Progress Energy

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Serial: RNP-RA/12-0067

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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/RENEWED LICENSE NO. DPR-23

RESPONSE TO THE NRC REQUEST FOR ADDITIONAL INFORMATION REGARDING H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 INSERVICE INSPECTION PROGRAM PLAN FOR THE FIFTH TEN-YEAR INTERVAL

Ladies and Gentlemen:

By letter to the Nuclear Regulatory Commission (NRC) dated March 14, 2012 (Agencywide Documents Access and Management System Accession No. ML12082A009), Carolina Power & Light Company, doing business as Progress Energy Carolinas, Inc., submitted the Inservice Inspection (ISI) Program Plan for the Fifth 10-Year Interval for the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBRSEP).

In a conference call between the NRC Staff and HBRSEP personnel on June 5, 2012, and as transmitted by NRC letter dated June 13, 2012, the NRC requested additional information to complete the review of Relief Request (RR) -02. RR-02 is related to the inservice inspection requirements of the regenerative heat exchanger. The additional information was requested by June 26, 2012, and is provided in the attachment to this letter.

This document contains no new Regulatory Commitments. If you have any questions concerning this matter, please contact Richard Hightower, Supervisor – Licensing/Regulatory Programs at (843) 857-1329.

Sincerely,

Richard Hightower for

Sharon A. Wheeler
Manager – Support Services - Nuclear

SAW/rjr

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NRR

Attachment: Response to the NRC Request for Additional Information Related to Relief Request-02

c: Mr. V. M. McCree, NRC, Region II
Ms. A. T. Billoch-Colón, NRC Project Manager, NRR
NRC Resident Inspector, HBRSEP

United States Nuclear Regulatory Commission
Attachment I to Serial: RNP-RA/12-0067
6 pages (including Cover)

RESPONSE TO THE NRC REQUEST FOR ADDITIONAL INFORMATION

RELATED TO RELIEF REQUEST-02

RESPONSE TO THE NRC REQUEST FOR ADDITIONAL INFORMATION
RELATED TO RELIEF REQUEST-02

RR-02: "Regenerative Heat Exchanger"

RAI 1: Summarize the inspection history, including preservice inspections, for the welds included in RR-2 for the fifth 10-year ISI interval at HBRSEP including the following issues if applicable:

NRC Question

1. What are the materials of construction for each weld?

PEC Response

The material construction for the regenerative heat exchanger shells were manufactured with ASTM SA213 Type 304 material. The heads were manufactured with ASTM A351 Grade CF8 material. The 3-inch nozzle necks were manufactured with ASTM A182 F304 material. All materials are austenitic stainless steel. The original construction in 1967 was ASME Section III, Class C. The weld material typically joining these components would be 308 weld materials.

NRC Question

2. Were the welds stress relieved prior to being placed into service?

PEC Response

Since the weld and component material is austenitic stainless steel it would not require stress relief, therefore it is not believed the welds were stress relieved.

NRC Question

3. Describe the inspection history for each weld including the inspection procedures used and the percentage coverage obtained.

PEC Response

The following discusses the examinations performed on the Regenerative Heat Exchanger.

First Ten-Year Inservice Inspection Interval, the first two periods were conducted in accordance with the ASME B&PV Code, Section XI, 1971 Edition. The last period was conducted in accordance with the ASME B&PV Code, Section XI, 1974 Edition with Addenda through summer 1975. The first Ten-Year Interval began in March 1971, and ended in March 1981. During the first period of the first interval, the upper shell, head to shell weld and the shell to tubesheet were visually and volumetrically examined with no indications. The upper shell inlet nozzle weld also received a visual and surface exam with no indications identified. During the second period of the first interval the lower shell, head to shell weld was visually and volumetrically examined with no indications identified. The lower shell inlet nozzle weld also received a visual and surface exam with no indications identified. During the third period of the

first interval the intermediate shell, head to shell weld was visually and volumetrically examined with no indications identified. The intermediate shell inlet nozzle weld also received a visual and surface exam with no indications identified.

Second Ten-Year Inservice Inspection Interval was conducted in accordance with the ASME B&PV Code, Section XI, 1977 Edition with Addenda through Summer 1978. The second Ten-Year Interval began in March 1981, and ended in February 1992. During the first period of the second interval the upper shell, head to divider assembly weld and divider assembly to tubesheet weld were examined volumetrically with no indications identified. The upper shell nozzle welds were examined visually, surface and volumetrically with no indications identified. During the second period of the second interval the upper shell, head to divider assembly weld and intermediate shell, divider assembly to tubesheet weld were examined volumetrically with no indications identified. The intermediate shell nozzle welds were examined by surface and volumetric with no indications identified. During the third period the initial relief request (Relief Request No. 20) was submitted and approved and no examinations were performed (NRC letter dated April 2, 1990, TAC No. 72250).

The Third Ten-Year Inservice Inspection Interval was conducted in accordance with the ASME B&PV Code, Section XI, 1986 Edition. The third Ten-Year Interval began in February 1992, and ended in February 2002. An interval extension of 349 days occurred due to the length of a steam generator replacement outage (CP&L letter dated April 3, 1991). This interval extension resulted in a Third Ten-Year Interval start date of February 1992 versus March 1991. Relief Request No. 02 was approved for the third interval, therefore no ASME surface or volumetric examinations were performed (NRC letter dated October 19, 1992, TAC No. M81310).

The Fourth Ten-Year Inservice Inspection Interval is being conducted in accordance with the ASME B&PV Code, Section XI, 1995 Edition, 1996 Addenda. The Fourth Ten-Year Interval began on February 19, 2002, and was scheduled to end on February 18, 2012. As allowed by ASME Section XI, IWA-2430(d)(1), the interval is being extended to allow for the completion of RO-27 which was postponed to January 2012 and the recent change to 10CFR50.55a which endorsed the 2007 Edition/2008 Addenda of ASME Section XI which will be applied to the Fifth Ten Year Interval Inservice Inspection Program and Plan. The new date for the end of the interval is July 20, 2012. Relief Request No. 02 was approved for the fourth interval, therefore no ASME surface or volumetric examinations were performed (NRC letter dated September 26, 2002, TAC MB2773).

NRC Question

4. Were there any recordable indications in the past inspections?

PEC Response

Based on the Program/Plan review of the First and Second Ten Year Interval there were no indications identified on the examinations performed.

RESPONSE TO THE NRC REQUEST FOR ADDITIONAL INFORMATION
RELATED TO RELIEF REQUEST-02

NRC Question

5. Describe the disposition of any recordable indications.

PEC Response

Based on the Program/Plan review of the First and Second Ten Year Interval there were no indications identified on the examinations performed. Therefore, no dispositions were required.

NRC Question

6. What is the anticipated degradation mechanism for each of these welds?

PEC Response

For the RNP regenerative heat exchanger, fatigue is the only operative mechanism that could have cause flaws to either initiate or grow in the welds during the period between the proposed alternative examinations. Corrosion, stress-corrosion cracking, and other forms of degradation due to the materials interaction with its chemical environment are not active degradation mechanisms for the regenerative heat exchanger welds. Although the regenerative heat exchanger components and welds are exposed to the reactor coolant, the coolant water chemistry is controlled such that oxygen and other aggressive contaminants are maintained at very low levels so that the coolant is not aggressive to the austenitic material. Furthermore, the welds have not been subjected to a history of abnormal operational loading events, so mechanical overload has not been an active flaw initiation or propagation mechanism. In conclusion, fatigue is the only likely operative mechanism that could create or propagate flaws between the proposed alternative examinations.

Other facilities with the same regenerative heat exchanger design/manufacturer (Turkey Point, North Anna, and Point Beach) have had no OE relative to failure of welds associated with the regenerative heat exchanger.

NRC Question

7. Have any similar welds been successfully inspected? What was the result of the inspection?

PEC Response

Of the 3" RCS butt welded configurations examined over the life of the plant at RNP, there have been no indications reported that exceeded the ASME Code allowable. Review of operating experience relative to weld failure did not identify any failures associated with the regenerative heat exchanger. Most weld failures were primarily associated with socket welds on small diameter piping – 1-inch or less of which there are none on the RNP regenerative heat exchanger.

RESPONSE TO THE NRC REQUEST FOR ADDITIONAL INFORMATION
RELATED TO RELIEF REQUEST-02

RAI 2: Provide a detailed explanation of the hardship involved to remove the original insulation to perform the required examinations of the welds. Also, provide a description of the welds that currently are not able to be inspected due to the insulation.

PEC Response

Explanation of the Hardship Involved

HBRSEP, Unit No. 2, is requesting relief from the requirements of ASME B&PV Code, Section XI, 2007 Edition with 2008 Addenda, Table IWB-2500-1 for the items listed in table below due to the excessive dose and the potential asbestos exposure to personnel performing the preparations and examinations. These items are located in the Regenerative Heat Exchanger Room.

The total estimated dose associated with performing these ASME Code required examinations is approximately 70 Rem. This is based on approximately 30 Rem estimated for preparation and examination, and 40 Rem for insulation and scaffolding.

These estimates are based on the following:

- Contact: 3 - 4 Rem/hour
- General Area: 1 - 2 Rem/hr

The insulation that would be required to be removed is the original insulation which contains asbestos. The removal of this insulation will require additional personnel protective measures which will add to the worker dose exposure. Additional dose is expected due to the remediation requirements once the insulation is disturbed.

A number of surface and volumetric examinations would require scaffolding for access, adding to the total dose.

There are also physical geometric restrictions associated with these components which also cause difficulty in the performance of Code-required examinations, specifically with ultrasonic examinations.

- The nozzle-to-vessel welds and nozzle inside radius sections for the heat exchanger were not designed for ultrasonic examination from the outside diameter.
- The small diameter of the heat exchanger shell prevents a meaningful ultrasonic examination of these components.
- The Code required volumetric examination on the heat exchanger head circumferential welds is limited due to the weld crown, radius of the closure caps, and the nozzles.
- The Code-required volumetric examination of the tubesheet welds is limited by the weld crown and is obstructed by a support clamp. The clamp must be removed prior to the examination of these welds.

RESPONSE TO THE NRC REQUEST FOR ADDITIONAL INFORMATION
RELATED TO RELIEF REQUEST-02

Description of the Welds that Currently are not able to be Inspected Due to the Insulation

Component ID	Component Description ASME
106/01	Head to Divider Assembly Weld
106/02	Assembly Divider to Tubesheet Weld
106/05	Head to Divider Assembly Weld
106/06	Assembly Divider to Tubesheet Weld
106/09	Head to Divider Assembly Weld
106/10	Assembly Divider to Tubesheet Weld
106/13	Regenerative Heat Exchanger to Nozzle
106/13IR	Regenerative Heat Exchanger Nozzle Inner Radius
106/14	Regenerative Heat Exchanger to Nozzle
106/14IR	Regenerative Heat Exchanger Nozzle Inner Radius
106/15	Regenerative Heat Exchanger to Nozzle
106/15IR	Regenerative Heat Exchanger Nozzle Inner Radius
106/16	Regenerative Heat Exchanger to Nozzle
106/16IR	Regenerative Heat Exchanger Nozzle Inner Radius
106/17	Regenerative Heat Exchanger to Nozzle
106/17IR	Regenerative Heat Exchanger Nozzle Inner Radius
106/18	Regenerative Heat Exchanger to Nozzle
106/18IR	Regenerative Heat Exchanger Nozzle Inner Radius
123/53	Regenerative Heat Exchanger Nozzle to Pipe
123/54	Regenerative Heat Exchanger Nozzle to Pipe
123/57	Regenerative Heat Exchanger Nozzle to Pipe
123/58	Regenerative Heat Exchanger Nozzle to Pipe
123/61	Regenerative Heat Exchanger Nozzle to Pipe
123/62	Pipe to Elbow
123A/48	Pipe to Elbow
123A/50	Regenerative Heat Exchanger Nozzle to Pipe
206/A	Regenerative Heat Exchanger Support
206/B	Regenerative Heat Exchanger Support
206/C	Regenerative Heat Exchanger Support
206/D	Regenerative Heat Exchanger Support
206/E	Regenerative Heat Exchanger Support
206/F	Regenerative Heat Exchanger Support