March 10, 1993

Docket Nos. 50-424
and 50-425

Mr. W. G. Hairston, III
Senior Vice President -
Nuclear Operations
Georgia Power Company
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Dear Mr. Hairston:

SUBJECT: ISSUANCE OF AMENDMENTS - VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2 (TACS M84525/M84526)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 57 to Facility Operating License No. NPF-68 and Amendment No. 36 to Facility Operating License NPF-81 for the Vogtle Electric Generating Plant, Units 1 and 2. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated September 17, 1992, as supplemented February 12 and 25, 1993.

The amendments modify the TS by revising a time constant used for lag compensation in the equations for overtemperature and overpower delta temperature trip functions, and a constant (K_4) in the setpoint equation for overpower delta temperature.

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,

/s/

Darl S. Hood, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 57 to NPF-68
2. Amendment No. 36 to NPF-81
3. Safety Evaluation

cc w/enclosures:
See next page

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

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Docket Nos. 50-424
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Senior Vice President -
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Dear Mr. Hairston:

SUBJECT: ISSUANCE OF AMENDMENTS - VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2 (TACS M84525/M84526)

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Sincerely,

Darl Hood

Darl S. Hood, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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cc w/enclosures:
See next page

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

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

DOCKET NO. 50-424

VOGTLE ELECTRIC GENERATING PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 57
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 Georgia Power Company, acting for itself, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the licensees), dated September 17, 1992, as supplemented February 12 and 25, 1993, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations 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 license 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.

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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. 57 , and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. GPC 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 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David B. Matthews, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: March 10, 1993

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

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

DOCKET NO. 50-425

VOGTLE ELECTRIC GENERATING PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 36
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 Georgia Power Company, acting for itself, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the licensees), dated September 17, 1992, as supplemented February 12 and 25, 1993, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations 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 license 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. 36, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. GPC 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 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David B. Matthews, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: March 10, 1993

ATTACHMENT TO LICENSE AMENDMENT NO. 57

FACILITY OPERATING LICENSE NO. NPF-68

AND LICENSE AMENDMENT NO. 36

FACILITY OPERATING LICENSE NO. NPF-81

DOCKETS NOS. 50-424 AND 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 Pages	Insert Pages
2-8	2-8
2-10	2-10

TABLE 2.2-1 (Continued)

TABLE NOTATIONS

NOTE 1: OVERTEMPERATURE ΔT

$$\Delta T \frac{(1 + \tau_1 S)}{(1 + \tau_2 S)} \left(\frac{1}{1 + \tau_3 S}\right) \le \Delta T_o \left\{K_1 - K_2 \frac{(1 + \tau_4 S)}{(1 + \tau_5 S)} \left[T \left(\frac{1}{1 + \tau_6 S}\right) - T'\right] + K_3 (P - P') - f_1 (\Delta I)\right\}$$

Where:	ΔT	=	Measured ΔT
	$\frac{1 + \tau_1 S}{1 + \tau_2 S}$	=	Lead-lag compensator on measured ΔT;
	τ_1, τ_2	=	Time constants utilized in lead-lag compensator for ΔT, $\tau_1 \ge 8$ s, $\tau_2 \le 3$ s;
	$\frac{1}{1 + \tau_3 S}$	=	Lag compensator on measured ΔT;
	τ_3	=	Time constants utilized in the lag compensator for ΔT, $\tau_3 = 2$ s;
	ΔT_o	=	Indicated ΔT at RATED THERMAL POWER;
	K_1	$\le$	1.12;
	K_2	=	0.0224/°F;
	$\frac{1 + \tau_4 S}{1 + \tau_5 S}$	=	The function generated by the lead-lag compensator for T_{avg} dynamic compensation;
	τ_4, τ_5	=	Time constants utilized in the lead-lag compensator for T_{avg}, $\tau_4 \ge 28$ s, $\tau_5 \le 4$ s;
	T	=	Average temperature, °F;
	$\frac{1}{1 + \tau_6 S}$	=	Lag compensator on measured T_{avg};
	τ_6	=	Time constant utilized in the measured T_{avg} lag compensator, $\tau_6 = 0$ s;

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: OVERPOWER ΔT

$$\Delta T \frac{(1 + \tau_1 S)}{(1 + \tau_2 S)} \left(\frac{1}{1 + \tau_3 S}\right) \leq \Delta T_o \left\{K_4 - K_5 \left(\frac{\tau_7 S}{1 + \tau_7 S}\right) \left(\frac{1}{1 + \tau_6 S}\right) T - K_6 \left[T \left(\frac{1}{1 + \tau_6 S}\right) - T''\right] - f_2 (\Delta I)\right\}$$

Where: ΔT = Measured ΔT;

$\frac{1 + \tau_1 S}{1 + \tau_2 S}$ = Lead-lag compensator on measured ΔT;

τ_1, τ_2 = Time constants utilized in lead-lag compensator for ΔT, $\tau_1 \geq 8$ S, $\tau_2 \leq 3$ s;

$\frac{1}{1 + \tau_3 S}$ = Lag compensator on measured ΔT;

τ_3 = Time constants utilized in the lag compensator for ΔT, τ_3=2s;

ΔT_o = Indicated ΔT at RATED THERMAL POWER;

K_4 ≤ 1.095,

K_5 ≥ 0.02/°F for increasing average temperature and ≥ 0 for decreasing average temperature,

$\frac{\tau_7 S}{1 + \tau_7 S}$ = The function generated by the rate-lag compensator for T_{avg} dynamic compensation,

τ_7 = Time constants utilized in the rate-lag compensator for T_{avg}, $\tau_7 \geq 10$ s,

$\frac{1}{1 + \tau_6 S}$ = Lag compensator on measured T_{avg};

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 57 TO FACILITY OPERATING LICENSE NPF-68

AND AMENDMENT NO. 36 TO FACILITY OPERATING LICENSE NPF-81

GEORGIA POWER COMPANY, ET AL.

VOGTLE ELECTRIC GENERATING PLANT, UNITS 1 AND 2

DOCKET NOS. 50-424 AND 50-425

1.0 INTRODUCTION

By letter dated September 17, 1992, Georgia Power Company, et al. (the licensee), proposed license amendments to change the Technical Specifications (TS) for the Vogtle Electric Generating Plant (Vogtle or the facility), Units 1 and 2. The proposed amendments would revise the time constant (τ_3) used in the lag compensator for delta temperature (ΔT) in the overtemperature delta temperature (OTΔT) and overpower delta temperature (OPΔT) reactor trip function setpoint equations in footnotes 1 and 3 of TS Table 2.2-1 from 0 seconds to 2.0 seconds. The K_4 term of the OPΔT equation in footnote 3 would also be changed from 1.08 to 1.095.

By letter dated February 12 and 25, 1993, the licensee provided additional information in support of the application for amendments. The additional information does not affect the NRC's proposed finding of no significant hazards considerations as published in the Federal Register (57 FR 47135) October 14, 1992.

2.0 BACKGROUND

The OTΔT reactor trip provides core protection to prevent departure from nucleate boiling (DNB) for all combinations of pressure, power, coolant temperature, and axial power distribution, provided that the transient is slow with respect to piping transit delays from the core to the temperature detectors (about 4 seconds), and pressure is within the range between the pressurizer-high and low pressure reactor trip setpoints.

The OPΔT reactor trip protects fuel integrity (e.g., prevents fuel pellet melting and excessive -- less than 1% -- cladding strain) under overpower conditions, limits the required range for the OTΔT reactor trip, and backs up the high neutron flux reactor trip. The OPΔT reactor trip also provides protection to mitigate the consequences of steam line break (SLB) accidents.

In addition to their reactor trip functions, OTΔT and OPΔT provide a signal to generate a turbine runback before the reactor protection system reaches a reactor trip setpoint. The turbine runback reduces turbine power and reactor

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power to alleviate the OTΔT or OPΔT condition and preclude the need for a reactor trip.

Two events prompted the licensee to request changes to the OTΔT and OPΔT reactor trip functions:

First, a flow phenomenon in the upper plenum of the reactor vessel has been recently observed. This phenomenon is manifested as a sudden rise in temperature in one of the reactor coolant system (RCS) hot legs with a concurrent decrease in temperature in the adjacent hot leg. The condition occurs randomly, lasts for a short duration, and temperatures then return to their previous values. In some observations at Vogtle, the temperature rise has been sufficient to cause a turbine runback signal from the affected hot leg. This runback signal is considered to be spurious and not indicative of an actual overtemperature or overpower condition.

Second, and by separate action, the licensee has proposed amendments to increase core power from 3411 megawatts thermal (Mwt) to 3565 Mwt. Extrapolations based upon the magnitude of the flow phenomenon at Vogtle's current power levels indicate that additional margin between the setpoint and the operating conditions for the uprated power may be needed to avoid spurious turbine runback signals. To gain this margin to avoid spurious runback signals, the licensee proposes the following TS changes:

Change τ_3 from 0 to 2 seconds in both the OTΔT and OPΔT reactor trip functions. τ_3 is the time constant in the lag compensator for measured ΔT. This proposed change would dampen the response of the system to any temperature spike of short duration.

Change K_4 from 1.08 to 1.095 in the OPΔT reactor trip function. K_4 defines a maximum power excursion limit. This would provide addition operating margin to compensate for the effect of the upper head flow phenomenon at the uprated power conditions.

3.0 <u>EVALUATION</u>

The impact of the changes to the OTΔT and OPΔT reactor trip functions has been assessed by the effect of the changed OTΔT and OPΔT setpoints on the events in the Vogtle Final Safety Analysis Report (FSAR) that rely upon these trips for protection. The bases used in determining the proposed OTΔT and OPΔT reactor trip setpoints were also reviewed.

3.1 Events That Rely Upon OTΔT Reactor Trip

<u>Uncontrolled Rod Cluster Control Assembly (RCCA) Bank Withdrawal at Power (FSAR Section 15.4.2)</u>

Uncontrolled RCCA bank withdrawal at power results in an increase in core heat flux. Unless terminated by manual or automatic action, the power mismatch and resultant coolant temperature rise could eventually result in DNB. To prevent damage to the fuel clad, the reactor protection system is designed to terminate any such transient before the departure from nucleate boiling ratio (DNBR) falls below its safe limit. Currently, the high neutron flux and OTΔT reactor trips provides protection over all reactivity insertion rates.

To address the effect of the increase in τ_3 from 0 to 2 seconds, the licensee reevaluated the relevant events currently presented in the FSAR. The revised analyses were performed using the same methods used in the FSAR analyses. The results show that events protected by a reactor trip from the high neutron flux signal would be unaffected by the increase in τ_3, and that the events protected by the OTΔT reactor trip would be only slightly affected. For all events, the minimum DNBR would remain above the safety analysis limit. Thus, the conclusions presented in the FSAR remain valid.

<u>Inadvertent Opening of a Pressurizer Safety or Relief Valve (FSAR Section 15.6.1)</u>

Events that result in a decrease in reactor coolant inventory include an inadvertent opening of a pressurizer safety or relief valve. Of these two events, the inadvertent opening of a pressurizer safety valve causes the more severe core conditions from an accidental depressurization of the RCS. The pressurizer safety valve opening is worse because it relieves about twice the steam flow of a relief valve and, thus, results in a much faster depressurization upon opening. Currently, the OTΔT and the pressurizer low pressure reactor trips provide adequate protection, and maintain DNBR above the safety limit.

The licensee's reevaluation addressed the effect of the increase in τ_3 from 0 to 2 seconds and the RCS depressurization event. The analyses were performed using the same methods used in the FSAR analyses. The results demonstrate that the DNBR limit would continue to be met. Therefore, the conclusions presented in the FSAR remain valid.

<u>Chemical and Volume Control System (CVCS) Malfunction That Results in a Decrease in the Boron Concentration in the Reactor Coolant (FSAR Section 15.4.6)</u>

Reactivity can be added to the core by feeding primary grade water into the RCS via the CVCS. Boron dilution is a manual operation under strict administrative controls with procedures calling for a limit on the rate and duration of dilution. The CVCS is designed to limit the potential rate of dilution. If a CVCS malfunction results in a dilution of the RCS boron concentration, the operator is alerted by instrumentation and alarms in time to correct the situation before a significant loss of shutdown margin.

During full power operation with the reactor in manual control, the operator would be alerted to an uncontrolled boron dilution of the reactor coolant by an OTΔT reactor trip. (This is the only situation associated with the postulated accident that relies on the OTΔT reactor trip). Without the proposed OTΔT change, the current FSAR analysis shows that at least 16.9 minutes would be available for operator action after the reactor trip before the loss of shutdown margin. In the licensee's reevaluation for the OTΔT changes, with τ_3 increased from 0 to 2 seconds, the change in time of reactor trip is less than 3 seconds. A change of such small magnitude is insignificant relative to the total time available for operator action following the trip before a loss of shutdown margin. Moreover, the criterion for operator action time (15 minutes) would continue to be met and the conclusions in the FSAR would remain valid.

Steam Generator Tube Rupture (FSAR 15.6.3)

The steam generator tube rupture (SGTR) accident is assumed to result from the complete severance of a single steam generator tube. The accident leads to contamination of the main steam system due to leakage of radioactive coolant from the RCS. In the event of a coincident loss of offsite power, the steam dump valves would automatically close to protect the condenser. Steam generator pressure would increase rapidly, resulting in the discharge of steam to the atmosphere through the steam generator power-operated relief valves (and the safety valves if their setpoints are reached). The mass releases are used for evaluating offsite radiation exposures.

The licensee's evaluation addressed the increase in τ_3 from 0 to 2 seconds. The delay in the time of the reactor trip had no effect on the SGTR response since the analysis conservatively assumes a 0-second delay between reaching the OTΔT setpoint and the reactor trip. For the SGTR event, a delay in the reactor trip signal would not increase the amount of steam released through the atmospheric relief valves and, therefore, would not increase the offsite radiation exposure. Therefore, the conclusions in the FSAR remain valid.

3.2 Events That Rely Upon OPΔT Reactor Trip

Steam Line Break Coincident With a Control Rod Withdrawal (FSAR Section 15.4.9)

A SLB in the vicinity of the turbine impulse pressure transmitters or the excore detectors may expose equipment used in the rod control to an adverse environment. If the associated cabling and connections are not properly qualified, then the potential would exist for steam to impinge upon this equipment and cause a control system malfunction. The resultng malfunction could initiate a control rod withdrawal during the SLB accident. Currently, the OPΔT reactor trip provides protection from this postulated accident and prevents DNBR from decreasing below the safety limit.

The licensee reevaluated this accident using the increase in τ_3 from 0 to 2 seconds and the change in K_4 from 1.08 to 1.095. The licensee used acceptable methods for the analysis. The results demonstrated that the

DNBR limit would continue to be met. Therefore, the FSAR conclusions remain valid.

Analysis of Steam Line Break With Super-Heat (WCAP-11285)

The licensee has previously analyzed four cases of a SLB with super-heated steam for which a reactor trip occurs from an OPΔT signal. In each of these cases, the total length of the transient is about 1800 seconds and the trip occurs early in the transient (before 30 seconds). The licensee used acceptable methods for these analyses. Based on the analysis performed for the SLB coincident with a control rod withdrawal (see above), the proposed modification to the OPΔT reactor function would not delay the reactor trip by more than a few seconds in the analyses of SLB with super-heat. A delay of such short magnitude would not result in any significant change in the overall profile of the mass and energy releases or super-heated conditions due to the extended length of the transient. Therefore, the analyses for SLB super-heat remain valid.

3.3 Setpoint Bases

The methods used by Westinghouse to calculate the OTΔT and OPΔT setpoints are provided in topical report WCAP-8745-P-A, "Design Bases for the Thermal Overpower ΔT and Thermal Overtemperature ΔT Trip Functions," dated March 1977. This topical report was approved by the NRC April 17, 1986. The NRC staff verified that the proposed changes to τ_3 and K_4 for Vogtle were completed in accordance with the methods described in WCAP-8745-P-A.

WCAP-8745-P-A also addresses the uncertainties in the OTΔT and OPΔT reactor trip functions, including the calibration and instrumentation channel error. The NRC staff accepted these uncertainties and error values during its approval of WCAP-8745-P-A.

Based on the above review, the staff finds that the proposed changes to the OTΔT and OPΔT reactor trip functions are based upon analyses performed in accordance with NRC approved methods. The licensee's evaluations were performed with the same models previously used in the FSAR safety analyses. Results of the evaluation show that existing safety criteria are met. Specifically, the analyses demonstrate that the limits for DNBR and fuel temperature would not be exceeded for the revised OTΔT and OPΔT reactor trip functions. Therefore, the NRC staff finds that 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. 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 (57 FR 47135, dated October 14, 1992). 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.

Principal Contributors: D. Hood
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H. Balukjian
P. Balmain

Date: March 10, 1993