



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

September 24, 1984

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

The Nuclear Regulatory Commission has issued Amendment No. 26 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 October 21, 1983.

The amendment modifies Technical Specification 3.4.9.3 "Overpressure Protection Systems," from a power operated relief valve system to a residual heat removal relief valve system. The amendment is effective as of its date of issuance.

A copy of the related safety evaluation supporting Amendment No. 26 to Facility Operating License NPF-12 is enclosed.

Sincerely,

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

Enclosures:

1. Amendment No. 26
2. Safety Evaluation

cc w/enclosure:
See next page

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Certified By

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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. 26
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 October 21, 1983, 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:

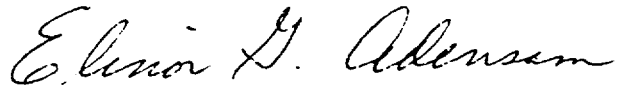
(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 26, 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



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

Enclosure:
Technical Specification Changes

Date of Issuance: September 24, 1984

ATTACHMENT TO LICENSE AMENDMENT NO. 26

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. To maintain document completeness, corresponding overleaf pages are also provided.

<u>Amended</u> <u>Page</u>	<u>Overleaf</u> <u>Page</u>
3/4 4-34	3/4 4-33
3/4 4-35	
B3/4 4-14	B3/4 4-13

Page 3/4 4-35a is deleted

REACTOR COOLANT SYSTEM

PRESSURIZER

LIMITING CONDITION FOR OPERATION

3.4.9.2 The pressurizer temperature shall be limited to:

- a. A maximum heatup of 100°F in any one hour period,
- b. A maximum cooldown of 200°F in any one hour period, and
- c. A maximum auxiliary spray water temperature differential of 625°F.

APPLICABILITY: At all times.

ACTION:

With the pressurizer temperature limits in excess of any of the above limits, restore the temperature to within the limits within 30 minutes; perform an engineering evaluation to determine the effects of the out-of-limit condition on the fracture toughness properties of the pressurizer; determine that the pressurizer remains acceptable for continued operation or be in at least HOT STANDBY within the next 6 hours and reduce the pressurizer pressure to less than 500 psig within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.9.2 The pressurizer temperatures shall be determined to be within the limits at least once per 30 minutes during system heatup or cooldown. The spray water temperature differential shall be determined to be within the limit at least once per 12 hours during auxiliary spray operation.

REACTOR COOLANT SYSTEM

OVERPRESSURE PROTECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.9.3 At least one of the following overpressure protection systems shall be OPERABLE:

- a. Two RHR relief valves with:
 1. A lift setting of less than or equal to 450 psig, and
 2. The associated RHR relief valve isolation valves open; or
- b. The Reactor Coolant System (RCS) depressurized with an RCS vent of greater than or equal to 2.7 square inches.

APPLICABILITY:

MODE 4 when the temperature of any RCS cold leg is less than or equal to 300°F, MODE 5, and MODE 6 with the reactor vessel head on.

ACTION:

- a. With one RHR relief valve inoperable, restore the inoperable valve to OPERABLE status within 7 days or depressurize and vent the RCS through a greater than or equal to 2.7 square inch vent within the next 8 hours.
- b. With both RHR relief valves inoperable, within 8 hours either:
 1. Restore at least one RHR relief valve to OPERABLE status, or
 2. Depressurize and vent the RCS through a greater than or equal to 2.7 square inch vent.
- c. In the event an RHR relief valve or RCS vent is used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the RHR relief valves or vent on the transient and any corrective action necessary to prevent recurrence.
- d. The provisions of Specification 3.0.4 are not applicable.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS

4.4.9.3.1 Each RHR relief valve shall be demonstrated OPERABLE by:

- a. Verifying the RHR relief valve isolation valves (8701A, 8701B, 8702A, and 8702B) are open at least once per 72 hours when the RHR relief valve is being used for overpressure protection.
- b. Testing pursuant to Specification 4.0.5.
- c. Verification of the RHR relief valve setpoint of at least one RHR relief valve, at least once per 18 months on a rotating basis.

4.4.9.3.2 The RCS vent shall be verified to be open at least once per 12 hours* when the vent is being used for overpressure protection.

*Except when the vent pathway is provided with a valve which is locked, sealed, or otherwise secured in the open position, verify these valves open at least once per 31 days.

REACTOR COOLANT SYSTEM

BASES

PRESSURE/TEMPERATURE LIMITS (Continued)

during cooldown results in a higher value of K_{IR} at the 1/4T location for finite cooldown rates than for steady-state operation. Furthermore, if conditions exist such that the increase in K_{IR} exceeds K_{It} , the calculated allowable pressure during cooldown will be greater than the steady-state value.

The above procedures are needed because there is no direct control on temperature at the 1/4T location; therefore, allowable pressures may unknowingly be violated if the rate of cooling is decreased at various intervals along a cooldown ramp. The use of the composite curve eliminates this problem and assures conservative operation of the system for the entire cooldown period.

HEATUP

Three separate calculations are required to determine the limit curves for finite heatup rates. As is done in the cooldown analysis, allowable pressure-temperature relationships are developed for steady-state conditions as well as finite heatup rate conditions assuming the presence of a 1/4T defect at the inside of the vessel wall. The thermal gradients during heatup produce compressive stresses at the inside of the wall that alleviate the tensile stresses produced by internal pressure. The metal temperature at the crack tip lags the coolant temperature; therefore, the K_{IR} for the 1/4T crack during heatup is lower than the K_{IR} for the 1/4T crack during steady-state conditions at the same coolant temperature. During heatup, especially at the end of the transient, conditions may exist such that the effects of compressive thermal stresses and different K_{IR} 's for steady-state and finite heatup rates do not offset each other and the pressure-temperature curve based on steady-state conditions no longer represents a lower bound of all similar curves for finite heatup rates when the 1/4T flaw is considered. Therefore, both cases have to be analyzed in order to assure that at any coolant temperature the lower value of the allowable pressure calculated for steady-state and finite heatup rates is obtained.

REACTOR COOLANT SYSTEM

BASES

PRESSURE/TEMPERATURE LIMITS (Continued)

The second portion of the heatup analysis concerns the calculation of pressure-temperature limitations for the case in which a 1/4T deep outside surface flaw is assumed. Unlike the situation at the vessel inside surface, the thermal gradients established at the outside surface during heatup produce stresses which are tensile in nature and thus tend to reinforce any pressure stresses present. These thermal stresses, of course, are dependent on both the rate of heatup and the time (or coolant temperature) along the heatup ramp. Furthermore, since the thermal stresses, at the outside are tensile and increase with increasing heatup rate, a lower bound curve cannot be defined. Rather, each heatup rate of interest must be analyzed on an individual basis.

Following the generation of pressure-temperature curves for both the steady-state and finite heatup rate situations, the final limit curves are produced as follows. A composite curve is constructed based on a point-by-point comparison of the steady-state and finite heatup rate data. At any given temperature, the allowable pressure is taken to be the lesser of the three values taken from the curves under consideration.

The use of the composite curve is necessary to set conservative heatup limitations because it is possible for conditions to exist such that over the course of the heatup ramp the controlling condition switches from the inside to the outside and the pressure limit must at all times be based on analysis of the most critical criterion.

Finally, the composite curves for the heatup rate data and the cooldown rate data are adjusted for possible errors in the pressure and temperature sensing instruments by the values indicated on the respective curves.

Although the pressurizer operates in temperature ranges above those for which there is reason for concern of non-ductile failure, operating limits are provided to assure compatibility of operation with the fatigue analysis performed in accordance with the ASME Code requirements.

The OPERABILITY of two RHRSRVs or an RCS vent opening of at least 2.7 square inches ensures that the RCS will be protected from pressure transients which could exceed the limits of Appendix G to 10 CFR part 50 when one or more of the RCS cold legs are less than or equal to 300°F. Either RHRSRV has adequate relieving capability to protect the RCS from overpressurization when the transient is limited to either (1) the start of an idle RCP with the secondary water temperature of the steam generator less than or equal to 50°F above the RCS cold leg temperatures or (2) the start of a HPSI pump and its injection into a water solid RCS.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 26 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 October 21, 1983, South Carolina Electric and Gas Company (the licensee) requested a change to Technical Specification 3.4.9.3, "Overpressure Protection Systems." The amendment would change Technical Specification 3.4.9.3 from a power operated relief valve (PORV) system to a residual heat removal (RHR) relief valve system. The associated Technical Specification bases and surveillance requirements would also be changed to reflect the RHR relief valve system. Additional information relating to this request was submitted by letter dated February 2, 1984.

II. EVALUATION

The proposed cold overpressure protection system (COPS) consists of two spring loaded relief valves, one in each train of the RHR system. The licensee states that these valves were designed in accordance with ASME, Section III, Class 2 requirements. Each of these valves has a relief area of 2.853 square inches when full open. The opening pressure is set at 450 psig. This passive system will be on line whenever the RHR system is on line.

The licensee's analyses show that one of these valves will prevent the reactor coolant system (RCS) pressure from exceeding the Appendix G limits with one charging/safety injection pump inadvertently operating at full flow or in the event of a reactor coolant pump start with the steam generator secondary temperature no more than 50°F higher than the RCS temperature.

The proposed Technical Specifications would require COPS to be operable in Mode 4 when the temperature of any RCS cold leg is less than or equal to 300°F, Mode 5, and Mode 6 with the reactor vessel head on. Also, the Technical Specifications require all but one charging/safety injection pump to be made inoperable by the removal of power. By procedure, a reactor coolant pump is not to be started when its steam generator secondary temperature is more than 50°F higher than the RCS temperature.

The NRC requires that the suction side of the RHR system have at least two power operated valves in series to isolate the RHR system from the RCS and that these valves have independent, diverse interlocks to prevent overpressurizing the RHR system to the point where RCS water would

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be pumped outside of containment. In the proposed system with no failures, the RHR suction isolation valves will automatically close when the RCS pressure goes above 700 psig. With a single failure, at least one RHR suction isolation valve will close in each line and isolate the line. In addition, for the independence and diversity required there will be an alarm to alert the operator if any one of the four isolation valves does not completely close as the RCS pressure is increased. This alarm is by monitor light panel indication, which indicates even when power is locked out to the RHR suction isolation valves. There will also be a control board alarm to show the operator that any one of the four isolation valves is not completely open when the RCS pressure is decreased to the point where the RHR system is brought on line. This meets the staff positions of RSB 5-1 and RSB 5-2. Therefore, we find this acceptable.

From the above, the staff finds that the proposed system has adequate relief flow capacity for cold overpressure protection and that the RHR suction isolation valve interlock system, Technical Specification, and operator surveillance of the isolation valves meet RSB 5-1 and RSB 5-2 and are acceptable. Therefore, the staff concludes that the proposed cold overpressure protection system is 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 changes 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 10742) on March 22, 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.

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Dated: September 24, 1984

September 24, 1984

AMENDMENT NO. 26 TO FACILITY OPERATING LICENSE NO. NPF-12 - Virgil C. Summer Unit 1

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