

July 20, 2007

Mr. James J. Sheppard
President and Chief Executive Officer
STP Nuclear Operating Company
South Texas Project Electric
Generating Station
P.O. Box 289
Wadsworth, TX 77483

SUBJECT: SOUTH TEXAS PROJECT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS
RE: TECHNICAL SPECIFICATION 3/4.8.2 FOR BATTERIES AND DC
SYSTEMS (TAC NOS. MD0333 AND MD0334)

Dear Mr. Sheppard:

The Commission has issued the enclosed Amendment No. 180 to Facility Operating License No. NPF-76 and Amendment No. 167 to Facility Operating License No. NPF-80 for the South Texas Project, Units 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated February 28, 2006, as supplemented by letters dated April 6, and May 31, 2007, and electronic mail dated July 18, 2007.

The amendments revise TSs 3/4.8.2.1, "DC [Direct Current] Sources - Operating," and 3/4.8.2.2, "DC Sources - Shutdown," and add a new TS 3/4.8.2.3, "Battery Parameters." The amendments revise allowed outage times for battery chargers as well as battery charger testing criteria, and relocate a number of battery surveillance requirements to a licensee-controlled Battery Monitoring and Maintenance Program. The changes are consistent with Standard TS Change Traveler TSTF-360, Revision 1, "DC Electrical Rewrite."

A copy of our related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA/

Mohan C. Thadani, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosures: 1. Amendment No. 180 to NPF-76
2. Amendment No. 167 to NPF-80
3. Safety Evaluation

cc w/encls: See next page

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Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

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3. Safety Evaluation

cc w/encls: See next page

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South Texas Project, Units 1 & 2

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March 2007

South Texas Project, Units 1 & 2

-2-

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March 2007

STP NUCLEAR OPERATING COMPANY

DOCKET NO. 50-498

SOUTH TEXAS PROJECT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 180
License No. NPF-76

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by STP Nuclear Operating Company* acting on behalf of itself and for Texas Genco, LP, the City Public Service Board of San Antonio (CPS), AEP Texas Central Company, and the City of Austin, Texas (COA) (the licensees), dated February 28, 2006, as supplemented by letters dated April 6 and May 31, 2007, and electronic mail dated July 18, 2007, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

*STP Nuclear Operating Company is authorized to act for Texas Genco, LP, the City Public Service Board of San Antonio, AEP Texas Central Company, and the City of Austin, Texas, and has exclusive responsibility and control over the physical construction, operation, and maintenance of the facility.

2. Accordingly, the license is amended by changes to the Technical Specifications and Paragraph 2.C.(2) of Facility Operating License No. NPF-76 as indicated in the attachment to this license amendment.
3. The license amendment is effective as of its date of issuance and shall be implemented within 120 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA Mohan C. Thadani for T. Hiltz/

Thomas G. Hiltz, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility
Operating License No. NPF-76
and the Technical Specifications

Date of Issuance: July 20, 2007

STP NUCLEAR OPERATING COMPANY

DOCKET NO. 50-499

SOUTH TEXAS PROJECT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 167
License No. NPF-80

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by STP Nuclear Operating Company* acting on behalf of itself and for NRG South Texas LP, the City Public Service Board of San Antonio (CPS), AEP Texas Central Company, and the City of Austin, Texas (COA) (the licensees), dated February 28, 2006, as supplemented by letters dated April 6 and May 31, 2007, and electronic mail dated July 18, 2007, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

*STP Nuclear Operating Company is authorized to act for NRG South Texas LP, the City Public Service Board of San Antonio, AEP Texas Central Company, and the City of Austin, Texas, and has exclusive responsibility and control over the physical construction, operation, and maintenance of the facility.

2. Accordingly, the license is amended by changes to the Technical Specifications and Paragraph 2.C.(2) of Facility Operating License No. NPF-80 as indicated in the attachment to this license amendment.
3. The license amendment is effective as of its date of issuance and shall be implemented within 120 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA Mohan C. Thadani for T. Hiltz/

Thomas G. Hiltz, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility
Operating License No. NPF-80
and the Technical Specifications

Date of Issuance: July 20, 2007

ATTACHMENT TO LICENSE AMENDMENT NOS. 180 AND 167

FACILITY OPERATING LICENSE NOS. NPF-76 AND NPF-80

DOCKET NOS. 50-498 AND 50-499

Replace the following pages of the Facility Operating Licenses, Nos. NPF-76 and NPF-80, and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Facility Operating License No. NPF-76

<u>REMOVE</u>	<u>INSERT</u>
4	4

Facility Operating License No. NPF-80

<u>REMOVE</u>	<u>INSERT</u>
4	4

Technical Specifications

<u>REMOVE</u>	<u>INSERT</u>
x	x
3/4 8-10	3/4 8-10
3/4 8-11	3/4 8-11
3/4 8-12	3/4 8-12
3/4 8-13	3/4 8-13
--	3/4 8-13a
--	3/4 8-13b
--	3/4 8-13c
6-12c	6-12c

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 180, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. STPNOC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Not Used(4) Initial Startup Test Program (Section 14, SER)*

Any changes to the Initial Test Program described in Section 14 of the Final Safety Analysis Report made in accordance with the provisions of 10 CFR 50.59 shall be reported in accordance with 50.59(b) within one month of such change.

(5) Safety Parameter Display System (Section 18, SSER No. 4)*

Before startup after the first refueling outage, HL&P[**] shall perform the necessary activities, provide acceptable responses, and implement all proposed corrective actions related to issues as described in Section 18.2 of SER Supplement 4.

(6) Supplementary Containment Purge Isolation (Section 11.5, SSER No. 4)

HL&P shall provide, prior to startup from the first refueling outage, control room indication of the normal and supplemental containment purge sample line isolation valve position.

* The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

** The original licensee authorized to possess, use and operate the facility was HL&P. Consequently, historical references to certain obligations of HL&P remain in the license conditions.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 167, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. STPNOC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Not Used

(4) Initial Startup Test Program (Section 14, SR)*

Any changes to the Initial Test Program described in Section 14 of the Final Safety Analysis Report made in accordance with the provisions of 10 CFR 50.59 shall be reported in accordance with 50.59(b) within one month of such change.

(5) License Transfer

Texas Genco, LP shall provide decommissioning funding assurance, to be held in decommissioning trusts for the South Texas Project, Unit 2 (Unit 2) upon the direct transfer of the Unit 2 license to Texas Genco, LP, in an amount equal to or greater than the balance in the Unit 2 decommissioning trust immediately prior to the transfer. In addition, Texas Genco, LP shall ensure that all contractual arrangements referred to in the application for approval of the transfer of the Unit 2 license to Texas Genco, LP to obtain necessary decommissioning funds for Unit 2 through a non-bypassable charge are executed and will be maintained until the decommissioning trusts are fully funded, or shall ensure that other mechanisms that provide equivalent assurance of decommissioning funding in accordance with the Commission's regulations are maintained.

(6) License Transfer

The master decommissioning trust agreement for Unit 2, at the time the direct transfer of Unit 2 to Texas Genco, LP is effected and thereafter, is subject to the following:

* The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 180 AND 167 TO

FACILITY OPERATING LICENSE NOS. NPF-76 AND NPF-80

STP NUCLEAR OPERATING COMPANY, ET AL.

SOUTH TEXAS PROJECT, UNITS 1 AND 2

DOCKET NOS. 50-498 AND 50-499

1.0 INTRODUCTION

By application dated February 28, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML060660218), as supplemented by letters dated April 6, and May 31, 2007 (ADAMS Accession Nos. ML071060176 and ML071590112, respectively), and electronic mail dated July 18, 2007 (ADAMS Accession No. ML072010270), STP Nuclear Operating Company (STPNOC, or the licensee), requested changes to the Technical Specifications (TSs) for South Texas Project (STP), Units 1 and 2.

The proposed changes modify TSs 3/4.8.2.1, "DC [Direct Current] Sources - Operating," and 3/4.8.2.2, "DC Sources - Shutdown," and add a new TS 3/4.8.2.3, "Battery Parameters." The changes revise allowed outage times for battery chargers as well as battery charger testing criteria, and relocate a number of battery surveillance requirements (SRs) to a licensee-controlled Battery Monitoring and Maintenance Program. The changes are consistent with Standard TS Change Traveler TSTF-360, Revision 1, "DC Electrical Rewrite."

The supplemental letters dated April 6 and May 31, 2007, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on September 12, 2006 (71 FR 53721).

2.0 REGULATORY EVALUATION

The following NRC requirements and guidance documents are applicable to the staff's review of the licensee's amendment request:

- Title 10 of the *Code of Federal Regulations* (10 CFR), Appendix A of Part 50, General Design Criterion (GDC) 17, "Electric power systems," requires, in part, that "An onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety ... The onsite electric power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence,

redundancy, and testability to perform their safety functions assuming a single failure. Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions ... Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies.”

- GDC 18, “Inspection and testing of electric power systems,” requires, in part, that “Electric power systems important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features ... ”
- Section 50.63 of 10 CFR, “Loss of all alternating current power,” requires, in part, that “Each light-water-cooled nuclear power plant licensed to operate must be able to withstand for a specified duration and recover from a station blackout as defined in §50.2 ...”
- Paragraph 50.65(a)(3) of 10 CFR, “Requirements for monitoring the effectiveness of maintenance at nuclear power plants,” requires, in part, that “Performance and condition monitoring activities and associated goals and preventive maintenance activities shall be evaluated at least every refueling cycle provided the interval between evaluations does not exceed 24 months ... Adjustments shall be made where necessary to ensure that the objective of preventing failures of structures, systems, and components through maintenance is appropriately balanced against the objective of minimizing unavailability of structures, systems, and components due to monitoring or preventive maintenance.”
- Paragraph 50.36(c)(2)(ii) of 10 CFR, “Technical specifications,” requires that “[a] technical specification limiting condition for operation of a nuclear reactor must be established for each item meeting one or more of the [criteria set forth in 10 CFR 50.36(c)(2)(ii)(A)-(D)].”
- Paragraph 50.36(c)(3) of 10 CFR, “Technical specifications,” requires that TSs include SRs, which “are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.”
- Regulatory Guide (RG) 1.129, Revision 2, “Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries for Nuclear Power Plants,” provides guidance for complying with GDCs 1, 17, and 18 with respect to the maintenance, testing, and replacement of vented lead-acid storage batteries in nuclear power plants.

- RG 1.32, Revision 3, "Criteria For Power Systems For Nuclear Power Plants," provides guidance for complying with GDCs 17 and 18 with respect to the design, operation, and testing of safety-related electric power systems of all types of nuclear power plants.

3.0 TECHNICAL EVALUATION

3.1 Design Features of STP, Units 1 and 2, Class 1E 125 volt (V) Direct Current (DC) Power Systems

The Class 1E 125 V DC battery system for each STP unit consists of four independent, physically separated buses, each energized by one of the two available battery chargers and one battery. Voltage on any separate bus varies between 105 and 137.5 V DC depending on the operating mode of battery charging equipment and system loads.

During normal operation, the 125 V DC loads are powered from the battery chargers with the batteries floating on the system. In case of a loss of normal power to the battery charger, the DC load is automatically powered from the station batteries. Batteries supply emergency power required for plant protection and control without interruption whenever the power from alternating current (AC) sources is interrupted.

Upon loss of power from the AC system to the battery chargers, the batteries automatically assume the load without switching. In the event all offsite AC sources are lost, AC power is supplied to the battery chargers by the onsite emergency diesel generators.

Each battery system also supplies power to its associated inverter system, which converts the DC power to AC power for the vital instrumentation and protection system. The ampere-hour capacity of each battery is sufficient to provide, for a minimum of two hours, the power required by emergency DC controls and the vital AC instrumentation and protection system.

The four 125 V DC batteries are each located in separate rooms in a seismic Category I building. Battery chargers and distribution panels associated with a given battery are located outside the battery room. The heating, ventilation, and air conditioning system supplies each battery room using fans energized from the engineered safety feature buses. The Class 1E DC power systems are designed to withstand the effects of tornadoes, fires, and the safe shutdown earthquake without loss of function.

Each DC electrical power subsystem has sufficient power output capacity for 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 from its design minimum charge to its fully charged state within 12 hours while supplying normal steady-state loads.

DC electrical power subsystems are required to be operable to ensure availability of the required power to shut down the reactor and maintain it in a safe condition after an Anticipated Operational Occurrence or a postulated Design-Basis Accident. Loss of any DC electrical power subsystem does not prevent the minimum safety function from being performed. An

operable DC electrical power subsystem requires the battery and one associated charger to be operating and connected to the associated DC bus.

The Class 1E battery system is designed to comply with requirements of RG 1.6, "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems," and RG 1.32, "Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants."

The STP electrical distribution system is further described in the STP Updated Final Safety Analysis Report (UFSAR), Chapter 8, Section 8.3, "Onsite Power Systems."

3.2 Evaluation of Proposed Changes

In its letter dated February 28, 2006, the licensee proposed a license amendment to the TSs for STP, Units 1 and 2, using TSTF-360, Revision 1. The proposed changes would revise TSs 3/4.8.2.1, "DC Sources - Operating," and 3/4.8.2.2, "DC Sources - Shutdown." Additionally, the proposed change would relocate a number of battery SRs to a licensee-controlled Battery Monitoring and Maintenance Program and create new TS 3/4.8.2.3, which incorporates surveillances for verification of battery parameters and actions for responding to parameters outside of established limits.

The staff reviewed and evaluated each of the proposed changes to the STP, Units 1 and 2, TSs as follows:

3.2.1 TS 3/4.8.2.1 (DC Sources - Operating) Changes

3.2.1.1 TS 3/4.8.2.1 Change (1)

Limiting Condition for Operation (LCO) 3.8.2.1 establishes the minimum requirements for operable DC electrical sources. The licensee proposes the following changes to LCO 3.8.2.1, Action b:

- b. With no battery charger for a channel operable:
 - 1. Restore battery terminal voltage to greater than or equal to the minimum established float voltage within two hours, and
 - 2. Verify float current for the affected battery does not exceed two amps once per 12 hours, and
 - 3. Restore one battery charger to operable status within 72 hours.

If the battery terminal voltage cannot be restored in the allowed time, float current is excessive, or a battery charger is not restored to operability in the time allowed, the affected reactor unit is to be in at least hot standby within the next 6 hours and in cold shutdown within the following 30 hours.

The licensee also proposes new Action c for the condition of one channel inoperable due to reasons other than an inoperable battery bank, or no operable battery chargers for a channel, as follows:

- c. With one of the required channels inoperable for reasons other than (a) or (b) above, restore the channel to operable status within 2 hours or be in at least hot standby within the next 6 hours and in cold shutdown within the following 30 hours.

Evaluation of TS 3/4.8.2.1 Change (1)

The proposed change to LCO 3.8.2.1 addresses the condition where no battery chargers on a channel are operable. The licensee proposes to increase the battery charger Completion Time (CT) from 2 hours to 72 hours provided that they are able to restore battery terminal voltage to greater than or equal to the minimum established float voltage within 2 hours, and are able to verify that battery float current for the affected battery does not exceed 2 amps once per 12 hours.

The STP design includes standby chargers to support continued battery capability. If both battery chargers became inoperable, the STP operators are directed by procedure to take action to minimize battery discharge (i.e., load shed). Loads required for support of plant shutdown would be left on the bus. The licensee stated that these actions are covered by procedure for responding to annunciator lampbox indications of battery function parameters.

The battery charger, in addition to maintaining battery operability, provides DC control power to AC circuit breakers and thus supports the recovery of AC power following events such as a loss of offsite power or station blackout. Therefore, it is essential that each battery charger has the capability to be supplied by a back-up power source (e.g., Class 1E diesel generator). New LCO Action b.1 would provide assurance that a battery discharge is terminated, by requiring that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage (i.e., 128 V DC) in 2 hours. This time period provides an allowance for returning an inoperable charger to operable status or for reestablishing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage.

New LCO Action b.1 provides assurance that the battery will be restored to its fully charged condition from any discharge that might have occurred due to the battery charger being inoperable. At the end of the 2 hours, a terminal voltage of at least the minimum established float voltage provides an indication that the battery is on the exponential charging current portion of its recharging cycle.

New LCO Action b.2 would require that once per 12 hours, the battery float current be verified to be less than or equal to 2 amps. This provides an indication that, if the battery has been discharged as the result of an inoperable battery charger, it has now been fully charged. If, at the expiration of the 12-hour period, the battery float current is not less than or equal to 2 amps, there may be additional problems and the battery must be declared inoperable (see safety evaluation Section 3.2.2.3 below for a more detailed discussion on the 2-amp float current

value). This verification provides assurance that the battery has sufficient capacity to perform its safety function.

New LCO Action b.3 would extend the CT for the battery chargers to 72 hours provided that the battery float voltage is restored to meet or exceed the minimum established float voltage by using an alternate method. Given that (1) the DC bus remains energized, (2) the battery discharge is terminated based on restoration of the battery terminal voltage (New LCO Action b.1), and (3) the battery is fully recharged based upon battery float current (New LCO Action b.2), the licensee has established a reasonable basis for extending the restoration time for an inoperable battery charger beyond the existing 2-hour limit to 72 hours (New LCO Action b.3). In addition, the NRC staff's approval of the extended CT for the STP battery chargers is based on the availability of a fully capable auxiliary battery charger (i.e., alternate method) that is capable of being powered by a diesel generator.

New LCO Action 3.8.2.1.c expands the actions in response to inoperability of a required channel for any reason other than an inoperable battery bank or battery chargers to a channel inoperable for any other reason. The staff finds that this new Action is clarifying in nature, and therefore, is acceptable.

Based on the above, the staff concludes that there is reasonable assurance that safe plant conditions will continue to be maintained; therefore, the proposed changes are acceptable.

3.2.1.2 TS 3/4.8.2.1 Change (2)

The licensee proposed deleting current SR 4.8.2.1.b and portions of SR 4.8.2.1.c from the TSs and relocating these surveillances to a licensee-controlled Battery Monitoring and Maintenance Program. The SRs would be the same, with some slight rewording, to read as follows:

- (SR 4.8.2.1.b) At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 110 V, or a battery overcharge with battery voltage above 135 V, verify:
 - There is no visible corrosion at either cell-to-cell or terminal connections, or the connection resistance of these items is less than or equal to 150×10^{-6} ohm; and
 - The average electrolyte temperature at six connected cells is above 65°F.
- (SR 4.8.2.1.c) At least once per 18 months, verify:
 - The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration.
 - The cell-to-cell and terminal connections are clean, tight, and coated with anticorrosion material.

- The resistance of each cell-to-cell and terminal connection is less than or equal to 150×10^{-6} ohm.

Evaluation of TS 3/4.8.2.1 Change (2)

In accordance with SR 4.0.1, SRs shall be met for conditions specified for individual LCOs; this is because the SRs represent the minimum acceptable requirements for operability of the required equipment. However, for SR 4.8.2.1.b and SR 4.8.2.1.c, failure to meet the SR does not necessarily mean that the equipment is not capable of performing its safety function. Furthermore, the corrective action is generally a routine or preventive maintenance-type activity. Therefore, these activities are inappropriate for SRs and can be controlled in the administrative maintenance program for batteries.

Visual inspection for physical damage or deterioration (SR 4.8.2.1.b) that could potentially degrade battery performance is not required for the battery to perform its safety function; it reflects ongoing preventive maintenance activities. Maintenance activities prevent degradation that could affect battery operability. The verification of battery electrolyte temperature will be covered by new SR 4.8.2.3.e. The details of this new SR are provided below in Section 3.2.6 of this safety evaluation.

With regard to the resistance verifications of SR 4.8.2.1.c, the values are nominal values and represent limits at which some corrective action should be taken, but do not necessarily represent limits meaning that the operability of the battery is in question.

The licensee's 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 the performance of SRs, the resistance of each battery cell connection varies independently from all the others. Some of these connection resistance values may be higher or lower than others, and the battery may still be able to perform its function and should not be considered inoperable. Overall resistance has 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. Specifically, these surveillances will be addressed by the new Battery Monitoring and Maintenance Program (proposed new TS 6.8.3.p) which is described below in Section 3.2.4 of this safety evaluation.

Based on the above, the staff concludes that SR 4.8.2.1.b and the portions of SR 4.8.2.1.c described above do not meet the criteria of 10 CFR 50.36(c)(2)(ii) or (c)(3) for inclusion in the TSs and may be relocated to a licensee-controlled program. Proposed changes to the program will be subject to evaluation under 10 CFR 50.59, "Changes, tests, and experiments," to determine whether the proposed changes require prior NRC review and approval, as discussed below in Section 3.2.4. The staff also concludes that there is reasonable assurance that safe plant conditions will continue to be maintained. Therefore, SR 4.8.2.1.b and the portions of SR 4.8.2.1.c described above may be relocated from the TSs to a licensee-controlled program.

3.2.1.3 TS 3/4.8.2.1 Change (3)

The licensee proposes to add an alternative criterion to current SR 4.8.2.1.c that would allow the battery charger operability to be verified at least once per 18 months by recharging its associated 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.

Evaluation of TS 3/4.8.2.1 Change (3)

SR 4.8.2.1.c specifies battery charger current requirements, and its purpose is to verify the design capacity of each battery charger. SR 4.8.2.1.c requires verification once per 18 months that each battery charger is capable of supplying 300 amps for greater than or equal to 8 hours. The licensee proposes adding an alternate acceptance criterion to SR 4.8.2.1.c to verify that 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. This proposed test is an alternate method for verifying the design capacity of each battery charger. The proposed wording accurately reflects the battery charger design capacity as it is detailed in the STP UFSAR.

As described in the proposed revision to the TS Bases for SR 4.8.2.1.c, this test would occur following a service test. The level of loading required may not normally be available following the battery service test and may need to be supplemented with additional loads. The duration of 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. Based on this information, the staff finds there is reasonable assurance that safe plant conditions will continue to be maintained; therefore, the proposed change to add the alternate criterion to SR 4.8.2.1.c is acceptable.

3.2.1.4 TS 3/4.8.2.1 Change (4)

The licensee proposes the following:

- Replace the specific gravity monitoring and its associated allowable value in Table 4.8-2 with float current monitoring (new Action 3.8.2.3.b and SR 4.8.2.3.a).

Evaluation of TS 3/4.8.2.1 Change (4)

The licensee proposes to replace the requirements to measure specific gravity with requirements to monitor float current (new Action 3.8.2.3.b and SR 4.8.2.3.a). Use of float current to determine the state-of-charge of the battery is consistent with RG 1.129, which endorses the Institute of Electrical and Electronics Engineers (IEEE) Standard 450-2002, "IEEE recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications." Section 5.4 of IEEE Standard 450-2002 describes available methods for determining the state-of-charge of a vented lead-acid battery.

In Attachment 7 to its April 6, 2007, supplemental letter, the licensee provided a letter from its battery manufacturer (GNB Industrial Power), which concurred with the use of float current monitoring for the purpose of determining the state-of-charge throughout the life of the STP batteries. The licensee also provided a regulatory commitment to maintain a 5 percent design margin for each battery to ensure that the 2-amp float current value provides an indication that the battery is fully charged.

Furthermore, in its April 6, 2007, supplemental letter, the licensee stated that the accuracy and capability of the float current monitoring equipment will provide adequate assurance that the deletion of the requirement for specific gravity measurements will not have a significant impact on safety or the ability to accurately determine the operability of the STP batteries. Based on its review of the information provided by the licensee, the NRC staff has reasonable assurance that the equipment for monitoring battery float current will have the necessary accuracy and capability to measure electrical currents in the expected range.

The staff finds that the concurrence of the battery manufacturer coupled with the licensee's statement concerning the accuracy and capability of the float monitoring equipment provides reasonable assurance that the deletion of the requirement to monitor specific gravity will not have a significant impact on safety or the ability to accurately determine the operability of the STP batteries; therefore, the proposed change is acceptable.

3.2.1.5 TS 3/4.8.2.1 Change (5):

TS Table 4.8-2, "Battery Surveillance Requirements," specifies limits for electrolyte level and float charge. The licensee proposes to relocate the SRs for float current, pilot and connected cell float voltage, electrolyte level, and pilot cell electrolyte values to TS 3/4.8.2.3, and delete references to Table 4.8-2. The licensee proposes to relocate the following requirements to the licensee-controlled Battery Monitoring and Maintenance Program:

- The limits for electrolyte level and float voltage for each designated pilot cell (Category A) and the limits for each connected cell (Category B);
- The allowable value for connected cell electrolyte level;
- The associated compensatory actions for battery cell electrolyte level, float voltage, and specific gravity not within limits; and
- The allowable value for the minimum battery charging float voltage of each connected cell.

In addition, the licensee proposes to revise SRs 4.8.2.1.a and 4.8.2.1.c by replacing the specific voltage limits of 129 V and 125 V, respectively, with "greater than or equal to the minimum established float voltage."

Evaluation of TS 3/4.8.2.1 Change (5)

The Category A and B values of TS Table 4.8-2 represent appropriate monitoring levels and appropriate preventive maintenance levels for long-term battery quality and extended battery

life. Paragraph 50.36(c)(2)(i) of 10 CFR states, in part, “[LCOs] are the lowest functional capability or performance levels of equipment required for safe operation of the facility.” As such, the Category A and B limits for cell voltage and electrolyte level are not necessary to meet the 10 CFR 50.36 criteria for LCOs. The licensee proposed that these values and the LCO Actions associated with restoration be relocated to the Battery Monitoring and Maintenance Program, a licensee-controlled program under the control of 10 CFR 50.59, “Changes, tests, and experiments.” The licensee stated that the battery parameters will be controlled at an acceptable level, and necessary remedial actions will be implemented in accordance with the plant corrective action program. Furthermore, the battery and its preventive maintenance and monitoring program are under the regulatory requirements of 10 CFR 50.65, “Requirements for monitoring the effectiveness of maintenance at nuclear power plants.” This proposed relocation will continue to assure the battery is maintained at current levels of performance.

The licensee also proposes to relocate the allowable value for each connected cell of TS Table 4.8-2 for the battery electrolyte level to the licensee-controlled Battery Monitoring and Maintenance Program. However, proposed new LCO 3.8.2.3 Actions c and d will require the electrolyte level (any battery cell) and temperature (pilot cell only) to be greater than or equal to minimum established design limits. Depending on the available excess capacity of the associated battery, the minimum temperature necessary to support operability of the battery can vary. Relocation to a licensee-controlled program will provide the licensee with flexibility to monitor and control this limit at values directly related to the battery’s ability to perform its assumed function.

The licensee proposes revising SRs 4.8.2.1.a and 4.8.2.1.c by replacing the specific voltage limit with “greater than or equal to the minimum established float voltage.” The voltage requirements are based on the battery charger voltage level after a response to a loss of AC power. Additionally, the battery manufacturer establishes this voltage limit to provide the optimum charge on the battery and to maintain the battery plates in a condition that supports maintaining the battery grid life. Maintaining the battery plates in a condition that supports maintaining the battery grid life provides assurance that the battery will be capable of providing its designed safety function.

The minimum float voltage allowed per cell is 2.17 V DC which results in a minimum battery float voltage of 128 V DC for a 59-cell string. The licensee stated that the minimum float voltage per cell will be included in the TS Bases as background information for 3/4.8.2, “DC Sources.”

The licensee’s proposed changes ensure that the battery parameters (maintenance, testing, and monitoring) are addressed in accordance with the “Battery Monitoring and Maintenance Program,” as specified in proposed new TS 6.8.3.p. The staff finds there is reasonable assurance that safe plant conditions will continue to be maintained; therefore, the proposed changes are acceptable.

3.2.1.6 TS 3/4.8.2.1 Change (6)

The licensee proposes to eliminate the “once per 60 month” restriction of SR 4.8.2.1.e on replacing the battery service test with the modified performance discharge test.

Evaluation of TS 3/4.8.2.1 Change (6)

The licensee proposes removing the “once per 60 month” restriction of SR 4.8.2.1.e. Since the modified performance discharge test envelopes the duty cycle of the service test, the “once per 60 month” restriction is no longer necessary. Therefore, the staff finds it acceptable to remove the wording “once per 60 month” from SR 4.8.2.1.e.

The licensee also proposes relocating the requirement of SR 4.8.2.1.e to SR 4.8.2.3.f. The relocation of the requirement to SR 4.8.2.3.f is administrative and does not change how the tests are actually performed; therefore, the staff finds the change acceptable.

3.2.2 TS 3/4.8.2.2 (DC Sources - Shutdown) Changes

3.2.2.1 TS 3/4.8.2.2 Change (1)

The licensee proposes adding the following Action b to LCO 3.8.2.2 to be consistent with the proposed changes for LCO 3.8.2.1 and to provide additional actions in case the battery terminal voltage cannot be restored within the allowed time, or a battery charger is not restored to operable status within the allowed time:

- b. With no battery chargers for a required channel operable:
 1. Restore battery terminal voltage to greater than or equal to the minimum established float voltage within 2 hours, and
 2. Verify float current for the affected battery does not exceed 2 amps once per 12 hours, and
 3. Restore one battery charger to operable status within 72 hours.

If the battery terminal voltage cannot be restored within the allowed time, float current is excessive, or a battery charger is not restored to operability in the time allowed:

- Initiate action to suspend operation with a potential for draining the reactor vessel, and
- Suspend all operations involving core alterations, operations involving positive reactivity additions that could result in loss of required shutdown margin or required boron concentration, or movement of irradiated fuel, and
- Initiate corrective action to restore the required DC electrical power subsystems to operable status as soon as possible.

Evaluation of TS 3/4.8.2.2 Change (1)

The proposed change to LCO 3.8.2.2 addresses the condition where no battery chargers on a channel are operable. The licensee proposes increasing the battery charger CT from 2 hours to 72 hours provided that they are able to restore battery terminal voltage to greater than or equal to the minimum established float voltage within 2 hours, and are able to verify that battery float current for the affected battery does not exceed 2 amps once per 12 hours. The basis for this change is the same as that provided for the proposed change to LCO 3.8.2.1 above. Therefore, given that (1) the DC bus remains energized, (2) the battery discharge is terminated based on restoration of the battery terminal voltage (New LCO 3.8.2.2 Action b.1), and (3) the battery is fully recharged based upon battery float current (New LCO 3.8.2.2 Action b.2), the licensee has established a reasonable basis for extending the restoration time for an inoperable battery charger beyond the existing 2-hour limit to 72 hours (New LCO 3.8.2.2 Action b.3). In addition, the NRC staff's approval of the extended CT for the STP battery chargers is based on the availability of a fully capable auxiliary battery charger (i.e., alternate method) that is capable of being powered by a diesel generator.

The licensee also proposes rewording the existing Action for LCO 3.8.2.2 and designating it as new Action a. The proposed change is administrative in nature and does not change any substantive requirement, and therefore, is acceptable.

3.2.2.2 TS 3/4.8.2.2 Change (2)

The licensee proposes to add requirements to SR 4.8.2.2 to be consistent with SR 4.8.2.1, and to relocate existing SR 4.8.2.1.d to new SR 4.8.2.2.c, because the requirement is applicable under shutdown conditions.

Evaluation of TS 3/4.8.2.2 Change (2)

The licensee proposed adding requirements to SR 4.8.2.2 for consistency with new SR 4.8.2.1. The requirements for monitoring specific gravity while in Modes 5 and 6 are the same as those in Modes 1, 2, 3, and 4. The justification for replacing specific gravity monitoring with float current monitoring is described in the staff's evaluation of SR 4.8.2.1 Change (3) above. The staff finds the proposed changes to SR 4.8.2.2 reasonable and consistent with new SR 4.8.2.1; therefore, the proposed changes are acceptable.

The licensee proposed relocating SR 4.8.2.1.d to SR 4.8.2.2.c since the requirement applies to shutdown conditions. Relocation of the requirements for the battery service test is consistent with the actual modes of operation in which it is performed. Since the relocation does not change how the test is actually performed and the test is more appropriately located in the TS for shutdown conditions, the NRC staff finds the proposed change acceptable.

3.2.3 (New) TS 3/4.8.2.3 (Battery Parameters)

3.2.3.1 TS 3/4.8.2.3 Change (1)

The licensee proposes adding a new LCO 3.8.2.3 to address battery parameters as follows:

3.8.2.3 Parameters for the Class 1E batteries shall be within the specified limits.

APPLICABILITY: When associated DC electrical power subsystems are required to be OPERABLE.

ACTION:

a. If a battery has one or more cells with float voltage < 2.07 V:

1. Perform surveillance requirement 4.8.2.1.a within 2 hours, AND
2. Perform surveillance requirement 4.8.2.3.a within 2 hours, AND
3. Restore float voltage of the affected cell(s) to ≥ 2.07 volts within 24 hours.

If the required action and associated completion of the above conditions are not met, declare the associated battery INOPERABLE immediately.

b. If a battery has float current > 2 amps:

1. Perform surveillance requirement 4.8.2.1.a within 2 hours, AND
2. Restore battery float current to ≤ 2 amps within 12 hours.

If the required action and associated completion of the above conditions are not met, declare the associated battery INOPERABLE immediately.

c. If a battery has one or more cells with electrolyte level less than minimum established design limits:

1. Restore electrolyte level in the affected cell(s) to above the top of the plates within 8 hours if the electrolyte level is below the top of the plates, AND
2. Verify there is no evidence of electrolyte leakage within 12 hours if electrolyte level is below the top of the plates, AND
3. Restore electrolyte level in the affected cell(s) to greater than or equal to minimum established design limits within 31 days.

If the required action and associated completion of the above conditions are not met, declare the associated battery INOPERABLE immediately.

d. If a battery has a pilot cell electrolyte temperature less than minimum established design limits, restore battery pilot cell electrolyte temperature

to greater than or equal to minimum established design limits within 12 hours.

If the required action and associated completion of the above conditions are not met, declare the associated battery INOPERABLE immediately.

- e. If battery parameters are not within limits for 2 or more batteries, restore battery parameters to within design limits within 2 hours with no more than one battery outside design limits if a longer time for completion is applicable.

If the required action and associated completion of the above conditions are not met, declare the associated batter(ies) INOPERABLE immediately.

If the required action and associated completion of the above conditions are not met, declare the associated battery INOPERABLE immediately.

- f. If a battery has one or more battery cells with float voltage < 2.07 volts and float current > 2 amps, declare the associated battery INOPERABLE immediately.

Evaluation of TS 3/4.8.2.3 Change (1)

The licensee proposes adding new LCO Action 3.8.2.3.a to address the allowable value for each connected cell for float voltage in former TS Table 4.8-2, and that applies to a battery with one or more cells with a float voltage less than 2.07 V. Once this condition has been entered, the battery cell is considered degraded and the actions are to verify: (a) the battery terminal voltage to be greater than or equal to the minimum established float voltage (SR 4.8.2.1.a), and (b) the battery float current is less than or equal to 2 amps for each battery (SR 4.8.2.3.a). The above actions assure that the battery still has sufficient capacity to perform its intended safety function. The licensee proposes continued operations up to 24 hours to allow the restoration of the affected cell(s) voltage to greater than or equal to 2.07 V. If the required action and associated completion of the above conditions are not met, the licensee must declare the associated battery inoperable immediately. The NRC staff considers that the proposed changes are equivalent to the float voltage requirement of former TS Table 4.8-2 and that the 24-hour restoration time provides reasonable assurance that safe plant conditions are maintained; therefore, the proposed changes are acceptable.

The licensee proposes adding new LCO Action 3.8.2.3.b to address the battery state-of-charge parameter. This new LCO Action would be applicable when one or more batteries are found with a float current greater than 2 amps. A float current of greater than 2 amps provides an indication that a partial discharge has occurred. The LCO Action is to verify within 2 hours that the battery terminal voltage is greater than or equal to the minimum established float voltage (SR 4.8.2.1.a), thus confirming battery charger operability. If the terminal voltage is satisfactory and there are no battery cells with a voltage less than 2.07 V, Action b.2 of LCO Action 3.8.2.3.b assures 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.

If the terminal voltage is found to be less than the minimum established float voltage, it indicates that the battery charger is either inoperable or is operating in the current limit mode. If the battery charger is operating in the current limit mode for 2 hours, it is an indication that the battery has been substantially discharged and likely cannot perform its required safety function. If the battery charger is found to be inoperable, then entry into the appropriate LCO Action for an inoperable battery charger is warranted.

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 and float current is greater than 2 amps, LCO Action 3.8.2.3.f would be applicable and the battery must be declared inoperable immediately. LCO Action 3.8.2.1.a would be applicable as well. If float voltage is satisfactory and there are no cells less than 2.07 V, and the out-of-limit float current condition is due to one or more battery cells with low voltage, then the battery is not substantially discharged and the 12-hour CT to restore battery float current to within limit is reasonable. If the required action is not completed within the allowed time, the licensee must declare the associated battery inoperable immediately.

Based on the above, the staff finds there is reasonable assurance that safe plant conditions will continue to be maintained; therefore, the proposed LCO Action 3.8.2.3.b is acceptable.

The licensee proposes adding new LCO Action 3.8.2.3.c to address the level of the electrolyte in a cell. This new LCO Action would be applicable when one or more cells are found with electrolyte level less than the minimum established design limit. If the level is above the top of the battery plates, but below the minimum limit (i.e., minimum level indication mark on the battery cell jar), the battery still has sufficient capacity and is considered operable. With electrolyte level below the top of the plates, there is a potential for dry-out and plate degradation. New LCO Actions c.1 and c.2 (as well as provisions in new TS 6.8.3.p) restore the level, ensure that the cause of the loss of electrolyte level is not due to a leak in the battery casing, and equalize and test battery cells that have been discovered with an electrolyte level below the minimum established level limit. If the required action and associated CT for the above conditions are not met, the licensee must declare the associated battery inoperable immediately. The staff concludes that these changes are adequate to ensure that minimum electrolyte levels are maintained and are, therefore, acceptable.

The licensee proposed adding new LCO Action 3.8.2.3.d which applies to a battery found with a pilot cell electrolyte temperature less than the minimum established design limit. The minimum design temperature for the STP batteries is 65 degrees Fahrenheit (°F). A low electrolyte temperature limits the current and power available from the battery. Depending on the available excess capacity of the associated battery, the minimum temperature necessary to support operability of the battery can vary. The licensee stated that the STP battery rooms are maintained at a temperature above 70 °F. The licensee procedurally verifies that battery room temperatures are above this level once per day. Since batteries have very large thermal inertia, the licensee expects that a low room temperature will be corrected prior to a battery reaching its minimum operating temperature. Furthermore, the licensee's historical search of battery room temperatures showed that the STP minimum/maximum temperatures are well within a 5 °F variance. This is consistent with the guidance in RG 1.129. The margins that the licensee used in sizing the battery further ensure that sufficient capacity is present to perform the intended function.

Since batteries have very large thermal inertia, the STP batteries are designed with significant margins (i.e., temperature, aging, and design), and procedures are in place to monitor and correct the cause of out-of-parameter battery room temperatures, the staff concludes that the pilot cell temperature is an accurate representation of the temperature of the battery bank. The 12-hour CT provides a reasonable time to restore the electrolyte temperature within established limits. If the required action and associated CT for the above conditions are not met, the licensee must declare the associated battery inoperable immediately. The staff concludes that the proposed change is adequate to ensure that the minimum electrolyte temperature is maintained and is, therefore, acceptable.

The licensee proposed adding new LCO Action 3.8.2.3.e to address the condition of two or more batteries with battery parameters that are not within limits. If this condition exists, there is not sufficient assurance that the batteries will be capable of performing their intended safety function. With redundant batteries involved, loss of function is possible for multiple systems that depend upon the batteries. The licensee proposed that battery parameters on one subsystem be restored to within limits within 2 hours. If the required action and associated CT for the above conditions are not met, the licensee must declare the associated battery inoperable immediately. The staff finds that there is reasonable assurance that the proposed change maintains safe plant conditions; therefore, the proposed change is acceptable.

The licensee proposed adding new LCO Action 3.8.2.3.f to address the case where a battery has one or more battery cells with float voltage less than 2.07 V and float current greater than 2 amps. Under these conditions, the battery capacity may not be sufficient for it to perform its intended design function, and the battery must be declared inoperable immediately. The staff concludes that the proposed change is reasonable and appropriate to maintain safe plant conditions; therefore, the proposed change is acceptable.

3.2.3.2 TS 3/4.8.2.3 Change (2)

The licensee proposes adding a new SR 4.8.2.3 to address battery parameters as follows:

- 4.8.2.3 Each 125-volt battery bank and charger shall be demonstrated operable:
- a. [Note: Performance of this surveillance is not required when battery terminal voltage is less than the minimum established float voltage of SR 4.8.2.1.a.]
At least once per 7 days, verify the float current for each battery is ≤ 2 amps.
 - b. At least once per 31 days, verify each battery pilot cell voltage is ≥ 2.07 V on float charge.
 - c. At least once per 92 days, verify each battery connected cell voltage is ≥ 2.07 V on float charge.
 - d. At least once per 31 days, verify each battery connected cell electrolyte level is greater than or equal to minimum established design limits.

- e. At least once per 31 days, verify each battery pilot cell temperature is greater than or equal to minimum established design limits.
- f. [Note: Battery capacity is to be verified during shutdown.]
 - 1) At least once per 12 months by giving modified performance discharge tests of battery capacity to any battery that shows degradation or reaches 85% of the service life expected for the application with capacity less than 100% of the manufacturer's rating. Degradation is indicated when the battery capacity drops more than 10% from its capacity on the previous performance/modified performance discharge test, or is below 90% of the manufacturer's rating; AND
 - 2) At least once per 24 months by giving modified performance discharge tests of battery capacity to any battery reaching 85% of the service life with capacity greater than or equal to 100% of the manufacturer's rating; AND
 - 3) At least once per 60 months by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a modified performance discharge test.

Evaluation of TS 3/4.8.2.3 Change (2)

The licensee proposes adding new SR 4.8.2.3.a, which would require verification that the float current for each battery is less than or equal to 2 amps every 7 days. The purpose of this SR is to determine the state-of-charge of the battery. Float charge is the condition in which the battery charger is supplying the continuous small amount of current (i.e., less than 2 amps) required to overcome the internal losses of a battery to maintain the battery in a fully charged state. The float current requirements are based on the float current indicative of a charged battery. As stated in the evaluation of SR 4.8.2.1 Change (3) above, the use of float current to determine the state-of-charge of the battery is consistent with STP's battery manufacturer recommendations. Therefore, the staff concludes that this change is reasonable and maintains safe plant conditions and is, therefore, acceptable.

The licensee proposes adding new SR 4.8.2.3.b and SR 4.8.2.3.c, which would require verification that the float voltage of pilot cells and all connected cells are greater than or equal to 2.07 V every 31 and 92 days, respectively. This voltage level represents the point where battery operability is in question. The Battery Monitoring and Maintenance Program (in new TS Section 6.8.3.p) includes actions to restore battery cells with float voltage less than 2.13 V and actions to verify that the remaining cells are greater than or equal to 2.07 V, when a cell or cells have been found to be less than 2.13 V. Therefore, the staff concludes that these changes are reasonable and maintain safe plant conditions and are, therefore, acceptable.

The licensee proposes adding SR 4.8.2.3.d, which would require verification that connected-cell electrolyte level for each battery is greater than or equal to minimum established design limits every 31 days. Operation of the batteries at electrolyte levels greater than the minimum

established design limit ensures that the battery plates do not suffer physical damage and continue to maintain adequate electron transfer capability. The staff concludes that this change is adequate to ensure that minimum electrolyte levels are maintained and is, therefore, acceptable.

The licensee proposes adding SR 4.8.2.3.e, which would require verification that the temperature of each battery pilot cell is greater than or equal to the minimum established design limits every 31 days. As stated above, since (1) the batteries have very large thermal inertia, (2) the STP batteries are designed with significant margins (i.e., temperature, aging, and design), and (3) procedures are in place to monitor and correct the cause of deficient battery room temperatures, the NRC staff concludes that the pilot cell temperature is an accurate representation of the temperature of the battery bank. The staff concludes that this change is adequate to ensure that the minimum electrolyte temperature is maintained, and is therefore, acceptable.

The licensee proposed relocating the requirements of existing SR 4.8.2.1.e and SR 4.8.2.1.f to SR 4.8.2.3.f. The proposed new SR requires verification of each battery's capacity during shutdown. Specifically, at least once per 60 months the licensee must verify that the battery capacity is at least 80 percent of the manufacturer's rating when subjected to a modified performance discharge test.

In addition, the licensee's proposed new SR 4.8.2.3.f would require performance of a modified performance discharge test at a 24-month frequency if a battery reaches 85 percent of the service life with capacity greater than or equal to 100 percent of the manufacturer's rating.

Furthermore, the new SR 4.8.2.3.f would require performing a modified performance discharge test of battery capacity at least once per 12 months to any battery that shows degradation or reaches 85 percent of the service life expected for the application with capacity less than 100 percent of the manufacturer's rating. Degradation is indicated when battery capacity drops more than 10 percent from its capacity on the previous performance/modified performance discharge test, or is below 90 percent of the manufacturer's rating. These changes are consistent with RG 1.129, which endorses IEEE Standard 450-2002.

Based on the above information, the NRC staff concludes that these proposed changes are consistent with RG 1.129 and reasonable and appropriate to maintain safe plant conditions; therefore, the proposed changes are acceptable.

3.2.4 (NEW) TS 6.8.3.p (Battery Monitoring and Maintenance Program)

The licensee proposes to create a new program, called the Battery Monitoring and Maintenance Program, to provide for battery restoration and maintenance, which includes the following:

- 1) Actions to restore battery cells with float voltage less than 2.13 V;
- 2) Actions to equalize and test battery cells that had been discovered with electrolyte level below the top of the plates;

- 3) Actions to verify that the remaining cells are greater than 2.07 V when a cell or cells are found to be less than 2.13 V; AND
- 4) Actions to ensure that the specific gravity readings are taken prior to each discharge test.

The licensee committed in its submittal to incorporate the Battery Monitoring and Maintenance Program into the STP Technical Requirements Manual, and stated that changes to the program would be subject to the STP corrective action program and the requirements of 10 CFR 50.59.

Evaluation of TS 6.8.3.p

The licensee proposes adding a new Battery Monitoring and Maintenance Program to TS Section 6.8, "Procedures, Programs, and Manuals," for the maintenance and monitoring of batteries. This program will have elements relocated from the different affected TSs. The program will primarily be based on the recommendations of the IEEE Standard 450 and the battery manufacturer. The licensee stated that this program will be contained in the STP Technical Requirements Manual, which is incorporated by reference in the STP UFSAR. Thus, proposed changes to the program will be subject to evaluation under 10 CFR 50.59, "Changes, tests, and experiments," to determine whether the proposed changes require prior NRC review and approval. Additionally, any changes to the program would be required to be reported to the NRC in accordance with 10 CFR 50.71(e), "Maintenance of records, making of reports."

The licensee provided a regulatory commitment in its April 6, 2007, supplemental letter, to relocate the portions of the TSs that are being revised to the proposed Battery Monitoring and Maintenance Program. The specific items that will be relocated to the Battery Monitoring and Maintenance Program are noted in Section 5.0 of this safety evaluation.

The licensee stated that 10 CFR 50.59 and the STP Corrective Action Program would be applied to control changes to the Battery Monitoring and Maintenance Program. The changes associated with the new Battery Maintenance and Monitoring Program will ensure that the batteries are maintained in a highly reliable condition.

Based on its review of the information provided by the licensee, the staff has reasonable assurance that the battery parameter values will continue to be controlled at their current level, and actions to restore deficient parameters will be implemented in accordance with the licensee's corrective action program. Furthermore, the battery and its preventive maintenance and monitoring program continue to be subject to the regulatory requirements of 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants."

The staff concludes that this change will continue to assure the battery is maintained at current levels of performance, and appropriately focuses operators on the monitoring of battery parameter degradations and, therefore, is acceptable.

3.3 Conclusion

Based on the above evaluation, the NRC staff finds the proposed revisions to the STP TSs provide reasonable assurance of the continued availability of the required DC power to shut

down the reactor and to maintain the reactor in a safe condition after an anticipated operational occurrence or a postulated design-basis accident. The staff also concludes that the proposed TS changes are in accordance with 10 CFR 50.36 and the requirements of GDCs 17 and 18. Therefore, the staff finds the proposed changes acceptable.

4.0 REGULATORY COMMITMENTS

In its application dated February 28, 2006, as supplemented by letters dated April 6 and May 31, 2007, the licensee made the following regulatory commitments:

- 1) STPNOC will continue to use specific gravity monitoring to measure electrolyte strength in addition to float current monitoring. STPNOC will relocate the current battery parameter for specific gravity from the Technical Specifications to the Battery Monitoring and Maintenance Program.
- 2) Maintain a 5% design margin allowing use of 2 amps as the float current limit. This margin will be included in the Technical Specification Bases and in the battery sizing calculation.
- 3) STPNOC commits to incorporate the Battery Monitoring and Maintenance Program into the STP Technical Requirements Manual.
- 4) The BATTERY MONITORING AND MAINTENANCE PROGRAM provides for battery restoration and maintenance which requires the following actions:
 - Restore battery cells discovered with float voltage <2.13 V.
 - Equalize and test battery cells discovered with electrolyte level below top of the plates.
 - Verify that the remaining cells are ≥ 2.07 V when a cell or cells are found to be <2.13 V.
 - Take specific gravity readings prior to each discharge test.
- 5) Relocate to the Battery Monitoring and Maintenance Program (from 4.8.2.1.b): At least once per 92 days, verify:
 - There is no visible corrosion at either cell-to-cell or terminal connections, or the connection resistance is no greater than 150×10^{-6} ohm; and
 - The average cell electrolyte temperature at six connected cells is above 65°F.
- 6) Relocate to the Battery Monitoring and Maintenance Program (from 4.8.2.1.b): Within 7 days after a severe battery discharge with battery terminal voltage below 1.6 volts per cell, or severe battery overcharge with battery voltage above 2.5 volts per cell, verify that:

- There is no visible corrosion at either cell-to-cell or terminal connections, or the connection resistance of these items is less than or equal to 40×10^{-6} ohm; and
 - The average electrolyte temperature of six connected cells is above 65°F.
- 7) Relocate to the Battery Monitoring and Maintenance Program (from 4.8.2.1.c):
At least once per 18 months, verify that:
- The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration;
 - Cell-to-cell and terminal connections are clean, tight, and coated with anti-corrosion material; and
 - The resistance of each cell-to-cell and terminal connection is less than or equal to 150×10^{-6} ohm.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Texas State official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes an inspection or SR. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (71 FR 53721, dated September 12, 2006). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: M. McConnell

Date: July 20, 2007