



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

October 16, 2008

The Honorable Dale E. Klein  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT: REPORT ON THE SAFETY ASPECTS OF THE LICENSE RENEWAL  
APPLICATION FOR THE SHEARON HARRIS NUCLEAR POWER PLANT,  
UNIT 1**

Dear Chairman Klein:

During the 556<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, October 2-3, 2008, we completed our review of the license renewal application for the Shearon Harris Nuclear Power Plant (HNP), Unit 1 and the final Safety Evaluation Report (SER) prepared by the NRC staff. Our Plant License Renewal Subcommittee also reviewed this matter during a meeting on May 7, 2008. During these reviews, we had the benefit of discussions with representatives of the NRC staff and the applicant, Carolina Power & Light Company (CP&L), doing business as Progress Energy Carolinas, Inc. We also had the benefit of the documents referenced. This report fulfills the requirement of 10 CFR 54.25 that the ACRS review and report on all license renewal applications.

#### CONCLUSION AND RECOMMENDATIONS

1. The programs established and committed to by the applicant to manage age-related degradation provide reasonable assurance that HNP, Unit 1 can be operated in accordance with its current licensing basis for the period of extended operation without undue risk to the health and safety of the public.
2. The application for renewal of the operating license of HNP, Unit 1 should be approved.
3. Prior to the period of extended operation, the staff should inspect the applicant's programs for managing water intrusion into underground cable vaults and cable insulation testing.

#### BACKGROUND AND DISCUSSION

HNP, Unit 1 is a three-loop Westinghouse pressurized water reactor with a large, dry, steel-lined, reinforced concrete containment. The current power rating of 2900 MWt includes a 4.5 percent power uprate that was implemented in 2001. The original HNP steam generators were replaced in 2001. Pressurizer nozzle weld overlays and enlargement of the containment sump screen were completed in 2007. CP&L requested renewal of the HNP, Unit 1 operating license for 20 years beyond the current license term, which expires on October 24, 2026.

In the final SER, the staff documented its review of the license renewal application and other information submitted by CP&L and obtained during the audits and an inspection conducted at the plant site. The staff reviewed the completeness of the applicant's identification of structures, systems, and components (SSCs) that are within the scope of license renewal; the integrated plant assessment process; the applicant's identification of the plausible aging mechanisms associated with passive, long-lived components; the adequacy of the applicant's Aging Management Programs (AMPs); and the identification and assessment of time-limited aging analyses (TLAAs) requiring review.

The applicant identified the SSCs that fall within the scope of license renewal and performed an aging management review for these SSCs. The applicant will implement 40 AMPs for license renewal. These include 28 existing programs, 19 of which have been enhanced, and 11 new programs that are consistent with guidance in the Generic Aging Lessons Learned (GALL) Report. In addition, one new site-specific AMP for testing of underground high-voltage oil-filled cable connections to the plant switchyard was developed as a result of the staff's audits and review.

The applicant identified the systems and components requiring TLAAs and reevaluated them for the period of extended operation. The staff concluded that the applicant has provided an acceptable list of TLAAs, as defined in 10 CFR 54.3. Further, the staff concluded that in all cases the applicant has met the requirements of the license renewal rule by demonstrating that: (a) the TLAAs will remain valid for the period of extended operation; (b) the TLAAs have been projected to the end of the period of extended operation; or (c) the aging effects will be adequately managed for the period of extended operation. We concur with the staff's conclusion that HNP TLAAs have been properly identified and that the required criteria will be met for the period of extended operation.

The staff conducted four license renewal audits and one inspection at the HNP site. The audits verified the appropriateness of the scoping and screening methodology, AMPs, aging management reviews, and TLAAs. The inspection verified that the license renewal requirements are appropriately implemented. Based on the audits and inspection, the staff concludes in the SER that the proposed activities will effectively manage the aging of SSCs identified in the application and that the intended functions of these SSCs will be maintained during the period of extended operation. We agree with this conclusion.

Corrosion of the containment liner at the base slab was detected in 1997. The moisture barrier was replaced in 1998, and only minor corrosion has been observed during subsequent inspections. Minor corrosion and pitting was recorded in 1993, 2000, and 2004 on exterior and interior surfaces of the containment spray and residual heat removal valve enclosures in the Auxiliary Building, which form part of the containment pressure boundary. No significant material loss has been reported. We agree with the staff's conclusion that the HNP ASME Section XI, Subsection IWE Program will adequately detect and manage the effects of containment liner corrosion.

Prior to the period of extended operation, the staff should confirm that the applicant has properly implemented the testing program intended to ensure that long-term cable insulation properties are maintained. Due to the plant-specific history of water intrusion into underground cable vaults, the staff should also confirm the adequacy of the applicant's programs to monitor and control water levels to minimize wetting of the cables.

The HNP current licensing basis (CLB) analyses include credit for closure of the feedwater regulating valves and bypass valves as a redundant method for main feedwater isolation during a main steamline break inside containment. According to the CLB, the feedwater regulating and bypass valves are not classified as safety-related components. The valves are located in the Turbine Building and close automatically from a main feedwater isolation signal, a loss of power signal from the reactor protection system, loss of control air, or loss of DC power. The staff raised a concern that the license renewal requirements for safety-related components, specified under 10 CFR 54.4(a)(1) should apply to these valves, due to their main feedwater isolation function. The applicant responded that Section 15.1.5 of the Standard Review Plan specifically allows credit for backup nonsafety-related components to mitigate the consequences of a main steamline break inside containment, following a single failure of an active safety-related isolation valve. As a result, the staff concludes in the final SER that the feedwater regulating and bypass valves are properly categorized as nonsafety-related components, that the requirements of 10 CFR 54.4(a)(2) apply to these valves, and that no additional SSCs need to be included within the HNP license renewal scope to ensure the isolation function of these valves. We agree with these conclusions.

We agree with the staff that there are no issues related to the matters described in 10 CFR 54.29(a)(1) and (a)(2) that preclude renewal of the operating license for HNP, Unit 1. The programs established and committed to by CP&L provide reasonable assurance that HNP, Unit 1 can be operated in accordance with its current licensing basis for the period of extended operation without undue risk to the health and safety of the public. The CP&L application for renewal of the operating license for HNP, Unit 1 should be approved.

Sincerely,

*/RA/*

William J. Shack,  
Chairman

## REFERENCES

1. Letter dated November 14, 2006, from C. J. Gannon, Jr., Carolina Power & Light Company, doing business as Progress Energy Carolinas, Inc. to U.S. Nuclear Regulatory Commission, transmitting the Shearon Harris Nuclear Power Plant, Unit 1, Application for Renewal of Operating License (ML063350270).
2. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report Related to the License Renewal of Shearon Harris Nuclear Power Plant, Unit 1," August 2008 (ML082340985).
3. Letter dated March 26, 2008, from M. Heath, U.S. Nuclear Regulatory Commission to R. J. Duncan II, Carolina Power & Light Company, transmitting the "Audit Summary Regarding the License Renewal Application for the Shearon Harris Nuclear Power Plant, Unit 1" (ML080800243).
4. Letter dated September 10, 2007, from J. W. Shea, U.S. Nuclear Regulatory Commission to R. J. Duncan II, Carolina Power & Light Company, transmitting Shearon Harris Nuclear Power Plant NRC Inspection Report 05000400/2007007 (ML072530894).

5. U.S. Nuclear Regulatory Commission, NUREG-1801, Volumes 1 & 2, Revision 1, "Generic Aging Lessons Learned Report," September 2005.
6. Letter dated May 30, 2008, from C. L. Burton, Progress Energy Carolinas, Inc. to U.S. Nuclear Regulatory Commission, transmitting "Resolution of Open Item and License Renewal Application Amendment 8" (ML081570346).
7. U.S. Nuclear Regulatory Commission, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Chapter 15, Accident Analysis, Section 15.1.5, Steam System Piping Failures Inside and Outside of Containment PWR, Revision 3, March 2007.

5. U.S. Nuclear Regulatory Commission, NUREG-1801, Volumes 1 & 2, Revision 1, "Generic Aging Lessons Learned Report," September 2005.
6. Letter dated May 30, 2008, from C. L. Burton, Progress Energy Carolinas, Inc. to U.S. Nuclear Regulatory Commission, transmitting "Resolution of Open Item and License Renewal Application Amendment 8" (ML081570346).
7. U.S. Nuclear Regulatory Commission, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Chapter 15, Accident Analysis, Section 15.1.5, Steam System Piping Failures Inside and Outside of Containment PWR, Revision 3, March 2007.

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