



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

January 31, 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. 37 to Facility Operating  
License NPF-12 Virgil C. Summer Nuclear Station,  
Unit No. 1

The Nuclear Regulatory Commission has issued Amendment No. 37 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 June 19, 1984, and revised November 29, 1984.

The amendment modifies the Technical Specifications to define allowable power levels for reactor coolant system flow rates less than 100% of thermal design flow. The amendment is effective as of its date of issuance.

A copy of the related safety evaluation supporting Amendment No. 37 to Facility Operating License NPF-12 is enclosed.

Sincerely,

*hrl* *DARL HOOD*  
Elinor G. Adensam, Chief  
Licensing Branch No. 4  
Division of Licensing

Enclosures:

1. Amendment No. 37
2. Safety Evaluation

cc w/enclosure:  
See next page

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DEFERRED OPINION  
Certified By *John M. Clark*

SUMMER (Amendment & Order)

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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. 37  
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 June 19, 1984, and revised November 29, 1984, 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. 37 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 as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*EARL HOOT*  
Elinor G. Adensam, Chief  
Licensing Branch No. 4  
Division of Licensing

Enclosure:  
Technical Specification Changes

Date of Issuance: January 31, 1985

ATTACHMENT TO LICENSE AMENDMENT NO. 37

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. Corresponding overleaf pages are also provided to maintain document completeness.

Amended  
Pages

2-2  
3/4 2-10

Overleaf  
Pages

2-1  
3/4 2-9

## 2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

### 2.1 SAFETY LIMITS

#### REACTOR CORE

2.1.1 The combination of THERMAL POWER, pressurizer pressure, and the highest operating loop coolant temperature ( $T_{avg}$ ) shall not exceed the limits shown in Figures 2.1-1 and 2.1-2 for 3 and 2 loop operation, respectively.

APPLICABILITY: MODES 1 and 2.

#### ACTION:

Whenever the point defined by the combination of the highest operating loop average temperature and THERMAL POWER has exceeded the appropriate pressurizer pressure line, be in HOT STANDBY within 1 hour, and comply with the requirements of Specification 6.7.1.

#### REACTOR COOLANT SYSTEM PRESSURE

2.1.2 The Reactor Coolant System pressure shall not exceed 2735 psig.

APPLICABILITY: MODES 1, 2, 3, 4 and 5.

#### ACTION:

MODES 1 and 2

Whenever the Reactor Coolant System pressure has exceeded 2735 psig, be in HOT STANDBY with the Reactor Coolant System pressure within its limit within 1 hour, and comply with the requirements of Specification 6.7.1.

MODES 3, 4 and 5

Whenever the Reactor Coolant System pressure has exceeded 2735 psig, reduce the Reactor Coolant System pressure to within its limit within 5 minutes, and comply with the requirements of Specification 6.7.1.

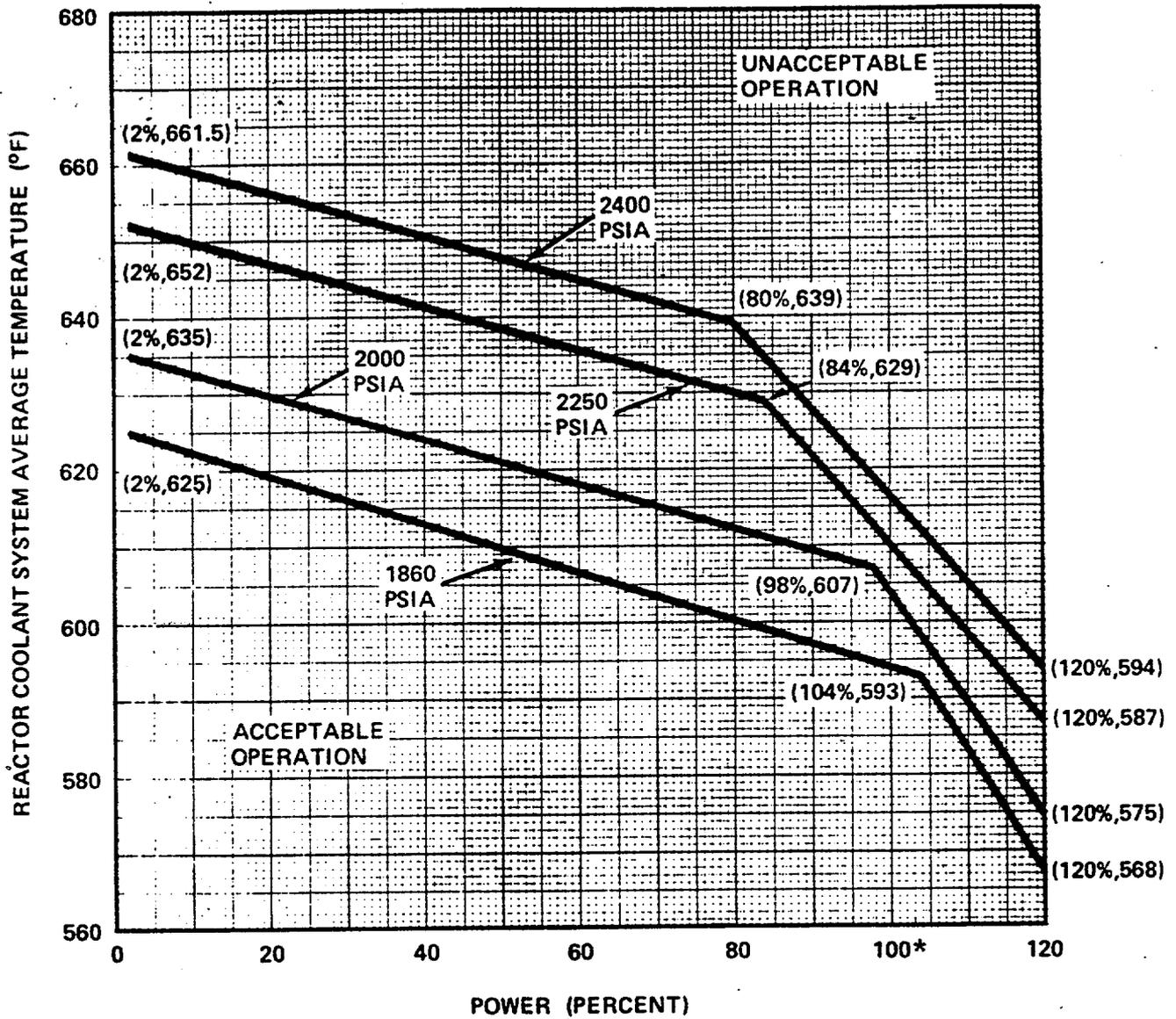


Figure 2.1-1  
Reactor Core Safety Limit - Three Loops in Operation

\*When operating in Region III of Technical Specification 3.2.3 (Figure 3.2-3), the restricted power level must be considered 100% RTP for this figure.

## POWER DISTRIBUTION LIMITS

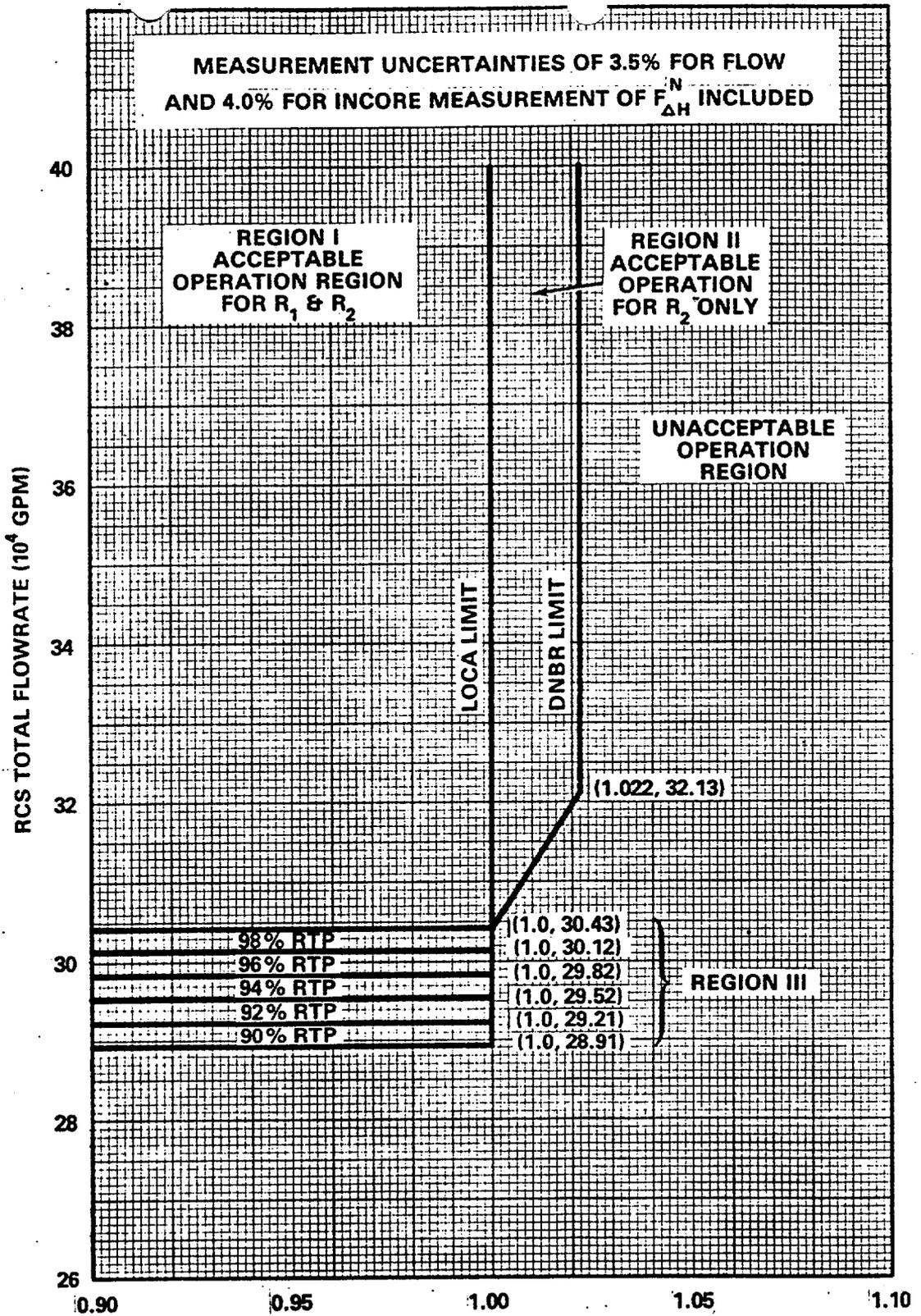
### ACTION: (Continued)

- b. Within 24 hours of initially being outside the above limits, verify through incore flux mapping and RCS total flow rate comparison that the combination of  $R_1$ ,  $R_2$  and RCS total flow rate are restored to within the above limits, or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 2 hours.
- c. Identify and correct the cause of the out-of-limit condition prior to increasing THERMAL POWER above the reduced THERMAL POWER limit required by ACTION items a.2. and/or b. above; subsequent POWER OPERATION may proceed provided that the combination of  $R_1$ ,  $R_2$  and indicated RCS total flow rate are demonstrated, through incore flux mapping and RCS total flow rate comparison, to be within the region of acceptable operation shown on Figure 3.2-3 prior to exceeding the following THERMAL POWER levels:
  1. A nominal 50% of RATED THERMAL POWER,
  2. A nominal 75% of RATED THERMAL POWER, and
  3. Within 24 hours of attaining greater than or equal to 95% of RATED THERMAL POWER.

## SURVEILLANCE REQUIREMENTS

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- 4.2.3.1 The provisions of Specification 4.0.4 are not applicable.
- 4.2.3.2 The combination of indicated RCS total flow rate and  $R_1$ ,  $R_2$  shall be determined to be within the region of acceptable operation of Figure 3.2-3:
  - a. Prior to operation above 75% of RATED THERMAL POWER after each fuel loading, and
  - b. At least once per 31 Effective Full Power Days.
- 4.2.3.3 The indicated RCS total flow rate shall be verified to be within the region of acceptable operation of Figure 3.2-3 at least once per 12 hours when the most recently obtained values of  $R_1$  and  $R_2$ , obtained per Specification 4.2.3.2, are assumed to exist.
- 4.2.3.4 The RCS total flow rate indicators shall be subjected to a CHANNEL CALIBRATION at least once per 18 months.
- 4.2.3.5 The RCS total flow rate shall be determined by measurement at least once per 18 months.



$$R_1 = F_{\Delta H}^N / 1.49 [1.0 + 0.2 (1.0 - P)]$$

$$R_2 = R_1 / [1.0 - RBP (BU)]$$

**NOTE:** When operating in Region III, the restricted power levels shall be considered to be 100% of Rated Thermal Power (RTP) for Figure 2.1-1.

**Figure 3.2-3 RCS FLOW RATE VERSUS R**



UNITED STATES  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 37 TO FACILITY OPERATING LICENSE NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

I. INTRODUCTION

By letter dated June 19, 1984 (Reference 1), South Carolina Electric and Gas Company (SCE&G) requested an amendment to the V. C. Summer Technical Specifications. The amendment would change the reactor coolant system flow measurement uncertainty from 3.5% to 2% in Technical Specification 3.2.3, "RCS Flow Rate and Nuclear Enthalpy Rise Hot Channel Factor" and in its bases. The amendment would also add a third region (Region III) of acceptable operation to Technical Specification Figure 3.2.3 "RCS Flow Rate versus R." This region would allow plant operation with a 2% reduction in power for every 1% reduction in flow from 100% to 95% total flow.

By letter dated November 29, 1984 (Ref. 2), SCE&G requested that their initial submittal be revised to eliminate the request for a reduced measurement uncertainty of 2% and then revise the Region III of acceptable operation to reflect a 3.5% reactor coolant system (RCS) flow measurement uncertainty instead of the 2% measurement uncertainty.

The initial amendment request was noticed in the Federal Register (49 FR 42830) on October 24, 1984. The revised amendment request effectively only eliminated the request for a revised RCS flow measurement uncertainty, which necessitated changing some Region III values. Because these changes were small and the basic amendment request, as noticed, of reducing power by 2% for every 1% reduction in flow from 100% to 95% total flow was not changed, this amendment request was not renoticed.

II. EVALUATION

The licensee presented information (Ref. 2) to justify operation at up to 10% reduced Rated Thermal Power (RTP) if measured RCS flow is found to be less than the Thermal Design (TD) flow. This is instead of the requirement of the current Technical Specification 3.2.3, Figure 3.2-3 which limits operation to less than 5% of RTP if the measured RCS flow is less than the TD flow used in the plant safety analyses. The licensee presented information on relationships between core power, flow and departure from nucleate boiling (DNB) which resulted in a relationship between power and flow of 0.555. However, instead they proposed a conservative value of 2.0. For comparison, a staff independent calculation was made using sensitivity factors from a Battelle Pacific Northwest Laboratories Study (Reference 3). The value obtained was 0.833 instead of 0.555. However, the licensee's proposed value of 2.0 for the power to flow relationship remains conservative to

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either calculation. Based on this value of 2.0, the licensee requested that a new region of acceptable operation be added to Figure 3.2-3 in the Technical Specifications for:

$$95\% \text{ TD flow} \leq \text{RCS flow} \leq 100\% \text{ TD flow.}$$

The licensee has modified Figure 3.2-3 such that the maximum power level for the new region is reduced by 2% for each 1% reduction in measured flow below TD flow in steps of 2% power up to a maximum of 10% reduction in rated power at 95% TD flow. The Technical Specification accident analysis results have been evaluated by the licensee to determine the impact of operating within the defined new region (Region III) of Figure 3.2-3 with the imposed restriction. It was found that sufficient margin exists in all cases to allow continued plant operation; no Technical Specification limits require modifications, including core limits, overtemperature delta T, overpower delta T, and Power Range Neutron Flux High Setpoints. This analysis took account of the increased margin to DNB because of power reduction. The licensee will restrict the power level to 100% Rated Thermal Power (RTP) for Figure 2.1-1, "Reactor Core Safety Limit - Three Loops in Operation" when operating in the defined new region (Region III) of Figure 3.2-3 at the 95% to 100% reduced TD flow conditions. The staff has found these changes to be acceptable.

In conclusion, we have reviewed the analysis performed by the licensee to justify the proposed Technical Specification changes for operation of the V. C. Summer plant at the proposed 2 to 1 power/flow tradeoff for operation between 95% TD to 100% TD flow. The review included sensitivity studies on the impact of flow reduction on DNB thermal margin and DNB ratio limiting transients. The sensitivity analysis was found to be acceptable. We have found that the proposed Technical Specification changes properly account for the power/flow tradeoff and are, therefore, 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 (49 FR 42830) on October 24, 1984, 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.

#### REFERENCES

1. Letter from O. W. Dixon, Jr., South Carolina Electric and Gas Company, to H. R. Denton, (NRC), dated June 19, 1984.
2. Letter from O. W. Dixon, Jr., South Carolina Electric and Gas Company, to H. R. Denton, (NRC), dated November 29, 1984.
3. G. M. Hesson and J. M. Cuta, "Analysis of the Sensitivity of Calculated MDNBR to Eight Selected DNB Parameters", FATE-70-101, Battelle Pacific Northwest Laboratories, March 1979.

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Dated: January 31, 1985

January 31, 1985

AMENDMENT NO.37 TO FACILITY OPERATING LICENSE NO. NPF-12 - Virgil C. Summer Unit 1

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