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MAR 28 2008

U. S. Nuclear Regulatory Commission
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Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENT NO. 298 TO UNIT 1 LICENSE NPF-14
AND AMENDMENT NO. 268 TO UNIT 2 LICENSE NPF-22:
DC ELECTRICAL POWER SYSTEMS TECHNICAL
SPECIFICATION 3.8.4 **Docket Nos. 50-387**
PLA-6304 **and 50-388**

Reference: 1) *Letter from Carl F. Lyon (USNRC), to Mr. J. V. Parrish (CGS), "Columbia Generating Station – Issuance of Amendment re: AC and DC Electrical Power (TAC No. MC7273,)" dated May 1, 2007.*

In accordance with the provisions of 10 CFR 50.90, PPL Susquehanna, LLC (PPL) is submitting a request for amendment to the Technical Specifications for Susquehanna Units 1 and 2.

The purpose of this letter is to propose changes to the Susquehanna Steam Electric Station (SSES) Units 1 and 2 Technical Specifications (TS) Section 3.8.4, "DC Sources - Operating".

These proposed changes reduce the potential for an unnecessary unit shutdown due to an inoperable Class 1E 250 Volt Direct Current (VDC) or 125 VDC battery charger provided established voltage and battery float current parameters are met. The existing Required Actions and Completion Time for an inoperable battery bank are unaffected by these changes.

The enclosure to this letter contains PPL's evaluation of these proposed changes. Included are a description of the proposed changes, technical analysis of the changes, regulatory analysis of the changes (No Significant Hazards Consideration and the Applicable Regulatory Requirements), and the environmental considerations associated with the changes.

These changes are consistent with the changes approved for Columbia Generating Station in License Amendment 204 (Reference 1).

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NRR

Attachment 1 to this letter contains the applicable pages of the SSES Units 1 and 2 TS, marked to show the proposed changes. (Underlined text is added and strike through text is deleted).

Attachment 2 contains the applicable pages of the SSES Units 1 and 2 Technical Specifications Bases (TSB), provided for information.

There are no regulatory commitments associated with these proposed changes.

The need for these changes has been discussed with the SSES NRC Project Manager. In addition, the changes have also been reviewed by the Susquehanna SES Plant Operations Review Committee (PORC) and the Susquehanna Review Committee (SRC).

PPL plans to implement the proposed changes as soon as practical following NRC approval. Therefore, we request NRC complete its review by December 31, 2008 to be implemented within 30 days of approval.

Any questions regarding this request should be directed to Mr. Duane L. Filchner at (610) 774-7819.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: 32808

B. T. McKinney

Enclosure: Evaluation of Proposed Changes to Units 1 & 2 Technical Specifications 3.8.4 "DC Sources – Operating."

Attachments: Attachment 1 - Proposed Units 1 & 2 Technical Specification Changes, (Mark-ups)
Attachment 2 - Proposed Units 1 & 2 Technical Specification Bases Changes, (Mark-ups for Information Only)

cc: NRC Region I
Mr. R. Janati, DEP/BRP
Mr. F. W. Jaxheimer, NRC Sr. Resident Inspector
Mr. B. K. Vaidya, NRC Project Manager

Enclosure to PLA-6304

PPL Susquehanna, LLC

Evaluation of Proposed Changes to Units 1 & 2 Technical Specifications 3.8.4 "DC Sources – Operating"

PPL EVALUATION

Subject: Units 1 & 2 DC Electrical Power Systems Technical Specification 3.8.4

1.0 DESCRIPTION

This is a request to amend Operating Licenses NPF-14 and NPF-22 for PPL Susquehanna, LLC (PPL), Susquehanna Steam Electric Station (SSES) Units 1 and 2. It represents proposed revisions to the SSES Technical Specification (TS) 3.8.4 "DC Sources – Operating."

2.0 PROPOSED CHANGES

Two new Conditions and their associated Required Actions are proposed for addition to the Units 1 & 2 TS 3.8.4.

New Condition A establishes the new Required Actions (A.1, A.2, and A.3) with their associated Completion Times for an inoperable Class 1E battery charger in the 250 VDC Division II or 125 VDC subsystems A, B, C, or D. New Condition A also addresses the condition where both 250 VDC Division I battery chargers are inoperable. These battery chargers are listed on TS Table 3.8.4-1 "DC Electrical Power Subsystems."

New Condition B establishes the new Required Action and Completion Time for an inoperable Class 1E battery bank in the 250 VDC or 125 VDC electric power subsystems. These battery banks are listed on TS Table 3.8.4-1 "DC Electrical Power Subsystems."

Additionally, the following editorial / administrative changes to TS 3.8.4 are included:

Unit 1 - the existing Condition A Note is added to new Conditions A and B. Existing Condition A is renamed Condition C, and existing Conditions B, C, and D, are renamed Conditions D, E, and F respectively. Additionally, renamed Condition D is changed to maintain consistency with the intent of the current TS by requiring entry into Mode 3 within 12 hours and Mode 4 within 36 hours for two or more subsystems inoperable. TS Table 3.8.4-1 is revised to clarify the identity of the battery banks, battery chargers, and subsystems.

Unit 2 - the existing Condition A Note is added to new Conditions A and B. Existing Condition A is renamed Condition C, and existing Conditions B, C, D, E, and F are renamed Conditions D, E, F, G, and H respectively. Additionally, renamed Condition D is changed to maintain consistency with the intent of the current TS by requiring entry into Mode 3 within 12 hours and Mode 4 within 36 hours for two or more subsystems inoperable. TS Table 3.8.4-1 is revised to clarify the identity of the battery banks, battery chargers, and subsystems.

These changes to TS 3.8.4 are shown in Attachment 1 as mark-ups of the affected TS pages. Text that has been inserted is underlined and text that has been deleted is crossed out. The affected Technical Specification Bases (TSB) pages are also marked-up and provided (for information) in Attachment 2.

A similar request for an inoperable battery charger was approved as License Amendment 204 on May 1, 2007 for Columbia Generating Station. (Reference 4).

3.0 BACKGROUND

250 VDC Electrical Power System

Each SSES unit has a 250 VDC electrical power system, which consists of two separate and independent Class 1E 250 VDC subsystems, designated as Division I and Division II. Each 250 VDC division contains a battery bank of 120 lead calcium cells having a nominal terminal voltage of 250 volts, a 250 VDC load center, and 250 VDC motor control centers, which distribute power to connected Class 1E and non-Class 1E loads. Additionally, each Division I 250 VDC sub-system has two full capacity battery chargers connected to the loads. The Division II 250 VDC subsystem system has only one full capacity battery charger connected to the loads.

Technical Specification (TS) Limiting Condition for Operation (LCO) 3.8.4 applies to each Division's source components (battery banks and battery chargers). TS LCO 3.8.7 applies to each Division's electrical distribution components (load centers, motor control centers, DC buses, and distribution panels).

The 250 VDC Division I sub-systems contain two full capacity battery chargers. As such, either 250 VDC Division I charger is capable of performing the required design function and the other charger is considered to be an installed Class 1E alternate charger.

The 250 VDC Division II subsystems were designed with one battery charger to supply all the connected loads. Since only one charger was provided, the 250 VDC Division II electrical power subsystem on either unit does not have an installed alternate battery charger.

The 250 VDC electrical power subsystems on each unit supply the DC power required for larger DC loads such as motor driven pumps and valves, inverters for the plant computer and vital 120V AC power supplies.

During normal operation, each 250 VDC load receives power from a connected Class 1E 250 VDC battery charger. The battery is connected in parallel to the charger and it floats at full capacity and charge on the system. A loss of the Class 1E 480 VAC power supply to any operating battery charger will cause the associated battery to discharge as it provides power to the connected 250 VDC loads. No operator action is required for this transfer because the battery bank is connected in parallel to the charger and it automatically assumes the loads when the battery charger output voltage falls below the battery open circuit terminal voltage.

125 VDC Electrical Power System

Each unit has a 125 VDC electrical power system which consists of four separate and independent Class 1E load group subsystems designated as subsystems A, B, C, and D. Each of these 125 VDC electrical power subsystems contains a battery bank of 60 lead calcium cells having a nominal terminal voltage of 125 volts, a 125 VDC battery charger, a 125 VDC load center, and 125 VDC Class 1E and non-Class 1E distribution panels which distribute power to the connected loads.

Technical Specification (TS) Limiting Condition for Operation (LCO) 3.8.4 applies to each Division's source components (battery banks and battery chargers). TS LCO 3.8.7 applies to each Division's electrical distribution components (load centers, motor control centers, DC buses, and distribution panels).

Each of the 125 VDC electrical power subsystems provides control power for its associated Class 1E AC power load group (designated as A, B, C, D) which consists of 4.16 kV switchgear, 480V load centers, and a standby diesel generator. FSAR Section 8.3.1 provides further discussion of the onsite AC power systems. The 125 VDC subsystems also provide DC power to the engineered safety feature (ESF) valve actuation, diesel generator auxiliaries and controls, and plant alarm and indication circuits.

The "A" and "C" 125 VDC load group subsystems together are considered to be the 125 VDC Division I. Similarly, the "B" and "D" 125 VDC load group subsystems together are considered to be the 125 VDC Division II.

During normal operation, each of the 125 VDC loads receives power from a connected Class 1E 125 VDC battery charger. The battery is connected in parallel to the charger and it floats at full capacity and charge on the system. A loss of the Class 1E 480 VAC power supply to any operating battery charger will cause the associated battery to discharge as it provides power to the connected 125 VDC loads. No operator action is required for this transfer because the battery bank is connected in parallel to the charger and it automatically assumes the loads when the battery charger output voltage falls below the battery open circuit terminal voltage.

Certain plant electrical loads, such as Emergency Service Water (ESW) are common to both units. These common loads are provided motive power from the Unit 1 4160 V subsystem. The 125 VDC control power for these common loads is normally provided from the Unit 1 125 VDC electric power subsystems. However, these 125 VDC common loads can be transferred to the Unit 2 125 VDC electric power subsystems when necessary. Unit 2 TS 3.8.7 Condition I establishes the requirements for common loads that are transferred from Unit 1 to Unit 2. Unit 2 TS 3.8.7 is not affected by these proposed changes.

Additionally, a Class 1E 125 VDC battery and charger is installed as a dedicated DC power supply for only the D/G E Class 1E DC loads and the four motor operated valves used to align Emergency Service Water (ESW) to D/G E. The D/G E 125 VDC electrical power subsystem consists of a separate and independent Class 1E subsystem. This 125 VDC electrical power subsystem contains a battery bank of 60 lead calcium cells having a nominal terminal voltage of 125 volts, a 125 VDC battery charger, a 125 VDC motor control center, and a 125 VDC distribution panels to distribute power to connected Class 1E loads. The D/G E Class 1E DC electrical power subsystem is not affected by these changes because it does not provide DC electrical power to any of the 125 VDC plant load group subsystems (A, B, C, D) described above.

DC Equipment Sizing

Each 250 VDC or 125 VDC battery has sufficient capacity, without its associated charger, to independently supply the required loads for 4 hours as discussed in the FSAR, Section 8.3.2.1.1.4, and shown on the associated load cycle tables in FSAR Section 8.3.

The battery cells for a DC electrical power subsystem are sized in accordance with IEEE Standard 485-1978 such that the required battery capacity exists at 80% of the battery rating. The minimum voltage design limit is 210 V for the 250 VDC batteries and 105 V for the 125 VDC batteries. The accident load profile for each battery is shown in its associated load cycle table in FSAR Section 8.3.

Each battery charger in the 250 VDC and the 125 VDC electrical power subsystems is sized with sufficient capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger can restore its associated battery bank from the design minimum charge to its fully charged state within 24 hours while supplying normal steady state loads as discussed in FSAR Section 8.3.2.1.1.4.

The 250 VDC and the 125 VDC electrical power subsystems are required to be operable to ensure the reactor can be shutdown and maintained in a safe condition after an anticipated operational occurrence (AOO) or a postulated design basis accident (DBA). Loss of any single DC electrical power subsystem does not prevent this minimum safety function from being performed. In addition to maintaining battery operability, each 125 VDC battery charger provides DC control power to AC circuit breakers and thus supports the recovery of AC power following events such as loss of offsite power or station blackout.

SSES FSAR Section 8.3.2.2.1, Compliance with General Design Criteria, Regulatory Guides, and IEEE Standards, provides discussion of SSES compliance with the applicable regulatory requirements and guidance. These proposed TS changes do not alter the design or function of any DC electrical power subsystem. They do not change the qualification of any component in any DC electrical power subsystem, and they do not cause any component to be reclassified with respect to it being shared, safety related, independent, redundant, and physically or electrically separated from non-Class 1E equipment.

4.0 TECHNICAL ANALYSIS

Existing Technical Specification (TS) 3.8.4 Condition A is applicable for one DC electrical power subsystem inoperable. The proposed change adds two new Conditions (A and B), which provide explicit Actions for battery charger and battery bank inoperability.

Additionally, the following editorial / administrative changes are necessary due to new Conditions A and B:

- Redesignation of the Units 1 and 2 Condition A as Condition C.

- Addition of existing Condition A Note to new Condition A and new Condition B.
- Redesignation of existing Unit 1 TS 3.8.4 Conditions A, B, C, and D as Conditions C, D, E, and F.
- Redesignation of existing Unit 2 TS 3.8.4 Conditions A, B, C, D, E, and F as Conditions C, D, E, F, G, and H.
- Clarification of equipment in the Units 1 and 2 Table 3.8.4-1.

The acceptability of the two new Conditions and Required Actions is described below. No further discussion is provided for the editorial / administrative changes except for the added text to Condition D.

NEW CONDITION A:

New Condition A applies when one (or two) battery charger(s) on one DC electrical power subsystem are inoperable (e.g., the battery terminal voltage specified in SR 3.8.4.1 is not maintained). New Condition A contains three new Required Actions which provide a tiered response that focuses on returning the battery to the fully charged state and restoring the inoperable charger to Operable status in a reasonable time period.

New Required Action A.1 provides assurance that the battery discharge is terminated and that the battery will be restored to its fully charged condition from any discharge that might have occurred due to the battery charger being inoperable. Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage (129 VDC for the 125 VDC subsystems and 258 VDC for the 250 VDC subsystems) within 2 hours. This can be accomplished by either restoring the inoperable battery charger to Operable status or by establishing the minimum float voltage by an alternate means, such as a spare, temporarily connected battery charger having sufficient capacity to supply the connected loads. At the end of the 2 hours, a terminal voltage of at least the minimum established float voltage provides an indication that the battery is on the exponential charging current portion of its recharging cycle.

New Required Action A.2 assures that the affected battery is in a fully charged state by verifying the battery float current is less than or equal to 2 amps within 12 hours. Battery float current of 2 amps or less is indication that, if the battery has been discharged as the result of an inoperable battery charger, it has been fully recharged. If at the expiration of the 12 hour period, the battery float current is not less than or equal to 2 amps, there may be additional problems and the battery is considered inoperable. Verification that the battery is fully charged provides assurance that the battery has sufficient capacity to perform its safety function.

Required Action A.3 requires restoring the inoperable battery charger to Operable status within 72 hours. This is acceptable based on providing an alternate means for the battery charger function with an appropriately sized, temporarily connected charger. The 72-hour completion time is consistent with the completion time for one inoperable Diesel Generator specified in LCO 3.8.1, and is less than the completion time for HPCI and RCIC. This is described in the New Required Action A.1 Technical Specification Bases.

Therefore, while in new Condition A, (1) the DC bus is energized and the DC distribution system remains capable of performing its function, (2) the battery discharge has been terminated based on restoration of the battery terminal voltage (New Required Action A.1), and (3) the battery has been fully recharged based upon battery float current (New Required Action A.2). These actions provide a reasonable basis for extending the restoration time for an inoperable battery charger beyond the existing 2-hour limit to 72 hours (New Required Action A.3). They include consideration of the low probability of a Design Basis Accident (DBA) occurring during the 72 hour LCO, and are consistent with the completion time for an inoperable diesel generator (72 hours) which is less than the completion time for HPCI and RCIC.

NEW CONDITION B:

New Condition B applies when one battery bank in one DC electrical power subsystem is inoperable. New Required Action B.1 states that the battery bank must be restored to Operable status within 2 hours. With the battery bank on one DC electrical power subsystem inoperable, the DC bus is being supplied by the Operable battery charger. Any event that results in a loss of the AC bus supporting the battery charger will also result in loss of DC power to that DC electrical power subsystem. Recovery of the AC bus, especially if it is due to a loss of offsite power, will be hampered by the fact that many of the components necessary for the recovery (e.g., diesel generator control and field flash, AC load shed and diesel generator output circuit breakers, etc.) rely on the batteries. In addition, the energization transients of any DC loads that are beyond the capability of the battery charger(s) and that normally require the assistance of the batteries, would not be able to be restored. The 2 hour limit allows sufficient time to effect restoration of an inoperable battery bank given that the majority of the conditions that lead to battery inoperability (e.g., loss of battery charger, inadequate battery cell voltage, etc) are identified elsewhere in TS 3.8.4, 3.8.5 and 3.8.6. New Condition B does not represent a change to any existing Required Action or Completion Time for an inoperable Battery Bank in the current Technical Specifications.

ADDITION TO RENAMED CONDITION D:

Renamed Condition D has been revised to maintain consistency with the intent of the Completion Time associated with the current TS 3.8.4 Action B.1 for two or more subsystems inoperable. This change is necessary to assure that the TSs require the unit to be in Mode 3 and Mode 4 within a Completion Time consistent with the current TS requirements.

The current TS 3.8.4 requires entry into LCO 3.0.3 for more than one DC Power Electrical subsystem inoperable since this condition is not addressed by TS 3.8.4. The Completion Times associated with LCO 3.0.3 are seven (7) hours to Mode 2, thirteen (13) hours to Mode 3, and thirty-seven (37) hours to Mode 4.

The proposed new TS 3.8.4 would require, without the revised Condition D, entry into Condition A for an inoperable Battery Charger and entry into Condition B for an inoperable battery bank. If Condition A or B Required Actions and Completion Times were not met, Condition D would be entered with the Required Actions being entry into Mode 3 within 12 hours and entry into Mode 4 within 36 hours. This could result in the requirement for the unit to be in Mode 3 within 14 hours and Mode 4 within 38 hours.

To avoid introducing additional time to reach Mode 3 and Mode 4, the text "Two or more subsystems inoperable" has been added to Condition D. This more restrictive Completion Time (12 hours to Mode 3 vs. 13 hours to Mode 3 as required by LCO 3.0.3) maintains consistency with the intent of the current TS and is consistent with plant operating procedures.

PRECEDENT NRC APPROVAL OF THE PROPOSED CHANGE

Per Reference 4, Columbia Generating Station received License Amendment No. 204, dated May 1, 2007 which included a similar change to TS 3.8.4 which added new Conditions and increased the Completion Time for an inoperable battery charger from 2 to 72 hours.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

The Commission has provided standards in 10 CFR 50.92(c) for determining whether a significant hazards consideration exists. A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

PPL proposes changes to Appendix A, Technical Specifications (TS), of Facility Operating License Nos. NPF-14 and NPF-22 for the Susquehanna Steam Electric Station Units 1 and 2 respectively.

The proposed changes revise TS Section 3.8.4, "DC Sources – Operating," by proposing new Actions with increased completion times for an inoperable battery charger.

In accordance with the criteria set forth in 10 CFR 50.92, PPL has evaluated the proposed TS change and determined it does not represent a significant hazards consideration. The following is provided in support of this conclusion.

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

No. The proposed changes revise the Technical Specifications (TS) for the DC Electrical Power Systems and propose new Actions with increased completion times for an inoperable battery charger. The DC electrical power systems, including associated battery chargers, are not initiators to any accident sequence analyzed in the Final Safety Analysis Report (FSAR). Operation in accordance with the proposed TS ensures that the DC electrical power systems are capable of performing functions as described in the FSAR. Therefore, the mitigative functions supported by the DC Power Systems will continue to provide the protection assumed by the analysis. 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 proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

No. The proposed changes only involve revising the TS for the DC electrical power systems. The DC electrical power systems are used to supply equipment used to mitigate an accident. These mitigative functions, supported by the DC electrical power systems are not affected by these changes and they will continue to provide the protection assumed by the safety analysis described in the FSAR. There are no new types of failures or new or different kinds of accidents or transients that could be created by these changes. Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

No. The margin of safety is established through equipment design, operating parameters, and the setpoints at which automatic actions are initiated. 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 electrical system capacity is ensured to support operation of mitigation equipment. The equipment fed by the DC electrical sources will continue to provide adequate power to safety related loads in accordance with the safety analysis. Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

5.2 Applicable Regulatory Requirements/Criteria

The following NRC requirements and guidance documents are applicable to the review of the proposed change:

Title 10 of the Code of Federal regulations (10 CFR) Part 50 Appendix A, General Design Criterion (GDC) 17, "Electric power systems," requires, in part that nuclear power plants have onsite and offsite electric power systems to permit the functioning of structures, systems, and components (SSCs) that are important to safety. The onsite system is required to have sufficient independence, redundancy, and testability to perform its safety function, assuming a single failure. In addition, this criterion requires provisions to minimize the probability of losing

electric power from the remaining electric power supplies as a result of loss of power from the unit, the offsite transmission network, or the onsite power supplies.

Regulatory Guide 1.6, "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems" describes an acceptable degree of independence between redundant standby (onsite) power sources and between their distribution systems.

The addition of New Conditions A and B to Technical Specification 3.8.4 does not affect the independence, redundancy, or the ability of any DC electrical power systems to perform their safety functions. The mitigative functions supported by each of the DC Power Systems will continue to provide the protection assumed by the safety analysis. Therefore, compliance with GDC 17 and Regulatory Guide 1.6 is maintained.

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

6.0 ENVIRONMENTAL CONSIDERATION

10 CFR 51.22(c)(9) identifies certain licensing and regulatory actions, which are eligible for categorical exclusion from the requirement to perform an environmental assessment. A proposed amendment to an operating license for a facility does not require an environmental assessment if operation of the facility in accordance with the proposed amendment would not (1) involve a significant hazards consideration; (2) result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite; or (3) result in a significant increase in individual or cumulative occupational radiation exposure. PPL has evaluated the proposed change and has determined that the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Accordingly, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with issuance of the amendment. This determination, using the above criteria, is:

1. As demonstrated in the No Significant Hazards Consideration Evaluation, the proposed amendment does not involve a significant hazards consideration.

2. There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite. The proposed change does not involve any physical alteration of the plant (no new or different type of equipment will be installed) or change in methods governing normal plant operation.

7.0 REFERENCES

1. General Design Criteria 17 - "Electric Power Systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," of 10CFR Part 50

2. Susquehanna Final Safety Analysis Report (FSAR) Chapter 8.3.

3. Regulatory Guide 1.6 – "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems."

4. Letter from Carl F. Lyon (USNRC), to Mr. J. V. Parrish (CGS), "Columbia Generating Station – Issuance of Amendment re: AC and DC Electrical Power (TAC) No. MC7273)," dated May 1, 2007.

Attachment 1 to PLA-6304

Proposed Units 1 & 2 Technical Specification Changes (Markups)

3.8.4 DC Sources-Operating

LCO 3.8.4 The DC electrical power subsystems in Table 3.8.4-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Not applicable to DG E DC electrical power system ----------		
One Unit 1 battery charger on one 125 VDC electrical power subsystem inoperable.	A.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage.	2 hours
OR	AND	
One Unit 1 battery charger on 250 VDC Division II electrical power subsystem inoperable.	A.2 Verify battery float current ≤ 2 amps.	Once per 12 hours
OR	AND	
Two Unit 1 battery chargers on 250 VDC Division 1 electrical power subsystem inoperable.	A.3 Restore battery charger(s) to OPERABLE Status.	72 hours

continued

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ----------NOTE---------- Not applicable to DG E DC electrical power system ---------- One Unit 1 125 VDC battery bank inoperable. OR One Unit 1 250 VDC battery bank inoperable.	B.1 Restore battery bank to OPERABLE status.	2 hours
~~A.~~ C ----------NOTE---------- ----- Not applicable to DG E DC electrical power subsystem. ---------- One Unit 1 DC electrical power subsystem inoperable for reasons other than Condition A or B.	~~A~~C.1 Restore Unit 1 DC electrical power subsystem to OPERABLE status.	2 hours
~~B~~D. Two or more Unit 1 subsystems inoperable. OR Required Action and Associated Completion Time of Conditions A, B, or C not met.	~~B~~D.1 Be in MODE 3. AND ~~B~~D.2 Be in MODE 4.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~C~~E. Diesel Generator E DC electrical power subsystem inoperable, when not aligned to the Class 1E distribution system.	~~C~~E.1 Verify that all ESW valves associated with Diesel Generator E are closed.	2 hours
~~D~~F. Diesel Generator E DC electrical power subsystem inoperable, when aligned to the Class 1E distribution system.	~~D~~F.1 Declare Diesel Generator E inoperable.	2 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is greater than or equal to the minimum established float voltage.	7 days
SR 3.8.4.2	Verify each required battery charger supplies its associated battery at the following rates for ≥ 4 hours at greater than or equal to the minimum established float voltages. a. ≥ 100 amps for the 125V Battery b. ≥ 300 amps for the 250V Battery c. ≥ 200 amps for the 125V Diesel Generator E Battery	24 months

(continued)

Table 3.8.4-1 (page 1 of 1)
Unit 1 and DG E DC Electrical Power Subsystems

~~TYPE~~	VOLTAGE	DIVISION I	DIVISION II
~~Battery Banks~~	250 V	1D650 (Battery Bank) 1D653A (Charger) or 1D653B (Charger)	1D660 (Battery Bank) 1D663 (Charger)
	125 V	Subsystem A 1D610 (~~Subsys. A~~ Battery Bank A) 1D613 (Charger A) Subsystem C 1D630 (~~Subsys. C~~ Battery Bank C) 1D633 (Charger C)	Subsystem B 1D620 (~~Subsys. B~~ Battery Bank B) 1D623 (Charger B) Subsystem D 1D640 (~~Subsys. D~~ Battery Bank D) 1D643 (Charger D)
~~DG E Battery Banks~~	125 V	0D595 Battery Bank E 0D596 (Charger)	

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources-Operating

LCO 3.8.4 The DC electrical power subsystems in Table 3.8.4-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A ----------NOTE---------- Not applicable to DG E DC electrical power system ----------		
One Unit 2 battery charger on one 125 VDC electrical power subsystem inoperable.	A.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage.	2 hours
OR	AND	
One Unit 2 battery charger on 250 VDC Division II electrical power subsystem inoperable.	A.2 Verify battery float current ≤ 2 amps.	Once per 12 hours
OR	AND	
Two Unit 2 battery chargers on 250 VDC Division 1 electrical power subsystem inoperable.	A.3 Restore battery charger(s) to OPERABLE Status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ----------NOTE---------- Not applicable to DG E DC electrical power system ---------- One Unit 2 125 VDC battery bank inoperable. OR One Unit 2 250 VDC battery bank inoperable.	B.1 Restore battery bank to OPERABLE status.	2 hours
~~A~~C. ----------NOTE---------- Not applicable to DG E DC electrical power subsystem. ---------- One Unit 2 DC electrical power subsystem inoperable for reasons other than Conditions A or B.	~~A~~C.1 Restore Unit 2 DC electrical power subsystem to OPERABLE status.	2 hours
~~B~~D. Two or more Unit 2 subsystems inoperable. OR ~~B~~D. Required Action and Associated Completion Time of Conditions A, B or C not met.	~~B~~D.1 Be in MODE 3. AND ~~B~~D.2 Be in MODE 4	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~C~~E. Diesel Generator E DC electrical power subsystem inoperable, when not aligned to the Class 1E distribution system.	~~C~~E.1 Verify that all ESW valves associated with Diesel Generator E are closed.	2 hours
~~D~~F. Diesel Generator E DC electrical power subsystem inoperable, when aligned to the Class 1E distribution system.	~~D~~F.1 Declare Diesel Generator E inoperable.	2 hours
~~E~~G. One or more Unit 1 DC electrical power subsystem(s) inoperable.	~~E~~G.1 Transfer associated Unit 1 and common loads to corresponding Unit 2 DC electrical power subsystem. AND ~~E~~G.2 Restore Unit 1 and common loads to corresponding Unit 1 DC electrical power subsystem.	2 hours 72 hours after Unit 1 DC electrical power subsystem is restored to OPERABLE status.
~~F~~H. Required Actions and associated Completion Times of Condition E not met.	~~F~~H.1 Declare associated common loads inoperable.	Immediately

Table 3.8.4-1 (page 1 of 1)
Unit 2 and DG E DC Electrical Power Subsystems

TYPE	VOLTAGE	DIVISION I	DIVISION II
Battery Banks	250 V	2D650 (Battery Bank) 2D653A (Charger) or 2D653B (Charger)	2D660 (Battery Bank) 2D663 (Charger)
	125 V	Unit 1 Subsystem A 1D610 (SubsysBattery Bank. A) 1D613 (Charger A) Unit 2 Subsystem A 2D610 (SubsysBattery Bank. A) 2D613 (Charger A) Unit 1 Subsystem C 1D630 (Subsys.Battery Bank C) 1D633 (Charger C) Unit 2 Subsystem C 2D630 (Subsys.Battery Bank C) 2D633 (Charger C)	Unit 1 Subsystem B 1D620 (Subsys.Battery Bank B) 1D623 (Charger B) Unit 2 Subsystem B 2D620 (Subsys.Battery Bank B) 2D623 (Charger B) Unit 1 Subsystem D 1D640 (Subsys.Battery Bank D) 1D643 (Charger D) Unit 2 Subsystem D 2D640 (Subsys.Battery Bank D) 2D643 (Charger D)
DG E Battery Banks	125 V	0D595 (Battery Bank E) 0D596 (Charger)	

Attachment 2 to PLA-6304

Proposed Units 1 & 2 Technical Specification Bases Changes (Markups for Information Only)

BASES (continued)

ACTIONS

A.1, A.2, A.3

Condition A represents one subsystem with one (or two) 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 charge to OPERABLE status in a reasonable time period.

Required Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within 12 hours, the battery will be restored to its fully charged condition (Required Action A.2) from any discharge that might have occurred due to the charger inoperability.

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

If established battery terminal 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.

(continued)

The charge time can be extensive, and there is not adequate assurance that it can be recharged to comply with the 12 hour Completion Time of Required Action A.2.

Required Action A.2 requires that the battery float current be verified as less than or equal to 2 amps. Float current less than 2 amps 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 2 amp value is based on documentation from the battery manufacturer that charging current less than 2 amps indicates a battery with a full state of charge (Reference 13). If monitoring the battery float current during the initial 12 hour period does not verify that the current is less than or equal to 2 amps at the expiration of the initial 12 hour period the battery must be declared inoperable. During subsequent 12 hour periods, if battery float current is greater than 2 amps, there may be additional battery problems and the battery must be declared inoperable.

Required Action A.3 limits the restoration time for the inoperable battery charger to 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 with sufficient capacity such that it is fully capable of restoring the battery voltage to the minimum acceptable limits, carrying respective DC bus loads, and maintaining the battery in a fully charged condition). The 72 hour Completion Time reflects a reasonable time to effect restoration of the qualified battery charger to OPERABLE status and is consistent with the 72 hours Completion Time for the SSES emergency diesel generators.

Condition A is modified by a Note that states that Condition A is not applicable to the DG E DC electrical power subsystem. Condition E or F is applicable to an inoperable DG E DC electrical power subsystem.

B.1

Condition B represents one subsystem with one battery bank inoperable. With one battery bank inoperable, the DC bus is being supplied by the OPERABLE battery charger. Any event that results in a loss of the AC bus supporting the battery charger will also result in loss of DC to that subsystem. Recovery of the AC bus, especially if it is due to a loss of offsite power, will be hampered by the fact that many of the components necessary for the recovery (e.g., diesel generator control and field flash, AC load shed, and diesel generator output circuit breakers, etc.) may rely upon the battery. In addition, the energization transients of any DC loads that are beyond the capability of the battery charger and normally require

(continued)

the assistance of the battery will not be able to be brought online. The 2 hour limit allows sufficient time to effect restoration of an inoperable battery bank given that the majority of the conditions that lead to battery inoperability (e.g., loss of battery charger, battery cell voltage less than 2.07 V, etc.) are identified in Specifications 3.8.4, 3.8.5, and 3.8.6 together with additional specific Completion Times.

Condition B is modified by a Note that states that Condition B is not applicable to the DG E DC electrical power subsystem. Condition E or F is applicable to an inoperable DG E DC electrical power subsystem.

~~ACTIONS~~

CA.1

Condition CA represents one subsystem with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. It is therefore imperative that the operator's attention focus on stabilizing the unit, 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 DC electrical power subsystems is inoperable, as a result of equipment other than the battery or battery charger being inoperable, ~~(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 worst case single failure could, however, result in the loss of minimum necessary DC electrical subsystems to mitigate a 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.

Condition C is modified by a Note that states that Condition C is not applicable to the DG E DC electrical power subsystem. Condition E or F is applicable to an inoperable DG E DC electrical power subsystem.

DB.1 and DB.2

If two Unit 1 DC electrical power subsystems are inoperable or if ~~th~~ean inoperable Unit 1 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

(continued)

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

(continued)

BASES

ACTIONS (continued)

~~EC~~.1

If Diesel Generator E is not aligned to the class 1E distribution system, the only supported safety function is for the ESW system. Therefore, under this condition, if Diesel Generator E DC power subsystem is not OPERABLE actions are taken to either restore the battery to OPERABLE status or shutdown Diesel Generator E and close the associated ESW valves in order to ensure the OPERABILITY of the ESW system. The 2 hour limit is consistent with the allowed time for other inoperable DC sources and provides sufficient time to evaluate the condition of the battery and take the corrective actions.

~~FD~~.1

If the Diesel Generator is aligned to the class 1E distribution system, the loss of Diesel Generator E DC power subsystem will result in the loss of a on-site Class 1E power source. Therefore, under this condition, if Diesel Generator E DC power subsystem is not OPERABLE actions are taken to either restore the battery to OPERABLE status or declare Diesel Generator E inoperable and take Actions of LCO 3.8.1. The 2 hour limit is consistent with the allowed time for other DC sources and provides sufficient time to evaluate the condition of the battery and take the necessary corrective actions.

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the battery chargers, which support the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a fully charged state while supplying the continuous steady state loads of the associated DC subsystem. On float charge, battery cells will receive adequate current to optimally charge the battery. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the minimum float voltage established by the battery manufacturer. ~~(2.20 Vpc or 132 V at the battery terminals).~~ This voltage maintains the battery plates in a condition that supports maintaining the grid life (expected to be approximately 20 years).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1 (continued)

The ~~nominal required~~minimum established float voltage for OPERABILITY, per SR 3.8.4.1 is 129 VDC for 125 VDC batteries and 258 VDC for 250 VDC batteries. This voltage should be adjusted downward by 2.20 VDC for any cells jumpered out of the battery bank. This SR must be performed every 7 days consistent with manufacturer recommendations and IEEE-450 (Ref. 8).

SR 3.8.4.2

This SR verifies the design capacity of the battery chargers. According to Regulatory Guide 1.32 (Ref. 9), the battery charger supply is recommended to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

This SR requires that each battery charger be capable of supplying DC current to its associated battery bank at the minimum established float voltage for greater than or equal to 4 hours. The ampere requirements are based on the output rating of the chargers. The voltage requirements are based on the charger voltage level after a response to a loss of AC power. The time period is sufficient for the charger temperature to have stabilized and to have been maintained for at least 2 hours.

The Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these 24 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.3 (continued)

Since the Diesel Generator E DC electrical power subsystem does not support loads other than the Diesel Generator E required loads, the mode restriction note need not be applied to the Diesel Generator E subsystem unless it is aligned to the class 1E distribution subsystem. The note does have applicability to the Diesel Generator E subsystem when the Diesel Generator E is substituted for one of the other Diesel Generators. When the Diesel Generator E is aligned to the class 1E distribution subsystem, the Diesel Generator E subsystem is required to support operability of the Diesel Generator E. Thus when in this configuration, the note does need to be applicable since performing the Surveillance would remove a required DC electrical power subsystem from service.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. Regulatory Guide 1.6.
3. IEEE Standard 308.
4. FSAR, Chapter 6.
5. FSAR, Chapter 15.
6. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
7. Regulatory Guide 1.93.
8. IEEE Standard 450.
9. Regulatory Guide 1.32, February 1977.
10. Regulatory Guide 1.129, April 1977, February 1978.
11. IEEE Standard 485.
12. FSAR, Chapter 8, Section 8.3.2.1.1.6
13. Letter from C&D Technologies, Inc - Power Solutions, "Float Current Used as an Indicator of Battery Charge State", to L. R. Casella, dated August 9, 2006.

BASES (continued)

ACTIONS

A.1, A.2, A.3

Condition A represents one subsystem with one (or two) 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 charge to OPERABLE status in a reasonable time period.

Required Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within 12 hours, the battery will be restored to its fully charged condition (Required Action A.2) from any discharge that might have occurred due to the charger inoperability.

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

If established battery terminal 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.

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The charge time can be extensive, and there is not adequate assurance that it can be recharged to comply with the 12 hour Completion Time of Required Action A.2.

Required Action A.2 requires that the battery float current be verified as less than or equal to 2 amps. Float current less than 2 amps 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 2 amp value is based on documentation from the battery manufacturer that charging current less than 2 amps indicates a battery with a full state of charge (Reference 13). If monitoring the battery float current during the initial 12 hour period does not verify that the current is less than or equal to 2 amps at the expiration of the initial 12 hour period the battery must be declared inoperable. During subsequent 12 hour periods, if battery float current is greater than 2 amps, there may be additional battery problems and the battery must be declared inoperable.

Required Action A.3 limits the restoration time for the inoperable battery charger to 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 with sufficient capacity such that it is fully capable of restoring the battery voltage to the minimum acceptable limits, carrying respective DC bus loads, and maintaining the battery in a fully charged condition). The 72 hour Completion Time reflects a reasonable time to effect restoration of the qualified battery charger to OPERABLE status and is consistent with the 72 hours Completion Time for the SSES emergency diesel generators.

Condition A is modified by a Note that states that Condition A is not applicable to the DG E DC electrical power subsystem. Condition E or F is applicable to an inoperable DG E DC electrical power subsystem.

B.1

Condition B represents one subsystem with one battery bank inoperable. With one battery bank inoperable, the DC bus is being supplied by the OPERABLE battery charger. Any event that results in a loss of the AC bus supporting the battery charger will also result in loss of DC to that subsystem. Recovery of the AC bus, especially if it is due to a loss of offsite power, will be hampered by the fact that many of the components necessary for the recovery (e.g., diesel generator control and field flash, AC load shed, and diesel generator output circuit breakers, etc.) may rely upon the battery. In addition, the energization transients of any DC loads

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that are beyond the capability of the battery charger and normally require the assistance of the battery will not be able to be brought online. The 2 hour limit allows sufficient time to effect restoration of an inoperable battery bank given that the majority of the conditions that lead to battery inoperability (e.g., loss of battery charger, battery cell voltage less than 2.07 V, etc.) are identified in Specifications 3.8.4, 3.8.5, and 3.8.6 together with additional specific Completion Times.

Condition B is modified by a Note that states that Condition B is not applicable to the DG E DC electrical power subsystem. Condition E or F is applicable to an inoperable DG E DC electrical power subsystem.

~~ACTIONS~~

CA.1

Condition CA represents one subsystem with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. It is therefore imperative that the operator's attention focus on stabilizing the unit, 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 DC electrical power subsystems is inoperable, , as a result of equipment other than the battery or battery charger being inoperable, ~~(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 worst case single failure could, however, result in the loss of minimum necessary DC electrical subsystems to mitigate a 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.

Condition C is modified by a Note that states that Condition C is not applicable to the DG E DC electrical power subsystem. Condition E or F is applicable to an inoperable DG E DC electrical power subsystem.

DB.1 and DB.2

If two Unit 2 DC electrical power subsystems are inoperable or if ~~the~~an

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inoperable Unit 2 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 to bring the unit to MODE 4 is consistent with the time required in Regulatory Guide 1.93 (Ref. 7).

(continued)

BASES

ACTIONS
(continued)

~~E~~C.1

If Diesel Generator E is not aligned to the class 1E distribution system, the only supported safety function is for the ESW system. Therefore, under this condition, if Diesel Generator E DC power subsystem is not OPERABLE actions are taken to either restore the battery to OPERABLE status or shutdown Diesel Generator E and close the associated ESW valves in order to ensure the OPERABILITY of the ESW system. The 2 hour limit is consistent with the allowed time for other inoperable DC sources and provides sufficient time to evaluate the condition of the battery and take the corrective actions.

~~F~~D.1

If the Diesel Generator is aligned to the class 1E distribution system, the loss of Diesel Generator E DC power subsystem will result in the loss of a on-site Class 1E power source. Therefore, under this condition, if Diesel Generator E DC power subsystem is not OPERABLE actions are taken to either restore the battery to OPERABLE status or declare Diesel Generator E inoperable and take Actions of LCO 3.8.1. The 2 hour limit is consistent with the allowed time for other DC sources and provides sufficient time to evaluate the condition of the battery and take the necessary corrective actions.

G~~E~~.1 and G~~E~~.2

With one or more DC Unit 1 DC power subsystems inoperable, the remaining DC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. However, overall reliability is reduced because a single failure in the remaining DC electrical power distribution subsystems could result in the minimum required ESF functions not being supported. The Completion Time of 2 hours is consistent with the Completion Times associated with a loss of one or more DC distribution subsystems and will allow sufficient time to restore power.

(continued)

BASES

ACTIONS

GE.1 and GE.2 (continued)

Completion of Required Action GE.1 causes Unit 1 loads to be powered from a Unit 2 DC electrical power subsystem. Although the corresponding Unit 2 DC electrical power subsystems are evaluated for this condition, the CONDITION violates a design commitment to maintain DC power separation between units. To minimize the time this condition exists, Required Action GE.2 directs power to be restored to the corresponding Unit 1 DC electrical power subsystem, which restores power to the common loads, or requires that the Unit 1 and common loads be declared inoperable. The Completion Time of 72 hours provides sufficient time to restore power and acknowledges the fact that the condition, although not consistent with all design requirements, maintains all required safety systems available.

HF.1

If Unit 1 and common loads required to support Unit 2 cannot be transferred to corresponding Unit 2 DC electrical power subsystem when Unit 1 DC sources are inoperable; or, cannot be transferred back to a Unit 1 DC source when the Unit 1 DC source becomes OPERABLE, the associated loads may be incapable of performing their intended function and must be declared inoperable immediately.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the battery chargers, which support the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery and maintain the battery in a fully charged state while supplying the continuous steady state loads of the associated DC subsystem. On float charge, battery cells will receive adequate current to optimally charge the battery. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the minimum float voltage established by the battery manufacturer. ~~(2.20 Vpc or 132 V at the battery terminals).~~ This voltage maintains the battery plates in a condition that supports maintaining the grid life (expected to be approximately 20 years). The ~~nominal required~~minimum established float voltage for OPERABILITY per SR 3.8.4.1 is 129 VDC for 125 VDC and 258 VDC for 250 VDC batteries. This voltage should be adjusted downward by 2.20 VDC for any cells jumpered out of the battery bank. This SR must be performed every 7 days consistent with manufacturer recommendations and IEEE-450 (Ref. 8).

SR 3.8.4.2

This SR verifies the design capacity of the battery chargers. According to Regulatory Guide 1.32 (Ref. 9), the battery charger supply is recommended to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

This SR requires that each battery charger be capable of supplying DC current to its associated battery bank at the minimum established float voltage for greater than or equal to 4 hours. The ampere requirements are based on the output rating of the chargers. The voltage requirements are based on the charger voltage level after a response to a loss of AC power. The time period is sufficient for the charger temperature to have stabilized and to have been maintained for at least 2 hours.

(continued)

BASES (continued)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. Regulatory Guide 1.6.
3. IEEE Standard 308.
4. FSAR, Chapter 6.
5. FSAR, Chapter 15.
6. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
7. Regulatory Guide 1.93.
8. IEEE Standard 450.
9. Regulatory Guide 1.32, February 1977.
10. Regulatory Guide 1.129, April 1977, February 1978.
11. IEEE Standard 485.
12. FSAR Chapter 8, Section 8.3.2.1.1.6.
13. Letter from C&D Technologies, Inc - Power Solutions, "Float Current Used as an Indicator of Battery Charge State", to L. R. Casella, dated August 9, 2006.