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SERIAL: HNP-07-087
10 CFR 54

U. S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

Subject: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400 / LICENSE NO. NPF-63
LICENSE RENEWAL APPLICATION - RESPONSES TO REQUESTS
FOR ADDITIONAL INFORMATION 2.1-1 AND 3.0-1

- References:
1. Letter from Cornelius J. Gannon to the U. S. Nuclear Regulatory Commission (Serial: HNP-06-136), "Application for Renewal of Operating License," dated November 14, 2006
 2. Letter from Maurice Heath to Robert J. Duncan II, "Requests for Additional Information for the Review of the Shearon Harris Nuclear Power Plant, Unit 1, License Renewal Application," dated June 11, 2007

Ladies and Gentlemen:

On November 14, 2006, Carolina Power & Light Company, now doing business as Progress Energy Carolinas Inc., requested the renewal of the operating license for the Shearon Harris Nuclear Power Plant, Unit No. 1, also known as the Harris Nuclear Plant (HNP), to extend the term of its operating license an additional 20 years beyond the current expiration date.

By letter dated June 11, 2007, the Nuclear Regulatory Commission (NRC) provided a request for additional information (RAI) concerning the HNP License Renewal Application. The enclosure to this letter provides responses to the RAI. Neither this letter nor the enclosure contains any new or revised Regulatory Commitments.

Please refer any questions regarding this submittal to Mr. Mike Heath, Supervisor - License Renewal, at (910) 457-3487.

Progress Energy Carolinas, Inc.
Harris Nuclear Plant
P. O. Box 165
New Hill, NC 27562

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NRR

I declare, under penalty of perjury, that the foregoing is true and correct
(Executed on *JULY 10, 2007*).

Sincerely,



Christopher L. Burton
Director – Site Operations
Harris Nuclear Plant

CJB/mhf

Enclosure: Responses to Requests for Additional Information dated June 11, 2007

cc:

Mr. P. B. O'Bryan (NRC Senior Resident Inspector, HNP)
Ms. B. O. Hall (Section Chief, N.C. DENR)
Mr. M. L. Heath (NRC License Renewal Project Manager, HNP)
Ms. L. M. Regner (NRC Project Manager, HNP)
Dr. W. D. Travers (NRC Regional Administrator, Region II)

Responses to Request for Additional Information dated June 11, 2007

Background

On November 14, 2006, Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., requested the renewal of the operating license for the Shearon Harris Nuclear Power Plant, Unit No. 1, also known as the Harris Nuclear Plant (HNP), to extend the term of its operating license an additional 20 years beyond the current expiration date.

By letter dated June 11, 2007, the Nuclear Regulatory Commission (NRC) provided a request for additional information (RAI) concerning the HNP License Renewal Application. This enclosure provides the responses to the NRC RAI.

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NRC RAI 2.1-1

Nonsafety-Related Affecting Safety-Related (10 CFR 54.4(a)(2))

The applicant's methodology for scoping of nonsafety-related (NSR) components affecting safety related (SR) components is briefly described in license renewal application (LRA) Section 2.1.1.2 and states the following:

Shearon Harris Nuclear Power Plant (HNP) final safety analysis report (FSAR) Section 3.7.3.13 discusses the interaction of other piping with Seismic Category I piping. The following quotes are from that discussion: In the case of non-Seismic Category I piping systems attached to Seismic Category I piping systems, the dynamic effects were included in the modeling of the Seismic Category I piping up to the first anchor or system of restraints which decouples the piping and it should be noted that all seismic/non-seismic interface restraints are located in seismically analyzed structures thereby assuring that collapse of the restraint structure will not occur. Therefore, NSR systems relied upon to provide seismic support for SR structure, system, and components (SSCs) were evaluated using the following rationale.

- SR piping is in the scope of license renewal per Title 10 Code of *Federal Regulations* (10 CFR) 54.4(a)(1).
- SR piping is located in Seismic Category I structures at HNP.
- Therefore, the NSR/SR boundary is located in a Seismic Category I structure.
- All piping systems in Seismic Category I structures are in the scope of license renewal as discussed with respect to spatial interactions above.

Thus, it follows that NSR, seismically-connected piping is in the scope of license renewal and enveloped by the HNP scoping methodology.

Based on a review of the LRA, the applicant's scoping and screening implementation procedures, and discussions with the applicant, the NRC staff determined that additional information is required with respect to certain aspects of the applicant's evaluation of the 10 CFR 54.4(a)(2) criteria. The staff requests the applicant to provide the following information:

- The staff requests that the applicant provide the basis and further discussion to support the determination that all NSR piping systems attached to SR SSCs contain a seismic anchor at a location beyond the nonsafety/safety interface and prior to NSR piping exiting the structure, and that by extending the in-scope portion of the NSR piping system to the room boundary, there is assurance that an acceptable license renewal 10 CFR 54.4(a)(2) bounding point has been encompassed.
- Discuss the methods used to identify the specific seismic anchors for the attached NSR piping systems and the methods used to ensure that there are no exceptions to this determination.

RAI 2.1-1 Response

Seismic-connected piping is addressed in the HNP LRA in Section 2.1.1.2 on pages 2.1-12 and 2.1-13. It relies on FSAR Section 3.7.3.13, Interaction of Other Piping with Seismic Category I Piping. The discussion in the FSAR is derived from interactions between CP&L and the NRC during the initial licensing of HNP.

Draft SER Open Item 275 requested that CP&L describe:

Methodology to account for the seismic motion of non-Category I piping systems in the design of Category I piping (excluding the Main Steam and Feedwater interface restraints).

CP&L provided its response to this item in a letter to the NRC (Serial: LAP-83-306) "Draft Safety Evaluation Report Responses," dated July 15, 1983. In that response, CP&L described the process used for the qualification of the subject piping. This description was basically transferred in its entirety to FSAR Section 3.7.3.13.

In November 1983, the NRC issued NUREG-1038, "Safety Evaluation Report related to the operation of the Shearon Harris Nuclear Power Plant, Units 1 and 2." The SER stated in Section 3.9.2.2, pages 3-37 through 3-39:

Based on its review of FSAR Section 3.7.3, the staff concludes that the applicant has met the relevant requirements of GDC 2 with respect to demonstrating the design adequacy of all Category I piping systems, components, and their supports to withstand earthquakes by meeting RGs 1.61 and 1.92 or an alternate method that provides an equivalent level of safety and by providing acceptable seismic analysis procedures and methodologies. The

scope of review of the seismic system analysis included the seismic analysis methods of all Category I piping systems components, and their supports. It included review of procedures for modeling, and inclusion of torsional effects, seismic analysis of multiply [sic] supported equipment and components with distinct inputs, and determination of composite damping. The review has included design criteria and procedures for evaluation of the interaction of non-Category I piping with Category I piping.

In a letter to the NRC (Serial: LAP-83-556) "Draft Safety Evaluation Report Mechanical Engineering Branch," dated December 1, 1983, CP&L provided additional information related to Draft SER Open Item 275 by responding to the following question:

What is the criteria for seismic/non-seismic interface anchors?

In its response, CP&L provided three criteria to address seismic/non-seismic interface anchors. The response was as follows:

In a meeting between the NRC staff and CP&L, CP&L agreed upon the following criteria for review of seismic/non-seismic interface anchors:

- 1) CP&L will identify all anchors that separate the seismic from the non-seismic portions of large bore piping, and for which the non-seismic portion of the pipe is not supported in the horizontal direction in accordance with the spacing recommended by ANSI B31.1 for vertical supports, or has heavy equipment above it. CP&L will demonstrate that those anchors are capable of accommodating a reaction load corresponding to yielding in the piping, or will demonstrate that the horizontal support spacing of the non-seismic portion is such that the load transmitted to the anchor from this portion does not exceed twice the load transmitted from the seismic portion or alternatively will demonstrate that the anchor is capable of accepting the actual load that would occur for the specific piping configurations. Based on limited sampling CP&L believe all such anchors are properly designed.
- 2) Seismic/non-seismic anchors on small bore piping, here defined as piping of diameter up to but excluding 6 inches, are capable of accommodating loads resulting from either portions of piping by reason of the manner in which the non-seismic portion of the piping is supported, i.e., both vertically and horizontally per ANSI B31.1 spacing. This spacing has been shown to result in acceptable result reactions and acceptable load on the anchors.
- 3) By the same argument presented in 2) above, large bore piping which is supported both horizontally and vertically per ANSI B31.1 will transmit seismic loads from the non-seismic portion which are acceptable to the anchor.

In NRC Inspection Report 50-400/84-02, dated April 2, 1984, it states:

During discussions with pipe support designers, the inspector noted that the licensee and its A/E design stress problem anchors between analyzed and non-analyzed piping. The anchor loads are obtained by multiplying the load generated by the analyzed piping by a factor of three. During discussions with HPES management, the inspector questioned the conservatism of this analytical procedure. The licensee stated that this subject had been

discussed with NRR and this was documented on [sic] CPL to NRR letter Serial: LAP-83-556 dated December 1, 1983. The inspector discussed the subject with the Mechanical Engineering Branch of NRR and determined that this was still an open issue. Pending further NRC inspection of this matter and confirmation of the conservatism of the analytical procedure. This was identified as Inspector Followup Item 50-400/84-02-01 Non-Analyzed Piping Anchor Loads.

In a letter to the NRC (Serial: NLS-84-411) "Piping Supports," dated September 26, 1984, CP&L addressed SER Confirmatory Item No. 5. The confirmatory item stated:

Evaluate the interaction of Non-Category I piping with Category I piping to the criteria established at the CP&L/NRC meeting of October 24, 1983.

In its response, CP&L stated that it had completed its review of seismic/non-seismic interface anchors utilized. This process included a review of 1141 piping stress isometrics that identified 220 anchors. 104 were found to be acceptable as is. The remaining anchors were being reviewed to the previously agreed criteria.

On August 21, 1985, the NRC issued its inspection findings in Report 50-400/85-28. In this report the Inspector Followup Item was addressed as follows:

(Closed) Inspector Followup Item 400/84-02-01, Unanalyzed stress problem anchor loads. This item concerned the interaction of category I piping with non-category I piping for which loads were generated for anchor design. The licensee had completed its review of the seismic/non-seismic interface anchors utilized at the Harris site. The licensee identified 220 seismic/non-seismic interface anchors. 104 of these anchors were found to be acceptable as designed. The remaining 116 anchors were required to have modifications on the non-seismic side of these anchors. The licensee's evaluation with respect to the above concern appeared to be acceptable. This item is considered closed.

The previous discussion supports the text in Section 3.7.3.13 of the FSAR that the dynamic effects of the non-Category I piping on Category I piping were evaluated.

In addition, the previous discussion supports the following conclusions:

- a) That the Current Licensing Basis (CLB), for the interfacing supports and/or anchors, at HNP is based on a specific agreement between the NRC staff and HNP.
- b) Adequate documentation is available on the Docket to validate (a).
- c) The NRC staff specifically reviewed HNP's compliance with the agreed upon criteria and concluded that the licensee's evaluation with respect to this concern appeared to be acceptable and considered the item closed.

Regarding NEI 95-10 Criteria versus HNP's Current Licensing Basis

NEI 95-10, Revision 6 (Appendix F, Section 4.4 on page F-8) states:

There may be isolated cases where an equivalent anchor point for a particular piping segment is not clearly described within the existing CLB information or original design basis. In those instances, the applicant may use a combination of restraints or supports such that the NSR piping and associated structures and components attached to SR piping is included in scope up to a boundary point that encompasses at least two (2) supports in each of three (3) orthogonal directions.

Since HNP has specific criteria in its CLB regarding the evaluation of non-safety related piping connected to safety related piping and associated support requirements, the definition of an equivalent anchor in NEI 95-10 need not be used. HNP's methodology described in the LRA is based on logic provided by the previously agreed upon criteria.

Also, as discussed in the LRA, specific reviews were required for air/gas systems that have non-Seismic Category I piping attached to Seismic Category I piping. These systems were evaluated by reviewing stress calculations, the PassPort EDB quality class designation, the FSAR, and system drawings. This ensured that non-safety related piping connected to safety related piping in these air/gas systems were included within the scope of License Renewal up to the first seismic anchor or set of seismic/non-seismic interface restraints past the safety/non-safety interface.

Main Steam and Feedwater Line Seismic/Non-Seismic Interface Restraints

Because the Draft SER Open Item 275 did not apply to the Main Steam and Feedwater interface restraints, the following clarification is provided:

The system of restraints for the Main Steam and Feedwater lines are attached to the outside wall of the Reactor Auxiliary Building as described in FSAR Section 3.6.2.1.2. Also, see Figures 3.6.2-1 and 1.2.2-80 in the FSAR. This design supports the creation of a pipe break exclusion zone.

An LRA amendment is required to document this clarification and will be provided in a later submittal.

Based on the above discussion, the description of the location of seismic/non-seismic interfaces and associated anchors or systems of restraints described in FSAR Section 3.7.3.13 has been the subject of NRC staff review and approval during initial licensing of HNP and is currently the CLB for HNP. This information is the basis for concluding that the License Renewal scoping boundaries for seismic/non-seismic interfaces have been appropriately scoped. The exception to the description in Section 3.7.3.13 that applies to the Main Steam and Feedwater Systems piping restraints between the RAB and the TB has been addressed separately in Section 3.6 of the FSAR.

NRC RAI 3.0-1

Quality Assurance Program Attributes Appendix B, "Aging Management Programs"

The NRC staff reviewed the applicant's aging management programs (AMPs) in Appendix B, "Aging Management Programs," of the LRA. In addition, the NRC staff reviewed each individual AMP basis document to ensure consistency in the use of the quality assurance attributes for each program. The purpose of this review was to assure that the aging management activities were consistent with the staff's guidance described in NUREG-1800, Section A.2, "Quality Assurance for Aging Management Programs (Branch Technical Position IQMB-1)."

Based on the NRC staff's evaluation, the descriptions and applicability of the plant-specific AMPs and their associated quality attributes provided in Appendix B, Section B.1.3, of the LRA, were determined to be generally consistent with the staff's position regarding quality assurance for aging management. However, AMP program description B2.8 contained in Appendix B, discusses "Exceptions to NUREG 1801," and indicates that corrective actions is an area to which an exception is being taken. However, there is no indication or description of the use of an alternative method to the 10 CFR Part 50, Appendix B quality assurance program being applied to the area of corrective action.

The NRC staff, therefore, requests that the applicant provide the following information to address the following:

- For AMPs, as described in Appendix B of the LRA, which take exceptions in the area of corrective action, confirmation process, or administrative controls, indicate whether the exceptions include an alternative to the application of the 10 CFR Part 50, Appendix B quality assurance program as described in Section B.1.3. If alternative approaches are identified, provide a description of sufficient detail such that the staff can determine if the quality attributes for the AMPs are consistent with the review acceptance criteria contained in NUREG-1800, Section A.2, "Quality Assurance for Aging Management Programs (Branch Technical Position IQMB-1)."

RAI 3.0-1 Response

In the HNP LRA, the only AMP that takes an exception in the area of corrective action, confirmation process, or administrative controls is the Bolting Integrity Program discussed in Subsection B.2.8. In a planned amendment to the LRA, the Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program, discussed in LRA Subsection B.2.6, will take exception to the corrective action element based on a response to an audit question from the recent NRC audit of Aging Management Programs and Time-Limited Aging Analyses. These two AMPs are discussed in the following paragraphs.

For the Bolting Integrity Program, the Corrective Actions element text in NUREG-1801 included specific reference to the ASME Code in addition to the generic statement that the NRC staff

finds the requirements of 10 CFR 50, Appendix B, acceptable to address corrective actions. In the HNP evaluation of this element, exception was taken to the following NUREG-1801 text:

Replacement of ASME pressure retaining bolting is performed in accordance with appropriate requirements of Section XI of the ASME Code, as subject to the additional guidelines and recommendations of EPRI NP-5769.

This exception was taken in order to identify the differences between the Code year specified in NUREG-1801 versus the Code year that HNP is required to use in the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. The specific text that prompted this exception is found in the following excerpt from NUREG-1801, Section XI.M1, ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD:

Title 10 of the Code of Federal Regulations, 10 CFR 50.55a, imposes the inservice inspection (ISI) requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, for Class 1, 2, and 3 pressure-retaining components and their integral attachments in light-water cooled power plants. Inspection, repair, and replacement of these components are covered in Subsections IWB, IWC, and IWD, respectively, in the 2001 edition including the 2002 and 2003 Addenda.

As stated in the HNP evaluation of this program element in LRA Subsection B.2.8:

NUREG-1801, XI.M1 describes the ASME Section XI, Subsections IWB, IWC and IWD, Inservice Inspection Program as conforming to the requirements of the ASME Code, Section XI, Subsections IWB, IWC and IWD in the 2001 edition including the 2002 and 2003 Addenda. However, as noted in the description of the NUREG-1801 Section XI.M1 program, 10 CFR 50.55a governs the application of Codes and Standards. In conformance with 10CFR50.55a(g)(4)(ii), the ISI Program is updated during each successive 120-month inspection interval to comply with the requirements of the latest edition and addenda of the Code specified twelve months before the start of the inspection interval. The difference between the HNP Code of record and the Code edition specified in NUREG-1801 is considered to be an exception to NUREG-1801 criteria.

As identified in the response to this program element, HNP is constrained by the requirements of the CFR with respect to the Code year it follows. This is the only reason for the exception noted. This exception does not mean to suggest that the program will be exempted from the quality assurance requirements of 10 CFR 50, Appendix B.

For the Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program, the Corrective Actions element text in NUREG-1801 included specific reference to the ASME Code in addition to the generic statement that the NRC staff finds the requirements of 10 CFR 50, Appendix B, acceptable to address corrective actions. Based on an HNP response to an audit question regarding this element, the LRA will be amended to take exception to the following NUREG-1801 text:

Repair is performed in conformance with IWA-4000 and IWB-4000, and replacement in accordance with IWA-7000 and IWB-7000.

The planned HNP exception will state:

HNP is updating the ISI Program to ASME Section XI, 2001 edition with addenda through 2003, per 10 CFR 50.55a. This differs from the Code edition specified in NUREG-1801. In the newer edition/addenda of the Code, Repair/Replacement Activities are controlled under Article IWA-4000. The IWX-4000 and IWX-7000 articles of Section XI have been incorporated into IWA-4000.

As identified in the discussion of the Bolting Integrity Program above, HNP is constrained by the requirements of the CFR with respect to the Code year it follows. The required revision to a different Code edition is the only reason for the Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program exception. This exception does not mean to suggest that the program will be exempted from the quality assurance requirements of 10 CFR 50, Appendix B.

Based on the above discussion, no exception is taken to application of the generic quality assurance program corrective actions described in LRA Subsection B.1.3 to the corrective action element for these programs. Therefore, no alternative to the application of the 10 CFR Part 50, Appendix B, quality assurance program as described in Section B.1.3 is necessary.