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

December 4, 2014

Vice President, Operations
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT NO. 2 - ISSUANCE OF AMENDMENT RE: ADOPTION OF TECHNICAL SPECIFICATION TASK FORCE (TSTF) CHANGE TRAVELER TSTF-500, REVISION 2, "DC ELECTRICAL REWRITE – UPDATE TO TSTF-360" (TAC NO. MF0595)

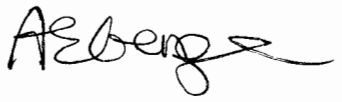
Dear Sir or Madam:

The Commission has issued the enclosed Amendment No. 297 to Renewed Facility Operating License No. NPF-6 for Arkansas Nuclear One, Unit No. 2. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated January 28, 2013, as supplemented by letters dated September 16, 2013, May 12, 2014, and August 12, 2014.

The amendment revises TS requirements related to direct current (DC) electrical systems in TS Limiting Condition for Operation (LCO) 3.8.2.3, "D.C. Distribution - Operating," and LCO 3.8.2.4, "D.C. Distribution – Shutdown." A new TS LCO 3.8.3, "Battery Parameters," is created, and a new "Battery Monitoring and Maintenance Program" is being established for TS Section 6.5, "Administrative Controls - Programs and Manuals." These changes are consistent with the U.S. Nuclear Regulatory Commission (NRC)-approved Technical Specifications Task Force (TSTF) Traveler TSTF-500, Revision 2, "DC Electrical Rewrite – Update to TSTF-360."

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,



Andrea E. George, Project Manager
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-368

Enclosures:
1. Amendment No. 297 to NPF-6
2. Safety Evaluation

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

ENTERGY OPERATIONS, INC.

DOCKET NO. 50-368

ARKANSAS NUCLEAR ONE, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 297
Renewed License No. NPF-6

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Entergy Operations, Inc. (the licensee), dated January 28, 2013, as supplemented by letters dated September 16, 2013, May 12, 2014, and August 12, 2014, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this 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.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-6 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 297, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The license amendment is effective as of its date of issuance and shall be implemented within 90 days from the date of issuance. Implementation of the amendment shall include revision of the Safety Analysis Report as described in Attachment 3 to the licensee's letter dated January 28, 2013.

FOR THE NUCLEAR REGULATORY COMMISSION

Eric R. Oesterle, Acting Chief
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility
Operating License No. NPF-6
Technical Specifications

Date of Issuance: December 4, 2014

(4) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(5) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70 to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(6) EOI, pursuant to the Act and 10 CFR Parts 30 and 70 to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to conditions specified in the following Commission regulations in 10 CFR Chapter I; Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

EOI is authorized to operate the facility at steady state reactor core power levels not in excess of 3026 megawatts thermal. Prior to attaining this power level EOI shall comply with the conditions in Paragraph 2.C.(3).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 297, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

Exemptive 2nd paragraph of 2.C.2 deleted per Amendment 20, 3/3/81.

(3) Additional Conditions

The matters specified in the following conditions shall be completed to the satisfaction of the Commission within the stated time periods following issuance of the renewed license or within the operational restrictions indicated. The removal of these conditions shall be made by an amendment to the renewed license supported by a favorable evaluation by the Commission.

2.C.(3)(a) Deleted per Amendment 24, 6/19/81.

ATTACHMENT TO LICENSE AMENDMENT NO. 297

RENEWED FACILITY OPERATING LICENSE NO. NPF-6

DOCKET NO. 50-368

Replace the following pages of the Renewed Facility Operating License No. NPF-6 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.

Operating License

REMOVE	INSERT
3	3

Technical Specifications

REMOVE	INSERT
3/4 8-8	3/4 8-8
3/4 8-9	3/4 8-9
3/4 8-9a	-------
3/4 8-10	3/4 8-10
-------	3/4 8-11
-------	3/4 8-12
6-17	6-17
-------	6-17a

ELECTRICAL POWER SYSTEMS

DC SOURCES – OPERATING

LIMITING CONDITION FOR OPERATION

3.8.2.3 The Train A and Train B DC electrical power subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With one of the required full capacity chargers inoperable:

   i. Restore the battery terminal voltage to greater than or equal to the minimum established float voltage within 2 hours, and

   ii. Verify battery float current ≤ 2 amps once per 12 hours.

b. With one DC electrical power subsystem inoperable for reasons other than ACTION 'a' above, restore the inoperable DC electrical power subsystem to OPERABLE status within 2 hours.

Otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.8.2.3.1 At least once per 7 days by verifying that the battery terminal voltage is greater than or equal to the minimum established float voltage.

SURVEILLANCE REQUIREMENTS (Continued)

4.8.2.3.2 At least once per 18 months by verifying that each battery charger supplies ≥ 300 amps at greater than or equal to the minimum established float voltage for ≥ 8 hours or, by verifying that each battery charger can recharge the battery to the fully charged state within 24 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.

4.8.2.3.3 At least once per 18 months by verifying that the battery capacity is adequate to supply, and maintain in OPERABLE status, required emergency loads for the design duty cycle when subjected to a battery service test. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this Surveillance. The battery performance discharge test required by Surveillance Requirement 4.8.3.6 may be performed in lieu of the battery service test once per 60 months.

ELECTRICAL POWER SYSTEMS

DC SOURCES – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.4 As a minimum, the following DC electrical equipment and bus shall be energized and OPERABLE:

1 - 125-volt DC bus, and

1 - 125-volt battery bank and charger supplying the above DC bus.

APPLICABILITY: MODES 5 and 6.

ACTION:

a. With the required battery charger inoperable:

i. Restore battery terminal voltage to greater than or equal to the minimum established float voltage within 2 hours, and

ii. Verify battery float current ≤ 2 amps once per 12 hours.

b. With the requirements of ACTION 'a' not met or with the above complement of DC equipment and bus otherwise inoperable, immediately suspend core alterations, the movement of irradiated fuel assemblies, and any operations involving positive reactivity additions.

SURVEILLANCE REQUIREMENTS

4.8.2.4.1 The above required 125-volt D.C. bus shall be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.4.2 The above required 125-volt battery bank and charger shall be demonstrated OPERABLE per Surveillance Requirements 4.8.2.3.1, 4.8.2.3.2, and 4.8.2.3.3; however, while each of these Surveillance Requirements must be met, Surveillance Requirements 4.8.2.3.2 and 4.8.2.3.3 are not required to be performed.

ELECTRICAL POWER SYSTEMS

BATTERY PARAMETERS

LIMITING CONDITION FOR OPERATION

3.8.3 Battery parameters for the Train A and Train B electrical power subsystem batteries shall be within the limits.

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

ACTION:

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

   i. Within 2 hours perform Surveillance Requirements 4.8.2.3.1 and 4.8.3.1, and

   ii. Within 24 hours restore affected cell voltage to ≥ 2.07 V.

b. With one battery with float current > 2 amps:

   i. Within 2 hours perform Surveillance Requirement 4.8.2.3.1, and

   ii. Within 12 hours restore battery float current to ≤ 2 amps.

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

   i. Within 8 hours restore electrolyte level to above top of plates[1], and

   ii. Within 12 hours verify no evidence of leakage[1], and

   iii. Within 31 days restore electrolyte level to greater than or equal to minimum established design limits.

d. With one battery with 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.

e. With both batteries with battery parameters not within limits, restore battery parameters for at least one battery to within limits within 2 hours.

f. With the requirements of ACTION 'a', 'b', 'c', 'd', or 'e' not met, or with one battery with one or more battery cells float voltage < 2.07 V and float current > 2 amps, immediately declare the battery inoperable.

Note 1: Only required if electrolyte level is below the top of the plates. If electrolyte level is below the top of the plates, ACTION c.ii shall be performed.

SURVEILLANCE REQUIREMENTS

4.8.3.1 At least once per 7 days by verifying that each battery float current is ≤ 2 amps. This Surveillance is not required when battery terminal voltage is less than the minimum established float voltage of Surveillance Requirement 4.8.2.3.1.

4.8.3.2 At least once per 31 days by verifying that each battery pilot cell float voltage is ≥ 2.07 V.

4.8.3.3 At least once per 31 days by verifying that each battery connected cell electrolyte level is greater than or equal to minimum established design limits.

4.8.3.4 At least once per 31 days by verifying that each battery pilot cell temperature is greater than or equal to minimum established design limits.

4.8.3.5 At least once per 92 days by verifying that each battery connected cell float voltage is ≥ 2.07 V.

4.8.3.6 At least once per 60 months by verifying the battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this Surveillance. In addition to the 60-month test interval, the performance discharge test shall be performed:

a. At least once per 12 months when battery shows degradation, or has reached 85% of the expected life with capacity < 100% of manufacturer's rating, and

b. At least once per 24 months when battery has reached 85% of the expected life with capacity ≥ 100% of manufacturer's rating.

6.5.13 Diesel Fuel Oil Testing Program

A diesel fuel oil testing program to implement required testing of both new fuel oil and stored fuel oil shall be established. The program shall include sampling and testing requirements, and acceptance criteria, all in accordance with applicable ASTM Standards. The purpose of the program is to establish the following:

a. Acceptability of new fuel oil for use prior to addition to storage tanks by determining that the fuel oil has:

   1. an API gravity or an absolute specific gravity within limits,

   2. a flash point and kinematic viscosity within limits for ASTM 2D fuel oil, and

   3. water and sediment within limits;

b. Within 31 days following addition of new fuel oil to storage tanks, verify that the properties of the new fuel oil, other than those addressed in a. above, are within limits for ASTM 2D fuel oil;

c. Total particulate concentration of the fuel oil is $\leq$ 10 mg/l when tested every 31 days based on ASTM D-2276, Method A-2 or A-3; and

d. The provisions of SR 4.0.2 and SR 4.0.3 are applicable to the Diesel Fuel Oil Testing Program surveillance frequencies.

6.5.14 Technical Specifications (TS) Bases Control Program

This program provides a means for processing changes to the Bases of these Technical Specifications.

a. Changes to the Bases of the TS shall be made under appropriate administrative controls and reviews.

b. Licensees may make changes to Bases without prior NRC approval provided the changes do not require either of the following:

   1. A change in the TS incorporated in the license or

   2. A change to the updated SAR or Bases that requires NRC approval pursuant to 10 CFR 50.59.

c. The Bases Control Program shall contain provisions to ensure that the Bases are maintained consistent with the SAR.

d. Proposed changes that do not meet the criteria of 6.5.14b above shall be reviewed and approved by the NRC prior to implementation. Changes to the Bases implemented without prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e).

6.5.15 Battery Monitoring and Maintenance Program

This Program provides controls for battery restoration and maintenance. The program shall be in accordance with IEEE Standard (Std) 450-2002, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications," as endorsed by Regulatory Guide 1.129, Revision 2 (RG), with RG exceptions and program provisions as identified below:

a. The program allows the following RG 1.129, Revision 2 exceptions:

1. Battery temperature correction may be performed before or after conducting discharge tests.

2. RG 1.129, Regulatory Position 1, Subsection 2, "References," is not applicable to this program.

3. In lieu of RG 1.129, Regulatory Position 2, Subsection 5.2, "Inspections," the following shall be used: "Where reference is made to the pilot cell, pilot cell selection shall be based on the lowest voltage cell in the battery."

4. In Regulatory Guide 1.129, Regulatory Position 3, Subsection 5.4.1, "State of Charge Indicator," the following statements in paragraph (d) may be omitted: "When it has been recorded that the charging current has stabilized at the charging voltage for three consecutive hourly measurements, the battery is near full charge. These measurements shall be made after the initially high charging current decreases sharply and the battery voltage rises to approach the charger output voltage."

5. In lieu of RG 1.129, Regulatory Position 7, Subsection 7.6, "Restoration", the following may be used: "Following the test, record the float voltage of each cell of the string."

b. The program shall include the following provisions:

1. Actions to restore battery cells with float voltage < 2.13 V;

2. Actions to determine whether the float voltage of the remaining battery cells is ≥ 2.13 V when the float voltage of a battery cell has been found to be < 2.13 V;

3. Actions to equalize and test battery cells that had been discovered with electrolyte level below the top of the plates;

4. Limits on average electrolyte temperature, battery connection resistance, and battery terminal voltage; and

5. A requirement to obtain specific gravity readings of all cells at each discharge test, consistent with manufacturer recommendations.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 297 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT NO. 2

DOCKET NO. 50-368

1.0 INTRODUCTION

By letter dated January 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13029A770), as supplemented by letters dated September 16, 2013, May 12, 2014, and August 12, 2014 (ADAMS Accession Nos. ML13261A353, ML14132A343, and ML14224A645, respectively), Entergy Operations, Inc. (Entergy, the licensee), proposed changes to the Technical Specifications (TS) for Arkansas Nuclear One, Unit 2 (ANO-2) to adopt U.S. Nuclear Regulatory Commission (NRC)-approved TS Task Force (TSTF) change traveler TSTF-500, Revision 2, "DC [Direct Current] Electrical Rewrite – Update to TSTF-360." The ANO-2 plant-specific adoption of TSTF-500, Revision 2, proposed new actions for an inoperable battery charger and a new alternate testing criterion for a battery charger for Limiting Condition for Operation (LCO) 3.8.2.3, "DC Distribution - Operating," and LCO 3.8.2.4, "DC Distribution - Shutdown." TS changes also include the addition of new TS 3.8.3, "Battery Parameters," and a new battery program in TS 6.5.15, "Battery Monitoring and Maintenance Program," and the relocation of Table 4.8-2, "Battery Surveillance Requirements," and a number of Surveillance Requirements (SRs) in TS 3.8.2.3 that perform preventive maintenance on the safety-related batteries, to the new battery program. In addition, specific requirements for out-of-limit conditions for battery cell voltage, electrolyte level, and electrolyte temperature are added to the new TS 3.8.3 and specific SRs are being proposed for verification of these parameters.

The proposed changes include the following:

- Specification 3.8.2.3, "DC Distribution - Operating," would be revised to modify actions for inoperable battery chargers and inoperable batteries. SRs on battery corrosion, connection resistance, visual inspection, and terminal connection would be relocated to the new Administrative Controls TS 6.5.15, "Battery Monitoring and Maintenance Program," and TS Table 4.8-2 would be deleted.

- Specification 3.8.2.4, "DC Distribution - Shutdown," would be revised to add actions for inoperable battery chargers. The list of TS 3.8.2.4 Surveillances that

must be met would also be revised to be consistent with the change to TS 3.8.2.3.

- New Specification 3.8.3, "Battery Parameters," including all actions and SRs, consistent with TSTF-500 TS 3.8.6 would be added.

- Maintenance and monitoring of station batteries would be controlled by the new Administrative Controls TS 6.5.15, "Battery Monitoring and Maintenance Program."

The Notice of Availability (NOA) for TSTF-500, Revision 2, was published in the *Federal Register* on September 1, 2011 (76 FR 54510), to announce the availability of the model application and model safety evaluation (SE) (ADAMS Accession No. ML111751792) for plant-specific adoption of TSTF-500, Revision 2 (ADAMS Accession No. ML092670242), as part of the consolidated line item improvement process (CLIIP). This NOA was later corrected to delete the CLIIP statement. The corrected NOA was published in the *Federal Register* on November 8, 2011 (76 FR 69296), to announce the availability for adoption of the TSTF-500 not under the CLIIP.

The supplemental letters dated September 16, 2013, May 12, 2014, and August 12, 2014, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on April 30, 2013 (78 FR 25313).

2.0 REGULATORY EVALUATION

The following NRC requirements and guidance documents are applicable to the NRC staff's review of the license amendment request (LAR):

The regulation at Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix A, General Design Criterion (GDC) 17, "Electric power systems," states, 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.

The regulation at 10 CFR Part 50, Appendix A, GDC 18, "Inspection and testing of electric power systems," states, in part, that

> Electric power systems important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features...

The regulation at 10 CFR Part 50, Appendix A, GDC 1, "Quality standards and records," states, in part, that

> Structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed.

The regulation at 10 CFR 50.36, "Technical specifications," establishes the requirements related to the content of the TS. Pursuant to 10 CFR 50.36(c) TS are required to include items in five specific categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings, (2) LCOs, (3) SRs, (4) design features; and (5) administrative controls. The proposed changes to the ANO-2 TS relate to the LCO, SR, and administrative controls categories.

The regulation at 10 CFR 50.36(c)(2)(ii), specifies four criteria to be used in determining whether a TS LCO needs to be established for a particular item. These criteria (1-4) are summarized as follows:

> *Criterion 1* - Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.
>
> *Criterion 2* - A process variable, design feature, or operating restriction that is an initial condition of a design-basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.
>
> *Criterion 3* - A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design-basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.
>
> *Criterion 4* - A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

The regulation at 10 CFR 50.65(a)(3), "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," states, 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.

NRC Regulatory Guide (RG) 1.75, Revision 3, "Criteria for Independence of Electrical Safety Systems," February 2005 (ADAMS Accession No. ML043630448), provides guidance with respect to the physical independence requirements of the circuits and electric equipment that comprise or are associated with safety systems.

NRC RG 1.129, Revision 2, "Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries for Nuclear Power Plants," February 2007 (ADAMS Accession No. ML063490110), provides guidance with respect to the maintenance, testing, and replacement of vented lead-acid storage batteries in nuclear power plants. This RG endorses, in part, the Institute of Electrical and Electronics Engineers (IEEE) Standard (Std.) 450-2002, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications."

TSTF-500, Revision 2, "DC Electrical Rewrite – Update to TSTF-360," dated September 22, 2009 (ADAMS Accession No. ML092670242).

Model application and SE for plant-specific adoption of TSTF-500, Revision 2 (ADAMS Accession No. ML111751792) as published for availability in the *Federal Register* on September 1, 2011 (76 FR 54510).

3.0 TECHNICAL EVALUATION

3.1 Design Features of the Class 1E DC Power System

The station Class 1E DC electrical power system provides the alternating current (AC) emergency power system with control power. It also provides both motive and control power to selected safety-related equipment and preferred AC vital bus power (via DC to AC power converters (i.e., inverters)). ANO-2 is licensed to 10 CFR Part 50, Appendix A, GDC 17, and 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 at ANO-2 consists of two independent and redundant safety-related Class 1E DC electrical power subsystems. Each subsystem consists of one battery, one battery charger, and all the associated control equipment and interconnecting cabling. Each subsystem additionally contains a spare battery charger, which provides backup service in the event that a battery charger is out of service. The backup charger on each subsystem can be switched in by operator action to replace the normal battery charger. Each charger is capable of supplying the normal DC load while maintaining the battery in a charged condition.

As described in ANO-2 Safety Analysis Report (SAR) Section 8.3.2, "DC Power Systems," during normal operation, the DC load is powered from the inservice battery charger with the battery floating on the system. In case of loss of normal power to the battery charger, the DC load is automatically powered from the station battery.

Each Class 1E battery and its related charger and the distribution equipment are located in a separate ventilated room. Each subsystem is located in an area separated physically and electrically from the other subsystem to ensure that a single failure in one subsystem does not cause a failure in a redundant subsystem. There is no sharing of dedicated components between redundant Class 1E subsystems, such as batteries, battery chargers, or distribution panels.

As described in the ANO-2 SAR, each Class 1E battery is sized to provide the maximum simultaneous combination of steady state loads and peak loads for the periods of the emergency duty cycle provided in Chapter 8, "Electric Power," of the SAR. Peak capacity of each battery will meet peak current demand for a minimum period of 1 minute. Voltage will not fall below 105 Volts (V) (1.81 V per cell (Vpc)) during any peak or continuous load condition. The batteries are of the lead-calcium type, consisting of 58 cells each and are rated at 2064 ampere-hours for an 8-hour rate of discharge to a cell voltage of 1.81 Vpc. Each battery is designed with additional capacity above that required by the design duty cycles to allow for temperature variations and other factors.

In the LAR, the licensee stated, in part, that,

> 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 58-cell battery (i.e., cell voltage of 2.063 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 $\geq$ 2.063 Vpc, the battery cell will maintain its capacity for 180 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.

Each battery charger is rated at 400 amps and is suitable for float charging or equalizing the associated battery. Each 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 receiving adequate current to charge the battery optimally. This assures the internal losses of a battery are overcome and the battery is maintained in a fully charged state. Each charger is designed to prevent the battery from discharging back into any internal charger load in case of AC power supply failure or charger malfunction.

3.2 Evaluation of Proposed Changes

ANO-2 has not converted to the standard TS (STS). The NRC approved changes to the Improved Standard TS (ISTS) NUREGs, Revision 1 and Revision 3.1, to incorporate TSTF-360-A, Revision 1, "DC Electrical Rewrite," and TSTF-500, Revision 2, respectively. TSTF-500, Revision 2 is a revision of TSTF-360-A. Following the recommendations of TSTF-500 for plants that have not adopted TSTF-360-A, the NRC staff used changes to Revision 1 of the ISTS

NUREG-1432, "Combustion Engineering Plants," as a model for the evaluation of the ANO-2 proposed TS changes.

In the LAR, the licensee stated that portions of the TSTF-500 TS allowing a 72-hour completion time (CT) for an inoperable required battery charger are not applicable to ANO-2 because each safety-related electrical subsystem at ANO-2 contains a redundant battery charger that can be placed in service to meet the associated TS requirements should the in-service charger fail.

3.2.1 TS 3.8.2.3 (DC Sources - Operating) Changes

The licensee proposed to revise the TS 3.8.2.3 title, LCO, Actions, and SRs and to relocate a number of SRs in TS 3.8.2.3 that perform preventive maintenance on the safety-related batteries.

TS 3.8.2.3 LCO requires both Train A and Train B DC electrical sources to be operable. Currently, TS 3.8.2.3 contains Action "a" for one of the required battery banks inoperable and Action "b" for one of the required full capacity chargers inoperable. The licensee initially proposed to modify and renumber Actions "a" and "b" and add a new Action "c" to address one inoperable DC electrical power subsystem. In its letter dated August 12, 2014, the licensee deleted the Action regarding required battery banks inoperable and proposed the Action to address one inoperable DC electrical power subsystem as Action "b," consistent with TSTF-500, since their respective CTs were 2 hours (the same). The licensee's application, as supplemented, also submitted new changes for revised Action "a" (current Action "b," one of the required full capacity chargers inoperable). The proposed changes would modify revised Action "a" to remove reference to Table 4.8-2 and add requirements for verifying battery float current.

3.2.1.1 TS 3.8.2.3; Title (Revised); Change (1)

The proposed change would revise the title of TS 3.8.2.3 from "D.C. Distribution – Operating" to "DC Sources – Operating."

Evaluation of TS 3.8.2.3; Title (Revised); Change (1)

The NRC staff concludes that the proposed change is editorial in nature and is, therefore, acceptable.

3.2.1.2 TS 3.8.2.3; LCO 3.8.2.3 (Revised); Change (2)

Current LCO 3.8.2.3 states:

> As a minimum, the following D.C. electrical power sources shall be OPERABLE:
>
> TRAIN "A" consisting of 125-volt D.C. bus No. 1, 125-volt D.C. battery bank No. 1 and a full capacity charger.
>
> TRAIN "B" consisting of 125-volt D.C. bus No. 2, 125-volt D.C. battery bank No. 2 and a full capacity charger.

Revised LCO 3.8.2.3 would state:

The Train A and Train B DC electrical power subsystems shall be OPERABLE.

Evaluation of TS 3.8.2.3; LCO 3.8.2.3 (Revised); Change (2)

Current LCO 3.8.2.3 provides components included in Trains A and B. The proposed change would eliminate components of Trains A and B from current LCO 3.8.2.3 and rewrite the LCO to match TSTF-500 LCO 3.8.4. Details of the trains' electrical power subsystems would be located in the TS Bases. The revised LCO does not change the intent of the TS.

The NRC staff concludes that the proposed change is editorial in nature and is, therefore, acceptable.

3.2.1.3 TS 3.8.2.3; Table 4.8-2 (Deleted); Change (3)

The proposed change would delete TS Table 4.8-2, "Battery Surveillance Requirements." Table 4.8-2 specifies the requirements (Category A limits and Category B limits and allowable value) for the battery cell parameters (electrolyte level, float voltage, and specific gravity).

The proposed change would relocate Category A limits, Category B limits, and allowable value for the battery cell parameters of the table and the required actions associated with restoring the battery cell parameters to within limits to the new Battery Monitoring and Maintenance Program, TS 6.5.15.

Evaluation of TS 3.8.2.3; Table 4.8-2 (Deleted) Change (3)

TS Table 4.8-2 Category A defines the parameters normal limits for each designated pilot cell and Category B defines the normal limits and the allowable value for each connected cell. The table requirements would be relocated to the TS 6.5.15, "Battery Monitoring and Maintenance Program."

The Category A and B limits of TS Table 4.8-2 represent appropriate monitoring levels and appropriate preventive maintenance levels for long-term battery quality and extended battery life. These limits will be relocated to the proposed Battery Monitoring and Maintenance Program in TS 6.5.15 (see Section 3.2.4 of this SE for more details). In its letter dated September 16, 2013, the licensee stated that ANO-2 battery maintenance procedures, which verify battery electrolyte level, float voltage, and specific gravity in accordance with the current TS Table 4.8-2, are being used to develop the new battery program in accordance with the proposed TS 6.5.15. Furthermore, the licensee stated that the battery maintenance procedures establish normal operating limits that are conservative to the current TS limits, such that corrective action is initiated prior to reaching a current TS limit. TS 6.4, "Procedures," requires written procedures to be established, implemented, and maintained for the TS 6.5.15 Battery Monitoring and Maintenance Program. Based on the information provided by the licensee, NRC staff concludes that the licensee provided assurance that the battery parameters values will continue to be controlled at their current level.

The Category B allowable value for electrolyte level and float voltage will be moved to the proposed TS 3.8.3, Actions "c" and "a", respectively. In addition, the proposed new SRs 4.8.3.1, 4.8.3.3, and 4.8.3.5 will require monitoring of battery float current (instead of cell specific gravity), connected cell electrolyte level, and connected cell float voltage, respectively (see Sections 3.2.3.8, 3.2.3.10, and 3.2.3.12 of this SE for the NRC staff evaluation of the new proposed SRs). These new SRs will satisfy the intent of the Category B limits.

The NRC staff concludes that relocating Category A and B values for the battery cell parameters and the required actions associated with restoration to the new TS 6.5.15, Battery Monitoring and Maintenance Program is acceptable because: (1) battery capacity is considered adequate when electrolyte level is above the top of the plates; (2) an individual battery cell float voltage criterion of greater than or equal to 2.13 V is a maintenance limit; (3) specific gravity measurement criteria are being replaced with float current monitoring; and (4) the licensee provided assurance that these battery parameter values will continue to be controlled at their current level, and that actions to restore deficient values will be implemented in accordance with the licensee's corrective action program. This relocation will continue to assure that the battery is maintained at current levels of performance, and that operators appropriately focus on monitoring the battery parameters for degradation.

Based on the above, the NRC staff concludes that relocating the battery parameters (electrolyte level, float voltage, specific gravity) to the TS 6.5.15, Battery Monitoring and Maintenance Program and to TS 3.8.3 Actions "a" and "c" are justified since these parameters will continue be controlled at their current level; therefore, the proposed change to delete TS Table 4.8-2 is acceptable.

3.2.1.4 TS 3.8.2.3; Float Current Monitoring (Added to Replace Specific Gravity Measurement); Change (4)

The proposed change would replace requirements to measure specific gravity to determine the battery state of charge with requirements to monitor float current and relocate requirements to obtain specific gravity readings to the new Battery Monitoring and Maintenance Program specified in TS 6.5.15.

Evaluation of TS 3.8.2.3; Float Current Monitoring (Added to Replace Specific Gravity Measurement); Change (4)

Currently, battery cell specific gravity verification is required by SRs 4.8.2.3.a.1 and 4.8.2.3.b.1. To determine the battery state of charge, the licensee proposed replacing the requirement to measure specific gravity with the requirement to monitor float current. Float current monitoring is recognized by the industry as being a more direct and expeditious method for determining battery state of charge than specific gravity monitoring. The licensee proposed a float current of 2 amperes (amps). In the Attachment 2 of the LAR, the licensee provided a letter from the manufacturer (C&D) of the Class 1E batteries used at ANO-2, verifying the acceptability of using float current monitoring instead of specific gravity monitoring as a reliable and accurate indication of a battery state of charge for the life of the batteries.

In its supplement dated September 16, 2013, the licensee stated that it has verified via C&D that a charging current less than or equal to 2 amps is an indication that the battery is at least

98 percent charged; thus, maintaining an additional 2 percent design margin in the ANO-2 battery sizing calculation is needed to ensure that 100 percent battery capacity is available once charging current is 2 amps or less. This is equivalent to the battery being 100 percent charged because the sizing calculation ensures that the battery can perform its safety-related function during a design bases event. In Attachment 6 of the LAR, the licensee provided a commitment to incorporate updates to the ANO-2 SAR which were included in Attachment 3 of the LAR. One of the required updates in LAR Attachment 3 is to include a description of how a 2 percent design margin for the batteries corresponds to a 2 amp float current value indicating that the battery is 98 percent charged (see SE Section 4.0 for additional discussion regarding regulatory commitments). In addition, the licensee stated that the equipment that will be used to monitor float current under SR 4.8.3.1 has the necessary accuracy and capability to measure electrical currents in the expected range.

The NRC staff concludes that the licensee's verifications of the battery manufacturer's specifications regarding the use of float current measurement to determine the battery's state of charge and the addition of 2 percent design margin to the battery sizing provide adequate assurance that replacing the specific gravity measurements with the float current monitoring will not have a significant impact on the ability to accurately determine the operability of the batteries. The NRC staff concludes that float current monitoring is a suitable replacement for specific gravity monitoring when used to determine a battery's state of charge.

Specific gravity monitoring is appropriate for troubleshooting activities and for periodic trending of the battery's state of health. The licensee will continue taking and trending specific gravity measurements during maintenance and testing activities prior to performing a battery service test, battery performance discharge test, or modified performance discharge test in accordance with the new proposed Battery Monitoring and Maintenance Program in TS 6.5.15.

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.2.1.5 TS 3.8.2.3; Current Action "b" (Revised and Renumbered as Action "a"); Change (5)

The proposed change would revise current Action "b" and renumber it as Action "a."

Current Action "b" states:

> b. With one of the required full capacity chargers inoperable, demonstrate the OPERABILITY of its associated battery bank by performing Surveillance Requirement 4.8.2.3.a.1 within one hour and at least once per 8 hours thereafter. If any Category A limit in Table 4.8-2 is not met, declare the battery inoperable.

Revised and renumbered Action "a" would state:

> a. With one of the required full capacity chargers inoperable:

i. restore the battery terminal voltage to greater than or equal to the minimum established float voltage within 2 hours, and

ii. Verify battery float current ≤ 2 amps once per 12 hours.

Evaluation of TS 3.8.2.3; Current Action "b" (Revised and Renumbered as Action "a"); Change (5)

Current Action "b" requires demonstrating the operability of the associated battery bank by performing SR 4.8.2.3.a.1 within 1 hour and at least once per 8 hours thereafter when a full capacity charger is inoperable. Additionally, current Action "b" requires declaring the battery inoperable when any Category A limit in Table 4.8-2 is not met.

Current SR 4.8.2.3.a.1 requires verification of current TS Table 4.8-2 values. As discussed in SE Section 3.2.1.3, the licensee proposed to delete Table 4.8-2 from the TS. The NRC staff concludes that deleting the requirements related to Table 4.8-2 in TS 3.8.2.3 is consistent with the elimination of the table.

New Action "a" would provide new actions a.i and a.ii that focus on returning the battery to the fully charged state when one required full capacity charger is inoperable.

New Action "a.i" provides assurance that the battery terminal voltage will be restored to greater than or equal to the minimum established float voltage within 2 hours. The battery charger, in addition to maintaining the battery operable, provides DC control power to AC circuit breakers and thus supports the recovery of AC power following events such as loss-of-offsite power or station blackout. The 2-hour CT provides an allowance for returning an inoperable charger to operable status or for reestablishing an alternate means (e.g., backup Class 1E battery charger) of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. This 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 indication that the battery is on the exponential charging current portion of its recharging cycle.

New Action "a.ii" would require that once per 12 hours, the battery float current be verified to be less than or equal to 2 amps. This would confirm that if the battery has been discharged as a result of an inoperable battery charger, it had been fully recharged. In its letter dated August 12, 2014, the licensee stated that the Class 1E batteries at ANO-2 would be expected to fully recharge in less than 12 hours to less than 2 amps charging current considering the capacity of the battery chargers (rated for 400 amps) and the relatively small amount of capacity (260 amp-hours) removed from the batteries within the 2-hour allowed time to place an operable battery charger on the battery. If, at the expiration of the 12-hour period, the battery float current is greater than 2 amps, then the battery subsystem is considered inoperable (see Section 3.2.1.4 of this SE 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.

Based on the above, the NRC staff concludes that the proposed change provides acceptable requirements for renumbered Action "a" as allowed by 10 CFR 50.36 and is, therefore, acceptable.

3.2.1.6 TS 3.8.2.3; Current Action "a" (Revised and Renumbered as Action "b"); Change (6)

The proposed change would revise current Action "a" and renumber it as Action "b."

Current Action "a" states:

> a. With one of the required battery banks inoperable, restore the inoperable battery bank 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.

Revised and renumbered Action "b" would state:

> b. With one DC electrical power subsystem inoperable for reasons other than ACTION 'a' above, restore the inoperable DC electrical power subsystem to OPERABLE status within 2 hours.

Evaluation of TS 3.8.2.3; Current Action "a" (Revised and Renumbered as Action "b"); Change (6)

Current Action "a" addresses requirements for an inoperable battery bank. The inoperable battery bank is required to be restored to operable status within 2 hours or the plant to be in at least hot standby within the next 6 hours and in cold shutdown within the following 30 hours. Action "a" would be revised and renumbered to Action "b" to address requirements for an inoperable DC electrical power subsystem, including a battery bank, for consistency with requirements in TSTF-500 TS 3.8.4. This correction to the licensee's proposed TS changes was submitted by letter dated August 12, 2014. The 2-hour restoration time for an inoperable battery bank in current Action "a" would remain the same for an inoperable DC electrical power subsystem.

Renumbered Action "b" would require restoration of one DC electrical power subsystem that is inoperable for reasons other than an inoperable battery charger within 2 hours. A statement "for reasons other than Action 'a' above" is added to the renumbered Action "b" to reflect the exclusion of an inoperable battery charger since requirements for an inoperable battery charger are addressed in renumbered Action "a" (see Section 3.2.1.5 of this SE for more details). Requirements for an inoperable battery bank are embedded in renumbered Action "b." If one of the required DC electrical power subsystems is inoperable for reasons other than an inoperable battery charger, the remaining DC electrical power subsystem has 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 the minimum necessary DC electrical subsystems to mitigate a worst-case accident, continued power operation is limited to 2 hours. In its letter dated September 16, 2013, the licensee stated that the 2-hour allowed outage time would support recovery efforts or time to prepare for an orderly shutdown of the unit if the DC electrical

power subsystem could not be restored to operable status. Therefore, the short duration provided for the restoration of an inoperable DC electrical power subsystem is reasonable.

The alternate Action "or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours" of current Action "a" would be relocated to follow all Actions in TS 3.8.2.3 (see Section 3.2.1.7 of this SE for more details).

Based on the above, the NRC staff concludes that the proposed change provides acceptable remedial actions as allowed by 10 CFR 50.36 and is acceptable.

3.2.1.7 TS 3.8.2.3; Alternate Action (Relocated from current Action "a"); Change (7)

The proposed change would relocate the alternate entry action required for an inoperable battery bank in current Action "a" to follow all of the Actions in TS 3.8.2.3.

Alternate Action from current Action "a" states:

> or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Relocated alternate Action would state:

> Otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Evaluation for TS 3.8.2.3; Alternate Action (Relocated from Current Action "a"); Change (7)

This alternate action currently applies only when an inoperable battery bank cannot be restored to operable status within 2 hours (i.e., current Action "a"). The proposed change would relocate this alternate Action to follow all of the Actions in TS 3.8.2.3, such that failure to meet any of the Actions (i.e., renumbered Action "a" or "b") will require shutdown of the unit. This proposed change is consistent with the required actions in TSTF-500 TS 3.8.4.

The NRC staff concludes that the proposed change is editorial in nature and is, therefore, acceptable.

3.2.1.8 TS 3/4.8.2.3; SRs 4.8.2.3.a.1; 4.8.2.3.b.1, 2, and 3; 4.8.2.3.c.1, 2, and 3; 4.8.2.3.e; and 4.8.2.3.f (Deleted); Change (8)

The proposed change would delete current SRs 4.8.2.3.b.1, 2, and 3; 4.8.2.3.c.1, 2, and 3; 4.8.2.3.e; and 4.8.2.3.f.

Current SRs 4.8.2.3.a.1; 4.8.2.3.b.1, 2, and 3; 4.8.2.3.c.1, 2, and 3; 4.8.2.3.e; and 4.8.2.3.f state:

4.8.2.3. Each 125-volt battery bank and charger shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying that:

1. The parameters in Table 4.8-2 meet the Category A LIMITS, and

b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 110 volts, or battery overcharge with battery terminal voltage above 150 volts, by verifying that:

1. The parameters in Table 4.8-2 meet the Category B LIMITS, and

2. There is no visible corrosion at battery terminals and connectors, or the connection resistance of these items is $\leq 150 \times 10E^{-6}$ ohm, and

3. The average electrolyte temperature of 12 of the connected cells is above 60°F.

c. At least once per 18 months by verifying that:

1. The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,

2. The cell-to-cell and terminal connections are clean, tight, and coated with anti-corrosion material,

3. The resistance of each cell-to-cell and terminal connection is less than or equal to $150 \times 10E^{-6}$ ohm, and

e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. Once per 60-month interval this performance discharge test may be performed in lieu of the battery service test.

f. At least once per 18 months, during shutdown, performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity

from its average on previous performance tests, or is below 90% of the manufacturer's rating.

The proposed change would relocate the requirements of SRs 4.8.2.3.b.2 (visual inspection for corrosion or verification of connection resistance), 4.8.2.3.c.1 (visual inspection for physical damage), 4.8.2.3.c.2 (removal of visible terminal corrosion and ensuring clean connections), and 4.8.2.3.c.3 (verification of connection resistance) to the new Battery Monitoring and Maintenance Program in TS 6.5.15.

Evaluation of TS 3/4.8.2.3; SRs 4.8.2.3.a.1; 4.8.2.3.b.1, 2, and 3; 4.8.2.3.c.1, 2, and 3; 4.8.2.3.e; and 4.8.2.3.f (Deleted); Change (8)

The statement "each 125-volt battery bank and charger shall be demonstrated OPERABLE" would be deleted. The SRs represent the minimum acceptable requirements for the operability of the required equipment and they are performed to demonstrate that the required equipment is capable of performing its specified function(s) (i.e., operable). Therefore, this statement is unnecessary in the SRs. The NRC staff concludes the elimination of this statement from the SRs acceptable.

Current SRs 4.8.2.3.a.1 and 4.8.2.3.b.1 require verification of battery cell parameters meeting Table 4.8-2 Category A limits and Category B limits, respectively. The Table 4.8-2, Category A and B limits do not represent a condition in which the batteries cannot perform their functions. As discussed in Section 3.2.1.3 above, the NRC staff concludes that relocating the TS Table 4.8-2 and the remedial actions associated with restoring the battery cell parameters to within limits is acceptable. The proposed change ensures the battery parameters (maintenance, testing, and monitoring levels) are appropriately monitored and maintained in accordance with the new Battery Monitoring and Maintenance Program, as specified in TS Section 6.5.15. In addition, the proposed float current monitoring (see Section 3.2.1.4 of this SE for the NRC staff's evaluation) satisfies the intent of SRs 4.8.2.3.a.1 and 4.8.2.3.b.1. Therefore, the NRC staff concludes that the elimination of current SRs 4.8.2.3.a.1 and 4.8.2.3.b.1 is consistent with the elimination of Table 4.8-2 from the TS.

Current SR 4.8.2.3.b.3 requires verification of average electrolyte temperature of 12 of the connected cells. This SR will be replaced with new SR 4.8.3.4 (see Section 3.2.3.11 of this SE for more details).

Visual inspection of the battery terminals (SRs 4.8.2.3.b.2, 4.8.2.3.c.1, and 4.8.2.3.c.2) is an important preventive maintenance practice for maintaining a healthy battery (e.g., the early identification and cleaning of battery terminal corrosion can prevent corrosion from spreading between the post and the connector). However, visual inspection of the battery terminals alone does not provide an indication of a battery's capability to perform its design function. The NRC staff concludes that the parameters of these preventive maintenance activities can be adequately controlled in the new TS 6.5.15, "Battery Monitoring and Maintenance Program."

Resistance verification (SRs 4.8.2.3.b.2 and 4.8.2.3.c.3) represent the minimum acceptable requirements for operability of the battery. In Section 2.2 of the LAR, the licensee stated that the resistance limit for each cell and terminal connection is revised from 150 micro-ohms to 50 micro-ohms based on ANO-2 DC voltage drop calculations, which illustrate that the minimum

DC voltage is maintained for all required loads assuming a resistance of 50 micro-ohms per connection. In its letter dated August 12, 2014, the licensee clarified that the resistance value of 50 micro-ohms is the maintenance limit for each inter-cell connection, interior cable connection (i.e., inter-tier or inter-rack), and terminal cable connection. The licensee also stated that any connection reaching the maintenance limit of 50 micro-ohms requires initiation of a Condition Report to evaluate operability impacts on the battery bank. In addition, actions are taken to correct the condition of a connection when resistance exceeds 50 micro-ohms.

In general, plant safety analyses do not assume a specific battery inter-cell connection resistance value, but typically assume that the batteries will supply adequate power. Therefore, the key operability issue is the overall battery connection resistance. Between surveillances, the resistance of each battery inter-cell connection varies independently from all the others. Some of these connection resistance values may be higher or lower than others, and the battery will still be able to perform its function and should not be considered inoperable. Overall connection resistance has a direct impact on operability and is adequately determined by completion of the battery service or modified performance discharge tests. Therefore, these activities are more appropriately controlled under the proposed TS 6.5.15, Battery Monitoring and Maintenance Program.

Current SR 4.8.2.3.e requires verification of the battery capacity during a performance discharge test and allows substitution of the battery service test (current 4.8.2.3.d) with the performance discharge test once per 60-month interval. This SR would be deleted and relocated to other SRs, as follows: (1) the requirement for the battery capacity testing would be relocated to new SR 4.8.3.6 (see Section 3.2.3.13 of this SE for more details); and (2) the allowance for substitution of the service test would be relocated to renumbered SR 4.8.2.3.3 (see Section 3.2.1.11 of this SE for more details). The new SR 4.8.3.6 and the renumbered SR 4.8.2.3.3 will satisfy the intent of current SR 4.8.2.3.e. Therefore, the NRC staff concludes that the elimination of this SR is acceptable.

Current SR 4.8.2.3.f requires performance discharge tests for any battery that shows signs of degradation or has reached 85 percent of its expected service life. This SR would be deleted and relocated to new SR 4.8.3.6. New SR 4.8.3.6 will satisfy the intent of current SR 4.8.2.3.f (see Section 3.2.3.13 of this SE for more details). Therefore, the NRC staff concludes that the elimination of this SR is acceptable.

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the limiting conditions for operation will be met and is, therefore, acceptable.

3.2.1.9 TS 3/4.8.2.3; Current SR 4.8.2.3.a.2 (Revised and Renumbered as SR 4.8.2.3.1); Change (9)

The proposed change would revise current SR 4.8.2.3.a.2 and renumber it as SR 4.8.2.3.1.

Current SR 4.8.2.3.a.2 states:

> 4.8.2.3. Each 125-volt battery bank and charger shall be demonstrated OPERABLE:
>
> a. At least once per 7 days by verifying that:
>
> 2. The total battery terminal voltage is greater than or equal to 129 volts on float charge for a 60 cell battery bank and greater than or equal to 124.7 volts on float charge for a 58 cell battery bank.

Revised and renumbered SR 4.8.2.3.1 would state:

> 4.8.2.3.1 At least once per 7 days by verifying that the total battery terminal voltage is greater than or equal to the minimum established float voltage.

The proposed change would delete the battery minimum established float voltage numerical value from the SR and relocate it to a licensee-controlled program.

Evaluation for TS 3/4.8.2.3; Current SR 4.8.2.3.a.2 (Revised and Renumbered as SR 4.8.2.3.1); Change (9)

Current SR 4.8.2.3.a.2 will be revised to eliminate the battery float voltage numerical values (design limit) for each battery bank (i.e., "129 volts on float charge for a 60 cell battery bank" and "124.7 volts on float charge for a 58 cell battery bank") from the TS. In its LAR, the licensee stated that the 60-cell battery bank has been replaced with a 58-cell battery bank. The phrase "the minimum established float voltage" would replace the requirements for the battery float voltage in the renumbered SR 4.8.2.3.1.

The purpose of renumbered SR 4.8.2.3.1 is to verify battery terminal voltage while the system is on a float charge, in order to ensure the effectiveness of the battery chargers is not degraded. The battery terminal voltage is the minimum voltage which ensures an optimum float charging voltage is applied to the battery. In the LAR, the licensee stated that 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 for a 58-cell battery, or 127.6 V at the battery terminals). This voltage will maintain the battery plates in a condition that supports optimizing battery grid life and will ensure that the battery is capable of providing its designed safety function.

The minimum established battery float voltage numerical value (design limit) for the 58-cell battery banks would be relocated to a licensee-controlled program. Relocating this float voltage design limit to a licensee-controlled program will allow flexibility to monitor and control this limit at values directly related to the battery's ability to perform its required safety function. In Attachment 6 of the LAR, the licensee provided a commitment to change or verify that the ANO-2 SAR incorporates the minimum established design limit for the battery terminal float voltage (see SE Section 4.0 for additional discussion regarding regulatory commitments). This

provides additional reasonable assurance that the numerical value will be appropriately maintained by the licensee to accurately reflect the design of the plant battery system.

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained to meet the requirements of the LCOs, and is therefore acceptable.

3.2.1.10 TS 3/4.8.2.3; Current SR 4.8.2.3.c.4 (Revised and Renumbered as SR 4.8.2.3.2); Change (10)

The proposed change would revise current SR 4.8.2.3.c.4 and renumber it as SR 4.8.2.3.2.

Current SR 4.8.2.3.c.4 states:

> 4.8.2.3.c. At least once per 18 months by verifying that:
>
> 4. The battery charger will supply ≥ 300 amperes at ≥ 125 volts for ≥ 8 hours.

Revised and renumbered SR 4.8.2.3.2 would state:

> 4.8.2.3.2 At least once per 18 months by verifying that each battery charger supplies ≥ 300 amps at greater than or equal to the minimum established float voltage for ≥ 8 hours or, by verifying that each battery charger can recharge the battery to the fully charged state within 24 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 3/4.8.2.3; Current SR 4.8.2.3.c.4 (Revised and Renumbered as SR 4.8.2.3.2); Change (10)

Current SR 4.8.2.3.c.4 specifies battery charger current requirements for each DC source, and its purpose is to verify the design capacity of each battery charger. The proposed change would revise this SR and renumber it SR 4.8.2.3.2 to be consistent with new SR 4.8.2.3.1 by replacing the specific voltage limits with "greater than or equal to the minimum established float voltage." The amperage requirements are based on the output rating of the chargers. Battery manufacturers establish 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 this voltage limit should ensure that the battery will be capable of providing its designed safety function.

As noted above, the licensee also proposed adding an alternative criterion to renumbered SR 4.8.2.3.2. The proposed alternative criterion provides an alternate method for verifying the design capacity of each battery charger because normal battery loads may not be available following the battery service test and may need to be supplemented with additional loads.

In its letter dated September 16, 2013, the licensee stated that the Class 1E batteries at ANO-2 would be fully recharged in less than 20 hours, considering the capacity of the battery chargers (rated for 400 amps) and the amount of capacity (60 percent – 70 percent) removed from the batteries during a design basis event.

The licensee further stated that this expectation is supported by NUREG/CR-7148, "Confirmatory Battery Testing: The use of Float Current Monitoring to Determine Battery State-of-Charge," November 2012 (ADAMS Accession No. ML12313A413), which provides a graph of a battery recharge at 180 amps (of a slightly larger-size than the ANO-2 C&D Technology LCR type battery, but the same design), with recharge (less than 2 amps) completed within approximately 20 hours following full 100-percent depth of discharge at the 4-hour discharge rate. Therefore, the battery charger is capable of recharging the battery to the fully charged state within 24 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. Based on this information, the NRC staff concludes that the proposed alternate testing criteria would satisfy the purpose of renumbered SR 4.8.2.3.2.

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.2.1.11 TS 3/4.8.2.3; Current SR 4.8.2.3.d (Revised and Renumbered as SR 4.8.2.3.3); Change (11)

The proposed change would revise current SR 4.8.2.3.d and renumber it as SR 4.8.2.3.3.

Current SR 4.8.2.3.d states:

> 4.8.2.3.d At least once per 18 months, during shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status, all of the actual or simulated emergency loads for the design duty cycle when the battery subjected to a battery service test.

Revised and renumbered SR 4.8.2.3.2 would state:

> 4.8.2.3.3 At least once per 18 months by verifying that the battery capacity is adequate to supply, and maintain in OPERABLE status, required emergency loads for the design duty cycle when subjected to a battery service test. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this Surveillance. The battery performance discharge test required by Surveillance Requirement 4.8.3.6 may be performed in lieu of the battery service test once per 60 months.

Evaluation of TS 3/4.8.2.3; Current SR 4.8.2.3.d (Revised and Renumbered as SR 4.8.2.3.3); Change (11)

The purpose of current SR 4.8.2.3.d is to verify battery's design capacity and ability to supply and maintain in an operable status all emergency loads (actual or simulated) when performing a battery service test during shutdown. The proposed change would revise this SR to replace the "during shutdown" condition with a note to state "This surveillance shall not be performed in Mode 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this Surveillance." The additional allowance to take credit for unplanned events that satisfy this SR is consistent with the allowance in TSTF-500 TS 3.8.4, SR 3.8.4.3.

The proposed change would also replace the statement "all of the actual or simulated emergency loads" with "required emergency loads" and delete the repetitive word "the battery" from the statement "when the battery is subjected to a battery service test." The NRC staff concludes that these changes to current SR 4.8.2.3.d are editorial in nature, do not change the intent of the SR, and are, therefore, acceptable.

The revised current SR 4.8.2.3.d is renumbered as SR 4.8.2.3.3. The renumbered SR 4.8.2.3.3 would allow the battery performance discharge test to be performed in lieu of the service test (i.e., renumbered SR 4.8.2.3.3) once per 60 months. This allowance already exists in current SR 4.8.2.3.e and is relocated to this revised, renumbered SR. Therefore, adding the allowance of substituting the battery service with the performance discharge test does not change the intent of the SR and is, therefore, acceptable.

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.2.2 TS 3.8.2.4 (DC Sources - Shutdown) Changes

The licensee proposed to revise TS 3.8.2.4 title, LCO, Actions, and SRs.

TS 3.8.2.4 contains the minimum DC electrical equipment and bus required to be energized and operable to support specific equipment and capabilities in Modes 5 and 6. Currently, TS 3.8.2.4 contains one Action to address actions to be taken when less than the minimum required DC electrical equipment and bus is operable. The licensee initially proposed to modify the current Action and add another Action "a" to address one requirement for an inoperable battery charger. In its letter dated September 16, 2013, the licensee proposed to add one additional requirement to new Action "a" and modify the current Action to account for the new Action. The requirements of the current Action to suspend the movement of recently irradiated fuel assemblies, the movement of new fuel assemblies over recently irradiated fuel assemblies, and operations involving positive reactivity additions that could result in loss of required shutdown margin (SDM) or loss of boron concentration would remain unchanged.

3.2.2.1 TS 3.8.2.4; Title (Revised); Change (1)

The proposed change would revise the title of TS 3.8.2.4 from "D.C. Distribution – Shutdown" to "DC Sources – Shutdown."

Evaluation of TS 3.8.2.4; Title (Revised); Change (1)

The NRC staff concludes that the proposed change is editorial in nature and is, therefore, acceptable.

3.2.2.2 TS 3.8.2.4; LCO (Revised); Change (2)

The proposed change would revise the acronym for direct current in the LCO from "D.C." to "DC."

Evaluation of TS 3.8.2.4; LCO (Revised); Change (2)

The NRC staff concludes that the proposed change is editorial in nature and is, therefore, acceptable.

3.2.2.3 TS 3.8.2.4; New Action "a" (Added); Change (3)

The proposed change would add new Action "a."

New Action "a" would state:

a. With the required battery charger inoperable:

   i. Restore battery terminal voltage to greater than or equal to the minimum established float voltage within 2 hours, and

   ii. Verify battery float current ≤ 2 amps once per 12 hours.

Evaluation of TS 3.8.2.4; New Action "a" (Added); Change (3)

TS 3.8.2.4 New Action "a" is similar to renumbered Action "a" in TS 3.8.2.3 with the exception that this Action prescribes the limitations during shutdown conditions. The NRC staff's evaluation of this proposed change can be found in Section 3.2.1.5 of this SE and is applicable to both the shutdown and operating modes.

Based on the above, the NRC staff concludes that the proposed change provides acceptable remedial actions as allowed by 10 CFR 50.36 and is, therefore, acceptable.

3.2.2.4 TS 3.8.2.4; Current Action "b" (Revised); Change (4)

The proposed change would revise current Action "b."

Current Action "b" states:

b. With less than the above complement of D.C. equipment and bus OPERABLE, immediately suspend the movement of recently irradiated fuel assemblies, the movement of new fuel assemblies over recently

irradiated fuel assemblies, and operations involving positive reactivity additions that could result in loss of required SDM or boron concentration.

Revised Action "b" would state:

b. With the requirements of ACTION 'a' not met or with the above complement of DC equipment and bus otherwise inoperable, immediately suspend core alterations, the movement of irradiated fuel assemblies, and any operations involving positive reactivity additions.

Evaluation of TS 3.8.2.4; Current Action "b" (Revised); Change (4)

The purpose of this change is to reflect the addition of new Action "a." With the required DC electrical equipment and bus inoperable, or the requirements of Action "a" not met, there may be insufficient capability to mitigate the consequences of a fuel handling accident. Therefore, sufficiently conservative actions are taken to minimize the probability of occurrence of a fuel handling accident (i.e., suspend core alterations, the movement of irradiated fuel assemblies, and any operations involving positive reactivity additions). Suspension of these activities does not preclude completion of actions to establish a safe, conservative condition. The immediate suspension of activities is consistent with the required times for actions requiring prompt attention.

Based on the above, the NRC staff concludes that the proposed change provides acceptable remedial actions as allowed by 10 CFR 50.36 and is, therefore, acceptable.

3.2.2.5 TS 3/4.8.2.4; Current SR 4.8.2.4.2 (Revised); Change (5)

The proposed change would modify SR 4.8.2.4.2 to reflect the change previously described in Section 3.2.1 of this SE.

Current SR 4.8.2.4.2 states:

4.8.2.4.2 The above required 125-volt battery bank and charger shall be demonstrated OPERABLE per Surveillance Requirement 4.8.2.3.

Revised SR 4.8.2.4.2 would state:

4.8.2.4.2 The above required 125-volt battery bank and charger shall be demonstrated OPERABLE per Surveillance Requirements 4.8.2.3.1, 4.8.2.3.2, and 4.8.2.3.3; however, while each of these Surveillance Requirements must be met, Surveillance Requirements 4.8.2.3.2 and 4.8.2.3.3 are not required to be performed.

Evaluation of TS 3/4.8.2.4; Current SR 4.8.2.4.2 (Revised); Change (5)

The licensee proposed modifying SR 4.8.2.4.2 to be consistent with the proposed change to TS 3.8.2.3. The revised SR 4.8.2.4.2 would require the licensee to demonstrate the operability of the battery bank and charger per SR 4.8.2.3.1, SR 4.8.2.3.2, and SR 4.8.2.3.3. However,

while each of these SRs is required to be met, the actual performance of SR 4.8.2.3.2 and SR 4.8.2.3.3 is not required. The reason for this flexibility is to preclude requiring the operable DC sources from being discharged below their capability to provide the required power supply or being otherwise rendered inoperable during the performance of SRs. Nevertheless, these SRs must still be capable of being met. SR 4.8.2.3.2 may be performed during normal operation without affecting plant safety and credit may be taken for unplanned events that satisfy SR 4.8.2.3.3 (see Sections 3.2.1.10 and 3.2.1.11 of this SE for more details). Requirements in the revised SR 4.8.2.4.2 are consistent with TSTF-500. The NRC staff has reviewed the proposed change and determined that the change is consistent with the proposed changes to TS 3.8.2.3 and TSTF-500 and meet the intent of the SR.

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.2.3 TS 3.8.3 (Battery Parameters) Changes

The licensee proposed to create a new TS 3.8.3, "Battery Parameters," to capture the intent of TSTF-500, TS 3.8.6. The new LCO and all actions of TSTF-500, TS 3.8.6, are adopted. The proposed change would require the use of float current monitoring for the battery state of charge (operability) determination.

3.2.3.1 TS 3.8.3; New Title, New LCO, New Applicability (Added); Change (1)

The proposed change would add a new title, LCO, and Applicability to the TS.

New title would state:

BATTERY PARAMETERS

New TS 3.8.3 LCO would state:

3.8.3 Battery parameters for the Train A and Train B electrical power subsystem batteries shall be within the limits.

New Applicability would state:

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

Evaluation of TS 3.8.3; New Title, New LCO, New Applicability (Added); Change (1)

The new TS 3.8.3 title, LCO 3.8.3, and Applicability reflect the current requirements of TS LCO 3.8.2.3 Table 4.8-2 and are consistent with the TSTF-500 TS 3.8.6 title, LCO, and Applicability.

Based on the above, the NRC staff concludes that the proposed change is acceptable.

3.2.3.2 TS 3.8.3; New Action "a" (Added); Change (2)

The proposed change would add new Action "a."

New Action "a" would state:

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

i. Within 2 hours perform Surveillance Requirements 4.8.2.3.1 and 4.8.3.1, and

ii. Within 24 hours restore affected cell voltage to ≥ 2.07 V.

Evaluation of TS 3.8.3; New Action "a" (Added); Change (2)

The proposed new Action "a" would address what was formerly the Category B allowable value for float voltage in TS Table 4.8-2. This new Action would be applicable when one battery is found with one or more battery cells with a float voltage less than 2.07 V. A battery cell with float voltage less than 2.07 V is degraded. Action a.i requires the licensee to verify: (a) the battery terminal voltage to be greater than or equal to the minimum established float voltage (SR 4.8.2.3.1), and (b) each battery's float current is less than or equal to 2 amps (SR 4.8.3.1). The above actions ensure that there is still sufficient capacity for the battery to perform its intended function. Continued operations for up to 24 hours are proposed to allow the restoration of the affected cell(s) voltage to greater than or equal to 2.07 V (Action a.ii). According to current Table 4.8-2 Category B allowable value, a battery cell float voltage is not allowed to be equal to 2.07 V. In its letter dated August 12, 2014, the licensee clarified that the allowance of a battery cell float voltage limit at 2.07 V is based on the actual open circuit cell voltage of 2.063 V provided by the manufacturer and the fact that a cell float voltage greater than the open circuit voltage is sufficient to prevent discharge of the floating cell. The NRC staff concludes that the requirements of Action "a" are reasonable and consistent with TSTF-500 TS 3.8.6, Action A. In Attachment 6 of the LAR, the licensee provided a commitment to incorporate the minimum established design limit of the battery terminal float voltage into the ANO-2 SAR (see SE Section 4.0 for additional discussion regarding regulatory commitments). This provides reasonable assurance that the value will be appropriately maintained by the licensee to reflect accurately the design of the plant.

Based on the above, the NRC staff concludes that the proposed change provides acceptable remedial actions as allowed by 10 CFR 50.36 and is, therefore, acceptable.

3.2.3.3 TS 3.8.3; New Action "b" (Added); Change (3)

The proposed change would add new Action "b" to address the battery state of charge.

New Action "b" would state:

b. With one battery with float current > 2 amps:

i. Within 2 hours perform Surveillance Requirement 4.8.2.3.1, and

ii. Within 12 hours restore battery float current to ≤ 2 amps.

Evaluation of TS 3.8.3; New Action "b" (Added); Change (3)

The proposed new Action "b" would be applicable when one battery is 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. Action b.i requires verification of the battery terminal voltage being greater than or equal to the minimum established float voltage (SR 3.8.4.1) within 2 hours, to confirm battery charger operability. Action b.ii ensures that the battery will be restored to its fully-charged condition (i.e., capable of performing its design function) from any discharge that might have occurred due to a temporary loss of the battery charger within 12 hours. In its letter dated August 12, 2014, the licensee stated that the ANO-2 Class 1E batteries would be expected to fully recharge in less than 12 hours to less than 2 amps charging current, considering the capacity of the battery chargers (rated for 400 amps) and the relatively small amount of capacity (260 amp-hours) removed from the batteries within the 2-hour allowed time to place an operable battery charger on the battery.

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 indicates that the battery has been substantially discharged and likely cannot perform its required design functions. In this case, new Action "f" would be entered.

Based on the above, the NRC staff concludes that the proposed change provides acceptable remedial actions as allowed by 10 CFR 50.36 and is, therefore, acceptable.

3.2.3.4 TS 3.8.3; New Action "c" (Added); Change (4)

The proposed change would add Action "c" to address the level of the electrolyte in a cell.

New Action "c" would state:

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

i. Within 8 hours restore electrolyte level to above top of plates[1], and

ii. Within 12 hours verify no evidence of leakage[1], and

iii. Within 31 days restore electrolyte level to greater than or equal to minimum established design limits.

Note 1: Only required if electrolyte level is below the top of the plates. If electrolyte level is below the top of the plates, ACTION c.ii shall be performed.

Evaluation of TS 3.8.3; New Action "c" (Added); Change (4)

The proposed new Action "c" would apply when one battery is found with one or more cells with an electrolyte level less than the minimum established design limits. If the electrolyte level is above the top of the battery plates, but below the minimum limit (i.e., the minimum level indication mark on the battery cell jar), the battery should still have sufficient capacity to perform its intended safety function. The affected battery is not required to be considered inoperable solely as a result of electrolyte level not met. Action c.iii restores the electrolyte level to greater than or equal to the minimum established design limits within 31 days.

With the electrolyte level below the top of the plates, there is a potential for dry-out and plate degradation. New Actions c.i and c.ii restore the electrolyte level to above top of the plates within 8 hours and ensure that the cause of the loss of the electrolyte level is not due to a leak in the battery cell jar within 12 hours. Actions c.i and c.ii are modified by Note 1, which indicates that these Actions are only applicable if electrolyte level is below the top of the plates.

Additionally, provisions in the new Battery Monitoring and Maintenance Program in TS 6.5.15 initiate actions to equalize and test the battery cells that have been discovered with an electrolyte level below the top of the plates. Therefore, the new Actions ensure the batteries will be restored to an operable condition in a timely manner.

Based on the above, the NRC staff concludes that the proposed change provides acceptable remedial actions as allowed by 10 CFR 50.36 and is, therefore, acceptable.

3.2.3.5 TS 3.8.3; New Action "d" (Added); Change (5)

The proposed change would add new Action "d" to address the electrolyte temperature of a pilot cell.

New Action "d" would state:

> d. With one battery with 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.

Evaluation of TS 3.8.3; New Action "d" (Added); Change (5)

The proposed new Action "d" would apply when one battery is found with a pilot cell electrolyte temperature less than the minimum established design limit. A low electrolyte temperature limits the current and power available from the battery.

In the LAR, the licensee stated that the LCR-31 Class 1E batteries at ANO-2 require less than 15 positive plates (this includes temperature correction for 60 degrees Fahrenheit (°F) and 1.25 aging factor for end-of-life) and are sized with 10-15 percent design margin as recommended by IEEE Standard 485, "Recommended Practice for Sizing Large Lead Storage Batteries for Generating Station and Substations." An additional 2 percent design margin will also be maintained to ensure that 100 percent battery capacity is available once charging current is 2 amps or less.

Furthermore, in its letter dated September 16, 2013, the licensee stated that the battery room temperature is monitored between 65 °F and 105 °F once per every shift through operations logs and once every 2 hours under certain equipment configurations. The licensee would implement corrective measures to restore the battery room temperature in accordance with plant procedures. Based on the above considerations and the fact that batteries have very large thermal inertia, the NRC staff concludes that it is highly likely that a room temperature excursion would be corrected by the licensee prior to the battery electrolyte reaching its maximum or minimum design temperature.

Due to the use of pilot cell temperature in lieu of average cell temperature and the use of 2.07 V as the minimum limit for cell voltage, changes are necessary in the method pilot cells are selected. In its letter dated September 16, 2013, the licensee stated that the pilot cell selection will be based on the lowest cell voltage in accordance with the new TS 6.5.15 Battery Monitoring and Maintenance Program and will be verified using quarterly data obtained from required surveillance testing.

Based on this information, the NRC staff concludes that the pilot cell temperature is a sufficiently accurate representation of the temperature of the battery bank because: (1) batteries have very large thermal inertia; (2) ANO-2 batteries are designed with sufficient margins (i.e., temperature, aging, and design); and (3) the licensee monitors and corrects low battery room temperatures. Therefore, the proposed 12-hour restoration time provides adequate time to restore the electrolyte temperature within established limits.

Based on the above, the NRC staff concludes that the proposed change provides acceptable remedial actions as allowed by 10 CFR 50.36 and is, therefore, acceptable.

3.2.3.6 TS 3.8.3; New Action "e" (Added); Change (6)

The proposed change would add new Action "e" to address battery parameters.

New Action "e" would state:

> e. With both batteries with battery parameters not within limits, restore battery parameters for at least one battery to within limits within 2 hours.

Evaluation of TS 3.8.3; New Action "e" (Added); Change (6)

The licensee proposed adding new TS 3.8.3 Action "e" to address requirements for both batteries being found with battery parameters not within limits. If parameters for both batteries are out of limits, 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 for at least one of the affected batteries be restored to within limits within 2 hours. The NRC staff concludes that the 2-hour time period is reasonable considering the potential for loss of function of components that depend on the batteries (i.e., AC vital bus subsystem(s), electrical breaker control/position indication power). Accordingly, a relatively short duration is provided to resolve the condition.

Based on the above, the NRC staff concludes that adding new TS 3.8.3 Action "e" provides acceptable remedial actions as allowed by 10 CFR 50.36 and is, therefore, acceptable.

3.2.3.7 TS 3.8.3; New Action "f" (Added); Change (7)

The proposed change would add new Action "f" to address requirements for battery inoperability.

New Action "f" would state:

> f. With the requirements of ACTION 'a', 'b', 'c', 'd', or 'e' not met, or with one battery with one or more battery cells float voltage < 2.07 V and float current > 2 amps, immediately declare the battery inoperable.

Evaluation of TS 3.8.3; New Action "f" (Added); Change (7)

New Action "f" provides requirements for a battery that is found with parameters outside the allowance of Actions "a", "b", "c", "d", or "e." Under this condition, it is assumed that there is insufficient capacity to supply the maximum expected load requirements. Action "f" also addresses an alternate condition where one battery is found with one or more battery cells having a float voltage less than 2.07 V (new TS 3.8.3 Action "a") and a float current greater than 2 amps (new TS 3.8.3 Action "b"). In this case, the battery may not have sufficient capacity to perform its intended design function. The requirement for either of these conditions is to declare the associated battery inoperable immediately. The NRC staff concludes that the requirements of Action "f" are reasonable and consistent with battery inoperability.

Based on the above, the NRC staff concludes that the proposed change provides acceptable remedial actions as allowed by 10 CFR 50.36 and is, therefore, acceptable.

3.2.3.8 TS 3/4.8.3; New SR 4.8.3.1 (Added); Change (8)

The proposed change would add new SR 4.8.3.1.

New SR 4.8.3.1 would state:

> 4.8.3.1 At least once per 7 days by verifying that each battery float current is ≤ 2 amps. This Surveillance is not required when battery terminal voltage is less than the minimum established float voltage of Surveillance Requirement 4.8.2.3.1.

Evaluation of TS 3/4.8.3; New SR 4.8.3.1 (Added); Change (8)

The licensee proposed adding new SR 4.8.3.1, which will require verification that the float current for each battery is less than or equal to 2 amps at least once per 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 a continuous small amount of current (i.e., less than or equal to 2 amps) which is required to overcome the internal losses of a battery and 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 above in SE Section 3.2.1.4, the use of float current to determine the state of charge of the battery is consistent with the recommendations of the battery manufacturer. The frequency of performance of the new SR 4.8.3.1 is consistent with the recommendations provided in IEEE Std. 450-2002.

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.2.3.9 TS 3/4.8.3; New SR 4.8.3.2 (Added); Change (9)

The proposed change would add new SR 4.8.3.2:

New SR 4.8.3.2 would state:

> 4.8.3.2 At least once per 31 days by verifying that each battery pilot cell float voltage is ≥ 2.07 V.

Evaluation of TS 3/4.8.3; New SR 4.8.3.2 (Added); Change (9)

The licensee proposed adding new SR 4.8.3.2, which will require verification that the float voltage of pilot cells are greater than or equal to 2.07 V at least once per 31 days. This voltage level represents the minimum SR acceptable voltage for operability. The Battery Monitoring and Maintenance Program in TS 6.5.15 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 2.13 V when a cell or cells have been found to be less than 2.13 V. Due to relying on a pilot cell(s) for

determining acceptable voltage for all cells in the battery, the NRC staff concludes that a 31-day monitoring frequency provides a reasonable timeframe for verifying the adequacy of float voltage. This frequency provides reasonable assurance that the battery can perform its intended safety function while providing a reasonable time between surveillances to allow appropriate corrective actions consistent with the safety significance of safety-related batteries. The NRC staff's conclusion is also based on the fact that the battery pilot cell(s) are evaluated and all battery cell float voltages are measured at least once per 92 days (SR 4.8.3.5). In addition, the frequency of performance of the new SR 4.8.3.2 is consistent with the recommendations provided in IEEE Std. 450-2002.

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.2.3.10 TS 3/4.8.3; New SR 4.8.3.3 (Added); Change (10)

The proposed change would add new SR 4.8.3.3.

New SR 4.8.3.3 would state:

> 4.8.3.3 At least once per 31 days by verifying that each battery connected cell electrolyte level is greater than or equal to minimum established design limits.

The proposed change would relocate the minimum established design limits for the battery electrolyte level to a licensee-controlled program.

Evaluation of TS 3/4.8.3; New SR 4.8.3.3 (Added); Change (10)

New SR 4.8.3.3 would require the connected cells electrolyte level to be greater than or equal to the "minimum established design limits." 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. Frequency of performance of the new SR 4.8.3.2 is consistent with the recommendations provided in IEEE Std. 450-2002.

Relocating the minimum established design limits for the battery electrolyte level to a licensee-controlled program will allow flexibility to monitor and control this limit at values directly related to the battery ability to perform its required safety function. In Attachment 6 of the LAR, the licensee provided a commitment to incorporate the minimum established design level limit into ANO-2 SAR, which will provide reasonable assurance that the value will be appropriately maintained by the licensee to accurately reflect the design of the plant battery system (see SE Section 4.0 for additional discussion regarding regulatory commitments).

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.2.3.11 TS 3/4.8.3; New SR 4.8.3.4 (Added); Change (11)

The proposed change would add new SR 4.8.3.4.

New SR 4.8.3.4 would state:

> 4.8.3.4 At least once per 31 days by verifying that each battery pilot cell temperature is greater than or equal to minimum established design limits.

The proposed change would relocate the minimum established design limits for the pilot cell temperature to a licensee-controlled program.

Evaluation of TS 3/4.8.3; New SR 4.8.3.4 (Added); Change (11)

New SR 4.8.3.4 would replace current SR 4.8.2.3.b.3, which requires verifying the average (versus pilot cell) electrolyte temperature of 12 connected cells at least once per 92 days and within 7 days after a battery discharge or a battery overcharge.

Batteries have very large thermal inertia; the batteries are designed with margins to account for factors affecting performance (i.e., temperature, aging); and there is monitoring to maintain optimum battery room temperatures. As a result, the pilot cell temperature is an accurate representation of the temperature of the battery bank and is adequate to ensure that the minimum electrolyte temperature is maintained. The frequency of performance of new SR 4.8.3.4 is consistent with the recommendations provided in IEEE Std. 450-2002.

Each pilot cell would be required 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. Relocating the minimum established design limit for the battery electrolyte temperature to the Battery Monitoring and Maintenance Program in TS 6.5.15 will allow flexibility to monitor and control this limit at values directly related to the battery ability to perform its intended function. In Attachment 6 of the LAR, the licensee provided a commitment to incorporate the minimum established design temperature limit into ANO-2 SAR, which will provide reasonable assurance that the value will be appropriately maintained by the licensee to accurately reflect the design of the plant's battery system (see SE Section 4.0 for additional discussion regarding regulatory commitments).

Based on the above, the NRC staff concludes that the pilot cell temperature is an accurate representation of the temperature of the battery bank. The NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.2.3.12 TS 3/4.8.3; New SR 4.8.3.5 (Added); Change (12)

The proposed change would add new SR 4.8.3.5.

New SR 4.8.3.5 would state:

> 4.8.3.5 At least once per 92 days by verifying that each battery connected cell float voltage is ≥ 2.07 V.

Evaluation of TS 3/4.8.3; New SR 4.8.3.5 (Added); Change (12)

The licensee proposed adding new SR 4.8.3.5, which will require verification that the float voltage of each battery connected cell is greater than or equal to 2.07 V at least once per 92 days. This voltage level represents the point below which (less than 2.07 V) battery operability cannot be assured. 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 V per cell. This voltage provides adequate over-potential, which limits the formation of lead sulfate and self discharge, which could eventually render the battery inoperable. Float voltages in this range or less, but greater than 2.07 V per cell, are addressed in the TS 6.5.15 Battery Monitoring and Maintenance Program. Furthermore, the Battery Monitoring and Maintenance Program 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 2.13 V when a cell or cells have been found to be less than 2.13 V. The 2.07 V individual cell limit reflects the Operability limit for the batteries. With all battery cells above 2.07 V, there is adequate assurance that that the terminal voltage is at an acceptable threshold for establishing battery operability. Frequency of performance of the new SR 4.8.3.5 is consistent with the recommendations provided in IEEE Std. 450-2002, "IEEE Recommended Practice for Maintenance, Testing and Replacement of Vented Lead-Acid Batteries for Stationary Applications," as endorsed by Regulatory Guide (RG) 1.129, Revision 2.

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.2.3.13 TS 3/4.8.3; New SR 4.8.3.6 (Relocated - Current SRs 4.8.2.3.e and 4.8.2.3.f); Change (13)

The proposed change would modify and relocate current SR 4.8.2.3.f and the first sentence of SR 4.8.2.3.e to new SR 4.8.3.6.

The first sentence of current SR 4.8.2.3.e states:

> e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test.

Current SR 4.8.2.3.f states:

> f. At least once per 18 months, during shutdown, performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the

application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

New SR 4.8.3.6 would state:

4.8.3.6 At least once per 60 months by verifying the battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this Surveillance. In addition to the 60-month test interval, the performance discharge test shall be performed:

a. At least once per 12 months when battery shows degradation, or has reached 85% of the expected life with capacity < 100% of manufacturer's rating, and

b. At least once per 24 months when battery has reached 85% of the expected life with capacity ≥ 100% of manufacturer's rating.

Evaluation of TS 3/4.8.3; New SR 4.8.3.6 (Relocated - Current SRs 4.8.2.3.e and 4.8.2.3.f) Change (13)

The purpose of the current SRs 4.8.2.3.e and 4.8.2.3.f is to demonstrate the operability of the battery; thus, in accordance with SR 3.0.1, these surveillances are relocated to the proposed new TS 4.8.3, "Battery Parameters." Exisitng SRs 4.8.2.3.e and 4.8.2.3.f are required to be performed during shutdown. This requirement is replaced with the statement "This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this Surveillance" in new SR 4.8.3.6. The additional allowance to take credit for unplanned events that satisfy this SR is consistent with the allowance in TSTF-500 TS 3.8.6, SR 3.8.6.6.

Current SR 4.8.2.3.f is modified and renumbered as SR 4.8.3.6.a. The frequency of performance of SR 4.8.3.6.a is changed from 18 months to 12 months. According to IEEE Std. 450-2002, an annual performance test of battery capacity should be made on any battery that shows signs of degradation or has reached 85 percent of the service life expected for the application.

Degradation is indicated when the battery capacity drops more than 10 percent from its capacity on the previous performance test, or is below 90 percent of the manufacturers rating. However, if the battery has reached 85 percent of service life, delivers a capacity of 100 percent or greater of the manufacturer's rated capacity, and has shown no signs of degradation, performance testing at 2-year intervals is acceptable until the battery shows signs of degradation. In accordance with the recommendations provided in IEEE Std. 450-2002, an additional 24-month frequency testing criterion for the battery performance discharge test is added to the new SR as 4.8.3.6.b.

New SR 4.8.3.6 contains surveillance frequencies based on guidance provided in the IEEE Std. 450-2002. These frequencies are based on the qualified life of safety-related batteries (typically 20 years), and known historical performance characteristics for vented lead-acid batteries. The SR 4.8.3.6 surveillance frequencies will provide adequate data points for trending in order to determine the state of health of the safety-related batteries, given the expected service life. The NRC staff concludes that the surveillance frequencies are appropriate given the condition of the battery, allow sufficient time for corrective actions to be taken, and are consistent with the safety significance of safety-related batteries.

Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.2.4 TS 6.5.15, Battery Monitoring and Maintenance Program (Added)

The proposed change would add a new Battery Monitoring and Maintenance Program as TS Section 6.5.15.

New TS 6.5.15 would state:

> 6.5.15 Battery Monitoring and Maintenance Program
>
> This program provides controls for battery restoration and maintenance. The program shall be in accordance with the IEEE Std. 450-2002, "IEEE Recommended Practice for Maintenance, Testing and Replacement of Vented Lead-Acid Batteries for Stationary Applications," as endorsed by Regulatory Guide 1.129, Revision 2 (RG), with RG exceptions and program provisions as identified below:
>
> a. The program allows the following RG 1.129, Revision 2 exceptions:
>
> 1. Battery temperature correction may be performed before or after conducting discharge tests.
>
> 2. RG 1.129, Regulatory Position 1, Subsection 2, "References," is not applicable to this program.
>
> 3. In lieu of RG 1.129, Regulatory Position 2, Subsection 5.2, "Inspections," the following shall be used: "Where reference is made to the pilot cell, pilot cell selection shall be based on the lowest voltage cell in the battery."
>
> 4. In RG 1.129, Regulatory Position 3, Subsection 5.4.1, "State of Charge Indicator," the following statements in paragraph (d) may be omitted: "When it has been recorded that the charging current has stabilized at the

charging voltage for three consecutive hourly measurements, the battery is near full charge. These measurements shall be made after the initially high charging current decreases sharply and the battery voltage rises to approach the charger output voltage."

5. In lieu of RG 1.129, Regulatory Position 7, Subsection 7.6, "Restoration," the following may be used: "Following the test, record the float voltage of each cell of the string."

b. The program shall include the following provisions:

1. Actions to restore battery cells with float voltage < 2.13 V;

2. Actions to determine whether the float voltage of the remaining battery cells is ≥ 2.13 V when the float voltage of a battery cell has been found to be < 2.13 V;

3. Actions to equalize and test battery cells that had been discovered with electrolyte level below the top of the plates;

4. Limits on average electrolyte temperature, battery connection resistance, and battery terminal voltage; and

5. A requirement to obtain specific gravity readings of all cells at each discharge test, consistent with manufacturer recommendations.

Evaluation of TS 6.5.15; New Battery Monitoring and Maintenance Program (Added)

The TS Battery Maintenance and Monitoring Program will be in accordance with IEEE Std. 450-2002, as endorsed by RG 1.129, Revision 2. RG 1.129, Revision 2, provides guidance with respect to the maintenance, testing, and replacement of vented lead-acid storage batteries in nuclear power plants. The exceptions to RG 1.129, Revision 2 (listed in TS 6.5.15) are needed to make the proposed TS requirements align with RG guidance, allow reasonable technical approaches, and be applicable to operating plants.

The licensee stated that monitoring of the current battery parameters (i.e., specific gravity, electrolyte level, cell temperature, float voltage, connection resistance, and physical condition) will be relocated to this program. The TS Battery Maintenance and Monitoring Program will ensure that the above battery parameters will be maintained and that actions will be implemented should the battery parameter(s) not be met.

TS 6.4, "Procedures," requires written procedures be established, implemented, and maintained for the TS 6.5.15, Battery Monitoring and Maintenance Program. The TS 6.5.15, Battery Monitoring and Maintenance Program, provides assurance that the battery parameters will be

monitored and controlled in accordance with the program, and that 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.

The NRC staff concludes that this change is consistent with TSTF-500 and provides assurance that the battery is maintained at required levels of performance and that pertinent battery parameters are monitored. Based on the above, the NRC staff concludes that the proposed change meets 10 CFR 50.36 requirements for surveillances by ensuring that the necessary quality of systems and components is maintained and that the LCOs will be met and is, therefore, acceptable.

3.3 Summary and Conclusions

Based on the above evaluation, the NRC staff concludes that the proposed changes to the ANO-2 TS to adopt TSTF-500, Revision 2, provide 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 NRC staff also concludes that the proposed TS changes are in accordance with 10 CFR 50.36 and meet the intent of GDCs 1, 17, and 18. Therefore, the NRC staff concludes that the proposed changes are acceptable.

4.0 REGULATORY COMMITMENTS

In Attachment 6 of the LAR, the licensee made the following regulatory commitments to be implemented with the amendment:

1. Entergy Operations, Inc. (Entergy) commits to include in a licensee-controlled program that is controlled under 10 CFR 50.59 a requirement to maintain a 2 percent design margin for the batteries which corresponds to a 2 amp float current value that is an indication that the battery is 98 percent charged.

2. Entergy will ensure that the minimum required procedural time to measure battery float current will be 30 seconds.

3. Entergy will revise the ANO-2 SAR to include those items described in Attachment 3 of this submittal.

4. Entergy commits to implement Technical Bases changes consistent with the Bases in TSTF-500 in accordance with the Technical Specifications Bases Control Program.

As discussed in Section 4.4.1 of the NRC's Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-101, Revision 4, "License Amendment Review Procedures" (ADAMS Accession No. ML113200053), since commitments made by a licensee in support of an LAR are not legally binding, the NRC staff's SE should not rely on commitments as a basis for any part of the NRC staff's approval of a proposed amendment. However, the staff may rely on a commitment if it is

escalated into an obligation (e.g., license condition) or subsequently incorporated into a mandated licensing basis document (e.g., SAR).

As discussed in this SE, the NRC staff has relied, in part, on a regulatory commitment listed above, commitment number 3, as part of the NRC staff's acceptance of the proposed amendment. Commitment number 3 of Attachment 6 of the LAR was made by the licensee in order to maintain consistency with the model application referenced in the TSTF-500 notice of availability in the September 1, 2011, *Federal Register* (76 FR 54510). Consistent with the guidance in NRR Office Instruction LIC-101, the NRC staff has determined that the commitment should be incorporated into the SAR. As such, the NRC staff has added the following words as a condition of the amendment to ensure that the SAR is revised as part of the implementation of the amendment:

> Implementation of the amendment shall include revision of the Safety Analysis Report as described in Attachment 3 to the licensee's letter dated January 28, 2013.

The NRC staff notes that, following incorporation of the commitments listed in Attachment 3 into the SAR, future changes to the program will be under the provisions of 10 CFR 50.59.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arkansas 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 installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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 published in the *Federal Register* on April 30, 2013 (78 FR 25313). 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) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: A. Foli, NRR/DE/EEEB

Date: December 4, 2014

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/

Andrea E. George, Project Manager
Plant Licensing Branch IV-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-368

Enclosures:
1. Amendment No. 297 to NPF-6
2. Safety Evaluation

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NAME	AGeorge	JBurkhardt	REIliott	JZimmerman*
DATE	10/31/2014	10/31/2014	11/06/2014	9/24/2014

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