Progress Energy

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

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

Ladies and Gentlemen:

On July 14, 2005, the NRC requested supplemental information to facilitate the review of the proposed change to Technical Specifications (TS) 6.8.4.K and TS Surveillance Requirement (SR) 4.6.1.6.1 for the Harris Nuclear Plant (HNP), which was submitted in letter HNP-05-002 dated April 06, 2005. This supplemental information provides the Evaluation of Risk Significance of ILRT Extension based on a revision to the methodology developed for the Nuclear Energy Institute (NEI).

Attachment 1 provides the revised description, background, and technical analysis for the proposed change to the TS.

Attachment 2 provides Revision 1 of calculation HNP-F/PSA-0066, "Evaluation of Risk Significance of ILRT Extension." This supplemental evaluation validates the conclusion in the original submittal (HNP-05-002) that the requested change for a one-time extension of the next Type A Containment Integrated Leakage Rate Test is not risk significant.

This supplemental information did not result in any change to the No Significant Hazards Consideration contained in the original submittal (HNP-05-002). This document contains no new regulatory commitment.

Please refer any question regarding this submittal to Mr. Dave Corlett at (919) 362-3137.

A001

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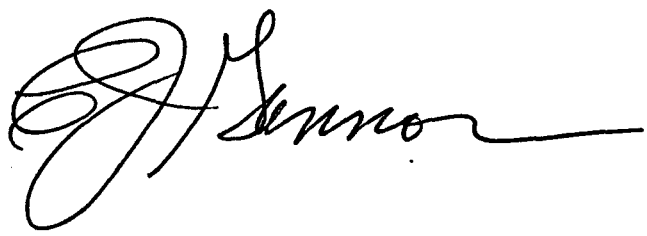
I declare, under penalty of perjury, that the attached information is true and correct (Executed on DEC 0 9 2005).

Sincerely,



CJG/jpy

Attachments:

1. Revised Description, Background, and Technical Analysis
2. HNP-F/PSA-0066, Revision 1, "Evaluation of Risk Significance of ILRT Extension"

c:
Mr. R. A. Musser, NRC Senior Resident Inspector
Ms. B. O. Hall, N.C. DENR Section Chief
Mr. C. P. Patel, NRC Project Manager
Dr. W. D. Travers, NRC Regional Administrator

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

REVISED DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

Description

Harris Nuclear Plant (HNP) proposes to revise Technical Specifications (TS) 6.8.4.k, "Containment Leakage Rate Testing Program," to incorporate a one-time extension of the Type A Containment Integrated Leakage Rate Test (ILRT) from once in 10 years to once in 15 years, which is consistent with extensions recently granted to other licensees. The proposed change will allow the Type A test to be performed within 15 years of the most recent Type A test that was performed in May 1997. The next Type A test is currently scheduled to be performed during Refueling Outage (RFO)-13 (Spring 2006). The proposed change will require performance of the next HNP Type A test no later than May 23, 2012.

In addition, HNP proposes to revise the wording of TS Surveillance Requirement (SR) 4.6.1.6.1, "Containment Vessel Surfaces," to specify that additional visual inspections are performed in accordance with Subsections IWE (Requirements for Class MC and Metallic Liners of Class CC Components of Light-Water Cooled Plants) and IWL (Requirements for Class CC Concrete Components of Light-Water Cooled Plants) of the American Society of Mechanical Engineers (ASME) Section XI Code, which provide the requirements approved by the NRC for containment vessel inspections. This proposed change does not change 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 change 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 Section XI Code and the NRC. Subsections IWE and IWL of the ASME Section XI Code provide the latest industry standards, structured examination methodology and schedule, and specific acceptance criteria to ensure that the structural integrity and leak-tightness of the HNP containment are maintained. This proposed change is intended to specify the approved program to perform these additional visual inspections and to remove reference to an extended 10-year interval.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

Proposed Change

HNP proposes to revise Technical Specifications (TS) 6.8.4.k, "Containment Leakage Rate Testing Program" and TS Surveillance Requirement (SR) 4.6.1.6.1, "Containment Vessel Surfaces."

The current 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. Therefore, the current HNP TS 6.8.4.k requires that the next Type A test be performed by May 23, 2007 (the last scheduled Refueling Outage (RFO) prior to this date is RFO-13, which is scheduled for April 8, 2006). The proposed change would revise TS 6.8.4.k to allow the next Type A test for HNP to be performed "no later than May 23, 2012." This proposed change is intended to incorporate the one-time extension of the Type A test from once in 10 years to once in 15 years, which is consistent with extensions recently granted to other licensees.

The current HNP TS SR 4.6.1.6.1 requires that in addition to 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 would revise TS SR 4.6.1.6.1 to specify that the additional inspections are to be done in accordance with Subsections IWE and IWL of the ASME Section XI Code, which provide the requirements approved by the NRC for containment vessel inspections. This proposed change does not change 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 change 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 Section XI Code and the NRC. Subsections IWE and IWL of the ASME Section XI Code provide the latest industry standards, structured examination methodology and schedule, and specific acceptance criteria to ensure that the structural integrity and leak-tightness of the HNP containment are maintained. This proposed change is intended to specify the program intended to perform additional visual inspections and to remove reference to an extended 10-year interval.

As described within the Technical Justification section of this letter, the bases for the proposed change are the satisfactory results from previous tests and inspections, combined with the re-evaluation of the risk basis.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

Background

Containment structure testing is intended to assure the leak-tight integrity of the containment structure under all design basis conditions. Conservative design and construction have led to very few containment Type A tests exceeding the leak test acceptance criteria. The NRC has extended the allowable Type A test period from three times in 10 years to once in 10 years based on past successful tests. NUREG-1493, "Performance-Based Containment Leak-Test Program," which supported that change, also states that test periods of up to 20 years would lead to an imperceptible increase in risk.

The currently approved HNP TS have established a program to implement the leakage rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50 Appendix J, Option B, as modified by approved exemptions. This program shall be in conformance with the NRC Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995, with the exception that the program is only applicable to Type A testing. Type B and Type C testing shall continue to be conducted in accordance with the original commitment to 10 CFR 50 Appendix J, Option A.

NRC Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995 endorses Nuclear Energy Institute (NEI) guidance document NEI 94-01, Revision 0 (July 1995), "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," as a method acceptable to the NRC staff for complying with the performance-based Appendix J, Option B. RG 1.163 provides four exceptions to the guidance in NEI 94-01, Revision 0. Exception 1 discusses the test interval for Type A tests. The RG states that ANSI/ANS 56.8-1994, "Containment System Leakage Testing Requirements," test intervals are not performance-based. Therefore, licensees intending to comply with 10 CFR Part 50 Appendix J, Option B for Type A test intervals must comply with Section 11.0 of NEI 94-01, which refers the licensee to Sections 9 and 10 of that document.

NEI 94-01 Section 9.2.3, "Extended Test Intervals," discusses Type A tests. This section states that Type A testing shall be performed during a period of reactor shutdown at a frequency of at least once per 10 years based on acceptable performance history. Acceptable performance history is defined as completion of two consecutive periodic Type A tests where the calculated performance leakage rate was less than 1.0 L_a. Elapsed time between the first and last tests in a series shall be at least 24 months.

Exception 3 discusses the visual examination of accessible internal and exterior surfaces of the containment system for structural problems. Exception 3 further states, "These examinations should be conducted prior to initiating a Type A test, and during two other

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

Background (continued)

refueling 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 uncovering of evidence of structural deterioration."

The other two exceptions in RG 1.163 are not pertinent to the discussion of Type A test frequencies, but instead involve Type B and Type C testing, which is not part of this license amendment request.

The preoperational Type A test for the HNP containment structure was successfully performed in February 1986. Three consecutive periodic Type A tests have been satisfactorily completed at HNP on: October 25, 1989; September 21, 1992; and May 23, 1997 (see listing in Technical Justification).

With the two most recent successful Type A tests, and a greater than 24 months of elapsed time between the two tests, HNP currently has a test interval of once every 10 years. The current 10-year interval for the completion of the next HNP Type A test ends May 23, 2007. The next Type A test is currently scheduled to be performed during Refueling Outage (RFO)-13 (Spring 2006).

On July 14, 2005, the NRC requested a re-assessment of the risk impacts of the requested change for HNP based on a revision to the methodology developed for the Nuclear Energy Institute (NEI). Specifically, the following supplemental information was requested:

> The risk assessment methodology used to support the ILRT interval extension for Shearon Harris is based on a methodology developed by Electric Power Research Institute (EPRI) in 1994. A revision to this methodology was developed for Nuclear Energy Institute (NEI) by EPRI in November 2001 ("Interim Guidance for Performing Risk Impact Assessments in Support of One-Time Extension for Containment Integrated leakage Rate Test Surveillance Intervals"), and corrected/improved the original methodology in several areas. Based on an NRC staff assessment, the revised methodology (referred to as the NEI Interim Guidance) would indicate larger risk impacts (e.g., ΔLERF) for the ILRT interval extension than the original. In view of the non-conservative nature of the original EPRI methodology, please provide a re-assessment of the risk impacts of the requested change for Shearon Harris based on the NEI Interim Guidance. In addition, if ΔLERF is greater than 10^{-7} per reactor year, please assess the total value of LERF (including external events) to show that it is less than 10^{-5} per reactor year in accordance with Regulatory Guide 1.174, Sections 2.2.4 and 2.2.5.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

Technical Justification

Summary of Test and Inspection Programs

Satisfactory results from previous Type A tests at Harris Nuclear Plant (HNP), as well as continued satisfactory results from Type B and Type C Local Leak Rate Tests and containment inspections, support the proposed one-time extension of the containment Type A test interval. The HNP reactor containment vessel (CV) will continue to be inspected under the requirements of the HNP programs for Subsections IWE and IWL of the American Society of Mechanical Engineers (ASME) Code, Section XI. The existing Type B and Type C containment penetration testing program will continue to be performed in accordance with 10 CFR 50 Appendix J, Option A.

Further justification is based on research documented in NUREG-1493 that, generically, very few potential containment leakage paths fail to be identified by Type B and Type C tests. In fact, an analysis of 144 ILRT results, including 23 failures, found that no failures were due to containment liner breach. The NUREG concluded that reducing the Type A (ILRT) testing frequency to one per twenty years would lead to an imperceptible increase in risk. Also, HNP has evaluated the risk significance of the ILRT extension and determined that the risk impact is very minor. This evaluation is provided as Attachment 2, "HNP-F/PSA-0066, Revision 1, Evaluation of Risk Significance of ILRT Extension."

Previous Type A Test Results

The preoperational Type A test for the HNP containment structure was successfully performed in February 1986. Three consecutive periodic Type A tests have been satisfactorily completed at HNP with each test passing the as-found acceptance criteria. The design basis containment leak rate limit (L_a) is 0.1% weight per day. The table below provides the test data summary.

As Found Data (Total Time Method) for HNP ILRTs Performed at Peak Accident Pressure (% weight per day)				
Date	L_{am}[1]	95% UCL[2]	Corrections[3]	As Found 95% UCL Leakage Rate
February 25,1986[4]	0.0559	0.0719	0.0008	**0.0727**
October 25, 1989	0.0406	0.0472	0.0008	**0.0480**
September 21, 1992	0.0354	0.0456	0.0158	**0.0614**
May 23, 1997	0.0285	0.0588	0.0004	**0.0668**[5]

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

Technical Justification (continued)

Notes:
1 – Calculated Leakage Rate
2 – Upper Confidence Limit calculated at 95 percent probability
3 – Correction for penetration paths not exposed to ILRT pressure and correction for net free volume change due to water level changes
4 – Preoperational Test
5 – Includes additions of 0.0041% weight per day associated with repair of leak identified at reduced pressure and 0.0035% weight per day for valves/penetrations which were repaired and/or adjusted prior to the ILRT

Subsection IWE and IWL Program Results

The HNP Subsection IWE and IWL programs are fully implemented, and expedited examinations for the first period (September 9, 1998 – September 8, 2001) of the program interval (September 9, 1998 – September 8, 2008) have been completed. General visual examination of 100% of the accessible surfaces of the CV 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. Those examinations are summarized below:

May 2000 (RFO-9), General visual examination of the liner, mechanical and electrical penetrations, personnel and emergency airlocks, equipment hatch, valve chambers, sumps and moisture barrier. No recordable conditions.

October 2000 – September 2001, General visual examination of the reinforced concrete exterior, including the dome exterior and main steam tunnel area. No recordable conditions.

In accordance with IWE-1240, "Surface Areas Requiring Augmented Examination," an engineering evaluation has been developed to determine areas that might require augmented examinations. No areas exist that are currently categorized as Examination Category E-C for augmented examinations.

The IWE and IWL program examinations have demonstrated that the structural integrity and leak-tightness of the HNP containment have not been compromised.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

Technical Justification (continued)

The proposed change would revise TS SR 4.6.1.6.1 to specify that the additional inspections are to be done in accordance with Subsections IWE and IWL of the ASME Section XI Code, which provide the requirements approved by the NRC for containment vessel inspections. This proposed change does not change 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 change 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 Section XI Code and the NRC. Subsections IWE and IWL of the ASME Section XI Code provide the latest industry standards, structured examination methodology and schedule, and specific acceptance criteria to ensure that the structural integrity and leak-tightness of the HNP containment are maintained.

The IWE and IWL examinations in combination with Type B and Type C testing provide a high degree of assurance that degradation of the containment structure will be detected and corrected before it can produce a containment leak path or impact structural integrity.

Re-Evaluation of Plant-Specific Risk Basis

A plant-specific risk assessment has been performed using guidance provided from the following documents:

Haugh, J., et al, "Interim Guidance for Performing Risk Impact Assessments in Support of One-Time Extensions for Containment Integrated Leakage Rate Test Surveillance Intervals," Revision 4, Nuclear Energy Institute (NEI), November 2001

NEI 94-01, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," Revision 0, July 26, 1995

Electric Power Research Institute (EPRI) Topical Report TR-104285, "Risk Impact Assessment of Revised Containment Leak Rate Testing Intervals," August 1994

NRC Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessments in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," July 1998

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

Technical Justification (continued)

Attachment 2 to this letter provides Revision 1 of the HNP calculation HNP-F/PSA-0066, "Evaluation of Risk Significance of ILRT Extension", which evaluated the risk impact associated with the proposed change. The following conclusions are summarized from the completed risk assessment:

> The increase in Large Early Release Frequency (LERF) from the one-time extension of the Type A test interval, including fire and seismic impacts, from the current once per 10 years to once per 15 years is 1.82E-8/year, or 0.044%. The calculated increase in LERF due to potential containment liner corrosion of 3.11E-9/year (attributable to a change in test frequency from three times in 10 years to one time in 15 years) bounds the increase of the test interval from 10 years to 15 years. Therefore, the total combined increase in LERF, due to a change in test interval from once in 10 years to once in 15 years is 2.13E-8/year.
>
> The increase in LERF from the test interval of three times in 10 years to one time in 15 years, including fire and seismic impacts, is 4.37E-8/year, or 0.105%. The calculated increase in LERF due to potential containment liner corrosion, considering a change in test frequency from three times in 10 years to one time in 15 years, is 3.11E-9/year. Therefore, the increase in LERF, due to both a change in test interval from three times in 10 years to one time in 15 years and potential containment liner corrosion, is 4.68E-8/year.

RG 1.174 provides guidance for determining the risk impact of plant-specific changes to the licensing basis. RG 1.174 defines "very small changes" in risk as resulting in increases of Core Damage Frequency (CDF) below 10^{-6} per year and increases in LERF below 10^{-7} per year. Since the containment Type A testing does not impact CDF, the relevant criterion is LERF.

Based on the guidance of RG 1.174, the change in LERF associated with an ILRT interval increase from once per 10 to once per 15 years at HNP constitutes a "very small change" in risk. HNP's risk assessment has demonstrated that increasing the ILRT interval from 10 to 15 years is non-risk significant.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

Conclusion

HNP 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.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-400/LICENSE NO. NPF-63

SUPPLEMENTAL INFORMATION TO THE PROPOSED LICENSE AMENDMENT REQUEST TO TECHNICAL SPECIFICATION (TS) 6.8.4.K AND TS SURVEILLANCE REQUIREMENT (SR) 4.6.1.6.1 (TAC NO. MC6722)

HNP-F/PSA-0066, REVISION 1, "EVALUATION OF RISK SIGNIFICANCE OF ILRT EXTENSION"