



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

June 24, 1985

Docket No. 50-395

Mr. O. W. Dixon, Jr.  
Vice President Nuclear Operations  
South Carolina Electric & Gas Company  
P.O. Box 764 (Mail Code 167)  
Columbia, South Carolina 29218

Dear Mr. Dixon:

Subject: Issuance of Amendment No. 43 to Facility Operating License  
NPF-12 Virgil C. Summer Nuclear Station, Unit No. 1

The Nuclear Regulatory Commission has issued Amendment No. 43 to Facility Operating License NPF-12 for the Virgil C. Summer Nuclear Station, Unit No. 1 located in Fairfield County, South Carolina. This amendment is in response to your letter dated April 9, 1985.

The amendment modifies Technical Specification 3/4.1.3, "Movable Control Assemblies," and its bases to permit 72 hours for evaluation and repair when more than one full length rod is inoperable due to a rod control urgent failure alarm or obvious electrical problem in the rod control system before requiring orderly shutdown. The amendment is effective seven days after its date of issuance.

A copy of the related safety evaluation supporting Amendment No. 43 to Facility Operating License NPF-12 is enclosed.

Notice of issuance will be included in the Commission's next monthly Federal Register notice.

Sincerely,

*Earl Hood*  
for Elinor G. Adensam, Chief  
Licensing Branch No. 4  
Division of Licensing

Enclosures:

1. Amendment No. 43
2. Safety Evaluation

cc w/enclosure:  
See next page

DESIGNATED ORIGINAL

Certified By

*[Signature]*

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June 24, 1985

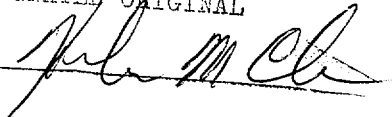
AMENDMENT NO. 43 TO FACILITY OPERATING LICENSE NO. NPF-12 - Virgil C. Summer Unit 1

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

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

DOCKET NO. 50-395

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 43  
License No. NPF-12

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment to the Virgil C. Summer Nuclear Station, Unit No. 1 (the facility) Facility Operating License No. NPF-12 filed by the South Carolina Electric & Gas Company acting for itself and South Carolina Public Service Authority (the licensees), dated April 9, 1985, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations as set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the 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;
  - E. The issuance of this license 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 attachments to this license amendment and paragraph 2.C(2) of Facility Operating License No. NPF-12 is hereby amended to read as follows:

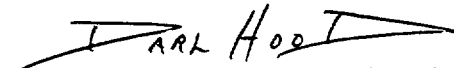
(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 43 are hereby incorporated into this license. South Carolina Electric & Gas Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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3. This license amendment is effective seven days after its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

  
for Elinor G. Adensam, Chief  
Licensing Branch No. 4  
Division of Licensing

Enclosure:  
Technical Specification Changes

Date of Issuance: June 24, 1985

ATTACHMENT TO LICENSE AMENDMENT NO. 43

FACILITY OPERATING LICENSE NO. NPF-12

DOCKET NO. 50-395

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. The corresponding overleaf pages are also provided to maintain document completeness.

<u>Amended</u> <u>Page</u>	<u>Overleaf</u> <u>Page</u>
3/4 1-14	3/4 1-13
B3/4 1-4	B3/4 1-3

## REACTIVITY CONTROL SYSTEMS

### SURVEILLANCE REQUIREMENTS

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- 4.1.2.6 Each borated water source shall be demonstrated OPERABLE:
- a. At least once per 7 days by:
    1. Verifying the boron concentration in the water,
    2. Verifying the contained borated water volume of the water source, and
    3. Verifying the boric acid storage system solution temperature when it is the source of borated water.
  - b. At least once per 24 hours by verifying the RWST temperature when the outside air temperature is less than 40°F.

## REACTIVITY CONTROL SYSTEMS

### 3/4.1.3 MOVABLE CONTROL ASSEMBLIES

#### GROUP HEIGHT

#### LIMITING CONDITION FOR OPERATION

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3.1.3.1 All full length (shutdown and control) rods which are inserted in the core shall be OPERABLE and positioned within  $\pm 12$  steps (indicated position) of their group step counter demand position.

APPLICABILITY: MODES 1\* and 2\*

#### ACTION:

- a. With one or more full length rods inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in HOT STANDBY within 6 hours.
- b. With more than one full length rod misaligned from the group step counter demand position by more than  $\pm 12$  steps (indicated position), be in HOT STANDBY within 6 hours.
- c. With more than one full length rod inoperable due to a rod control urgent failure alarm or obvious electrical problem in the rod control system for greater than 72 hours, be in HOT STANDBY within the following 6 hours.
- d. With one full length rod inoperable due to causes other than addressed by ACTION a., above, or misaligned from its group step counter demand height by more than  $\pm 12$  steps (indicated position), POWER OPERATION may continue provided that within one hour either:
  1. The rod is restored to OPERABLE status within the above alignment requirements, or
  2. The remainder of the rods in the group with the inoperable rod are aligned to within  $\pm 12$  steps of the inoperable rod within one hour while maintaining the rod sequence and insertion limits of Figures 3.1-1 and 3.1-2; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or
  3. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. POWER OPERATION may then continue provided that:

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\*See Special Test Exceptions 3.10.2 and 3.10.3.



## REACTIVITY CONTROL SYSTEMS

### BASES

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#### BORATION SYSTEMS (Continued)

MARGIN from expected operating conditions of 1.77% delta k/k after xenon decay and cooldown to 200°F. The maximum expected boration capability requirement occurs at EOL from full power equilibrium xenon conditions and requires 12475 gallons of 7000 ppm borated water from the boric acid storage tanks or 64,040 gallons of 2000 ppm borated water from the refueling water storage tank.

With the RCS temperature below 200°F, one injection system is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity changes in the event the single injection system becomes inoperable.

The limitation for a maximum of one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable below 275°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN of 2 percent delta k/k after xenon decay and cooldown from 200°F to 140°F. This condition requires either 2000 gallons of 7000 ppm borated water from the boric acid storage tanks or 9690 gallons of 2000 ppm borated water from the refueling water storage tank.

The contained water volume limits include allowance for water not available because of discharge line location and other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.5 and 11.0 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

The OPERABILITY of one boron injection system during REFUELING ensures that this system is available for reactivity control while in MODE 6.

#### 3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section ensure that (1) acceptable power distribution limits are maintained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) limit the potential effects of rod misalignment on associated accident analyses. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits.

## REACTIVITY CONTROL SYSTEMS

### BASES

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#### MOVABLE CONTROL ASSEMBLIES (Continued)

For purposes of determining compliance with Technical Specification 3.1.3.1, any inoperability of full length control rod(s), due to being immovable, invokes ACTION statement "a".

The intent of Technical Specification 3.1.3.1 ACTION statement "a" is to ensure that before leaving ACTION statement "a" and utilizing ACTION statement "c" that the rod urgent failure alarm is illuminated or that an obvious electrical problem is detected in the rod control system by minimal electrical troubleshooting techniques. Expeditious action will be taken to determine if rod immovability is due to an electrical problem in the rod control system.

The ACTION statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original design criteria are met. Misalignment of a rod requires measurement of peaking factors or a restriction in THERMAL POWER; either of these restrictions provide assurance of fuel rod integrity during continued operation. In addition, those safety analyses affected by a misaligned rod are reevaluated to confirm that the results remain valid during future operation.

The maximum rod drop time restriction is consistent with the assumed rod drop time used in the safety analyses. Measurement with  $T_{avg}$  greater than or equal to 551°F and with all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a reactor trip at operating conditions.

Control rod positions and OPERABILITY of the rod position indicators are required to be verified on a nominal basis of once per 12 hours with more frequent verifications required if an automatic monitoring channel is inoperable. These verification frequencies are adequate for assuring that the applicable LCO's are satisfied.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 43 TO FACILITY OPERATING LICENSE NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

I. INTRODUCTION

By letter dated April 9, 1985, South Carolina Electric & Gas Company requested a revision to the Virgil C. Summer Nuclear Station Technical Specification 3/4.1.3 "Movable Control Assemblies." Technical Specification 3.1.3.1 sets forth those actions which must be taken when a full length movable control assembly is inoperable. This is applicable in Modes 1 and 2. The proposed Technical Specification includes a new action statement to address the inoperability of the movable control rod assembly due to a rod control urgent failure alarm or obvious electrical problem in the rod control system for greater than 72 hours.

II. EVALUATION

The rod control system (RCS) is used to compensate for fast short term reactivity changes such as those resulting from power changes and xenon peaking. The RCS utilizes the control banks in order to maintain a programmed average temperature in the reactor system by regulating the reactivity in the core, but is not directly involved with the performance of any safety functions for mitigating the consequences of a transient or accident. As such, it is classified as a non-Class 1E system. The system actuates alarms, governs control rod movement, and initiates rod movement in response to load changes. One of the annunciators displayed on the plant annunciator panel is the "Rod Control Urgent Failure" alarm, which indicates that an internal failure has occurred in the full length rod control system. This inhibits automatic rod motion but permits manual movement of a selected bank if the logic cabinet and the two power cabinets associated with the selected bank are not in urgent alarm.

The present action statement under the limiting condition for operation (LCO) addresses the situation where more than one full length rod is inoperable or misaligned from the group step counter demand position by more than  $\pm 12$  steps. In this case, the unit must be in hot standby within 6 hours. The licensee has proposed to include a new action statement to address inoperability of the movable control rod assemblies due to a rod control urgent failure alarm or obvious electrical problem in the rod control system. This would allow 72 hours to perform any required maintenance to restore the system to an operable status. Otherwise the unit must be brought to hot standby within the following 6 hours.

As justification for the proposed change in the Technical Specifications for operable control rod assemblies, the licensee provided a description

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of the rod control system, the diagnostic features of the rod control system and the process for identifying the root cause of rod control system malfunctions. One such diagnostic feature of the rod control system is failure detection. A "Rod Control Urgent Failure" alarm is actuated by five failure detectors (regulation failure, phase failure, logic error, multiplexing error and card missing) in each power cabinet or by three failure detectors (slave cyclor receives a GO pulse during a step, oscillating failure, card missing) in the logic cabinet. A rod control urgent failure alarm which is annunciated in the main control room stops automatic rod motion but permits manual movement of a selected bank under certain conditions.

Due to the types of failures which result in the rod control urgent failure alarm, the licensee concludes that this condition is only indicative of problems associated with the rod control system and is not an indication that would preclude the capability for control rod insertion on a reactor trip. Based on our review of this matter, we concur with the licensee's conclusion that the rod control urgent failure alarm is an indication of a control system failure and is not related to control rods being untrippable.

Since the inoperability of the rod control system does not present an immediate concern with regard to the capability of safety systems, we conclude that it is prudent not to require actions which could lead to unusual operating circumstances.

The rod control system operates independently of the rod drive mechanisms. A rod control urgent alarm is the result of a control system failure and is not related to a mechanically inoperable rod or rods. There are failures that do not result in a rod control urgent failure alarm that could prevent one or more rods from moving. In this regard, the licensee addressed the means available to distinguish whether the problem is in the control system or in the coil mechanism. Test points are located in the power cabinets for the rod control system which permit monitoring of the electrical current to coils in the control rod mechanism. If the control system does not vary the currents to the mechanism coils, the problem is isolated to failures in the rod control system. In this case it would be obvious that the malfunction is due to component failures associated with the rod control system and not related to the control rod drive mechanism. Therefore, based on this review the staff concludes that where the inoperability of control rod assemblies can be positively identified as being associated with malfunctions internal to the rod control system, it is acceptable to allow adequate time for maintenance before requiring that the unit be placed in hot standby.

Therefore, the staff concludes that the proposed changes to the Technical Specifications are acceptable.

### III. ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Sec. 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 this amendment.

### IV. CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (50 FR 20989) on May 21, 1985, and consulted with the state of South Carolina. No public comments were received, and the state of South Carolina did not have any comments.

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: Jon B. Hopkins, Licensing Branch No. 4, DL  
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Dated: June 24, 1985