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

ACRSR-2192

May 17, 2006

The Honorable Nils J. Diaz
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: REPORT ON THE SAFETY ASPECTS OF THE LICENSE RENEWAL APPLICATION FOR THE BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

Dear Chairman Diaz:

During the 532nd meeting of the Advisory Committee on Reactor Safeguards, May 4-5, 2006, we completed our review of the license renewal application for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2 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 February 8, 2006. During these reviews, we had the benefit of discussions with representatives of the staff and the applicant, Carolina Power and Light (CP&L). We also had the benefit of the documents referenced. This report fulfills the requirement of 10 CFR 54.25, which requires that the ACRS review and report on all license renewal applications.

## CONCLUSIONS AND RECOMMENDATIONS

1. The programs committed to and established by the applicant to manage age-related degradation provide reasonable assurance that BSEP, Units 1 and 2 can be operated in accordance with their current licensing basis for the period of extended operation with no undue risk to the health and safety of the public.

2. CP&L's application for renewal of the operating licenses for BSEP, Units 1 and 2 should be approved.

3. The staff's new two-tiered process for reviewing the scoping of balance of plant (BOP) systems was effective and improved the efficiency of the review. This process should be used by the staff in its review of future license renewal applications.

## BACKGROUND AND DISCUSSION

BSEP consists of two boiling water reactor (BWR) units that were built on a site located south of Wilmington, NC at the mouth of the Cape Fear River in Brunswick County. The current operating licenses will expire on September 8, 2016 for Unit 1 and December 27, 2014 for Unit 2. The applicant has requested renewal of these licenses for an additional 20 years. These units are General Electric BWRs with Mark I containments. Each unit is authorized to operate at 2,923 MWt. The main condensers are cooled by a once-through circulating water system using cooling water from the Cape Fear River estuary.

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

The application demonstrates consistency with, or justifies deviations from, the approaches specified in the Generic Aging Lessons Learned Report. The applicant has correctly identified those long-lived passive SSCs from both units that fall within the scope of license renewal. The applicant performed an aging management review of components in scope. Based on the results of this review, the licensee will apply 20 Aging Management Programs (AMP) to both units and 14 additional AMPs which are specific to one unit or the other. Of the 34 AMPs, 26 are existing AMPs and 8 are new AMPs.

This application was the first to be reviewed using a new two-tiered process for the scoping of BOP systems. In Tier 1, the license renewal application and the Updated Final Safety Analysis Report were reviewed to identify apparent missing components for an aging management review. In Tier 2, the license renewal boundary drawings and other licensing basis documents were reviewed in addition to the license renewal application and the Updated Final Safety Analysis Report. The screening criteria used to identify systems for the detailed Tier-2 review are based on: safety importance/risk significance; potential for system failure to cause failure of redundant safety system trains; operating experience indicating likely passive failures; and experience from reviews of previous license renewal applications indicating likely omissions. For this license renewal application, 15 BOP systems received a Tier-1 review and 24 BOP systems received a Tier-2 review. The two-tiered review process was effective and the staff should continue to use this process in reviewing future license renewal applications.

The staff conducted an inspection and an audit of this license renewal application. The inspection was performed to verify that the scoping and screening methodology was consistent with the regulations and adequately reflected in the application. The audit verified that the AMPs and the Aging Management Reviews are adequate. Based on the inspection and audit, the staff concluded that the license renewal activities are consistent with the descriptions contained in the CP&L license renewal application. Also, the staff concluded that existing programs to be credited as AMPs for license renewal are generally functioning well and that an implementation plan had been established in the applicant's Action Request System to track license renewal commitments to ensure their timely completion.

Analyses of reactor vessel neutron embrittlement (upper shelf energy and pressure-temperature limits) performed by the applicant and independently verified by the staff demonstrate that the limiting reactor vessel beltline welds and plate materials will satisfy the acceptance criteria for the period of extended operation. Both the applicant and the staff chose to use a conservative lifetime capacity factor of 90 percent for determining neutron fluence. We agree.

The construction details of the Mark I containments used in this plant are unique. The drywell uses reinforced concrete as the load bearing structural component with an inner liner of carbon steel which serves as a leak-tight membrane. While liner integrity is important to ensure leak tightness, the structural integrity of the liner is not important in maintaining the integrity of the pressure boundary. The applicant proposes a combination of visual inspections to detect liner bulges and corrosion as well as the integrated leak rate tests as an adequate containment liner AMP. The staff has accepted this approach. We concur.

No open items or confirmatory items have been identified in the SER. CP&L has made 31 commitments related to establishing AMPs to manage aging effects for structures and components identified during the scoping review. The staff has included appropriate license conditions in the final SER to satisfy remaining documentation issues and action items. No changes in the technical specifications for BSEP are required.

CP&L submitted a well prepared application for renewal of the licenses for BSEP, Units 1 and 2, which resulted in a reduction in the number of Requests for Additional Information (RAIs). CP&L's responses to the staff's RAIs were thorough and timely. The staff's evaluation was technically comprehensive and well documented in the final SER.

No issues related to the matters described in 10 CFR 54.29(a)(1) and (a)(2) preclude renewal of the operating licenses for BSEP, Units 1 and 2. The programs committed to and established by the applicant provide reasonable assurance that BSEP, Units 1 and 2 can be operated in accordance with their current licensing basis for the period of extended operation with no undue risk to the health and safety of the public. The application for renewal of the operating licenses for BSEP, Units 1 and 2 should be approved.

Sincerely,

**/RA/**

Graham B. Wallis
Chairman

References:

1. U.S. Nuclear Regulatory Commission, "The Final Safety Evaluation Report Related to the License Renewal of the Brunswick Steam Electric Plant, Units 1 and 2," dated March 2006.
2. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report Related to the License Renewal of the Brunswick Steam Electric Plant, Units 1 and 2," dated December 2005.
3. Progress Energy Carolinas, Inc., "Brunswick Steam Electric Plant, License Renewal Application," dated October 18, 2004.
4. U.S. Nuclear Regulatory Commission, "Brunswick Steam Electric Plant - Inspection Report 05000325/2005008 and 05000324/2005008," dated July 22, 2005.
5. Brookhaven National Laboratory, "Audit and Review Report for Plant Aging Management Reviews and Programs Brunswick Steam Electric Plant, Units 1 and 2," dated June 21, 2005.
6. U.S. Nuclear Regulatory Commission, "Generic Aging Lessons Learned Report," NUREG-1801, Vol. 1-2, Rev. 1, dated September 2005.

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