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

August 26, 1985

Docket No. 50-395

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

Dear Mr. Dixon:

Subject: Issuance of Amendment No. 44 to Facility Operating License NPF-12 Virgil C. Summer Nuclear Station, Unit No. 1

The Nuclear Regulatory Commission has issued Amendment No. 44 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, and supplemented May 20, 1985, and June 20, 1985.

The amendment modifies the Technical Specifications to delete the Boron Injection System. The amendment is effective seven days after its date of issuance.

A copy of the related safety evaluation supporting Amendment No.44 to Facility Operating License NPF-12 is enclosed.

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

Sincerely,

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

Enclosures:
1. Amendment No. 44
2. Safety Evaluation

cc w/enclosure:
See next page

DESIGNATED ORIGINAL
Certified By

cc:
Mr. William A. Williams, Jr.
Technical Assistant - Nuclear Operations
Santee Cooper
P.O. Box 764 (Mail Code 167)
Columbia, South Carolina 29218

J. B. Knotts, Jr., Esq.
Bishop, Liberman, Cook, Purcell
and Reynolds
1200 17th Street, N.W.
Washington, D. C. 20036

Mr. Mark B. Whitaker, Jr.
Group Manager - Regulatory and
Support Services
South Carolina Electric & Gas Company
P.O. Box 764 (Mail Code 160)
Columbia, South Carolina 29218

Resident Inspector/Summer NPS
c/o U.S. Nuclear Regulatory Commission
Route 1, Box 64
Jenkinsville, South Carolina 29065

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission,
101 Marietta Street, N.W., Suite 2900
Atlanta, Georgia 30323

Chairman, Fairfield County Council
P.O. Box 293
Winnsboro, South Carolina 29180

Attorney General
Box 11549
Columbia, South Carolina 29211

Mr. Heyward G. Shealy, Chief
Bureau of Radiological Health
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

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. 44
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, and supplemented May 20, 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. 44, 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.

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: August 26, 1985

ATTACHMENT TO LICENSE AMENDMENT NO. 44

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.

Amended Page	Overleaf Page
VI	V
XIII	XIV
3/4 5-9	
B3/4 5-2	B3/4 5-1

Pages 3/4 5-10 and 3/4 5-11 are deleted.
Page B3/4 5-3 is deleted.

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LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

BASES

SECTION PAGE

3/4.5.4 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.5 The refueling water storage tank (RWST) shall be OPERABLE with:

a. A minimum contained borated water volume of 453,800 gallons,

b. A boron concentration of between 2000 and 2100 ppm of boron, and

c. A minimum water temperature of 40°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the refueling water storage tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.5 The RWST shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the contained borated water volume in the tank, and

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWST temperature when the outside air temperature is less than 40°F.

3/4.5 EMERGENCY CORE COOLING SYSTEMS

BASES

3/4.5.1 ACCUMULATORS

The OPERABILITY of each Reactor Coolant System (RCS) accumulator ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs in the event the RCS pressure falls below the pressure of the accumulators. This initial surge of water into the core provides the initial cooling mechanism during large RCS pipe ruptures.

The limits on accumulator volume, boron concentration and pressure ensure that the assumptions used for accumulator injection in the safety analysis are met.

The accumulator power operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these accumulator isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with an accumulator inoperable for any reason except an isolation valve closed minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional accumulator which may result in unacceptable peak cladding temperatures. If a closed isolation valve cannot be immediately opened, the full capability of one accumulator is not available and prompt action is required to place the reactor in a mode where this capability is not required.

3/4.5.2 and 3/4.5.3 EMERGENCY CORE COOLING SYSTEM (ECCS) SUBSYSTEMS

The OPERABILITY of two independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

With the RCS temperature below 350°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

ECCS SUBSYSTEMS (Continued)

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 charging pump to be inoperable below 300°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained. Surveillance requirements for throttle valve position stops and flow balance testing provide assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses.

3/4.5.4 REFUELING WATER STORAGE TANK

The OPERABILITY of the Refueling Water Storage Tank (RWST) as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWST minimum volume and boron concentration ensure that 1) sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following mixing of the RWST and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

Additionally, the OPERABILITY of the Refueling Water Storage Tank as part of the ECCS ensures that sufficient negative reactivity is injected into the core to counteract any positive increase in reactivity caused by RCS system cooldown. RCS cooldown can be caused by inadvertent depressurization, a loss-of-coolant accident, or a steam line rupture.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or 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.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 44 TO FACILITY OPERATING LICENSE NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1

I. INTRODUCTION

By letter dated April 9, 1985, South Carolina Electric & Gas Company requested an amendment to the V. C. Summer Nuclear Station Technical Specifications. The amendment would delete Technical Specification 3/4.5.4, "Boron Injection System," modify bases section B 3/4.5.5, "Refueling Water Storage Tank," and incorporate the necessary administrative changes to the index and page numbering that result from the Technical Specification deletion. These changes will allow for the removal of the boron injection tank (BIT) and other piping and components related to BIT operation. Additional information related to this request was submitted by letters dated May 20 and June 20, 1985.

II. EVALUATION

The BIT was originally incorporated into the plant design to meet the criteria of the Standard Review Plan, NUREG-0800, Chapter 15.1.5, "Steam System Piping Failures Inside and Outside Containment." The BIT was installed to provide a reservoir of highly concentrated borated water that would be swept into the reactor coolant system by the safety injection system. The injection of this concentrated boric acid was relied on in the analyses of the steam line break to limit the peak power during the post cooldown return to power.

Historically, the BIT, which contains a relatively small volume of highly borated water, has been a source of operation and maintenance problems at the V. C. Summer Nuclear Station. The heat tracing elements have been difficult to maintain operable and frequent crystallization of the boron in the sampling lines requires additional effort be expended to obtain required samples. Because of those problems, and because improved analysis methods now show that BITs are not needed to provide acceptable mitigation of steam line break events, the licensee submitted a request for approval to hydraulically remove the BIT, the heat tracing elements, and other piping and components related to BIT operation.

The licensee proposed to hydraulically remove the BIT from the safety injection system by cutting and capping the BIT inlet and outlet piping, then installing new piping around the BIT. A pipe break and whip analysis was performed for this piping which demonstrates that the surrounding

equipment required to safely shutdown the plant is not compromised. Also, the modifications to the system were taken into account in the piping and support load calculations.

With regard to the proposed removal of the heat tracing elements and their corresponding Technical Specification (TS) sections, reduction of boron concentration to zero ppm would eliminate the need for TS sections concerning the BIT and associated surveillance including heat tracing.

The proposed hydraulic removal of the BIT and installation of bypass piping was accompanied by a reanalysis of the rupture of the Main Steam Line. All analyses were performed utilizing end of life core conditions, minimum safety injection flow, and the highest worth control rod fully withdrawn from the core. In addition, the BIT was assumed to be installed in the flow path and filled with water containing zero ppm boric acid.

In the evaluation of the "Major Rupture of a Main Steam Line," two analyses were done, one with offsite power available and one without offsite power. The analysis assuming offsite power availability was the bounding event because of the greater heat transfer available with the reactor coolant pumps in operation. The hot, zero power condition, and a 1.4 ft^2 double ended rupture (which is the limiting steam line break as a result of the steam generator integral flow restrictor) were assumed. The analyses showed return to criticality with power levels remaining below 15%. Removal of the BIT was determined not to decrease the departure from nucleate boiling ratio (DNBR) below the minimum DNBR of 1.3. The analytical methodologies i.e., use of LOFTRAN (WCAP 7907, April 1984), for evaluating the accident have been reviewed and approved by the staff.

With the hydraulic removal of the Boron Injection Tank, heat tracing elements and other piping and components related to BIT operation, core analysis evaluation demonstrated that the departure from nucleate boiling ratio (DNBR) remained above the minimum DNBR of 1.3 for the steam line break accident and therefore the acceptance criteria are still satisfied. The analyses showed a return to power with power levels remaining below 15%. The analyses demonstrated that the refueling water storage tank is capable of supplying negative reactivity to the core to counteract any positive increase in reactivity resulting from a reactor coolant system cooldown following a main steam line break.

These results demonstrate compliance with the criteria of Section 15.1.5 of the Standard Review Plan "Steam System Piping Failure Inside and Outside of Containment (PWR)."

Based on our review of the applicant's analyses, we find the proposed systems modifications and Technical Specification changes acceptable.

III. ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation 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 29015) on July 17, 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
Concepecion Balatbat, Reactor Systems Branch, DSI

Dated: August 26, 1985

August 26, 1985

AMENDMENT NO. 44 TO FACILITY OPERATING LICENSE NO. NPF-12 - Virgil C. Summer Unit 1

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NRC PDR
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NSIC
PRC System
LB #4 r/f
J. Hopkins
M. Duncan
E. Adensam
Attorney, OELD
R. Diggs, ADM
T. Barnhart (4)
E. L. Jordan, DEQA:I&E
L. Harmon, I&E
J. Partlow
B. Grimes
M. Virgilio
C. Balatbat, RSB

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