameters meet Table 3.8.6 1 Category A limits.~~	~~7 days~~
SR 3.8.6.1	**---------- NOTE ---------- Not required to be met when battery terminal voltage is less than the minimum established float voltage of SR 3.8.4.1. ----------** **Verify each battery float current is ≤ 2 amps.**	**7 days**
SR 3.8.6.2	**Verify each battery pilot cell voltage is ≥ 2.07 V.**	**31 days**

(continued)

SURVEILLANCE		FREQUENCY
SR 3.8.6.3	Verify each battery connected cell electrolyte level is greater than or equal to minimum established design limits.	31 days
SR 3.8.6.4	Verify each battery pilot cell temperature is greater than or equal to minimum established design limits.	31 days
SR 3.8.6.5	Verify each battery connected cell voltage is $\geq$ 2.07 V.	92 days
~~SR 3.8.6.2~~	~~Verify battery cell parameters meet Table 3.8.6-1 Category B limits.~~	~~92 days~~ ~~AND~~ ~~Once within 72 hours after battery overcharge > 150 V~~
~~SR 3.8.6.3~~	~~Verify average electrolyte temperature of representative cells is $\geq$ 65° F.~~	~~92 days~~

SURVEILLANCE		FREQUENCY
SR 3.8.6.6	----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR. ----------	
	Verify battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.	60 months AND 12 months when battery shows degradation or has reached 85% of the expected life with capacity < 100% of manufacturer's rating AND 24 months when battery has reached 85% of the expected life with capacity ≥ 100% of manufacturer's rating

Table 3.8.6-1 (page 1 of 1)
Battery Cell Parameter Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: LIMITS FOR EACH CONNECTED CELL
Electrolyte Level	> Minimum level indication mark, and ≤ 1/4 inch above maximum level indication mark(a)	> Minimum level indication mark, and ≤ 1/4 inch above maximum level indication mark(a)	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V	> 2.10 V
Specific Gravity(b)(c)	≥ 1.195	≥ 1.190 AND Average of all connected cells ≥ 1.200	Not more than 0.020 below average of all connected cells AND Average of all connected cells ≥ 1.190

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum level during equalizing charges provided it is not overflowing.

(b) Corrected for electrolyte temperature and level. Level correction is not required, however, when battery charging is < 2 amps when on float charge.

(c) A battery charging current of < 2 amps when on float charge is acceptable for meeting specific gravity limits following a battery recharge, for a maximum of 7 days. When charging current is used to satisfy specific gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

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5.5 Programs and Manuals (continued)

5.5.14 Battery Monitoring and Maintenance Program

This program provides for battery restoration and maintenance, based on the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing and Replacement of Vented Lead-Acid Batteries for Stationary Applications," including the following:

a. Actions to restore battery cells with float voltage < 2.13 V, and

b. Actions to equalize and test battery cells that had been discovered with electrolyte level below the minimum established design limit.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources—Operating

BASES

BACKGROUND

The station DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment. As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the requirements of Regulatory Guide 1.6 (Ref. 2) and IEEE-308 (Ref. 3).

The 125 VDC electrical power system consists of four independent Class 1E DC electrical power subsystems, Divisions 1, 2, 3, and 4. Each subsystem consists of a battery, associated battery charger, and all the associated control equipment and interconnecting cabling.

During normal operation, the DC loads are powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC loads are automatically powered from the Engineered Safety Feature (ESF) batteries.

Each of the Division 1 and 2 electrical power subsystems provides the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 480 V load centers. Also, these DC subsystems provide DC electrical power to the Division 1 and 2 inverters, which in turn power the respective uninterruptible AC buses. The Division 3 DC electrical power subsystem provides DC motive and control power as required for the High Pressure Core Spray (HPCS) System diesel generator (DG) set control and protection. The DC subsystem also provides power to the Division 3 inverter, which in turn powers the Division 3 uninterruptible AC bus. The Division 4 DC electrical power subsystem provides DC electrical power to the Division 4 inverter, which in turn powers the Division 4 uninterruptible AC bus.

(continued)

BASES

BACKGROUND (continued)

The DC power distribution system is described in more detail in Bases for LCO 3.8.9, "Distribution Systems—Operating," and LCO 3.8.10, "Distribution Systems—Shutdown."

Each Division 1, 2, 3, and 4 battery has adequate storage capacity to **meet the duty cycle(s)** ~~carry the required load continuously for at least 4 hours as~~ discussed in the USAR, Section 8.3.2 (Ref. 4). **The battery is designed with additional capacity above that required by the design duty cycle to allow for temperature variations and other factors.**

Each DC battery subsystem is separately housed in a ventilated room apart from its charger and distribution centers. Each subsystem is located in an area separated physically and electrically from the other subsystems to ensure that a single failure in one subsystem does not cause a failure in a redundant subsystem. There is no sharing between redundant Class 1E subsystems such as batteries, battery chargers, or distribution panels.

The batteries for a DC electrical power subsystem are sized to produce required capacity at 80% of nameplate rating. The **minimum** ~~voltage~~ design **voltage** limit is 105 V. ~~(Ref. 4).~~ **The battery cells are flooded lead acid construction with a nominal specific gravity of 1.215. This specific gravity corresponds to an open circuit battery voltage of approximately 120 V for a 58 cell battery (i.e., cell voltage of 2.065 volts per cell (Vpc)). The open circuit voltage is the voltage maintained when there is no charging or discharging. Once fully charged with its open circuit voltage $\geq$ 2.065 Vpc, the battery cell will maintain its capacity for 30 days without further charging per manufacturer's instructions. Optimal long term performance, however, is obtained by maintaining a float voltage of 2.20 to 2.25 Vpc. This provides adequate over-potential, which limits the formation of lead sulfate and self discharge. The nominal float voltage of 2.22 Vpc corresponds to a total float voltage output of 128.8 V for a 58 cell battery as discussed in USAR 8.3.2 (Ref. 4).**

Each battery charger of Division 1, 2, 3, and 4 DC electrical power subsystems has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger has sufficient **excess** capacity to restore the battery bank from the design minimum charge to its fully charged state within 12 hours while supplying normal steady state loads (Ref. 4).

The battery charger is normally in the float charge mode. Float charge is the condition in which the charger is supplying the connected loads and the battery cells are

(continued)

BASES

BACKGROUND (continued)

receiving adequate current to optimally charge the battery. This assures the internal losses of a battery are overcome and the battery is maintained in a fully charged state.

When desired, the charger can be placed in the equalize mode. The equalize mode is at a higher voltage than the float mode and charging current is correspondingly higher. The battery charger is operated in the equalize mode after a battery discharge or for routine maintenance. Following a battery discharge, the battery recharge characteristic accepts current at the current limit of the battery charger (if the discharge was significant, e.g., following a battery service test) until the battery terminal voltage approaches the charger voltage setpoint. Charging current then reduces exponentially during the remainder of the recharge cycle. Lead-calcium batteries have recharge efficiencies of greater than 95%, so once at least 105% of the ampere-hours discharged have been returned, the battery capacity would be restored to the same condition as it was prior to the discharge. This can be monitored by direct observation of the exponentially decaying charging current or by evaluating the amp-hours discharged from the battery and amp-hours returned to the battery.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the USAR, Chapter 6 (Ref. 5) and Chapter 15 (Ref. 6), assume that ESF systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. As described in Ref. 4, only Division 1, Division 2, and Division 3 DC electrical power subsystems are assumed to be available for the safe shutdown analysis of the plant. These requirements include maintaining DC sources OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite AC power or of all onsite AC power; and

b. A worst case single failure.

The DC sources satisfy Criterion 3 of the NRC Policy Statement.

(continued)

BASES

LCO

The DC electrical power subsystems, each subsystem consisting of one battery, one battery charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated bus within the divisions, are required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Loss of any DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, and 3 to ensure safe unit operation and to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided, and containment integrity and other vital functions are maintained in the event of a postulated DBA.

The DC electrical power requirements for MODES 4 and 5 are addressed in the Bases for LCO 3.8.5, "DC Sources—Shutdown."

ACTIONS

A.1, A.2 and A.3

Condition A represents one division with one Division 1 or 2 battery charger inoperable (e.g., the voltage limit of SR 3.8.4.1 is not maintained). The ACTIONS provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to OPERABLE status in a reasonable time period. Required Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within 12 hours, the battery will be restored to its fully charged condition (Required Action A.2) from any discharge that might have occurred due to the charger inoperability.

A discharged battery having terminal voltage of at least the minimum established float voltage indicates that the battery

(continued)

BASES (continued)

ACTIONS (continued)

is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus, there is good assurance of fully recharging the battery within 12 hours, avoiding a premature shutdown with its own attendant risk.

If established battery terminal float voltage cannot be restored to greater than or equal to the minimum established float voltage within 2 hours, and the charger is not operating in the current-limiting mode, a faulty charger is indicated. A faulty charger that is incapable of maintaining established battery terminal float voltage does not provide assurance that it can revert to and operate properly in the current limit mode that is necessary during the recovery period following a battery discharge event that the DC system is designed for.

If the charger is operating in the current limit mode after 2 hours that is an indication that the battery is partially discharged and its capacity margins will be reduced. The time to return the battery to its fully charged conditions in this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within 12 hours (Required Action A.2).

Required Action A.2 requires that the battery float current be verified as less than or equal to 2 amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it has now been fully recharged. If at the expiration of the initial 12 hour period, the battery float current is not less than or equal to 2 amps, this indicates there may be additional battery problems and the battery must be declared inoperable.

Required Action A.3 limits the restoration time for the inoperable battery charger to 7 days. This action is applicable if an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage has been used (e.g., balance of plant non-Class 1E battery charger). The 7 day completion time reflects a reasonable time to effect restoration of the qualified battery charger to operable status.

B.1

Condition B represents one battery on Division 1 or 2 inoperable. With one battery inoperable, the DC bus is being supplied by the OPERABLE battery charger. Any event that results in a loss of the AC buss supporting the battery

(continued)

BASES (continued)

ACTIONS (continued)

charger will also result in loss of DC to that division. Recovery of the AC bus, especially if it is due to a loss of offsite power, will be hampered by the fact that many of the components necessary for the recovery (e.g., diesel generator control and field flash, AC load shed and diesel generator output circuit breakers, etc.) likely rely upon the battery. In addition, the energization transients of any DC loads that are beyond the capability of the battery charger and normally require the assistance of the battery will not be able to be brought online. The 2 hour limit allows sufficient time to effect restoration of an inoperable batery given that the majority of the conditions that lead to batery inoperability (e.g., loss of battery charger, battery cell voltage less than 2.07 V, etc.) are identified in Specifications 3.8.4, 3.8.5, and 3.8.6 together with additional specific completion times.

CA.1

Condition A represents one division with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for complete loss of DC power to the affected division. The 2 hour limit is consistent with the allowed time for an inoperable DC distribution system division.

If one of the required Division 1 or 2 DC electrical power subsystems is inoperable for reasons other than Condition A or B (e.g., ~~inoperable battery, inoperable battery charger, or~~ inoperable battery charger and associated inoperable battery), the remaining DC electrical power subsystems have the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent worst case single failure could, however, result in the loss of minimum necessary DC electrical subsystems, continued power operation should not exceed 2 hours. The 2 hour Completion Time is based on Regulatory Guide 1.93 (Ref. 7) and reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem and, if the DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

~~BD~~.1

With one or more Division 3 or 4 DC electrical power subsystems inoperable, the HPCS System may be incapable of performing its intended functions and must be immediately declared inoperable.
This declaration also requires entry into applicable Conditions and Required Actions of LCO 3.5.1, "ECCS—Operating."

(continued)

BASES (continued)

ACTIONS

~~C~~**E**.1 and ~~C~~**E**.2

If the **inoperable** DC electrical power subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. The Completion Time to bring the unit to MODE 4 is consistent with the time required in Regulatory Guide 1.93 (Ref. 7).

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

Verifying battery terminal voltage while on float charge helps to ensure the effectiveness of the **battery chargers, which support the ability of the batteries to perform their intended function.** ~~charging system and the ability of the batteries to perform their intended function.~~ Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery ~~(or battery cell)~~ in a fully charged state **while supplying the continuous steady state loads of the associated DC subsystem. On float charge, battery cells will receive adequate current to continually charge the battery. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the minimum float voltage established by the battery manufacturer (2.20 Vpc or 127.6 V at the battery terminals). This voltage maintains the battery plates in a condition that supports maintaining the grid life (expected to be approximately 20 years).** ~~The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations.~~ The 7 day Frequency is consistent with manufacturer's recommendations and IEEE-450 (Ref. 8).

With regard to battery terminal voltage values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 12).

~~SR 3.8.4.2~~

~~Visual inspection to detect corrosion of the battery cells and connections, or measurement of the resistance of each~~

(continued)

~~inter-cell, inter-rack, inter-tier, and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.~~

~~The Surveillance Frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. This Frequency is considered acceptable based on operating experience related to detecting corrosion trends.~~

~~(continued)~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.2 (continued)

With regard to battery connection resistance **values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref.** 12**).**

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

The 18 month Frequency of the Surveillance is based on engineering judgement, taking into consideration the desired unit conditions to perform the Surveillance. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.8.4.4 and SR 3.8.4.5

Visual inspection and resistance measurements of inter-cell, inter-rack, inter-tier, and terminal connections provides an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anti-corrosion material is used to ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection.

The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR, provided visible corrosion is removed during performance of this Surveillance. For the purposes of this SR, oxidation is not considered corrosion, provided the resistance of the connection is within the limits.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~SR 3.8.4.4 and SR 3.8.4.5 (continued)~~

~~The 18 month Frequency of the Surveillance is based on engineering judgement, taking into consideration the desired unit conditions to perform the Surveillance. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.~~

~~With regard to battery connection resistance values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 12).~~

SR 3.8.4.~~6~~2

This SR verifies ~~Battery charger capability requirements are based on~~ the design capacity of the **battery** chargers. ~~(Ref. 4).~~ According to Regulatory Guide 1.32 (Ref. 9), the battery charger supply is **recommended** ~~required~~ to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensure that these requirements can be satisfied. **This SR provides two options. One option requires that each battery charger be capable of supplying 300 amps for Divisions 1 and 2 (100 amps for Divisions 3 and 4) at the minimum established float voltage for 4 hours. The ampere requirements are based on the output rating of the chargers. The voltage requirements are based on the charger voltage level after a response to a loss of AC power. The time period is sufficient for the charger temperature to have stabilized and to have been maintained for at least 2 hours.**

The other option requires that each battery charger be capable of recharging the battery after a service test coincident with supplying the largest coincident demands of the various continuous steady state loads (irrespective or the status of the plant during which these demands occur). This level of loading may not normally be available following the battery service test and will need to be supplemented with additional loads. The duration for this test may be longer than the charger sizing criteria since the battery recharge is affected by float voltage, temperature, and the exponential decay in charging current. The battery is recharged when the measured charging current is $\leq$ 2 amps.

(continued)

BASES

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these 18 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

With regard to minimum required amperes and duration values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 12).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.3~~7~~

A battery service test is a special test of the battery's capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length are established with a dummy load that corresponds to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 9) and Regulatory Guide 1.129 (Ref. 10), which state that the battery service test should be performed during refueling operations or at some other outage, with intervals between tests not to exceed 18 months.

This SR is modified by two Notes. Note 1 allows the ~~once per 60 months~~ performance of a modified performance discharge test SR 3.8.6.6~~4.a~~ in lieu of SR 3.8.4.3~~7~~. This substitution is acceptable because SR 3.8.6.6~~4.a~~ represents an ~~equivalent, more severe~~ test of battery capability as ~~capacity than~~ SR 3.8.4.3~~7~~. The reason for Note 2 is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

With regard to battery capacity values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 12).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.8 (continued)

A battery performance test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

The acceptance criteria for this Surveillance is consistent with IEEE-450 (Ref. 8) and IEEE-485 (Ref. 11). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life, the Surveillance Frequency is reduced to 18 months. Degradation is indicated, according to IEEE-450 (Ref. 8), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is ≥ 10% below the manufacturer's rating. These Frequencies are based on the recommendations in IEEE-450 (Ref. 8).

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

BASES

With regard to battery capacity values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 12).

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. Regulatory Guide 1.6, March 10, 1971.
3. IEEE Standard 308, 1978.
4. USAR, Section 8.3.2.
5. USAR, Chapter 6.
6. USAR, Chapter 15.
7. Regulatory Guide 1.93, December 1974.
8. IEEE Standard 450, 1995.
9. Regulatory Guide 1.32, February 1977.
10. Regulatory Guide 1.129, December 1974.
~~11. IEEE Standard 485.~~
~~12. Calculation IP-0-0123.~~

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources—Shutdown

BASES

BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the USAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 4 and 5 and during movement of irradiated fuel assemblies in the primary or secondary containment ensures that:

a. The facility can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

The DC sources satisfy Criterion 3 of the NRC Policy Statement.

LCO

One DC electrical power subsystem (consisting of one battery, one battery charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated bus within the division) associated with the

(continued)

BASES

LCO (continued)

Division 1 or Division 2 onsite Class 1E DC electrical power distribution subsystem(s) required OPERABLE by LCO 3.8.10, "Distribution Systems - Shutdown," is required to be OPERABLE. Similarly, when the High Pressure Core Spray (HPCS) System is required to be OPERABLE, the Division 3 and Division 4 DC electrical power subsystems associated with the Division 3 and Division 4 onsite Class 1E DC electrical power distribution subsystems required OPERABLE by LCO 3.8.10 are required to be OPERABLE. In addition to the preceding subsystems required to be OPERABLE, a Class 1E battery or battery charger and the associated control equipment and interconnecting cabling capable of supplying power to the remaining Division 1 or Division 2 onsite Class 1E DC electrical power distribution subsystem(s), when portions of both Division 1 and Division 2 DC electrical power distribution subsystems are required to be OPERABLE by LCO 3.8.10. This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the primary or secondary containment provide assurance that:

a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;

b. Required features needed to mitigate a fuel handling accident are available;

c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The DC electrical power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.4.

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BASES (continued)

ACTIONS

The ACTIONS are modified by a Note indicating that LCO 3.0.3 does not apply. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of irradiated fuel assemblies is not sufficient reason to require reactor shutdown.

A.1, A.2, and A.3

Condition A represents one division with one battery charger inoperable (e.g., the voltage limit of SR 3.8.4.1 is not maintained). The ACTIONS provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to OPERABLE status in a reasonable time period. Required Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, with 12 hours, the battery will be restored to its fully charged condition (Required Action A.2) from any discharge that might have occurred due to the charger inoperability. A discharged battery having terminal voltage of at least the minimum established float voltage indicates that the battery is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus there is good assurance of fully recharging the battery within 12 hours, avoiding a premature shutdown with its own attendant risk.

If established battery terminal float voltage cannot be restored to greater than or equal to the minimum established float voltage within 2 hours, and the charger is not operating in the current-limiting mode, a faulty charger is indicated. A faulty charger that is incapable of maintaining established battery terminal float voltage does not provide assurance that it can revert to and operate properly in the current limit mode that is necessary during the recovery period following a battery discharge event that the DC system is designed for.

If the charger is operating in the current limit mode after 2 hours, that is an indication that the battery is partially discharged and its capacity margins will be reduced. The time to return the battery to its fully charged condition in

(continued)

BASES (continued)

ACTIONS (continued)

this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within 12 hours (Required Action A.2).

Required Action A.2 required that the battery float current be verified as less than or equal to 2 amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it has now been fully recharged. If at the expiration of the initial 12 hour period the battery float current is not less than or equal to 2 amps, this indicates there may be additional battery problems and the battery must be declared inoperable.

Required Action A.3 limits the restoration time for the inoperable battery charger to 7 days. This action is applicable if an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage has been used (e.g., balance of plant non-Class 1E battery charger). The 7 day completion time reflects a reasonable time to effect restoration of the qualified battery charger to operable status.

~~A~~B.1, ~~A~~B.2.1, ~~A~~B.2.2, ~~A~~B.2.3, and ~~A~~B.2.4

If more than one DC distribution subsystem is required according to LCO 3.8.10, the DC subsystems remaining OPERABLE with one or more DC power sources inoperable may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowing the option to declare required features inoperable with associated DC power source(s) inoperable, appropriate restrictions are implemented in accordance with the affected system LCOs' ACTIONS. In many instances this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the plant safety systems.

The Completion Time of immediately is consistent with the

(continued)

BASES (continued)

ACTIONS required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.~~83~~. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendered inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required.

REFERENCES

1. USAR, Chapter 6.
2. USAR, Chapter 15.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery ~~Cell~~ Parameters

BASES

BACKGROUND

This LCO delineates the limits on **battery float current as well as** electrolyte temperature, level~~,~~ **and** float voltage~~, and specific gravity~~ for the DC power source batteries. A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources—Operating," and LCO 3.8.5, "DC Sources—Shutdown." **In addition to the limitations of this Specification, the "Battery Maintenance and Monitoring Program," specified in Specification 5.5.14, is a program that monitors various battery parameters based on the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications" (Ref. 3).**

The battery cells are of flooded lead acid construction with a nominal specific gravity of 1.215. This specific gravity corresponds to an open circuit battery voltage of approximately 120 V for a 58 cell battery (i.e., cell voltage of 2.065 Volts per cell (Vpc)). The open circuit voltage is the voltage maintained when there is no charging or discharging. Once fully charged with its open circuit voltage $\geq$ 2.065 Vpc, the battery cell will maintain its capacity for 30 days without further charging per manufacturer's instructions. Optimal long term performance however, is obtained by maintaining a float voltage 2.20 to 2.25 Vpc. This provides adequate over-potential which limits the formation of lead sulfate and self discharge. The nominal float voltage of 2.22 Vpc corresponds to a total float voltage output of 128.8 V for a 58 cell battery as discussed in the USAR, Section 8.3.2 (Ref. 6).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in USAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power subsystems provide normal and emergency DC electrical power for the diesel generators, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least one division of DC sources OPERABLE during accident conditions, in the event of:

a. An assumed loss of all offsite AC power or all onsite AC power; and

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)

b. A worst case single failure.

Since battery ~~cell~~ parameters support the operation of the DC power sources, they satisfy Criterion 3 of the NRC Policy Statement.

LCO

Battery ~~cell~~ parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. **Battery parameter** ~~Electrolyte~~ limits are conservatively established, allowing continued DC electrical system function even with limits not met.

Additional preventive maintenance, testing, and monitoring is performed in accordance with the "Battery Maintenance and Monitoring Program" as specified in Specification 5.5.14.

APPLICABILITY

The battery ~~cell~~ parameters are required solely for the support of the associated DC electrical power subsystem. Therefore, battery **parameter limits are** ~~electrolyte is~~ only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussion in Bases for LCO 3.8.4 and LCO 3.8.5.

ACTIONS

A.1, A.2, and A.3

With parameters of one or more cells in one or more batteries **in one division < 2.07 V, the battery cell is degraded. Within 2 hours, verification of the required battery charger OPERABILITY is made by monitoring the battery terminal voltage (SR 3.8.4.1) and of the overal battery state of charge by monitoring the battery float charge current (SR 3.8.6.1). this assures that there is still sufficient battery capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of one or more cells in one or more batteries < 2.07 V, and continued operation is permitted for a limited period up to 24 hours.**

Since the Required Actions only specify "perform," a failure of SR 3.8.4.1 or SR 3.8.6.1 acceptance criteria does not result in this Required Action not met. However, if one of the SRs is failed, the appropriate Condition(s), depending on the cause of the failures, is entered. If SR 3.8.6.1 is failed, then there is not assurance that there is still sufficient battery capacity to perform the intended function and the battery must be declared inoperable immediately.

(continued)

BASES (continued)

~~not within limits (i.e., Category A limits not met, Category B limits not met, or Category A and B limits not met) but within the Category C limits specified in Table 3.8.6-1, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met, and continued operation is permitted for a limited period.~~

~~The pilot cell electrolyte level and float voltage are required to be verified to meet Category C limits within 1 hour (Required Action A.1). This check provides a quick indication of the status of the remainder of the battery cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cell. One hour is considered a reasonable amount of time to perform the required verification.~~

~~Verification that the Category C limits are met (Required Action A.2) provides assurance that, during the time needed to restore the parameters to the Category A and B limits, the battery is still capable of performing its intended function. A period of 24 hours is allowed to complete the initial verification because specific gravity measurements must be obtained for each connected cell. Taking into consideration both the time required to perform the required verification and the assurance that the battery cell parameters are not severely degraded, this time is considered reasonable. The verification is repeated at 7 day intervals until the parameters are restored to Category A and B limits. This periodic verification is consistent with the normal Frequency of pilot cell surveillances.~~

~~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 and B.2

One or more batteries in one division with float current > 2 amps indicates that a partial discharge of the battery capacity has occurred. This may be due to one or more battery cells in a low voltage condition reflecting some loss of capacity. Within 2 hours, verification of the required battery charger OPERABILITY is made by monitoring the battery terminal voltage. If the terminal voltage is found to be less than the minimum established float voltage, there are two possibilities: the battery charger is

(continued)

BASES (continued)

ACTIONS

inoperable, or is operating in the current limit mode. Condition A addressed charger inoperability. If the charger is operating in the current limit mode after 2 hours, that is an indication that the battery has been substantially discharged and likely cannot perform its required design functions. The time to return the battery to its fully charged condition in this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within 12 hours (Required Action B.2). The battery must therefore be declared inoperable.

If the float voltage is found to be satisfactory but there are one or more battery cells with float voltage less than 2.07 V, the associated "OR" statement in Condition F is applicable and the battery must be declared inoperable immediately. If float voltage is satisfactory and there are no cells less than 2.07 V, there is good assurance that, within 12 hours, the battery will be restored to its fully charged condition (Required Action B.2) from any discharge that might have occurred due to a temporary loss of the battery charger. A discharged battery with float voltage (the charger setpoint) across its terminals, indicates that the battery is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus, there is good assurance of fully recharging the battery within 12 hours, avoiding a premature shutdown with its own attendant risk.

If the condition is due to one or more cells in a low voltage condition but is still greater than 2.07 V, and float voltage is found to be satisfactory, this is not indication of a substantially discharged battery and 12 hours is a reasonable time prior to declaring the battery inoperable.

Since Required Action B.1 only specifies "perform," a failure of SR 3.8.4.1 acceptance criteria does not result in the Required Action not met. However, if SR 3.8.4.1 is failed, the appropriate Condition(s), depending on the cause of the failure, is entered.

C.1, C.2 and C.3

With one or more batteries in one division with one or more cells electrolyte level above the top of the plates, but below the minimum established design limits, the battery

(continued)

BASES (continued)

still retains sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of electrolyte level not met. Within 31 days, the minimum established design limits for electrolyte level must be re-established.

With electrolyte level below the top of the plates, there is a potential for dryout and plate degradation. Required Actions C.1 and C.2 address this potential (as well as provisions in Specification 5.5.14, Battery Monitoring and Maintenance Program). They are modified by a note that indicates they are only applicable if electrolyte level is below the top of the plates. Within 8 hours, level is required to be restored to above the top of the plates. The Required Action C.2 requirement to verify that there is no leakage by visual inspection and the Specification 5.5.14, Item b, to initiate action to equalize and test in accordance with manufacturer's recommendation are taken from Annex D of IEEE Standard 450-1995. They are performed following the restoration of the electrolyte level to above the top of the plates. Based on the results of the manufacturer's recommended testing, the battery may have to be declared inoperable and the affected cell(s) replaced.

D.1

With one or more batteries in one division with pilot cell temperature less than the minimum established design limits, 12 hours is allowed to restore the temperature to within limits. A low electrolyte temperature limits the current and power available. Since the battery is sized with margin, while battery capacity is degraded, sufficient capacity exists to perform the intended function and the affected battery is not required to be considered inoperable solely as a result of the pilot cell temperature not met.

E.1

With one or more batteries in redundant trains with battery parameters not within limits, there is not sufficient assurance that battery capacity has not been affected to the degree that the batteries can still perform their required function, given that redundant batteries are involved. With redundant batteries involved, this potential could result in a total loss of function on multiple systems that rely upon the batteries. The longer completion times specified for battery parameters on non-redundant batteries not within limits are therefore not appropriate, and the parameters must be restored to within limits on at lease one train within 2 hours.

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BASES (continued)

BF.1

When any battery parameter is outside the **allowances of the Required Actions for condition A, B, C, D, or E,** ~~Category C limit for any connected cell,~~ sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding **battery** ~~DC electrical power subsystem~~ must be declared inoperable. Additionally, **discovering one or more batteries in one train with one or more battery cells float voltage less than 2.07 V and float current greater than 2 amps indicates that the battery capacity may not be sufficient to perform the intended functions. The battery must therefore be declared inoperable immediately.** ~~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 65°F, also are cause for immediately declaring the associated DC electrical power subsystem inoperable.~~

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

Verifying battery float current while on float charge is used to determine the state of charge of the battery. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a charged state. The float current requirements are based on the float current indicative of a charged battery. Use of float current to determine the state of charge of the battery is consistent with IEEE Standard 450-1995 (Ref. 3). The 7 day frequency is consistent with IEEE Standard 450-1995.

This SR is modified by a Note that states the float current requirement is not required to be met when battery terminal voltage is less than the minimum established float voltage of SR 3.8.4.1. When this float voltage is not maintained, the Required Actions of LCO 3.8.4, ACTION A, are being taken, which provide the necessary and appropriate verifications of the battery condition. Furthermore, the float current limit of 2 amps is established based on the nominal float voltage value and is not directly applicable when this voltage is not maintained. ~~The SR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 3), which recommends regular battery inspections including float voltage, specific gravity, and electrolyte level of pilot cells. The 7 day Frequency ensures that these inspections are performed within the frequency recommended by IEEE 450 (Ref. 3).~~

~~With regard to battery cell parameter values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a~~

~~nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 4).~~

SR 3.8.6.2 and SR 3.8.6.5

Optimal long-term battery performance is obtained by maintaining a float voltage greater than or equal to the minimum established design limits provided by the battery manufacturer, which corresponds to 127.6 V at the battery terminals, or 2.20 Vpc. This provides adequate over-potential, which limits the formation of lead sulfate and self discharge, which could eventually render the battery inoperable. Float voltage, in this range or less, but greater than 2.07 Vpc, are addressed in Specification 5.5.14. SRs 3.8.6.2 and 3.8.6.5 require verification that the cell float voltages are equal to or greater than the short-term absolute minimum voltage of 2.07 V. The Frequency for cell voltage verification every 31 days for pilot cell and 92 days for each connected cell is consistent with IEEE Standard 450-1995 (Ref. 3).

~~The quarterly inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3). In addition, within 72 hours of a battery overcharge > 150 V, the battery must be demonstrated to meet Category B limits. This inspection is also consistent with IEEE-450 (Ref. 3), which recommends special inspections following a severe discharge or overcharge, to ensure that no significant degradation of the battery occurs as a consequence of such discharge or overcharge.~~

~~With regard to battery cell parameter values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 4).~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.6.3

The limit specified for electrolyte level ensures that the plates suffer no physical damage and maintains adequate electron transfer capability. The Frequency is consistent with IEEE Standard 450-1995 (Ref. 3).
~~This Surveillance verification that the average temperature of representative cells is ≥ 65°F is consistent with a recommendation of IEEE-450 (Ref. 3), which states that the temperature of electrolytes in representative cells should be determined on a quarterly basis.~~

~~Lower than normal temperatures act to inhibit or reduce battery capacity. This SR ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer's recommendations.~~

~~With regard to electrolyte temperature values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 4).~~

SR 3.8.6.4

This surveillance verifies that the pilot cell temperature is greater than or equal to the minimum established design limit (i.e., 65 degrees F). Pilot cell electrolyte temperature is maintained above this temperature to assure the battery can provide the required current and voltage to meet the design requirements. Temperatures lower than assumed in battery sizing calculations act to inhibit or reduce battery capacity. The Frequency is consistent with IEEE Standard 450-1995 (Ref. 3).

SR 3.8.6.6

A battery performance test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

The acceptance criteria for this Surveillance is consistent with IEEE Standard 450-1995 (Ref. 3) and IEEE Standard 485 (Ref. 5). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements. Furthermore, the battery is

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BASES (continued)

sized to meet the assumed duty cycle loads when the battery design capacity reaches this 80% limit.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life, the Surveillance Frequency is reduced to 18 months. Degradation is indicated, according to IEEE Standard 450 (Ref. 3), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is ≥ 10% below the manufacturer's rating. These Frequencies are based on the recommendations in IEEE Standard 450 (Ref. 3).

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

~~Table 3.8.6-1~~

~~This table delineates the limits on electrolyte level, float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.~~

~~Category A defines the normal parameter limit for each designated pilot cell in each battery. The cells selected as pilot cells are those whose electrolyte level, float voltage, and specific gravity approximate the state of charge of the entire battery.~~

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BASES

SURVEILLANCE REQUIREMENTS

~~Table 3.8.6-1 (continued)~~

~~The Category A limits specified for electrolyte level are based on manufacturer's recommendations and are consistent with the guidance in IEEE-450 (Ref. 3), with the extra 1/4 inch allowance above the high water level indication for operating margin to account for temperature and charge effects. In addition to this allowance, footnote a to Table 3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.~~

~~The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on the recommendation of IEEE-450 (Ref. 3), which states that prolonged operation of cells below 2.13 V can reduce the life expectancy of cells.~~

~~The Category A limit specified for specific gravity for each pilot cell is ≥ 1.195 based on the manufacturer's recommendations. This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C).~~

~~The specific gravity readings are corrected for actual electrolyte temperature and level. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F when using a float hydrometer. Temperature correction will be performed in accordance with the hydrometer manufacturer's recommendations when using a digital hydrometer (referenced to 77°F (25°C)). The specific gravity of the electrolyte in a cell increases with a loss of water due to electrolysis or evaporation. Level correction will be in accordance with manufacturer's recommendations.~~

~~Category B defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that may be jumpered out.~~

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BASES

SURVEILLANCE REQUIREMENTS

~~Table 3.8.6-1 (continued)~~

~~The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A and have been discussed above. The Category B limit specified for specific gravity for each connected cell is ≥ 1.190 with the average of all connected cells ≥ 1.200. These values are based on manufacturer's recommendations. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell do not mask overall degradation of the battery.~~

~~Category C defines the limit for each connected cell. These values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety. When any battery parameter is outside the Category C limit, the assurance of sufficient capacity described above no longer exists, and the battery must be declared inoperable.~~

~~The Category C limit specified for electrolyte level (above the top of the plates and not overflowing) ensures that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C limit for float voltage is based on manufacturer's recommendations to ensure no internal cell problems that may require cell replacement.~~

~~The Category C limit of average specific gravity (≥ 1.190), is based on manufacturer's recommendations. In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.~~

~~The footnotes to Table 3.8.6-1 that apply to specific gravity are applicable to Category A, B, and C specific gravity.~~

~~Footnote b in Table 3.8.6-1 requires the above mentioned correction for electrolyte level and temperature, with the exception that level correction is not required when battery charging current is < 2 amps on float charge. This current~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

~~Table 3.8.6-1 (continued)~~

~~provides, in general, an indication of overall battery condition.~~

~~Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE 450 (Ref. 3).~~

~~Footnote c to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a battery recharge. Within 7 days each connected cell's specific gravity must be measured to confirm the state of charge. Following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant, and confirming measurements may be made in less than 7 days.~~

REFERENCES

1. USAR, Chapter 6.

2. USAR, Chapter 15.

3. IEEE Standard 450, 1995.

4. Calculation IP-0-0123.

5. **IEEE Standard 485, 1983.**

6. **USAR, Chapter 8.**

INFORMATION SUPPORTING A FINDING OF NO SIGNIFICANT HAZARDS CONSIDERATION

According to 10 CFR 50.92, "Issuance of Amendment," paragraph (c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

(1) Involve a significant increase in the probability of occurrence or consequences of an accident previously evaluated; or,

(2) Create the possibility of a new or different kind of accident from any previously analyzed; or,

(3) Involve a significant reduction in a margin of safety.

AmerGen Energy Company, LLC (i.e., AmerGen), proposes changes to Appendix A, Technical Specifications (TS), of Facility Operating License No. NPF-62 for the Clinton Power Station (CPS).

The proposed changes are to TS Section 3.8.4, "DC Sources – Operating," Section 3.8.5, "DC Sources – Shutdown," and Section 3.8.6, "Battery Cell Parameters." The proposed changes request new actions with increased completion times for an inoperable battery charger, as well as request an alternate battery charger testing criteria for Limiting Condition for Operation (LCO) 3.8.4 and LCO 3.8.5. The proposed changes also include the relocation of a number of Surveillance Requirements (SRs) in TS Section 3.8.4, that perform preventive maintenance on the safety related batteries, to a licensee-controlled program. It is proposed that TS Table 3.8.6-1, "Battery Cell Parameter Requirements," be relocated to a licensee-controlled program, and specific actions with associated completion times for out-of-limits conditions for battery cell voltage, electrolyte level, and electrolyte temperature be added to TS Section 3.8.6. In addition, specific SRs are being proposed for verification of these parameters.

A new program is being proposed for the maintenance and monitoring of station batteries based on the recommendations of Institute of Electrical and Electronics Engineers (IEEE) Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications." This program will be described in new TS Section 5.5.14, "Battery Monitoring and Maintenance Program." All of the items proposed to be relocated will be contained within this new program.

Information supporting the determination that the criteria set forth in 10 CFR 50.92 are met for these proposed changes is provided below.

Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The proposed changes restructure the TS for the DC Electrical Power system. The proposed changes add actions to specifically address battery charger inoperability with increased completion times. This change will rely upon the

capability of providing the battery charger function by an alternate means, (e.g., a spare battery charger that will function as a qualified backup) to take advantage of the proposed increased completion time. The DC Power System or associated battery chargers are not initiators to any accident sequence analyzed in the Updated Safety Analysis Report (USAR). Operation in accordance with the proposed TS ensures that the DC Power System is capable of performing function as described in the USAR, therefore the mitigative functions supported by the DC Power System will continue to provide the protection assumed by the analysis.

The relocation of preventive maintenance surveillance, and certain operating limits and actions to a newly-created, licensee-controlled TS 5.5.14, "Battery Monitoring and Maintenance Program," will not challenge the ability of the DC Power System to perform its design function. The maintenance and monitoring required by current TS, which are based on industry standards, will continue to be performed. In addition, the DC Power System is within the scope of 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," which will ensure the control of maintenance activities associated with the DC Power System.

In summary, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed changes involve restructuring the TS for the DC Electrical Power system. This change will rely upon the capability of providing the battery charger function by an alternate means, (e.g., a spare battery charger that will function as a qualified backup) to take advantage of the proposed increased completion time. The DC Power System or associated battery chargers are not initiators to any accident sequence analyzed in the Updated Safety Analysis Report (USAR).

Allowing the use of a spare battery charger will increase the reliability of the DC Electrical Power system. The mitigative functions supported by the DC Power System will continue to provide the protection assumed by the safety analysis described in the USAR. Therefore, there are no new types of failures that could be created by a failure of the spare battery charger. As such, no new or different kind of accident or transient is expected by these changes.

Therefore, these proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Does the change involve a significant reduction in a margin of safety?

The proposed changes will not adversely affect operation of plant equipment. These changes will not result in a change to the setpoints at which protective actions are initiated. Sufficient DC capacity to support operation of mitigation equipment is ensured. The changes associated with the new Battery Maintenance

and Monitoring Program will ensure that the station batteries are maintained in a highly reliable manner. The use of a spare battery charger will increase the reliability of the DC system during periods of normal battery charger inoperability. The equipment fed by the DC Electrical Sources will continue to provide adequate power to safety related loads in accordance with analysis assumptions.

Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

Therefore, based on the above evaluation, we have concluded that the proposed changes do not involve a significant hazards consideration.

INFORMATION SUPPORTING AN ENVIRONMENTAL ASSESSMENT

AmerGen Energy Company, LLC (i.e., AmerGen), has evaluated these proposed changes against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments." AmerGen has determined that this proposed change meets the criteria for a categorical exclusion set forth in 10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," paragraph (c)(9), and as such, has determined that no irreversible consequences exist in accordance with 10 CFR 50.92, "Issuance of amendment," paragraph (b). This determination is based on the fact that this change is being proposed as an amendment to a license issued pursuant to 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," which changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation," or that changes an inspection or surveillance requirement, and the amendment meets the following specific criteria.

(i) The proposed changes involve no significant hazards consideration.

As demonstrated in Attachment C, these proposed changes do not involve any significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

The proposed changes to Technical Specification (TS) Section 3.8.4, "DC Sources – Operating," Section 3.8.5, "DC Sources – Shutdown," Section 3.8.6, "Battery Cell Parameters," and new Section 5.5.14, "Battery Maintenance and Monitoring Program," are consistent with the design basis of the plant. As documented in Attachment A, there will be no significant increase in the amounts of any effluents released offsite. These changes do not result in an increase in power level, do not increase the production, nor alter the flow path or method of disposal of radioactive waste or byproducts. Therefore, the proposed changes will not affect the types or increase the amounts of any effluents released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed changes will result in changes that increase the reliability of the current plant equipment. There will be no change in the level of controls or methodology used for processing of radioactive effluents or handling of solid radioactive waste, nor will the proposal result in any change in the normal radiation levels in the plant. Therefore, there will be no increase in individual or cumulative occupational radiation exposure resulting from these changes.

INFORMATION SUPPORTING A FINDING OF NO SIGNIFICANT HAZARDS CONSIDERATION

According to 10 CFR 50.92, "Issuance of Amendment," paragraph (c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

(1) Involve a significant increase in the probability of occurrence or consequences of an accident previously evaluated; or,

(2) Create the possibility of a new or different kind of accident from any previously analyzed; or,

(3) Involve a significant reduction in a margin of safety.

AmerGen Energy Company, LLC (i.e., AmerGen), proposes changes to Appendix A, Technical Specifications (TS), of Facility Operating License No. NPF-62 for the Clinton Power Station (CPS).

The proposed changes are to TS Section 3.8.4, "DC Sources – Operating," Section 3.8.5, "DC Sources – Shutdown," and Section 3.8.6, "Battery Cell Parameters." The proposed changes request new actions with increased completion times for an inoperable battery charger, as well as request an alternate battery charger testing criteria for Limiting Condition for Operation (LCO) 3.8.4 and LCO 3.8.5. The proposed changes also include the relocation of a number of Surveillance Requirements (SRs) in TS Section 3.8.4, that perform preventive maintenance on the safety related batteries, to a licensee-controlled program. It is proposed that TS Table 3.8.6-1, "Battery Cell Parameter Requirements," be relocated to a licensee-controlled program, and specific actions with associated completion times for out-of-limits conditions for battery cell voltage, electrolyte level, and electrolyte temperature be added to TS Section 3.8.6. In addition, specific SRs are being proposed for verification of these parameters.

A new program is being proposed for the maintenance and monitoring of station batteries based on the recommendations of Institute of Electrical and Electronics Engineers (IEEE) Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications." This program will be described in new TS Section 5.5.14, "Battery Monitoring and Maintenance Program." All of the items proposed to be relocated will be contained within this new program.

Information supporting the determination that the criteria set forth in 10 CFR 50.92 are met for these proposed changes is provided below.

Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The proposed changes restructure the TS for the DC Electrical Power system. The proposed changes add actions to specifically address battery charger inoperability with increased completion times. This change will rely upon the

capability of providing the battery charger function by an alternate means, (e.g., a spare battery charger that will function as a qualified backup) to take advantage of the proposed increased completion time. The DC Power System or associated battery chargers are not initiators to any accident sequence analyzed in the Updated Safety Analysis Report (USAR). Operation in accordance with the proposed TS ensures that the DC Power System is capable of performing function as described in the USAR, therefore the mitigative functions supported by the DC Power System will continue to provide the protection assumed by the analysis.

The relocation of preventive maintenance surveillance, and certain operating limits and actions to a newly-created, licensee-controlled TS 5.5.14, "Battery Monitoring and Maintenance Program," will not challenge the ability of the DC Power System to perform its design function. The maintenance and monitoring required by current TS, which are based on industry standards, will continue to be performed. In addition, the DC Power System is within the scope of 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," which will ensure the control of maintenance activities associated with the DC Power System.

In summary, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

The proposed changes involve restructuring the TS for the DC Electrical Power system. This change will rely upon the capability of providing the battery charger function by an alternate means, (e.g., a spare battery charger that will function as a qualified backup) to take advantage of the proposed increased completion time. The DC Power System or associated battery chargers are not initiators to any accident sequence analyzed in the Updated Safety Analysis Report (USAR).

Allowing the use of a spare battery charger will increase the reliability of the DC Electrical Power system. The mitigative functions supported by the DC Power System will continue to provide the protection assumed by the safety analysis described in the USAR. Therefore, there are no new types of failures that could be created by a failure of the spare battery charger. As such, no new or different kind of accident or transient is expected by these changes.

Therefore, these proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Does the change involve a significant reduction in a margin of safety?

The proposed changes will not adversely affect operation of plant equipment. These changes will not result in a change to the setpoints at which protective actions are initiated. Sufficient DC capacity to support operation of mitigation equipment is ensured. The changes associated with the new Battery Maintenance

and Monitoring Program will ensure that the station batteries are maintained in a highly reliable manner. The use of a spare battery charger will increase the reliability of the DC system during periods of normal battery charger inoperability. The equipment fed by the DC Electrical Sources will continue to provide adequate power to safety related loads in accordance with analysis assumptions.

Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

Therefore, based on the above evaluation, we have concluded that the proposed changes do not involve a significant hazards consideration.

INFORMATION SUPPORTING AN ENVIRONMENTAL ASSESSMENT

AmerGen Energy Company, LLC (i.e., AmerGen), has evaluated these proposed changes against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments." AmerGen has determined that this proposed change meets the criteria for a categorical exclusion set forth in 10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," paragraph (c)(9), and as such, has determined that no irreversible consequences exist in accordance with 10 CFR 50.92, "Issuance of amendment," paragraph (b). This determination is based on the fact that this change is being proposed as an amendment to a license issued pursuant to 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," which changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation," or that changes an inspection or surveillance requirement, and the amendment meets the following specific criteria.

(i) The proposed changes involve no significant hazards consideration.

As demonstrated in Attachment C, these proposed changes do not involve any significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

The proposed changes to Technical Specification (TS) Section 3.8.4, "DC Sources – Operating," Section 3.8.5, "DC Sources – Shutdown," Section 3.8.6, "Battery Cell Parameters," and new Section 5.5.14, "Battery Maintenance and Monitoring Program," are consistent with the design basis of the plant. As documented in Attachment A, there will be no significant increase in the amounts of any effluents released offsite. These changes do not result in an increase in power level, do not increase the production, nor alter the flow path or method of disposal of radioactive waste or byproducts. Therefore, the proposed changes will not affect the types or increase the amounts of any effluents released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed changes will result in changes that increase the reliability of the current plant equipment. There will be no change in the level of controls or methodology used for processing of radioactive effluents or handling of solid radioactive waste, nor will the proposal result in any change in the normal radiation levels in the plant. Therefore, there will be no increase in individual or cumulative occupational radiation exposure resulting from these changes.