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2CAN011301

January 28, 2013

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: License Amendment Request
Adoption of Technical Specification Task Force (TSTF)-500, Revision 2
"DC Electrical Rewrite - Update to TSTF-360"
Arkansas Nuclear One, Unit 2
Docket No. 50-368
License No. NPF-6

REFERENCE: Entergy letter dated November 8, 2007, "Pending License Amendment Requests Affected by TSTF-500" (CNRO-2007-00039) (ML# 073180400)

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests the following amendment to the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TS). In accordance with the provisions of Title 10 of the Code of Federal Regulations (10 CFR) Section 50.90, Entergy is submitting a request for an amendment to the ANO-2 TSs to incorporate the NRC-approved TSTF-500, Revision 2, "DC Electrical Rewrite - Update to TSTF-360."

Attachment 1 provides a description and assessment of the proposed changes including the requested confirmation of applicability and plant-specific verifications; technical analyses; regulatory analyses; and environmental considerations. Attachment 2 provides vendor verification related to the use of float current versus specific gravity for battery health monitoring. Attachment 3 provides a summary of the required Safety Analysis Report (SAR) descriptions. Attachment 4 provides markup pages of existing TSs and TS Bases to show the proposed change. Attachment 5 provides revised (clean) TS pages.

In Reference above, Entergy informed the NRC that TSTF-500, when approved for industry use, would be adopted by ANO-2 (among other Entergy plants) to reconcile non-conservative TSs associated with battery inter-cell connection resistances and battery terminal voltage. In accordance with NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," administrative controls to ensure continued operability of the station vital battery banks have previously been established and will remain in place until TSTF-500 is approved for ANO-2.

Entergy requests approval of the proposed license amendment by February 1, 2014, with the amendment being implemented within 90 days of approval.

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and it has been determined that the change involves no significant hazards consideration. The bases for these determinations are included in the attached submittal.

In accordance with 10 CFR 50.91(b)(1), a copy of this application and the reasoned analysis about no significant hazards consideration is being provided to the designated Arkansas state official.

The proposed change includes new commitments specified in Attachment 6.

If you have any questions or require additional information, please contact Stephenie Pyle at 479-858-4704.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on January 28, 2013.

Sincerely,

ORIGINAL SIGNED BY JEREMY G. BROWNING

JGB/dbb

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Battery Manufacturer Letter Describing Use of Float Current
3. List of Required Safety Analysis Report Descriptions
4. Proposed Technical Specification and Bases Changes (mark-up)
5. Revised (clean) Technical Specification Pages
6. List of Regulatory Commitments

cc: Mr. Elmo E. Collins
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Attachment 1 to

2CAN011301

Analysis of Proposed Technical Specification Change

DESCRIPTION AND ASSESSMENT OF THE PROPOSED CHANGES

1.0 DESCRIPTION

This letter is a request to amend Operating License NPF-6 for Arkansas Nuclear One, Unit 2 (ANO-2).

The ANO-2 Technical Specification (TS) requirements are revised from requirements on battery cells to requirements on the battery. This focuses the requirements on the assumed safety function of the battery. The proposed amendment would revise 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." Because ANO-2 is a custom TS plant, a new TS 3.8.3 is created to capture the intent of standard TS (STS) LCO 3.8.6, "Battery Parameters," as modified by TSTF-500. A new "Battery Monitoring and Maintenance Program" is also being proposed for Section 6.5, "Administrative Controls - Programs and Manuals."

Specifically, the proposed changes include the relocation of a number of Surveillance Requirements (SRs) in TS 3.8.2.3 that perform preventive maintenance on the safety-related batteries to a licensee-controlled program. It is proposed that TS Table 4.8-2, "Battery Surveillance Requirements," be modified by relocating requirements to a licensee-controlled program, and that specific actions with associated Allowable Outage Times (AOTs) for out-of-limits conditions for battery cell voltage, electrolyte level, and electrolyte temperature be added to new proposed TS 3.8.3. In addition, specific SRs are being proposed for verification of these parameters.

A new program is being proposed for Section 6.5 of the Administrative Controls for the maintenance and monitoring of station batteries. The items proposed to be relocated will be contained within this program, entitled "Battery Monitoring and Maintenance Program."

These changes are consistent with the U.S. Nuclear Regulatory Commission (NRC)-approved Technical Specifications Task Force (TSTF) Traveler TSTF-500, Revision 2. The availability of this TS improvement as part of the consolidated line item improvement process (CLIIP) was announced in the Federal Register on September 1, 2011 (76 FR 54510).

TSTF-500, Revision 2, is modeled after plants that have a non-qualified standby battery charger that could be aligned to support a DC distribution bus and the associated battery for a limited period of time when the fully qualified battery charger is out of service. Because ANO-2 has previously installed TS qualified backup chargers (one for each of the two DC distribution subsystems), the 72-hour allowance for operation with a non-qualified charger is not needed.

The ANO-2 TSs have not been converted to the standard TS (STS) version contained in NUREG-1432, *Standard Technical Specifications for Combustion Engineering Plants.* Therefore format and wording will differ from that contained in TSTF-500. In addition, ANO-2 has not adopted the older version of TSTF-500 (i.e., TSTF-360). Deviations, if any, will be discussed in detail later in this submittal. However, a summary list is provided below to enhance NRC review of the proposed TS changes. The first column represents the LCOs, Actions, and SRs impacted by the TSTF. The second column states whether the equivalent ANO-2 TS requires revision.

TSTF-500 (STS Rev. 1 markup)	ANO-2
LCO 3.8.4 – LCO	LCO 3.8.2.3 modified to match the STS.
LCO 3.8.4 – Required Action A.1	Action b modified to essentially match.
LCO 3.8.4 – Required Action A.2/A.3	Not adopted; ANO-2 has TS qualified swing chargers.
LCO 3.8.4 – Required Action B.1	Action a modified to essentially match.
LCO 3.8.4 – Required Action C.1	New Action c added to essentially match.
LCO 3.8.4 – Required Action D.1/D.2	Currently included in Action 'a', but moved to coverall statement following Actions 'a', 'b', and 'c'.
LCO 3.8.4 – SR 3.8.4.1	SR 4.8.2.3.a.2 modified to essentially match and renumbered as SR 4.8.2.3.1.
LCO 3.8.4 – SR 3.8.4.2 thru 3.8.4.5	Relocated to new battery program.
LCO 3.8.4 – SR 3.8.4.6	SR 4.8.2.3.c.4 modified, but current 300 amp value is maintained; renumbered as SR 4.8.2.3.2.
LCO 3.8.4 – SR 3.8.4.7	SR 4.8.2.3.d modified to essentially match and renumbered as SR 4.8.2.3.3. STS Notes are added to the SR. The last portion of SR 4.8.2.3.e is also included in this SR.
LCO 3.8.4 – SR 3.8.4.8	With exception of the last portion of SR 4.8.2.3.e which is added to SR 4.8.2.3.3 above, SRs SR 4.8.2.3.e and SR 4.8.2.3.f are relocated to new TS 3.8.3 (see below).
LCO 3.8.5 – new Action A	2-hour Completion Time adopted to allow time to place TS qualified backup charger in service; changes associated with 72-hour allowance not required for ANO-2.
LCO 3.8.5 – SR 3.8.5.1	SR 4.8.2.4.2 is modified to refer to the correct SRs which have been renumbered due to TSTF-500 adoption and, subsequently, adopt the ITS Note contained in STS SR 3.8.5.1.
LCO 3.8.6 – LCO and Actions	New LCO 3.8.3 created and all Actions adopted.
LCO 3.8.6 – SR 3.8.6.1	SR 4.8.2.3.a.1 and Table 4.8-2 Note (b) modified to essentially match and renumbered as SR 4.8.3.1.
LCO 3.8.6 – SR 3.8.6.2 thru 3.8.6.5	New SRs adopted (similar to requirements currently contained in Table 4.8-2) and renumbered as SR 4.8.3.2 through 4.8.3.5, respectively.
LCO 3.8.6 – SR 3.8.6.6	SR 4.8.2.3.e modified to essentially match (the last sentence is relocated to ANO-2 SR 3.8.4.3 above) and renumbered as SR 4.8.3.6. SR 4.8.2.3.f modified to essentially match (18 months reduced to 12 months) and added to SR 4.8.3.6. The STS 24-month requirement is adopted and added to SR 4.8.3.6.
TS 5.5.17	New program numbered 6.5.15 adopted – no deviations.

2.0 ASSESSMENT

Entergy has reviewed the model SE referenced in the Federal Register Notice of Availability published on September 1, 2011 (76 FR 54510), as part of the CLIIP. The review included the NRC staff's Safety Evaluation (SE), as well as the supporting information provided in TSTF-500, Revision 2. As described herein, Entergy has concluded that the technical bases for the proposed changes presented in TSTF-500, Revision 2, and the model SE prepared by the NRC staff are applicable to ANO-2 and support incorporation of this amendment into the ANO-2 TS. Because the ANO-2 TSs have not been converted to the STS, the layout of the specifications, when compared to TSTF-500 (markups associated with NUREG-1432, Revision 1), will differ significantly in format. However, the technical differences are minor. Differences are as follows (STS number is shown as revised by TSTF-500, unless otherwise stated).

TSTF-500 #	ANO-2 #
LCO 3.8.4 – Required Action (RA) A.1	LCO 3.8.2.3 Action 'b' is modified to essentially match the requirements of the STS and TSTF and renumbered as Action 'a'. No technical deviations. Format and minor wording differences are administrative.
LCO 3.8.4 – RAs A.2 and A.3	Not adopted. ANO-2 has a TS qualified backup battery charger on each vital DC electrical distribution subsystem. **This is discussed in further detail below.**
LCO 3.8.4 – Condition B	LCO 3.8.2.3 Action 'a' is modified to essentially match the requirements of the STS and TSTF and renumbered as Action 'b'. No technical deviations. Format and minor wording differences are administrative.
LCO 3.8.4 – Condition C	No equivalent Action exists. Therefore, a new Action 'c' is proposed in TS 3.8.2.3 to provide consistency with the STS. No technical deviations. Format and minor wording differences are administrative. **Adoption of this new Action is discussed below.**
LCO 3.8.4 – RAs D.1 and D.2	These requirements are currently located in Action 'a', but are relocated to follow all of the Actions, consistent with custom TS format, such that failure to meet any of the Actions will require shutdown of the unit. Format and minor wording differences are administrative.
LCO 3.8.4 – SR 3.8.4.1	Existing SR 4.8.2.3.a.2 is modified consistent with the STS version by relocating the terminal voltage value to the new licensee controlled program. In addition, the phrase referring to a 60 cell battery is removed since ANO-2 has completed replacement of both vital battery banks, which are now 58 cell battery banks (Reference 1). This SR is renumbered as SR 4.8.2.3.1.

LCO 3.8.4 – SR 3.8.4.2	Existing SR 4.8.2.3.c.4 is modified consistent with the STS in that the voltage value is relocated to the new licensee controlled program; however, the current 300 amp value is maintained (Reference 2). This SR is renumbered as SR 4.8.2.3.2. **Maintenance of the 300 amp value is discussed further below.**
LCO 3.8.4 – SR 3.8.4.3	Existing SR 4.8.2.3.d modified to essentially match and renumbered as SR 4.8.2.3.3. The last portion of SR 4.8.2.3.e is also included in this SR, which is consistent with STS Note 1, with the exception that the term "modified" is not included (ANO-2 has not adopted the modified performance discharge test to date). STS Note 2 is also incorporated into the ANO-2 SR which permits portions of the test to be completed above cold shutdown conditions to reestablish operability. No technical deviations. Format and minor wording differences are administrative.
LCO 3.8.5	Existing TS 3.8.2.4 modified with minor editorial changes for consistency with STS (title from Distribution to Sources, D.C. to DC). Format and minor wording differences are administrative.
LCO 3.8.5 – Condition A and RA A.1	A new Action 'a' is adopted in existing TS 3.8.2.4 to match the 2-hour STS Completion Time to allow the TS qualified backup charger to be placed in service **(see discussion below)**. The statement referring to redundant subsystem operability in Condition A is not adopted because ANO-2 LCO 3.8.2.4 requires only one subsystem to be operable, consistent with the current licensing basis. Format and minor wording differences are administrative.
LCO 3.8.5 – RAs A.2 and A.3	These actions are applicable to plants that may opt to use a non-qualified battery charger while a qualified battery charger is inoperable. ANO-1 maintains a TS qualified backup battery charger on each DC distribution subsystem. Therefore, these actions are not adopted. **See discussion below.**
LCO 3.8.5 – Condition B	Existing TS 3.8.2.4 Action 'b' is modified to be consistent with the STS such that the required actions will be applicable when equipment other than the battery charger is inoperable and when new Action 'a' is not met. Format and minor wording differences are administrative.
LCO 3.8.5 – SR 3.8.5.1	Existing SR 4.8.2.4.2 is modified to refer to the correct SRs which have been renumbered due to TSTF-500 adoption and, subsequently, adopt the ITS Note contained in STS SR 3.8.5.1. Format and minor wording differences are administrative.

TS 3.8.6	No current TS exists for ANO-2; therefore, new TS 3.8.3 created and all Actions adopted. Format and minor wording differences are administrative.
LCO 3.8.6 – SR 3.8.6.1	Existing SR 4.8.2.3.a.1 and Table 4.8-2 Note (b) modified to essentially match and renumbered as SR 4.8.3.1. Format and minor wording differences are administrative.
LCO 3.8.6 – SR 3.8.6.2 through 3.8.6.5	New SRs adopted (similar to requirements currently contained in existing Table 4.8-2) and renumbered as SR 4.8.3.2 through 4.8.3.5, respectively. Format and minor wording differences are administrative.
LCO 3.8.6 – SR 3.8.6.6	Existing SR 4.8.2.3.e modified to essentially match (the last sentence is relocated to ANO-2 SR 3.8.4.3 above) and renumbered as SR 4.8.3.6. Existing SR 4.8.2.3.f modified to essentially match (18 months reduced to 12 months) and added to SR 4.8.3.6. The STS 24-month requirement is adopted and added to SR 4.8.3.6. Format and minor wording differences are administrative. Changes are more restrictive, are consistent with the STS and TSTF-500 and, therefore, do not represent a deviation.
TS 5.5.17	Adopted into new TS 6.5.15. Format and minor wording differences are administrative. The new program essentially captures the specific gravity and maintenance float voltage limit contained existing Table 4.8-2, along with the requirements of existing SRs 4.8.2.3.b, 4.8.2.3.b.1, 4.8.2.3.b.2, 4.8.2.3.b.3, 4.8.2.3.c, 4.8.2.3.c.1, 4.8.2.3.c.2, and 4.8.2.3.c.3.

72-hour Battery Charger Allowance

Portions of the SE that approve a 72-hour allowance during periods when a required battery charger is inoperable are not applicable to ANO-2. Each of the two safety related electrical trains at ANO-2 contain a redundant battery charger which can be placed in service to meet the associated electrical TS requirements should the in-service charger fail. Therefore, the 72-hour AOT and requirements associated with this allowance are not being adopted. Entergy considers this an insignificant difference between TSTF-500 and the proposed ANO-2 TS change since the TSTF allowance represents a less-restrictive change. This difference is associated with the Conditions and Required Actions of TSTF-500 TS 3.8.4, “DC Sources - Operating,” specifically changes associated with Condition A. This difference does not impact the ANO-2 ability to continue to meet the conditions of the SE.

The TSTF provides this same 72-hour AOT for TS 3.8.5, “DC Sources – Shutdown.” Consistent with the above, Entergy is not adopting this allowance. However, ANO-1 TS 3.8.5 does not currently contain the 2-hour AOT to restore battery terminal voltage should the in-service charger fail. This 2-hour period would provide time for the standby charger to be placed in service before more restrictive actions would be required to be implemented. Therefore, this

portion of the TSTF-500 TS 3.8.5 change is being adopted (specifically, new Condition A and Required Action A.1). Because placing the standby charger in service ensures battery terminal voltage will be restored, the conditions of the SE are met for this partial adoption. This difference does not impact the ANO-2 ability to continue to meet the conditions of the SE.

LCO 3.8.2.3 Action c (new)

The ANO-2 TSs currently contain no guidance with regard to appropriate action for conditions where a portion of a DC distribution system train is inoperable other than the battery or the battery charger. As written, this would require immediate entry into LCO 3.0.3 should such a condition exist (i.e., with the distribution system 125 VDC bus inoperable).

While in this condition, the remaining DC distribution system train 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, consistent with the STS. The 2-hour AOT is based on Regulatory Guide (RG) 1.93 (Reference 3) and reflects a reasonable time to assess unit status as a function of the inoperable DC distribution subsystem and, if the DC distribution subsystem is not restored to an operable status, to prepare for and effect an orderly and safe unit shutdown. This permits a short time period to recover from the condition, which would avoid a challenge to offsite power sources inherent with a shutdown of the unit.

Based on the above, the new LCO 3.8.2.3 Action ‘c’ is acceptable. This difference does not impact the ANO-2 ability to continue to meet the conditions of the SE.

300 Amp Value for Battery Charger Testing

The original ANO-2 TSs contained a 200-amp value associated with the battery charger testing requirements. In 1999 (Reference 2), the NRC approved a change to this requirement (SR 4.8.2.3.c.4), increasing the value to 300 amps. The increase was necessary due to the planned replacement of the ANO-2 inverters which would contain a rectifier circuit and, therefore, be normally powered from the 125 VDC distribution system. The new inverters would create an increase in loading on the 125 VDC distribution system. The following is an excerpt form the NRC Safety Evaluation Report (Reference 2):

> *The existing chargers will be replaced with chargers of 400 ampere design capacity. The sizing of the new battery chargers will satisfy the R.G. 1.32 requirement as each charger will be able to furnish the energy for the largest combined demands of the loads while restoring the battery capacity from minimal charged state to the fully charged state.*
>
> *The proposed periodic testing requirement of SR 4.8.2.3.c.4 of $\geq$ 300 ampere limits ensure that the chargers will perform their function. The additional 100 amperes will allow a faster battery recharge time and will allow available capacity for potential load growth of the dc system. This design change will adequately compensate for the inverter replacement and is acceptable. This change does not reduce the margin of safety specified in the TSs and does not represent a condition adverse to the health and safety of the public.*

As noted in the excerpt above, the design capacity of the chargers is 400 amps. Therefore, it is not reasonable to adopt the STS SR requiring the chargers to be tested at ≥ 400 amps (greater than design capacity). In addition, this value is "bracketed" in the STS, indicating that a plant-specific value may be justified in lieu of the value presented. Based on the above and the current ANO-2 licensing basis, maintaining the existing 300-amp value contained in SR 4.8.2.3.c.4 (new SR 4.8.2.3.2) is acceptable. This difference does not impact the ANO-2 ability to continue to meet the conditions of the SE.

Attachment 4 contains a markup of the affected TS and TS Bases pages. Attachment 5 contains a revised (clean) version of each affected TS page. Note that TS 3.8.2.4, "DC Sources – Shutdown" (as revised) and the associated TS Bases includes changes associated with Entergy letter dated July 9, 2012 (Reference 4), which is currently under NRC review. These pages will require modification should the proposed TS changes associated with the Reference 4 letter not be approved.

Model SE – Regulatory Evaluation

Section 2.0, "Regulatory Evaluation," of the model SE

The Traveler and model Safety Evaluation discuss the applicable regulatory requirements and guidance, including the 10 CFR 50, Appendix A, General Design Criteria (GDC). ANO-2 was originally designed to comply with the "Proposed General Design Criteria for Nuclear Power Plant Construction Permits," published in July 1967. However, an assessment of compliance with the GDCs was thereafter performed because the ANO-2 construction permit was issued on December 6, 1972 (post-GDC). Sections 3.1.1 through 3.1.6 of the ANO-2 Safety Analysis Report (SAR) provide a comparison with the GDCs published as Appendix A to 10 CFR 50 in 1971.

GDC 1 As provided in discussion of GDC 17 below and SAR Section 3.1.1, ANO-2 is constructed such that structures, systems, and components (SSCs) important to safety are designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. The separate offsite power sources, Emergency Diesel Generators (EDGs), and vital electrical AC and DC distribution systems are maintained and tested in accordance with the ANO-2 TSs as required by 10 CFR 50.36.

GDC 17 As documented in Section 3.1.2 and Chapter 8 of the Safety Analysis Report (SAR), ANO-2 maintains two independent offsite and two onsite power sources along with two independent vital electrical distribution systems. Power for normal Mode 1 operations is fed from the Main Generator via a Unit Auxiliary transformer. Upon loss of the Main Generator (plant trip), power is automatically transferred to one of two startup transformers (offsite power sources). Power for plant startup, and shutdown is supplied by either of the two startup transformers. In the event of non-availability of these two power sources, power to the Engineered Safety Features (ESF) buses can be furnished by the two fully redundant EDGs. Upon loss of all onsite and offsite AC power, i.e., station blackout, one of the ESF buses 2A3 or 2A4 can be manually energized from the Alternate AC Diesel Generator (AACDG).

A 120-volt uninterruptible AC power system is provided for reactor protection and ESF control channels. The AC power system consists of four channelized distribution panels. Each distribution panel is fed from a power supply that includes an inverter, static switch, manual load switches, and alternate source transformer. In addition, two independent and physically separated Class 1E 125-volt batteries with respective control panels and four battery chargers provide the necessary vital DC power sources for the plant.

GDC 18 ANO-2 Electric power systems important to safety are designed to permit appropriate periodic inspection and testing of important areas and features.

Regulatory Guide (RG) 1.75, Revision 3, "Criteria for Independence of Electrical Safety Systems," describes a method acceptable to the NRC staff for complying with the NRC regulations with respect to the physical independence requirements of the circuits and electric equipment that comprise or are associated with safety systems. RG 1.75 states:
Section 50.55a, "Codes and Standards," of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," requires in 10 CFR 50.55a(h) that protection systems for plants with construction permits issued after January 1, 1971, but before May 13, 1999, must meet the requirements stated in either Institute of Electrical and Electronics Engineers (IEEE) Std. 279, "Criteria for Protection Systems for Nuclear Power Generating Stations," or IEEE Std. 603-1991, "Criteria for Safety Systems for Nuclear Power Generating Stations." The ANO-2 construction permit was issued December 6, 1972. ANO-2 is licensed to IEEE Standard 279-1971. The ANO-2 DC distribution system design is consistent with the referenced guidance as described in Section 3.1 and Chapters 7 and 8 of the ANO-2 SAR.

The model SE supporting this TSTF refers to RG 1.129, Revision 2, "Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries for Nuclear Power Plants," which provides guidance for meeting the intent of GDC 1, 17, and 18 with respect to the maintenance, testing, and replacement of vented lead-acid storage batteries in nuclear power plants. This RG endorses, in part, IEEE Standard 450-2002, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications." A review of IEEE Standard 450-2002 was performed during LAR development. The maintenance of the ANO-2 DC distribution system, given the program modifications committed to via adoption of TSTF-500, meets the intent of the referenced guidance.

In addition to the above, electrical SSCs important to safety are included in the ANO-2 program applying 10 CFR 50.65(a)(3), "Requirements for monitoring the effectiveness of maintenance at nuclear power plants."

2.2 VERIFICATIONS AND REQUIRED FINAL SAFETY ANALYSIS REPORT CHANGES

As described in Section 4.7.1, "Verifications," in TSTF-500, Entergy provides the following verifications:

1. Attachment 2 contains a letter from the manufacturer of the 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 the state-of-charge of the battery and that this will hold true over the life of the battery.

2. Entergy has verified that the equipment 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. Additionally, Entergy will ensure that the minimum required procedural time to measure battery float current will be 30 seconds. This minimum float current measurement time is required to provide a more accurate battery float current reading.
3. Entergy has verified that battery room temperature is routinely monitored as part of the Battery Monitoring and Maintenance Program development such that a room temperature excursion could reasonably expect to be detected and corrected prior to the average battery electrolyte temperature dropping below the minimum electrolyte temperature.
4. The cell resistance limits in SR 4.8.2.3.b.2 and SR 4.8.2.3.c.3 are relocated to the Battery Monitoring and Maintenance Program. The connection resistance limit is 50 µOhm based on ANO-2 DC voltage drop calculations. The calculations illustrate that the minimum DC voltage is maintained for all required loads assuming a resistance of 50 µOhms per connection.
5. Monitoring of battery parameters (i.e., specific gravity, electrolyte level, cell temperature, float voltage, connection resistance, and physical condition) will be included in the licensee-controlled program, required and described in TS Section 6.5, “Programs and Manuals,” and titled the “Battery Monitoring and Maintenance Program.”
6. Entergy verifies that plant procedures will require verification of the selection of the pilot cell or cells when performing SR 4.8.3.5 as required by the new Battery Monitoring and Maintenance Program described in TS 6.5.15.

As described in Attachment 3, “List of Required Safety Analysis Report (SAR) Descriptions,” Entergy will revise the ANO-2 SAR to include the following, as part of the adoption of TSTF-500, Revision 2 (also see Attachment 6, “List of Regulatory Commitments”):

1. 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.
2. How 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.
3. How the batteries are sized with correction margins that include temperature and aging and how these margins are maintained.
4. The minimum established design limit for battery terminal float voltage.
5. The minimum established design limit for electrolyte level.
6. The minimum established design limit for electrolyte temperature.
7. How each battery is designed with additional capacity above that required by the design duty cycles to allow for temperature variations and other factors.
8. Normal DC system operation i.e., powered from the battery chargers with the batteries floating on the system, and with a loss of normal power to the battery charger.

Attachment 4 contains a markup of the affected TS and TS Bases pages. Attachment 5 contains a revised (clean) version of each affected TS page. Note that TS 3.8.2.4, "DC Sources – Shutdown" (as revised) and the associated TS Bases includes changes associated with Entergy letter dated July 9, 2012 (Reference 4), which is currently under NRC review. These pages will require modification should the proposed TS changes associated with the Reference 4 letter not be approved.

2.3 OPTIONAL CHANGES AND VARIATIONS

None

3.0 REGULATORY ANALYSIS

3.1 NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

Entergy Operations, Inc. (Entergy) has evaluated the proposed changes to the TS using the criteria in Section 50.92 to Title 10 of the *Code of Federal Regulations* (10 CFR) and has determined that the proposed changes do not involve a significant hazards consideration.

The proposed amendment would revise 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." New LCO 3.8.3, "Battery Parameters," is adopted to be consistent with the standard technical specifications (STS) of NUREG 1432, Revision 3.1, *Standard Technical Specifications for Combustion Engineering Plants,* and TSTF-500, Revision 2, *DC Electrical Rewrite - Update to TSTF-360*. A new "Battery Monitoring and Maintenance Program" is being proposed for Section 6.5, "Administrative Controls - Programs and Manuals."

As required by 10 CFR 50.91(a), the Entergy analysis of the issue of no significant hazards consideration is presented below:

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

   Response: No

   The proposed changes restructure the Technical Specifications (TS) for the direct current (DC) electrical power system and are consistent with TSTF-500, Revision 2. The proposed changes modify TS Actions relating to battery and battery charger inoperability. The DC electrical power system, including associated battery chargers, is not an initiator of any accident sequence analyzed in the Safety Analysis Report (SAR). Rather, the DC electrical power system supports equipment used to mitigate accidents. The proposed changes to restructure TS and change surveillances for batteries and chargers to incorporate the applicable updates included in TSTF-500, Revision 2, will maintain the same level of equipment performance required for mitigating accidents assumed in the SAR. Operation in accordance with the proposed TS would ensure that the DC electrical power system is capable of performing its specified safety function as described in the SAR. Therefore, the mitigating functions supported by the DC electrical

power system will continue to provide the protection assumed by the analysis. A new licensee-controlled Battery Monitoring and Maintenance Program will ensure appropriate monitoring and maintenance that is consistent with industry standards. In addition, the DC electrical power system is within the scope of 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," which will ensure the control of maintenance activities associated with the DC electrical power system.

The integrity of fission product barriers, plant configuration, and operating procedures as described in the SAR will not be affected by the proposed changes. Therefore, the consequences of previously analyzed accidents will not increase by implementing these changes. Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

   Response: No

   The proposed changes involve restructuring the TS for the DC electrical power system. The DC electrical power system, including associated battery chargers, is not an initiator to any accident sequence analyzed in the SAR. Rather, the DC electrical power system supports equipment used to mitigate accidents. The proposed changes to restructure the TS and change surveillances for batteries and chargers to incorporate the applicable updates included in TSTF-500, Revision 2, will maintain the same level of equipment performance required for mitigating accidents assumed in the SAR. Administrative and mechanical controls are in place to ensure the design and operation of the DC systems continues to meet the plant design basis described in the SAR. Therefore, operation of the facility in accordance with this proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

   Response: No

   The margin of safety is established through equipment design, operating parameters, and the setpoints at which automatic actions are initiated. The equipment margins will be maintained in accordance with the plant-specific design bases as a result of the proposed changes. The proposed changes will not adversely affect operation of plant equipment. These changes will not result in a change to the setpoints at which protective actions are initiated. Sufficient DC capacity to support operation of mitigation equipment is ensured. The changes associated with the new Battery Maintenance and Monitoring Program will ensure that the station batteries are maintained in a highly reliable manner. The equipment fed by the DC electrical sources will continue to provide adequate power to safety-related loads in accordance with analysis assumptions.

   TS changes made in accordance with TSTF-500, Revision 2, maintain the same level of equipment performance stated in the SAR and the current TSs. Therefore, the proposed changes do not involve a significant reduction of safety.

3.2 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

Entergy has reviewed the NRC staff's model SE referenced in the Notice of Availability and concluded that the Regulatory Evaluation section is applicable to ANO-2. ANO-2 was originally designed to comply with the "Proposed General Design Criteria for Nuclear Power Plant Construction Permits," published in July 1967. However, because the ANO-2 construction permit was issued December 6, 1972 (post-GDC), a comparison of the ANO-2 design against the GDCs was performed shortly after GDC issuance. Sections 3.1.1 through 3.1.6 of the ANO-2 SAR provide this comparison with the GDCs published as Appendix A to 10 CFR 50 in 1971, as described in Section 2.1 above.

4.0 ENVIRONMENTAL CONSIDERATION

The proposed TS change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR Part 20, and would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed TS change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed TS change.

5.0 REFERENCES

1. NRC Safety Evaluation Report dated July 11, 1986, *ANO-2 Battery Replacement,* (2CNA078603) (ML# 021490507)

2. NRC Safety Evaluation Report dated January 13, 1999, *ANO-2 Inverters and Battery Chargers Replacement,* (2CNA019902) (ML# 021560233)

3. Regulatory Guide 1.93, *Availability of Electric Power Sources*, March 2012

4. Entergy letter dated July 9, 2012, *License Amendment Request - Supplemental – Technical Specification (TS) Change Related to Revised Fuel Assembly Drop Analysis and Adoption of TSTF-51, TSTF-272, TSTF-286, and TSTF-471* (2CAN071201) (ML12192A089)

Attachment 2

2CAN011301

Battery Manufacturer Letter Describing Use of Float Current

C&D TECHNOLOGIES, INC.
Power Solutions

1400 Union Meeting Road
Blue Bell, PA 19422
Phone: (215) 775-1314
Fax: (215) 619-7887

Sent via Email to: JMILLE3@entergy.com

May 22, 2012

Mr. Brad Miller
Arkansas Nuclear One
Entergy

Subject: Float Current vs Specific Gravity Monitoring

Dear Brad:

In regards to the C&D batteries used in safety related (Class 1-E) applications at Arkansas Nuclear One, it is acceptable to use float current monitoring instead of specific gravity monitoring as a reliable and accurate indication of the state of charge of the battery. This relationship remains valid for the life of these batteries.

I hope that this information meets your needs. If you require any additional information, please contact me.

Regards,

Larry A. Carson
Nuclear Project Manager
C&D Technologies, Inc.

Attachment 3 to

2CAN011301

List of Required Safety Analysis Report Descriptions

List of Required Safety Analysis Report Descriptions

The following table identifies Safety Analysis Report (SAR) descriptions required by Entergy as part of the adoption of TSTF-500, Revision 2. Upon implementation of the approved Technical Specification amendment, Entergy will change or verify that the SAR:

1. Describes 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.
2. States that long term battery performance is supported by maintaining a float voltage greater than or equal to the minimum established design limits provided by the battery manufacturer, which corresponds to 2.20 V per connected cell and that there are 58 connected cells in the battery, which corresponds to 127.6 V at the battery terminals.
3. Describes how the batteries are sized with correction margins that include temperature and aging and how these margins are maintained.
4. States the minimum established design limit for battery terminal float voltage.
5. States the minimum established design limit for electrolyte level.
6. States the minimum established design limit for electrolyte temperature.
7. Describes how each battery is designed with additional capacity above that required by the design duty cycles to allow for [temperature variations and other factors].
8. Describes normal DC system operation i.e., powered from the battery chargers with the batteries floating on the system, and with a loss of normal power to the battery charger.

Attachment 4 to

2CAN011301

Proposed Technical Specification and Bases Changes (mark-up)

D.C. SOURCESDISTRIBUTION – OPERATING

LIMITING CONDITION FOR OPERATION

3.8.2.3 As a minimum, The Train A and Train Bfollowing D.C. electrical power subsystemssources 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.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

ba. 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.

ab. With one of the required full capacity chargers inoperable, restore the battery terminal voltage to greater than or equal to the minimum established float voltagedemonstrate the OPERABILITY of its associated battery bank by performing Surveillance Requirement 4.8.2.3.a.1 within 2one hours 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.

c. With one DC electrical power subsystem inoperable for reasons other than ACTION 'a' or 'b' 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 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

2. tThe total battery terminal voltage is greater than or equal to the minimum established float voltage129 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.

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,

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

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

4.8.2.3.2c. 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 x 10^{-6} ohm, and

4. eachThe battery charger will supplies ≥ 300 amperes at greater than or equal to the minimum established float voltage≥ 125 volts 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.

4.8.2.3.3d. 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 requiredthe actual or simulated emergency loads for the design duty cycle when the battery is 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 3.8.3.6 may be performed in lieu of the battery service test once per 60 months.

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.

TABLE 4.8-2

BATTERY SURVEILLANCE REQUIRMENTS

	CATEGORY A(1)	CATEGORY B(2)	
Parameter	LIMITS for each designated pilot cell	LIMITS for each connected cell	ALLOWABLE(3)VALUE for eachconnected cell
Electrolyte	> Minimum level indication mark, and ≤ ¼" above maximum level indication mark	> Minimum levelindication mark, and≤ ¼" abovemaximum levelindication mark	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 volts	≥ 2.13 volts(c)	> 2.07 volts
Specific Gravity(a)	≥ 1.195(b)	≥ 1.190 Average of all connected cells > 1.200	Not more than .020below the averageof all connectedcells Average of allconnected cells≥ 1.190(b)

(a) Corrected for electrolyte temperature and level.

(b) Or battery charging current is less than 2 amps when on charge.

(c) Corrected for average electrolyte temperature.

(1) For any Category A parameter(s) outside the LIMIT(S) shown, the battery may beconsidered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their ALLOWABLE VALUES, and provided all Category A and B parameter(s) are restored to within LIMITS within the next 6 days.

(2) For any Category B parameter(s) outside the LIMIT(S) shown, the battery may be considered OPERABLE provided that the Category B parameters are restored to within LIMITS within 7 days.

(3) Any Category B parameter not within its ALLOWABLE VALUE indicates an inoperable battery.

ELECTRICAL POWER SYSTEMS

D~~.~~C~~.~~ SOURCES~~DISTRIBUTION~~ – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.4 As a minimum, the following D~~.~~C~~.~~ electrical equipment and bus shall be energized and OPERABLE:

1 - 125-volt D~~.~~C~~.~~ bus, and

1 - 125-volt battery bank and charger supplying the above D~~.~~C~~.~~ bus.

APPLICABILITY: MODES 5 and 6.

ACTION:

a. With the required battery charger inoperable, restore battery terminal voltage to greater than or equal to the minimum established float voltage within 2 hours.

b. With the requirements of ACTION 'a' not met or with~~less than~~ the above complement of D~~.~~C~~.~~ equipment and bus otherwise inoperable~~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.

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.

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.

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]

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

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 shows degradation, or 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 not used~~

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.

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for 1) the safe shutdown of the facility and 2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criteria 17 of Appendix "A" to 10 CFR 50.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods and 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status. Upon loss of a required power source, suspension of the movement of recently irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours), the movement of new fuel assemblies over recently irradiated fuel assemblies, and activities that could result in loss of required SDM (Mode 5) or boron concentration (Mode 6) act to minimize the probability of the occurrence of postulated events. Suspension of these activities shall not preclude placing fuel assemblies in a safe position. Due to radioactive decay, AC/DC electrical power and associated distribution systems are only required to mitigate fuel handling accidents involving movement of recently irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours) or the movement of new fuel assemblies over recently irradiated fuel assemblies.

Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

AC

TS 3.8.1.1 ACTIONction “a” includes an allowance for extending the allowable outage time for Startup Transformer No. 2 only, for up to 30 days. The 30-day allowance is permitted not more than once in any 10-year period, which is considered sufficient for proper maintenance of the transformer. The 30-day window should permit extensive preplanned preventative maintenance without placing either unit in an action statement of short duration and would allow both units to be operating during such maintenance. Because this allowance assumes parts are prestaged, appropriate personnel are available, and proper contingencies have been established, it is not intended to be used for an unexpected loss of the transformer. Pre-established contingencies will consider the projected stability of the offsite electrical grid, the atmospheric stability projected for the maintenance window, the ability to adequately control other ongoing plant maintenance activities that coincide with the window, projected flood levels, and the availability of all other power sources. Since a station blackout is the most affected event that could occur when power sources are inoperable, the steam driven emergency feedwater (EFW) pump will also be maintained available during the evolution.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the accident analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source. ACTION requirements are consistent with Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability" and the Revised Standard Technical Specifications (NUREG 1432). The evaluation of a common cause failure (degradation that may affect the OPERABILITY of the remaining diesel generator) should be completed within 24 hours from when the affected emergency diesel generator (EDG) is determined to be inoperable.

A Note prohibits the application of LCO 3.0.4.b to an inoperable ~~emergency diesel generator (~~EDG~~)~~. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable EDG and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

TS 3.8.1.1 ACTION~~ction~~ “b” allows for the extension of the EDG AOT up to 14 days. Typically, use of the extended AOT will be restricted to once per 18-month cycle per EDG for voluntary planned maintenance or inspections, but it may be used for failures or other corrective maintenance activities provided plant risk is managed. The following contingencies shall be met prior to entering the extended EDG AOT (not applicable to 14-day AOT for Pressurizer Proportional Heater bank inoperability, with the exception of AACDG availability) when pre-planned maintenance activities are scheduled or within 72 hours if unplanned entry into the action is required:

1. The local area weather conditions will be evaluated prior to entering the extended EDG AOT for voluntary planned maintenance. An extended EDG AOT will not be entered for voluntary planned maintenance purposes if weather forecasts for the local area are predicting severe weather conditions that could affect the switchyard or offsite power supply during the AOT.

2. The condition of the switchyard, offsite power supply, and the grid will be evaluated prior to entering the extended AOT for elective maintenance. An extended EDG AOT will not be entered to perform elective maintenance when grid stress conditions are high such as during extreme summer temperatures and/or high demand.

3. No discretionary switchyard maintenance will be allowed. In addition, no discretionary maintenance will be allowed on the main, auxiliary, or startup transformers associated with the unit.

4. No maintenance or testing that affects the reliability of the ANO-2 train associated with the OPERABLE EDG will be scheduled during the extended AOT. If any testing and maintenance activities must be performed while the extended AOT is in effect, a 10 CFR 50.65(a)(4) evaluation will be performed.

5. The Alternate AC Diesel Generator (AACDG) will be available as a backup to the inoperable EDG and will not be used for non-safety functions such as power peaking to the grid. After entering the extended AOT, the AACDG will be verified available every 8 hours and treated as protected equipment.

6. ANO-1 personnel will be notified to ensure no elective maintenance activities will be scheduled on the ANO-1 EDGs and will be made aware of the dedication of the AACDG to ANO-2.

7. The steam driven EFW~~emergency feedwater~~ pump will not be taken out of service for planned maintenance activities and will be treated as protected equipment.

8. The system dispatcher will be contacted once per day and informed of the EDG status, along with the power needs of the facility.

9. Should a severe weather warning be issued for the local area that could affect the switchyard or offsite power supply during the AOT, an operator will be available locally at the AACDG should local operation of the AACDG be required as a result of on-site weather-related damage.

10. ANO-2 on-shift Operations crews will discuss and review appropriate normal and emergency operating procedures upon or prior to assuming the watch for the first time after having scheduled days off while the AOT is in effect.

11. ANO-2 on-shift Operations crews will be briefed concerning the ANO-2 EDG activities, including compensatory measures established and the importance of promptly starting and aligning the AACDG following instruction of the ANO-2 Shift Manager upon a loss of offsite power event. This briefing will be performed upon or prior to assuming the watch for the first time after having scheduled days off while the AOT is in effect.

12. During the EDG outage, welding and transient combustibles will be controlled and continuous fire watch(es) established in the vicinity of the Turbine Building Switchgear (2A1/2A2/2A9).

13. During the EDG outage, welding and transient combustibles in the following areas will be controlled: the transformer yard; the south Switchgear Room (SS/2100-Z); the Cable Spreading Room (G/2098-L); Intake Structure (OO/IS); Diesel Corridor (JJ/2109-U); Lower South Electrical/Piping Penetration Room (EE/2055SC); and Electrical Equipment Room (TT/2108-S).

14. Prior to the EDG outage, the ANO-2 Operations personnel and ANO-1 fire brigade personnel will be briefed on information related to fighting electrical fires and fires that may occur in the transformer yard. The briefing will include relevant industry operating experience related to fires in these areas and will also include a discussion of equipment restoration.

15. Prior to the EDG outage, the operability of the fire suppression in the transformer yard will be confirmed. This will be accomplished by verifying that surveillances are current and the system is not isolated. If the system is isolated, then fire hoses will be staged to the transformer yard area during the EDG maintenance outage.

Note 1 of TS 3.8.1.1 ACTIONction "b" requires availability of the AACDG when an EDG is removed from service. If the AACDG becomes unavailable (inoperable), then the AOTallowable outage time is reduced to 72 hours from the time the AACDG becomes unavailable, not to exceed 14 days from the initial entry related to the inoperable EDG. Either the AACDG or the EDG may be restored within the 72 hours. If the EDG is restored, then TS 3.8.1.1, ACTIONaction "b" is exited. If the AACDG is restored within the 72 hours, then restoration of the EDG must be accomplished within the initial 14 day AOT (i.e. 14 days from the time the EDG was initially declared inoperable and ACTIONaction "b" was entered). For the purposes of this specification, AACDG availability (OPERABILITY) is demonstrated by its last test performance and no known AACDG deficiencies that bring into question its ability to accept loads as described in the SAR).

TS 3.8.1.1 ACTION "c.4" is entered when one of the inoperable A.C. Sources is restored to an OPERABLE status as required by ACTION "c.3" and requires restoration of the remaining inoperable A.C. Source to an OPERABLE status. The allowable restoration time in ACTION "c.4" for the remaining inoperable A.C. source began when the component initially became inoperable. If not restored within the AOT, then a plant shutdown is required. The requirement associated with the AACDG (reference ACTIONction "b.3" Note 1) is applicable to the EDG AOT.

TS 3.8.1.1 ACTION "e.3" requires restoration of the remaining inoperable EDG to an OPERABLE status. The time allowed for restoration is based on the time at which the remaining inoperable EDG was initially declared inoperable. If not restored within the AOT, then a plant shutdown is required. The requirement associated with the AACDG (reference ACTION "b.3", Note 1) is applicable to the EDG AOT.

Note that if a plant shutdown is required in accordance with TS 3.8.1.1 ACTIONsS "b.3", "c.3", "c.4", "e.2", or "e.3" (due to one or more EDGs remaining inoperable), TS 3.4.4 ACTION "(b")" requires the plant to be in HOT SHUTDOWN within 12 hours.

TS 4.8.1.2.c.3 demonstrates the EDG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency while maintaining a specified margin to the overspeed trip. For ANO-2, the single load for each EDG is the Service Water pump, rated at 800 HP (636.9 KW).

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9 "Selection of Diesel Generator Set Capacity for Standby Power Supplies", March 10, 1971, and 1.108 "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants", Revision 1, August 1977, and Generic Letters 84-15, 93-05, and 94-01. Load Ranges provided in surveillances are allowed to avoid routine overloading of diesel generators. Load in excess of these load ranges for special testing, momentary variation due to changing bus loads, or short term variations, shall not invalidate surveillance tests. For the purpose of surveillance testing, the term "standby condition" is defined as the approximate temperature range of the jacket cooling water and engine lube oil sump normally maintained by the engine keep warm system. An exception to this definition is the engine conditions that exist when performing the hot restart test following the 24-hour EDG endurance run. When performing this test, the engine is near normal operating temperature when in a "standby condition". Additionally, this definition includes the allowance to perform engine pre-lubrication prior to all planned test starts.

Fuel Oil

TS 3.8.1.3 ensures sufficient quantity and quality of stored fuel oil is available to support OPERABILITY of the EDGs. Regulatory Guide 1.137 addresses recommended fuel oil practices as supplemented by ANSI N195-1976. The fuel oil properties assessed by these documents are water and sediment content, specific gravity, kinematic viscosity, and impurity level. SAR Section 9.5.4.1 discusses the mission time of the EDGs based on required stored fuel oil capacity. The stored fuel oil supports operation of the EDGs (TSs 3.8.1.1 and 3.8.1.2) and, therefore, satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). The stored fuel oil is required to be within limits when the associated EDG is required to be OPERABLE.

The ACTIONSactions of TS 3.8.1.3 are modified by a Note indicating that separate entry is allowed for each EDG fuel oil subsystem. This is acceptable since the ACTIONSactions provide compensatory actions for each inoperable EDG subsystem. Complying with the ACTIONSactions for one inoperable EDG subsystem may allow for continued operation, and subsequent inoperable EDG subsystems are governed by separate entry and application of associated ACTIONSactions. The fuel oil day tank volume limit is a nominal value. Instrument uncertainty need not be applied (reference CR-ANO-2-2003-0821, CA 007).

ACTION 1

This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of fuel oil to the fuel oil storage tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to declaring the EDG inoperable. This period is acceptable based on the remaining capacity, the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period. The 17,446 gallon limit is equivalent to 75% level in the tank (reference LO-ALO-2003- 0200-0050).

ACTION 2

Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, and particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated EDG inoperable. The period of 7 days allows for further evaluation, re-sampling, and re-analysis of the EDG fuel oil.

ACTION 3

With the new fuel oil properties not within the required limits, a period of 30 days is allowed for restoring the stored fuel oil properties. This period provides sufficient time to test the stored fuel oil to determine that the new fuel oil, when mixed with previously stored fuel oil, remains acceptable, or restore the stored fuel oil properties. This restoration may involve feed and bleed procedures, filtering, or combinations of these procedures. Even if a EDG start and load was required during this time interval and the fuel oil properties were outside limits, there is a high likelihood that the EDG would still be capable of performing its intended function.

ACTION 4

With an AOT~~allowable outage time~~ not met, or one or more EDGs with diesel fuel oil not within limits for reasons other than addressed by ACTIONS~~actions~~ 1 through 3, the associated EDG may be incapable of performing its intended function and must be immediately declared inoperable.

TS 4.8.1.3.1 provides verification that there is an adequate inventory of fuel oil in the storage tanks to support at least one EDG's operation for 7 days at full load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

TS 4.8.1.3.2 verifies that the required stored fuel oil testing is performed in accordance with the Diesel Fuel Oil Testing Program.

Inverters

Maintaining vital inverters functional ensures that the redundancy incorporated into the design of the RPS and ESFAS instrumentation and controls is maintained. The four inverters (two per train) ensure an uninterruptible supply of AC electrical power to the AC vital RS buses even if the 4.16 kV safety buses are de-energized. Functional inverters require the associated vital bus to be powered by the inverter with output voltage and frequency within tolerances, and power input to the inverter from a 125 VDC station battery. Alternatively, power supply may be from an AC source via rectifier as long as the station battery is available as the uninterruptible power supply.

Because of their importance, the vital inverters are administratively controlled for ANO-2 such that a non-functional inverter must be restored to a functional status within 24 hours during MODES applicable to the respective RS buses. This is appropriate because, when the AC vital bus is powered from its AC source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The RS bus remains operable provided it remains energized from either its DC or AC source. However, the 24-hour administrative limitation prevents an RS panel from indefinitely being in a state in which it is powered solely from the interruptible AC source. The 24-hour limitation is appropriate due to the low probability that a loss of offsite power event will occur during this period, the fact that two RS buses must be lost to result in an undesired plant trip or ESFAS actuation, and because transient risks associated with a unit shutdown are avoided. This limitation is also consistent with the requirements of the improved TSs (ITS) of NUREG 1432, Revision 3.1 and NRC Generic Letter (GL) 91-11, Resolution of Generic Issues 48, “LCOs for Class 1E Vital Instrument Buses,” and 49, “Interlocks and LCOs for Class 1E Tie Breakers” Pursuant to 10 CFR 50.54(f).

In the event an inverter cannot be restored to a functional status prior to the expiration of the 24-hour administrative limitation, a justification for continued operation beyond the initial 24-hour period may be performed. The NRC should also be informed of the unexpected configuration and the acceptability of continued operation while inverter repairs are completed (reference Licensing Conversation Memorandum DCM 94-004). If the acceptable justification for continued operation cannot be established, the unit should be placed in Mode 3 within 6 hours and in Mode 5 within the following 30 hours, consistent with the ITS and with the intent of GL 91-11.

DC

The 125 VDC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power subsystems (Train A and Train B). Each subsystem consists of one 125 VDC battery, the associated battery charger for each battery, and all the associated control equipment and interconnecting cabling.

Additionally, there is one spare battery charger per subsystem, which provides backup service in the event that a battery charger is out of service. If the spare battery charger is substituted, then the requirements of independence and redundancy between subsystems are maintained.

During normal operation, each 125 VDC subsystem is powered from the in-service battery charger with the battery floating on the system. In case of a loss of normal power to the battery charger, the DC load is automatically powered from the station battery. This results in a discharge of the associated battery (and may affect both the system and cell parameters). Each battery has adequate storage capacity to meet the duty cycle(s) discussed in the SAR, Chapter 8. The battery is designed with additional capacity above that required by the design duty cycle to allow for temperature variations and other factors.

The batteries for Train A and Train B DC electrical power subsystems are sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand. The minimum design voltage limit is 105 V. The Train A and Train B batteries are C&D type LCR-31 (58 cell). This size of battery was required before the black battery was added because of the large non-1E lift oil and seal oil pump motors fed from the 1E batteries. The LCR-31 batteries have 15 positive plates and with the present loads the calculated positive plate requirement for the Train A and Train B battery is less than 15 positive plates (this includes temperature correction for 60 °F and 80% aging factor for end-of-life). IEEE 485 recommends a 10-15% design margin. IEEE 485 is used as a reference in the battery sizing calculation which is the document, along with the battery test procedure, used to determine that the batteries are adequately sized.

The battery cells are of flooded lead acid construction with a nominal specific gravity of 1.215. This specific gravity corresponds to an open circuit battery voltage of approximately 120 V for a 58 cell battery (i.e., cell voltage of 2.063 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 ≥ 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. This provides adequate over-potential, which limits the formation of lead sulfate and self discharge. The nominal float voltage of 2.22 Vpc corresponds to a total float voltage output of 128.8 V for a 58 cell battery.

Each subsystem battery charger has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger is also designed with sufficient excess capacity to restore the battery from the design minimum charge to its fully charged state within 24 hours while supplying normal steady state loads.

The battery charger is normally in the float-charge mode. Float-charge is the condition in which the charger is supplying the connected loads and the battery cells are receiving adequate current to optimally charge the battery. This assures the internal losses of a battery are overcome and the battery is maintained in a fully charged state.

When desired, the charger can be placed in the equalize mode. The equalize mode is at a higher voltage than the float mode and charging current is correspondingly higher. The battery charger is operated in the equalize mode after a battery discharge or for routine maintenance. Following a battery discharge, the battery recharge characteristic accepts current at the current limit of the battery charger (if the discharge was significant, e.g., following a battery service test) until the battery terminal voltage approaches the charger voltage setpoint. Charging current then reduces exponentially during the remainder of the recharge cycle. Leadcalcium batteries have recharge efficiencies of greater than 95%, so once at least 105% of the ampere-hours discharged have been returned, the battery capacity would be restored to the same condition as it was prior to the discharge. This can be monitored by direct observation of the exponentially decaying charging current or by evaluating the amp-hours discharged from the battery and amp-hours returned to the battery.~~TS 3.8.2.3 ACTION b requires the performance of SR 4.8.2.3.a.1 within one hour and at leastonce per 8 hours thereafter for a loss of one of the required full capacity chargers. If any Category A limit in Table 4.8-2 is not met while a charger is inoperable, the associated battery bank shall be declared inoperable and ACTION a entered. The Category A limits in Table 4.8-2 specify the normal limits for electrolyte level, float voltage and specific gravity for each designated pilot cell. When TS 3.8.2.3 ACTION b is entered without the associated battery bank being on float (i.e. charger not connected to the bus), pilot cell float voltage is determined by measuring pilot cell voltage. The term "full capacity charger" as used in TS 3.8.2.3 is defined as a charger that is capable of supplying an output of ≥ 300 amperes.~~

TS 3.8.2.3 DC Sources – Operating

ACTIONs associated with TS 3.8.2.3 represents one subsystem with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. It is therefore imperative that the operator's attention focus on stabilizing the unit and minimizing the potential for complete loss of DC power to the affected subsystem. The 2-hour limit provides the opportunity to place a standby battery charger in service to restore the battery terminal voltage to greater than or equal to the minimum established float voltage, when degradation or inoperability is associated with an in-service battery charger.

If one of the required DC electrical power subsystems is inoperable for reasons other than a degraded or inoperable battery charger (e.g., inoperable battery, distribution bus, etc.), 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 complete loss of the minimum necessary 125 VDC electrical power subsystems to mitigate a worse case accident, continued steady-state power operation should not exceed 2 hours. The 2-hour AOT reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem. If the inoperable DC electrical power subsystem cannot be restored to OPERABLE status within the required AOT, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within the following 30 hours. The AOTs are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

Cascading to other TSs is not required solely due to a single station battery inoperability. In accordance with TS 3.0.5, the DC bus remains OPERABLE if its redundant power source (vital AC source via its battery charger) is OPERABLE and the redundant DC bus is fully OPERABLE (both vital AC and DC are available to supply the bus). Therefore, all DC loads associated with the affected train, including the respective EDG, remain OPERABLE. The 2-hour restoration period sufficiently takes into account the importance of the battery source and the vulnerability of supported equipment when a battery bank is out of service.

Surveillance Requirement (SR) 4.8.2.3.1 requires verifying battery terminal voltage while on float charge. This helps to ensure the effectiveness of the battery chargers, which support the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a fully charged state while supplying the continuous steady-state loads of the associated DC subsystem. On float charge, battery cells will receive adequate current to optimally charge the battery. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the minimum float voltage established by the battery manufacturer (2.20 Vpc times the number of connected cells or 127.6 V for a 58 cell battery at the battery terminals). This voltage maintains the battery plates in a condition that supports maintaining the grid life. The 7-day Frequency is consistent with manufacturer recommendations.

SR 4.8.2.3.2 verifies the design capacity of the chargers. According to Regulatory Guide (RG) 1.32, the battery charger supply is recommended to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensure that these requirements can be satisfied.

This SR provides two options. One option requires that each battery charger be capable of supplying ≥ 300 amps at the minimum established float voltage for 8 hours. The ampere requirements are based on the output rating of the chargers. The voltage requirements are based on the charger voltage level after a response to a loss of AC power. The time period is sufficient for the charger temperature to have stabilized and to have been maintained for at least 2 hours.

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

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

SR 4.8.2.3.3 requires a battery service test, a special test of the battery capability as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements.

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

A performance discharge test may be performed in lieu of a service test. The performance discharge test required by SR 3.8.3.6 may be performed in lieu of the battery service test on a once per 60-month basis.

TS 3.8.2.4 DC Sources – Shutdown

In general, when the unit is shutdown, the TS requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1 and 2 have no specific analyses in MODES 3, 4, 5 and 6. Worst case bounding events are deemed not credible in MODES 5 and 6 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence being significantly reduced or eliminated, and in minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

ACTION “a”, similar to that of TS 3.8.2.3, provides the opportunity to place the standby battery charger in service to restore the battery terminal voltage to greater than or equal to the minimum established float voltage, when degradation or inoperability is associated with an in-service battery charger. The 2-hour AOT also may be utilized to place the redundant train or subsystem in service. With the time requirement of ACTION “a” not met or with the required DC distribution system otherwise inoperable, actions must be taken to suspend the movement of recently irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours), the movement of new fuel assemblies over recently irradiated fuel assemblies, and activities that could result in loss of required SDM (Mode 5) or boron concentration (Mode 6), which act to minimize the probability of the occurrence of postulated events. Suspension of these activities shall not preclude placing fuel assemblies in a safe position. Due to radioactive decay, AC/DC electrical power and associated distribution systems are only required to mitigate fuel handling accidents involving movement of recently irradiated fuel assemblies (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours) or the movement of new fuel assemblies over recently irradiated fuel assemblies.

Suspending positive reactivity additions that could result in failure to meet the minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

SR 4.8.2.4.2 relies on SRs 4.8.2.3.1, 4.8.2.3.2, and 4.8.2.3.3 to demonstrate OPERABILITY of the required shutdown DC source. While all three SRs must be met, SRs 4.8.2.3.2 and 4.8.2.3.3 are not required to be performed. Due to the long period of time in which an outage may ensue, the specified Frequency of SRs 4.8.2.3.2 and 4.8.2.3.3 may expire prior to restart. Provided these SRs were satisfactorily met when previously performed and no modifications or maintenance have occurred that would require these tests to be performed to verify OPERABILITY, the SRs are not required to be performed in MODE 5 or 6 solely due to expiration of the specified Frequency.

TS 3.8.3 Battery Parameters

This LCO delineates the limits on battery float current as well as electrolyte temperature, level, and float voltage for the DC power subsystem batteries. A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.2.3, "DC Sources – Operating," and LCO 3.8.2.4, "DC Sources – Shutdown." In addition to the limitations of this Specification, the licensee controlled program also implements a program specified in Specification 6.5.15 for monitoring various battery parameters.

The battery cells are of flooded lead-acid construction with a nominal specific gravity of 1.215. This specific gravity corresponds to an open circuit battery voltage of approximately 120 V for a 58 cell battery (i.e., cell voltage of 2.063 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 ≥ 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. This provides adequate over-potential which limits the formation of lead sulfate and self discharge. The nominal float voltage of 2.22 Vpc corresponds to a total float voltage output of 128.8 V for a 58 cell battery. The battery parameters are required solely for the support of the associated DC electrical power subsystems. Therefore, battery parameters are only required to be within limits when the DC power source is required to be OPERABLE. See discussion in the Bases for LCO 3.8.2.3 and LCO 3.8.2.4.

With one or more cells in one battery < 2.07 V, the battery cell is degraded. In accordance with ACTION “a”, within 2 hours verification of the required battery charger OPERABILITY is made by monitoring the battery terminal voltage (SR 4.8.2.3.1) and of the overall battery state of charge by monitoring the battery float charge current (SR 4.8.3.1). This may require placing the standby battery charger in service. The verification assures that sufficient battery capacity remains to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of one or more cells in one or more batteries < 2.07 V, and continued operation is permitted for a limited period up to 24 hours. Since ACTION “a” only specifies "perform," a failure of SR 4.8.2.3.1 or SR 4.8.3.1 acceptance criteria does not result in this ACTION not being met. However, if one of the SRs is failed the appropriate ACTION(s), depending on the cause of the failures, is entered. If SR 4.8.3.1 is failed, then there is not assurance that there is still sufficient battery capacity to perform the intended function and the battery must be declared inoperable immediately.

A battery with float current > 2 amps indicates that a partial discharge of the battery capacity has occurred. This may be due to a temporary loss of a battery charger or possibly due to one or more battery cells in a low voltage condition reflecting some loss of capacity. Within 2 hours verification of the required battery charger OPERABILITY is made by monitoring the battery terminal voltage, in accordance with ACTION “b”. If the terminal voltage is found to be less than the minimum established float voltage there are two possibilities, the battery charger is inoperable or is operating in the current limit mode. ACTION “a” addresses charger inoperability. A charger is operating in the current limit mode after 2 hours may indicate that the battery has been substantially discharged and likely cannot perform its required design functions. The time to return the battery to its fully charged condition in this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within 12 hours. The battery must therefore be declared inoperable.

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

A discharged battery with float voltage (the charger setpoint) across its terminals indicates that the battery is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus there is good assurance of fully recharging the battery within 12 hours, avoiding a premature shutdown with its own attendant risk. If the condition is due to one or more cells in a low voltage condition but still greater than 2.07 V and float voltage is found to be satisfactory, this is not indication of a substantially discharged battery and 12 hours is a reasonable time prior to declaring the battery inoperable.

Since ACTION “b” only specifies "perform," a failure of SR 4.8.2.3.1 acceptance criteria does not result in the ACTION not being met. However, if SR 4.8.2.3.1 is failed, the appropriate ACTION(s), depending on the cause of the failure, is entered.

With one battery with one or more cells electrolyte level above the top of the plates, but below the minimum established design limits, the battery still retains sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of electrolyte level not met. Within 31 days the minimum established design limits for electrolyte level must be re-established, in accordance with ACTION “c”.

With electrolyte level below the top of the plates there is a potential for dryout and plate degradation. ACTION “c” addresses this potential (as well as provisions in Specification 6.5.15, Battery Monitoring and Maintenance Program). ACTIONs “c.i” and “c.ii” are modified by a Note that indicates they are only applicable if electrolyte level is below the top of the plates. Within 8 hours level is required to be restored to above the top of the plates and within 12 hours a visual inspection to very no leakage is performed. Specification 6.5.15.b.3 initiates action to equalize and test in accordance with manufacturer's recommendation following restoration of the electrolyte level to above the top of the plates. Based on the results of the manufacturer's recommended testing, the battery may have to be declared inoperable and the affected cell[s] replaced.

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

With both batteries with battery parameters not within limits there is not sufficient assurance that battery capacity has not been affected to the degree that the batteries can still perform their required function, given that redundant batteries are involved. This potential could result in a total loss of function on multiple systems that rely upon the batteries. The longer AOTs specified for battery parameters on non-redundant batteries not within limits are, therefore, not appropriate, and the parameters must be restored to within limits on at least one battery within 2 hours, in accordance with ACTION "e".

With one or more batteries with any battery parameter outside the allowances of ACTION "a", "b", "c", "d", or "e", sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding battery must be declared inoperable. Additionally, discovering one battery with one or more battery cells float voltage less than 2.07 V and float current greater than 2 amps indicates that the battery capacity may not be sufficient to perform the intended functions. The battery must, therefore, be declared inoperable immediately.

Verifying battery float current while on float charge in accordance with SR 4.8.3.1 is used to determine the state of charge of the battery. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a charged state. The equipment used to monitor float current must have the necessary accuracy and capability to measure electrical currents in the expected range. The float current requirements are based on the float current indicative of a charged battery. The 7-day Frequency is consistent with IEEE-450. The SR also states the float current requirement is not required to be met when battery terminal voltage is less than the minimum established float voltage of SR 4.8.2.3.1. When this float voltage is not maintained, LCO 3.8.2.3 ACTION "a" is entered, which provide the necessary and appropriate verifications of the battery condition. Furthermore, the float current limit of 2 amps is established based on the nominal float voltage value and is not directly applicable when this voltage is not maintained.

Optimal long term battery performance is obtained by maintaining a float voltage greater than or equal to the minimum established design limits provided by the battery manufacturer, which corresponds to 127.6 V at the battery terminals, or 2.20 Vpc. This provides adequate over-potential, which limits the formation of lead sulfate and self discharge, which could eventually render the battery inoperable. Float voltages in this range or less, but greater than 2.07 Vpc, are addressed in Specification 6.5.15. SRs 4.8.3.2 and 4.8.3.5 require verification that the cell float voltages are equal to or greater than the short term absolute minimum voltage of 2.07 V. The Frequency for cell voltage verification every 31 days for pilot cell and 92 days for each connected cell is consistent with IEEE-450.

The limit specified for electrolyte level in SR 4.8.3.3 ensures that the plates suffer no physical damage and maintains adequate electron transfer capability. The minimum design electrolyte level is the minimum level indication mark on the battery cell jar. The Frequency is consistent with IEEE-450.

SR 4.8.3.4 verifies that the pilot cell temperature is greater than or equal to the minimum established design limit (i.e., 60 °F). Pilot cell electrolyte temperature is maintained above this temperature to assure the battery can provide the required current and voltage to meet the design requirements. Temperatures lower than assumed in battery sizing calculations act to inhibit or reduce battery capacity. The Frequency is consistent with IEEE-450.

BASES

A battery performance discharge test is a test of constant current capacity of a battery after having been in service, to detect any change in the capacity determined by the acceptance test. SR 4.8.3.6 is intended to determine overall battery degradation due to age and usage. The performance discharge test is acceptable for satisfying the battery service test requirements of SR 3.8.2.3.3 on a once per 60-month basis.

The acceptance criteria for this SR are consistent with IEEE-450, which recommends that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements. Furthermore, the battery is sized to meet the assumed duty cycle loads when the battery design capacity reaches this 80% limit.

The SR Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the SR Frequency is reduced to 12 months. However, if the battery shows no degradation, but has reached 85% of its expected life, the SR Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's ratings. Degradation is indicated, according to IEEE-450, when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is ≥ 10% below the manufacturer's rating. These Frequencies are consistent with the recommendations in IEEE-450.

Attachment 5 to

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Revised (clean) Technical Specification Pages

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

b. With one of the required battery banks inoperable, restore the inoperable battery bank to OPERABLE status within 2 hours.

c. With one DC electrical power subsystem inoperable for reasons other than ACTION 'a' or 'b' 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 3.8.3.6 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, restore battery terminal voltage to greater than or equal to the minimum established float voltage within 2 hours.

b. With the requirements of ACTION 'a' not met or with the above complement of DC equipment and bus otherwise inoperable, 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.

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.

   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.

   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]

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

   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.

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 shows degradation, or 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.

Attachment 6 to

2CAN011301

List of Regulatory Commitments

LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
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.		✓	Upon implementation of the approved TS amendment
Entergy will ensure that the minimum required procedural time to measure battery float current will be 30 seconds.		✓	Upon implementation of the approved TS amendment
Entergy will revise the ANO-2 SAR to include those items described in Attachment 3 of this submittal.	✓		Upon implementation of the approved TS amendment
Entergy commits to implement Technical Bases changes consistent with the Bases in TSTF-500 in accordance with the Technical Specifications Bases Control Program.	✓		Upon implementation of the approved TS amendment