October 3, 2001

Mr. James Scarola, Vice President
Shearon Harris Nuclear Power Plant
Carolina Power & Light Company
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New Hill, North Carolina 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 - ISSUANCE OF AMENDMENT REGARDING REVISION TO TECHNICAL SPECIFICATION 3/4.8.1 (TAC NO. MB0781)

Dear Mr. Scarola:

The Nuclear Regulatory Commission has issued Amendment No. 106 to Facility Operating License No. NPF-63 for the Shearon Harris Nuclear Power Plant, Unit 1, in response to your request dated December 14, 2000, as supplemented by letters dated August 16, and September 12, 2001. The amendment revises Technical Specification (TS) 3/4.8.1 "A. C. Sources - Operating." The amendment specifically revises TS Surveillance Requirement 4.8.1.1.2.f.7, the 24-hour emergency diesel generator endurance test, by removing the restriction to perform this surveillance during shutdown conditions.

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

Sincerely,

/RA/
N. Kalyanam, Acting Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-400

Enclosures:
1. Amendment No. 106 to NPF-63
2. Safety Evaluation

cc w/encls: See next page

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CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-400

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 106
License No. NPF-63

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Carolina Power & Light Company, (the licensee), dated December 14, 2000, as supplemented by letters dated August 16 and September 12, 2001, 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-63 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No. 106, are hereby incorporated into this license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/
Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 3, 2001

ATTACHMENT TO LICENSE AMENDMENT NO. 106

FACILITY OPERATING LICENSE NO. NPF-63

DOCKET NO. 50-400

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages	Insert Pages
3/4 8-6	3/4 8-6
3/4 8-7	3/4 8-7
3/4 8-8	3/4 8-8
3/4 8-9	3/4 8-9

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 106 TO FACILITY OPERATING LICENSE NO. NPF-63

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

1.0 INTRODUCTION

By letter dated December 14, 2000, as supplemented by letters dated August 16, and September 12, 2001, Carolina Power & Light Company (CP&L, the licensee) submitted a request for changes to the Technical Specifications (TS) for the Shearon Harris Nuclear Power Plant, Unit 1 (HNP). The requested change would amend the TS to remove the restriction on performing the 24-hour endurance run test of emergency diesel generators (EDGs) only during shutdown conditions. The purpose of the proposed change is to provide the licensee with greater flexibility in optimizing outage schedules and the use of resources while still protecting the health and safety of the public and station personnel. The supplements dated August 16, and September 12, 2001, provided clarifying information that did not change the scope of the December 14, 2000, application nor the initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

At present, the TS Surveillance Requirement (SR) 4.8.1.1.2.f.7 requires that operability of each EDG be determined every 18 months by performing a 24-hour endurance run test during shutdown. In order to obtain the required loading on the EDG for this test, the machine must be paralleled with the offsite power system. The requested change would remove the restriction on performing the test only during shutdown. Specifically, the proposed change would delete the words “during shutdown” from TS 4.8.1.1.2.f and add those same words to each of the individual surveillances under that TS, with the exception of the EDG 24-hour run test, TS SR 4.8.1.1.2.f.7.

The licensee states that the design of the EDG circuitry includes a direct trip of the EDG output breaker when an EDG is in the test mode and a loss of offsite power (LOOP) is detected by a LOOP relay. The LOOP relay will also trip the cross tie breaker between the non-safety bus and the safety bus that provides the normal and offsite power sources to the safety bus. The LOOP relay is actuated when:

- both of the incoming line breakers to the upstream non-safety bus open, or
- the incoming line breaker to the upstream non-safety bus from the startup transformer is open and the main generator lockout relay actuates.

In total, if the LOOP relay actuates during EDG testing the following actions occur:

- The non-safety bus and safety bus tie breaker and the EDG output breaker will trip.
- The EDG remains running, and the governor control transfers to “isochronous” mode from “droop” mode.
- The EDG protective trips (other than engine overspeed, generator differential relay action, generator bus fault, and loss of generator potential transformer circuit) are bypassed.
- Load shed of all breakers from the safety buses except the 6.9 kV breakers feeding the 480-volt power center transformers.
- The EDG output breaker closes.
- Emergency safeguards features sequenced loads connect.

If a safety injection actuation signal is received during EDG testing, the following actions will occur:

- The EDG breaker to the safety bus trips.
- The EDG protective trips (other than engine overspeed, generator differential relay action, generator bus fault, and loss of generator potential transformer circuit) are bypassed.
- The EDG remains running, and the governor control transfers to “isochronous” mode from “droop” mode.
- The offsite breaker remains connected to the bus per design, that is, load breakers if closed remain closed; otherwise, loads are sequenced to the bus.

3.0 EVALUATION

The staff previously evaluated for HNP the features identified above that separate the EDG from the test mode when it is being tested in parallel with the offsite power system, and found them acceptable ("Issuance of Amendment No. 72 to Facility Operating License No. NPF-63, Regarding Design Deficiency in the Protection Circuitry for Emergency Diesel Generators - Shearon Harris Nuclear Power Plant, Unit 1 (TAC No. M98193),” dated May 8, 1997). The staff has required that such features be included in EDG designs because plant TS require that EDGs be load tested on a monthly frequency (TS SR 4.8.1.1.2.a.5 at HNP), and these tests are allowed to be conducted at power with the EDG in parallel with offsite power. The staff believes that these tests conducted at power on a monthly frequency are necessary to ensure the continued reliability of the EDGs. The design features are necessary to ensure compliance with the requirement of General Design Criteria 17 that the probability of losing electric power from the plant generator, the offsite power system, or the onsite power system is minimized when power is lost from any one of the three. Because the monthly test is conducted with the EDG in parallel with the offsite power source, common cause loss of the EDG as a result of a LOOP could be greater without these design features in place. The design features also improve the availability of the EDGs for accidents.

The 24-hour endurance run EDG test that is the subject of the licensee’s amendment request is required by TS to be performed on a frequency (typically 18 months) that is consistent with the plant’s refueling outage. This allows the TS to require that the test be performed at shutdown, reducing the consequences of exposure to potential common cause effects associated with operating the EDG in parallel with the offsite system at power. The staff pursued additional questions on the capability of the EDG to separate from the test mode under a range of

conditions, since the licensee is asking that this test be performed at power in order to reduce burden and provide cost savings.

A drop in voltage at the HNP plant switchyard while the EDG is operating in parallel during the 24-hour test could result in excessive EDG armature or field current as the EDG produces reactive current in an attempt to support the voltage at the safety bus. Such a reduction of voltage could occur following a trip of the HNP generator when it is contributing to support of the switchyard voltage. This condition would not be detected by the LOOP relay described above.

The licensee, in its August 16, 2001, letter, described a 51V EDG (voltage-controlled overcurrent) relay that would provide some additional level of overload protection. The letter acknowledged, however, that the 51V setpoint calculation recognizes that, if the voltage does not decay to a level to trip the breaker, operator action may be required. In the letter, the licensee indicated that the EDGs are supplied with an overload alarm set to annunciate at 118 percent of EDG full-load amperage rating. There are also generator stator temperature alarms. The licensee stated that the operators will therefore be aware of any overload conditions and identified various plant procedures that provide precautions to the operators to ensure they are aware of conditions that could potentially result in overloading the EDG. Although the licensee's proposed actions appear reasonable, the staff asked the licensee to provide some probabilistic safety assessment (PSA) insights in order to address any increased risk associated with performing the 24-hour test at power in lieu of shutdown.

PSA Insights

In its letter dated September 12, 2001, the licensee proposes to present an upper bound on the risk impact of performing a 24-hour EDG run test at power by examining the risk impact of removing the EDG from service at power. The inability of the EDG to perform its required function is comprised of a failure to start unavailability and a failure to run unavailability over the required time. Generally in PRA, an EDG is required to operate up to 24 hours after a demand, and over this time period, the failure to start and the failure to run unavailability contributions are similar. If the EDG is already operating, the lack of the failure to start unavailability will offset the increased failure to run unavailability caused by the EDG running during the test time up to the demand, and then the following 24 hours. Therefore, the change in risk associated with allowing the 24-hour EDG being unavailable during the 24-hour run test at power provides an upper bound on the risk impact.

The licensee has calculated that, when the EDG is removed from service, the increase in core damage frequency is 4.0 E-7/r-yr and the increase in large early release frequency is 4.0 E-9/r-yr. These are well within the guidelines of Regulatory Guide (RG) 1.174, and are acceptable. The incremental conditional core damage probability is 2.88 E-7 and the incremental conditional large early release probability is 3.84 E-10. These are well within the guidelines of RG 1.177, and are acceptable.

External Events

The conclusion that the unavailability of the EDG to perform its required function during a 24-hour run test is similar to the unavailability of an operable stand-by EDG during external events. External events of sufficient magnitude to challenge plant mitigating systems tend to

be much less frequent than internal events, and therefore their risk contribution should be negligible and need not be estimated.

PSA Quality

In response to Generic Letter (GL) 88-20, “Individual Plant Examination for Severe Accident Vulnerabilities,” the licensee states that the HNP Individual Plant Examination (IPE) was submitted to the staff by letter dated August 20, 1993, with subsequent supplements. In its IPE Safety Evaluation Reports, the staff concluded that the study fully met the intent of GL 88-20. The IPE is a level 2 PSA and was the result of a joint utility/contractor effort, with Science Applications International Corporation, Safety and Reliability Optimization Services, Inc., and Gabor, Kenton, and Associates, Inc. being the principal contractors.

The HNP PSA model of record is an internal events model and includes the contribution from internal flooding. It utilizes a fault tree linking approach with small functional event trees and detailed, linked fault trees. The origin of the current model of record is the HNP IPE. Since the IPE submittal, the PSA model has been updated to reflect changes in plant configuration and to address changes in key plant component performance. The PSA is periodically updated in accordance with requirements set forth in CP&L procedure ADM-NGGC-0004 to incorporate any PSA-significant plant modifications, to update the plant-initiating event frequencies, and to incorporate component operating history for major components into the failure rate database. The HNP IPE model of 1993 was updated in 1995, 1997, 1998, and 2000 to reflect the changes made to the plant since the development of the submittal. A review of these updates by the licensee has identified the following significant changes to the model:

- LOCA-initiating event frequencies based on work developed by Electric Power Research Institute (EPRI) (EPRI Topical Report (TR)-102266, “Pipe Failure Study Update”) and plant-specific parameters were incorporated into the HNP PSA methodology.

- Transient-initiating event frequencies were updated to reflect the most recent operating experience through 1995.

- LOOP-initiating event analysis was updated as part of the transient event update by using EPRI TR-106306.

- Plant-specific data for major pumps and diesels were updated through a review of the operator logbooks and work tickets through October 1995.

- Added system fault trees for Demineralized Water and Main Feedwater/Condensate.

- Removed dependency of refueling water storage tank make-up (Demineralized Water) for small-break loss-of-coolant accidents in the May 1998 update.

- Incorporated new operator recovery actions, including the alignment of offsite ac breakers, alignment and restoration of alternative fuel oil supplies for the EDGs, alignment of swing standby pumps for component cooling water and high-head safety injection, and operator actuation of the essential service water system on failure of return valves.

- Incorporation of air compressor system modification and development of instrument air initiating event fault tree.

- Changes due to plant modifications and procedure revisions through May 2000 have also been incorporated into the model.

The licensee states that the PSA models are continually used and studied by plant PSA personnel in the performance of their duties. Electronic copies of the models are maintained in a controlled read-only server location. Potential model modifications/enhancements are captured in the corrective action program, evaluated, and maintained for further investigation and subsequent implementation, if necessary.

The HNP internal events PSA is scheduled to receive the Westinghouse Owner's Group Peer Review in June 2002. Erin Engineering and Research has, however, performed an independent documentation review of the HNP PSA in October 2000 based on the Nuclear Energy Institute PSA Peer Review Process Guidance. The review assessed the quality, scope, and technical adequacy of the existing PSA model to support PSA applications. The review concluded that "the Harris PSA is viewed as capable of supporting risk-informed applications."

4.0 SUMMARY

The staff finds that the risk of performing the EDG 24-hour run test at power is very slight, and is bounded by a 24-hour at-power out-of-service configuration. The staff therefore finds the EDG 24-hour run test at power to be acceptable.

5.0 STATE CONSULTATION

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

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes the Surveillance Requirements with respect to a facility component located within the restricted area as defined in 10 CFR Part 20. 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 (66 FR 7672). 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.

7.0 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.

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Date: October 3, 2001

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SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 - ISSUANCE OF AMENDMENT REGARDING REVISION TO TECHNICAL SPECIFICATION 3/4.8.1 (TAC NO. MB0781)

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Sincerely,
/RA/
N. Kalyanam, Acting Project Manager, Section 2
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Docket No. 50-400

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