



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

December 19, 2019

The Honorable Kristine L. Svinicki  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT:     REPORT ON THE SAFETY ASPECTS OF THE SUBSEQUENT LICENSE  
                  RENEWAL APPLICATION REVIEW OF THE PEACH BOTTOM ATOMIC  
                  POWER STATION, UNITS 2 AND 3**

Dear Chairman Svinicki:

During the 669<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards (ACRS), December 4-6, 2019, we completed our review of the subsequent license renewal application (SLRA) for Peach Bottom Atomic Power Station, Units 2 and 3 (Peach Bottom), and the associated final safety evaluation report. Our review considered actions by Exelon Generation Company, LLC (Exelon), to extend the license of each unit by 20 years beyond 60 years of operation.

To conduct a focused review of past, current, and future actions to address subsequent license renewal at Peach Bottom, our Plant License Renewal Subcommittee reviewed this matter during a meeting on November 5, 2019. During this review, we had the benefit of discussions with representatives of the staff and Exelon. We also had the benefit of the referenced documents. 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 established programs and the commitments made by Exelon to manage age-related degradation provide reasonable assurance that Peach Bottom can be operated in accordance with its current licensing basis for the subsequent period of extended operation without undue risk to the health and safety of the public.
2. The Exelon application for subsequent license renewal of the operating license for Peach Bottom should be approved.

### **BACKGROUND**

Peach Bottom is located in southeastern Pennsylvania on the westerly shore of Conowingo Pond. Each unit consists of a General Electric BWR-4 boiling water reactor with a Mark I primary containment. The units have a licensed power output of 4,016

megawatts-thermal (MWt). The Nuclear Regulatory Commission (NRC) issued the initial operating licenses on October 25, 1973, for Unit 2 and July 2, 1974, for Unit 3. The NRC issued the first renewed operating licenses on May 7, 2003.

In this application, Exelon requests renewal of the operating licenses for an additional 20 years beyond the expiration of their current renewed licenses. The licenses would be extended to August 8, 2053, for Unit 2 and to July 2, 2054, for Unit 3.

## **DISCUSSION**

The staff reviewed the Exelon application for Subsequent License Renewal (SLR) in accordance with the Generic Aging Lessons Learned (GALL-SLR) and the Standard Review Plan (SRP-SLR) guidance documents. Conformance with this guidance provides bases for a conclusion that an applicant for life extension of 20 additional years beyond 60 years will assure adequate protection of the public through the Subsequent Period of Extended Operation (SPEO).

The most significant generic issues challenging operation beyond 60 years are: reactor pressure vessel embrittlement; irradiation-assisted stress corrosion cracking of reactor internals; concrete structures and containment degradation; and electrical cable environmental qualification, condition monitoring, and assessment. Each of these items has been addressed by Exelon and evaluated by the staff through the review process. We agree with the staff's safety evaluation report regarding these issues.

Prior to requesting SLR, Exelon has been making systematic improvements in the Peach Bottom facility. Each unit was originally authorized to operate at steady state reactor core power levels not more than 3,293 MWt. Through a series of license amendments, each unit is currently approved for a maximum power level not to exceed 4,016 MWt. The bases for these increased power levels included continuing improvements in analytical techniques, fuel and core design, and additional plant hardware modifications, enabling plant power to be increased to approximately 20 percent above the units' original licensed thermal power. In addition to the facility modifications and upgrades performed for the Extended Power Uprate and first license renewal, Exelon has recently converted major systems to digital controls and has replaced the fuel pool cooling heat exchangers. These improvements also demonstrated investments by Exelon to maintain the units in good material condition.

In its final safety evaluation report, the staff documented its review of the SLRA and other information submitted by Exelon and obtained through staff audits. The staff also performed an audit on the technical details of the SLRA from November 13, 2018 to April 29, 2019 wherein the completeness of the structures, systems, and components that are within the scope of license renewal was evaluated.

Exelon will implement 47 Aging Management Programs (AMPs) for SLR, comprised of 36 existing programs and 11 new programs. Of the 11 new programs, 8 are consistent with the GALL-SLR Report and 3 are consistent with allowed exceptions. Of the 36 existing programs, 8 are consistent with the GALL-SLR Report, 19 are consistent with enhancements, 2 are consistent with allowed exceptions, 6 are consistent with enhancements and allowed exceptions, and one is a plant-specific enhancement evaluated against the SRP-SLR. The staff found the programs with exceptions and enhancements to be acceptable.

Exelon has demonstrated the effectiveness of their programs to maintain material condition, to sustain system and equipment performance, and to identify improvements to assure facility safety and reliability. Exelon is implementing lessons learned from both its own license renewal experience as well as those from industry. Commitments in the SLRA and in Exelon responses to the staff audits and inspections provide assurance that these programs will continue throughout the SPEO. These are managed through the Exelon commitment tracking program.

The staff conducted license renewal audits, and the audits verified the appropriateness of the Exelon scoping and screening methodology for AMPs, the appropriateness of the aging management review, and the acceptability of the plant-specific time limited aging analyses. The staff audit reports confirm the validity of the Peach Bottom aging management program. The Post-Approval Site Inspection for License Renewal verified that the current license renewal requirements are implemented appropriately. The audits and inspection were comprehensive, and the corresponding reports were thorough. The License Renewal Program inspections demonstrated that the AMPs associated with the initial license renewal are being implemented appropriately and have resulted in no findings.

Based on these audits, inspections, and the staff reviews, the staff concluded that Exelon has demonstrated that the effects of aging at Peach Bottom will continue to be adequately managed. Safety functions will be maintained consistent with Peach Bottom's licensing basis for the SPEO, as required by 10 CFR 54.21(a)(3). The staff's review of the SLRA identified one confirmatory item related to the BWR vessel internals inspection plan and no open items. Exelon submitted documentation that supplements the SLRA and committed to additional actions to resolve the staff's concerns. This confirmatory item is now closed. We agree with the staff's conclusion 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 Peach Bottom.

## **SUMMARY**

The established programs and the commitments made by Exelon to manage age-related degradation provide reasonable assurance that Peach Bottom can be operated in accordance with its licensing basis for the SPEO without undue risk to the health and safety of the public. The Exelon application for a SLR of the operating license for Peach Bottom should be approved.

Members Riccardella and Sunseri did not participate in portions of the meeting related to metal and environmental fatigue and irradiation embrittlement issues of the RPV and sacrificial shield wall in Chapter 4 of the application.

We are not requesting a formal response from the staff to this letter report.

Sincerely,

**/RA/**

Peter C. Riccardella  
Chairman

**REFERENCES**

1. Exelon Generation Company, LLC, "Subsequent License Renewal Application Peach Bottom Atomic Power Station, Units 2 and 3, The Second License Renewal Application," July 2018, (ML18193A773).
2. Exelon Generation Company, LLC, "Peach Bottom Atomic Power Station, Units 2 & 3, Submittal of Revision 27 to Updated Final Safety Analysis Report and Revision 22 to Fire Protection Program and Reference Drawings," April 8, 2019, (ML19114A265).
3. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report Related to the Subsequent License Renewal of Peach Bottom Atomic Power Station, Units 2 and 3," November 2019, (ML19317E013).
4. U.S. Nuclear Regulatory Commission, "Revised Report for the Operating Experience Review Audit Regarding the Peach Bottom Atomic Power Station Units 2 and 3, Subsequent License Renewal Application (EPID NO. L-2018-RNW-0012)," June 6, 2019, (ML19142A369).
5. U.S. Nuclear Regulatory Commission, "Report for the In-Office Regulatory Audit Peach Bottom Atomic Power Station, Units 2 and 3 Subsequent License Renewal Application (EPID NO. L-2018-RNW-0012)," September 24, 2019, (ML19205A206).
6. U.S. Nuclear Regulatory Commission, NRC NUREG-1800, Revision 2, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR), December 2010, (ML103490036).
7. U.S. Nuclear Regulatory Commission, NRC NUREG-1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," December 2010, (ML103490041).
8. U.S. Nuclear Regulatory Commission, NRC NUREG-2191, Volume 1, "Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report," July 2017, (ML17187A031).
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10. U.S. Nuclear Regulatory Commission, NRC Regulatory Guide 1.188, Revision 1, "Standard Format and Content for Application to Renew Nuclear Power Plant Operating Licenses," September 2005, (ML051920430).
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12. U.S. Nuclear Regulatory Commission, NRC NUREG-2221, "Technical Bases for Changes in the Subsequent License Renewal Guidance Documents NUREG-2191 and NUREG-2192," December 2017, (ML17362A126).

13. U.S. Nuclear Regulatory Commission, NRC NUREG-2222, "Disposition of Public Comments on the Draft Subsequent License Renewal Guidance Documents NUREG-2191 and NUREG-2192," December 2017, (ML17362A143).
14. U.S. Nuclear Regulatory Commission, NRC Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988, (ML003740284).

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