



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

ACRSR-2124

May 13, 2005

The Honorable Nils J. Diaz
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 2005-0001

SUBJECT: REPORT ON THE SAFETY ASPECTS OF THE LICENSE RENEWAL
APPLICATION FOR ARKANSAS NUCLEAR ONE, UNIT 2

Dear Chairman Diaz:

During the 522nd meeting of the Advisory Committee on Reactor Safeguards, May 5-6, 2005, we completed our review of the license renewal application for Arkansas Nuclear One, Unit 2 (ANO-2), and the associated final Safety Evaluation Report (SER) prepared by the NRC staff. Our Plant License Renewal Subcommittee also reviewed this matter during a meeting on December 1, 2004. During our review, we had the benefit of discussions with representatives of the NRC staff and Entergy Operations, Inc. (Entergy). We also had the benefit of the documents referenced. This report fulfills the requirements 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 ANO-2 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 Entergy application for renewal of the operating license for ANO-2 should be approved.

BACKGROUND AND DISCUSSION

ANO-2 is a Combustion Engineering pressurized water reactor rated at 3026 MWt, enclosed in a large dry containment building. The current power rating includes a 7.5% power uprate implemented in 2002. The ANO-2 steam generators were replaced with new Westinghouse Delta steam generators with Alloy 690 tubing in conjunction with this power uprate.

Entergy requested renewal of the ANO-2 operating license for 20 years beyond the current license term, which expires on July 17, 2018. In the final SER, the staff documents its review of the license renewal application and other information submitted by Entergy and obtained during the audits and inspections 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 plausible aging mechanisms associated with passive, long-lived components; the adequacy of the applicant's aging management programs; and the identification and assessment of time-limited aging analyses (TLAAs).

The ANO-2 application demonstrates consistency with the Generic Aging Lessons Learned (GALL) Report or documents deviations from the approaches specified in that report. The ANO-2 application is the second one evaluated by the staff using the new audit and review process developed to confirm consistency with, and the acceptability of deviations from, the GALL Report. The new process requires that more review activities be conducted at the site. As in the first application, this approach has resulted in more effective interactions between the applicant and the staff and has significantly reduced requests for additional information (RAIs).

During its review, the staff identified several components that the applicant should have included in the scope of license renewal but did not. The applicant subsequently brought them into scope. The staff concluded that these omissions were the result of minor oversights or different interpretations of the scoping methodology, and not an indication of process problems. The staff also concluded that the applicant's scoping and screening processes have successfully identified SSCs within the scope of license renewal and subject to an aging management review. We agree with these conclusions.

The applicant performed a comprehensive aging management review of all SSCs within the scope of license renewal. In the application, Entergy describes 34 aging management programs for license renewal, including existing, enhanced, and new programs. We agree with the staff's conclusion that these programs are adequate.

Implementation is key to effective aging management programs. Although the applicant's Structures Monitoring-Masonry Wall Program is consistent with the GALL Report, the staff's audit of this program revealed that the initial baseline examinations were not documented properly, the first 5-year reexamination was not performed, and qualifications for personnel responsible for walkdowns were not established. The Annual Assessment Letter for ANO, Units 1 and 2, dated March 3, 2004, had already identified a substantive cross-cutting issue concerning problem identification and resolution. Based on the Annual Assessment Letter dated March 2, 2005, the weaknesses in the ANO-2 Problem Identification and Resolution Program appear to have been corrected. Maintaining an effective problem identification and resolution program is critical to the success of the aging management programs.

As in previous reviews, we questioned the adequacy of relying on opportunistic inspections of inaccessible buried piping and tanks, in lieu of periodic inspections at a plant-specific frequency, as specified in the GALL Report. The applicant has committed to enhance its Buried Piping Inspection Program by performing an inspection within 10 years of entering the period of extended operation unless an opportunistic inspection has occurred within this 10-year period. This program enhancement is appropriate.

The applicant identified and reevaluated systems and components requiring TLAA's for 20 more years of operation. The applicant's analyses of reactor vessel embrittlement (upper shelf energy, pressurized thermal shock, and pressure-temperature limits), independently verified by the staff, demonstrate that the limiting beltline materials will satisfy the acceptance criteria at 48 effective full-power years (EFPYs). This value corresponds to a constant capacity factor of 80% for 60 years. We questioned the use of 48 EFPYs, rather than the 54 EFPYs used by other applicants to bound 60 years of operation. Given the current performance of the fleet, 54 EFPYs seems to be a more appropriate value for 60 years of operation. The staff independently verified that the upper shelf energy and pressurized thermal shock acceptance criteria would still be met at 54 EFPYs.

In 2000, nondestructive examinations revealed a number of leaks in pressurizer and hot-leg penetration nozzles. The applicant implemented repairs using the half-nozzle repair technique. The applicant evaluated the potential for existing flaws in the remaining pressurizer and hot-leg penetration welds to propagate into the pressurizer or hot leg. The applicant has performed a TLAA to bound the period of extended operation and has demonstrated that stress corrosion cracking will not cause existing flaws to propagate into the carbon steel or low-alloy steel base metal.

Since a shroud prevents a complete 360E bare metal visual inspection of some of the control rod drive mechanism (CRDM) penetrations, the applicant performed alternative eddy current and volumetric inspections. Although these inspections did not identify any cracking or leakage, ANO-2 is ranked as highly susceptible to CRDM cracking. The applicant has scheduled the procurement of a new reactor vessel head in 2006. Meanwhile, the applicant plans to modify the shroud to allow increased access for visual examinations.

We agree with the staff that no issues related to the matters described in 10 CFR 54.29(a)(1) and (a)(2) preclude renewal of the operating license for ANO-2. The programs established and committed to by Entergy provide reasonable assurance that ANO-2 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 Entergy application for renewal of the operating license for ANO-2 should be approved.

Sincerely,

/RA/

Graham B. Wallis
Chairman

References

3. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report Related to the License Renewal of the Arkansas Nuclear One, Unit 2," April 2005
4. Entergy Operations Inc., "License Renewal Application Arkansas Nuclear One - Unit 2," October 2003
5. U.S. Nuclear Regulatory Commission, "Draft Safety Evaluation Report Related to the License Renewal of the Arkansas Nuclear One, Unit 2," November 2004
6. U.S. Nuclear Regulatory Commission, "Arkansas Nuclear One, Unit 2 - NRC License Renewal Scoping and Screening Inspection Report 05000368/2004-06," April 19, 2004
7. Information Systems Laboratories, Inc., "Audit and Review Report for Plant Aging Management Reviews and Programs, Arkansas Nuclear One - Unit 2," July 29, 2004