

February 14, 2003

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

SUBJECT: REPORT ON THE SAFETY ASPECTS OF THE LICENSE RENEWAL
APPLICATION FOR THE MCGUIRE NUCLEAR STATION UNITS 1 AND
2 AND THE CATAWBA NUCLEAR STATION UNITS 1 AND 2

Dear Chairman Meserve:

During the 499th meeting of the Advisory Committee on Reactor Safeguards on February 6–8, 2003, we completed our review of the License Renewal Application (LRA) for the McGuire Nuclear Station Units 1 and 2 (McGuire) and the Catawba Nuclear Station Units 1 and 2 (Catawba), and the related final safety evaluation report (SER) prepared by the NRC staff. Our review included a meeting of our Plant License Renewal Subcommittee on October 8, 2002. During our review, we had the benefit of discussions with representatives of the NRC staff and Duke Energy Corporation (Duke). We also had the benefit of the documents referenced.

CONCLUSIONS AND RECOMMENDATIONS

1. The Duke application for renewal of the operating licenses for McGuire Units 1 and 2 and Catawba Units 1 and 2 should be approved.
2. The programs instituted to manage aging-related degradation are appropriate and provide reasonable assurance that McGuire Units 1 and 2 and Catawba Units 1 and 2 can be operated in accordance with their current licensing bases for the period of extended operation without undue risk to the health and safety of the public.

BACKGROUND AND DISCUSSION

This report fulfills the requirement of 10 CFR 54.25, which states that the ACRS should review and report on all license renewal applications. McGuire Units 1 and 2 and Catawba Units 1 and 2 are 3,411-MWt, four-loop Westinghouse pressurized-water reactors (PWRs) in ice condenser containments. In its application, Duke requested that the NRC renew the operating licenses for all four units beyond their current license terms, which expire on June 12, 2021 (McGuire Unit 1); March 3, 2023 (McGuire Unit 2); December 6, 2024 (Catawba Unit 1); and February 24, 2026 (Catawba Unit 2). At the time of the application, only McGuire Unit 1 met the requirements of 10 CFR 54.17(c), which prohibits an applicant from submitting an application for license renewal

earlier than 20 years before the expiration of its current operating license. Duke requested an exemption from this requirement, which the NRC staff granted based on the similarities of the four units and the efficiency of a single application.

The final SER documents the results of the staff's review of information submitted by Duke, including commitments that were necessary to resolve open items identified by the staff in the initial SER. In particular, the staff reviewed the completeness of the applicant's identification of structures, systems, and components (SSCs) that are subject to aging management; the integrated plant assessment process; the applicant's identification of the possible aging mechanisms associated with passive, long-lived components; and the adequacy of the applicant's aging management programs. The staff also conducted several inspections at Duke's engineering offices and at the McGuire and Catawba sites to verify the adequacy of the methodology described in the application and its implementation.

During our Plant License Renewal Subcommittee meeting on October 8, 2002, the lead NRC license renewal inspector for Region II provided an overview of the NRC's inspection process. This process, which is well-structured and effective, is becoming increasingly important as license renewal applications become less detailed. As a result, as in other recent applications, the review of the McGuire and Catawba LRA required a substantial number of requests for additional information and depended heavily on review of plant drawings at the sites.

On the basis of our review of the final SER, we agree with the staff's conclusion that all open and confirmatory items have been closed appropriately, and there are no issues that preclude renewal of the operating licenses for McGuire Units 1 and 2 and Catawba Units 1 and 2.

The process implemented by the applicant to identify SSCs that are within the scope of license renewal was effective. However, in the initial SER the staff identified a number of SSCs that should have been in the scope of license renewal but were excluded by Duke's interpretation of license renewal requirements. Among those SSCs were fan and damper housings, building sealants, electrical equipment connecting the units to the offsite power source for recovery from station blackout (SBO), and jockey pumps and manual fire suppression equipment in potential fire exposure areas. The inclusion of fan and damper housings, building sealants, and SBO equipment has been disputed in previous license renewal applications.

For fan and damper housings, Duke initially took the position that loss of pressure retention or structural integrity function would be evidenced by functional failure, as is a failure of the active components of dampers and fans. By contrast, the staff views the passive components of these assemblies as being within the scope of license renewal, just like pump casings, which are explicitly called for in 10 CFR 54.21. We agree that the explicit example provided in the rule supports the staff's interpretation. With regard to jockey pumps, the staff determined that these components are relied upon to meet the requirements of 10 CFR 50.48, "Fire Protection." We concur with the staff's determination. Duke agreed to close these open items by bringing all of the identified SSCs into the scope of license renewal.

During our review, we questioned why certain other SSCs were not included within the scope and, in all cases, the applicant provided appropriate justification for exclusion. We conclude that the applicant and the staff have appropriately identified all SSCs that are within the scope of license renewal.

The applicant performed a comprehensive aging management review of SSCs that are within the scope of license renewal. Appendix B to the LRA describes 51 aging management programs for license renewal, which include existing, enhanced, and new programs. In addition, the resolution of staff questions and SER open items has resulted in further commitments, including the implementation of a one-time inspection of the condenser circulating water system expansion joints at Catawba to characterize potential degradation, one-time VT-1 inspection of the pressurizer spray head, one-time inspection of the internal surfaces of the auxiliary feedwater system carbon steel piping components, and an inspection program for non-environmentally qualified neutron flux instrumentation circuits. The SER lists 21 such committed actions to be implemented by the applicant.

The McGuire and Catawba LRA includes a new aging management program, the Alloy 600 Aging Management Review. This program is intended to identify Alloy 600/690, 82/182, and 52/152 locations; to rank susceptibility to primary water stress corrosion cracking (PWSCC); and to verify that nickel-based alloy locations are adequately inspected by the Inservice Inspection Program, the Control Rod Drive Mechanism and other Vessel Head Penetration (VHP) programs, the Reactor Vessel Internals Program, and the Steam Generator Integrity Program. This review will provide general oversight and management of cracking due to PWSCC. We applaud this initiative to provide comprehensive oversight of activities to manage PWSCC. Given the current challenge created by PWSCC, we encourage Duke to implement this program soon, in the current license term, rather than waiting for the end of the initial license terms of the four units.

With regard to reactor vessel penetration nozzle cracking and head wastage issues, Duke has committed to incorporate the future industry resolution of these issues into the VHP Nozzle Program and the Alloy 600 Management Review Program. This provides reasonable assurance that the effects of aging associated with the VHP Nozzle Program and the Alloy 600 Review Program will be adequately managed so that the intended function(s) will be maintained in a manner that is consistent with the current licensing basis throughout the period of extended operation.

Duke is the first utility to seek license renewal for plants that use ice condensers in the containment to absorb thermal energy in the event of a loss-of-coolant-accident or a steamline break. Duke has developed a new program to manage aging degradation of ice baskets and ice condenser components at McGuire and Catawba. We agree with the staff's conclusion that the proposed program is adequate to identify and manage aging effects during the period of extended operation.

Duke identified those components of the McGuire and Catawba plants that are supported by time-limited aging analyses and provided sufficient data to demonstrate that the components have sufficient margin to operate properly for the period of extended operation.

As noted in previous applications, LRAs include a substantial number of activities and commitments that will not be accomplished until near the end of the current license period. Consequently, the NRC staff will need to conduct a substantial amount of inspection activity just before the plants enter the extended period of operation. The staff is aware of this future workload and has issued Inspection Procedure 71003, "Post-Approval Site Inspection for License Renewal," to manage this significant effort. Given the large number of power plants that will approach the license renewal term at approximately the same time, this nationwide inspection effort is likely to impose a major demand for staff resources.

The staff has performed an outstanding review of the Duke application. The applicant and the staff have identified plausible aging effects associated with passive, long-lived components. The applicant has also established adequate programs to manage the effects of aging so that McGuire Units 1 and 2 and Catawba Units 1 and 2 can be operated in accordance with their current licensing bases for the period of extended operation without undue risk to the health and safety of the public.

Sincerely,

/RA/

Mario V. Bonaca
Chairman

References:

1. Letter dated June 13, 2001, from M. S. Tuckman, Duke Energy Corporation, to U. S. Nuclear Regulatory Commission, transmitting Application to Renew the Operating Licenses of McGuire Nuclear Station, Units 1 and 2 and Catawba Nuclear Station, Units 1 and 2.
2. U.S. Nuclear Regulatory Commission, NUREG-XXX, "Safety Evaluation Report Related to the License Renewal of McGuire Nuclear Station, Units 1 and 2 and Catawba Nuclear Station, Units 1 and 2," January 2003.
3. U.S. Nuclear Regulatory Commission, NRC Inspection Procedure 71003, "Post-Approval Site Inspection for License Renewal," December 9, 2002.