

September 11, 1996

Mr. C. S. Hinnant, Vice President
Carolina Power & Light Company
H. B. Robinson Steam Electric Plant
Unit No. 2
3581 West Entrance Road
Hartsville, South Carolina 29550

SUBJECT: ISSUANCE OF AMENDMENT NO. 174 TO FACILITY OPERATING LICENSE NO. DPR-23 REGARDING EMERGENCY DIESEL GENERATOR SURVEILLANCE REQUIREMENTS - H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 (TAC NO. M94614)

Dear Mr. Hinnant:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 174 to Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR). This amendment changes the HBR Technical Specifications (TS) in response to your request dated January 30, 1996, as supplemented May 20, 1996.

The amendment revises the TS to: (1) add TS 4.6.1.5 to provide criteria for 24-hour full-load testing of the emergency diesel generators (EDGs) to be performed during each refueling outage; (2) revise TS 4.6.1.2 to allow testing of the EDG protective bypasses listed in TS 3.7.1.d to be done independent of the safety injection or loss of offsite power testing; and (3) revise TS 4.6.1.3 to include the EDG protective bypass inspection. Your request to change a requirement to inspect the EDGs "at each refueling" to read "at least once every refueling interval" is still under review and will be addressed separately.

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

Sincerely,

Original signed by:

Brenda L. Mozafari, Project Manager
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosures:

- 1. Amendment No. 174 to DPR-23
- 2. Safety Evaluation

cc w/enclosures:
See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-261

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 174
License No. DPR-23

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Carolina Power & Light Company (the licensee), dated January 30, 1996, as supplemented May 20, 1996, 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 3.B. of Facility Operating License No. DPR-23 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 174, are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

A E Edison for

Eugene V. Imbro, 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: September 11, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 174

FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

<u>Remove Pages</u>	<u>Insert Pages</u>
4.6-1	4.6-1
4.6-2	4.6-2
4.6-3	4.6-3
4.6-4	4.6-4

4.6 EMERGENCY POWER SYSTEM PERIODIC TESTS

Applicability

Applies to periodic testing and surveillance requirements of the emergency power system.

Objective

To verify that the emergency power system will respond promptly and properly when required.

Specification

The following tests and surveillance shall be performed as stated:

4.6.1 Diesel Generators

- 4.6.1.1 On a monthly basis, each diesel generator shall be tested by manually-initiated start, followed by manual synchronization with other power sources, and verification that each diesel generator is loaded and operates for ≥ 60 minutes at a load ≥ 2350 kW and ≤ 2500 kW.
- 4.6.1.2 Automatic start of each diesel generator, load shedding and restoration to operation of particular vital equipment, initiated by a simulated loss of all normal A-C station service power supplies together with a simulated safety injection signal. This test will be conducted at each refueling interval, to assure that the diesel generator will start and assume required load within 50 seconds after the initial starting signal.
- 4.6.1.3 Each diesel generator shall be inspected at each refueling. The diesel protective bypasses listed in Specification 3.7.1.d shall be demonstrated to be operable by simulating a trip signal to each of the trip devices that is bypassed and observing that the diesel does not receive a trip signal.
- 4.6.1.4 The following diesel generator load limits shall be observed:
- a. The continuous load rating for the diesel generator is 2500 kW. Continuous operation above this limit shall not be permitted, except as defined within Technical Specification 4.6.1.4.b.
 - b. The short-term, overload rating of the diesel generator is 2750 kW. Operation at this load shall not exceed 2 hours in any 24 hour period. Operation above the short-term, overload rating shall not be permitted.

4.6.1.5 At each refueling interval, each diesel generator shall be tested by manual-initiated start, followed by manual synchronization with other power sources, and verification that each diesel generator is loaded and operates for ≥ 24 hours. During two hours of this test, the load shall be maintained between 2650 kW and 2750 kW*. During the remaining 22 hours of this test, the load shall be maintained between 2400 kW and 2500 kW*. The power factor shall be maintained between 0.8 and 0.9 during the entire test.

4.6.2 Diesel Fuel Tanks

A minimum fuel oil inventory sufficient to ensure 19,000 gallons available to the diesel generators shall be maintained at all times in the Unit 2 diesel generator fuel oil storage tank and an additional 15,000 gallons available to the diesel generators shall be maintained at all times in either the Unit 1 I-C turbine fuel oil storage tanks or a combination of the Unit 1 I-C turbine fuel oil storage tanks and the Unit 2 diesel generator fuel oil storage tank.

4.6.3 Station Batteries

4.6.3.1 The voltage and temperature of a pilot cell in each battery shall be measured and recorded daily, 5 days/week.

4.6.3.2 The specific gravity and voltage to the nearest 0.01 volt, the temperature reading of every fifth cell, the height of electrolyte and the amount of water added to each cell shall be measured and recorded monthly.

4.6.3.3 Each battery shall be subjected to an equalizing charge annually. The requirements in 4.6.3.2 above shall be performed after each equalizing charge.

4.6.3.4 At each time data is recorded, new data shall be compared with old to detect signs of abuse or deterioration.

* The minimum and maximum kW values are included as guidance to avoid overloading of the engine. Loads in excess of this range for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate this test.

PAGE 4.6-2a HAS BEEN DELETED

4.6.3.5 The batteries shall be subjected to a performance test once every five years.

4.6.3.6 The batteries shall be subjected to a service test at least once per 18 months, during a shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the design duty cycle. Surveillance 4.6.3.5 may be performed at five year intervals in lieu of this test.

4.6.4 Pressurizer Heaters' Emergency Power Supply

The emergency power supply for the pressurizer heaters shall be demonstrated operable each refueling shutdown by transferring power from normal to the emergency power supply and energizing the heaters.

4.6.5 Battery Chargers

Demonstrate the in-service battery charger is operable by monitoring the output voltage daily, five days per week, and during normal equalizing charges.

Basis

The tests specified are designed to demonstrate that the diesel generators will provide power for operation of equipment. They also assure that the emergency generator system controls and the control systems for the safety features equipment will function automatically in the event of a loss of all normal 480 V AC station service power.⁽¹⁾

The test to ensure proper operation of engineered safety features upon loss of AC power is initiated by tripping the breakers supplying normal power to the 480 volt buses and initiating a safety injection signal. This test demonstrates the proper tripping of motor feeder breakers, main supply and tie breakers on the affected bus, operation of the diesel generators, and sequential starting of essential equipment.

Each unit as a backup to the normal standby AC power supply is capable of sequentially starting and supplying the power requirement of one complete set of safety features equipment. It can accept full load within 35 seconds after the initial starting signal,⁽¹⁾ and will sequentially start and supply the power requirements of one complete set of safety features equipment in 50 seconds.⁽²⁾

The 24 hour full-load test demonstrates the ability of the diesel generators to provide the necessary power to the emergency buses under accident loading conditions. The 2 hour portion of the testing at 110 percent of full-load encompasses the maximum expected analyzed load.

The testing shall be performed for a duration of not less than 24 hours which includes 2 hours at or up to 110 percent of the continuous duty rating of the generator in a 24 hour period. The remainder of the test shall be performed at a load equivalent to 100 percent of the continuous duty rating of the generator. The generator load shall be maintained at a power factor of 0.8 to 0.9 to ensure the diesel generator is tested under load conditions as close to design conditions as possible.

A supply of 19,000 gallons of fuel will ensure the operation of both diesels carrying rated design capacity for at least 48 hours or one diesel for at least 96 hours. An additional 15,000 gallons will be available to assure an adequate fuel supply for at least seven days of operation of a single diesel generator at its rated design capacity. Rated design capacity for this specification is defined as operation at 2500 kW for 22 hours and at 2750 kW for two hours in any 24-hour period.

Station batteries will deteriorate with time, but precipitous failure is extremely unlikely. The surveillance specified is that which has been demonstrated over the years to provide an indication of a cell becoming unserviceable long before it fails.

The equalizing charge, as recommended by the manufacturer, is vital to maintaining the ampere-hour capability of the battery. As a check upon the effectiveness of the equalizing charge, the battery should be loaded rather heavily and the voltage monitored as a function of time. Experience has shown that this test should be repeated at intervals to detect deterioration of cells.⁽³⁾⁽⁴⁾ If a cell has deteriorated or if a connection is loose, the voltage under load will drop excessively indicating replacement or maintenance.

References

- (1) FSAR Section 8.2
- (2) FSAR Table 8.2-4
- (3) AEC Information Letter ROE: 67-1, January 31, 1967.
- (4) FSAR Section 8.3.2



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 174 TO FACILITY OPERATING LICENSE NO. DPR-23
CAROLINA POWER & LIGHT COMPANY
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261

1.0 INTRODUCTION

By letter dated January 30, 1996, as supplemented May 20, 1996, the Carolina Power & Light Company (licensee) submitted a request for changes to the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR), Technical Specifications (TS). The requested changes would add a 24-hour full-load emergency diesel generator (EDG) testing provision, which will be performed at a refueling interval. The proposed TS amendment also (1) revises the EDG (protective) trip bypass testing provision, which is usually performed at each refueling outage during unit shutdown, to separate it from the current TS section and incorporate it into the EDG inspection section and (2) modifies the frequency of the EDG trip bypass test and the EDG inspection so that they can be performed on-line at each refueling interval. The request to change a requirement to inspect the EDGs "at each refueling" to read "at least once every refueling interval" is still under review and will be addressed separately at a future date. The May 20, 1996, letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

2.0 EVALUATION

Because EDGs provide the onsite AC standby power source to shutdown and maintain the reactor in a safe condition under a design basis accident (DBA), that is, a loss of coolant accident (LOCA) coincident with a loss of offsite power (LOOP) event, the EDG is among the most risk significant components in a nuclear power plant that affect the core damage frequency (CDF). To achieve low CDF, EDGs must maintain adequate reliability and availability levels. Each EDG at HBR consists of a 12-cylinder Fairbanks-Morse engine directly coupled to a Fairbanks-Morse 480-Vac generator. The EDGs are designed to start and attain rated speed (i.e., 900 rpm) and voltage within 10 seconds and assume the required loads automatically started during a safeguards actuation within 50 seconds.

The NRC staff has reviewed the proposed changes to TS Section 4.6.1. The evaluation of each of the proposed changes follows.

2.1 Revision of TS Section 4.6.1.2

Current TS Section 4.6.1.2 states:

Automatic start of each diesel generator, load shedding and restoration to operation of particular vital equipment, initiated by a simulated loss of all normal A-C station service power supplies together with a simulated safety injection signal. This test will be conducted each refueling interval, to assure that the diesel generator will start and assume required load within 50 seconds after the initial starting signal. During this test, the diesel protective bypasses listed in Specification 3.7.1.d shall be demonstrated to be operable by simulating a trip signal to each of the trip devices that is bypassed and observing that the diesel does not trip.

The EDG (protective) trip bypass test and the EDG safety injection (SI)/LOOP test were performed at each refueling outage when the unit was shutdown. The licensee proposes that the EDG trip bypass testing requirement be moved from the current TS Section 4.6.1.2 to Section 4.6.1.3. The proposed change will allow the EDG trip bypass test to be performed during an EDG outage.

The NRC staff has reviewed the improved standard TS (STS), NUREG-1431, for Westinghouse plants to evaluate whether the EDG trip bypass test and the EDG SI/LOOP test should be performed together, thus requiring them to be in the same TS section. The NRC staff finds that there is no basis for requiring these two tests to be performed together and to be located in the same TS sections. Because moving the EDG trip bypass test from the SI/LOOP testing provision section would not affect the ability of the EDGs to mitigate an accident, the NRC staff concludes that the licensee's proposed request is acceptable.

2.2 Revision of TS Section 4.6.1.3

With incorporation of the EDG (protective) trip bypass test into the EDG inspection section (i.e., TS Section 4.6.1.3), the licensee proposes to modify how EDG trips would be observed by changing the last clause of the EDG trip bypass testing provision from "observing that the diesel does not trip" to "observing that the diesel does not receive a trip signal." Thus, the new TS Section 4.6.1.3 would read as follows:

Each diesel generator shall be inspected at each refueling. During this test, the diesel protective bypasses listed in Specification 3.7.1.d shall be demonstrated to be operable by simulating a trip signal to each of the trip devices that is bypassed and observing that the diesel does not receive a trip signal.

The purpose of the EDG trip bypass test is to demonstrate that EDG non-critical protective features listed in TS Section 3.7.1.d (i.e., low lube oil pressure, low coolant pressure, high coolant temperature, high crankcase pressure, and engine start failure) are bypassed during a DBA, but EDG critical protective features (such as engine overspeed and generator differential) would trip the EDG to avoid substantial damage to the EDG. The design is based on logic that the EDG's availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not detrimental to emergency operation of the EDG. The non-critical trips are

bypassed during DBAs, but provide an alarm on an abnormal engine condition. The alarm provides the operator with sufficient time to react appropriately.

The testing of the EDG protective trip bypass is accomplished during an SI/LOOP test by a manual key-lock switch which is placed in "Trips Defeat" position to test the trip bypass feature. During monthly testing the switch is placed in "Trips in Service" position. When a jumper is placed across a set of contacts simulating a device actuation, the EDG shutdown relay should energize, but the EDG stopping relay should remain de-energized. The only difference between the proposed test and the testing during SI/LOOP test is an additional jumper, which is required across relay TD3 contacts 1/5 to simulate EDG operation. Therefore, with the requested TS change, the licensee will manually jumper TD3 Contacts 1/5 to simulate the EDG operation without actually running the EDG and observe that the EDG does not receive a trip signal when simulating each EDG protective trip device actuation. The NRC staff has reviewed the licensee's schematic diagram and its control logic for the EDG trip bypass test and finds that the proposed change will achieve the same result. Therefore, the NRC staff finds the proposed TS section 4.6.1.3 acceptable.

2.3 Addition of TS Section 4.6.1.5

The licensee proposes to add a new TS Section 4.6.1.5 for 24-hour full-load testing of the EDGs at a refueling interval, as no such requirement currently exists at HBR. The TS Section 4.6.1.5 states:

At each refueling interval, each diesel generator shall be tested by manually-initiated start, followed by manual synchronization with other power sources, and verification that each diesel generator is loaded and operates for ≥ 24 hours. During two hours of this test, the load shall be maintained between 2650 kW and 2750 kW*. During the remaining 22 hours of this test, the load shall be maintained between 2400 kW and 2500 kW*. The power factor shall be maintained between 0.8 and 0.9 during the entire test.

* The minimum and maximum kW values are included as guidance to avoid overloading of the engine. Loads in excess of this range for special testing under direct monitoring of the manufacturer or momentary variations due to changing bus loads shall not invalidate this test.

Section 2.2.9, "Endurance and Margin Test," of Regulatory Guide (RG) 1.9, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants," requires demonstrating the full-load carrying capability of the EDG at a power factor between .8 and .9 for an interval of not less than 24 hours, of which 2 hours are at a load equal to 105 to 110 percent of the continuous rating of the EDG, and 22 hours are at a load equal to 90 to 100 percent of its continuous rating.

Although the licensee has not committed to RG 1.9 to perform 24-hour full-load testing of the EDGs at HBR, the licensee proposes to add 24-hour full-load testing to demonstrate reliability of the EDGs and to ensure that the EDGs can

withstand accident loading conditions. In accordance with the latest EDG loading calculation, the maximum loading has been determined to be 2542 kW for EDG A and 2583 kW for EDG B. The NRC staff has reviewed the proposed TS Section 4.6.1.5 and its footnote and compared it with the improved STS. The NRC staff finds that it includes all the power factors and EDG loading conditions that are necessary to ensure that the EDG is tested under loading conditions that are as close to design conditions as possible and also includes the EDG loading ranges to avoid routine overloading of the EDG that could result in more frequent teardown inspections.

Since the proposed TS change is consistent with the recommendation provided in the RG and the improved STS, the proposed TS testing verifies the endurance of the EDGs and demonstrates its full-load carrying capability, and will not affect the ability of the EDG to perform its design function. On this basis, the NRC staff concludes that the proposed addition of TS Section 4.6.1.5 is acceptable.

2.4 Addition of Two Paragraphs to Basis Section 4.6.1, "Diesel Generators"

The licensee proposes to add paragraphs to the basis of TS Section 4.6.1.5 regarding the addition of the 24-hour full-load test and providing details of the EDG's loading values. The NRC staff has reviewed these paragraphs and finds that they provide an adequate basis for modifying TS 4.6.1.5. Thus, the NRC has no objection to the proposed TS basis change.

However, because the basis change to TS 4.6.1.2 involves a TS change still under active NRC review, it will be addressed separately.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of South Carolina official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes the Surveillance Requirements. The NRC 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 the amendment involves no significant hazards consideration, and there has been no public comment on such finding (61 FR 7546). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 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 the amendment.

5.0 CONCLUSION

The Commission 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, (2) such activities will be conducted in compliance with the Commission's regulations,

and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: P. Kang

Date: September 11, 1996

AMENDMENT NO. 174 TO FACILITY OPERATING LICENSE NO. DPR-23 - H. B. ROBINSON
STEAM ELECTRIC PLANT, UNIT NO. 2

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