January 22, 1999

Mr. J. B. Beasley, Jr.
Vice President
Southern Nuclear Operating
Company, Inc.
Post Office Box 1295
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SUBJECT: ISSUANCE OF AMENDMENTS - VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2 (TAC NOS. MA3505 AND MA3506)

Dear Mr. Beasley:

The Nuclear Regulator Commission has issued the enclosed Amendment No. 104 to Facility Operating License NPF-68 and Amendment No. 82 to Facility Operating License NPF-81 for the Vogtle Electric Generating Plant (VEGP), Units 1 and 2. The amendments consist of changes to the Facility Operating Licenses and the Technical Specifications (TS) in response to your application dated September 3, 1998, as supplemented by letter dated December 8, 1998.

The amendments change VEGP, Units 1 and 2 TS to: (1) support the replacement of the Nuclear Instrumentation System Source Range and Intermediate Range Channels and Post-Accident Neutron Flux Monitoring System, and (2) delete the requirement for performing response time testing of the source range channels and power range detector plateau voltage determinations.

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,
ORIGINAL SIGNED BY:
David H. Jaffe, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-424 and 50-425

Enclosures:
1. Amendment No. 104 to NPF-68
2. Amendment No. 82 to NPF-81
3. Safety Evaluation

cc w/encls: See next page

DOCUMENT NAME: G:\VOGTLE\AMD3505.WPD

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COPY	YES NO	YES NO	YES NO	YES NO

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 22, 1999

Mr. J. B. Beasley, Jr.
Vice President
Southern Nuclear Operating
Company, Inc.
Post Office Box 1295
Birmingham, Alabama 35201-1295

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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. 104
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. (Southern Nuclear), acting for itself, Georgia Power Company, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the licensees), dated September 3, 1998, as supplemented by letter dated December 8, 1998, 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 that (i) 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. 104 , 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 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: January 22, 1999

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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. 82
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. (Southern Nuclear), acting for itself, Georgia Power Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the licensees), dated September 3, 1998, as supplemented by letter dated December 8, 1998, 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. 82 , 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 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: January 22, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 104

FACILITY OPERATING LICENSE NO. NPF-68

DOCKET NO. 50-424

AND

TO LICENSE AMENDMENT NO. 82

FACILITY OPERATING LICENSE NO. NPF-81

DOCKET NO. 50-425

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the areas of change.

Remove	Insert
3.3-11	3.3-11
3.3-14	3.3-14
3.3-15	3.3-15
3.3-18	3.3-18
B 3.3-13	B 3.3-13
B 3.3-14	B 3.3-14
B 3.3-29	B 3.3-29
B 3.3-33	B 3.3-33
B 3.3-56	B 3.3-56
B 3.3-57	B 3.3-57
B 3.3-60	B 3.3-60
B 3.3-171	B 3.3-171
B 3.3-172	B 3.3-172
B 3.9-9	B 3.9-9
B 3.9-11	B 3.9-11

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.8	----------NOTE---------- Only required when not performed within previous 31 days. ---------- Perform COT.	Prior to Reactor Startup
SR 3.3.1.9	----------NOTE---------- Verification of setpoint is not required. ---------- Perform TADOT.	92 days
SR 3.3.1.10	----------NOTE---------- This Surveillance shall include verification that the time constants are adjusted to the prescribed values. ---------- Perform CHANNEL CALIBRATION.	18 months
SR 3.3.1.11	----------NOTE---------- Neutron detectors are excluded from CHANNEL CALIBRATION. ---------- Perform CHANNEL CALIBRATION.	18 months

(continued)

Table 3.3.1-1 (page 1 of 8)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(n)
1. Manual Reactor Trip	1,2	2	B	SR 3.3.1.13	NA	NA
	3(a), 4(a), 5(a)	2	C	SR 3.3.1.13	NA	NA
2. Power Range Neutron Flux						
a. High	1,2	4	D	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.15	≤ 111.3% RTP	109% RTP
b. Low	1(b),2	4	E	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.15	≤ 27.3% RTP	25% RTP
3. Power Range Neutron Flux High Positive Rate	1,2	4	E	SR 3.3.1.7 SR 3.3.1.11	≤ 6.3% RTP with time constant ≥ 2 sec	5% RTP with time constant ≥ 2 sec
4. Intermediate Range Neutron Flux	1(b), 2(c)	2	F,G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 41.9% RTP	25% RTP
	2(d)	2	H	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 41.9% RTP	25% RTP

(continued)

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(n) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.

Table 3.3.1-1 (page 2 of 8)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(n)
5. Source Range Neutron Flux	2(d)	2	I,J	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 1.7 E5 cps	1.0 E5 cps
	3(a), 4(a), 5(a)	2	J,K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.11	≤ 1.7 E5 cps	1.0 E5 cps
	3(e), 4(e), 5(e)	1	L	SR 3.3.1.1 SR 3.3.1.11	NA	NA
6. Overtemperature ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 1 (Page 3.3-20)	Refer to Note 1 (Page 3.3-20)
7. Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 2 (Page 3.3-21)	Refer to Note 2 (Page 3.3-21)

(continued)

(a) With RTBs closed and Rod Control System capable of rod withdrawal.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(e) With the RTBs open. In this condition, source range Function does not provide reactor trip but does provide input to the High Flux at Shutdown Alarm System (LCO 3.3.8) and indication.

(n) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.

Table 3.3.1-1 (page 5 of 8)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(n)
14. Turbine Trip						
a. Low Fluid Oil Pressure	1(j)	3	O	SR 3.3.1.10 SR 3.3.1.16	≥ 500 psig	580 psig
b. Turbine Stop Valve Closure	1(j)	4	P	SR 3.3.1.10 SR 3.3.1.14	≥ 90% open	96.7% open
15. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	Q	SR 3.3.1.13	NA	NA
16. Reactor Trip System Interlocks						
a. Intermediate Range Neutron Flux, P-6	2(d)	2	R	SR 3.3.1.11 SR 3.3.1.12	≥ 1.2E-5% RTP	2.0E-5% RTP
b. Low Power Reactor Trips Block, P-7	1	1 per train	S	SR 3.3.1.5	NA	NA
c. Power Range Neutron Flux, P-8	1	4	S	SR 3.3.1.11 SR 3.3.1.12	≤ 50.3% RTP	48% RTP
d. Power Range Neutron Flux, P-9	1	4	S	SR 3.3.1.11 SR 3.3.1.12	≤ 52.3% RTP	50% RTP
e. Power Range Neutron Flux, P-10 and input to P-7	1,2	4	R	SR 3.3.1.11 SR 3.3.1.12	(l,m)	(l,m)
f. Turbine Impulse Pressure, P-13	1	2	S	SR 3.3.1.10 SR 3.3.1.12	≤ 12.3% Impulse Pressure Equivalent turbine	10% Impulse Pressure Equivalent turbine

(continued)

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(j) Above the P-9 (Power Range Neutron Flux) interlock.

(l) For the P-10 input to P-7, the Allowable Value is ≤ 12.3% RTP and the Nominal Trip Setpoint is 10% RTP.

(m) For the Power Range Neutron Flux, P-10, the Allowable Value is ≥ 7.7% RTP and the Nominal Trip Setpoint is 10% RTP.

(n) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

4. Intermediate Range Neutron Flux (continued)

Above the P-10 setpoint, the Power Range Neutron Flux — High Setpoint trip and the Power Range Neutron Flux — High Positive Rate trip provide core protection for a rod withdrawal accident. In MODE 3, 4, or 5, the Intermediate Range Neutron Flux trip does not have to be OPERABLE because the reactor cannot be started up in this condition. The core also has the required SDM to mitigate the consequences of a positive reactivity addition accident. In MODE 6, all rods are fully inserted and the core has a required increased SDM. Also, the NIS intermediate range indication is typically low off-scale in this MODE.

5. Source Range Neutron Flux

The LCO requirement for the Source Range Neutron Flux trip (NI-0031B, D, & E, NI-0032B, D, & G) Function ensures that protection is provided against an uncontrolled RCCA bank rod withdrawal accident from a subcritical condition during startup. This trip Function provides redundant protection to the Power Range Neutron Flux — Low Setpoint and Intermediate Range Neutron Flux trip Functions. In MODES 3, 4, and 5, administrative controls also prevent the uncontrolled withdrawal of rods. The NIS source range detectors are located external to the reactor vessel and measure neutrons leaking from the core. The NIS source range detectors do not provide any inputs to control systems. The source range trip is the only RTS automatic protection function required in MODES 3, 4, and 5. Therefore, the functional capability at the specified Trip Setpoint is assumed to be available.

The LCO requires two channels of Source Range Neutron Flux to be OPERABLE. Two OPERABLE channels are sufficient to ensure no single random failure will disable this trip Function. The LCO also requires two channels of the Source Range Neutron Flux to be OPERABLE in MODE 3, 4, or 5 with RTBs closed.

The Source Range Neutron Flux Function provides protection for control rod withdrawal from

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

5. Source Range Neutron Flux (continued)

subcritical, boron dilution (see LCO 3.3.8) and control rod ejection events. The Function also provides visual neutron flux indication in the control room.

In MODE 2 when below the P-6 setpoint during a reactor startup, the Source Range Neutron Flux trip must be OPERABLE. Above the P-6 setpoint, the Intermediate Range Neutron Flux trip and the Power Range Neutron Flux — Low Setpoint trip will provide core protection for reactivity accidents. Above the P-6 setpoint, the Source Range Neutron Flux trip is blocked.

In MODE 3, 4, or 5 with the reactor shut down, the Source Range Neutron Flux trip Function must also be OPERABLE. If the Rod Control System is capable of rod withdrawal, the Source Range Neutron Flux trip must be OPERABLE to provide core protection against a rod withdrawal accident. If the Rod Control System is not capable of rod withdrawal, the source range detectors are not required to trip the reactor. Source range detectors also function to monitor for high flux at shutdown. This function is addressed in Specification 3.3.8. Requirements for the source range detectors in MODE 6 are addressed in LCO 3.9.3.

6. Overtemperature ΔT

The Overtemperature ΔT trip Function (TDI-0411C, TDI-0421C, TDI-0431C, TDI-0441C, TDI-0411A, TDI-0421A, TDI-0431A, TDI-0441A) is provided to ensure that the design limit DNBR is met. This trip Function also limits the range over which the Overpower ΔT trip Function must provide protection. The inputs to the Overtemperature ΔT trip include pressure, coolant temperature, axial power distribution, and reactor power as indicated by loop ΔT assuming full reactor coolant flow. Protection from violating the DNBR limit is assured for those transients that are slow with respect to delays from the core to the measurement system. The Function monitors both variation in power and flow since a decrease in flow

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

16. Reactor Trip System Interlocks

Reactor protection interlocks are provided to ensure reactor trips are in the correct configuration for the current unit status. They back up operator actions to ensure protection system Functions are not bypassed during unit conditions under which the safety analysis assumes the Functions are not bypassed. Therefore, the interlock Functions do not need to be OPERABLE when the associated reactor trip functions are outside the applicable MODES. These are:

a. Intermediate Range Neutron Flux, P-6

The Intermediate Range Neutron Flux, P-6 interlock (NI-0035B, D, & E, NI-0036B, D, & G) is actuated when any NIS intermediate range channel goes approximately one decade above the minimum channel reading. If both channels drop below the setpoint, the permissive will automatically be defeated. The LCO requirement for the P-6 interlock ensures that the following Functions are performed:

- on increasing power, the P-6 interlock allows the manual block of the NIS Source Range, Neutron Flux reactor trip. This prevents a premature block of the source range trip and allows the operator to ensure that the intermediate range is OPERABLE prior to leaving the source range.

- on decreasing power, the P-6 interlock automatically enables the NIS Source Range Neutron Flux reactor trip.

The LCO requires two channels of Intermediate Range Neutron Flux, P-6 interlock to be OPERABLE in MODE 2 when below the P-6 interlock setpoint.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

d. Power Range Neutron Flux, P-9 (continued)

reactor is not at a power level sufficient to have a load rejection beyond the capacity of the Steam Dump System.

e. Power Range Neutron Flux, P-10

The Power Range Neutron Flux, P-10 interlock (NI-0041B & C, NI-0042B & C, NI-0043B & C, NI-0044B & C) is actuated at approximately 10% power, as determined by two-out-of-four NIS power range detectors. If power level falls below 10% RTP on 3 of 4 channels, the nuclear instrument trips will be automatically unblocked. The LCO requirement for the P-10 interlock ensures that the following Functions are performed:

- on increasing power, the P-10 interlock allows the operator to manually block the Intermediate Range Neutron Flux reactor trip. Note that blocking the reactor trip also blocks the signal to prevent automatic and manual rod withdrawal;
- on increasing power, the P-10 interlock allows the operator to manually block the Power Range Neutron Flux — Low reactor trip;
- on increasing power, the P-10 interlock automatically provides a backup signal to block the Source Range Neutron Flux reactor trip;
- the P-10 interlock provides one of the two inputs to the P-7 interlock; and
- on decreasing power, the P-10 interlock automatically enables the Power Range Neutron Flux — Low reactor trip and the Intermediate Range Neutron Flux reactor trip (and rod stop).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.10

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology. The difference between the current "as found" values and the previous test "as left" values must be consistent with the drift allowance used in the setpoint methodology.

The Frequency of 18 months is based on the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology for some instrument functions, and the need to perform this Surveillance for some instrument functions under the conditions that apply during a plant outage and the potential for an unplanned plant transient if the Surveillance were performed at power. Operating experience has shown these components usually pass the Surveillance when performed on the 18 month Frequency.

SR 3.3.1.10 is modified by a Note stating that this test shall include verification that the time constants are adjusted to the prescribed values where applicable.

SR 3.3.1.11

SR 3.3.1.11 is the performance of a CHANNEL CALIBRATION, as described in SR 3.3.1.10, every 18 months. This SR is modified by a Note that states that neutron detectors are excluded from the CHANNEL CALIBRATION. The CHANNEL CALIBRATION for the power range neutron detectors includes a normalization of the detectors based on a power calorimetric and flux map performed above 75% RTP. The CHANNEL CALIBRATION for the source range neutron detectors includes obtaining the detector preamp discriminator curves and evaluating those curves.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.11 (continued)

The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed on the 18 month Frequency.

SR 3.3.1.12

SR 3.3.1.12 is the performance of a COT of RTS interlocks every 18 months.

The Frequency is based on the known reliability of the interlocks and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

SR 3.3.1.13

SR 3.3.1.13 is the performance of a TADOT of the Manual Reactor Trip and the SI Input from ESFAS. This TADOT is as described in SR 3.3.1.4, except that the test is performed every 18 months.

The manual reactor trip TADOT shall independently verify the OPERABILITY of the undervoltage and shunt trip circuits for the manual reactor trip function. This test shall also verify the OPERABILITY of the Bypass breaker trip circuit(s), including the automatic undervoltage trip.

The Frequency is based on the known reliability of the Functions and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

(continued)

BASES

REFERENCES (continued)

2. FSAR, Chapter 6.

3. FSAR, Chapter 15.

4. IEEE-279-1971.

5. 10 CFR 50.49.

6. WCAP-11269, Westinghouse Setpoint Methodology for Protection Systems; as supplemented by:

   - Amendments 34 (Unit 1) and 14 (Unit 2), RTS Steam Generator Water Level — Low Low, ESFAS Turbine Trip and Feedwater Isolation SG Water Level — High High, and ESFAS AFW SG Water Level — Low Low.
   - Amendments 48 and 49 (Unit 1) and Amendments 27 and 28 (Unit 2), deletion of RTS Power Range Neutron Flux High Negative Rate Trip.
   - Amendments 60 (Unit 1) and 39 (Unit 2), RTS Overtemperature ΔT setpoint revision.
   - Amendments 57 (Unit 1) and 36 (Unit 2), RTS Overtemperature and Overpower ΔT time constants and Overtemperature ΔT setpoint.
   - Amendments 43 and 44 (Unit 1) and 23 and 24 (Unit 2), revised Overtemperature and Overpower ΔT trip setpoints and allowable values.
   - Amendments ____ (Unit 1) and ____ (Unit 2), revised RTS Intermediate Range Neutron Flux, Source Range Neutron Flux, and P-6 trip setpoints and allowable values.

7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

8. FSAR, Chapter 16.

9. Westinghouse Letter GP-16696, November 5, 1997.

B 3.3 INSTRUMENTATION

B 3.3.8 High Flux at Shutdown Alarm (HFASA)

BASES

BACKGROUND

The primary purpose of the HFASA is to warn the operator of an unplanned boron dilution event in sufficient time (15 minutes prior to loss of shutdown margin) to allow manual action to terminate the event. The HFASA is used for this purpose in MODES 3 and 4, and MODE 5 with the loops filled.

The HFASA consists of two channels of alarms, with each channel receiving input from one source range channel. An alarm setpoint of $\leq$ 2.3 times background provides at least 15 minutes from the time the HFASA occurs to the total loss of shutdown margin due to an unplanned dilution event. This meets the Standard Review Plan criteria for mitigating the consequences of an unplanned dilution event by relying on operator action.

APPLICABLE SAFETY ANALYSES

The analysis presented in Reference 1 identifies credible boron dilution initiators. Time intervals from the HFASA until loss of shutdown margin were calculated. The results demonstrate that sufficient time for operator response is available to terminate an inadvertent dilution event taking credit for one HFASA with a setpoint of $\leq$ 2.3 times background.

The HFASA satisfied Criterion 3 of the NRC Policy Statement.

LCO

The LCO requires two channels of HFASA to be OPERABLE with input from two source range channels to provide protection against single failure.

APPLICABILITY

The HFASA must be OPERABLE in MODES 3, 4, and 5.

The Applicability is modified by a Note which allows the HFASA to be blocked in MODE 3 during reactor startup so that spurious alarms are not generated.

(continued)

BASES

APPLICABILITY (continued)

In MODES 1 and 2, operators are alerted to an unplanned dilution event by a reactor trip on overtemperature delta-T or power range neutron flux high, low setpoint, respectively. As a protective measure in addition to HFASA, in MODE 5 with the loops not filled, unplanned dilution events are precluded by requiring the unborated water source (reactor makeup water storage tank (RMWST)) to be isolated.

ACTIONS

A.1

With one channel of HFASA inoperable, Required Action A.1 requires the inoperable channel to be restored within 48 hours. In this condition, one channel of HFASA remains available to provide protection. The 48 hour Completion Time is consistent with that required for an inoperable source range channel.

B.1 and B.2

With the Required Action A.1 and associated Completion Time not met, or with both channels of HFASA inoperable, the appropriate ACTIONS are to verify that the required SDM is present and isolate the unborated water source by performing SR 3.9.2.1. This places the unit in a condition that precludes an unplanned dilution event. The Completion Times of 1 hour and once per 12 hours thereafter for verifying SDM provide timely assurance that no unintended dilution occurred while the HFASA was inoperable and that SDM is maintained. The Completion Times of 4 hours and once per 14 days thereafter for verifying that the unborated source is isolated provide timely assurance that an unplanned dilution event cannot occur while the HFASA is inoperable and that this protection is maintained until the HFASA is restored.

SURVEILLANCE REQUIREMENTS

The HFASA channels are subject to a COT and a CHANNEL CALIBRATION.

(continued)

B 3.9 REFUELING OPERATIONS

B 3.9.3 Nuclear Instrumentation

BASES

BACKGROUND

The source range neutron flux monitors are used during refueling operations to monitor the core reactivity condition. The installed source range neutron flux monitors (NI-0031 and NI-0032) are part of the Nuclear Instrumentation System (NIS). These detectors are located external to the reactor vessel and detect neutrons leaking from the core. Temporary neutron flux detectors which provide equivalent indication may be utilized in place of installed instrumentation.

The installed source range neutron flux monitors are fission chamber detectors. The detectors monitor the neutron flux in counts per second. The instrument range covers seven decades of neutron flux (1E-1cps to 1E+6cps) with a 2% instrument accuracy. The detectors also provide continuous visual indication in the control room. The NIS is designed in accordance with the criteria presented in Reference 1.

APPLICABLE SAFETY ANALYSES

Two OPERABLE source range neutron flux monitors are required to provide a signal to alert the operator to unexpected changes in core reactivity such as an improperly loaded fuel assembly. The need for a safety analysis for an uncontrolled boron dilution accident is minimized by isolating all unborated water sources except as provided for by LCO 3.9.2, "Unborated Water Source Isolation Valves."

The source range neutron flux monitors satisfy Criterion 3 of the NRC Policy Statement.

LCO

This LCO requires that two source range neutron flux monitors be OPERABLE to ensure that redundant monitoring capability is available to detect changes in core reactivity. To be OPERABLE each monitor must provide visual indication.

(continued)

BASES

ACTIONS

B.2 (continued)

are OPERABLE. This stabilized condition is determined by performing SR 3.9.1.1 to ensure that the required boron concentration exists.

The Completion Time of once per 12 hours is sufficient to obtain and analyze a reactor coolant sample for boron concentration and to ensure that unplanned changes in boron concentration would be identified. The 12 hour Completion Time is reasonable, considering the low probability of a change in core reactivity during this time period.

SURVEILLANCE REQUIREMENTS

SR 3.9.3.1

SR 3.9.3.1 is the performance of a CHANNEL CHECK, which is a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that the two indication channels should be consistent with core conditions. Changes in fuel loading and core geometry can result in significant differences between source range channels, but each channel should be consistent with its local conditions.

The Frequency of 12 hours is consistent with the CHANNEL CHECK Frequency specified similarly for the same instruments in LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation."

SR 3.9.3.2

SR 3.9.3.2 is the performance of a CHANNEL CALIBRATION every 18 months. This SR is modified by a Note stating that neutron detectors are excluded from the CHANNEL CALIBRATION. The CHANNEL CALIBRATION for the source range neutron flux monitors includes obtaining the detector preamp discriminator curves and evaluating those curves. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage. Operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency.

(continued)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 104 TO FACILITY OPERATING LICENSE NPF-68

AND AMENDMENT NO. 82 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 September 3, 1998, as supplemented by letter dated December 8, 1998, Southern Nuclear Operating Company, Inc., et al. (the licensee), proposed license amendments to change the Technical Specifications (TSs) for Vogtle Electric Generating Plant (Vogtle), Units 1 and 2. The proposed amendments would change the TSs for Vogtle Units 1 and 2 to: (1) support the replacement of (a) the Nuclear Instrumentation System Source Range and Intermediate Range Channels and (b) Post-Accident Neutron Flux Monitoring System (NFMS) and (2) delete the requirement for performing response time testing of the source range channels and power range detector plateau voltage determinations. The December 8, 1998, supplement provided clarifying information that did not change the scope of the September 3, 1998, application and the initial proposed no significant hazards consideration determination.

2.0 DISCUSSION

The overpower protection provided by the out-of-core nuclear instrumentation consists of three discrete but overlapping ranges (source range (SR), intermediate range (IR), and power range (PR)) for monitoring reactor flux. Continuation of reactor startup operation or power increase requires a permissive signal from the higher range instrumentation channels before the lower range level trips can be manually blocked by the operator. The PR low setpoint trip and the IR and SR trips are designed to protect the reactor core against power excursions during reactor startup or low-power operation. The SR and IR trips provide redundant protection during reactor startup or low-power operation.

In order to improve system reliability, the existing SR and IR excore detector system supplied by Westinghouse is being replaced with an equivalent neutron-monitoring system manufactured by Gamma-Metrics. The Westinghouse-supplied post-accident NFMS, which currently provides indication of reactor core flux in post-accident conditions in accordance with the guidance in Regulatory Guide (RG) 1.97, will also be replaced by the new Gamma-Metrics system. In addition, the Gamma-Metrics system will replace the current High Flux at Shutdown Alarm (HFASA) function used to alert the operators in case of an inadvertent boron dilution event.

The licensee has proposed changes to the present TS requirements because of design differences between the old and new reactor flux monitoring systems. In addition to these

changes, the licensee has proposed to delete the requirements for performing response time testing of the source range channels and power range detector plateau voltage determinations. In a December 8, 1998, supplemental letter, the licensee provided additional clarifying information on the proposed TS changes and also provided two additional TS Bases changes that were identified after the original September 3, 1998, license amendment request was made.

3.0 EVALUATION

The proposed design change replaces the existing Class 1E Westinghouse excore SR, IR, and NFMS with an equivalent neutron-monitoring system using the Gamma-Metrics Series 300 design. This total replacement includes the detectors and the associated processing electronics. The new Gamma-Metrics detector system consists of fission chambers that will perform the SR, IR, and post-accident monitoring functions. The licensee stated that the new system meets the safety-related Class 1E design requirements in the current Vogtle licensing basis for the existing system and meets RG 1.97, Revision 2, and Branch Technical Position CMEB 9.5-1 guidance for the design of post-accident monitoring instrumentation. The new Gamma-Metrics equipment is compatible with the rest of the nuclear instrumentation and reactor protection systems as well as with the Plant Safety Monitoring System (PSMS) for post-accident monitoring, and will perform all the functional requirements of the equipment being replaced; however, the new system design differs in six major aspects from the present Nuclear Instrumentation System (NIS) design, which necessitated changes to the TS and the TS Bases. These differences are

(1) change in source range detector output,
(2) change in intermediate range scale units from amps to percent power,
(3) change in source range scale from six to seven decades,
(4) change in HFASA setpoint,
(5) no need to deenergize the Gamma-Metrics SR detector high voltage, and
(6) no need to determine detector plateau curve for calibration of Gamma-Metrics equipment.

The following TS changes are proposed:

(1) Delete Note 2 in Surveillance Requirement 3.3.1.11.

(2) For TS Table 3.3.1-1, "Reactor Trip System Instrumentation":

- Increase allowable value of IR neutron flux trip (Function 4).
- Increase allowable value of SR neutron flux trip and delete response time Surveillance Requirement 3.3.1.15 (Function 5).
- Convert P-6 allowable value and trip setpoint from "amp" to "% RTP [reactor thermal power]" (Function 16.a).

(3) Change reference to IR scale (Function 4) in Bases B 3.3.1.

(4) For Bases B 3.3.1, "Applicable Safety Analyses":

- Remove reference to deenergizing SR detectors above P-6 (Function 5).
- Remove reference to deenergizing/energizing SR detectors (Function 16.a).
- Remove reference to deenergizing SR detectors (Function 16.e).
- Remove reference to detector plateaus and correct a typographical error in SR 3.3.1.11. The typographical error referencing 50 percent RTP is being corrected to 75 percent RTP, making it consistent with SR 3.3.1.6.
- Revise Reactor Trip System (RTS) Instrumentation Bases page B 3.3-60 to include this amendment in the list of references (Reference 6 on page B 3.3-60).
- Revise HFASA Instrumentation Bases page B 3.3-172 to remove reference to the SR instrumentation being deenergized.

(5) For Bases B 3.3.8, the HFASA setpoint will be changed from "2.3" to "≤ 2.3."

(6) For Bases B 3.9.3:

- Replace reference to BF_3 detectors with fission chambers and revise instrument range and accuracy to be consistent with new instrumentation.
- Remove reference to SR detector plateau from SR 3.9.3.2.

The tables that follow show the before and after values for neutron flux trip setpoints and allowable values as they relate to the design changes as they are reflected in proposed changes in IR neutron flux, SR neutron flux, and IR neutron flux, P-6.

BEFORE CHANGE

Table 3.3.1-1

Function	Allowable Value	Nominal Trip Setpoint
4. Intermediate Range Neutron Flux	≤ 31.1% RTP	25% RTP*
5. Source Range Neutron Flux	≤ 1.4 E5 cps	1.0 E5 cps
16.a. Intermediate Range Neutron Flux, P-6	≥ 6E-11 amp	1E-10 amp

*(Current Equivalent)

AFTER CHANGE

Table 3.3.1-1

Function	Allowable Value	Nominal Trip Setpoint
4. Intermediate Range Neutron Flux	≤ 41.9% RTP** (Changed)	25% RTP (No Change)
5. Source Range Neutron Flux	≤ 1.7 E5 cps** (Changed)	1.0 E5 cps (No Change)
16.a. Intermediate Range Neutron Flux, P-6	≥ 1.2 E-5% RTP** (Changed)	2.0 E-5% RTP (Equivalent Conversion)

**Derived value based on setpoint calculation.

As shown in the preceding tables, the P-6 (Function 16.a) value is the only trip setpoint that is changing; the new value is an equivalent conversion based on the approximate linear relationship between the IR current and reactor power. The licensee stated that the relationship between the IR current and reactor power has been verified through review of several cycles of plant data from both Vogtle units. The P-6 setpoint value was determined by linear extrapolation of the IR current versus power to obtain the power equivalent of the P-6 setpoint.

The new allowable values were derived on the basis of rack uncertainty values for the new Gamma-Metrics instrumentation. The setpoint methodology used at Vogtle is based on Westinghouse report WCAP-11269, which is referenced in TS Bases B 3.3.1. The methodology of statistically combining the uncertainty terms has not changed; however, instead of applying the rack uncertainty values to a linear scale, as is presently done in the Westinghouse setpoint methodology, the uncertainty values are applied to a logarithmic scale. This is a more appropriate method since the instrumentation is operating in the logarithmic mode; therefore, the proposed change to the setpoints and allowable values will implement realistic values based on the design capabilities of the instrumentation.

Additionally, as referenced in the licensee's December 8, 1998, letter, the methodology used for the design change calculations, which verify the correct correlation between the SR neutron flux trip and the P-6 permissive setpoints, is similar to that used by the Sequoyah Steam Electric Station (SSES) licensee for Amendment No. 136 for SSES Unit 1, dated April 27, 1990, and Amendments 185 and 177 for SSES Units 1 and 2, respectively, dated July 26, 1994. The SSES TS changes were associated with the replacement of the Westinghouse SR and IR detectors with Gamma-Metric detectors similar to the proposed Vogtle design change. The SR, IR, and P-6 setpoints are also consistent with Westinghouse functional requirements for nuclear startup instrument protection. The functional requirements specify a range of settings for the SR, IR, and P-6 setpoints. A comparison of the proposed Vogtle SR, IR, and P-6 setpoints with those of SSES and the Watts Bar Nuclear Plant, which are also Westinghouse four-loop plants, indicates that the values are comparable.

The reliability of the RTS has not been decreased by the proposed TS changes because the SR allowable value continues to be well below the power range setpoint of 25 percent RTP. For the IR, the increase in allowable value does not impact overall RTS reliability because the

uncontrolled rod withdrawal analysis in Section 15.4.1 of the Vogtle Updated Final Safety Analysis Report (UFSAR) indicates that the rise in power is so rapid that the effect of an error in the trip setpoint on the actual time at which the rods release is negligible. The reactor trip actuation at 35 percent RTP (as assumed in the accident analysis) by the PR or 41 percent RTP by the IR (allowable value) will result in essentially the same accident response and, therefore, will maintain the overall RTS reliability provided by the IR. In the accident analyses, no credit is taken for the automatic protective actuation of the SR or IR trips. The current surveillance requirements for the IR trip do not include a requirement for performing a response time test; therefore, it is appropriate to delete the response time test for the SR trip in TS Table 3.3.1-1 by deleting the reference to Surveillance Requirement 3.3.1.15.

The proposed design change will also result in changes to the HFASA TS Bases 3.3.8. The primary purpose of the HFASA alarm is to monitor inadvertent boron dilution accidents while the reactor is shut down. The HFASA design submitted by Gamma-Metrics does not provide an alarm setpoint of 2.3 times background as assumed in the safety analyses. Rather, it provides hardware-selectable alarm setpoints of 1.25, 1.5, 2.0, 2.5, 3.0, and 4.0 times background. The value of 2.0 times background will be used (that is conservative relative to the value assumed in the safety analyses). The change of the setpoint in the conservative direction will warn the operators of an unplanned boron dilution event in sufficient time (in excess of 15 minutes preceding loss of shutdown margin) to allow manual action to terminate the event. The main control room and containment alarms are not being modified. The HFASA will continue to be derived from the SR neutron detectors. The TSs are being revised to specify a setpoint of less than or equal to 2.3 to be consistent with the safety analyses.

The proposed design change will also remove the need to deenergize the Gamma-Metrics SR detector high voltage. In the existing Westinghouse system, the SR indication is disabled by deenergizing high voltage to the SR detectors when the SR trip is blocked upon receipt of the P-6 permissive. This is done in order to prevent damage to the BF_3 detectors due to operation at flux levels beyond their design limits. The need to remove high voltage from the Gamma-Metrics fission chamber detectors no longer exists because the system is not subject to damage at high flux levels. The detectors will remain energized through all levels of power operation. TS Bases 3.3.1 was revised to remove the requirement to deenergize the high voltage to the SR detectors.

The proposed design change will also eliminate the need to determine the detector plateau curve for calibration of the Gamma-Metrics equipment. The Gamma-Metrics fission chambers do not require detector plateau curves to be obtained as part of the channel calibration. The fission chambers operate in the ionization chamber region of the detector ionization curve at all flux levels. The pulse output of the detectors is not dependent on the applied voltage over a wide range of voltage, as the fission chambers are operated at a fixed high voltage. Accordingly, it is appropriate to revise TS 3.3.1.11, by deleting "NOTE 2," to remove the requirement to determine plateau curves for the SR, IR, and PR detectors.

The staff determined that the changes to the SR and IR instrumentation and setpoints, as well as the deletion of SR response time testing, do not affect the Vogtle safety analyses conclusions because the SR and IR trips are not explicitly credited in any design-basis accident. Only the power range low setpoint trip of 25 percent RTP is assumed to actuate to mitigate the uncontrolled rod cluster control assembly withdrawal accident as described in Sections 7.2 and 15.4 of the Vogtle UFSAR. The staff also determined that the HFASA function during a

boron dilution event will continue to be provided by the new SR detector system. No changes have been made to the HFASA setpoint value assumed in the Vogtle safety analyses. The new detector system is qualified as safety-related Class 1E equipment in accordance with the guidance of RG 1.97 for post-accident monitoring instrumentation. Finally, the staff determined that the functional and operability requirements for the PR channels are not affected by deleting the requirement for determining detector voltage plateaus; thus, the staff finds that the proposed TS changes reflect the design and operational characteristics of the new Gamma-Metrics equipment and do not adversely affect the overall operation or ability of the equipment to perform its intended function. The new TS setpoint values are functionally equivalent to the existing values and are consistent with the plant safety analyses.

On the basis of the NRC staff's review associated with the September 3, 1998, application, as supplemented by letter dated December 8, 1998, the NRC staff concludes that the licensee's proposed replacement of the Westinghouse NIS, including the SR, IR and post-accident NFMS, with an equivalent system supplied by Gamma-Metrics is acceptable. In addition, the proposed associated TS changes are consistent with the guidance in RG 1.97 for post-accident monitoring equipment, the current licensing basis and safety analyses, and approved setpoint methodology, and are, therefore, 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 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 (63 FR 53957, October 7, 1998). 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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