September 16, 2002

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

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT UNIT 2 - ISSUANCE OF AMENDMENT - TECHNICAL SPECIFICATION CHANGE REGARDING ONE-TIME EXTENSION OF CONTAINMENT TYPE A TEST INTERVAL, H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 (TAC NO. MB4658)

Dear Mr. Moyer:

The Commission has issued the enclosed Amendment No. 193 to Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBRSEP2). This amendment consists of changes to the Technical Specifications (TS) in response to your application dated March 26, 2002, as supplemented by letters dated June 19, and August 8, 2002.

The amendment to the TS for HBRSEP2 modifies TS Surveillance Requirement 5.5.16, "Containment Leakage Rate Testing Program," to require the performance of a Type A test within 12.1 years from the last Type A test, which was performed on April 9, 1992. This is a one-time extension to the 10-year performance-based Type A test interval based on an acceptably low level of risk as supported by a plant-specific risk assessment.

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

Sincerely,

/RA/

Ram Subbaratnam, Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosures:
1. Amendment No. 193 to License No. DPR-23
2. Safety Evaluation

cc w/encls: See next page

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TS Page: ML022660140 & Package: ML022690760
Amendment: ML022690765 *Staff SE

PM:PDII-S2	Intern:PDII/S2	LA:PDII-S2	SPSB:DSSA*	EMEB:DE*	OGC	SC:PDII-2(A)
RSubbaratnam	MMcConnell	EDunnington			RHoefling	KJabbour
09/14/02	09/14/02	09/14/02	08/29/02	7/31/02	9/11/02	09/12/02
Yes/No	Yes/No	Yes/No			Yes/No	Yes/No

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AMENDMENT NO. 193TO FACILITY OPERATING LICENSE NO. DPR-23 - H. B. Robinson, UNIT 2

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CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-261

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

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 193
License No. DPR-23

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

   A. The application for amendment filed by Carolina Power & Light Company (CP&L, the licensee), March 26, 2002, and supplemented by letters dated June 19, and August 8, 2002, 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. DPR-23 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 193 , 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 its date of issuance and shall be implemented within 45 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Kahtan N. Jabbour, Acting 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: September 16, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 193

FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove Page	Insert Page
5.0-24	5.0-24

SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

TECHNICAL SPECIFICATION CHANGE REQUEST TO ONE-TIME EXTENSION OF

APPENDIX J, TYPE A INTEGRATED LEAK RATE TEST INTERVAL

H. B. ROBINSON, UNIT 2

DOCKET NO. 50-261

1.0 INTRODUCTION

By letter dated March 26, 2002, as supplemented by letters dated June 19, and August 8, 2002, the Carolina Power & Light Company (CP&L), the licensee for the H. B. Robinson Steam Electric Plant, Unit 2 (HBRSEP2), requested a change to Section 5.5.16, "Containment Leakage Rate Testing Program," of the Technical Specifications (TS). This change would allow the licensee to extend its Appendix J, Type A, Containment Integrated Leak Rate Test (ILRT), Option B of HBRSEP2 from the scheduled October 2002 timeframe to no later than May 2004. The TS change is requested based on a risk-informed approach developed using the guidelines in Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis." The supplemental letters dated June 19, and August 8, 2002, contained clarifying information only, and did not change the initial proposed no significant hazards consideration determination or expand the scope of the initial application.

This Safety Evaluation addresses age-related degradation of the containment pressure boundary as it relates to a proposed TS amendment, which would provide a one-time extension of the containment ILRT interval from 10 years to 12.1 years. The proposed change is supported by a plant-specific risk assessment.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix J, Option B requires that a Type A test be conducted at a periodic interval based on historical performance of the overall containment system. HBRSEP2 TS 5.5.16 requires that containment 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 RG 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995. This RG endorses, with certain exceptions, 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 HBRSEP2 have been successful, so the current interval requirement is 10 years.

The licensee is requesting additions to TS 5.5.16 that would indicate that they are allowed to take an exception from the guidelines of RG 1.163 regarding the Type A test interval. Specifically, the proposed TS states that the first Unit 2 Type A test performed after the April 9, 1992, Type A test shall be performed no later than May 2004.

3.0 TECHNICAL EVALUATION

3.1 Inservice Inspection Program

HBRSEP2 is a Westinghouse pressurized-water reactor. The containment pressure boundary structure is dry, post-tension, steel-lined concrete vertical cylinder with a hemispherical dome, containment access penetrations, process piping, and electrical penetrations. The integrity of the penetrations is verified through Type B and Type C local leak rate tests (LLRTs) as required by 10 CFR Part 50, Appendix J. The overall integrity of the containment structure is verified through an ILRT. These tests are performed to verify the essentially leaktight characteristics of the containment structure at the design-basis accident pressure. As stated in the request, HBRSEP2's last two successful Type A tests were completed on April 8, 1987, and April 9, 1992. Based on the last two successful Type A tests at HBRSEP2 and the requirements of 10 CFR Part 50, Appendix J, Option B, the current testing interval is 10 years. With the requested 2.1 year extension (from 10 to 12.1 years) of the ILRT time interval, the licensee proposed that the next overall verification of the containment leaktight integrity will be performed no later than May 2004. Because the leak rate testing requirements (ILRT and LLRT) of 10 CFR Part 50, Appendix J, Option B and the containment inservice inspection (ISI) requirements mandated by 10 CFR 50.55a complement each other in ensuring the leaktightness of the pressure boundary and the structural integrity of the containment, the licensee, in its request, provided information related to the ISI of the containment and potential areas of weakness in the containment that may not be apparent in the risk assessment. The licensee also provided information to explicitly address staff questions raised during its review. The staff's evaluation of the licensee's responses to these questions is discussed in the following paragraphs.

Regarding the ISI performed on the containment, CP&L stated that a Containment Inspection Program has been implemented in conformance with 10 CFR 50.55a(g)(6)(ii)(B). The Containment Inspection Program has been established, in accordance with Subsections IWE and IWL of the American Society of Mechanical Engineers (ASME) Code, Section XI, 1992 Edition through the 1992 Addenda, including the NRC-approved request for relief from certain Code requirements, to assure detection of deterioration affecting containment integrity. The first interval of the HBRSEP2 Containment Inspection Program began September 1998, and ends in September 2008. 10 CFR 50.55a(g)(6)(ii)(B) required that expedited examinations of the containment be completed by September 9, 2001. Visual examinations of the containment structure were conducted on 100 percent of the accessible surfaces between 1998 and 2001, and were performed to meet the requirements of ASME Section XI, Subsections IWE and IWL. These examinations consisted of a general visual examination of the accessible areas of the containment vessel liner (Pressure Boundary) for IWE and the reinforced concrete exterior (Structural Integrity) for IWL. Although the containment vessel liner between the floor and the containment vessel dome is insulated and not typically accessible, numerous sections of the insulation were removed over the last three refueling outages, which allowed VT-3 examinations of portions of the containment vessel liner. RG 1.163, Regulatory Position C.3,

specifies that examinations of the accessible surfaces of the containment for detection of structural problems should be conducted prior to initializing a Type A test and during two other outages before the next Type A test if the interval for the Type A test has been extended to 10 years, in order to allow for early detection of evidence of structural deterioration. The visual examinations have been completed with no significant defects noted.

In accordance with IWE-1240, an engineering evaluation was developed to determine which containment surface areas required augmented examinations. The only component categorized as Category E-C (augmented examination) at HBRSEP2, was the equipment hatch cylinder. In 1999, during Refueling Outage (RO)-19, corrosion was observed on a small area of the bottom of the interior portion of the cylinder. The bottom portion of this equipment hatch was categorized as augmented because a majority of this portion of the cylinder is insulated and not visible. The insulation was removed to allow examination of the bottom portion of the cylinder interior in 2000, during RO-20. The evaluation of the identified areas indicated the following:

a. The maximum amount of corrosion observed on the cylinder that has a 1" nominal thickness was 1/16".

b. The maximum amount of corrosion observed on the cylinder that has a 3-1/2" nominal thickness was 5/16".

This degradation was determined to be acceptable without repair. From the discussion above, the staff finds that the licensee's ISI program, including areas of augmented inspections, will provide adequate assurance that the containment structural integrity will be maintained during the extended ILRT period.

With regard to the issue related to the ISI of seals, gaskets, and examination and testing of bolts associated with the primary containment pressure boundary (Examination categories E-D and E-G), the licensee stated that the Type B and Type C tests concerning the seals, gaskets, and bolts are currently, and will be, performed in accordance with 10 CFR Part 50, Appendix J, Option A at each refueling outage as required by TS 5.5.16. Thus, the one-time extension requested for Type A testing does not affect the frequency at which the Type B and Type C tests will be performed. The staff finds that the licensee's ISI program for seals, gaskets, and bolted connections provides reasonable assurance that the integrity of the containment pressure boundary will be maintained.

With regard to the integrity of the two-ply stainless steel bellows, the licensee stated that the evaluation of this issue, as supported by NRC Information Notice 92-10, "Inadequate Local Rate Testing," for HBRSEP2 dated May 6, 1993, determined that the Type B testing issue for two-ply stainless steel bellows was not applicable to HBRSEP2. The routine penetration sleeve testing is performed from outside of containment via test connections that are installed into the sleeve end plate such that the entire sleeve, including bellows, is tested as one unit. There have been no known occurrences of excessive leakage identified during the Type A test that had not been identified by the Type B test. In summary, this issue does not apply to the HBRSEP2 containment.

The ILRT helps to identify areas of through-wall degradation when the containment vessel is pressurized. The staff requested that the licensee address how the potential leakage due to age-related degradation in the uninspectable areas (areas that cannot be visually examined)

were considered in the risk assessment of the extended ILRT. This assessment, as stated by the licensee, provides a conservative evaluation of the change in likelihood of detecting liner corrosion due to extending the ILRT. The likelihood was then used to determine the resulting change in risk. The following issues were addressed:

1. Differences between the containment basemat and the containment cylinder and dome.

2. The historical line flaw likelihood due to concealed corrosion.

3. The impact on aging.

4. The liner corrosion leakage dependency on containment pressure.

5. The likelihood that visual inspections will be effective at detecting a flaw.

The licensee incorporated the potential for liner corrosion from the uninspectable side of the liner in its risk assessment using the following assumptions:

1. A half failure is assumed for basemat concealed liner corrosion due to the lack of identified failures.

2. The success data was limited to 5.5 years. Although it has been 5.75 years since September 1996, when 10 CFR 50.55a started requiring visual inspection, the use of 5.5 years is considered to be a conservative assumption. Additional success data was not used to limit the aging impact of this corrosion issue, even though inspections were being performed prior to this date, and there is no evidence that liner corrosion issues were identified.

3. The liner flaw likelihood is assumed to double every 5 years. This is based solely on judgment and is included in this assessment to address the increased likelihood of corrosion as the liner ages.

4. The likelihood of the containment atmosphere reaching the outside atmosphere given a liner flaw is a function of the pressure inside the containment. Even without the liner, the containment is an excellent barrier. However, as pressure increases inside containment, cracks will form. If a crack occurs in the same region as a liner flaw, the containment atmosphere can communicate to the outside atmosphere. At low pressures, this crack formation is extremely unlikely. Near the point of containment failure, crack formation is virtually guaranteed. Anchored points of 0.1 percent at 20 psia and 100 percent at 145 psia were selected. Intermediate failure likelihoods are determined through interpolation.

5. The likelihood of leakage (due to crack formation) in the basemat region is considered to be 10 times less likely than the containment cylinder and dome regions.

6. Nondetectible containment overpressurization failures are assumed to be large early releases. This approach avoids a detailed analysis of containment failure timing and operator recovery actions.

The assessment results show that the risk of extending the ILRT from 10 years to 12.1 years is small.

Based on the staff's review of the information provided in the TS change request, and on the licensee's responses to the five questions, the staff finds that:

1. The structural integrity of the containment vessel is verified through the periodic ISI conducted as required by Subsections IWE and IWL of the ASME Code, Section XI.

2. The integrity of the penetrations and containment isolation valves are periodically verified through Type B and Type C tests as required by 10 CFR Part 50, Appendix J, Option A and HBRSEP2 TS.

3. The potential for large leakage from the areas that cannot be examined by ISI has been explicitly modeled in performing the risk assessment.

In addition, the system pressure tests for containment pressure boundary (Appendix J tests) are required to be performed following repair and replacement activities, if any, in accordance with Article IWE-5000 of the ASME Code, Section XI. Also, significant degradation of the primary containment pressure boundary is required to be reported under 10 CFR 50.72 and 10 CFR 50.73.

3.2 Risk Assessment

In addition to the structural integrity arguments as stated above, the licensee has performed a risk impact assessment of extending the Type A test interval to 12.1 years. The assessment was provided to the staff in the March 26, 2002, application for license amendment. Additional analysis and information were provided by the licensee in letters dated June 19, 2002, and August 8, 2002. In performing the risk assessment, the licensee considered the guidelines of NEI 94-01, the methodology used in EPRI TR-104285, "Risk Impact Assessment of Revised Containment Leak Rate Testing," 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 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," September 1995, provided the technical basis to support rulemaking 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 the NRC's rulemaking basis, NEI 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 EPRI study estimated that relaxing the test frequency from 3 in 10 years to 1 in 10 years will increase the average time that a leak 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, in percent of person-rem/year, for the pressurized-water reactor and boiling-water reactor representative plants confirmed the NUREG-1493 conclusion that a reduction in the frequency of Type A tests from 3 per 10 years to 1 per 10 years leads to an "imperceptible" increase in risk ranging from 0.02 to 0.14 percent.

Building upon the methodology of the EPRI study, the licensee assessed the change in the predicted person-rem/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 Option B rulemaking in 1995, the staff has issued RG 1.174 on the use of probabilistic risk assessment in risk-informed changes to a plant's licensing basis. The licensee has proposed using RG 1.174 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) less than 10^{-6} per reactor year and increases in large early release frequency (LERF) less than 10^{-7} per reactor 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 3 in 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 an analysis that estimated all of these risk metrics and whose methodology is consistent with previously approved submittals. The following conclusions can be drawn from the analysis associated with extending the Type A test frequency:

- A slight increase in risk is predicted when compared to that estimated from current requirements. Given the change from a 10-year test interval to a 15-year test interval, the increase in the total integrated plant risk, in person-rem/year, is estimated to be 0.05 percent. The increase in the total integrated plant risk, given the change from a 3 in 10 year test interval to a 15-year test interval, was 0.1 percent. NUREG-1493 concluded that a reduction in the frequency of tests from 3 per 10 years to 1 per 10 years leads to an "imperceptible" increase in risk, ranging from 0.02 to 0.14 percent. Therefore, the increase in the total integrated plant risk for the proposed change is considered small and supportive of the proposed change.

- Rather than calculating the LERF impact for a 15-year test interval, the licensee chose to reduce its requested interval to 12.1 years so as to ensure that the LERF impact would be small. The increase in LERF resulting from a change in the Type A test interval from the original 3 in 10 years to 1 in 12.1 years is estimated to be 2×10^{-7}/year.

  However, there is some likelihood that the undetected flaw in the containment liner estimated as part of the Class 3b frequency would be detected as part of the IWE visual examination process of the containment liner. Visual examinations of the containment structure were conducted on 100 percent of the accessible surfaces between 1998 and 2001, and were performed to meet the requirements of ASME Section XI, Subsections IWE and IWL. Twenty-two percent of the inner containment liner can be visually inspected. Assuming the visual inspections are capable of detecting large flaws in the visible regions of the containment, then the increase in

LERF would go from 2 x 10^{-7}/year to 1 x 10^{-7}/year. Therefore, increasing the Type A test interval to 12.1 years is considered to be a very small change in LERF when using the guidelines of RG 1.174.

The licensee performed an additional sensitivity analysis to consider the impact of hypothetical corrosion in inaccessible areas of the containment liner on the proposed change. The inaccessible areas included the backside of the containment liner. The risk analysis considered the likelihood of an age-adjusted liner flaw that would lead to a breach of the containment. The risk analysis also considered the likelihood that the flaw was not visually detected but could be detected by a Type A ILRT. The increase in LERF due to possible corrosion of the containment liner is estimated to be 1 x 10^{-8}/year. This additional risk analysis estimates that the impact of hypothetical corrosion in inaccessible areas of the containment liner is an order of magnitude less than that calculated for the proposed change and, therefore, supports the NRC staff's conclusion that increasing the Type A test interval to 12.1 years is a very small change in LERF.

- 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 among prevention of core damage, prevention of containment failure, and consequence mitigation. Based on information provided by the licensee, the staff estimates the change in the conditional containment failure probability to be an increase of 0.002 for the proposed change and 0.006 for the cumulative change of going from a test interval of 3 in 10 years to the originally requested 1 in 15 years. This bounds the impact from a 12.1-year test interval. The staff finds that the defense-in-depth philosophy is maintained based on the change in the conditional containment failure probability for the proposed amendment.

On the basis of its review, the NRC staff concludes that the increase in predicted risk due to the proposed change is on the order of the acceptance guidelines while maintaining the defense-in-depth philosophy of RG 1.174 and, therefore, is acceptable.

Based on the foregoing evaluation, the NRC staff concludes that the interval until the next Type A test at HBRSEP2 may be extended to 12.1 years on a one-time basis, and that the proposed changes to TS 5.5.16 are acceptable.

4.0 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.

5.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a surveillance requirement. 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 (67 FR 36928). 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 this amendment.

6.0 CONCLUSION

The staff has concluded, based on the consideration 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. Therefore, the proposed changes are acceptable.

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M. Snodderly

Date: September 16, 2002

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