Charles R. Pierce
Regulatory Affairs Director

Southern Nuclear
Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, AL 35242

Tel 205.992.7872
Fax 205.992.7601

SOUTHERN NUCLEAR
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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

E.I. Hatch Nuclear Plant Units 1 and 2
Withdrawal of TSTF-500 Request to Increase the Completion Time for the Station Service Batteries from 2 to 12 Hours

Ladies and Gentlemen:

On August 11, 2015, the Southern Nuclear Operating Company (SNC) submitted a Technical Specifications revision request to implement TSTF-500 into the Hatch Nuclear Plant's (HNP) Unit 1 and Unit 2 Technical Specifications (TS). The revision included changes to LCO 3.8.4, "DC Sources – Operating", LCO 3.8.5, "DC Sources – Shutdown", LCO 3.8.6, "Battery Cell Parameters", and Section 5.5, "Programs and Manuals". As part of that change proposal, SNC opted to take the available variation of requesting an increase to the station service battery TS Completion Time from 2 to 12 hours. With this letter, SNC hereby withdraws that portion of the TSTF-500 revision request. SNC respectfully requests that all other parts of the TSTF-500 TS change proposal remain under consideration.

Accordingly, Attachment 1 of this letter contains the revised justification for change, regulatory analyses, and environmental consideration. It supersedes the Attachment 1 included in the original submittal of August 11, 2015. These sections are identical to those submitted with the original revision request except that the optional variation of increasing the battery Completion Time is removed.

Attachment 2 of this letter provides the mark up of the revised LCO 3.8.4 TS and Bases pages and Attachment 3 of this letter provides the clean typed LCO 3.8.4 TS pages. There are no changes to the TS and Bases pages for LCOs 3.8.5 and 3.8.6 as provided in the original submittal. The marked up Bases are submitted for your information.

Attachment 2 and Enclosure 1 of the original submittal remain valid. Enclosure 2 of the original submittal, "Evaluation Supporting a Completion Time Longer than 2 Hours for Specification 3.8.4, Required Action 3.8.4.E" is hereby withdrawn.

This letter contains no Regulatory Commitments.

If you have any questions, please contact Ken McElroy at 205-992-7369.

Mr. C.R. Pierce states he is Regulatory Affairs Director of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and, to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

C. R. Pierce
Regulatory Affairs Director

CRP/OCV/

Sworn to and subscribed before me this 17 *day of* June, *2016.*

Laura L. Crapps
Notary Public

My commission expires: 10-8-2017

Attachments: 1. Description and Assessment of the Proposed Changes
2. Markup Pages of Existing TS and TS Bases for LCO 3.8.4
3. Clean Typed TS Pages

cc: Southern Nuclear Operating Company
Mr. S. E. Kuczynski, Chairman, President & CEO
Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer
Mr. D. R. Madison, Vice President – Fleet Operations
Mr. M. D. Meier, Vice President – Regulatory Affairs
Mr. B. J. Adams, Vice President – Engineering
Mr. G. L. Johnson, Regulatory Affairs Manager – Hatch
RType: CVC7000

U. S. Nuclear Regulatory Commission
Ms. C. Haney, Regional Administrator
Mr. M. D. Orenak, NRR Project Manager – Hatch
Mr. D. H.Hardage, Senior Resident Inspector – Hatch

State of Georgia
Mr. J. H. Turner, Director- Environmental Protection Division

Edwin I. Hatch Nuclear Plant – Units 1 and 2

Withdrawal of TSTF-500 Request to Increase the Completion Time for the Station Service Batteries from 2 to 12 hours

Attachment 1

Description and Assessment of the Proposed Changes

1.0 DESCRIPTION

The 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) 3.8.4, "DC Sources - Operating," LCO 3.8.5, "DC Sources - Shutdown," and LCO 3.8.6, "Battery Cell Parameters." A new "Battery Monitoring and Maintenance Program" is being proposed for Section 5.5 "Administrative Controls - Programs and Manuals."

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

A new program is being proposed for Section 5.5 of the Administrative Controls for the maintenance and monitoring of station batteries. The items proposed to be relocated will be contained within this program, titled the "Battery Monitoring and Maintenance Program."

The proposed changes provide new Actions for an inoperable battery charger and alternate battery charger testing criteria. The longer CT for an inoperable battery charger will allow additional time for maintenance and testing. In addition, a number of SRs are relocated to licensee control including the monitoring of battery cell parameter requirements and performance of battery maintenance activities.

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 was announced in the *Federal Register* on September 1, 2011 (76 FR 54510).

2.0 ASSESSMENT

2.1 APPLICABILITY OF TSTF-500 AND MODEL SAFETY EVALUATION (SE)

Southern Nuclear Operating Company (SNC) has reviewed the model SE referenced in the *Federal Register* Notice of Availability published on September 1, 2011 (76 FR 54510). The review included the NRC staff's SE, as well as the supporting information provided in TSTF-500, Revision 2. As described herein, SNC 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 Edwin I. Hatch Nuclear Plant, Units 1 and 2 (HNP) and support incorporation of this amendment into the HNP TS.

The HNP Station Service DC system is very similar to the system described in TSTF-500, with respect to its ability to meet the duty cycle assumed in the accident analyses and with its operations in the float and equalize modes. However, HNP also has a DC system specifically intended to support the Safety Related Diesel Generators (DGs), which is not described in TSTF-500-A, Revision 2. (The DG DC system is listed in the LCO 3.8.4 statement of the TSTF-500 TS mark-up, but is not described in Section 4.1 of the TSTF Technical Analysis). Following is a brief description of both HNP systems.

HNP Station Service DC System

The 125/250 V DC Station Service system for each HNP unit is made up of two separate subsystems, consisting of DC switchgear R22-S016 (Subsystem I) and R22-S017 (Subsystem II). Each subsystem contains the following major components covered by TS Limiting Conditions for Operation (LCO) 3.8.4, 3.8.5, and 3.8.6:

- One 120 cell, 250 Volt (V), lead-acid type battery.
- Three 125 V, 400 amp battery chargers.

The battery is essentially two 60 cell, 125 V batteries connected in series. They are center tapped such that they allow for the supply of both 125 V loads and 250 V loads.

Two of the three chargers are normally in service, with one in standby. Two battery throwover switches per division are used to determine which two chargers are in service and which one is in standby.

A subsystem of the station service DC System is considered Operable when the 125/250 VDC battery and two of the three battery chargers are Operable.

HNP Safety Related DG DC System

The HNP DG DC system uniquely supports the Safety Related Emergency DGs.

There are a total of five emergency diesel generators at HNP. Two are dedicated to Unit 1, two are dedicated to Unit 2, and one is a "swing" diesel capable of supplying either Unit 1 or 2.

The DG DC system is made up of five subsystems, each supporting one Diesel Generator. Like the station service system, each DG subsystem is also covered by LCOs 3.8.4. 3.8.5, and 3.8.6, and contains the following major components:

- One 60 cell, 125 V lead-acid type battery.
- Two 125 V, 100 amp battery chargers.

One charger is normally in service and one is in standby. Like the station service chargers, each pair of diesel battery chargers has a throwover switch to align power to the selected loads.

The DC system for a DG is considered Operable when its battery and one of its

two battery chargers are Operable.

The HNP TS for DC Sources is similar to the Specification used in TSTF-500 as the starting point for the revisions. HNP never implemented TSTF-360, consequently, the attached HNP specific mark-up follows the mark-up provided in Attachment B of TSTF-500 as closely as possible.

The primary difference between the HNP TS and the NUREG-1433 TS marked-up for TSTF-500 is HNP's separation of the Station Service and DG DC systems in the LCO Conditions, and the default Conditions if the DG DC systems' CTs are not met. The 12 hour CT for one DG DC electrical power subsystem inoperable (current TS 3.8.4 Condition B) is consistent with the CT for one required offsite circuit inoperable concurrent with one required DG inoperable (HNP TS 3.8.1 Condition E). Similarly, the default Condition's RAs for the CT of current TS 3.8.4 Condition B not being met are the same as the default Condition's RAs for the CT of TS 3.8.1 Condition E not being met (MODE 3 in 12 hours, MODE 4 in 36 hours). The default Condition for the NUREG-1433 TS marked-up for TSTF-500 require the associated DG to be declared inoperable if the CT for the one DG DC electrical power subsystem is not met. The HNP TS is therefore conservative and more limiting than the TSTF-500 for the case of an inoperable DG battery. Again, the TSTF would require declaring the associated diesel generator inoperable at the end of the 2 hour CT, which would provide at least another 72 hours of operation. On the other hand, at the end of the 12 hour DG DC system CT for HNP, an immediate shutdown would be required with Mode 3 required in 12 hours or less. These differences do not affect the applicability of the model SE for HNP.

The HNP Station Service batteries and the HNP DG batteries also have different required float currents for determining that their respective batteries are charged. This requires different Conditions for the Station Service battery chargers inoperable and the DG battery chargers inoperable, since different values of battery float current are required to be verified. This affects the HNP markups for TS 3.8.4, 3.8.5, and 3.8.6 (and the associated TS Bases). Having separate required float currents for the station service and DG batteries does not affect the applicability of the published model SE.

Also, the HNP LCO Condition for TS 3.8.4 discusses the opposite unit's DC systems that are needed to support safety systems common to both units; accordingly, there are corresponding Conditions for the opposite unit's DC DG electrical power subsystem. This Condition is unaffected by the proposed changes in TSTF-500, except to modify the required SRs appropriately based on re-numbering. This does not impact the applicability of the published model SE.

The HNP Actions for LCO 3.8.4 list a Condition for two or more DC electrical power subsystems inoperable that result in a loss of function, with a required immediate entry into LCO 3.0.3. This Condition is not explicitly stated in the TSTF-500 Actions for LCO 3.8.4; however, immediate entry into LCO 3.0.3 would be nonetheless required based on the LCO 3.0.3 Applicability. This does not impact the applicability of the published model SE.

The surveillance requirements (SR) in the HNP specification are similar to those in TSTF-500, but the HNP SRs also include requirements for the opposite unit's DC sources if they are required per the LCO. Current HNP SR 3.8.4.6 does not contain the Note stating that the surveillance shall not be performed in Modes 1, 2, or 3. This note is

eliminated from the TS in TSTF-500; but since it does not exist in the current HNP TS, this change was not necessary. Also, current HNP SR 3.8.4.7 does not include the 60 month provision for the modified performance test, which TSTF-500 removes, consequently, this spec will not be modified, other than to be re-numbered. Otherwise, the changes to this SR are the same as the TSTF changes.

HNP has implemented the Surveillance Frequency Control Program (SFCP) per the provisions of TSTF- 425, and as approved by the NRC for Plant Hatch via Amendments No. 266 and 210 for the Hatch Unit 1 and Unit 2 Technical Specifications, respectively. Consequently, the surveillance frequencies in this submittal are listed as "... in accordance with the Surveillance Frequency Control Program", or words to that effect. In the current HNP TS, the surveillances which verify battery terminal voltage, charger function, battery capacity, electrolyte level and temperature, specific gravity (which, per procedure, includes a measurement of float current) and cell float voltage have frequencies controlled by the SFCP. Any revised frequencies are evaluated by NEI 04-10, "Risk Informed Method for Control of Surveillance Frequencies", Revision 1, as required by the Program.

Finally, the Model Safety evaluation states that the battery rooms are "environmentally controlled". The HNP battery rooms are environmentally controlled in the following sense:

1) The station service and diesel generator battery rooms have specific ventilation systems (exhaust fans) primarily designed to vent any hydrogen released in the room from the charging process,

2) The station service battery rooms are in the Control Building and are thus serviced by the Control Building Ventilation system. Similarly, the diesel battery rooms are located inside the diesel generator building which is serviced by the diesel generator ventilation system.

2.2 VERIFICATION AND REQUIRED FINAL SAFETY ANALYSIS REPORT CHANGES

As described in Section 4.7.1, "Verifications," in TSTF-500, SNC provides the following verifications.

1. Enclosure 1 contains a letter from the manufacturers of the batteries used at HNP 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. SNC verifies that the equipment that will be used to monitor float current under SR 3.8.6.1 will have the necessary accuracy and capability to measure electrical currents in the expected range. Additionally, SNC verifies that the minimum required procedural time to measure battery float current will be 30 seconds or as recommended by the float current measurement instrument manufacturer. This minimum float current measurement time is required to provide a more accurate battery float current reading.

3. SNC verifies that battery room temperature is routinely monitored 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. (Not Used).

5. The cell resistance limits in existing SR 3.8.4.5 are relocated to the Battery Monitoring and Maintenance Program. The connection resistance limits are currently provided in Technical Requirements Manual Table T9.1-1 (One TRM for each unit). The resistance limits apply to the overall connection resistance and allow for an increase in connection resistance due to changes in connection tightness and contact surface corrosion. The OPERABILITY resistance limit is calculated for a battery that has reached end of life (80 % of capacity).

6. Monitoring of battery parameters (i.e., specific gravity, electrolyte level, cell temperature, float voltage, connection resistance, and physical condition) will be relocated to the licensee-controlled program, required and described in TS Section 5.5, "Programs and Manuals," and titled the "Battery Monitoring and Maintenance Program."

7. SNC verifies that plant procedures will require verification of the selection of the pilot cell or cells when performing SR 3.8.6.5.

As described in Attachment 2, "List of Required Final Safety Analysis Report (FSAR) Descriptions," SNC will revise the FSAR to include the following, as part of the adoption of TSTF-500, Revision 2:

1. How a 5 percent design margin for the batteries corresponds to a 20 amp float current value for the station service batteries and a 5 amp float current value for the DG batteries, indicating that the battery is 95 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.

2.3 OPTIONAL CHANGES AND VARIATIONS

SNC is proposing the following variations from the TS changes described in the TSTF-500, Revision 2, or the applicable parts of the NRC staff's model SE referenced in the *Federal Register* on September 1, 2011 (76 FR 54510). Unless otherwise noted, these options were recognized as acceptable variations in TSTF-500 and the NRC staff's model SE.

SNC is proposing a variation with respect to pilot cell selection. Per the IEEE Std. 450-2002, the HNP station service and diesel generator batteries do not exhibit a temperature deviation across the battery of greater than 5 degrees Fahrenheit. Consequently, HNP will not take temperature into account when selecting the battery pilot cells.

SNC also proposes to add a statement to the SR 3.8.6.6 Bases that there are three different types of battery modified performance discharge tests suitable for satisfying the requirements of SR 3.8.6.6. These three type tests are identified and described as acceptable methods by IEEE-450-2002. The suggested wording for the SR Bases is included in Attachment 3 to this letter. This variation was not provided for in TSTF-500.

3.0 REGULATORY ANALYSIS

3.1 NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

SNC 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.

Description of Amendment Request: The proposed amendment would revise TS requirements related to direct current (DC) electrical systems in TS Limiting Condition for Operation (LCO) 3.8.4, "DC Sources - Operating," LCO 3.8.5, "DC Sources - Shutdown," and LCO 3.8.6, "Battery Cell Parameters." A new "Battery Monitoring and Maintenance Program" is being proposed for Section 5.5 "Administrative Controls - Programs and Manuals."

Basis for proposed no significant hazards consideration determination: As required by 10 CFR 50.91(a), the SNC 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 any 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 Final Safety Analysis Report (FSAR). 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 updates included in TSTF-500, Revision 2, will maintain the same level of equipment performance required for mitigating accidents assumed in the FSAR. 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 FSAR. Therefore, the mitigating functions supported by the DC electrical power system will continue to provide the protection assumed by the analysis.

The relocation of preventive maintenance surveillances, and certain operating limits and actions, to a licensee-controlled Battery Monitoring and Maintenance Program will not challenge the ability of the DC electrical power system to perform its design function. Appropriate monitoring and maintenance that are consistent with industry standards will continue to be performed. 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 FSAR 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 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 FSAR. 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 updates included in TSTF-500, Revision 2, will maintain the same level of equipment performance required for mitigating accidents assumed in the FSAR. 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 FSAR. 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 the 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 Monitoring and Maintenance 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 FSAR and the current TSs. Therefore, the proposed changes do not involve a significant reduction of safety.

3.2 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

Southern Nuclear Operating Company has reviewed the NRC staff's model safety evaluation referenced in the Notice of Availability and concluded that the Regulatory Evaluation section is applicable to HNP, with the following qualifiers:

Reg Guide 1.75 – The construction permit for HNP-2 was issued in December 1972. The implementation date given in Section D of Reg Guide 1.75 is February 1974. For this reason, the recommendations of Reg Guide 1.75 are not required to be met on HNP-2. However, physical independence of the DC systems is maintained and discussed in the HNP -2 FSAR, Section 8.3.1.4.

Reg Guide 1.129 – The Battery Monitoring and Maintenance Program, proposed for Section 5 of the TS, indicates the adherence to Reg Guide 1.129 and IEEE (std) 450-2002, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead –Acid Batteries for Stationary Application", with exceptions noted. This is consistent with TSTF-500.

The Traveler and model safety evaluation discuss the 10 CFR 50, Appendix A, General Design Criteria (GDC). HNP-2 is committed to these GDC. HNP-1, however, was not licensed to the 10 CFR 50, Appendix A GDC. The HNP-1 construction permit was received under the 70 general design criteria, as discussed in Section F.3 of the UFSAR. (Appendix F has since been designated as historical). However, the HNP Unit 1 Design Bases has been reviewed against the 10 CFR 50, Appendix A, GDC based on an understanding of its intent. Those evaluations are presented in Appendix F of the Unit 1 FSAR and a portion of them are presented below for those GDC quoted in the model safety evaluation.

10 CFR Appendix A, Criterion 1, "Quality Standards".

Design Evaluation

Those system and components of reactor facilities which are essential to the prevention of accidents which could affect the public health and safety or to mitigation of their consequences shall be identified and then designed, fabricated, and erected to quality standards that reflect the importance of the safety function to be performed. Where generally recognized codes or standards on design, materials, fabrication, and inspection are used, they shall be identified. Where adherence to such codes or standards does not suffice to assure a quality product in keeping with the safety function, they shall be supplemented or modeled as necessary. Quality assurance programs, test procedures, and inspection acceptance levels to be used shall be identified. A showing of sufficiency and applicability of codes, standards, quality assurance programs, test procedures, and inspection acceptance levels used is required.

The Southern Nuclear Operating Company (SNC) HNP Quality Assurance (QA) Program is discussed in Appendix D of the Unit 1 FSAR and in Chapter 17 of the Unit 2 FSAR, which are not designated as historical sections. The QA program for HNP is designed to assure the plant's safe and reliable operation and to satisfy the quality assurance requirements of Appendix B to 10 CFR Part 50. The items covered under the QA program are the safety related structures, systems and components. A more detailed description of the QA program is found in the Quality Assurance Topical Report (QATR) for the SNC Fleet.

10 CFR Appendix A, Criterion 17, "Electric Power Systems".

Design Evaluation

Both onsite and offsite electric power systems are capable of providing a reliable source of power to permit functioning of structures, systems, and components important to safety. Both of these sources have the capability to furnish required power for all postulated AOO and accident conditions. In the event that all offsite circuits are lost, the emergency buses will be connected to the onsite emergency diesel generators. Physically independent circuits are provided from the HNP-1 switchyard to the startup auxiliary transformers. These circuits are fed by at least two independent transmission lines, physically separated as they approach the switchyard so that the failure of one line will not cause failure of the other. From the switchyard to the onsite electrical distribution system, separation is also provided so that failure of one circuit will not cause failure of the other.

The Unit 1 features that indicate conformance to Criterion 1 are described in Section 8.3 of the Unit 1 FSAR. This FSAR section discusses the safety basis of the safety related electrical systems including system operation, separation between systems, and single failure criteria.

The features of the safety related DC system are discussed in Unit 1 FSAR section 8.5.

Neither section 8.3 nor 8.5 are designated as historical.

10 CFR Appendix A, Criterion 18, "Inspection and Testing of Electric Power Systems".

Design Evaluation

The primary circuit breakers are inspected, maintained, and tested on a routine basis. This can be accomplished without removing the generators, transformers, and transmission lines from service. Transmission line protective relaying is tested on a routine basis. This can be accomplished without removing the transmission line from service. Generator, unit auxiliary transformer, and startup auxiliary relaying are tested during refueling. Automatic transfers of 4160-V buses 1E, 1F, and 1G from startup transformers to emergency standby diesel generators are tested during the refueling of the unit to prove the operability of the system. The DC system is equipped with detectors to indicate when there is a ground existing in any portion of the system. A ground on one portion of the DC system will not cause any equipment to malfunction. The batteries are under continuous automatic charging and are inspected and checked on a routine basis while the unit is in service.

Additionally, inspection and testing is discussed in general for the Unit 1 safety related electrical systems in Section 8.3.7 of the Unit 1 FSAR and specifically for the safety related DC systems in Section 8.5.5. Again, neither of these sections are historical. Additionally, and with respect to the DC systems, inspection and testing is carried out via the various TS surveillance requirements of LCOs 3.8.4, 3.8.5, and 3.8.6. This will continue to be true following implementation of TSTF-500, again by the various TS surveillance requirements, but also by the new "Battery Monitoring and Maintenance Program" referenced from Section 5.0 in the TS.

4.0 ENVIRONMENTAL CONSIDERATION

The proposed TS revision 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, or 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

Unit 1 FSAR Section 8.5

Unit 2 FSAR Section 8.3.2

SNC Calculations:

MC-H-14-0009, "Station Service 1A – Sizing and Voltage Profile"

MC-H-14-0010, "Station Service 1B – Sizing and Voltage Profile"

MC-H-14-0013, "Station Service Battery 2B – Sizing"

MC-H-14-0014, "Emergency Diesel Batteries 1A, 1B, & 1C Sizing"

MC-H-14-0015, Emergency Diesel Batteries 2A & 2C Sizing"

MC-H-14-0016, "Station Service Battery 2A – Sizing"

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Attachment 2

Mark Up Pages of Existing TS and TS Bases for LCO 3.8.4

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources - Operating

LCO 3.8.4 The following DC electrical power subsystems shall be OPERABLE:

a. The Unit 1 Division 1 and Division 2 station service DC electrical power subsystems;

b. The Unit 1 and the swing DGs DC electrical power subsystems; and

c. The Unit 2 DG DC electrical power subsystems needed to support the equipment required to be OPERABLE by LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," and LCO 3.8.1, "AC Sources - Operating."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Swing DG DC electrical power subsystem inoperable due to performance of SR 3.8.4.~~7~~ 3 or SR 3.8.~~4.8~~6.6. OR One or more required Unit 2 DG DC electrical power subsystems inoperable.	A.1 Restore DG DC electrical power subsystem to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Unit 1 DG DC battery charger on one subsystem inoperable OR Required swing DG DC battery charger inoperable for reasons other than Condition A.	B.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage AND B.2 Verify battery float current is ≤ 5 amps AND B.3 Restore battery charger(s) to OPERABLE status	2 hours Once per 12 hours 72 hours
~~B~~C. One Unit 1 DG DC electrical power subsystem inoperable for reasons other than Condition B. OR Swing DG DC electrical power subsystem inoperable for reasons other than Condition A or B.	~~B~~C.1 Restore DG DC electrical power subsystem to OPERABLE status.	12 hours

D. One or more required Unit 1 station service DC battery chargers on one subsystem inoperable	D.1	Restore battery terminal voltage to greater than or equal to the minimum established float voltage	2 hours
	AND		
	D.2	Verify battery float current is ≤ 20 amps	Once per 12 hours
	AND		
	D.3	Restore battery charger(s) to OPERABLE status	72 hours

~~C~~E. One Unit 1 station service DC electrical power subsystem inoperable for reasons other than Condition D.	~~C~~E.1	Restore station service DC electrical power subsystem to OPERABLE status.	2 hours
~~D~~F. Required Action and Associated Completion Time of Condition A, B, ~~or~~ C, D, or E not met.	~~D~~F.1 AND ~~D~~F.2	Be in MODE 3. Be in MODE 4.	12 hours 36 hours
~~E~~G. Two or more DC electrical power subsystems inoperable that result in a loss of function.	~~E~~G.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------
SR 3.8.4.1 through SR 3.8.4.~~8~~ 3 are applicable only to the Unit 1 DC sources. SR 3.8.4.~~9~~ 4 is applicable only to the Unit 2 DC sources.

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ~~≥ 125 V on float charge~~greater than or equal to the minimum established float voltage.	In accordance with the Surveillance Frequency Control Program
~~SR 3.8.4.2~~	~~Verify no visible corrosion at battery terminals and connectors.~~ ~~OR~~ ~~Verify battery connection resistance is within limits.~~	~~In accordance with the Surveillance Frequency Control Program~~
~~SR 3.8.4.3~~	~~Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration.~~	~~In accordance with the Surveillance Frequency Control Program~~
~~SR 3.8.4.4~~	~~Remove visible corrosion, and verify battery cell to cell and terminal connections are coated with anti-corrosion material.~~	~~In accordance with the Surveillance Frequency Control Program~~
~~SR 3.8.4.5~~	~~Verify battery connection resistance is within limits.~~	~~In accordance with the Surveillance Frequency Control Program~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.~~6~~2	Verify each required battery charger supplies ≥ 400 amps for station service subsystems, and ≥ 100 amps for DG subsystems at ~~≥ 129 V~~greater than or equal to the minimum established float voltage for ≥ 1 hour. OR Verify 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.	In accordance with the Surveillance Frequency Control Program
SR 3.8.4.~~7~~3	----------NOTES---------- 1. The modified performance discharge test in SR 3.8.~~4.8~~6.6 may be performed in lieu of ~~the service test in~~ SR 3.8.4.~~7~~3. 2. This Surveillance shall not be performed in MODE 1, 2, or 3, except for the swing DG battery. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
~~SR 3.8.4.8~~	~~NOTE~~ ~~This Surveillance shall not be performed in MODE 1, 2, or 3, except for the swing DG battery. However, credit may be taken for unplanned events that satisfy this SR.~~ ~~Verify battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.~~	~~In accordance with the Surveillance Frequency Control Program~~ ~~AND~~ ~~12 months when battery shows degradation or has reached 85% of expected life with capacity < 100% of manufacturer's rating~~ ~~AND~~ ~~24 months when battery has reached 85% of expected life with capacity ≥ 100% of manufacturer's rating~~
SR 3.8.4.~~9~~4	For required Unit 2 DC sources, the SRs of Unit 2 Specification 3.8.4 are applicable.	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources - Operating

LCO 3.8.4 The following DC electrical power subsystems shall be OPERABLE:

a. The Unit 2 Division 1 and Division 2 station service DC electrical power subsystems;

b. The Unit 2 and the swing DGs DC electrical power subsystems; and

c. The Unit 1 DG DC electrical power subsystems needed to support the equipment required to be OPERABLE by LCO 3.6.4.3, "Standby Gas Treatment (SGT) System"; LCO 3.7.4, "Main Control Room Environmental Control (MCREC) System"; LCO 3.7.5, "Control Room Air Conditioning (AC) System"; and LCO 3.8.1, "AC Sources - Operating."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Swing DG DC electrical power subsystem inoperable due to performance of SR 3.8.4.~~7~~ 3 or SR 3.8.4.~~8~~6.6. OR One or more required Unit 1 DG DC electrical power subsystems inoperable.	A.1 Restore DG DC electrical power subsystem to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Unit 2 DG DC battery charger on one subsystem inoperable OR Required swing DG DC battery charger inoperable for reasons other than Condition A.	B.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage AND B.2 Verify battery float current is ≤ 5 amps AND B.3 Restore battery charger(s) to OPERABLE status	2 hours Once per 12 hours 72 hours
~~B~~C. One Unit 2 DG DC electrical power subsystem inoperable for reasons other than Condition B. OR Swing DG DC electrical power subsystem inoperable for reasons other than Condition A or B.	~~B~~C.1 Restore DG DC electrical power subsystem to OPERABLE status.	12 hours

D. One or more required Unit 2 station service DC battery chargers on one subsystem inoperable	D.1	Restore battery terminal voltage to greater than or equal to the minimum established float voltage	2 hours
	AND		
	D.2	Verify battery float current is ≤ 20 amps	Once per 12 hours
	AND		
	D.3	Restore battery charger(s) to OPERABLE status	72 hours

~~C~~E. One Unit 2 station service DC electrical power subsystem inoperable for reasons other than Condition D.	~~C~~E.1	Restore station service DC electrical power subsystem to OPERABLE status.	2 hours
~~D~~F. Required Action and Associated Completion Time of Condition A, B, ~~or~~ C, D, or E not met.	~~D~~F.1	Be in MODE 3.	12 hours
	AND		
	~~D~~F.2	Be in MODE 4.	36 hours
~~E~~G. Two or more DC electrical power subsystems inoperable that result in a loss of function.	~~E~~G.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------
SR 3.8.4.1 through SR 3.8.4.~~8~~ 3 are applicable only to the Unit 2 DC sources. SR 3.8.4.~~9~~ 4 is applicable only to the Unit 1 DC sources.

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ~~≥ 125 V on float charge~~greater than or equal to the minimum established float voltage.	In accordance with the Surveillance Frequency Control Program
~~SR 3.8.4.2~~	~~Verify no visible corrosion at battery terminals and connectors.~~ ~~OR~~ ~~Verify battery connection resistance is within limits.~~	~~In accordance with the Surveillance Frequency Control Program~~
~~SR 3.8.4.3~~	~~Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration.~~	~~In accordance with the Surveillance Frequency Control Program~~
~~SR 3.8.4.4~~	~~Remove visible corrosion, and verify battery cell to cell and terminal connections are coated with anti-corrosion material.~~	~~In accordance with the Surveillance Frequency Control Program~~
~~SR 3.8.4.5~~	~~Verify battery connection resistance is within limits.~~	~~In accordance with the Surveillance Frequency Control Program~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.~~6~~2	Verify each required battery charger supplies ≥ 400 amps for station service subsystems, and ≥ 100 amps for DG subsystems at ~~≥ 129 V~~greater than or equal to the minimum established float voltage for ≥ 1 hour. OR Verify 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.	In accordance with the Surveillance Frequency Control Program
SR 3.8.4.~~7~~3	----------NOTES---------- 1. The modified performance discharge test in SR 3.8.~~4.8~~6.6 may be performed in lieu of ~~the service test in~~ SR 3.8.4.~~7~~3. 2. This Surveillance shall not be performed in MODE 1, 2, or 3, except for the swing DG battery. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
~~SR 3.8.4.8~~	~~NOTE~~ ~~This Surveillance shall not be performed in MODE 1, 2, or 3, except for the swing DG battery. However, credit may be taken for unplanned events that satisfy this SR.~~ ~~Verify battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.~~	~~In accordance with the Surveillance Frequency Control Program~~ ~~AND~~ ~~12 months when battery shows degradation or has reached 85% of expected life with capacity < 100% of manufacturer's rating~~ ~~AND~~ ~~24 months when battery has reached 85% of expected life with capacity ≥ 100% of manufacturer's rating~~
SR 3.8.4.~~9~~4	For required Unit 1 DC sources, the SRs of Unit 1 Specification 3.8.4 are applicable.	In accordance with applicable SRs

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources - Operating

BASES

BACKGROUND

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

The station service DC power sources provide both motive and control power to selected safety related and nonsafety related equipment. Each DC subsystem is energized by one 125/250 V station service battery (consisting of two 125 V batteries in series), and three 125 V battery chargers (two normally inservice chargers and one standby charger). Each battery is exclusively associated with a single 125/250 VDC bus. Each set of battery chargers exclusively associated with a 125/250 VDC subsystem cannot be interconnected with any other 125/250 VDC subsystem. The normal and backup chargers are supplied from the same AC load groups for which the associated DC subsystem supplies the control power. The loads between the redundant 125/250 VDC subsystem are not transferable except for the Automatic Depressurization System, the logic circuits and valves of which are normally fed from the Division 1 DC system.

The diesel generator (DG) DC power sources provide control and instrumentation power for their respective DG and their respective offsite circuit supply breakers. In addition, DG 1A power source provides circuit breaker control power for the respective Division I loads on 4160 VAC buses 1E and 1F, and DG 1C power source provides circuit breaker control power for the respective Division II loads on 4160 VAC buses 1F and 1G. Each DG DC subsystem is energized by one 125 V battery and two 125 V battery chargers (one normally inservice charger and one standby charger).

During normal operation, the DC loads are powered from the respective station service and DG battery chargers with the batteries floating on the system.

In case of loss of normal power to any battery charger, the DC loads are automatically powered from the associated battery. This will

(continued)

BASES

BACKGROUND (continued)

result in the discharging of the associated battery (and affect the battery cell parameters).

The DC power distribution system is described in more detail in Bases for LCO 3.8.7, "Distribution System - Operating," and LCO 3.8.8, "Distribution System - Shutdown."

~~Each battery has adequate storage capacity to carry the required load continuously for approximately 2 hours (Ref. 4).~~

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

Each battery has adequate storage capacity to meet the duty cycle(s) discussed in the FSAR, Chapter 8 (Ref 4). The battery is designed with additional capacity above that required by the design duty cycle to allow for temperature variations and other factors.

The batteries for DC electrical power subsystems are sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life. The minimum design voltage limit is 105/210 V.

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 124 V for a 60 cell battery (i.e., cell voltage of 2.07 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 > 2.07 Vpc, the battery cell will maintain its capacity for 30 days without further charging per manufacturer's instructions. Optimal long term performance however, is obtained by maintaining a float voltage 2.20 to 2.25 Vpc. This provides adequate over-potential, which limits the formation of lead sulfate and self discharge. The nominal float voltage of 2.20 Vpc corresponds to a total float voltage output of 132 V for a 60 cell battery as discussed in the FSAR, Chapter 8 (Ref. 4).

Each battery charger of the DC electrical power subsystem has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining a fully charged battery. Each battery charger has sufficient excess capacity to restore the battery from the design

(continued)

minimum charge to its fully charged state within 24 hours while supplying normal steady state loads (Ref. 4).

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

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

A description of the Unit 2 DC power sources is provided in the Bases for Unit 2 LCO 3.8.4, "DC Sources - Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapters 5 and 6 (Ref. 5), and Chapter 14 (Ref. 6), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation. The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining DC sources OPERABLE during accident conditions in the event of:

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

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

b. A postulated worst case single failure.

The DC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 13).

LCO

The Unit 1 DC electrical power subsystems -- with: 1) each station service DC subsystem consisting of one 125/250 V station service battery (two 125 V batteries in series), two battery chargers, and the corresponding control equipment and interconnecting cabling supplying power to the associated bus; and 2) each DG DC subsystem consisting of one battery bank, one battery charger, and the corresponding control equipment and interconnecting cabling -- are required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. In addition, some components required by Unit 1 require power from Unit 2 sources (e.g., Standby Gas Treatment (SGT) System and Low Pressure Coolant Injection (LPCI) valve load centers). Therefore, the Unit 2 DG DC and the swing DG DC electrical power subsystems needed to provide DC power to the required Unit 2 components are also required to be OPERABLE. Thus, loss of any DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

APPLICABILITY

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

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

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

The DC electrical power requirements for MODES 4 and 5, and other conditions in which DC Sources are required, are addressed in the Bases for LCO 3.8.5, "DC Sources - Shutdown."

(continued)

BASES (continued)

ACTIONS

A.1

If one or more of the required Unit 2 DG DC electrical power subsystems is inoperable (e.g., inoperable battery, inoperable battery charger(s), or inoperable battery charger and associated inoperable battery), or if the swing DG DC electrical power subsystem is inoperable due to performance of SR 3.8.4.3~~7~~ or SR 3.8.6.6~~4.8~~, and a loss of function has not occurred as described in Condition ~~E~~G, the remaining DC electrical power subsystems have the capacity to support a safe shutdown and to mitigate an accident condition. In the case of an inoperable required Unit 2 DG DC electrical power subsystem, continued power operation should not exceed 7 days, since a subsequent postulated worst case single failure could result in the loss of certain safety functions (e.g., SGT System and LPCI valve load centers). The 7 day Completion Time takes into account the capacity and capability of the remaining DC sources, and is based on the shortest restoration time allowed for the systems affected by the inoperable DC source in the respective system Specification.

In the case of an inoperable swing DG DC electrical power subsystem, since a subsequent postulated worst case single failure could result in the loss of minimum necessary DC electrical subsystems to mitigate a postulated worst case accident, continued power operation should also not exceed 7 days. The 7 day Completion Time is based upon the swing DG DC electrical power subsystem being inoperable due to performance of SR 3.8.4.3~~7~~ or SR 3.8.6.6~~4.8~~. Performance of these two SRs will result in inoperability of the DC battery. Since this battery is common to both units, more time is provided to restore the battery, if the battery is inoperable for performance of required Surveillances, to preclude the need to perform a dual unit shutdown to perform these Surveillances. The swing DG DC electrical power subsystem also does not provide power to the same type of equipment as the other DG DC sources (e.g., breaker control power for 4160 V loads is not provided by the swing DG battery). The Completion Time also takes into account the capacity and capability of the remaining DC sources.

B.1, B.2, and B.3

Condition B represents one Unit 1 DG DC subsystem with a required battery charger inoperable (e.g., the voltage limit of SR 3.8.4.1 is not maintained), or the swing DG DC subsystem with a required battery charger inoperable for reasons other than Condition A. The ACTIONS provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to OPERABLE status in a reasonable time period. Required Action B.1 requires that the battery terminal voltage be restored to greater

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than or equal to the minimum established float voltage within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within 12 hours, the battery will be restored to its fully charged condition (Required Action B.2) from any discharge that might have occurred due to the charger inoperability.

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

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

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

Required Action B.2 requires that the battery float current be verified as less than or equal to 5 amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it is now fully capable of supplying the maximum expected load requirement. The 5 amp value is based on returning the battery to 95% charge and assumes a 5% design margin for the battery. If at the expiration of the initial 12 hour period the battery float current is not less than or equal to 5 amps this indicates there may be additional battery problems and the battery must be declared inoperable.

Required Action B.3 limits the restoration time for the inoperable

(continued)

battery charger to 72 hours. This action is applicable if an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage has been used (e.g., balance of plant non-Class 1E battery charger). The 72 hour Completion Time reflects a reasonable time to effect restoration of the qualified battery charger to OPERABLE status.

~~B~~C.1

If a Unit 1 DG DC electrical power subsystem is inoperable for reasons other than Condition B, or if the swing DG DC electrical power subsystem is inoperable ~~(~~for reasons other than Condition A or B~~)~~, (e.g. inoperable battery or inoperable battery charger and associated inoperable battery), the remaining DC electrical power subsystems have the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent postulated worst case single failure could result in the loss of minimum necessary DC electrical subsystems to mitigate a postulated worst

(continued)

BASES

ACTIONS

~~B~~C.1 (continued)

case accident, continued power operation should not exceed 12 hours. The 12 hour Completion Time provides a period of time to correct the problem commensurate with the importance of maintaining the DG DC electrical power subsystem OPERABLE. (The DG DC electrical power subsystem affects both the DG and the offsite circuit, as well as the breaker closure power for various 4160 VAC loads, but does not affect 125/250 VDC station service loads.)

D.1, D.2, and D.3

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

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

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

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

Required Action D.2 requires that the battery float current be verified as less than or equal to 20 amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it is now fully capable of supplying the maximum expected load requirement. The 20 amp value is based on returning the battery to 95% charge and assumes a 5% design margin for the battery. If at the expiration of the initial 12 hour period the battery float current is not less than or equal to 20 amps this indicates there may be additional battery problems and the battery must be declared inoperable.

Required Action D.3 limits the restoration time for the inoperable battery charger to 72 hours. This action is applicable if an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage has been used (e.g., balance of plant non-Class 1E battery charger). The 72 hour Completion Time reflects a reasonable time to effect restoration of the qualified battery charger to OPERABLE status.

~~C~~E.1

~~Condition C represents one Unit 1 station service division with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. It is therefore imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for complete loss of DC power to the affected division. The 2 hour limit is consistent with the allowed time for an inoperable DC Distribution System division.~~

If one of the required Unit 1 station service DC electrical power subsystems is inoperable for reasons other than Condition D (e.g., inoperable battery~~, inoperable battery charger(s),~~ or inoperable battery charger and associated inoperable battery), the remaining DC electrical power subsystems have the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent postulated worst case single failure could result in the loss of minimum necessary DC electrical subsystems to mitigate a postulated worst case accident, continued power operation should not exceed

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2 hours. The 2 hour Completion Time is based on Regulatory Guide 1.93 (Ref. 7) and reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem and, if the DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

~~D~~F.1 and ~~D~~F.2

If the DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, 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 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. The Completion Time

(continued)

BASES

ACTIONS

~~D~~F.1 and ~~D~~F.2 (continued)

to bring the unit to MODE 4 is consistent with the time required in Regulatory Guide 1.93 (Ref. 7).

~~E~~G.1

Condition ~~E~~ G corresponds to a level of degradation in the DC electrical power subsystems that causes a required safety function to be lost. When more than one DC source is lost, and this results in the loss of a required function, the plant is in a condition outside the accident analysis. Therefore, no additional time is justified for continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

SURVEILLANCE REQUIREMENTS

The SRs are modified by a Note to indicate that SR 3.8.4.1 through SR 3.8.4.~~8~~ 3 apply only to the Unit 1 DC sources, and that SR 3.8.4.~~9~~ 4 applies only to the Unit 2 DC sources.

SR 3.8.4.1

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the ~~charging system and the ability of the batteries to perform their intended function~~ 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 ~~(or battery cell)~~ and maintain the battery ~~(or a battery cell)~~ in a fully charged state while supplying the continuous steady state loads of the associated DC subsystem. On float charge, battery cells will receive adequate current to 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). For example, if 60 cells are connected, the voltage at the battery terminals would be 132 V, 2.20 Vpc times 60 cells. With only 58 connected cells, the terminal voltage would be 127.6 V.
This voltage maintains the battery plates in a condition that supports maintaining the grid life. ~~Voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. The voltage requirement for battery terminal voltage is based on the open circuit~~

(continued)

~~voltage of a lead-calcium cell of nominal 1.215 specific gravity. Without regard to other battery parameters, this voltage is indicative of a battery that is capable of performing its required safety function.~~ The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~SR 3.8.4.2~~

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

~~SR 3.8.4.2 (continued)~~

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

~~The connection resistance limits are established to maintain connection resistance as low as reasonably possible to minimize the overall voltage drop across the battery and the possibility of battery damage due to heating of connections.~~

~~The resistance values for each battery connection are located in the Technical Requirements Manual (Ref. 9).~~

~~The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.~~

~~SR 3.8.4.3~~

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

~~The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.~~

~~SR 3.8.4.4 and SR 3.8.4.5~~

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

~~The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR, provided visible corrosion is removed during performance of this Surveillance.~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

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

~~The connection resistance limits are established to maintain connection resistance as low as reasonably possible to minimize the overall voltage drop across the battery and the possibility of battery damage due to heating of connections. The resistance values for each battery connection are located in the Technical Requirements Manual (Ref. 9).~~

~~The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.~~

SR 3.8.4.6~~2~~

This SR verifies ~~Battery charger capability requirements are based on~~ the design capacity of the battery chargers ~~(Ref. 4)~~. According to Regulatory Guide 1.32 (Ref. 10), each battery charger supply is ~~required~~ 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 ensures that these requirements can be satisfied.

This SR provides two options. One option requires that each battery charger be capable of supplying ≥ 400 amps for station service subsystems and ≥ 100 amps for DG subsystems at the minimum established float voltage for 1 hour. 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 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 ≤ 20 amps for the station service battery and ≤ 5 amps for the DG batteries.

(continued)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.8.4.~~7~~3

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

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.~~7~~ 3 (continued)

~~The modified performance discharge test is a simulated duty cycle consisting of just two rates: the 1 minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated 1 minute discharge represent a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.~~

~~A modified performance discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service discharge test.~~

The reason for Note 2 is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance. The swing DG DC battery is exempted from this restriction, since it is required by both units' LCO 3.8.4 and cannot be performed in the manner required by the Note without resulting in a dual unit shutdown.

~~SR 3.8.4.8~~

~~A battery performance discharge test is a constant current capacity test to detect any change in the capacity determined by the acceptance test. Initial conditions consistent with IEEE-450 need to be met prior to the performing of a battery performance discharge test. The test results reflect the overall effects of usage and age.~~

~~A battery modified performance discharge test is described in the Bases for SR 3.8.4.7. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.8; however, only the modified performance discharge test~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

~~SR 3.8.4.8 (continued)~~

~~may be used to satisfy SR 3.8.4.8, while satisfying the requirements of SR 3.8.4.7 at the same time. The acceptance criteria for this Surveillance is consistent with IEEE-450 (Ref. 8) and IEEE-485 (Ref. 12). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. Although there may be ample capacity, the battery rate of deterioration is rapidly increasing.~~

~~The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.~~

~~This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance. The swing DG DC battery is exempted from this restriction, since it is required by both units' LCO 3.8.4 and cannot be performed in the manner required by the Note without resulting in a dual unit shutdown.~~

SR 3.8.4.~~9~~ 4

With the exception of this Surveillance, all other Surveillances of this Specification (SR 3.8.4.1 through SR 3.8.4.~~8~~3) are applied only to the Unit 1 DC sources. This Surveillance is provided to direct that the appropriate Surveillances for the required Unit 2 DC sources are governed by the Unit 2 Technical Specifications. Performance of the applicable Unit 2 Surveillances will satisfy both any Unit 2 requirements, as well as satisfying this Unit 1 SR.

The Frequency required by the applicable Unit 2 SR also governs performance of that SR for both Units.

(continued)

BASES (continued)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.

2. Regulatory Guide 1.6.

3. IEEE Standard 308-1971.

4. FSAR, Section 8.5.

5. FSAR, Chapters 5 and 6.

6. Unit 2 FSAR, Chapter 15~~4~~.

7. Regulatory Guide 1.93, December 1974.

8. IEEE Standard 450-2002~~1987~~.

9. Technical Requirements Manual, Section 9.0.

10. Regulatory Guide 1.32, February 1977.

11. Not used.

12. IEEE Standard 485-1983.

13. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

14. Not used.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources - Operating

BASES

BACKGROUND

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

The station service DC power sources provide both motive and control power to selected safety related and nonsafety related equipment. Each DC subsystem is energized by one 125/250 V station service battery (consisting of two 125 V batteries in series), and three 125 V battery chargers (two normally inservice chargers and one standby charger). Each battery is exclusively associated with a single 125/250 VDC bus. Each set of battery chargers exclusively associated with a 125/250 VDC subsystem cannot be interconnected with any other 125/250 VDC subsystem. The normal and backup chargers are supplied from the same AC load groups for which the associated DC subsystem supplies the control power. The loads between the redundant 125/250 VDC subsystem are not transferable except for the Automatic Depressurization System, the logic circuits and valves of which are normally fed from the Division 1 DC system.

The diesel generator (DG) DC power sources provide control and instrumentation power for their respective DG and their respective offsite circuit supply breakers. In addition, DG 2A power source provides circuit breaker control power for the respective Division I loads on 4160 VAC buses 2E and 2F, and DG 2C power source provides circuit breaker control power for the respective Division II loads on 4160 VAC buses 2F and 2G. Each DG DC subsystem is energized by one 125 V battery and two 125 V battery chargers (one normally inservice charger and one standby charger).

During normal operation, the DC loads are powered from the respective station service and DG battery chargers with the batteries floating on the system.

In case of loss of normal power to any battery charger, the DC loads are automatically powered from the associated battery. This will

(continued)

BASES

BACKGROUND (continued)

result in the discharging of the associated battery (and affect the battery cell parameters).

The DC power distribution system is described in more detail in Bases for LCO 3.8.7, "Distribution System - Operating," and LCO 3.8.8, "Distribution System - Shutdown."

~~Each battery has adequate storage capacity to carry the required load continuously for approximately 2 hours (Ref. 4).~~

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

Each battery has adequate storage capacity to meet the duty cycle(s) discussed in the FSAR, Chapter 8 (Ref 4). The battery is designed with additional capacity above that required by the design duty cycle to allow for temperature variations and other factors.

The batteries for DC electrical power subsystems are sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life. The minimum design voltage limit is 105/210 V.

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 124 V for a 60 cell battery (i.e., cell voltage of 2.07 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 > 2.07 Vpc, the battery cell will maintain its capacity for 30 days without further charging per manufacturer's instructions. Optimal long term performance however, is obtained by maintaining a float voltage 2.20 to 2.25 Vpc. This provides adequate over-potential, which limits the formation of lead sulfate and self discharge. The nominal float voltage of 2.20 Vpc corresponds to a total float voltage output of 132 V for a 60 cell battery as discussed in the FSAR, Chapter 8 (Ref. 4).

Each battery charger of the DC electrical power subsystem has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining a fully charged battery. Each battery charger has sufficient excess capacity to restore the battery from the design

(continued)

minimum charge to its fully charged state within 24 hours while supplying normal steady state loads (Ref. 4).

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

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

A description of the Unit 1 DC power sources is provided in the Bases for Unit 1 LCO 3.8.4, "DC Sources - Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 5), and Chapter 15 (Ref. 6), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation. The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining DC sources OPERABLE during accident conditions in the event of:

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

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

b. A postulated worst case single failure.

The DC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 13).

LCO

The Unit 2 DC electrical power subsystems -- with: 1) each station service DC subsystem consisting of one 125/250 V station service battery (two 125 V batteries in series), two battery chargers, and the corresponding control equipment and interconnecting cabling supplying power to the associated bus; and 2) each DG DC subsystem consisting of one battery bank, one battery charger, and the corresponding control equipment and interconnecting cabling -- are required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. In addition, some components required by Unit 2 require power from Unit 1 sources (e.g., Standby Gas Treatment (SGT) System, Low Pressure Coolant Injection (LPCI) valve load centers, Main Control Room Environmental Control (MCREC) System, and Control Room Air Condition (AC) System). Therefore, the Unit 1 DG DC and the swing DG DC electrical power subsystems needed to provide DC power to the required Unit 1 components are also required to be OPERABLE. Thus, loss of any DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

APPLICABILITY

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

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

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

The DC electrical power requirements for MODES 4 and 5, and other conditions in which DC Sources are required, are addressed in the Bases for LCO 3.8.5, "DC Sources - Shutdown."

(continued)

BASES (continued)

ACTIONS

A.1

If one or more of the required Unit 1 DG DC electrical power subsystems is inoperable (e.g., inoperable battery, inoperable battery charger(s), or inoperable battery charger and associated inoperable battery), or if the swing DG DC electrical power subsystem is inoperable due to performance of SR 3.8.4.3~~7~~ or SR 3.8.6.6~~4.8~~, and a loss of function has not occurred as described in Condition ~~E~~G, the remaining DC electrical power subsystems have the capacity to support a safe shutdown and to mitigate an accident condition. In the case of an inoperable required Unit 1 DG DC electrical power subsystem, continued power operation should not exceed 7 days since a subsequent postulated worst case single failure could result in the loss of certain safety functions (e.g., SGT System and LPCI valve load centers). The 7 day Completion Time takes into account the capacity and capability of the remaining DC sources, and is based on the shortest restoration time allowed for the systems affected by the inoperable DC source in the respective system Specification.

In the case of an inoperable swing DG DC electrical power subsystem, since a subsequent postulated worst case single failure could result in the loss of minimum necessary DC electrical subsystems to mitigate a postulated worst case accident, continued power operation should also not exceed 7 days. The 7 day Completion Time is based upon the swing DG DC electrical power subsystem being inoperable due to performance of SR 3.8.4.3~~7~~ or SR 3.8.6.6~~4.8~~. Performance of these two SRs will result in inoperability of the DC battery. Since this battery is common to both units, more time is provided to restore the battery, if the battery is inoperable for performance of required Surveillances, to preclude the need to perform a dual unit shutdown to perform these Surveillances. The swing DG DC electrical power subsystem also does not provide power to the same type of equipment as the other DG DC sources (e.g., breaker control power for 4160 V loads is not provided by the swing DG battery). The Completion Time also takes into account the capacity and capability of the remaining DC sources.

B.1, B.2, and B.3

Condition B represents one Unit 2 DG DC subsystem with a required battery charger inoperable (e.g., the voltage limit of SR 3.8.4.1 is not maintained), or the swing DG DC subsystem with a required battery charger inoperable for reasons other than Condition A. The ACTIONS provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to OPERABLE status in a reasonable time period. Required Action B.1 requires that the battery terminal voltage be restored to greater

(continued)

than or equal to the minimum established float voltage within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within 12 hours, the battery will be restored to its fully charged condition (Required Action B.2) from any discharge that might have occurred due to the charger inoperability.

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

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

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

Required Action B.2 requires that the battery float current be verified as less than or equal to 5 amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it is now fully capable of supplying the maximum expected load requirement. The 5 amp value is based on returning the battery to 95% charge and assumes a 5% design margin for the battery. If at the expiration of the initial 12 hour period the battery float current is not less than or equal to 5 amps this indicates there may be additional battery problems and the battery must be declared inoperable.

Required Action B.3 limits the restoration time for the inoperable

(continued)

battery charger to 72 hours. This action is applicable if an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage has been used (e.g., balance of plant non-Class 1E battery charger). The 72 hour Completion Time reflects a reasonable time to effect restoration of the qualified battery charger to OPERABLE status.

~~B~~C.1

If a Unit 2 DG DC electrical power subsystem is inoperable for reasons other than Condition B, or if the swing DG DC electric power subsystem is inoperable for reasons other than Condition A or B, (e.g. inoperable battery or inoperable battery charger and associated inoperable battery), the remaining DC electrical power subsystems have the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent postulated worst case single failure could result in the loss of minimum necessary DC electrical subsystems to mitigate a postulated worst

(continued)

BASES

ACTIONS

~~B~~C.1 (continued)

case accident, continued power operation should not exceed 12 hours. The 12 hour Completion Time provides a period of time to correct the problem commensurate with the importance of maintaining the DG DC electrical power subsystem OPERABLE. (The DG DC electrical power subsystem affects both the DG and the offsite circuit, as well as the breaker closure power for various 4160 V AC loads, but does not affect 125/250 V DC station service loads.)

D.1, D.2, and D.3

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

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

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

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

Required Action D.2 requires that the battery float current be verified as less than or equal to 20 amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it is now fully capable of supplying the maximum expected load requirement. The 20 amp value is based on returning the battery to 95% charge and assumes a 5% design margin for the battery. If at the expiration of the initial 12 hour period the battery float current is not less than or equal to 20 amps this indicates there may be additional battery problems and the battery must be declared inoperable.

Required Action D.3 limits the restoration time for the inoperable battery charger to 72 hours. This action is applicable if an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage has been used (e.g., balance of plant non-Class 1E battery charger). The 72 hour Completion Time reflects a reasonable time to effect restoration of the qualified battery to OPERABLE status.

~~C~~E.1

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

If one of the required Unit 2 station service DC electrical power subsystems is inoperable for reasons other than Condition D (e.g., inoperable battery~~, inoperable battery charger(s),~~ or inoperable battery charger and associated inoperable battery), the remaining DC electrical power subsystems have the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent postulated worst case single failure could result in the loss of minimum necessary DC electrical subsystems to mitigate a postulated

(continued)

worst case accident, continued power operation should not exceed 2 hours. The 2 hour Completion Time is based on Regulatory Guide 1.93 (Ref. 7) and reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem and, if the DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

~~D~~F.1 and ~~D~~F.2

If the DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, 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 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. The Completion Time

(continued)

BASES

ACTIONS

~~D~~F.1 and ~~D~~F.2 (continued)

to bring the unit to MODE 4 is consistent with the time required in Regulatory Guide 1.93 (Ref. 7).

~~E~~G.1

Condition ~~E~~ G corresponds to a level of degradation in the DC electrical power subsystems that causes a required safety function to be lost. When more than one DC source is lost, and this results in the loss of a required function, the plant is in a condition outside the accident analysis. Therefore, no additional time is justified for continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

SURVEILLANCE REQUIREMENTS

The SRs are modified by a NOTE to indicate that SR 3.8.4.1 through SR 3.8.4.~~8~~ 3 apply only to the Unit 2 DC sources, and that SR 3.8.4.~~9~~ 4 applies only to the Unit 1 DC sources.

SR 3.8.4.1

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the ~~charging system and the ability of the batteries to perform their intended function~~ 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 ~~(or battery cell)~~ and maintain the battery ~~(or a battery cell)~~ in a fully charged state while supplying the continuous steady state loads of the associated DC subsystem. On float charge, battery cells will receive adequate current to 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). For example, if 60 cells are connected, the voltage at the battery terminals would be 132 V, 2.20 Vpc times 60 cells. With only 58 connected cells, the terminal voltage would be 127.6 V.
This voltage maintains the battery plates in a condition that supports maintaining the grid life. ~~Voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. The voltage requirement for battery terminal voltage is based on the open circuit~~

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~~voltage of a lead-calcium cell of nominal 1.215 specific gravity. Without regard to other battery parameters, this voltage is indicative of a battery that is capable of performing its required safety function.~~ The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~SR 3.8.4.2~~

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

~~SR 3.8.4.2 (continued)~~

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

~~The connection resistance limits are established to maintain connection resistance as low as reasonably possible to minimize the overall voltage drop across the battery and the possibility of battery damage due to heating of connections.~~

~~The resistance values for each battery connection are located in the Technical Requirements Manual (Ref. 9).~~

~~The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.~~

~~SR 3.8.4.3~~

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

~~The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.~~

~~SR 3.8.4.4 and SR 3.8.4.5~~

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

~~The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR, provided visible corrosion is removed during performance of this Surveillance.~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

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

~~The connection resistance limits are established to maintain connection resistance as low as reasonably possible to minimize the overall voltage drop across the battery and the possibility of battery damage due to heating of connections. The resistance values for each battery connection are located in the Technical Requirements Manual (Ref. 9).~~

~~The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.~~

SR 3.8.4.6~~2~~

This SR verifies ~~Battery charger capability requirements are based on~~ the design capacity of the battery chargers ~~(Ref. 4)~~. According to Regulatory Guide 1.32 (Ref. 10), each battery charger supply is ~~required~~ 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 ensures that these requirements can be satisfied.

This SR provides two options. One option requires that each battery charger be capable of supplying ≥ 400 amps for the station service subsystems and ≥ 100 amps for the DG subsystems at the minimum established float voltage for 1 hour. 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 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 ≤ 20 amps for the station service battery and ≤ 5 amps for the DG batteries.

(continued)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.8.4.~~7~~3

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

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.~~7~~3 (continued)

~~The modified performance discharge test is a simulated duty cycle consisting of just two rates: the 1 minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated 1 minute discharge represent a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.~~

~~A modified performance discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service discharge test.~~

The reason for Note 2 is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance. The swing DG DC battery is exempted from this restriction, since it is required by both units' LCO 3.8.4 and cannot be performed in the manner required by the Note without resulting in a dual unit shutdown.

~~SR 3.8.4.8~~

~~A battery performance discharge test is a constant current capacity test to detect any change in the capacity determined by the acceptance test. Initial conditions consistent with IEEE-450 need to be met prior to the performing of a battery performance discharge test. The test results reflect the overall effects of usage and age.~~

~~A battery modified performance discharge test is described in the Bases for SR 3.8.4.7. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.8; however, only the modified performance discharge test~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

~~SR 3.8.4.8 (continued)~~

~~may be used to satisfy SR 3.8.4.8, while satisfying the requirements of SR 3.8.4.7 at the same time.~~

~~The acceptance criteria for this Surveillance is consistent with IEEE-450 (Ref. 8) and IEEE-485 (Ref. 12). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. Although there may be ample capacity, the battery rate of deterioration is rapidly increasing.~~

~~The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.~~

~~This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance. The swing DG DC battery is exempted from this restriction, since it is required by both units' LCO 3.8.4 and cannot be performed in the manner required by the Note without resulting in a dual unit shutdown.~~

SR 3.8.4.~~9~~ 4

With the exception of this Surveillance, all other Surveillances of this Specification (SR 3.8.4.1 through SR 3.8.4.~~8~~3) are applied only to the Unit 2 DC sources. This Surveillance is provided to direct that the appropriate Surveillances for the required Unit 1 DC sources are governed by the Unit 1 Technical Specifications. Performance of the applicable Unit 1 Surveillances will satisfy both any Unit 1 requirements, as well as satisfying this Unit 2 SR.

The Frequency required by the applicable Unit 1 SR also governs performance of that SR for both Units.

(continued)

BASES (continued)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.

2. Regulatory Guide 1.6.

3. IEEE Standard 308-1971.

4. FSAR, Paragraphs 8.3.2.1.1 and 8.3.2.1.2.

5. FSAR, Chapter 6.

6. FSAR, Chapter 15.

7. Regulatory Guide 1.93, December 1974.

8. IEEE Standard 450-2002~~1987~~.

9. Technical Requirements Manual, Section 9.0.

10. Regulatory Guide 1.32, February 1977.

11. Not used

12. IEEE Standard 485-1983.

13. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

Edwin I. Hatch Nuclear Plant – Units 1 and 2

Withdrawal of TSTF-500 Request to Increase the Completion Time for the Station Service Batteries from 2 to 12 hours

Attachment 3

Clean Typed TS pages

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources - Operating

LCO 3.8.4 The following DC electrical power subsystems shall be OPERABLE:

a. The Unit 1 Division 1 and Division 2 station service DC electrical power subsystems;

b. The Unit 1 and the swing DGs DC electrical power subsystems; and

c. The Unit 2 DG DC electrical power subsystems needed to support the equipment required to be OPERABLE by LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," and LCO 3.8.1, "AC Sources - Operating."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Swing DG DC electrical power subsystem inoperable due to performance of SR 3.8.4.3 or SR 3.8.6.6. OR One or more required Unit 2 DG DC electrical power subsystems inoperable.	A.1 Restore DG DC electrical power subsystem to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Unit 1 DG DC battery charger on one subsystem inoperable. OR Required swing DG DC battery charger inoperable for reasons other than Condition A.	B.1	Restore battery terminal voltage to greater than or equal to the minimum established float voltage.	2 hours
	AND		
	B.2.	Verify battery float current is ≤ 5 amps.	Once per 12 hours
	AND		
	B.3	Restore battery charger(s) to OPERABLE status.	72 hours
C. One Unit 1 DG DC electrical power subsystem inoperable for reasons other than Condition B. OR Swing DG DC electrical power subsystem inoperable for reasons other than Condition A or B.	C.1	Restore DG DC electrical power subsystem to OPERABLE status.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One or more required Unit 1 station service DC battery chargers on one subsystem inoperable.	D.1	Restore battery terminal voltage to greater than or equal to the minimum established float voltage.	2 hours
	AND		
	D.2.	Verify battery float current is ≤ 20 amps.	Once per 12 hours
	AND		
	D.3	Restore battery charger(s) to OPERABLE status.	72 hours
E. One Unit 1 station service DC electrical power subsystem inoperable for reasons other than Condition D.	E.1	Restore station service DC electrical power subsystem to OPERABLE status.	2 hours
F. Required Action and Associated Completion Time of Condition A, B, C, D, or E not met.	F.1	Be in MODE 3.	12 hours
	AND		
	F.2	Be in MODE 4.	36 hours
G. Two or more DC electrical power subsystems inoperable that result in a loss of function.	G.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------
SR 3.8.4.1 through SR 3.8.4.3 are applicable only to the Unit 1 DC sources. SR 3.8.4.4 is applicable only to the Unit 2 DC sources.

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is greater than or equal to the minimum established float voltage.	In accordance with the Surveillance Frequency Control Program
SR 3.8.4.2	Verify each required battery charger supplies ≥ 400 amps for station service subsystems, and ≥ 100 amps for DG subsystems at greater than or equal to the minimum established float voltage for ≥ 1 hour. OR Verify 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.	In accordance with the Surveillance Frequency Control Program
SR 3.8.4.3	----------NOTES---------- 1. The modified performance discharge test in SR 3.8.6.6 may be performed in lieu of SR 3.8.4.3. 2. This Surveillance shall not be performed in MODE 1, 2, or 3, except for the swing DG battery. However, credit may be taken for unplanned events that satisfy this SR. --- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.4	For required Unit 2 DC sources, the SRs of Unit 2 Specification 3.8.4 are applicable.	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources - Operating

LCO 3.8.4 The following DC electrical power subsystems shall be OPERABLE:

a. The Unit 2 Division 1 and Division 2 station service DC electrical power subsystems;

b. The Unit 2 and the swing DGs DC electrical power subsystems; and

c. The Unit 1 DG DC electrical power subsystems needed to support the equipment required to be OPERABLE by LCO 3.6.4.3, "Standby Gas Treatment (SGT) System"; LCO 3.7.4, "Main Control Room Environmental Control (MCREC) System"; LCO 3.7.5, "Control Room Air Conditioning (AC) System"; and LCO 3.8.1, "AC Sources - Operating."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Swing DG DC electrical power subsystem inoperable due to performance of SR 3.8.4.3 or SR 3.8.6.6. OR One or more required Unit 1 DG DC electrical power subsystems inoperable.	A.1 Restore DG DC electrical power subsystem to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Unit 2 DG DC battery charger on one subsystem inoperable. OR Required swing DG DC battery charger inoperable for reasons other than Condition A.	B.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage. AND B.2 Verify battery float current is ≤ 5 amps. AND B.3 Restore battery charger(s) to OPERABLE status.	2 hours Once per 12 hours 72 hours
C. One Unit 2 DG DC electrical power subsystem inoperable for reasons other than Condition B. OR Swing DG DC electrical power subsystem inoperable for reasons other than Condition A or B.	C.1 Restore DG DC electrical power subsystem to OPERABLE status.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One or more required Unit 2 station service DC battery chargers on one subsystem inoperable.	D.1	Restore battery terminal voltage to greater than or equal to the minimum established float voltage.	2 hours
	AND		
	D.2	Verify battery float current is ≤ 20 amps.	Once per 12 hours
	AND		
	D.3	Restore battery charger(s) to OPERABLE status.	72 hours
E. One Unit 2 station service DC electrical power subsystem inoperable for reasons other than Condition D.	E.1	Restore station service DC electrical power subsystem to OPERABLE status.	2 hours
F. Required Action and Associated Completion Time of Condition A, B, C, D, or E not met.	F.1	Be in MODE 3.	12 hours
	AND		
	F.2	Be in MODE 4.	36 hours
G. Two or more DC electrical power subsystems inoperable that result in a loss of function.	G.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------
SR 3.8.4.1 through SR 3.8.4.3 are applicable only to the Unit 2 DC sources. SR 3.8.4.4 is applicable only to the Unit 1 DC sources.

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is greater than or equal to the minimum established float voltage.	In accordance with the Surveillance Frequency Control Program
SR 3.8.4.2	Verify each required battery charger supplies ≥ 400 amps for station service subsystems, and ≥ 100 amps for DG subsystems at greater than or equal to the minimum established float voltage for ≥ 1 hour. OR Verify 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.	In accordance with the Surveillance Frequency Control Program
SR 3.8.4.3	----------NOTES---------- 1. The modified performance discharge test in SR 3.8.6.6 may be performed in lieu of the service test in SR 3.8.4.3. 2. This Surveillance shall not be performed in MODE 1, 2, or 3, except for the swing DG battery. However, credit may be taken for unplanned events that satisfy this SR. --- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.4	For required Unit 1 DC sources, the SRs of Unit 1 Specification 3.8.4 are applicable.	In accordance with applicable SRs