March 2, 2005

Mr. D. E. Grissette
Vice President
Southern Nuclear Operating
Company, Inc.
P.O. Box 1295
Birmingham, AL 35201-1295

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2 RE: ISSUANCE OF AMENDMENTS TO ADOPT TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) STANDARD TECHNICAL SPECIFICATION CHANGE TRAVELER 360, REVISION 1, "DC ELECTRICAL REWRITE" (TAC NOS. MC1029 AND MC1030)

Dear Mr. Grissette:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 133 to Facility Operating License NPF-68 and Amendment No. 112 to Facility Operating License NPF-81 for the Vogtle Electric Generating Plant, Units 1 and 2. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated October 13, 2003, as supplemented by letters dated April 12 and October 28, 2004.

The amendments adopt TSTF-360, Revision 1, "DC Electrical Rewrite." The changes revise TS Limited Conditions for Operation (LCO) 3.8.4, "DC Sources-Operating," LCO 3.8.5, "DC Sources-Shutdown," LCO 3.8.6, "Battery Cell Parameters," and adds a new TS Section 5.5.19 "Administrative Controls Programs."

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Christopher Gratton, Sr. Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-424 and 50-425

Enclosures:
1. Amendment No. 133 to NPF-68
2. Amendment No. 112 to NPF-81
3. Safety Evaluation

cc w/encls: See next page

March 2, 2005

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Southern Nuclear Operating
Company, Inc.
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Birmingham, AL 35201-1295

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Christopher Gratton, Senior Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-424 and 50-425

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cc w/encls: See next page

DISTRIBUTION: See next page

Package Number: ML050660234
License Amendment Number: ML050600411
Tech Spec Number: ML050630223 *w/ comments NRR-058

OFFICE	PDII-1/PM	PDII-1/LA	DE/EEIB	DIPM/IROB	OGC	PDII-1/SC*
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SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2 RE: ISSUANCE OF AMENDMENTS (TAC NOS. MC1029 AND MC1030)

Date: March 2, 2005

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SOUTHERN NUCLEAR OPERATING COMPANY, INC.

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

VOGTLE ELECTRIC GENERATING PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 133
License No. NPF-68

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

   A. The application for amendment to the Vogtle Electric Generating Plant, Unit 1 (the facility) Facility Operating License No. NPF-68 filed by the Southern Nuclear Operating Company, Inc. (the licensee), acting for itself, Georgia Power Company, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the owners), dated October 13, 2003, as supplemented by letters dated April 12 and October 28, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

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

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-68 is hereby amended to read as follows:

   Technical Specifications and Environmental Protection Plan

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 133, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

John A. Nakoski, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: March 2, 2005

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

VOGTLE ELECTRIC GENERATING PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 112
License No. NPF-81

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

   A. The application for amendment to the Vogtle Electric Generating Plant, Unit 2 (the facility) Facility Operating License No. NPF-81 filed by the Southern Nuclear Operating Company, Inc. (the licensee), acting for itself, Georgia Power Company Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the owners), dated October 13, 2003, as supplemented by letters dated April 12 and October 28, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

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

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-81 is hereby amended to read as follows:

   Technical Specifications and Environmental Protection Plan

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 112, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

John A. Nakoski, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: March 2, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 133

FACILITY OPERATING LICENSE NO. NPF-68

DOCKET NO. 50-424

AND

TO LICENSE AMENDMENT NO. 112

FACILITY OPERATING LICENSE NO. NPF-81

DOCKET NO. 50-425

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
iv	iv
v	v
3.8.4-1 thru -3	3.8.4-1 thru -3
3.8.4-4	-
3.8.5-2	3.8.5-2
3.8.6-1 thru -4	3.8.6-1 thru -4
5.5-22	5.5-22
TS Bases	
iii	iii
B 3.8.4-2 thru -9	B 3.8.4-2 thru -9
B 3.8.4-10	-
B 3.8.5-4	B 3.8.5-4
B 3.8.6-1 thru -7	B 3.8.6-1 thru -7
-	B 3.8.6-8

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 133 TO FACILITY OPERATING LICENSE NPF-68

AND AMENDMENT NO. 112 TO FACILITY OPERATING LICENSE NPF-81

SOUTHERN NUCLEAR OPERATING COMPANY, INC., ET AL.

VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2

DOCKET NOS. 50-424 AND 50-425

1.0 INTRODUCTION

By letter dated October 13, 2003, as supplemented by letters dated April 12 and October 28, 2004, Southern Nuclear Operating Company, Inc., et al. (SNC, the licensee) proposed license amendments to change the Technical Specifications (TSs) for the Vogtle Electric Generating Plant (Vogtle), Units 1 and 2. The proposed changes would adopt Technical Specifications Task Force (TSTF) Standard Technical Specification (STS) Change Traveler 360 (TSTF-360), Revision 1, "DC Electrical Rewrite." The changes revise TS Limited Conditions for Operation (LCO) 3.8.4, "DC Sources-Operating," LCO 3.8.5, "DC Sources-Shutdown," LCO 3.8.6, "Battery Cell Parameters," and adds a new TS Section 5.5.19 "Administrative Controls Programs."

The supplemental letters dated April 12 and October 28, 2004, provided clarifying information that did not change the scope of the October 13, 2003, application and the initial proposed no significant hazards consideration determination.

2.0 REGULATORY EVALUATION

The regulatory requirements that the Nuclear Regulatory Commission (NRC) staff applied in its review of the application includes:

Title10 of the *Code of Federal Regulations* (10 CFR) Appendix A of Part 50, 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 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. The offsite power system is required to be supplied by two physically independent circuits that are designed and located so as to minimize, to the extent practical, the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. In addition, this criterion requires provisions to minimize the probability of losing

Enclosure

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.

GDC-18, “Inspection and testing of electric power systems,” requires that electric power systems that are important to safety must be designed to permit appropriate periodic inspection and testing.

10 CFR 50.63, “Loss of All Alternating Current Power,” requires that each light-water cooled nuclear power plant licensed to operate must be able to withstand for a specified duration and recover from a station blackout.

10 CFR 50.36, “Technical Specifications,” requires a licensee’s TSs to establish LCOs, that include completion times (CTs) for equipment that is required for safe operation of the facility. Existing LCOs and related surveillances included as TS requirements that satisfy any of the criteria specified in 10 CFR 50.36 must be retained in the TSs, while those requirements that do not fall within or satisfy these criteria may be relocated to licensee-controlled documents.

10 CFR 50.65, “Requirements for monitoring the effectiveness of maintenance at nuclear power plants,” requires that preventive maintenance activities must not reduce the overall availability of the systems, structures, and components.

Regulatory Guide (RG) 1.32, “Criteria For Safety-Related Electric Power Systems For Nuclear Power Plants,” provides guidance for complying with GDC 17 and 18 with respect to design, operation, and testing of safety-related electric power systems of all types of nuclear power plants.

RG 1.93, “Availability of Electric Power Sources,” provides guidance with respect to operating restrictions (i.e., CTs/allowed outage times (AOTs)) if the number of available direct current (DC) sources is less than that required by the TS LCO. In particular, this guide prescribes a maximum CT of 2 hours for an inoperable DC source.

RG 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,” describes a risk-informed approach, acceptable to the NRC, for assessing the nature and impact of proposed licensing-basis changes by considering engineering issues and applying risk insights.

RG 1.177, “An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications,” describes an acceptable risk-informed approach specifically for assessing proposed TS changes in AOTs. These RGs also provide acceptance guidelines for evaluating the results of such evaluations.

Conformance with TSTF-360, Revision 1: The changes to the STS as proposed in TSTF-360, Revision 1, were approved for incorporation into STS by the NRC staff on December 18, 2000, as set forth in a letter from W. D. Beckner to A.R. Pietrangelo of the Nuclear Energy Institute (NEI). This TSTF provides guidance for the rewrite of current TS requirements for Class 1E DC power supply systems as referenced in the STS NUREGs, Revision 3 (i.e., NUREG-1430 Babcock & Wilcox, NUREG-1431 Westinghouse, NUREG-1432 Combustion Engineering, NUREG-1433 General Electric (BWR/4), and NUREG-1434 General Electric (BWR/6)). The acceptability of a licensee-proposed rewrite of its DC Electrical Systems TS requirements is

based on the NRC staff review and evaluation of the licensee justifications for each of the proposed changes. This includes justifications for revising, relocating, and removing current plant-specific requirements in order to convert the current TSs into new TS LCOs 3.8.4, 3.8.5, 3.8.6, and 5.5.19 similar to those outlined in the TSTF. In general, in adopting the staff-approved TSTF-360, Revision 1, licensees are expected to address the following areas to be consistent with TSTF-360 during conversion of plant TSs to the ITS format of the above stated NUREGs:

Relocation of preventive maintenance surveillance requirements (SRs) to licensee-controlled programs:

(1) Provide a specific Action and increased CT for an inoperable battery charger;

(2) Relocation of preventative maintenance SRs to licensee-controlled programs;

(3) Specification of alternate testing criteria for battery charger testing;

(4) Replacement of battery specific gravity monitoring with float current monitoring;

(5) Relocation of maintenance surveillance for cell voltage and electrolyte level based on the industry recommendations in IEEE [Institute of Electrical and Electronics Engineers] Standard 450 ["IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications"] to a licensee-control program, and creation of a new section in TS Chapter 5 (this new section in Chapter 5 will be a TS-controlled activity with its detailed requirements relocated to a plant procedure);

(6) Addition of specific Actions and increased CTs for out-of-limits conditions for battery cell voltage, electrolyte level, and electrolyte temperature; and

(7) Provision of enhanced TS Bases for each of the newly proposed TS 3.8.4, 3.8.5, and 3.8.6.

In particular, the NRC staff reviewed licensee plant justifications for adopting the various elements of TSTF-360 for consistency with the revised Bases of the TSTF. These Bases were reviewed and accepted by the NRC staff during the review of the TSTF-360, Revision 0, and TSTF-360, Revision 1, that was submitted by NEI on behalf of the industry on February 4, 2000, and November 6, 2000, respectively. Changes approved in TSTF-360, Revisions 1 and 2 have been incorporated in the latest applicable NUREG series for STS, Revision 3.

3.0 TECHNICAL EVALUATION

3.1 Design of Vogtle, Units 1 and 2 125 VDC Electrical Power System

At Vogtle, Units 1 and 2, the 125 VDC "safety features" system for each unit consists of two independent and redundant safety-related Class 1E DC electrical power systems (Train A and Train B). There are four safety features 125 VDC systems per unit, namely System A, B, C, and D. Systems A and C form the Train A safety features DC system, and Systems B and D form the Train B safety features DC system. Each system consists of one 125 VDC battery, the

associated battery chargers, and all the associated control equipment and interconnecting cabling.

Each battery is provided with two-100 percent capacity battery chargers. Both chargers are normally online and in the float-charge mode. Float-charge is the condition where the charger is supplying the connected loads and the battery cells are receiving adequate current from the charger to optimally charge the battery. This assures the internal losses of a battery are overcome and the battery is maintained in a fully charged state. When desired, the charger can be placed in the equalize mode. The equalize mode is at a higher voltage than the float mode and charging current is correspondingly higher. The battery charger is operated in the equalize mode after a battery discharge or for routine maintenance. Each battery charger has sufficient excess capacity to restore the battery from the design minimum charge to its fully charged state within 12 hours while supplying normal steady state loads as described in the Vogtle, Units 1 and 2 Final Safety Analysis Report (FSAR), Chapter 8.

The 125 VDC batteries of each train are separately housed in a ventilated room apart from its charger and distribution centers. Each DC system is located in an area separated physically and electrically from the other DC system to ensure that a single failure in one system does not cause a failure in a redundant system. There is no sharing between redundant Class 1E systems, such as batteries, battery chargers, or distribution panels. Each battery has adequate capacity to meet the duty cycle(s) as discussed in the Vogtle, Units 1 and 2 FSAR, Chapter 8. The battery is designed with additional capacity above that required by the design duty cycle to allow for temperature variations and other factors.

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. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn powers the AC vital buses. Following a battery discharge, the battery recharges and accepts current at the current limit of the battery charger (if the discharge was significant, e.g., following a battery service test) until the battery terminal voltage approaches the charger voltage setpoint. Charging current then reduces exponentially during the remainder of the recharge cycle. Lead calcium batteries have recharge efficiencies of greater than 95 percent, so once at least 105 percent of the ampere-hours (amp-hours) discharged have been returned, the battery capacity would be restored to the same condition as it was prior to the discharge. This can be monitored by direct observation of the exponentially decaying charging current or by evaluating the amp-hours discharged from the battery and amp-hours returned to the battery.

3.2 Evaluation of Proposed Changes

In its letter dated October 13, 2003, the licensee proposed a license amendment to the TSs for for Vogtle, Units 1 and 2, using TSTF-360, Revision 1. The proposed changes would revise LCO 3.8.4, “DC Sources-Operating,” LCO 3.8.5, “DC Sources-Shutdown,” and LCO 3.8.6, “Battery Cell Parameters,” and add a new TS section 5.5.19, “Administrative Controls Program.”

The NRC staff reviewed and evaluated each of the proposed changes to the Vogtle, Units 1 and 2, TSs as follows:

3.3 LCO 3.8.4

3.3.1 LCO 3.8.4 Change (1): The licensee proposed the following:

- Add new Conditions A and B with Required Actions and increased CTs for a DC source inoperable due to an inoperable battery.

The licensee used the guidance in RG 1.177 to demonstrate that increasing the CT for LCO 3.8.4 is acceptable. RG 1.177 describes the methods acceptable to the NRC staff for assessing the nature and impact of proposed TS changes by considering engineering issues and applying risk insights.

Evaluation of LCO 3.8.4 Change (1)

The NRC staff performed the following deterministic and probabilistic evaluations of the proposed changes to LCO 3.8.4:

3.3.1.1 Deterministic Evaluation

The proposed change to LCO 3.8.4 addresses the condition where one DC source is declared inoperable due to an inoperable battery. Currently, LCO 3.8.4 requires restoration of the DC electrical power subsystem to operable status within 2 hours. The proposed Required Action is to restore the DC source to operable status and the proposed CT is 24 hours. The wording for the new Required Action differs from that of TSTF-360 because the TSs specify DC source operability in terms of individual sources rather than trains. The purpose of the proposed change is to provide the licensee with added flexibility in conducting a more orderly and effective work process and to minimize the potential for an additional shutdown/restart transient.

The licensee stated that there is no single failure in any 125 V DC system that will result in conditions that will prevent the safe shutdown of Vogtle, Units 1 or 2. Therefore, with one DC source inoperable, the capability to respond to design basis events, excluding single failure due to the time-limited condition, is maintained. The licensee compared Systems A and B to show the key safety features that would be affected due to a loss-of-offsite power (LOOP) with one system having an inoperable battery. The results of the comparison analysis showed that the loss of System A or B alone would not result in the loss of any redundant features. Additionally, the licensee compared Systems C and D. The results of the licensee's comparison analysis for Systems C and D showed that, with the exception of the Turbine Driven Auxiliary Feedwater Pump (TDAFWP), the loss of either system would not result in the loss of any redundant features.

TDAFWP

The only non-redundant feature of the 125 V DC system is the TDAFWP control power and power associated valves of System C. The licensee contends that if a LOOP were to occur with the battery of System C inoperable, adequate auxiliary feedwater pump (AFW) flow would be available from either or both motor driven trains. The availability of the motor driven trains of AFW would not be affected by the inoperable System C battery, because a single failure is not postulated while in the time-limited LCO for the battery. Therefore, the remaining motor driven trains of the AFW system would be capable of mitigating any design basis event in conjunction with a LOOP.

With System C battery inoperable, the capability to cope with a station blackout (SBO) is adversely affected. In accordance with RG 1.155, “Station Blackout,” and NUMARC 87-00, “Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout At Light Water Reactors,” Revision 1, August 1991, a SBO coping duration of 4 hours was determined for Vogtle, Units 1 and 2. The SBO coping capability relies in part on the availability of AFW as provided by the turbine driven train of the AFW system. The frequency of an SBO event occurring at Vogtle, Units 1 and 2 is approximately 1.680 E-05 per year, and the probability of an SBO event occurring during a 24-hour interval would be approximately 4.6 E-08.

In its October 28, 2004, response to an NRC staff request for additional information (RAI), the licensee stated that in the event of an SBO at Vogtle, Units 1 and 2, Control Room Operators (CRO) would enter Procedure 19100-C, ECA-0.0 Loss of All AC Power. Step 4 of this procedure requires verification that AFW flow greater than 570 gallons per minute is being supplied to the steam generators. If the required AFW flow rate is not met, the TDAFWP cannot be operated normally due to either governor or DC power failure. In this situation, the procedure directs that an operator be dispatched to attempt local manual control of the TDAFWP. Vogtle Procedure 18034-1(2), “Loss of Class 1E 125 V DC Power,” provides instructions for operating the TDAFWP if its associated DC bus is de-energized. In its April 12, 2004, response to an NRC staff RAI, the licensee stated that its CROs are trained on the use of this guidance a minimum of once every 2 years. Steam to the turbine can be manually throttled to control pump speed using the pump miniflow indicator. The pump discharge valves are normally open, so once proper pump speed is achieved, AFW flow to the steam generators will be established. The licensee stated that based on a conservative, bounding evaluation of the plant response while AFW is being established via local manual control of the TDAFWP, there would be at least 30 minutes available to support this operator action. CROs are trained to accomplish manual control of the TDAFWP via a job performance measure. Since the operators would enter Procedure 19100-C immediately upon recognition of a loss of AC power to the emergency buses, and verification of AFW flow occurs early in this procedure (step 4), the first three steps being verify reactor trip, verify turbine trip, and check if reactor coolant system is isolated, respectively, the licensee contends that operators should be able to identify the need to take manual control of the TDAFWP quickly. Under these circumstances, the licensee expects that manual control of the TDAFWP should be accomplished within approximately 30 minutes.

Standby Auxiliary Transformer (SAT)

There are five 230 kV transmission lines that supply power to Vogtle, Units 1 and 2 230 kV and 500 kV switchyards. Vogtle, Units 1 and 2 system load studies indicate that this arrangement has the capacity and capability to supply the power necessary for the safety loads of one unit while placing the other unit in cold shutdown. In addition to these transmission lines, the switchyard is equipped with a SAT. The SAT is a 13.8 kV qualified offsite source that can be connected to any one safety bus on either unit. The offsite power circuit, which provides AC power through the SAT, feeds the SAT through a direct buried cable. The buried cable originates at Georgia Power Company's Plant Wilson and can be powered by either the 230 kV grid system or from any combination of the Plant Wilson's six 60 megavar combustion turbine generators (CTGs). Two of these six CTGs have enhanced black-start capability, complete with a black-start diesel generator. These enhanced black-start CTGs are regularly tested to maintain a combined reliability of $ 95 percent.

In a safety evaluation report, dated May 20, 1998, the NRC staff noted that the licensee meets the requirements of 10 CFR 50.63 (SBO Rule) by coping with DC power only, and that the AC power source provided by Georgia Power Company's Plant Wilson was not credited as an alternate AC (AAC) source as part of the licensee's SBO conformance. However, the NRC staff used the guidance provided in NUMARC 87-00 and RG 1.155 to evaluate Georgia Power Company's Plant Wilson as "equivalent" to an AAC source. The NRC staff concluded that the Georgia Power Company's Plant Wilson facility meets the applicable requirements of NUMARC 87-00 as an "equivalent" AAC source.

With a SBO at Vogtle, Units 1 and 2, and the Georgia Power Company's Plant Wilson switchyard energized, the SAT power feed circuit provides an additional and diverse connection to the Southern Electric System grid. The SAT power feed circuit is immediately available as an energized line to the low voltage switchyard. In a letter dated January 22, 1998, the licensee stated that the SAT power feed can be manually realigned and connected to feed either unit's safe shutdown loads via a 4.16 kV Class 1E safety bus within 1-hour. The SAT underground power feed remains continuously energized.

The licensee stated that although restoration of offsite power by the system dispatcher would simultaneously proceed given the grid restoration plan, a black-start of one of the Plant Wilson CTGs would be an immediate option for plant personnel to implement in order to expedite the restoration of safe shutdown power via the SAT. The recovery from an SBO by application of the SAT power feed has been added to both plant emergency operation procedures and the system dispatcher's plan for restoration of offsite safe shutdown power.

In its April 12, 2004, response to a staff RAI, the licensee stated that Procedure 14230, AC Source Verification, provides guidance to demonstrate the operability of the offsite transmission network to the onsite Class 1E distribution system by verifying correct breaker alignment and indicated power availability. The line-up procedure, which provides guidance for the SAT, is 11418-C. This procedure provides the necessary instructions for energizing and operating the SAT.

Because Batteries A and B are required for emergency diesel generators (EDG) A and B, respectively, to start and flash the generator field, the NRC staff and the licensee agreed that it would be appropriate to enter LCO 3.8.1, Condition B, due to the extended CT for restoring an inoperable battery. Entering LCO 3.8.1, Condition B, would invoke LCO 3.8.1, Required Action B.2 to verify that the SAT is available within 1-hour and once per 12 hours thereafter. Therefore, in its October 28, 2004, response to an NRC staff RAI, the licensee proposed revising the section titled "INSERT: 3.8.4 ACTIONS." The revised insert includes a new Condition A that would be applicable to Batteries A and B only, and Required Action A.1 would include the following new Note:

> "Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources – Operating," for emergency diesel generator made inoperable by inoperable battery A or B."

Since Batteries C and D do not impact the operability of the EDGs, a separate Condition was required in order to invoke the Required Action to verify the availability of the SAT. In its October 28, 2004 response to an NRC staff RAI, the licensee proposed adding a new Condition

B for Batteries C and D that includes a Required Action B.1 to verify that the SAT is available within 1-hour and once per 12 hours, hereafter.

With the addition of the above mentioned Required Actions, the NRC staff concludes that there is reasonable assurance that, in the event of an SBO event occurring at Vogtle, Units 1 and 2 during the time that a single battery is inoperable, the capability to provide AFW as part of the SBO coping strategy will be maintained.

Required Features

The NRC staff had a concern with respect to Batteries A, B, C, and D regarding whether the licensee would declare required feature(s) supported by an inoperable battery 'inoperable' when the redundant required feature(s) are inoperable. The licensee's proposed revision to "INSERT: 3.8.4 ACTIONS" addresses this concern. For the EDG made inoperable by Battery A or B, entering LCO 3.8.1, Condition B will invoke Required Action B.3. Required Action B. 3 addresses redundant features. For Batteries C and D, the Safety Function Determination Program is invoked by LCO 3.0.6 and TS 5.5.15, "Safety Function Determination Program." LCO 3.0.6 requires that when a supported system LCO is not met due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered. However, additional evaluations and limitations may be required in accordance with TS 5.5.15. If a loss of safety function is determined to exist by this program, the licensee is required to enter the appropriate Conditions and Required Actions of the LCO.

Based on the above discussion, the NRC staff's concern with this issue is resolved.

Compensatory Measures

The licensee stated that it will continue to implement compensatory measures that are currently in place to minimize the impact of the proposed extended CT for LCO 3.8.4. The NRC staff evaluated the compensatory measures to determine whether the actions needed to be considered regulatory commitments. The compensatory measures include work controls, actions taken during severe weather, and electrical system alignments.

With respect to work controls, the licensee stated that there will be no scheduled work or surveillance testing that could result in a reactor or turbine-generator trip hazard, cause a plant transient, or impact safety-related systems during the extended CT for LCO 3.8.4. This includes testing of the solid state protection system and the sequencer. The NRC staff considered whether making such work controls a regulatory commitment. The licensee stated that the Configuration Risk Management Program (CRMP), as required by TS 5.5.18, provides a proceduralized risk-informed assessment to manage the risk associated with equipment inoperability. The CRMP includes provisions, which are detailed in Section 3.3.1.2 of this safety evaluation, requiring the licensee to: 1) perform an assessment prior to entering the LCO Condition for preplanned activities; 2) perform an assessment after entering an LCO Condition for unplanned entry in to a LCO Condition; and 3) assess the need for additional actions after the discovery of additional equipment out-of-service conditions while in an LCO Condition. Based on the TS-required CRMP, the NRC staff finds that a regulatory commitment is not needed to ensure that the licensee's administrative programs will adequately control the work control process when implementing the proposed extended CT for LCO 3.8.4.

In the event severe weather were to occur at the time the extended CT were in effect, the licensee stated that it will implement the severe weather checklist to help minimize the impact severe weather can have on facilities' electrical systems. The NRC staff considered whether implementing the severe weather checklist under these conditions should be made a regulatory commitment. The licensee stated that the severe weather checklist is implemented for all severe weather conditions, not only those encountered during the extended CT for LCO 3.8.4. In addition, the proposed extended CT is not intended to be used during on-line preventive maintenance, rather, it is only to provide for more orderly corrective maintenance. Given the relatively short duration of the extended CT for LCO 3.8.4 and its use for corrective maintenance, the NRC staff concludes that it is not necessary to establish a regulatory commitment for the implementation of the severe weather checklist.

The final compensatory measure assessed by the NRC staff concerned electrical system alignments. The licensee stated that prior to the extended CT for LCO 3.8.4, it will verify both battery chargers are available for the train with an inoperable battery and will ensure one battery charger is aligned for service. The NRC staff considered whether these actions should be a regulatory commitment. The TSs require one battery charger to be operable to support the associated DC power system. Should the licensee have the aligned battery charger become inoperable (without the backup battery charger available) during the 24-hour LCO 3.8.4 under Condition A, the licensee would be required to enter LCO 3.8.4, Condition C, until a charger was made available and aligned for service. Condition C is a more restrictive LCO that requires the licensee to restore a charger within 2 hours. Prior to the restoration of a charger, if the associated DC power system removed the ability of an EDG to start in fast automatic start conditions, that EDG would be declared inoperable under TS 3.8.1 and the required actions taken, even though the EDG would still be available in the slow start mode. The battery is necessary to flash the EDG field under fast automatic start conditions. In slow start mode, field flashing is not required. Thus, slow start mode allows the EDG to be manually started in response to an event and provide rated power, even though it could not be credited to start under fast start conditions. The NRC staff concludes, therefore, that no regulatory commitment is needed to ensure that the electrical alignment described by the licensee will be established prior to entering the extended battery CT due to the more restrictive LCO requirements of LCO 3.8.4, Condition C, and the required action taken under TS 3.8.1 for the affected EDG.

Deterministic Conclusion

The NRC staff finds the proposed changes to LCO 3.8.4 acceptable based on the available procedures; the assurance provided by TS 5.5.18; adequate compensatory measures; and redundancy, defense-in-depth provided by the Georgia Power Company's Plant Wilson enhanced black-start CTGs and the SAT.

The changes made to the other conditions of LCO 3.8.4 are editorial/administrative to accommodate the addition of the new conditions and to clarify that renamed Condition C (previously Condition A) is applicable for reasons other than new Conditions A or B. The NRC staff finds these editorial changes acceptable.

3.3.1.2 Probabilistic Evaluation

The licensee has evaluated its proposed TS change to determine that current regulations continue to be met and guidelines followed, that adequate defense-in-depth provisions are

maintained, and that any increases in the “at power” core damage frequency (CDF) and large early release frequency (LERF) are small and consistent with the NRC staff’s Safety Goal Policy Statement. The impact on risk of the proposed TS change was evaluated in accordance with the guidelines in RG 1.174 and RG 1.177.

The risk impact of the proposed change in CT from 2 hours to 24 hours for an inoperable battery was evaluated using the three tiers of RG 1.177. The first tier, Tier 1, assesses the impact of the proposed change on CDF, incremental conditional core damage probability (ICCDP), LERF, and incremental conditional large early release probability. The original Vogtle, Units 1 and 2 PRA model was developed as part of the Individual Plant Examination (IPE) process. The licensee stated that the current probabilistic risk analysis (PRA) model was reviewed by an Independent Review Group and a consultant, PLG, Inc., who reviewed the PRA as part of the IPE process. This review provided confidence that the results and conclusions of the IPE were applicable and representative of Vogtle, Units 1 and 2. The original PRA was converted to linked-fault tree methodology based on the Electric Power Research Institute (EPRI) Computer Aided Fault Tree Analysis suite of software. The current PRA is a Revision 2cy model that incorporates plant operating history as well as findings resulting from the Westinghouse Owners Group (WOG) peer review. The licensee stated that all calculations performed in support of the proposed extended CT for an inoperable battery were performed in accordance with SNC approved procedures by qualified personnel. The current PRA includes both a Level 1 and Level 2 analysis. The analysis models both generic and plant-specific initiators, including internal flooding, and dependencies that exist between initiating events and the associated mitigating systems. Generic data sources and plant-specific data were incorporated into the model using Bayesian techniques. Common cause failures are treated using the multiple Greek letter method and generic data.

The licensee’s analysis of the risk significance of the proposed change in CT for an inoperable battery was performed in accordance with SNC procedures. The licensee stated that the risk analysis was originated and reviewed by fully qualified engineers. The responsibility of the originator is to ensure that the model utilized has been properly developed, controlled, documented in accordance with SNC procedure, and calculations are performed using a computer that has been verified to produce accurate results for the model selected. The reviewer’s responsibility is to confirm that the risk analysis is error free, accurately addresses the issue under consideration, utilizes an appropriate approved model, is based on technically sound judgement, and is properly documented. The analysis is considered a Quality Assurance record and is maintained for the life of the plant.

The current estimated plant CDF for internal events at Vogtle, Units 1 and 2 is 1.712 E-05 per year, and the SBO contribution is approximately 4.60 percent. In its analysis, the licensee based the outage time for the batteries on an average time derived from historical data. In order to evaluate the risk impact of the proposed extended CT, the licensee increased the average time to an estimated value based on the ratio of the proposed CT (24 hours) and the current CT (2 hours). With the increase in CT from 2 hours to 24 hours for an inoperable battery, the licensee stated that the CDF increased by a value of 1.7 E-07 per year and the LERF increased by a value less than 1 E-10 per year. The increased values for CDF and LERF are within the guidelines of RG 1.174, and therefore, are acceptable.

With the increase in CT from 2 hours to 24 hours for an inoperable battery, ICCDP and ILERP were calculated as 1.5 E-07 per year and 5.9 E-11 per year, respectively. The increased values for ICCDP and ILERP are within the guidelines of RG 1.177, and therefore, are acceptable.

Vogtle, Units 1 and 2 has a CRMP as required by TS 5.5.18. The CRMP provides a proceduralized, risk-informed assessment to manage the risk associated with equipment inoperability. The program includes the following elements:

- Provisions for the control and implementation of a Level 1 at-power internal events PRA-informed methodology. The assessment shall be capable of evaluating the applicable plant configuration.

- Provisions for performing an assessment prior to entering the LCO Condition for preplanned activities.

- Provisions for performing an assessment after entering the LCO Condition for unplanned entry in to the LCO Condition.

- Provisions for assessing the need for additional actions after the discovery of additional equipment out-of-service conditions while in the LCO Condition.

- Provisions for considering other applicable risk significant contributors, such as Level 2 issues and external events, qualitatively or quantitatively.

The licensee stated that the procedure that is utilized to implement the CRMP is the same procedure that provides instructions to conduct risk-informed assessments required by 10 CFR 50.65 (a)(4) of the safety impacts associated with scheduling maintenance and maintenance activities in Modes 1, 2, 3, and 4.

The CRMP meets the Tier 2 and Tier 3 requirements of RG 1.177. The CRMP is a combination of a quantitative, at-power, internal events based, Equipment Out-of-Service (EOOS) risk assessment tool and a deterministic safety assessment process utilized by the plant. The EOOS risk assessment tool satisfies the Tier 2 requirement that the licensee provide reasonable assurance that risk-significant plant equipment outage configurations will not occur when specific plant equipment is out-of-service consistent with the proposed change in CT for an inoperable battery.

PRA Quality

A team from the WOG peer reviewed Revision 2c to the Vogtle, Units 1 and 2 PRA model (dated August 28, 2001) in December 2001. The peer review team had findings on certain PRA elements they designated as “Contingency Grade 3” items. Contingency Grade 3 items are categorized into four levels of significance (A, B, C, or D), with “Level A” being the most significant. None of the Contingency Grade 3 items were judged by the peer review team to be “Level A,” which would have required prompt resolution to ensure the technical adequacy of the PRA. Thirteen “Level B” observations were identified by the peer review team. Most of the observations are only considered important for the long-term enhancement of the PRA model and their resolution were deferred until the next periodic PRA model update. After the WOG peer review, the PRA model was updated to Revision 2cy on May 13, 2003, to address three items that were considered to be the most significant among 13 “Level B” items. The resolutions to the three items were:

< Re-evaluate the residual heat removal (RHR) pump common cause failure (CCF) probabilities using the most recent NRC CCF data base (observation DA-02),

< Re-bin all steam generator tube rupture sequences into containment bypass sequences in the LERF model (observation AS-08), and

< Add RHR pump demand failures to the low pressure recirculation fault tree for small loss-of-coolant accident (observation QU-06).

External Events

(1) Seismic

Although a seismic PRA has not been developed for Vogtle, Units 1 and 2, the licensee performed a seismic margins assessment (SMA) for resolution of the seismic portion of NRC Generic Letter (GL) 88-20, Supplement 4, entitled “Individual Plant Examination of External Events (IPEEE) for Severe Accidents.” The licensee used a 0.3 g peak ground acceleration (PGA) NUREG/CR-0098 spectrum earthquake for the SMA. Even though plant structures and equipment were designed for a safe shutdown earthquake (SSE) of 0.2 g PGA as defined by RG 1.60, “Design Response Spectra for Seismic Design of Nuclear Power Plants,” most of the Seismic Category I structures and equipment were qualified for a capacity of 0.3 g PGA due to conservatisms applied to the evaluation techniques. Based on the results of the SMA evaluations, the NRC staff considers Vogtle, Units 1 and 2 to have a high-confidence-low-probability-of-failure capacity of at least 0.3 g PGA.

Furthermore, the probability of an earthquake greater than the design basis earthquake (the 0.2 g SSE) occurring during the additional time proposed for the battery CT extension (22 hours) is very low. Therefore, any seismic-related increase in risk due to extending the battery CT from 2 to 24 hours, although not quantified, is expected to be very small. Consequently, the NRC staff concludes that any increase in seismic-related risk due to the proposed 24-hour battery CT extension is small.

(2) Fire

A fire PRA was performed for Vogtle, Units 1 and 2 in response to GL 88-20, Supplement 4. The objective of the analysis was to identify fire and smoke induced plant-specific vulnerabilities to severe accidents. Based on the results of the analyses, the total fire CDF was reported to be 1E-05 per year. Using the fire CDF reported in the IPEEE, the total combined baseline CDF (internal events plus fire risk) is 1.71 E-05 + 1.01 E-05 = 2.72 E-05 per year, indicating the CDF will not be "considerably higher" than the RG 1.174 guidance of 1 E-04 per year. Therefore, RG 1.174 guidance can still be used to determine acceptability of the total (internal plus fire) CDF increase resulting from increasing the battery CT from 2 to 24 hours.

The licensee performed an analysis to determine the sensitivity of the fire CDF reported in the IPEEE for the top three fire zones to an increase in battery unavailability from 2 to 24 hours consistent with the proposed extended CT. The IPEEE fire analyses results identified the main control room, the 4160 volt Train A switchgear room, and the 4160 volt Train B switchgear room as the top three fire zones in terms of fire CDF. For these three fire zones, the dominant impacts in the fire core damage sequences in the IPEEE were fire-related Loss of Station Power and failure of AC power equipment. In these sequences, core damage is mitigated by manually opening the steam admission valve and locally operating the TDAFWP. Since the success or failure of these TDAFWP-related operator actions are not affected by battery unavailability, the NRC staff concludes that the increase in fire risk due to the proposed 24-hour battery CT extension is small.

(3) High Winds

According to the Vogtle, Units 1 and 2 IPEEE, the facility conforms to the Standard Review Plan, NUREG-75/087, criteria regarding high winds and tornadoes. There have been no significant changes to the design of the facility that would adversely affect the high winds design basis since the issuance of the operating license. Therefore, the NRC staff concludes that the risk associated with high winds is small.

(4) Freezing rains

According to the Vogtle, Units 1 and 2 FSAR, freezing rain is rare. Furthermore, the calculation of the LOOP initiating event frequency included LOOP events caused by freezing rain. Thus, the impact of freezing rain has already been considered in the battery CT calculation.

Probabilistic Conclusion

The NRC staff finds that the proposed changes to LCO 3.8.4 result in a small impact on risk, which satisfies the acceptance criteria in RG 1.174 and RG 1.177. Additionally, the use of the CRMP will ensure that overall plant risk is managed to acceptable levels while operating under the extended CT. Therefore, the proposed changes are acceptable.

3.3.2 LCO 3.8.4 Change (2): In its RAI response dated October 28, 2004, the licensee proposed the following:

- The existing Condition A would be renamed Condition C and revised to address one DC electrical power source inoperable for reasons other than Condition A or Condition B, and the existing Condition B would be renamed Condition D.

Evaluation of Proposed LCO 3.8.4 Change (2)

New Condition C addresses the situation where one DC source becomes inoperable for reasons other than Condition A or Condition B. The Required Action is to restore the inoperable battery to operable status within a 2-hour CT. The 2-hour CT is based on RG 1.93, “Availability of Electric Power Sources.” The NRC staff finds that the proposed change is administrative in nature, does not change substantive requirements, is consistent with NUREG-1431, Revision 3, “Standard Technical Specifications, Westinghouse Plants,” and therefore, is acceptable.

3.3.3 LCO 3.8.4 Change (3): The licensee proposed the following:

- The existing Surveillance Requirement SR 3.8.4.1 would be revised to “Verify battery terminal voltage is greater than or equal to the minimum established float voltage.”

Evaluation of Proposed LCO 3.8.4 Change (3)

The revised SR 3.8.4.1 provides for the verification of battery terminal voltage while the system is on float charge and helps to ensure the effectiveness of the battery chargers. The licensee stated that voltage requirements are consistent with the minimum float voltage established by the battery manufacturer, and the 7-day frequency is consistent with manufacturer recommendations and IEEE Standard 450-1995. The specific limiting value for battery terminal voltage is stated in the TS Bases. The NRC staff finds that the proposed change to SR 3.8.4.1 meets 10 CFR 50.36 requirements, is consistent with NUREG-1431, "Standard Technical Specifications, Westinghouse Plants,” Revision 3, and therefore, is acceptable.

3.3.4 LCO 3.8.4 Change (4): The licensee proposed the following

- The existing Surveillance Requirements SR 3.8.4.2, SR 3.8.4.3, SR 3.8.4.4, and SR 3.8.4.5 would be removed from the TS, and their requirements would become part of the Battery Monitoring and Maintenance Program that will be required by new TS 5.5.19.

Evaluation of Proposed LCO 3.8.4 Change (4)

Below is a brief description of the existing SRs:

- SR 3.8.4.2 (Verification of visible corrosion at battery terminals and connectors, OR Verification of battery connection resistance values).

- SR 3.8.4.3 (Visual indication of battery cells, cell plates, and racks for physical damage or abnormal deterioration).

- SR 3.8.4.4 (Removal of visible corrosion, and verification that connections are coated with anti-corrosion material).

- SR 3.8.4.5 (Verification of battery connection resistance values).

Failure to meet the above SRs does not necessarily mean equipment failure. Corrective action is generally a routine or preventive maintenance activity. The proposed relocation of these SRs to a maintenance program provides adequate assurance of system operability commensurate with the safety significance. The relocated SRs will continue to be performed and any changes will be evaluated in accordance with 10 CFR 50.59. Therefore, the NRC staff finds the proposed change reasonable, meets 10 CFR 50.36 requirements, is consistent with the intent of NUREG-1431, Revision 3, and therefore, acceptable.

3.3.5 LCO 3.8.4 Change (5): The licensee proposed the following:

- The existing SR 3.8.4.6 would be renumbered to SR 3.8.4.2, the Note associated with this SR would be deleted, and the SR would be revised to replace the 125 V criteria with “greater than or equal to the minimum established [float] voltage.”

- An alternative criteria would be added to the SR that allows the charger operability to be verified by recharging its associated battery to the fully charged state within 12 hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state.

- The charging time requirement for Systems C and D is revised from $8 hours to $3 hours.

<u>Evaluation of Proposed LCO 3.8.4 Change (5)</u>

SR 3.8.4.6 specifies battery charger current requirements for each DC source, and its purpose is to verify the design capacity of each battery charger. Currently, SR 3.8.4.6 requires that each battery charger be capable of supplying 400 amps for Systems A and B, 300 amps for System C, and 200 amps for System D at 125 V for $ 8 hours. The licensee has proposed revising this SR to be consistent with SR 3.8.4.1 by replacing the specific voltage limit (i.e., 125 V) with "greater than or equal to the minimum established float voltage." The minimum established float voltage for the batteries is 129.8 V. Therefore, the proposed limit is conservative with respect to the current specified limit. The voltage requirements are based on the battery charger voltage level after a response to a loss of AC power. Additionally, the battery manufacturer establishes this voltage limit to provide the optimum charge on the battery and to maintain the battery plates in a condition that supports maintaining the battery grid life. Maintaining the battery plates in a condition that supports maintaining the battery grid life provides assurance that the battery will be capable of providing its designed safety function. Based on the above discussion, the NRC staff finds the proposed changes acceptable. In addition, the NRC staff notes that the proposed change to renumber SR 3.8.4.6 is consistent with the changes accepted in Section 3.3.4 of this Safety Evaluation, are administrative in nature, and are therefore, acceptable.

The licensee has proposed deleting the Note restricting the performance of this SR during Modes 1, 2, 3, and 4. With two 100 percent capacity chargers for each battery, this SR can be

performed at any time during power operation or shutdown for the battery charger that is not required for DC source operability. To perform this SR during Modes 1, 2, 3, or 4, the licensee would remove one of the battery chargers from service and apply a load to demonstrate the battery charger capacity. Therefore, this SR can be performed at any time without potential for electrical perturbations to the 120 V AC or 125 V DC buses. Based on this information, the NRC staff finds the proposed change acceptable.

The licensee proposed reducing the minimum time that the battery chargers must deliver the required current from 8 hours to 3 hours based on current loading requirements for DC Systems C and D. Given present design requirements for Systems C and D, if the associated battery chargers can deliver the specified current for at least 3 hours, they will be capable of fully recharging the batteries following a design basis discharge with margin. Thus, the ampere requirements are based on the output rating of the chargers. Based on adequate design capacities and ratings of Systems C and D battery chargers and batteries, and that the time period is sufficient for the charger temperature to have stabilized and to have been maintained for at least 2 hours, the NRC staff finds the proposed change acceptable.

The licensee also proposed adding the following alternate acceptance criteria to SR 3.8.4.6: perform an actual inservice demonstration that the battery charger can recharge the battery to the fully charged state within 12 hours, while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state. This is an alternate method for verifying the design capacity of each battery charger. The proposed wording accurately reflects the battery charger design capacity as it is detailed in the FSAR. As described in the revised TS Bases for SR 3.8.4.2, this test would occur following a service test. The level of loading required may not normally be available following the battery service test and may need to be supplemented with additional loads. The duration of this test may be longer than the charger sizing criteria since the battery recharge is affected by float voltage, temperature, and the exponential decay in charging current. Based on this information, the NRC staff finds the proposed change to add the alternate criteria to the revised SR 3.8.4.2 acceptable.

3.3.6 LCO 3.8.4 Change (6): The licensee proposed the following:

- The existing SR 3.8.4.7 would be renumbered to SR 3.8.4.3, and the reference to SR 3.8.4.6 in the Note associated with existing SR 3.8.4.7 would be renumbered to SR 3.8.6.6.

<u>Evaluation of Proposed LCO 3.8.4 Change (6)</u>

The purpose of SR 3.8.4.7 is to verify the battery's capability, as found, to satisfy the battery duty cycle of the DC electrical power system. The Note states that the licensee is allowed to perform a modified performance discharge test in lieu of a service test. The renumbering of SR 3.8.4.7 and related references are editorial changes in nature. The NRC staff finds that the proposed change maintains compliance with requirements governing the design and operation of the DC electrical power system, provides adequate assurance of system operability, and therefore, is acceptable.

3.3.7 LCO 3.8.4 Change (7): The licensee proposed the following:

- The existing SR 3.8.4.8 would be moved to LCO 3.8.6 and renumbered to read SR 3.8.6.6. Existing Table 3.8.4-1 would be deleted and replaced with the Frequency from the associated SR in NUREG-1431.

Evaluation of Proposed LCO 3.8.4 Change (7)

The purpose of SR 3.8.4.8 is to determine the battery's existing capacity by means of performance discharge testing. The licensee proposed to move SR 3.8.4.8 to LCO 3.8.6 as SR 3.8.6.6. This change is considered editorial in nature. SR 3.8.4.8 would also be revised to be consistent with NUREG-1431. Table 3.8.4-1 shows the Frequency based on battery life and considering degradation, in accordance with IEEE Standard 450-1995. For the proposed SR 3.8.6.6, the licensee would eliminate Table 3.8.4-1 and adopt NUREG-1431 SR 3.8.6.6, "Surveillance Requirement and Frequency." The Notes associated with Table 3.8.4-1 would also be eliminated. The licensee stated that Note 1, which defines the term 'degradation,' is already defined in IEEE Standard 450-1995. In addition, the deletion of Notes 2 and 3 is conservative. Both notes address maintenance issues using cell replacement to increase battery life that the licensee decided not to adopt. Based on the above, the NRC staff finds the proposed change maintains compliance with requirements governing the design and operation of the DC electrical power system, provides adequate assurance of system operability, and therefore, is acceptable.

3.4 LCO 3.8.5 Changes

The licensee proposed the following:

- The existing SR 3.8.5.1 would be revised to delete reference to the SRs relocated from LCO 3.8.4 and renumber the remaining referenced SRs.

Evaluation of Proposed LCO 3.8.5 Change

The proposed changes to SR 3.8.5.1, deleting references to the SRs relocated from TS 3.8.4 and renumbering the remaining SRs in the SR Note, are administrative in nature, do not change substantive requirements, and are acceptable.

3.5 LCO 3.8.6 Changes

The licensee proposed the following:

- Deletion of the word "cell" from TS 3.8.6, and the LCO statement is revised to delete reference to the specific limits of Table 3.8.6-1. With regard to the specific limits of Table 3.8.6-1, the following limits are relocated to the Battery Monitoring and Maintenance Program specified in new TS 5.5.19:

    - Category A and B limits for cell voltage and electrolyte level.
    - Category C specific value limit for electrolyte level.
    - The requirements for specific gravity will be replaced with float current monitoring.

- The existing Condition A, associated Required Actions and CTs will be deleted and replaced with the following new Conditions:

  - A new Condition A, associated Required Actions and CTs for one battery with one or more battery cells float voltage < 2.07 V.
  - A new Condition B, associated Required Actions and CTs for one battery with float current > 2 amps for battery A or B, or > 1 amp for battery C or D.
  - A new Condition C, associated Required Actions and CTs for one battery with one or more cell electrolyte level less than minimum established design limits.
  - A new Condition D, associated Required Actions and CTs for one battery with pilot cell electrolyte temperature less than the minimum established design limits.
  - A new Condition E, associated Required Actions and CTs for two or more batteries with battery parameters not within limits.

- The existing Condition B would be renamed Condition F and revised by referencing the new Conditions B, C, D, and E. In addition, the existing portions of the Condition that address electrolyte temperature and battery cell parameters not within Category C limits would be deleted and replaced with a Condition that addresses battery cell voltage and float current.

- The existing SRs and Table 3.8.6-1 would be deleted and replaced with SR 3.8.6.1 for float current, SR 3.8.6.2 for pilot cell voltage, SR 3.8.6.3 for electrolyte level, SR 3.8.6.4 for pilot cell temperature, and SR 3.8.6.5 for connected cell voltage.

- A new program, the Battery Monitoring and Maintenance Program, to be specified in new TS 5.5.19, will be created. The requirements of this program will be based on the recommendations of IEEE Standard 450-1995.

Evaluation of Proposed LCO 3.8.6 Change

The NRC staff considers deleting the word “Cell” from TS 3.8.6 to be an editorial change, and is administrative in nature. Regarding TS Table 3.8.6-1, the table specifies the battery cell parameter requirements, including electrolyte level, float voltage, and specific gravity. Since the licensee proposed to delete Table 3.8.6-1, deleting references to Table 3.8.6-1 are administrative changes in nature and do not change substantive requirements. Therefore, the NRC staff concludes that these changes are acceptable.

Categories A and B values represent appropriate monitoring levels and appropriate preventive maintenance levels for long term battery quality and extended battery life. The LCO category presented in 10 CFR 50.36 states that LCOs are “the lowest functional capability or performance levels of equipment required for safe operation of the facility.” As such, Categories A and B limits for cell voltage and electrolyte level do not reflect the 10 CFR 50.36 criteria for LCOs. It is proposed that these values and the Required Actions associated with restoration be relocated to a licensee-controlled program that is under the control of 10 CFR 50.59, “Changes, tests, and experiments.” This program is to be based on the recommendations of IEEE Standard 450-1995. The battery parameter values will continue to be controlled at their current level, and actions will be implemented in accordance with the

licensee's corrective action program. Furthermore, the battery and its preventive maintenance and monitoring program are under the regulatory requirements of 10 CFR 50.65. This relocation will continue to assure the battery is maintained at current levels of performance, and allows the licensed operators to focus on the monitoring of battery parameter degradations.

Category C specific limiting values for the battery electrolyte levels are also relocated to a licensee-controlled program that is under the control of 10 CFR 50.59. However, a new TS Condition D will require the electrolyte temperature and level to be greater than or equal to minimum established design limits. Depending on the available excess capacity of the associated battery, the minimum temperature necessary to support operability of the battery can vary. Relocation to a licensee-controlled program will allow the flexibility to monitor and control this limit at values directly related to the battery's ability to perform its assumed function.

The licensee proposed the replacement of the requirements to measure specific gravity with requirements to monitor float current. Use of float current to determine the state of charge of the battery is consistent with Section 4.5 of IEEE Standard 450-1995. The NRC staff finds that the deletion of the requirement for specific gravity measurements will not have a significant impact on safety or the ability to accurately determine the operability of the batteries.

The proposed changes by the licensee listed above ensure the battery parameters (maintenance, testing, and monitoring) are performed in accordance with the "Battery Monitoring and Maintenance Program," as specified in TS 5.5.19. Therefore, the NRC staff finds the proposed changes reasonable, meets 10 CFR 50.36 requirements, are consistent with the intent of NUREG-1431, Revision 3, and therefore, are acceptable.

The proposed new Condition A addresses what was formerly the Category C for float voltage in Table 3.8.6-1, and applies to a battery that has one or more battery cells with a float voltage less than 2.07 V. Once Condition A has been entered, the battery cell is considered degraded and the Required Actions are to verify: (a) the battery terminal voltage to be greater than or equal to the minimum established float voltage (SR 3.8.4.1), and (b) the battery float current is less than or equal to 2 amps for Systems A and B, and less than or equal to 1 amp for Systems C and D (SR 3.8.6.1). The above actions assure that there is still sufficient battery capacity to perform its intended function without considering the battery inoperable. Continued operations up to 24 hours is proposed to allow the restoration of the affected cell(s) voltage to greater than or equal to 2.07 volts. The NRC staff concludes that the 24-hour restoration time is reasonable, is consistent with the intent of NUREG-1431, Revision 3, and therefore, is acceptable.

The proposed new Condition B addresses the battery state of charge. A partial discharge has occurred when float current is greater than 2 amps for Systems A and B, and is greater than 1 amp for Systems C and D. The Required Action is to verify within 2 hours that the battery terminal voltage is greater than or equal to the minimum established float voltage (Required Action B.1 performs SR 3.8.4.1), thus confirming battery charger operability. If the terminal voltage is satisfactory and there are no cells with a voltage less than 2.07 V, Required Action B.2 of Condition B assures that within 12 hours the battery will be restored to its fully-charged condition from any discharge that might have occurred due to a temporary loss of the battery charger.

If the terminal voltage is found to be less than the minimum established float voltage, it indicates that the battery charger is either inoperable or is operating in the current limit mode. If

the battery charger is operating in the current limit mode for 2 hours, it is an indication that the battery has been substantially discharged and likely cannot perform its required design functions. If the battery charger is found to be inoperable, entry into Condition B of LCO 3.8.4 applies. If the terminal voltage is low and the charging current is high for 2 hours, there is an indication of a substantial battery discharge, the battery would be inoperable, and Condition A of LCO 3.8.4 would apply.

If the float voltage is found to be satisfactory, but there are one or more battery cells with float voltage less than 2.07 V, the associated “OR” statement in the revised Condition F of LCO 3.8.6 would be applicable and the battery must be declared inoperable immediately. Since the battery has been declared inoperable, Condition A of LCO 3.8.4 would be applicable as well. If the cell voltage remains greater than or equal to 2.07 V, and the out-of-limit float current condition is due to one or more battery cells with low voltage, the battery is not substantially discharged and the 12-hour CT to restore battery float current to within limit is reasonable.

Based on the above, the NRC staff concludes that the proposed changes to Condition B are reasonable, are consistent with the intent of NUREG-1431, Revision 3, and therefore, are acceptable.

The proposed new Condition C addresses the level of the electrolyte in a cell. If the level is above the top of the battery plates, but below the minimum limit, the battery still has sufficient capacity and is not considered inoperable. With electrolyte level below the top of the plates, there is a potential for dry-out and plate degradation. New Required Actions C.1 and C.2 (as well as provisions in new TS 5.5.19) restore the level, ensure that the cause of the loss of electrolyte level is not due to a leak in the battery casing, and equalize and test battery cells that have been discovered with an electrolyte level below the minimum established level limit. The NRC staff concludes these actions adequate to ensure that minimum electrolyte levels are maintained, are consistent with the intent of NUREG-1431, Revision 3, and therefore, are acceptable.

The proposed new Condition D applies to a battery found with a pilot cell electrolyte temperature less than the minimum established design limit. A low electrolyte temperature limits the current and power available. Since the battery is sized with margin, while battery capacity is degraded, sufficient capacity exists to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of the pilot cell temperature not being met, and the 12-hour CT provides a reasonable time to restore the electrolyte temperature within established limits. The NRC staff concludes that these changes are consistent with the intent of NUREG-1431, Revision 3, and therefore, are acceptable.

The proposed new Condition E addresses batteries with battery parameters not within limits. If this condition exists, there is not sufficient assurance that the batteries will perform their intended function. With two batteries with an out-of-limit parameter, loss of function is possible for multiple systems that depend upon the batteries. The licensee proposed that battery parameters be restored to within limits on at least three batteries within 2 hours. The NRC staff reviewed the licensee’s bases for the proposed change and concludes that they are reasonable, consistent with the intent of NUREG-1431, Revision 3, and therefore, acceptable.

The proposed new Condition F is what was formerly called Condition B. It provides a default condition for one or more batteries with battery parameters outside the allowance of the

Required Action for Condition A, B, C, D, or E. Under this condition, it is assumed that there is not sufficient capacity to supply the maximum expected load requirements. New Condition F also addresses the case where one battery has one or more cells with float voltage less than 2.07 V and float current greater than 2 amps for System A and B batteries, or one or more cells with float voltage less than 2.07 V and float current greater than 1 amp for System C and D batteries. An example has been added to the Bases to address and clarify the described condition. If the battery is in the float mode and one or more cells has a float voltage less than 2.07 V, placing the battery in equalizing charge may restore the cell voltage. If the licensee places the battery in equalizing charge, it is expected that this condition will increase the float current to a level above that required by TS 3.8.6, Condition F. The intent of restoring the cell voltage may raise the current, but the rise in current is not a degraded condition. Based on the above discussion, the NRC staff concludes that this change is reasonable, consistent with NUREG-1431, Revision 3, and therefore, acceptable.

In addition to the above proposed new Conditions added for LCO 3.8.6, the licensee also proposed the following revisions to SRs associated with current LCO 3.8.6:

SR 3.8.6.1 requires verification that Systems A and B float current is less than or equal to 2 amps, and Systems C and D float current is less than or equal to 1 amp. The float current is an indication of the battery conditions and ensures that a proper state of charge is maintained for the batteries. This is consistent with IEEE 450-1995, and therefore, is acceptable.

SR 3.8.6.2 requires verification that pilot cell voltage for each battery is greater than or equal to 2.07 volts every 31 days. This is consistent with IEEE 450-1995, and therefore, is acceptable.

SR 3.8.6.3 requires verification that connected cell electrolyte level for each battery is greater than or equal to minimum established design limits every 31 days. This is consistent with IEEE 450-1995, and therefore, is acceptable.

SR 3.8.6.4 requires verification that the temperature of each battery pilot cell is greater than or equal to the minimum established design limits every 31 days. The program is based on IEEE Standard 450-1995. The NRC staff concludes that the revised frequency is reasonable to achieve safe conditions, and therefore, is acceptable.

SR 3.8.6.5 requires verification that the connected cell voltage for each battery is greater than or equal to 2.07 V every 92 days. A battery voltage of 2.07 V is the minimum voltage to assure battery operability. The surveillance frequency and minimum established design limits for optimal long-term battery performance are based on IEEE Standard 450-1995, and therefore, are acceptable.

SR 3.8.6.6 was created through the relocation of the current SR 3.8.4.8. The relocation is an administrative change that was discussed as part of LCO 3.8.4 Change (7) of this evaluation (See Section 3.3.7 of this safety evaluation report).

The licensee is also proposing a new program for the maintenance and monitoring of batteries. This program will have elements relocated from the different affected TSs. The program will be based on the recommendations of IEEE Standard 450-1995. The program is covered in the TSs as follows:

5.5.19 Battery Monitoring and Maintenance Program

This program provides for battery restoration and maintenance, based on the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing and Replacement of vented Lead-Acid Batteries for Stationary Applications," of the following:

a. Actions to restore battery cells with float voltage <2.13 V, and

b. Action to equalize and test battery cells that had been discovered with electrolyte level below the top of the plates.

The battery parameter values will continue to be controlled at their current level and actions will be implemented in accordance with the licensee's corrective action program. The changes associated with the new Battery Maintenance and Monitoring Program will ensure that the batteries are maintained in a highly reliable condition.

Based on the above discussion, the NRC staff finds the proposed revisions to the SRs under TS LCO 3.8.6 are reasonable and are designed to maintain battery parameters within their acceptable limits. The proposed changes continue to ensure the availability of the required DC power to shut down the reactor and to maintain the reactor in a safe condition after an anticipated operational occurrence or a postulated design basis accident. Therefore, the NRC staff finds the proposed changes acceptable.

3.6 Technical Evaluation Summary

The proposed changes to the DC electrical power systems specifications TS 3.8.4, TS 3.8.5, TS 3.8.6, and the addition of new administrative control program TS 5.5.19, based on the recommendations of IEEE Standard 450-1995, are consistent with the NRC-approved TSTF-360, Revision 1, and with NUREG-1431, Revision 3. The proposed changes have adequately addressed the following areas included in TSTF-360, Revision 1: (1) provided a specific Action and increased CT for an inoperable battery charger, (2) relocated preventive maintenance SRs to licensee-controlled programs, (3) proposed alternate testing criteria for battery charger testing, (4) replaced battery specific gravity monitoring with float current monitoring, (5) relocated maintenance surveillances for cell voltages and electrolyte levels to a licensee-controlled program based on recommendations from IEEE Standard 450-1995, (6) provided specific Actions and increased restoration times for out-of-limits conditions for battery cell voltages, electrolyte levels, and electrolyte temperatures, and (7) provided enhanced TSs Bases for each of the newly proposed TS 3.8.4 and TS 3.8.5. Each of these proposed changes have been evaluated in accordance with the requirements of 10 CFR 50.36 and determined not to adversely affect nuclear safety or continued safe plant operations. Therefore, the NRC staff concludes the proposed changes are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Georgia State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (69 FR 2746). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

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

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M. Concepcion

Date: March 2, 2005