Progress Energy

Serial: RNP-RA/03-0154

DEC 10 2003

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23

REVISED INFORMATION REGARDING LICENSE RENEWAL APPLICATION

Ladies and Gentlemen:

By letter dated June 14, 2002, Carolina Power & Light (CP&L) Company, now doing business as Progress Energy Carolinas, (PEC) Inc., submitted an application for renewal of the Operating License for the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, which is also referred to as the Robinson Nuclear Plant (RNP).

During NRC review of the application and subsequent to conversations between PEC and NRC, it has become necessary to provide additional information and to revise certain information regarding the license renewal application. Attachment II provides a revision to license renewal commitments 31 and 47, and corrected wording for license renewal commitment 6. Attachment III provides a revised response to Confirmatory Items 3.1.2.4.5.5-1 and B.4.3-1, and a response to Confirmatory Items 4.6.4-1 and B.4.1-1. Attachment IV contains a clarification to the discussion section of license renewal application Table 3.3-1.

If you have any questions concerning this matter, please contact Mr. C. T. Baucom.

Sincerely,

J. F. Lucas

J. F. Lucas
Manager - Support Services - Nuclear

JSK/jsk

Attachments:

I. Affirmation
II. Revised License Renewal Commitments 6, 31, and 47
III. Response to Confirmatory Items
IV. Clarification to License Renewal Application Table 3.3-1

A091

Progress Energy Carolinas, Inc.
Robinson Nuclear Plant
3581 West Entrance Road
Hartsville, SC 29550

c: Mr. T. P. O'Kelley, Director, Bureau of Radiological Health (SC)
Mr. L. A. Reyes, NRC, Region II
Mr. C. P. Patel, NRC, NRR
NRC Resident Inspectors, HBRSEP
Attorney General (SC)
Mr. S. K. Mitra, NRC, NRR
Mr. R. L. Emch, NRC, NRR
Mr. R. M. Gandy, Division of Radioactive Waste Management (SC)
Mr. H. J. Porter, Division of Radioactive Waste Management (SC)

AFFIRMATION

The information contained in letter RNP-RA/03-0154 is true and correct to the best of my information, knowledge and belief; and the sources of my information are officers, employees, contractors, and agents of Progress Energy Carolinas, Inc. I declare under penalty of perjury that the foregoing is true and correct.

Executed on: 10 DECEMBER, 2003 C L Burton

C. L. Burton
Director-Site Operations, HBRSEP, Unit No. 2

H. B. Robinson Steam Electric Plant, Unit No. 2
Revised License Renewal Commitments 6, 31, and 47

Item	Commitment	Updated Final Safety Analysis Report (UFSAR) Supplement Location	Frequency	Source
6.	Reactor Head Closure Studs Program. Existing program is credited. No changes required. See note 1 below.	A.3.1.3		
31.	The Nickel-Alloy Nozzles and Penetrations Program is a new program that will incorporate the following: (1) evaluations of indications will be performed under the ASME Boiler & Pressure Vessel Code, Section XI program, (2) corrective actions for augmented inspections will be performed in accordance with repair and replacement procedures equivalent to those requirements in ASME Boiler & Pressure Vessel Code, Section XI, (3) RNP will maintain its involvement in industry initiatives and will systematically assess for implementation applicable programmatic enhancements, that are agreed upon between the NRC and the nuclear power industry to monitor for, detect, evaluate, and correct cracking in the Vessel Head Penetration (VHP) nozzles and other nickel-based alloy components, including base metals and welds, during the extended period of operation; and (4) RNP will submit, for review and approval, its inspection plan for the Nickel-Alloy Nozzles and Penetrations Program, as it will be implemented from the applicant's participation in industry initiatives, prior to July 31, 2009. Revised commitment	A.3.1.28	As noted in the commitment	LR Application Appendix B, Section B.4.1 RAI B.4.1-1 RNP-RA/03-0154

Item	Commitment	Updated Final Safety Analysis Report (UFSAR) Supplement Location	Frequency	Source
47.	TLAA – Aging of Boraflex in Spent Fuel Pool. Prior to the period of extended operation, the Boraflex Monitoring Program will be modified to (1) include neutron attenuation testing, called blackness testing, to determine gap formation in Boraflex panels; (2) include trending the results for silica levels by using the EPRI RACKLIFE predictive code or equivalent, and (3) include measurement of boron areal density by techniques such as the BADGER device; RNP has requested, by letter dated May 28, 2003, Serial: RNP-RA/03-0038, an amendment to the Technical Specifications to eliminate the need to credit Boraflex neutron absorbing material for reactivity control. The Boraflex Monitoring Program will be eliminated upon NRC approval of this amendment or upon implementation of another option (such as re-racking the spent fuel pool) which eliminates the need to credit Boraflex for reactivity control. Revised commitment	A.3.2.8	Prior to the period of extended operation	LR Application, Section 4.6.4 RNP-RA/03-0154

Note 1: Consistent with guidance provided by letter from Pao-Tsin Kuo (NRC) to Alan Nelson (NEI) and David Lochbaum (Union of Concerned Scientists), "Consolidated List Of Commitments For License Renewal," dated December 16, 2002.

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
RESPONSE TO CONFIRMATORY ITEMS

Confirmatory Item 3.1.2.4.5.5-1:

(Nickel-based alloy incore flux thimbles tubes)

The staff seeks confirmation that the scope of AMR 16 of LRA Table 3.1-2 is for nickel-based alloy incore flux thimble tubes and not the retractable incore flux thimbles. An inspection-based program should be used in conjunction with the Water Chemistry Program to manage SCC in these components and therefore the staff also seeks confirmation that the applicant will credit both the PWR Vessel Internals Program and the Water Chemistry Program to manage SCC (including PWSCC and/or IASCC) in the nickel-based alloy incore flux thimble tubes. This is Confirmatory Item 3.1.2.4.5.5-1.

Confirmatory Item 3.1.2.4.5.5-1 Response:

This response revises the response to Confirmatory Item 3.1.2.4.5.5-1, provided by Robinson Nuclear Plant (RNP) letter RNP-RA/03-0103, dated September 16, 2003.

The scope of Aging Management Review (AMR) 16 of license renewal application (LRA) Table 3.1-2 evaluates cracking due to stress corrosion cracking (SCC) for the retractable incore flux thimble tubes fabricated from nickel-based alloy (Alloy 600), and not for the fixed guide tube that is welded to the reactor vessel and attached to the seal table. AMR 33 of LRA Table 3.1-1 evaluates cracking due to SCC for the guide tube which is made from Type 304 stainless steel. For the guide tube, an inspection based program (PWR Vessel Internals Program) is used in conjunction with the Water Chemistry Program to manage cracking due to SCC.

The RNP flux thimble tubes are a double wall design consisting of an Alloy 600 outer sheath and Alloy 600 calibration tube with thermocouple leads between the two. The normal environment for the outer sheath is treated water on the outside surface and air on the inside surface. The outer sheath provides a barrier between the treated water and the calibration tube so the normal environment for the calibration tube is air for both the inner and outer surfaces. AMR 16 of LRA Table 3.1-2 evaluates cracking due to SCC for the retractable Alloy 600 flux thimble tubes. This is applicable to the outer sheath. The Water Chemistry Program is credited for managing this aging effect. It should be noted that periodic sampling for contaminants assures that corrosion processes are not occurring. This sampling provides verification of the effectiveness of water chemistry control. In addition, the Nickel-Alloy Nozzles and Penetrations Program is credited for management of Alloy 600 cracking. The calibration tube is subject to wear, but is not subject to SCC due to the normal environment of air for both the inner and outer surfaces. AMR 28 of Table 3.1-1 evaluates wear of this inner calibration tube by periodic eddy current testing.

Confirmatory Item B.4.1-1:

(Issued with regard to the staff's assessment of the LRA Section B.4.1, Nickel-Alloy Nozzles and Penetrations Program, as evaluated in Section 3.1.2.3.6 of the LRA)

The first paragraph in the UFSAR Supplement summary description for the Nickel-Alloy Nozzles and Penetrations Program is not up to date and needs be amended to reflect that the applicant's inspection program for the RNP vessel head penetration (VHP) nozzles is based on the requirements in NRC Order No. EA-03-009 (February 11, 2003) and the applicant's response to the Order dated March 3, 2003. Confirm that the UFSAR Supplement summary description for the Nickel-Alloy Nozzles and Penetrations Program (as given in Section A.3.1.28 of Appendix A to the LRA) will be amended to reflect the augmented requirements in NRC Order No. EA-03-009 for the RNP upper reactor vessel head and its VHP nozzles. This is Confirmatory Item B.4.1-1.

Confirmatory Item B.4.1-1 Response:

The program description should read as follows:

> **"A.3.1.28 Nickel-Alloy Nozzles and Penetrations Program**
>
> The program includes (a) primary water stress corrosion cracking (PWSCC) susceptibility assessment to identify susceptible components, (b) monitoring and control of reactor coolant water chemistry to mitigate PWSCC, and (c) inservice inspection (ISI) of reactor vessel head penetrations to monitor PWSCC and its effect on the intended function of the component. For susceptible penetrations and locations, the program includes an industry wide, integrated, long-term inspection program based on the industry responses to NRC Generic Letter (GL) 97-01. This program includes the augmented requirements in NRC Order No. EA-03-009 for the RNP upper reactor vessel head and its VHP nozzles.
>
> Prior to the period of extended operation, the Nickel-Alloy Nozzles and Penetrations Program will incorporate the following: (1) evaluations of indications will be performed under the ASME Boiler & Pressure Vessel Code, Section XI program, (2) corrective actions for augmented inspections will be performed in accordance with repair and replacement procedures equivalent to those requirements in ASME Boiler & Pressure Vessel Code, Section XI, (3) RNP will maintain its involvement in industry initiatives and will systematically assess for implementation applicable programmatic enhancements, that are agreed upon between the NRC and the nuclear power industry to monitor for, detect, evaluate, and correct cracking in the Vessel Head Penetration (VHP) nozzles and other nickel-based alloy components, including base-metals and welds, during the extended period of operation, and (4) RNP will submit, for review and approval,

its inspection plan for the Nickel-Alloy Nozzles and Penetrations Program, as it will be implemented from the applicant's participation in industry initiatives, prior to July 31, 2009."

Confirmatory Item B.4.3-1:

(Issued with regard to the staff's assessment of the LRA Section B.4.3, PWR Vessel Internals Program, as evaluated in Section 3.1.2.3.8 of the LRA)

The staff will confirm that the applicant has incorporated the commitment regarding the Nickel-Alloy Nozzles and Penetrations Program into the UFSAR Supplement summary description of Section A.3.1.30 of Appendix A to the LRA when the applicant revises its UFSAR Supplement for this AMP. This is Confirmatory Item B.4.3-1.

Confirmatory Item B.4.3-1 Response:

Note: The PWR Vessel Internals Program is evaluated in Section 3.1.2.3.4 of the LRA and not Section 3.1.2.3.8. The Nickel-Alloy Nozzles and Penetrations Program is evaluated in Section 3.1.2.3.2 and is associated with Confirmatory Item B.4.1-1. The updated commitment to provide, for NRC review and approval, the inspection plan for the PWR Vessel Internals Program was provided in RNP letter RNP-RA/03-0031, dated April 28, 2003. This response corrects the response provided in RNP letter RNP-RA/03-0103, dated September 16, 2003.

The program description provided within the Updated Final Safety Analysis Report (UFSAR) Supplement, Section A.3.1.30, is revised to add the following sentence:

> "RNP will submit, for review and approval, its inspection plan for the PWR Vessel Internals Program, as it will be implemented from participation in industry initiatives, 24 months prior to the augmented inspection."

Confirmatory Item 4.6.4-1:

(Issued with regard to the staff's assessment of LRA Section 4.6.4, Aging of Boraflex, as evaluated in Section 4.6.4.2 of the SER)

By letter dated May 28, 2003, the applicant submitted for staff review a license amendment to change the technical specifications regarding removal of Boraflex monitoring procedures. The staff will need confirmation that the license amendment to remove the requirements to credit the Boraflex panels from the RNP technical specification has been approved and that the Boraflex panels will no longer be needed to maintain the K_{eff} for the geometry of the spent fuel rods stored in the spent fuel pool within acceptable levels. As part of this confirmatory item, the staff will need the applicant to provide a reference regarding the staff's safety evaluation to CP&L approving the license amendment for the Boraflex panels. This confirmatory item also requires the applicant's statement that it will not be necessary to include a summary description of the Boraflex TLAA in the UFSAR Supplement of the application (i.e., in Appendix A of the LRA). This is Confirmatory Item 4.6.4-1.

Confirmatory Item 4.6.4-1 Response:

The aging of Boraflex in the spent fuel racks is a time limited aging analysis (TLAA). As stated in letter RNP-RA/96-0182, "RNP Response to Generic Letter (GL) 96-04, Boraflex Degradation in Spent Fuel Pool Storage Racks," dated October 23, 1996, RNP cannot quantitatively determine whether the Boraflex racks are capable of maintaining the 5% subcriticality margin for the life of plant (current period of operation). Relative to 10 CFR 54.21(c)(1), it follows that options (i) and (ii) cannot be demonstrated and accordingly, RNP chooses option (iii) to verify that the Boraflex TLAA will be adequately managed for the period of extended operation.

As stated in RNP UFSAR Section 9.1.2, a periodic test procedure will monitor coupon samples of Boraflex in the spent fuel pool for signs of degradation. The description of the RNP Boraflex Monitoring Program follows:

BORAFLEX MONITORING PROGRAM

The Boraflex Monitoring Program is an existing program that is implemented for the neutron absorbing (Boraflex) panels in the spent fuel racks to assure that no unexpected degradation of the Boraflex material would compromise the criticality analysis in support of the design of the high density spent fuel storage racks. This Aging Management Program (AMP), based on manufacturer's recommendations, relies on periodic inspection, testing, monitoring, and analysis of the criticality design to assure that the required 5% subcriticality margin is maintained.

This AMP is a long-term coupon surveillance program, which includes a visual examination of the test coupon to identify extensive cracking, attenuation testing of test

coupons to determine boron areal density, and sampling, analysis, and trending for silica levels in the spent fuel pool water. Additionally, administrative means are used to control radiation exposure to the actual Boraflex panels.

As a result of the license renewal review, the program elements for *Preventive Action and Detection of Aging Effects* will be enhanced to (1) include neutron attenuation testing, called blackness testing, to determine gap formation in Boraflex panels; (2) include trending the results for silica levels by using the EPRI RACKLIFE predictive code or equivalent, and (3) include measurement of boron areal density by techniques such as the BADGER device.

Operating Experience

RNP has considered NRC Information Notice (IN) 87-43, NRC IN 93-70, NRC IN 95-38, and NRC GL 96-04 in the development and maintenance of the RNP Boraflex Monitoring Program.

Conclusion

The Boraflex Monitoring Program, with the enhancements identified above, is consistent with GALL Section XI.M22, Boraflex Monitoring. Implementation of the Boraflex Monitoring Program provides reasonable assurance that the Boraflex racks are capable of maintaining the 5% subcriticality margin.

RNP has requested, via letter RNP-RA/03-0038, dated May 28, 2003, an amendment to the Technical Specifications to eliminate the need to credit Boraflex neutron absorbing material for reactivity control. The Boraflex Monitoring Program will be eliminated upon NRC approval of this amendment or upon implementation of another option (such as re-racking the spent fuel pool) which eliminates the need to credit Boraflex for reactivity control. The elimination of the Boraflex Monitoring Program includes the elimination of all testing and inspections with regard to Boraflex.

Based on the above, Appendix A of the license renewal application should read as follows:

> **"A.3.2.8 Aging of Boraflex in the Spent Fuel Pool**
>
> The neutron absorber, Boraflex, in the spent fuel storage racks may experience degradation over time. Degradation includes leaching of boron from the borosilicate matrix, resulting in diminished neutron absorption capability of the Boraflex panels. As stated in letter RNP-RA/96-0182, "RNP Response to Generic Letter 96-04, Boraflex Degradation in Spent Fuel Pool Storage Racks," dated October 23, 1996, RNP cannot quantitatively determine whether the Boraflex racks are capable of maintaining the 5% subcriticality margin for the life of plant (current period of operation). Relative to 10 CFR 54.21(c)(1), it follows

that options (i) and (ii) cannot be demonstrated and accordingly, RNP chooses option (iii) to verify that the Boraflex TLAA will be adequately managed for the period of extended operation.

Boraflex Monitoring Program

The Boraflex Monitoring Program monitors the neutron absorbing (Boraflex) panels in the spent fuel racks to assure that no unexpected degradation of the Boraflex material would compromise the criticality analysis in support of the design of the high density spent fuel storage racks.

Prior to the period of extended operation, the Boraflex Monitoring Program will be modified to (1) include neutron attenuation testing, called blackness testing, to determine gap formation in Boraflex panels; (2) include trending the results for silica levels by using the EPRI RACKLIFE predictive code or equivalent, and (3) include measurement of boron areal density by techniques such as the BADGER device.

RNP has requested, by letter RNP-RA/03-0038, dated May 28, 2003, an amendment to the Technical Specifications to eliminate the need to credit Boraflex neutron absorbing material for reactivity control. The Boraflex Monitoring Program will be eliminated upon NRC approval of this amendment or upon implementation of another option (such as re-racking the spent fuel pool) which eliminates the need to credit Boraflex for reactivity control.

Commitment 47 is revised to read:

"Prior to the period of extended operation, the Boraflex Monitoring Program will be modified to (1) include neutron attenuation testing, called blackness testing, to determine gap formation in Boraflex panels; (2) include trending the results for silica levels by using the EPRI RACKLIFE predictive code or equivalent, and (3) include measurement of boron areal density by techniques such as the BADGER device. RNP has requested, by letter dated May 28, 2003, Serial: RNP-RA/03-0038, an amendment to the Technical Specifications to eliminate the need to credit Boraflex neutron absorbing material for reactivity control. The Boraflex Monitoring Program will be eliminated upon NRC approval of this amendment or upon implementation of another option (such as re-racking the spent fuel pool) which eliminates the need to credit Boraflex for reactivity control."

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
CLARIFICATION TO LICENSE RENEWAL APPLICATION TABLE 3.3-1

The following information is provided as a clarification to license renewal application (LRA) Table 3.3-1, Item 13.

LRA Table 3.3-1, Item 13, "Discussion," includes the following statement:

"The RNP AMR determined that boric acid attack of aluminum components is a potential aging effect. Since aluminum is not recognized for this group in the GALL Report, it is discussed in Table 3.3-2, Item 14."

This statement should not be interpreted to mean that every auxiliary system applicable to Table 3.3-1, Item 13, has aluminum components applicable to Table 3.3-2, Item 14. There are several auxiliary systems having components applicable to Table 3.3-1, Item 13, that do not have components applicable to Table 3.3-2, Item 14. For example, the Containment Vapor and Pressure Sampling System contains components applicable to Table 3.3-1, Item 13, but does not contain aluminum components applicable to Table 3.3-2, Item 14. This can be verified by a review of Table 2.3-7, which does not include a reference to Table 3.3-2, Item 14. However, some auxiliary systems have components applicable to both Table 3.3-1, Item 13, and Table 3.3-2, Item 14. An example of this is the Service Water System as shown in Table 2.3-8.