



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

December 10, 1999

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

Dear Chairman Meserve:

**SUBJECT: REPORT ON THE SAFETY ASPECTS OF THE LICENSE RENEWAL  
APPLICATION FOR CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS 1  
AND 2**

During the 468<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, December 2-4, 1999, we completed our review of the Baltimore Gas and Electric Company's (BGE's) application for license renewal of the Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2 and the related Final Safety Evaluation Report (FSER). Our review included four meetings with the staff and the applicant concerning the license renewal of CCNPP and two meetings with the staff and the Nuclear Energy Institute concerning generic license renewal issues. During this review, we had the benefit of discussions with representatives of the NRC staff and BGE. We also had the benefit of insights gained from our review of another license renewal application and of the documents referenced. We provided an interim letter, dated May 19, 1999, concerning the BGE application.

### Conclusion

On the basis of our review of BGE's application, the FSER, and the resolution of the open and confirmatory items identified in the Safety Evaluation Report (SER), we conclude that BGE has properly identified the structures, systems, and components (SSCs) that are subject to aging management programs. Furthermore, we conclude that the programs instituted to manage aging-related degradation of the identified SSCs are appropriate and provide reasonable assurance that Calvert Cliffs Nuclear Power Plant, Units 1 and 2 can be operated in accordance with their current licensing basis for the period of the extended license without undue risk to the health and safety of the public.

### Background and Discussion

This report is intended to fulfill the requirement of 10 CFR 54.25 that each license renewal application be referred to the ACRS for a review and report. BGE requested renewal of the operating licenses for the CCNPP, Units 1 and 2 for a period of 20 years beyond the current license term. The FSER documents the results of the staff's review of information submitted by

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BGE, including those commitments that were necessary to resolve open and confirmatory items identified by the staff in its SER. The staff's review included the verification of the completeness of the identification and categorization of the SSCs considered in the application; the validation of the integrated plant assessment process; the identification of the possible aging mechanisms associated with each passive long-lived component; and the adequacy of the aging management programs. The staff also conducted onsite inspections to verify the implementation of these programs.

The staff's SER identified a number of open and confirmatory items. The staff and BGE have now resolved all the open and confirmatory items, in part, through additional commitments made by BGE. The BGE commitments to be added to its Final Safety Analysis Report (FSAR) will become a part of the plant's licensing basis and are enforceable.

The commitments made by BGE are adequate to resolve the open and confirmatory items. Several of the open items such as the effects of the reactor coolant environment on fatigue life and the thermal fatigue of American Society of Mechanical Engineers (ASME) Class 1 small-bore piping may have generic implications for other applications for license renewal.

BGE committed to the implementation of a plant-specific monitoring program in which it will use correlations published in NUREG/CR-5704 to calculate the effects of the reactor coolant environment on fatigue life of components and piping. The correlations reflect data developed to resolve Generic Safety Issue (GSI)-190, "Fatigue Evaluation of Metal Components for 60-year Plant Life." We concur with the staff's conclusion that BGE's proposed program is an acceptable plant-specific approach for the resolution of GSI-190 concerns.

BGE resolved an open item concerning cracking of ASME Class 1 small-bore piping by including small-bore piping in the CCNPP's age-related degradation inspection (ARDI) program. Under the ARDI program, inspections of small-bore piping will be performed during the last five years of the current license term. The timing of these inspections is appropriately set late in the current licensing period so that they will be most useful for assessing the need for additional requirements. We concur with the resolution of this open item.

Another open item concerned the adequacy of the bases provided to justify the use of one-time inspections to resolve some potential aging issues. The staff has accepted one-time inspections prior to the end of the current license term, rather than regular, periodic inspections, in those cases in which age-related degradation is not expected to occur. In such cases, the one-time inspection is intended to confirm the expectation that age-related degradation is not occurring, or that its effects are insignificant. We agree that this is an appropriate approach to address such aging issues. We reviewed the basis for the staff's acceptance of one-time inspections in individual cases (SER open item 3.1.6.3-1) and concur with the staff's determination.

During our meeting, BGE informed us that it expects to conduct most of the one-time inspections after 30 years of plant operation. We believe that it is important that these one-time inspections be performed late in the current license term (the last ten years).

After the SER was issued, the staff identified void swelling as a potential mode of degradation for pressurized water reactor vessel internals. BGE committed to participate in the industry

programs to address the significance of void swelling and to develop an inspection program if needed.

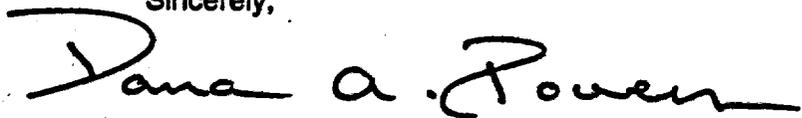
As CCNPP, Units 1 and 2 age, inspection and operating experience may prompt significant adjustments to their aging management programs. BGE is required to document in its FSAR that the 10 CFR Part 50 Appendix B quality assurance program also applies to those nonsafety-related SSCs which are subject to an aging management review. Furthermore, the staff has required that BGE include in its FSAR the license renewal application commitments that the staff relied on to conclude that aging effects will be adequately managed for the period of extended operation. These steps ensure that future changes can be controlled under the 10 CFR 50.59 process. Future schedule changes will require license amendments if the schedules are delayed.

The staff has performed a comprehensive and thorough review of the BGE application. The additional programs required by the staff are appropriate and sufficient. Current regulatory requirements and existing BGE programs provide adequate management of aging-induced degradation for those components within the scope of the license renewal rule.

We believe that the applicant and the staff have identified possible aging mechanisms associated with passive long-lived components. Adequate programs have been established to manage the effects of aging so that CCNPP, Units 1 and 2 can be operated safely in accordance with their licensing basis for the period of the extended license.

Dr. William J. Shack did not participate in the Committee's deliberations on aging-induced degradation.

Sincerely,



Dana A. Powers  
Chairman

References:

1. Letter dated November 16, 1999, from Christopher I. Grimes, Office of Nuclear Reactor Regulation, NRC, to Charles H. Cruse, Baltimore Gas and Electric Company, Subject: Final Safety Evaluation Report.
2. Letter dated May 19, 1999, from Dana A. Powers, Chairman, ACRS, to William D. Travers, Executive Director for Operations, NRC, Subject: Interim Letter on the Safety Aspects of the Baltimore Gas and Electric Company's License Renewal Application for Calvert Cliffs Nuclear Power Plant, Units 1 and 2.
3. U. S. Nuclear Regulatory Commission, NUREG/CR-5704, "Effects of LWR Coolant Environments on Fatigue Design Curves of Austenitic Stainless Steels," April 1999.
4. U. S. Nuclear Regulatory Commission, "Safety Evaluation Report Related to the License Renewal of Calvert Cliffs Nuclear Power Plant, Units 1 and 2," March 1999.
5. Letter dated April 8, 1998, from Charles H. Cruse, Baltimore Gas and Electric Company, to U. S. Nuclear Regulatory Commission Document Control Desk, Subject: Calvert Cliffs Nuclear Power Plant Unit Nos. 1 and 2, Application for License Renewal.

6. **U. S. Nuclear Regulatory Commission, Code of Federal Regulations, 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."**
7. **U. S. Nuclear Regulatory Commission, Code of Federal Regulations, 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants."**