



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

March 13, 2015

The Honorable Stephen G. Burns  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT:     REPORT ON THE SAFETY ASPECTS OF THE LICENSE RENEWAL  
              APPLICATION OF THE SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2.**

Dear Chairman Burns:

During the 622<sup>nd</sup> meeting of the Advisory Committee on Reactor Safeguards (ACRS), March 6-7, 2015, we completed our review of the license renewal application for Sequoyah Nuclear Plant Units 1 and 2 (Sequoyah) and the final Safety Evaluation Report (SER) prepared by the NRC staff. Our subcommittee on Plant License Renewal reviewed this matter during a meeting on November 5, 2014. During these reviews, we had the benefit of discussions with representatives of the NRC staff and the Tennessee Valley Authority (TVA). 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 TVA to manage age-related degradation provide reasonable assurance that Sequoyah can be operated in accordance with its current licensing bases for the period of extended operation without undue risk to the health and safety of the public.
2. TVA's application for renewal of the operating licenses for Sequoyah Nuclear Plant Units 1 and 2 should be approved.

**BACKGROUND**

Sequoyah is a dual-unit site located northeast of Chattanooga, Tennessee. The NRC issued the Sequoyah Unit 1 construction permit on May 27, 1970, and operating license on September 17, 1980. The NRC issued the Sequoyah Unit 2 construction permit on May 27, 1970, and operating license on September 15, 1981.

Both units are of a pressurized water reactor design. Westinghouse Electric Corporation supplied the nuclear steam supply system. TVA designed and constructed the balance of the plant. Each unit utilizes an ice condenser containment. The licensed power output for each unit is 3,455 megawatts thermal with a gross electrical output of approximately 1,199 megawatts electric.

In this application, TVA requests renewal of the operating licenses (Facility Operating License Nos. DPR-77 and DPR-79) for a period of 20 years beyond the current expiration at midnight September 17, 2020, for Unit 1, and at midnight September 15, 2021, for Unit 2.

## **DISCUSSION**

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

TVA's Sequoyah license renewal application identified the SSCs that fall within the scope of license renewal. The application demonstrates consistency with the Generic Aging Lessons Learned (GALL) Report (NUREG-1801, Revision 2) or documents and justifies deviations to the specified approaches in that report. TVA will implement 43 AMPs for license renewal, comprised of 31 existing programs and 12 new programs. Eighteen of the 43 AMPs are consistent with the GALL Report, without enhancements or exceptions. Twenty-three AMPs are consistent with enhancements. One AMP is consistent with enhancements and exceptions. We agree with the staff's conclusions that the GALL program exceptions are acceptable. One AMP is plant-specific.

The one AMP that is plant-specific is the program titled "Periodic Surveillance and Preventative Maintenance Program (PSPM)." This AMP commits to visual examination or inspection of numerous components for aging effects that are not covered by the other AMPs, such as loss of material, fouling, cracking, and change in material properties.

The staff conducted license renewal audits and performed a license renewal inspection at Sequoyah. The audits verified the appropriateness of the scoping and screening methodology for AMPs, the aging management review, and the TLAAs. The inspection verified that the license renewal requirements are implemented appropriately. Both the inspection and the report of that inspection are thorough. Based on the audits, inspection, and staff reviews related to this license renewal application, the staff concluded in the final SER that the proposed activities will 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 this conclusion.

The single remaining open item that was resolved between our subcommittee meeting and our final review on March 6, 2015 addressed reactor vessel internals neutron fluence. TVA communicated that the existing Reactor Vessel Internals Program, with enhancements, will be consistent with the program described in NUREG-1801, Section XI.M16A, PWR Vessels Internals Program, as revised by LR-ISG-2011-04. The staff determined that more information was required in order to demonstrate that the projected neutron fluence on the upper core plate (UCP) of the internals after 60 years will be acceptable. TVA submitted information that identified the peak projected fluence values for the UCP locations of interest, compared those values with previous fluence models, and provided qualification and adequacy of the methodology and uncertainty in those models. Recognizing that the neutron fluence values on the UCP are above applicable irradiation damage limits, TVA has committed to periodic visual inspection of the UCP. A more extensive inspection of the UCP will be initiated if cracking is observed in the lower core barrel girth weld. The staff found that the applicant has adequately addressed the staff's concerns regarding fluence in the UCP and closed the open item. We concur with the staff's acceptance of the resolution.

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 Sequoyah. The programs established and committed to by TVA provide reasonable assurance that Sequoyah 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 TVA application for renewal of the operating license for Sequoyah Nuclear Plant Units 1 and 2 should be approved.

Dr. Peter Riccardella did not participate in the Committee's deliberations regarding this matter.

Sincerely,

**/RA/**

John W. Stetkar  
Chairman

## REFERENCES

1. Safety Evaluation Report Related to the License Renewal of Sequoyah Nuclear Plant Units 1 and 2, dated January 2015 (ML15021A356).
2. Sequoyah Nuclear Plant Units 1 and 2- NRC License Renewal Inspection, Inspection Report 05000327/2013012 AND 05000328/2013012, dated January 31, 2014 (ML14031A291).
3. Safety Evaluation Report with Open Items Related to the License Renewal of Sequoyah Nuclear Plant Units 1 and 2, dated September 2014 (ML14266A033).

4. Sequoyah Nuclear Plant, Units 1 and 2, License Renewal Application (Package), dated January 7, 2013 (ML130240007).
5. NRC Aging Management Programs Audit Report Regarding the Sequoyah Nuclear Plant Units 1 and 2, dated June 13, 2013 (ML13141A320).
6. Scoping and Screening Methodology Audit Report regarding the Sequoyah Nuclear Plant Units 1 and 2, dated May 16, 2013 (ML13119A135).
7. NRC NUREG 1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," dated December 2010 (ML103409041).
8. NRC NUREG-1800, Revision 2, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR), dated December 2010 (ML103409036).
9. NRC Regulatory Guide 1.188, Revision 1, "Standard Format and Content for Application to Renew Nuclear Power Plant Operating Licenses," dated September 2005 (ML082950585).
10. NRC License Renewal Interim Staff Guidance, "Updated Aging Management Criteria for Reactor Vessel Internal Components for Pressurized Water Reactors," LR-ISG-2011-04, dated June 3, 2013 (ML12270A436)

4. Sequoyah Nuclear Plant, Units 1 and 2, License Renewal Application (Package), dated January 7, 2013 (ML130240007).
5. NRC Aging Management Programs Audit Report Regarding the Sequoyah Nuclear Plant Units 1 and 2, dated June 13, 2013 (ML13141A320).
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7. NRC NUREG 1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," dated December 2010 (ML103409041).
8. NRC NUREG-1800, Revision 2, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR), dated December 2010 (ML103409036).
9. NRC Regulatory Guide 1.188, Revision 1, "Standard Format and Content for Application to Renew Nuclear Power Plant Operating Licenses," dated September 2005 (ML082950585).
10. NRC License Renewal Interim Staff Guidance, "Updated Aging Management Criteria for Reactor Vessel Internal Components for Pressurized Water Reactors," LR-ISG-2011-04, dated June 3, 2013 (ML12270A436)

Accession No: **ML15070A551**

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