



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

April 24, 2012

The Honorable Gregory B. Jaczko  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT:     REPORT ON THE SAFETY ASPECTS OF THE LICENSE RENEWAL  
                 APPLICATION FOR THE COLUMBIA GENERATING STATION**

Dear Chairman Jaczko:

During the 593<sup>rd</sup> meeting of the Advisory Committee on Reactor Safeguards (ACRS), April 12-14, 2012, we completed our review of the license renewal application (LRA) for the Columbia Generating Station (CGS) and the final Safety Evaluation Report (SER) prepared by the NRC staff. Our Plant License Renewal Subcommittee also reviewed this matter during its meeting on October 19, 2011. During these reviews, we had the benefit of discussions with representatives of the NRC staff and Energy Northwest (EN or the applicant). 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 RECOMMENDATION**

1. The programs established and committed to by the applicant to manage age-related degradation provide reasonable assurance that CGS can be operated in accordance with its current licensing basis (CLB) for the period of extended operation (PEO) without undue risk to the health and safety of the public.
2. The EN application for renewal of the operating license of CGS should be approved.

**BACKGROUND AND DISCUSSION**

CGS is a boiling-water reactor (BWR-5) designed by General Electric with a Mark II containment. CGS is located approximately 12 miles north of Richland, WA and 3 1/2 miles west of the Columbia River, on land leased from the Department of Energy on the Hanford Nuclear Site. The licensed power output of the unit is 3,886 megawatts thermal with a gross electrical output of approximately 1,230 megawatts electric. EN has requested renewal of the CGS operating license for 20 years beyond the current license term, which expires on December 20, 2023.

In the final SER, the staff documented its review of the license renewal application and other information submitted by the applicant or obtained from the staff audits and inspection at the plant site. The staff reviewed the completeness of the applicant's identification of the 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.

In the CGS license renewal application, EN identified the SSCs that fall within the scope of license renewal. For these SSCs, the applicant performed a comprehensive aging management review. The applicant will implement 55 AMPs for license renewal, of which 35 are existing programs and 20 are new programs. The EN application either demonstrates consistency with NUREG-1801, Generic Aging Lessons Learned (GALL) Report, or documents deviations to the approaches specified in that Report. We have reviewed the exceptions and agree with the staff that they are acceptable.

The staff conducted two license renewal audits and an inspection at CGS. The audits verified the appropriateness of the scoping and screening methodology, aging management review, and associated AMPs. The inspection verified that the license renewal requirements are being appropriately implemented. Based on the audit and inspection, the staff concluded in the final SER that the proposed activities will reasonably manage the effects of 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 these conclusions.

#### Closure of the Open Items from the draft SER

At the conclusion of the ACRS Plant License Renewal Subcommittee meeting on October 19, 2011, there were six open items. These were closed as follows:

##### High Voltage Porcelain Insulators

The applicant indicated that it would include the 230 kV post insulators at the Ashe Substation as part of the High Voltage Porcelain Insulator Program with testing every eight years and cleaning if needed.

##### Use of Operating Experience

The staff reviewed several aspects associated with the applicant's activities for the ongoing review of operating experience and determined that the applicant will perform the appropriate review of operating experience related to aging.

### Upper-Shelf Energy (USE)

The staff had concerns that the applicant did not provide a technical basis for the unirradiated transverse USE and copper content used in the calculation of the projected USE for the N12 nozzles. The applicant provided additional information to address the staff's concerns. The copper content was acceptable to the staff because it was an appropriately conservative value from the database. The applicant also identified Charpy data from the same heat as its N12 nozzles. The data indicated that the USE in the longitudinal orientation for this heat is on the order of 230 ft-lbs or more. Based on this data, the staff found the applicant's conservative data of 62 ft-lbs to be acceptable, and that the USE for the N12 nozzles will remain greater than 50 ft-lbs at the end of vessel life in accordance with 10 CFR Part 50 Appendix G.

### Metal Fatigue

The staff noted that the applicant's plant-specific configuration contains additional locations that may need to be analyzed for the effects of the reactor coolant environment other than those identified in NUREG/CR-6260. The applicant provided additional information to address the staff's concern. Based on an audit, the staff was able to verify the applicant's approach in identifying locations that can be affected by environmentally assisted fatigue.

### Core Plate Rim Hold-Down Bolts

In its original LRA submitted on January 19, 2010, the applicant stated that CGS had wedges installed around the periphery of the core plate within the shroud. Subsequently, the applicant was informed by General Electric that no core plate wedges were installed. CGS confirmed this to be accurate by in-vessel inspection. Lateral restraint was instead provided by hold-down bolts. Unlike hold-down bolts, core plate wedges prevent lateral motion of the core plate and are not subject to stress relaxation. The applicant has committed to follow the guidance in BWRVIP-25, "BWR Core Plate Inspection and Flaw Evaluation Guidelines," for the analysis and inspection of the hold-down bolts, which provides a justification for operation through the current license period. The staff will issue a license condition requiring the applicant to install core plate wedges on or before December 20, 2021.

Upon discovery that the vendor design information was inaccurate, the applicant conducted a review of the extent of condition of the vessel internals that are subject to inspection according to BWRVIP guidelines. This review demonstrated that the absence of the core plate wedges was the only deviation from the documented design of the components required to be inspected.

### Crane Load Cycle Limit

In the LRA, the applicant did not address TLAA's of its in-scope cranes. However, the staff determined that the analyses of the cranes meet the definition of a TLAA because the cranes have a design limit on cycles. The applicant provided additional information to address the staff's concern and identified the analyses of its cranes as TLAA's.

The staff concluded that the applicant has provided an adequate list of TLAAs. Further, the staff concluded that the applicant has met the requirements of the License Renewal Rule by demonstrating that the TLAAs will remain valid for the PEO, or that the TLAAs have been projected to the end of the PEO, or that the aging effects will be adequately managed for the PEO.

The staff has concluded that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the PEO, as required by 10 CFR 54.21(a)(3). We concur with this conclusion.

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 CGS. The programs established and committed to by EN provide reasonable assurance that the CGS can be operated in accordance with its current licensing basis for the PEO without undue risk to the health and safety of the public. The EN application for renewal of the operating license for CGS should be approved.

Sincerely,

/RA/

J. Sam Armijo  
Chairman

## REFERENCES

1. NRC Safety Evaluation Report Related to the License Renewal of Columbia Generating Station, February 2012 (ML12059A357).
2. Safety Evaluation Report with Open Items Related to the License Renewal of Columbia Generating Station, August 2011 (ML11349A022).
3. Columbia Generating Station License Renewal Application, January 19, 2010 (ML100250656).
4. Energy Northwest Letter, Columbia Generating Station License Renewal Application First Annual Update, July 16, 2010 (ML102090559).
5. NRC Letter, NRC Scoping and Screening Audit Report Regarding the Columbia Generating Station License Renewal Application, August 19, 2010 (ML102160357).
6. NRC Letter, Columbia Generating Station NRC License Renewal Inspection Report 05000397/2010007, December 17, 2010 (ML103540496).
7. NRC Letter, Audit Report Regarding the Columbia Generating Station License Renewal Application, January 21, 2011 (ML102450757).
8. NRC Letter, Audit Report on the Metal Fatigue Calculations in the Columbia Generating Station License Renewal Application, February 16, 2012 (ML12033A058).

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Letter to The Honorable Gregory B. Jaczko, NRC Chairman from J. Sam Armijo, ACRS  
Chairman, dated April 24, 2012

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