

May 30, 1989

Docket No. 50-395

DISTRIBUTION  
See attached sheet

Mr. O. S. Bradham  
Vice President, Nuclear Operations  
South Carolina Electric & Gas Company  
Virgil C. Summer Nuclear Station  
P.O. Box 88  
Jenkinsville, South Carolina 29065

Dear Mr. Bradham:

SUBJECT: ISSUANCE OF AMENDMENT NO. 77 TO FACILITY OPERATING LICENSE  
NO. NPF-12 - VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1,  
REGARDING EMERGENCY DIESEL GENERATORS (TAC NO. 59465)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 77 to Facility Operating License No. NPF-12 for the Virgil C. Summer Nuclear Station, Unit No. 1. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated June 10, 1985, as supplemented December 6, 1985 and May 16, July 14, July 28, and November 18, 1988 and April 5, 1989.

The amendment changes the Technical Specifications to reduce the number and severity of starts of the emergency diesel generators, thereby decreasing engine wear and increasing reliability.

The amendment also changes the TS to: (1) modify the ACTION statement to TS 3.8.1.1; (2) modify surveillance requirements 4.8.1.1 and 4.8.1.2; and (3) modify the bases to 3/4.8.1, 3/4.8.2 and 3/4.8.3.

A copy of the related Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's Bi-weekly Federal Register notice.

Sincerely,

Original Signed By:

8906060467 890530  
PDR ADOCK 05000395  
P PNU

John J. Hayes, Jr., Project Manager  
Project Directorate II-1  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 77 to NPF-12
  - 2. Safety Evaluation
- cc w/enclosures:  
See next page

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OFC	: LAZ	: PD21	: DRPR	: PM	: PD21	: DRPR	: D	: PD21	: DRPR	:	:	:	:
NAME	: PAnderson	:	: Hayes	:	: EAdensam	:	:	:	:	:	:	:	:
DATE	: 5/27/89	:	: 5/27/89	:	: 5/27/89	:	:	:	:	:	:	:	:

CP/ga

Mr. O. S. Bradham  
South Carolina Electric & Gas Company

Virgil C. Summer Nuclear Station

cc:

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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. 77  
License No. NPF-12

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by South Carolina Electric & Gas Company (the licensee), dated June 10, 1985, as supplemented December 6, 1985 and May 16, July 14, July 28 and November 18, 1988, and April 5, 1989, 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;
  - D. The issuance of this 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 amended by 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-12 is hereby amended to read as follows:

8906060469 890530  
PDR ADOCK 05000395  
P PNU

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 77, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. South Carolina Electric & Gas Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

- 3. This amendment is effective as of its date of issuance, and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Original Signed By:

Elinor G. Adensam, Director  
Project Directorate II-1  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: May 30, 1989

OFC	: LA 2021	DRPR: RM: PD21: DRPR: SELB: DESTG	: OGC	D: PD21: DRPR	:	:
NAME	: P Anderson	: J Hayes	: F Rosa	: E Adensam	:	:
DATE	: 5/22/89	: 5/22/89	: 5/22/89	: 5/23/89	:	:

ATTACHMENT TO LICENSE AMENDMENT NO. 77  
TO 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.

Remove Pages

3/4 8-1  
3/4 8-2  
3/4 8-2a  
3/4 8-3  
3/4 8-4  
3/4 8-5  
3/4 8-6  
3/4 8-6a  
3/4 8-7  
3/4 8-8  
B 3/4 8-1  
B 3/4 8-2

Insert Pages

3/4 8-1  
3/4 8-2  
3/4 8-2a  
3/4 8-3  
3/4 8-4  
3/4 8-5  
3/4 8-6  
3/4 8-6a  
3/4 8-7  
3/4 8-8  
B 3/4 8-1  
B 3/4 8-2 (overleaf)

### 3/4.8 ELECTRICAL POWER SYSTEMS

#### 3/4.8.1 A.C. SOURCES

##### OPERATING

#### LIMITING CONDITION FOR OPERATION

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3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the onsite Class IE distribution system, and
- b. Two separate and independent Emergency Diesel Generators (EDG), each with:
  1. A separate day fuel tank containing a minimum volume of 300 gallons of fuel,
  2. A separate fuel storage system containing a minimum volume of 42,500 gallons of fuel, and
  3. A separate fuel transfer pump.

APPLICABILITY: MODES 1, 2, 3 and 4.

##### ACTION:

- a. With one offsite circuit of 3.8.1.1.a inoperable:
  1. Demonstrate the OPERABILITY of the remaining offsite A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter, and
  2. If either EDG has not been successfully tested within the past 24 hours, demonstrate its OPERABILITY by performing Surveillance Requirement 4.8.1.1.2.a.3 separately for each such EDG within 24 hours unless the diesel is already operating, and
  3. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
- b. With one EDG of 3.8.1.1.b inoperable:
  1. Demonstrate the OPERABILITY of the A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter, and
  2. If the EDG became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirements 4.8.1.1.2.a.3 within 24 hours\*, and

\*This test is required to be completed regardless of when the inoperable EDG is restored to OPERABILITY.

## ELECTRICAL POWER SYSTEMS

### LIMITING CONDITION FOR OPERATION

#### ACTION: (Continued)

3. Within 2 hours, verify that required systems, subsystems, trains components and devices that depend on the remaining EDG as a source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
4. Restore the EDG to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- c. With one offsite circuit and one EDG inoperable:
  1. Demonstrate the OPERABILITY of the remaining offsite A.C. source by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter, and
  2. If the EDG became inoperable due to any cause other than preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirement 4.8.1.1.2.a.3 within 8 hours\*, and
  3. Within 2 hours, verify that required systems, subsystems, trains, components and devices that depend on the remaining EDG as source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
  4. Restore one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and
  5. Restore the other A.C. power source (offsite circuit or diesel generator) to OPERABLE status in accordance with the provisions of Section 3.8.1.1 Action Statement a. or b., as appropriate, with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable A. C. power source.

\*This test is required to be completed regardless of when the inoperable EDG is restored to OPERABILITY.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

- d. With two of the required offsite A. C. circuits inoperable:
  - 1. Demonstrate the OPERABILITY of the two EDG's by sequentially performing Surveillance Requirement 4.8.1.1.2.a.3 on both within 8 hours, unless the EDG's are already operating, and
  - 2. Restore one of the inoperable offsite sources to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours.
  - 3. Following restoration of one offsite source, follow Action Statement a. with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable offsite A.C. circuit.
  
- e. With two of the above required EDG's inoperable:
  - 1. Demonstrate the OPERABILITY of two offsite A.C. circuits by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter, and
  - 2. Restore one of the inoperable EDG's to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
  - 3. Following restoration of one EDG, follow Action Statement b. with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable diesel generator.

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignment and indication of power availability, and

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

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- b. Demonstrated OPERABLE at least once every 18 months by manually transferring the onsite Class 1E power supply from the normal circuit to the alternate circuit.

#### 4.8.1.1.2 Each EDG shall be demonstrated OPERABLE:

- a. In accordance with the frequency specified in Table 4.8-1 on a STAGGERED TEST BASIS by:
  - 1. Verifying the fuel level in the day tank and fuel storage tank.
  - 2. Verifying the fuel transfer pump can be started and transfers fuel from the storage system to the day tank.
  - 3. Verifying the diesel generator can start\* and accelerate to synchronous speed (504 rpm) with generator voltage and frequency at  $7200 \pm 720$  volts and  $60 \pm 1.2$  Hz.
  - 4. Verifying the generator is synchronized, gradually loaded\* to an indicated 4150-4250 kW\*\* and operates for at least 60 minutes.
- b. At least once per 31 days and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by removing accumulated water from the day tank.
- c. By obtaining a sample of fuel oil in accordance with ASTM-D270-1975 at least once per 92 days and prior to the addition of new fuel oil to the storage tanks and verifying that the sample meets the following minimum requirements and is tested within the specified time limits:
  - 1. As soon as sample is taken (or prior to adding new fuel to the storage tank) verify in accordance with the tests specified in ASTM-D975-77 that the sample has:
    - a) A water and sediment content of less than or equal to 0.05 volume percent.
    - b) A kinematic viscosity @ 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes.
    - c) A specific gravity as specified by the manufacturer @ 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89 or an API gravity @ 60°F of greater than or equal to 27 degrees but less than or equal to 39 degrees.

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\*This test shall be conducted in accordance with the manufacturer's recommendations regarding engine prelube and warmup procedures, and as applicable regarding loading recommendations.

\*\*This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

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2. Within 1 week after obtaining the sample, verify an impurity level of less than 2 mg of insolubles per 100 ml when tested in accordance with ASTM-D2274-70.
  3. Within 2 weeks of obtaining the sample, verify that the other properties specified in Table 1 of ASTM-D975-77 and Regulatory Guide 1.137 Position 2.a are met when tested in accordance with ASTM-D975-77.
- d. At least once per 184 days by:
1. Starting and accelerating the EDG to synchronous speed (504 rpm) with generator voltage and frequency at  $7200 \pm 720$  volts and  $60 \pm 1.2$  Hz within 10 seconds after the start signal. The EDG shall be started for this test by using one of the following signals:
    - a) Simulated loss of offsite power by itself.
    - b) Simulated loss of offsite power in conjunction with an ESF actuation test signal.
    - c) An ESF actuation test signal by itself.
    - d) Simulated degraded offsite power by itself.
    - e) Manual.
  2. The generator shall be manually synchronized, loaded to an indicated 4150-4250 kW\*\* in less than or equal to 60 seconds, and operate for at least 60 minutes.
- e. At least once every 18 months by:
1. Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service,
  2. Verifying that on rejection of a load of greater than or equal to 729, the voltage and frequency are maintained at  $7200 \pm 720$  volts and frequency at  $60 \pm 1.2$  Hz.
  3. Verifying the generator capability to reject a load of 4250 kw without tripping. The generator voltage shall not exceed 7920 volts during and following the load rejection.
  4. Simulating a loss of offsite power by itself, and:
    - a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.

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\*\*This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

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- b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization of these loads, the steady-state voltage and frequency shall be maintained at  $7200 \pm 720$  volts and  $60 \pm 1.2$  Hz
5. Verifying that on an ESF actuation test signal, without loss of offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be  $7200 \pm 720$  volts and  $60 \pm 1.2$  Hz within 10 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test. After 5 minutes of standby operation verify that on a simulated loss of offsite power:
- a) the loads are shed from the emergency busses,
  - b) the diesel generator does not connect to the bus for at least 5 seconds, and
  - c) that subsequent loading of the diesel generator is in accordance with design requirements.
6. Simulating a loss of offsite power in conjunction with an ESF actuation test signal, and
- a) Verifying de-energization of the emergency busses and load shedding from the emergency busses.
  - b) Verifying the EDG starts in the emergency mode, energizes the emergency busses with permanently connected loads within 10 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes and maintains the steady state voltage and frequency at  $7200 \pm 720$  volts and  $60 \pm 1.2$  Hz
  - c) Verifying that all EDG trips, except engine overspeed, generator differential and low lube oil pressure are automatically bypassed upon loss of voltage on the emergency bus concurrent with a safety injection actuation signal.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

7. Verifying the EDG operates for at least 24 hours.
  - a) The EDG shall be loaded to the continuous rating (4150-4250 kw\*\*) for the time required to reach engine temperature equilibrium, at which time the EDG shall be loaded to an indicated target value of 4676 kw (between 4600-4700 kw\*\*) and maintained for 2 hours.
  - b) During the remaining 22 hours of this test, the EDG shall be loaded to an indicated 4150-4250 kw\*\*.
  - c) During this test the steady state voltage and frequency shall be maintained at  $7200 \pm 720$  volts and  $60 \pm 1.2$  Hz.
  - d) Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2.e.4.b.
8. Verifying that the auto-connected loads to each EDG do not exceed the 2000 hour rating of 4548 kw.
9. Verifying the EDG's capability to:
  - a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
  - b) Transfer its loads to the offsite power source, and
  - c) Be restored to its standby status.
10. Verifying that with the diesel generator operating in a test mode, connected to its bus, a simulated safety injection signal overrides the test mode by (1) returning the diesel generator to standby operation and (2) automatically energizes the emergency loads with offsite power.
11. Verifying that the fuel transfer pump transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross connection lines.
12. Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within  $\pm 10\%$  of its design interval.
13. Verifying that the following diesel generator lockout features prevent diesel generator starting only when required:
  - a. Barring Device
  - b. Remote-Local-Maintenance Switch

\*\*This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

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- f. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting the diesel generators simultaneously, during shutdown, and verifying that the diesel generators accelerate to at least 504 rpm in less than or equal to 10 seconds.
- g. At least once per 10 years by:
  - 1. Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite solution or its equivalent, and
  - 2. Performing a pressure test of those portions of the diesel fuel oil system designed to Section III subsection ND of the ASME Code at a test pressure equal to 110 percent of the system design pressure.

4.8.1.1.3 Reports - All diesel generator failures, valid or non-valid, shall be reported to the Commission in a Special Report pursuant to Specification 6.9.2 within 30 days. Reports of diesel generator failures shall include the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977. If the number of failures in the last 100 valid tests (on a per diesel generator basis) is greater than or equal to 7, the report shall be supplemented to include the additional information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

TABLE 4.8-1

DIESEL GENERATOR TEST SCHEDULE

<u>Number of Failures in Last 20 Valid Tests*</u>	<u>Number of Failures in Last 100 Valid Tests*</u>	<u>Test Frequency</u>
<u>≤1</u>	<u>≤4</u>	Once per 31 days
<u>≥2**</u>	<u>≥5</u>	Once per 7 days

\*Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, but determined on a per diesel generator basis.

For the purposes of determining the required test frequency, the previous test failure count may be reduced to zero if, in conjunction with the manufacturer a complete diesel overhaul to like-new conditions is completed, and if acceptable reliability has been demonstrated. The reliability criterion shall be the successful completion of 14 consecutive tests in a single series. Ten of these tests shall be in accordance with Surveillance Requirement 4.8.1.1.2.a.3 and 4.8.1.1.2.a.4; four tests, in accordance with Surveillance Requirement 4.8.1.1.2.d. If this criterion is not satisfied during the first series of tests, any alternate criterion to be used to transvalue the failure count to zero requires NRC approval.

\*\*The associated test frequency shall be maintained until seven consecutive failure free demands have been performed and the number of failures in the last 20 valid demands has been reduced to one.

## ELECTRICAL POWER SYSTEMS

### A.C. SOURCES

#### SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

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3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and the onsite Class 1E distribution system, and
- b. One diesel generator\* with:
  1. A day fuel tank containing a minimum volume of 300 gallons of fuel,
  2. A fuel storage system containing a minimum volume of 30,000 gallons of fuel, and
  3. A fuel transfer pump.

APPLICABILITY: MODES 5 and 6.

#### ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS positive reactivity changes, movement of irradiated fuel, or crane operation with loads over the fuel storage pool. In addition, when in MODE 5 with the Reactor Coolant loops not filled, or in MODE 6 with the water level less than 23 feet above the reactor vessel flange, immediately initiate corrective action to restore the required sources to OPERABLE status as soon as possible.

#### SURVEILLANCE REQUIREMENTS

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4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the Surveillance Requirements of 4.8.1.1.1, 4.8.1.1.2 (with the exception of 4.8.1.1.2.a.4) and 4.8.1.1.3.

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\*ESF load sequencer may be deenergized in Modes 5 and 6 provided that the loss of voltage and degraded voltage relays are disabled.

## 3/4.8 ELECTRICAL POWER SYSTEMS

### BASES

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#### 3/4.8.1, 3/4.8.2 AND 3/4.8.3 A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety related equipment required for 1) the safe shutdown of the facility and 2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix "A" to 10 CFR 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss of offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the surveillance requirements needed to demonstrate the OPERABILITY of the component.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods and 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, and 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979, as modified by the NRC's review and approval of South Carolina Electric & Gas Company's June 10, 1985 and December 6, 1985 amendment requests.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
SUPPORTING AMENDMENT NO. 77 TO FACILITY OPERATING LICENSE NO. NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-395

1.0 INTRODUCTION

By letter dated June 10, 1985, South Carolina Electric & Gas Company (SCE&G) requested changes to the Technical Specifications (TS) for the diesel generators (Section 3/4.8.1, AC Sources) at the Virgil C. Summer Nuclear Station, Unit No. 1. Based on staff comments and requests for additional information, SCE&G revised their original submittal in letters dated December 6, 1985, May 16, 1988, July 14, 1988, July 28, 1988 and November 18, 1988 and April 5, 1989.

In Amendment No. 50 to Facility Operating License NPF-12, the staff approved those portions of the technical specification changes that related to the reduction of the number of diesel generator cold fast starts as called for in Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability." The staff also approved administrative changes to regroup the surveillance requirements to clarify the requirements and increase their useability. The staff stated in its Amendment No. 50 Safety Evaluation (SE) that the remaining portion of the TS changes were still under review and would be addressed at a later date. The following evaluation addresses those remaining portions of the TS changes.

2.0 EVALUATION:

- (a) The proposed changes regroup the Action statements in Section 3.8.1.1 to clarify the requirements and increase their usability. The staff has reviewed these administrative changes to the TS and finds them acceptable.
- (b) Action statement 3.8.1.1.a.2 deletes the requirement to demonstrate the diesel generators operable for loss of an offsite circuit provided they have been successfully tested within the past 24 hours. The staff find this change reduces unnecessary testing and, thereby, the associated detrimental

effects of frequent starts and is, therefore, acceptable. This change is also in accordance with previously approved TS on North Anna.

- (c) Action statements 3.8.1.1.a.2, b.2, c.2, and d.1 expand the length of time allowed to demonstrate a diesel generator operable from 1 hour in all cases, to 8 hours for the loss of two power sources (offsite or onsite) and 24 hours for the loss of one power source. The requirement to retest at least once per 8 hours is also eliminated. The staff finds these changes provide sufficient time to perform an orderly start test on the DGs, reduce unnecessary testing and thereby the associated detrimental effects of frequent starts and are therefore acceptable. These changes are also in accordance with the guidance in Generic Letter 84-15 and with previously approved TS on North Anna.
- (d) Action statements 3.8.1.1.a.b.2 and c.2 eliminate the need to demonstrate the operability of a diesel generator when its redundant counterpart is inoperable due to preplanned testing or maintenance. The staff finds that this change reduces unnecessary testing and thereby the associated detrimental effects of frequent starts and is, therefore, acceptable. This change is also in accordance with previously approved TS on North Anna.
- (e) A footnote has been added to Action statements 3.8.1.1.b.2 and c.2 that requires that surveillance testing on a redundant diesel generator be completed regardless of when the inoperable diesel generator is restored to operability. The staff finds that this change ensures that both diesel generators are tested for common-mode failures which may have caused the initial inoperability of the first diesel generator. This change is acceptable and in accordance with previously approved TS on North Anna.
- (f) In Surveillance Requirements 4.8.1.1.2.a.4 and 4.8.1.1.2.d.2, the diesel generator loading requirements have been specified as an indicated loading band which extends up to the continuous rating of the diesel generator (e.g., "an indicated 4150-4250 kw" for the continuous rating of 4250kW). The diesel generator loading requirements in these surveillances were originally specified as "greater than or equal to 4250 kW." A new footnote has also been added to the loading band specified in these Surveillance Requirements which reads: "This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test." The staff has found that the open-ended language "greater than or equal to" that exists in the present technical specification has the potential for routine overloading of the diesel generators. The open-ended load requirement creates a situation wherein operators will tend to operate the diesel generators at a load for which the meter indicates a value greater than the specified value in order to avoid an enforcement action for an invalid test if the meter indication should slip below the specified value. Because routine overloading of the diesel generators should be avoided, and because the loading band

utilized is sufficiently narrow to ensure the machines are nominally loaded to their continuous rating, the staff finds these changes acceptable. The staff has also approved this type of change on North Anna and on near-term operating license reviews.

- (g) In Surveillance Requirement 4.8.1.1.2.e.2, the value of the load that must be rejected by the diesel generator has been changed from 830kW to 729kW. The purpose of this surveillance is to demonstrate that the diesel generator can reject a load equal to the value of the largest single emergency load while maintaining voltage and frequency within the specified band. As listed in the Virgil C. Summer Nuclear Station Final Safety Analysis Report, Table 8.3-3 (Channel A), the largest load is 729kW and is associated with the charging pump. Therefore, the staff considers this change acceptable.
- (h) In Surveillance Requirement 4.8.1.1.2.e.7, the various requirements of the surveillance have been separated into individual steps to improve clarity and useability. This administrative change is acceptable. In addition, the loading of the diesel generator to its continuous rating which is presently required to be "greater than or equal to 4250kW" is now specified to be a loading band of "4150-4250kW\*\*". Also, the loading of the diesel generator to its overload rating which is presently required to be "greater than or equal to 4676kW" is now specified as "an indicated target value of 4676kW (between 4600-4700kW\*\*)". The footnote associated with these loading bands is the same as that previously described in item (f) above. The staff finds the use of loading bands in this surveillance requirement is acceptable for the reasons discussed in item (f). In addition to the above changes, revised Surveillance Requirement 4.8.1.1.2.e.7 adds a provision to load the diesel generator to its continuous rating until engine temperature equilibrium has been established prior to loading it to its overload rating. This change is in accord with the provisions of NRC Regulatory Guide 1.9 and is therefore acceptable.
- (i) In the first footnote to Table 4.8-1 of the existing Summer TS, the discussion on the 14 consecutive reliability tests states that, "Ten of these tests shall be in accordance with Surveillance Requirement 4.8.1.1.2.a.3 ...." SCE&G has taken the present start and load surveillance (4.8.1.1.2.a.3) and separated it into a separate start surveillance (4.8.1.1.2.a.3) and separate load surveillance (4.8.1.1.2.a.4). The subject footnote was revised to read "Ten of these tests shall be in accordance with Surveillance Requirements 4.8.1.1.2.a.3 and 4.8.1.1.2.a.4 ....". The staff finds this change to the footnote acceptable.
- j) In the A.C. SOURCES, SHUTDOWN section of the proposed TS, a footnote, has been added to Limiting Condition for Operation (LCO), 3.8.1.2.b. The footnote reads, "ESF Load Sequencer may be deenergized in Mode 5 and 6." The LCO that the footnote applies to requires that one diesel generator be operable in modes 5 and 6. The addition of the footnote allows the load sequencer associated with that diesel generator to be inoperable in modes 5 and 6. In their original submittals SCE&G stated that, because the signals

that automatically start the diesel generator are not required to be operable in modes 5 and 6, to be consistent, this footnote is necessary to provide clarification for the determination of the diesel generator's operability in modes 5 and 6. The staff however was concerned that deenergization of the load sequencer without deactivation of the corresponding loss of power relays could result in abnormal response of the diesel generator to certain loss of power events. For instance, it appeared from review of the load sequencer and diesel generator breaker logic diagrams in the Summer SAR, that a trip of the offsite power breaker with the load sequencer deenergized and loss of power relays operable would result in the diesel generator picking up the previously energized loads as a block rather than sequentially. In order to prevent this kind of occurrence, the original proposal for the footnote should have read something to the effect that, "ESF Load Sequencer may be deenergized in Modes 5 and 6 provided the loss of voltage and degraded voltage relays are disabled". The staff discussed this concern with SCE&G and in an April 5, 1989 submittal, SCE&G proposed the above mentioned footnote to TS 3.8.1.2.b. The staff has reviewed the proposed change and finds it acceptable.

- (k) Existing surveillance requirement 4.8.1.2 stipulates that the A.C. electrical power sources required in the shutdown mode "be demonstrated operable by the performance of each of the Surveillance Requirements of 4.8.1.1.1, 4.8.1.1.2 (except for requirement 4.8.1.1.2.a.4) and 4.8.1.1.3." The licensee had proposed, prior to their April 5, 1989 submittal, that the surveillance requirement be changed to read "...be demonstrated OPERABLE by the performance or verification of each ...(with the exception of 4.8.1.1.2.a.4) and ...." The staff reviewed the proposed change and determined that the addition of the terminology "or verification" did not alter the meaning or intent of the present surveillance requirement nor did it enhance the surveillance requirement in any manner. The surveillance requirements associated with this proposed change, (4.8.1.1.1, 4.8.1.1.2, and 4.8.1.1.3) contain numerous instances where the action to be taken begins with the term "verifying". Modifying the existing surveillance requirement to add "or verification" seemed unnecessary. Therefore, the licensee modified the proposed surveillance requirements 4.8.1.2 to delete the terminology "or verification".

#### SUMMARY

The staff has reviewed the portions of the SCE&G requested changes to the diesel generator technical specifications at Summer not previously reviewed under Amendment No. 50 to Facility Operating License NPF-12, and finds them acceptable.

### 3.0 ENVIRONMENTAL CONSIDERATION\*

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. 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 off site, 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 Section 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.

### 4.0 CONCLUSION

The Commission has issued a "Notice of Consideration of Issuance of Amendment to Facility Operating License and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing" which was published in the FEDERAL REGISTER on July 17, 1985 (50 FR 29016), June 4, 1986 (51 FR 20373), August 24, 1988 (53 FR 32295), and April 26, 1989 (54 FR 18055) and consulted with the State of South Carolina. No public comments or requests for hearing were received, and the State of South Carolina did not have comments.

The staff 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, 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: May 30, 1989

AMENDMENT NO. 77 TO FACILITY OPERATING LICENSE NO. NPF-12 - SUMMER, UNIT NO. 1

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