J. Barnie Beasley, Jr., P.E.
Vice President

Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201

Tel 205.992.7110
Fax 205.992.0341

SOUTHERN COMPANY
Energy to Serve Your World℠

September 19, 2003

Docket No.: 50-348

NL-03-1914

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

Joseph M. Farley Nuclear Plant – Unit 1
Request for Technical Specification Changes
DC Sources – Operating

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.90, Southern Nuclear Operating Company (SNC) proposes to amend the Farley Nuclear Plant (FNP) Unit 1 Technical Specifications (TS), Appendix A to Operating License NPF-2. The proposed changes would revise TS Limiting Conditions for Operation (LCO) 3.8.4, "DC Sources – Operating," for Unit 1 for the remainder of operating cycle 19. Cycle 19 is presently scheduled to end on October 2, 2004.

The proposed changes would increase the Completion Time for the 1B Auxiliary Building DC electrical power subsystem inoperability due to an inoperable battery to allow for on-line replacement of individual cells. The 1B battery bank is reaching the end of its useful life and there are plans to replace it during the next Unit 1 refueling outage. FNP has experienced a failure of a battery cell, and initial evaluation of the failure indicates that it is due to aging. Other cells within the battery bank have similar indications of aging.

Enclosure 1 provides a basis for the proposed changes. Enclosure 2 provides the basis for a determination that the proposed changes do not involve a significant hazards consideration pursuant to 10 CFR 50.92. Marked-up TS and TS Bases pages are provided in Enclosure 3, and clean-typed pages are provided in Enclosure 4. The TS Bases changes are submitted for information only and will be approved in accordance with the Farley TS Bases Control Program.

SNC has reviewed the proposed amendment pursuant to 10 CFR 50.92 and determined that it does not involve a significant hazards consideration. In addition, there is no significant increase in the amounts of effluents that may be released offsite, and there is no significant increase in individual or cumulative occupational radiation exposure. Consequently, the proposed amendment satisfies the criteria of 10 CFR 51.22 for categorical exclusion from the requirements for an environmental assessment, and the human environment is not affected by this amendment.

A001

SNC requests approval of the proposed changes by December 31, 2003. A copy of the proposed changes has been sent to Dr. D. E. Williamson, the Alabama State Designee, in accordance with 10 CFR 50.91(b)(1).

Mr. J. B. Beasley, Jr. states he is a Vice President 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.

This letter contains no NRC commitments. If you have any questions, please advise.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

J. B. Beasley, Jr.

Sworn to and subscribed before me this 19th *day of* September, *2003.*

Glenda C. Spinks
Notary Public

My commission expires: 11/10/06

JBB/WAS/sdl

Enclosures:
1. Basis for the TS Change
2. 10 CFR 50.92 Evaluation
3. Marked-Up Technical Specification and TS Bases Pages
4. Clean Typed Technical Specification and TS Bases Pages

cc: Southern Nuclear Operating Company
Mr. J. D. Woodard, Executive Vice President w/o Enclosures
Mr. L. M. Stinson, General Manager – Farley
Mr. D. E. Grissette, General Manager – Plant Farley
Document Services RTYPE: CFA04.054; LC# 13841

U. S. Nuclear Regulatory Commission
Mr. L. A. Reyes, Regional Administrator
Mr. F. Rinaldi, NRR Project Manager – Farley
Mr. T. P. Johnson, Senior Resident Inspector – Farley

Alabama Department of Public Health
Dr. D. E. Williamson, State Health Officer

Enclosure 1

Joseph M. Farley Nuclear Plant – Unit 1
Request for Technical Specification Changes
DC Sources - Operating

Basis for the TS Change

Enclosure 1

Joseph M. Farley Nuclear Plant – Unit 1
Request for Technical Specification Changes
DC Sources - Operating

Basis for the TS Change

Proposed Changes

Southern Nuclear Operating Company (SNC) proposes to revise the Farley Nuclear Plant (FNP) Unit 1 Technical Specifications (TSs) for the remainder of operating cycle 19. The proposed changes would revise TS Limiting Condition for Operation (LCO) 3.8.4, "DC Sources – Operating," for Unit 1 only.

The Completion Time for the 1B Auxiliary Building DC electrical power subsystem inoperability due to an inoperable battery is proposed to be changed. Condition A of LCO 3.8.4 currently requires restoration of an inoperable Auxiliary Building DC electrical power subsystem to operable status within 2 hours.

The 1B battery bank is reaching the end of its useful life and there are plans to replace it during the next Unit 1 refueling outage. FNP has experienced a failure of a battery cell and initial evaluation of the failure indicates that it is due to aging. Other cells within the battery bank have similar indications of aging. The proposed change provides a new Completion Time for the 1B Auxiliary Building DC electrical power subsystem on Unit 1 which extends the Completion Time from 2 to 12 hours for the remainder of cycle 19 for inoperability due to an inoperable battery.

Background

The existing FNP Unit 1 TS LCO 3.8.4, "DC Sources – Operating," specifies DC source operability in terms of DC electrical power subsystems. The 125 VDC electrical power system consists of two main systems, the Auxiliary Building System and the Service Water Intake Structure (SWIS) System with 2 trains (subsystems) in each main system.

The Auxiliary Building 125 VDC system consists of two independent and redundant subsystems (A-Train and B-Train) which supply DC power to various Engineered Safety Features (ESF) systems throughout the plant. Each Auxiliary Building subsystem consists of a 125 VDC battery, an associated full capacity battery charger and all associated control equipment and interconnecting cabling. Each Auxiliary Building 125 VDC train is normally supplied by the associated battery charger (A or B). In the event of an A or B battery charger failure, battery charger C, the full capacity swing battery charger, may supply power to either train. Either train may be considered OPERABLE when supplied from battery charger C. Battery charger C input and output breakers are interlocked to prevent paralleling the redundant DC buses or the AC buses through the battery charger and to prevent cross-connecting trains.

During normal operation, the 125 VDC load is powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC load is automatically powered from the station batteries. In the unlikely event that a battery charger fails, the swing battery charger is manually placed in service.

The A-Train and B-Train DC electrical power subsystems provide the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, 600 V load centers, ESF controls, emergency lights, Emergency Diesel Generator (EDG) field flashing and control, DC solenoids for air-operated valves, miscellaneous controls and alarms, and reactor trip switchgear. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC vital buses. DC bus 1A supplies primary power for TS static inverters 1A and 1B, while DC bus 1B supplies primary power for TS inverters 1C and 1D.

The A-Train EDGs for FNP (1C and 1-2A) support both units and as such, the control panel for each Diesel Generator (DG) receives DC power from Unit 1 A-Train DC and Unit 2 A-Train DC through power seeking automatic transfer switches (ATSs). This ensures that an operable DC power supply is available for the A-Train DGs.

The B-train EDGs for FNP are unit specific (Unit 1 – 1B, Unit 2 – 2B.) The control panel for each DG receives DC power from its respective Unit's B-Train DC system.

The Station Blackout (SBO) DG for FNP (2C) is B-Train and supports both units. As such, the control panel for the DG receives DC power from Unit 1 B-Train DC and Unit 2 B-Train DC through power seeking automatic transfer switches (ATSs). This ensures that an operable DC power supply is available at all times to the SBO DG.

The Auxiliary Building batteries are stationary type consisting of 60 individual lead-calcium cells electrically connected in series to establish a nominal 125 VDC power supply. Initially, during a Loss of Offsite Power (LOSP) or LOSP with Safety Injection (SI), the Auxiliary Building batteries supply safety-related loads without charger support. The design is such that subsequent to LOSP, the battery chargers are re-energized by the EDGs.

Per the TS Bases, an operable Auxiliary Building DC electrical power subsystem must include a battery, a battery charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated bus within the train.

Bases for Proposed Changes

The 1B battery bank is reaching the end of its useful life and there are plans to replace it during the next Unit 1 refueling outage. FNP has experienced a failure of a battery cell and initial evaluation of the failure indicates that it is due to aging. Other cells within the battery bank have similar indications of aging.

The proposed change would increase the Completion Time for the 1B Auxiliary Building DC electrical power subsystem inoperability due to an inoperable battery. The Required Action is to restore the 1B Auxiliary Building DC electrical power subsystem to operable status and the Completion Time is 12 hours. Presently, if the battery is inoperable, or if maintenance such as cell replacement is required, the 2-hour Completion Time is severely restrictive. Allowing 12 hours for maintenance on the battery will facilitate a more orderly and effective work process. It will also minimize the potential for an additional shutdown/restart transient to comply with the TS in order to accomplish the required maintenance.

At FNP, a failure of a single Auxiliary Building 125 VDC system will not result in conditions that will prevent the safe shutdown of the unit. Procedures are in place to respond to a complete loss of a train of DC power and maintain the capability to respond to design basis events, excluding a single failure due to the time-limited Condition.

For this condition, a dual unit LOSP with a SI on Unit 1 would be the most limiting accident condition. If this event occurred while a Unit 1 Auxiliary Building battery was unavailable, the opposite train of emergency power would start and sequence on the SI/LOSP loads. With the battery unavailable, field flashing to the 1B EDG is not assured. In that circumstance, proceduralized operator action would allow emergency power to be supplied to Unit 1 from the SBO DG for LOSP loads. Field flashing for the SBO DG may be supplied by either unit.

Risk insights were also considered in this proposed TS amendment request. The Plant Farley-specific Level 1 and Level 2 Probabilistic Risk Assessment (PRA) Model, Revision 5, was used to evaluate the change in the Farley internal events Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) resulting from the unavailability of the 1B Auxiliary Building battery for a period of 12 hours. This model, when used in conjunction with deterministic evaluations, is of sufficient quality to support regulatory applications such as this submittal, as described below. The associated PRA calculations performed as part of the development of this submittal were originated, verified, approved and documented in accordance with SNC procedures for the preparation and control of calculations.

As an integral part of its initial development pursuant to NRC Generic Letter 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities," the Farley PRA was reviewed by an Independent Review Group which included experts in plant design, plant operation, and probabilistic risk assessment. Further, each subsequent revision to the model has been internally reviewed and approved in accordance with applicable SNC procedures. In addition, an evaluation based upon Appendix B of the EPRI PSA Applications Guide was performed to confirm that the PRA conforms to the industry state-of-the-art practices with respect to the scope of potential plant scenarios.

In August 2001, the Revision 4 Farley PRA was extensively reviewed by an experienced five-man Peer Review Team coordinated by the Westinghouse Owners Group in a manner described in the Nuclear Energy Institute's document NEI 00-02, "Industry Peer Review Process." The peer review evaluated the eleven elements of the PRA and concluded that all elements were either a "Grade 3" or a "Contingency Grade 3." None of the items resulting in the assignment of a "Contingency Grade 3" rating to an element were judged to be of a level of significance to require prompt resolution to ensure the technical adequacy of the PRA.

The evaluation performed indicated that the incremental conditional core damage probability (ICCDP) for a 12 hour battery outage is 3.424E-07 and the incremental conditional large early release probability (ICLERP) is 6.575E-11. These values are acceptable when compared to the acceptance criteria of ICCDP less than 5.0E-07 and ICLERP less than 5.0E-08 provided in NRC Regulatory Guide 1.177, An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications. This change would also be classified as "very small" when compared to the acceptance guidelines of

NRC Regulatory Guide 1.174, An Approach for Using Probabilistic Risk Assessments in Risk-Informed Decision-making.

There is reasonable assurance that risk-significant plant equipment configurations will not occur when the 1B battery is out of service (OOS) consistent with the proposed TS change. Increases in risk posed by potential combinations of equipment OOS will be managed under the site procedures.

FNP's configuration risk management program is governed by procedure FNP-0-ACP-52.1, "Guidelines for Scheduling of On-Line Maintenance," which ensures that on-line risk is appropriately evaluated prior to performing any maintenance activity. This program provides guidance for managing plant trip risk, probabilistic risk, and safety function degradation from on-line maintenance, external or internal conditions, as required by 10 CFR 50.65(a)(4) of the Maintenance Rule. The procedure addresses risk management practices in the maintenance planning and maintenance execution phases for Modes 1 through 3.

Therefore, the proposed extended Completion Time for an inoperable 1B battery is acceptable based on the available redundancy, defense-in-depth provided by the SBO DG, and the fact that the acceptance criteria of RGs 1.174 and 1.177 are met due to the very small impact on risk.

Conclusion

The 1B battery bank is reaching the end of its useful life and there are plans to replace it during the next Unit 1 refueling outage. FNP has experienced a failure of a battery cell and initial evaluation of the failure indicates that it is due to aging. Other cells within the battery bank have similar indications of aging. Requiring a unit shutdown is not warranted when corrective maintenance such as replacement of a battery cell cannot be accomplished within a 2-hour window. The proposed TS change modifies the Completion Time for Condition A of LCO 3.8.4 such that a Unit 1 1B Auxiliary Building DC electrical power subsystem may be inoperable for up to 12 hours before beginning an orderly shutdown of the unit. This change is applicable to Unit 1 only for the remainder of operating cycle 19.

Enclosure 2

Joseph M. Farley Nuclear Plant – Unit 1
Request for Technical Specification Changes
DC Sources - Operating

10 CFR 50.92 Evaluation

Enclosure 2

Joseph M. Farley Nuclear Plant – Unit 1
Request for Technical Specification Changes
DC Sources - Operating

10 CFR 50.92 Evaluation

Proposed Changes

Southern Nuclear Operating Company (SNC) proposes to revise the Farley Nuclear Plant (FNP) Unit 1 Technical Specifications (TS) for the remainder of operating cycle 19. The proposed changes would revise TS Limiting Condition for Operation (LCO) 3.8.4, "DC Sources – Operating," for Unit 1 only. These changes are needed to address required maintenance on aging battery cells. The Completion Time for the 1B Auxiliary Building DC electrical power subsystem inoperability due to an inoperable battery is proposed to be changed.

Evaluation

Pursuant to 10 CFR 50.92, SNC has evaluated the proposed amendment and has determined that operation of the facility in accordance with the proposed amendment would not involve a significant hazards consideration. The basis for this determination is as follows:

1. The proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed change to LCO 3.8.4 creates an extended Completion Time for an inoperable 1B Auxiliary Building DC electrical power subsystem due to an inoperable battery on Unit 1 only for the remainder of operating cycle 19. The Auxiliary Building battery is not a direct initiator of any analyzed accident sequence. The radiological consequences of any associated accidents are not impacted by the proposed amendment. Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change involves no change to the physical plant. It allows additional time for corrective maintenance on the 1B Auxiliary Building battery on Unit 1. The proposed amendment involves an extension of a previously determined acceptable mode of operation. The proposed amendment does not introduce any new equipment, create new failure modes for existing equipment, or create any new limiting single failures. Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed changes do not involve a significant reduction in a margin of safety.

   The physical plant is unaffected by these changes. The proposed changes do not impact accident offsite dose, containment pressure or temperature, emergency core cooling system (ECCS) or reactor protection system (RPS) settings or any other parameter that could affect a margin of

safety. Under the proposed amendment, the unit will continue to be operated in a condition that will ensure that emergency power will be available as needed. The extended Completion Time for an inoperable battery has been shown to have a very small impact on plant risk using the criteria of Regulatory Guides 1.174, An Approach for Using Probabilistic Risk Assessments in Risk-Informed Decision-making and 1.177, An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications and is acceptable. Therefore, the proposed amendment does not involve a significant reduction in a margin to safety.

Conclusion

Based on the preceding analysis, SNC has determined that the proposed changes to the Technical Specifications will not significantly increase the probability or consequences of an accident previously evaluated, create the possibility of a new or different kind of accident from any accident previously evaluated, or involve a significant reduction in a margin of safety. SNC therefore concludes that the proposed changes meet the requirements of 10 CFR 50.92(c) and do not involve a significant hazards consideration.

Enclosure 3

Joseph M. Farley Nuclear Plant – Unit 1
Request for Technical Specification Changes
DC Sources - Operating

Marked-Up Technical Specification and Bases Pages

Affected Pages

3.8.4-1
B 3.8.4-5

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources — Operating

LCO 3.8.4 The Train A and Train B Auxiliary Building and Service Water Intake Structure (SWIS) DC electrical power subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

INSERT A

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One Auxiliary Building DC electrical power subsystem inoperable.	A.1	Restore the Auxiliary Building DC electrical power subsystem to OPERABLE status.	2 hours
B. One Auxiliary Building DC electrical power subsystem with battery connection resistance not within limit.	B.1	Restore the battery connection resistance to within limit.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 AND C.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours
D. One required SWIS DC electrical power subsystem battery connection resistance not within limit.	D.1	Restore the battery connection resistance to within the limit.	24 hours
E. One required SWIS DC electrical power subsystem inoperable. OR Required Action and associated Completion Time of Condition D not met.	E.1	Declare the associated Service Water System train inoperable.	Immediately

INSERT A

12 hours for 1B Auxiliary Building DC electrical power subsystem inoperable due to inoperable battery for cycle 19 only

INSERT B

BASES

ACTIONS

A.1

Condition A represents one train of Auxiliary Building DC electrical power 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 train. The 2 hour limit is consistent with the allowed time for an inoperable DC distribution system train.

If one of the required DC electrical power subsystems is inoperable (e.g., inoperable battery, inoperable battery charger(s), or inoperable battery charger and associated inoperable battery), the remaining DC electrical power subsystem has the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent worst case single failure would, however, result in the complete loss of the remaining 125 VDC electrical power subsystems with attendant loss of ESF functions, in the case of the Auxiliary Building DC power subsystem, continued power operation should not exceed 2 hours. The 2 hour Completion Time is based on Regulatory Guide 1.93 (Ref. 8) and reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem and, if the Auxiliary Building DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

B.1 and D.1

Conditions B and D represent one Auxiliary Building or SWIS DC electrical power subsystem with connection resistance not within the specified limit. Consistent with the guidance in IEEE-450, connection resistance not within the limit is an indication that the affected battery requires attention to restore the resistance to within the limit but is not a basis on which to declare the battery inoperable. Therefore, the 24 hour Completion Time allowed to restore the battery connection resistance to within the required limit is a reasonable time considering that variations in connection resistance do not mean the battery is incapable of performing its required safety function, but is an indication that the battery requires maintenance.

(continued)

INSERT B

[For Unit 1 only for cycle 19] The second Completion time for Condition A represents the 1B train of Auxiliary Building DC electrical power subsystem due to an inoperable battery. With the 1B Auxiliary Building battery 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 the loss of DC to that train. 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 breakers, etc.) rely upon the battery. The 12 hour limit allows sufficient time to effect restoration of the inoperable battery given that the majority of the conditions that lead to battery inoperability (e.g., loss of battery charger, battery cell voltage less than 2.02 volts, etc.) are identified in Specifications 3.8.4, 3.8.5, and 3.8.6 together with additional specific completion times.

Enclosure 4

Joseph M. Farley Nuclear Plant – Unit 1
Request for Technical Specification Changes
DC Sources - Operating

Clean Typed Technical Specification and Bases Pages

Affected Pages

3.8.4-1
B 3.8.4-5
B 3.8.4-6
B 3.8.4-7
B 3.8.4-8
B 3.8.4-9
B 3.8.4-10
B 3.8.4-11

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources — Operating

LCO 3.8.4 The Train A and Train B Auxiliary Building and Service Water Intake Structure (SWIS) DC electrical power subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Auxiliary Building DC electrical power subsystem inoperable.	A.1 Restore the Auxiliary Building DC electrical power subsystem to OPERABLE status.	2 hours 12 hours for 1B Auxiliary Building DC electrical power subsystem inoperable due to inoperable battery for cycle 19 only
B. One Auxiliary Building DC electrical power subsystem with battery connection resistance not within limit.	B.1 Restore the battery connection resistance to within limit.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours
D. One required SWIS DC electrical power subsystem battery connection resistance not within limit.	D.1 Restore the battery connection resistance to within the limit.	24 hours
E. One required SWIS DC electrical power subsystem inoperable. OR Required Action and associated Completion Time of Condition D not met.	E.1 Declare the associated Service Water System train inoperable.	Immediately

BASES

ACTIONS

A.1

Condition A represents one train of Auxiliary Building DC electrical power 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 train. The 2 hour limit is consistent with the allowed time for an inoperable DC distribution system train.

[For Unit 1 only for cycle 19] The second Completion time for Condition A represents the 1B train of Auxiliary Building DC electrical power subsystem due to an inoperable battery. With the 1B Auxiliary Building battery 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 the loss of DC to that train. 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 breakers, etc.) rely upon the battery. The 12 hour limit allows sufficient time to effect restoration of the inoperable battery given that the majority of the conditions that lead to battery inoperability (e.g., loss of battery charger, battery cell voltage less than 2.02 volts, etc.) are identified in Specifications 3.8.4, 3.8.5, and 3.8.6 together with additional specific completion times.

If one of the required DC electrical power subsystems is inoperable (e.g., inoperable battery, inoperable battery charger(s), or inoperable battery charger and associated inoperable battery), the remaining DC electrical power subsystem has the capacity to support a safe shutdown and to mitigate an accident condition. Since a subsequent worst case single failure would, however, result in the complete loss of the remaining 125 VDC electrical power subsystems with attendant loss of ESF functions, in the case of the Auxiliary Building DC power subsystem, continued power operation should not exceed 2 hours. The 2 hour Completion Time is based on Regulatory Guide 1.93 (Ref. 8) and reflects a reasonable time to assess unit status as a function of the inoperable DC electrical power subsystem and, if the Auxiliary Building DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

(continued)

BASES

ACTIONS
(continued)

B.1 and D.1

Conditions B and D represent one Auxiliary Building or SWIS DC electrical power subsystem with connection resistance not within the specified limit. Consistent with the guidance in IEEE-450, connection resistance not within the limit is an indication that the affected battery requires attention to restore the resistance to within the limit but is not a basis on which to declare the battery inoperable. Therefore, the 24 hour Completion Time allowed to restore the battery connection resistance to within the required limit is a reasonable time considering that variations in connection resistance do not mean the battery is incapable of performing its required safety function, but is an indication that the battery requires maintenance.

C.1 and C.2

If the inoperable Auxiliary Building DC electrical power subsystem cannot be restored to OPERABLE status or the connection resistance restored to within the limit 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 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems. The Completion Time to bring the unit to MODE 5 is consistent with the time required in Regulatory Guide 1.93 (Ref. 8).

E.1

If a required SWIS DC electrical power subsystem is inoperable or the connection resistance is not restored to within the limit and the associated Completion Time has expired, the Service Water System train supported by the affected SWIS DC electrical power subsystem must be declared inoperable. The capability of the affected SWIS DC electrical power subsystem to fully support the associated train of Service Water is not assured. Therefore, consistent with the definition of OPERABILITY, the associated train of Service Water must be declared inoperable immediately, thereby limiting operation in this condition to the Completion Time associated with the affected Service Water System train.

BASES

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 charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is applying a voltage to the battery to maintain it in a fully charged condition during normal operation. The float voltage of 2.2 V per cell or 132 V overall is higher than the nominal design voltage of 125 V and is consistent with the manufacturer's recommendations for maintaining a full charge. Verifying that terminal voltage is ≥ 127.8 V provides assurance that the average of all cell voltages is maintained greater than 2.13 V. Maintaining float voltage at the higher value of 2.2 V per cell prolongs cell life expectancy. The 7 day Frequency is consistent with IEEE-450 (Ref. 9).

SR 3.8.4.2

Visual inspection to detect excessive corrosion on the battery terminals or connectors, or measurement of the post to post resistance of these items provides an indication of the need for cleaning and/or retorqueing.

The Surveillance Frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. This Frequency is considered acceptable based on operating experience related to detecting corrosion trends.

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 presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

The 18 month frequency for this SR is sufficient to detect abnormal deterioration and has been shown to be adequate by operating experience.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.4 and SR 3.8.4.5

Visual inspection and post to post resistance measurements of battery terminals or connectors provide an indication of the need for cleaning and/or retorqueing. The anticorrosion 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 SR 3.8.4.4.

The 18 month frequency for this SR is sufficient to detect abnormal deterioration and has been shown to be adequate by operating experience.

SR 3.8.4.6

This SR requires that each required battery charger be capable of supplying 536 amps (Auxiliary Building chargers) and 3 amps (SWIS chargers) at 125 V for $\geq$ 4 hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), the battery charger supply is required 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.

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

This surveillance is modified by a Note which clarifies that it may be performed in any mode of operation provided certain conditions are met. The design is such that any battery charger may be tested while a spare or redundant battery and/or charger is in service in its place. The spare or redundant battery and/or charger must be within the 18 month surveillance frequency to maintain the DC subsystem(s) to which they are aligned OPERABLE. This operational flexibility maintains TS OPERABILITY of the applicable battery and DC train while testing the normally aligned charger.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.7

A battery service test is a special test of battery capability, as found, to satisfy the design requirements (design load profile) of the DC electrical power system. The discharge rate and test length should correspond to the design load profile requirements as specified in Reference 4.

The Surveillance Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 10), which states that the battery service test should be performed during refueling operations or at some other outage, (applicable to Auxiliary Building batteries only) with intervals between tests, not to exceed 18 months.

This SR is modified by three Notes. Note 1 allows the performance of a performance discharge test in lieu of a service test once per 60 months. Note 2 allows the performance of a modified performance discharge test in lieu of a service test at any time.

The modified performance discharge test is a simulated duty cycle consisting of just two rates: the one 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 envelop the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents 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 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 test.

The reason for Note 3 is that performing the Surveillance for the Auxiliary Building batteries would perturb the electrical distribution system and challenge safety systems.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.8

A battery performance discharge test is a test of constant current capacity of a battery, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

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. The modified performance discharge test may be used to satisfy SR 3.8.4.8 while simultaneously satisfying the requirements of SR 3.8.4.7 at any time. The performance discharge test may be used to satisfy 3.8.4.8 while simultaneously satisfying the requirements of SR 3.8.4.7 once per 60 months.

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9). This reference recommends that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life or 17 years, whichever comes first, the Surveillance Frequency is reduced to 18 months. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is > 10% below the manufacturer's rating. These Frequencies are consistent with the recommendations in IEEE-450 (Ref. 9).

This SR is modified by a Note. The reason for the Note is that performing the Surveillance for the Auxiliary Building batteries would perturb the electrical distribution system and challenge safety systems.

REFERENCES

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

2. Regulatory Guide 1.6, March 10, 1971.

(continued)

BASES

REFERENCES (continued)

3. IEEE-308-1971.

4. FSAR, Section 8.3.

5. None.

6. FSAR, Chapter 6.

7. FSAR, Chapter 15.

8. Regulatory Guide 1.93, December 1974.

9. IEEE-450-1980.

10. Regulatory Guide 1.32, February 1972.