March 30, 2006

Mr. Cornelius J. Gannon, Vice President Shearon Harris Nuclear Power Plant Carolina Power & Light Company Post Office Box 165, Mail Code: Zone 1 New Hill, North Carolina 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 - ISSUANCE OF

AMENDMENT REGARDING CONTAINMENT INTEGRATED LEAK RATE TEST

(TAC NO. MC6722)

Dear Mr. Gannon:

The Nuclear Regulatory Commission has issued Amendment No.122 to Facility Operating License No. NPF-63 for the Shearon Harris Nuclear Power Plant, Unit 1. This amendment changes the Technical Specifications (TS) in response to your application dated April 6, 2005, as supplemented by letters dated August 8 and December 9, 2005.

The amendment revises TS 6.8.4.k, "Containment Leakage Rate Testing Program" and TS Surveillance Requirement 4.6.1.6.1, "Containment Vessel Surfaces." Specifically, the amendment allows a one-time extension of the Appendix J to Part 50 of Title 10 of the *Code of Federal Regulation*, Type A, Containment Integrated Leak Rate Test interval from once in 10 years to once in 15 years.

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

Sincerely,

/RA/

Chandu P. Patel, Project Manager Plant Licensing Branch II-2 Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Docket No. 50-400

Enclosures:

- 1. Amendment No.122 to NPF-63
- 2. Safety Evaluation

cc w/enclosures: See next page Mr. Cornelius J. Gannon, Vice President Shearon Harris Nuclear Power Plant Carolina Power & Light Company Post Office Box 165, Mail Code: Zone 1 New Hill, North Carolina 27562-0165

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DATE	3/16/06	3/16/06	3/27/06	memo dated 9/19/05	memo dated 2/17/06	3/30/06

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-400

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 122 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 April 6, 2005, as supplemented by letters dated August 8 and December 9, 2005, 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.122, 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/

Michael L. Marshall, Jr., Branch Chief Plant Licensing Branch II-2 Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 30, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 122

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 6-8	3/4 6-8		
6-19c	6-19c		

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO AMENDMENT NO. 122 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 April 6, 2005, as supplemented by letters dated August 8 and December 9, 2005, the Carolina Power & Light Company (the licensee) submitted a request for changes to the Shearon Harris Nuclear Power Plant, Unit 1 (HNP), Technical Specifications (TS). The requested changes would revise TS 6.8.4.k, "Containment Leakage Rate Testing Program" and TS Surveillance Requirement (SR) 4.6.1.6.1, "Containment Vessel Surfaces." Specifically, the change would allow a one-time extension of the Appendix J, Type A, Containment Integrated Leak Rate Test (ILRT) interval from once in 10 years to once in 15 years.

The August 8, and December 9, 2005, supplemental letters provided additional information that did not change the initial proposed no significant hazards consideration determination.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," Option B, "Performance Based Requirements," requires that a Type A test be conducted at a periodic intervals based on historical performance of the overall containment system. HNP TS 6.8.4.k, "Containment Leakage Rate Testing Program," requires that leakage rate testing be performed as required by 10 CFR Part 50, Appendix J, Option B, as modified by approved exemptions, and in accordance with the guidelines contained in Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995, with an exception that is noted in the TS. This RG endorses, with certain exceptions, Nuclear Energy Institute (NEI) Report NEI 94-01, Revision 0, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," dated July 26, 1995.

A Type A test is an overall (integrated) leakage rate test of the containment structure.

NEI 94-01 specifies an initial test interval of 48 months, but allows an extended interval of 10 years, based upon two consecutive successful tests. There is also a provision for extending

the test interval an additional 15 months in certain circumstances. The most recent two Type A tests at HNP have been successful, so the current interval requirement is 10 years.

The licensee is requesting a change to TS 6.8.4.k that would add an additional exception from the guidelines of RG 1.163 and NEI 94-01, Revision 0, regarding the Type A test interval. Specifically, the exception states that the first Type A test performed after the May 23, 1997, Type A test will be performed no later than May 23, 2012.

The local leakage rate tests (Type B and Type C tests), including their schedules, are not affected by this request.

3.0 TECHNICAL EVALUATION

3.1 Background

HNP is a pressurized-water reactor with a large steel-lined reinforced concrete structure. The containment consists of a pressure-retaining structural shell with numerous penetrations (access penetrations, process piping and electrical penetrations). The basic structural elements of the containment structure are the basemat, cylinder wall and steel-lined dome. The primary function of the liner is to serve as a leak-tight membrane. The integrity of the penetrations is verified through Type B and Type C local leak rate tests as required by 10 CFR Part 50, Appendix J, and the overall integrity of the containment structure is verified through an ILRT (Type A test). These tests are performed to verify the essentially leak-tight characteristics of the containment structure at the design basis accident pressure.

Currently HNP TS 6.8.4.k requires that the next Type A test be performed within 10 years from the performance of the previous Type A test based on the successful performance of the previous Type A tests. Three consecutive periodic Type A tests have been satisfactorily completed at HNP on October 25, 1989, September 21, 1992 and May 23, 1997, respectively. Currently the 10-year interval for the completion of the next HNP Type A test ends May 23, 2007. Therefore, the current HNP TS 6.8.4.k requires that the next Type A test be performed by May 23, 2007. The proposed change will require performance of the next HNP Type A test no later than May 23, 2012.

This evaluation discusses the acceptability of the licensee's procedures and activities that would ensure the containment structural integrity by managing the aging degradation of the containment pressure boundary components. These activities are directly related to the proposed one-time TS amendment to extend the test interval for performing the containment ILRT from the currently required 10 years to 15 years.

3.2 Inservice Inspection Program and Engineering Evaluation

The current HNP TS SR 4.6.1.6.1 requires that beside the visual inspection of the accessible interior and exterior surfaces of the containment vessel prior to a Type A test, additional inspections shall be performed during two other refueling outages before the next Type A test if the interval for the Type A test has been extended to 10 years. The proposed change revises TS SR 4.6.1.6.1 to specify that the additional inspections will be performed in accordance with Subsections IWE and IWL of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Section XI, which provide the requirements approved by

the Nuclear Regulatory Commission (NRC) for containment vessel inspections. The licensee indicated that this proposed change does not alter the number of the visual inspections of the containment exposed accessible interior surface (i.e., metal liner) from three inspections in a 10-year interval. This proposed change may reduce the number of the visual inspections of the containment exposed accessible exterior surface (i.e., concrete), depending on the scheduling of IWL inspections (i.e., from three inspections to two inspections in a 10-year interval), but this number of inspections corresponds with the schedule required by the IWL program approved by the ASME Code, Section XI and the NRC. The proposed change to HNP TS SR 4.6.1.6.1 is intended to specify the program designated to perform additional visual inspections and to remove reference to an extended 10-year interval.

The licensee has proposed the one-time extension of the containment Type A test interval based on the satisfactory results from previous Type A tests, continued satisfactory results from Type B and Type C Local Leak Rate Tests, containment inspections, and risk informed analysis performed in accordance with Regulatory Guide 1.174. The licensee also stated that the existing Type B and Type C containment penetration testing program will continue to be performed in accordance with 10 CFR Part 50 Appendix J, Option A.

HNP has fully implemented Subsection IWE and IWL programs, and expedited examinations for the first period (9/9/1998 - 9/8/2001) of the program interval (9/9/1998 - 9/8/2008) have been completed. General visual examination of 100 percent of the accessible surfaces of the reactor containment vessel liner (pressure boundary) and the reinforced concrete exterior (structural integrity) were conducted between 2000 and 2001 in accordance with the 1992 Edition (with 1992 Addenda) of the ASME Code for Subsections IWE and IWL and no recordable conditions were found. The licensee stated that no areas exist that are currently categorized as Examination Category E-C for augmented examinations as require per IWE-1240.

During its review, the NRC staff asked the licensee to provide more information about its experience related to corrosion in the containment liner and the corrective actions taken to ensure that the containment structural and leak-tight integrity will be maintained. In its response dated August 8, 2005, the licensee stated that HNP has established a Containment Liner Inspection Program to satisfy the provisions of 10 CFR 50.55a associated with ASME Code, Section XI (1992 Edition with 1992 Addenda). HNP has also established a Coatings Program to monitor, control, maintain, and improve the condition of Service Level I protective coatings inside the containment. These programs ensure that the integrity of the containment liner is maintained and conditions that could lead to degradation are promptly identified and corrected. When HNP has identified light surface corrosion, it has been inspected and evaluated, and qualified coatings have been restored.

On the basis of its review of the information provided by the licensee, the NRC staff finds that HNP's IWE and IWL programs will maintain the structural integrity of the HNP containment. The staff concludes that the licensee has adequate procedures to examine and monitor the structural integrity of the containment at HNP. The staff finds the revised TS SR 4.6.1.6.1 acceptable.

3.3 Risk Assessment

The licensee has performed a risk impact assessment of extending the Type A test interval to 15 years. In performing the assessment, the licensee considered the guidelines of NEI 94-01, the methodology used in Electric Power Research Institute (EPRI) Research Project Report TR-104285, "Risk Impact Assessment of Revised Containment Leak Rate Testing Intervals," and RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."

The basis for the current 10-year test interval is provided in Section 11.0 of NEI 94-01, Revision 0, and was established in 1995 during the development of the performance-based Option B to Appendix J. Section 11.0 of NEI 94-01 states that NUREG-1493, "Performance-Based Containment Leak-Test Program," provided the technical basis to revise leakage rate testing requirements contained in Option B to Appendix J. The basis consisted of qualitative and quantitative assessments of the risk impact (in terms of increased public dose) associated with a range of extended leakage rate test intervals. To supplement this basis, industry undertook a similar study. The results of that study are documented in EPRI Research Project Report TR-104285.

The EPRI study used an analytical approach similar to that presented in NUREG-1493 for evaluating the incremental risk associated with increasing the interval for Type A tests. The Appendix J, Option A, requirements that were in effect for HNP early in the plant's life required a Type A test frequency of three tests in 10 years. The EPRI study estimated that relaxing the test frequency from three tests in 10 years to one test in 10 years would increase the average time that a leak that was detectable only by a Type A test goes undetected from 18 to 60 months. Since Type A tests only detect about 3 percent of leaks (the rest are identified during local leak rate tests based on industry leakage rate data gathered from 1987 to 1993), this results in a 10-percent increase in the overall probability of leakage. The risk contribution of pre-existing leakage for the pressurized-water reactor and boiling-water reactor representative plants in the EPRI study confirmed the NUREG-1493 conclusion that a reduction in the frequency of Type A tests from three tests in 10 years to one test in 20 years leads to an "imperceptible" increase in risk that is on the order of 0.2 percent and a fraction of one person-rem per year in increased public dose.

Building upon the methodology of the EPRI study, the licensee assessed the change in the predicted person-rem per year frequency. The licensee quantified the risk from sequences that have the potential to result in large releases if a pre-existing leak were present. Since the completion of the Option B rulemaking in 1995, the staff has issued RG 1.174 on the use of PRA in evaluating risk-informed changes to a plant's licensing basis. The licensee has proposed using RG 1.174 guidance to assess the acceptability of extending the Type A test interval beyond that established during the Option B rulemaking.

RG 1.174 defines very small changes in the risk-acceptance guidelines as increases in core damage frequency (CDF) of less than 10⁻⁶ per year and increases in large early release frequency (LERF) of less than 10⁻⁷ per year. Since the Type A test does not impact CDF, the relevant criterion is the change in LERF. The licensee has estimated the change in LERF for the proposed change and the cumulative change from the original frequency of three tests in a 10-year interval. RG 1.174 also discusses defense-in-depth and encourages the use of risk analysis techniques to help ensure and show that key principles, such as the defense-in-depth

philosophy, are met. The licensee estimated the change in the conditional containment failure probability for the proposed change to demonstrate that the defense-in-depth philosophy is met.

The licensee provided the analyses, as discussed below. The following comparisons of risk are based on a change in test frequency from three tests in 10 years (the test frequency under Appendix J, Option A) to one test in 15 years. This bounds the impact of extending the test frequency from one test in 10 years to one test in 15 years. The following conclusions can be drawn from the analysis associated with extending the Type A test frequency:

- 1. Given the change from a three in 10-year test frequency to a one in 15-year test frequency, the increase in the total integrated plant risk is estimated to be approximately 0.1 person-rem per year. This increase is comparable to that estimated in NUREG-1493, where it was concluded that a reduction in the frequency of tests from three in 10 years to one in 20 years leads to an "imperceptible" increase in risk. Therefore, the increase in the total integrated plant risk for the proposed change is considered small and supportive of the proposed change.
- 2. The increase in LERF resulting from a change in the Type A test frequency from the original three in 10 years to one in 15 years is estimated to be 1.25 x 10^{-7} per year based on the internal events PRA, and 1.45 x 10^{-7} per year when external events (fire and seismic) are included. The licensee provided a further evaluation of the major contributors to LERF, specifically, events with loss of the alternating current power system and a reactor coolant pump seal loss-of-coolant accident, and determined that given a more realistic assessment of the recovery of ac power, the increase in LERF would be further reduced by about 70 percent. The staff did not credit this further evaluation in its review. There is also some likelihood that the flaws in the containment estimated as part of the Class 3b frequency would be detected as part of the IWE/IWL visual examination of the containment surfaces (as identified in ASME Code, Section XI, Subsections IWE/IWL). Visual inspections are expected to be effective in detecting large flaws in the visible regions of containment, and this would reduce the impact of the extended test interval on LERF. The licensee's risk analysis considered the potential impact of age-related corrosion/degradation in inaccessible areas of the containment shell on the proposed change. The increase in LERF associated with corrosion events is estimated to be approximately 1 x 10⁻⁸ per year.

When the calculated increase in LERF is in the range of 10⁻⁷ per year to 10⁻⁶ per year, applications are considered if the total LERF is less than 10⁻⁵ per year. Based on information provided by the licensee, the total LERF for internal and external events (without the requested change) is approximately 4 x 10⁻⁶ per year. Thus, the total LERF including the requested change would remain below 10⁻⁵ per year. The staff concludes that increasing the Type A interval to 15 years results in only a small change in LERF and is consistent with the acceptance guidelines of RG 1.174.

3. RG 1.174 also encourages the use of risk analysis techniques to help ensure and show that the proposed change is consistent with the defense-in-depth

philosophy. Consistency with the defense-in-depth philosophy is maintained if a reasonable balance is preserved between prevention of core damage, prevention of containment failure, and consequence mitigation. The licensee estimates the change in the conditional containment failure probability to be an increase of approximately one percentage point for the cumulative change of going from a test frequency of three in 10 years to one in 15 years. The staff finds that the defense-in-depth philosophy is maintained based on the small magnitude of the change in the conditional containment failure probability for the proposed amendment.

Based on these conclusions, the staff finds that the increase in predicted risk due to the proposed change is within the acceptance guidelines while maintaining the defense-in-depth philosophy of RG 1.174 and, therefore, is acceptable.

3.4 Summary

Based on the foregoing evaluation, the staff finds that the interval until the next Type A test at HNP may be extended to 15 years, and that the proposed change to that effect in TS 6.8.4.k, "Containment Leakage Rate Testing Program," is acceptable. Therefore, granting of a one-time 5-year extension to the current 10-year test interval for the ILRT as proposed by the licensee in Section 6.8.4.k of the proposed TS amendment request is acceptable.

4.0 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.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and 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 (70 FR 59084). 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.

6.0 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 Contributors: Ashar

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Date: March 30, 2006

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