ACRSR-1972

November 16, 2001

The Honorable Richard A. Meserve
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Chairman Meserve:

SUBJECT: REPORT ON THE SAFETY ASPECTS OF THE LICENSE RENEWAL APPLICATION FOR THE EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2

During the 487th meeting of the Advisory Committee on Reactor Safeguards, November 8-10, 2001, we completed our review of the Southern Nuclear Operating Company's (SNC's) application for license renewal of the Edwin I. Hatch Nuclear Plant, Units 1 and 2, and the related final Safety Evaluation Report (SER). We issued an interim letter concerning this application and the SER with open items on April 16, 2001, and our Plant License Renewal Subcommittee held discussions with representatives of the staff and SNC on October 25, 2001. We also had the benefit of the documents referenced.

Conclusions and Recommendations

1. The SNC application for renewal of the operating licenses for Hatch, Units 1 and 2, should be approved.

2. The programs instituted to manage aging-related degradation are appropriate and provide reasonable assurance that Hatch, Units 1 and 2, can be operated safely in accordance with their licensing bases for the period of extended operation without undue risk to the health and safety of the public.

3. The staff has performed a comprehensive review of SNC's application. The open items identified in the February 2001 draft SER have been resolved satisfactorily.

4. The SER clarifies staff positions on non-safety-related seismic II-over-I piping systems, long-lived passive components of skid-mounted complex assemblies, fan housings, and damper frames. These clarifications provide significant guidance that could prevent these issues from becoming open items in future applications. They should be incorporated into the generic license renewal guidance documents.

Background and Discussion

This report fulfills the requirement of 10 CFR 54.25 that the ACRS review and report on license renewal applications. SNC requested renewal of the operating licenses for Hatch, Units 1 and 2, for a period of 20 years beyond the current license terms, which expire on August 6, 2014, for Unit 1, and June 13, 2018, for Unit 2. The final SER documents the results of the staff's review of information submitted by SNC, including those commitments that were necessary to resolve open items identified by the staff in its February 2001 draft SER. The staff's review included the verification of the completeness of structures, systems, and components (SSCs) identified in the application, the validation of the integrated plant assessment process, the identification of the possible aging effects associated with each passive long-lived component, and the verification of the adequacy of the aging management programs. The staff also conducted site inspections to verify the adequacy of the implementation of the methodology described in the application.

As noted in our April 16, 2001 interim letter, the SNC's approach to identifying SSCs that are within the scope of the License Renewal Rule is function-based, rather than the system-based approach used in previous applications. This approach was adequate, but made it difficult for the reviewers to ascertain which SSCs were in scope and which were not. The staff's review relied heavily on supporting documents located at the site and on requests for additional information. In addition, the staff performed a "walk-through" of the process for three systems that are within scope. On the basis of its extensive review, the staff identified some additional components that the applicant should have included within the scope of license renewal, and classified them as open items. These open items have been resolved by including the additional components in scope. We concur with the staff that the applicant has now properly identified SSCs requiring an aging management review.

Components brought into scope through the resolution of open items include non-safety-related seismic II-over-I piping systems, long-lived passive components of skid-mounted complex assemblies, fan housings, and damper frames. The inclusion of these components was contested in previous license renewal applications. The issue of seismic II-over-I piping is an open item in an application that is currently under review. The Hatch SER includes effective clarifications of why these components need to be included within scope. The guidance provided by these clarifications could prevent these issues from becoming open items in future applications. Consequently, these clarifications should be incorporated into the generic license renewal guidance documents.

SNC has conducted a comprehensive aging management review of SSCs that are within scope. Aging effects were identified on the basis of component material, operating environment, and operating stresses using plant-specific and industry-wide operating experience. Topical reports developed by the Boiling Water Reactor Vessel and Internals Project (BWRVIP) were also used to identify aging effects and to develop aging management programs that support the Hatch application. We reviewed a number of BWRVIP topical reports and commented on their effectiveness in supporting license renewal in our April 16, 2001 letter.

Appendix A to the Hatch application describes 17 existing programs, 5 modified programs, and 7 new programs that SNC has implemented to manage aging effects during the period of extended operation. The resolution of open items has resulted in added commitments to these programs, including a one-time inspection of plant service water piping in the diesel generator building and a one-time inspection of small-bore butt-welded stainless steel piping.

One of the added commitments resulting from resolution of open items involves periodic testing of fire-protection system sprinkler heads that are within the scope of license renewal. SNC had proposed a one-time test of such sprinkler heads at or before the start of the period of extended operation. The staff did not agree with the one-time test, because the design life (50 years) of the sprinkler heads does not cover the period of extended operation. As recommended by the staff, SNC has committed to perform the sprinkler head tests as specified in the National Fire Protection Association (NFPA) Standard 25, Section 2.3.3.1, "Sprinklers." The application of this Standard will result in periodic testing of the sprinkler heads at 10-year intervals, with the first test taking place during the third year of the renewal period. This program is acceptable because it confirms the effectiveness of the periodic inspections to which the sprinkler heads are subjected and ensures testing of the sprinkler heads early in the renewal period.

The staff requested that SNC perform a one-time inspection of the four buried emergency diesel generator (EDG) fuel oil storage tanks. SNC responded by performing visual inspections and ultrasonic testing of one of the four tanks. Ultrasonic testing of 144 locations along the lower shell of the tank indicated that there was no thinning of the wall. Visual inspections of the internal surface revealed very little corrosion. SNC and the staff concluded that the one-time inspection demonstrated that loss of material of the diesel fuel oil storage tanks was not an aging effect requiring management during the period of extended operation.

We also considered the possibility that the external coating of a tank could be damaged at some location during installation and result in localized fuel oil leakage. Such damage would be of concern during the current license term and, thus, would not be specific to the period of extended operation. The safety consequences would not be significant because the potential leakage would not cause substantial depletion of the fuel oil inventory before it would be detected. We concur with the staff's determination that loss of material of the diesel fuel oil storage tanks is not an aging effect requiring management during the period of extended operation.

Jet pump assemblies and fuel supports contain cast austenitic stainless steel (CASS) components that are within the scope of license renewal. These components may be exposed to neutron fluence levels that would make them susceptible to neutron irradiation embrittlement and loss of fracture toughness. Since neutron embrittlement becomes a concern when cracks are present in the components, the staff requested that SNC propose a one-time inspection of the jet pump assemblies and fuel supports to confirm that these CASS components have not experienced cracking. Following this request, the staff recognized that cracking of CASS components has not been observed to date. Furthermore, BWRVIP-41, "BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines," requires inspections of jet pump assembly welds that are

generally believed to be more susceptible to cracking than the CASS components and, therefore, provide a leading indicator for inspection of CASS components. SNC has committed to perform the weld inspection required by BWRVIP-41. In addition, the BWRVIP and the NRC's Office of Nuclear Regulatory Research plan to conduct confirmatory research to determine the effects of high levels of neutron fluence on BWR internals. SNC has committed to implement any requirements resulting from this research. Given the above, the staff concluded that the requested one-time inspection is not warranted at this time. We agree with the staff's conclusion.

Time-limited aging analyses (TLAA) have shown that neutron irradiation embrittlement during the extended period of operation will have no significant impact on the integrity of the Hatch reactor vessels. At the end of the renewal period, the vessels will still have margin over applicable regulatory limits. In order to monitor time-dependent parameters used in the TLAA, SNC plans to implement the provisions of the integrated surveillance program (ISP) described in BWRVIP-78, BWR integrated surveillance program plan, and BWRVIP-86, BWR integrated surveillance program implementation plan. Since these topical reports have not yet been approved by the staff, SNC committed to implement either a staff-approved ISP or a plant-specific program that meets specific staff requirements on periodic removal of capsules to monitor neutron fluence and the impact of irradiation on the reactor vessels. SNC committed to provide the staff with program details prior to the period of extended operation. The staff made this commitment a license condition.

The staff has performed a comprehensive review of SNC's application. The applicant and the staff have identified plausible aging effects associated with passive and long-lived components. Adequate programs have been established to manage the effects of aging so that Hatch, Units 1 and 2, can be operated safely in accordance with their current licensing bases for the period of extended operation.

Sincerely,

/RA/

George E. Apostolakis
Chairman

References:

1. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report Related to the License Renewal of the Edwin I. Hatch Nuclear Plant, Units 1 and 2," issued October 2001.
2. U. S. Nuclear Regulatory Commission, "Safety Evaluation Report Related to the License Renewal of the Edwin I. Hatch Nuclear Plant, Units 1 and 2," issued February 2001.
3. Letter dated February 29, 2000, from H. L. Sumner, SNC, to the U.S. Nuclear Regulatory Commission, "Edwin I. Hatch Nuclear Plant Application for Renewed Operating Licenses."
4. Letter dated April 16, 2001, from George E. Apostolakis, Chairman ACRS, to

William D. Travers, Executive Director for Operations, NRC, Subject: Interim Letter Related to the License Renewal of Edwin I. Hatch Nuclear Station, Units 1 and 2.

5. Topical Report BWRVIP-41, “BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines,” October 1997.
6. Topical Report BWRVIP-78, “BWR Integrated Surveillance Program - Unirradiated Charpy Reference Curves for Surveillance Material,” December 1999.
7. Topical Report BWRVIP-86, “BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan.”