



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 12, 2019

Mr. Bryan C. Hanson
Senior Vice President
Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO)
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: CLINTON POWER STATION, UNIT NO. 1 - ISSUANCE OF AMENDMENT
REGARDING RECAPTURE OF LOW-POWER TESTING TIME (EPID L-2018-
LLA-0250)

Dear Mr. Hanson:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 224 to Facility Operating License No. NPF-62 for the Clinton Power Station (Clinton), Unit No. 1. The amendment is in response to your application dated September 17, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18260A307).

The amendment revises the expiration date of the Clinton full-power operating license (FPOL) such that it expires 40 years from the date of issuance of the FPOL (April 17, 2027), as opposed to 40 years from the date of the low-power testing license (September 29, 2026).

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in black ink, appearing to read "Joel S. Wiebe".

Joel S. Wiebe, Senior Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-461

Enclosures:

1. Amendment No. 224 to NPF-62
2. Safety Evaluation

cc: Listserv



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EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-461

CLINTON POWER STATION, UNIT NO. 1

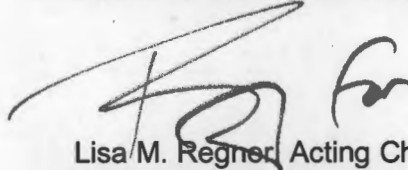
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 224
License No. NPF-62

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee), dated September 17, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Facility Operating License as indicated in the attachment to this license amendment.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Lisa M. Regner, Acting Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility
Operating License

Date of Issuance: June 12, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 224

CLINTON POWER STATION, UNIT NO. 1

FACILITY OPERATING LICENSE NO. NPF-62

DOCKET NO. 50-461

Replace the following page of the Facility Operating License with the attached revised page. The revised page is identified by amendment number and contain marginal lines indicating the areas of change.

Remove

License NPF-62
Page 9

Insert

License NPF-62
Page 9

- H. Exelon Generation Company shall have and maintain financial protection of such type and in such amounts as the Commission shall require in accordance with Section 170 of the Atomic Energy Act of 1954, as amended, to cover public liability claims:
- I. This license is effective as of the date of issuance and shall expire at midnight on April 17, 2027.

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by:

Thomas E. Murley, Director
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Attachments 1 (Deleted) and 2
- 2. Appendix A - Technical Specifications (NUREG-1235)
- 3. Appendix B - Environmental Protection Plan
- 4. Appendix C - Deleted

Date of Issuance: April 17, 1987



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 224 TO FACILITY OPERATING LICENSE NO. NPF-62

EXELON GENERATION COMPANY, LLC

CLINTON POWER STATION, UNIT NO. 1

DOCKET NO. 50-461

1.0 INTRODUCTION

By letter dated September 17, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18260A307), Exelon Generation Company, LLC (EGC, the licensee) submitted a license amendment request (LAR) to revise the expiration date of the Clinton Power Station, Unit No. 1, (CPS) full-power operating license (FPOL) such that it expires 40 years from the date of the issuance of the FPOL (NPF-62 issued April 17, 1987), as opposed to 40 years from the date of the issuance of the low-power testing license (LPOL) (NPF-55 issued September 29, 1986). The requested amendment is not a request for license renewal under Title 10 of the *Code of Federal Regulations* (10 CFR), Part 54.

On January 31, 2019, the Nuclear Regulatory Commission (NRC or the Commission) staff published a proposed no significant hazards consideration (NSHC) determination in the *Federal Register* (84 FR 813) for the proposed amendment. No comments were received.

2.0 REGULATORY EVALUATION

Section 103.c of the Atomic Energy Act of 1954, as amended, provides that a license is to be issued for a specific period not to exceed 40 years. 10 CFR 50.51 also specifies that each license will be issued for a fixed period of time not to exceed 40 years from the date of issuance. Also, 10 CFR 50.56 and 50.57 allow the issuance of an operating license pursuant to 10 CFR 50.51 after the construction of the facility has been substantially completed, in conformity with the construction permit and when other provisions specified in 10 CFR 50.57 are met.

Staff Requirements Memorandum (SRM) for SECY-98-296, "Staff Requirements – SECY-98-296 – Agency Policy Regarding License Recapture of Low-Power Testing or Shutdown Time for Nuclear Power Plants," dated March 30, 1999 (available at www.nrc.gov/reading-rm/doc-collections/commission/srm/1998/1998-296srm.pdf) and SECY-98-296, "Agency Policy Regarding Licensee Recapture of Low-Power Testing or Shutdown Time for Nuclear Power Plants," dated December 21, 1998 (ADAMS Accession No. ML992870025), establish the NRC policy for recapture of low-power testing time. The policy discusses the draft Grand Gulf

Nuclear Station, Unit 1, license amendment (attached to SECY-98-296) to amend the expiration date of its license to recover the time spent in an extended low-power testing condition before receiving the FPOL. The final Grand Gulf Nuclear Station, Unit 1, license amendment is available from ADAMS at Accession No. ML19112A195. The policy also includes the intent to grant similar requests from other licensees provided the 40-year license term began with the LPOL and a separate FPOL was issued.

The current licensed term for CPS ends on September 29, 2026. This is 40 years from the date of the LPOL, which was issued on September 29, 1986. In the LPOL, the licensee was only authorized to operate the plant up to 5 percent of rated power. On April 17, 1987, the NRC issued facility operating license NFP-62 to allow the licensee to operate CPS up to 100 percent rated power or 3473 megawatts thermal, with an expiration date of September 29, 2026.

Because the CPS license amendment request is similar to the Grand Gulf license amendment request, the NRC staff concludes that it has the regulatory authority to grant the extension of the CPS FPOL expiration date.

Regulation 10 CFR, Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," provides the requirements for a quality assurance program.

Regulation 10 CFR, Part 50, Appendix G, "Fracture Toughness Requirements," specifies the fracture toughness requirements for ferritic materials of pressure retaining components of the reactor coolant pressure boundary, including reactor pressure vessels.

Regulation 10 CFR, Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements," specifies the requirements to monitor changes in the fracture toughness properties of ferritic materials in the RPV.

Regulation 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants," specifies the requirements for establishing a program for qualifying electrical equipment.

3.0 TECHNICAL EVALUATION

This section provides the NRC staff's technical evaluation on the adverse effects of aging to ensure that important systems, structures, and components will continue to perform their intended functions during the requested period of recapture. The staff reviewed the effect of the recapture period on the reactor pressure vessel, structures, mechanical equipment, electrical equipment, and quality assurance and maintenance programs. The NRC staff's evaluation is consistent with that established by the SRM for SECY-98-296, "Staff Requirements – SECY-98-296 – Agency Policy Regarding License Recapture of Low-Power Testing or Shutdown Time for Nuclear Power Plants," dated March 30, 1999, and SECY-98-296, "Agency Policy Regarding Licensee Recapture of Low-Power Testing or Shutdown Time for Nuclear Power Plants," dated December 21, 1998.

3.1 Neutron Damage of the Reactor Pressure Vessel

The reactor pressure vessel was designed and fabricated in accordance with the requirements of Section III, Class 1, of the American Society of Mechanical Engineers (ASME) Code¹ edition,

¹ Section III of the ASME Code is available from ASME at <https://www.asme.org/shop/standards>.

addenda, and Code Cases applicable at the time of design and construction. Operating limitations of the ASME Code and of Appendix G, "Fracture Toughness Requirements," of 10 CFR, Part 50, are also applicable. The reactor pressure vessel (RPV) and the reactor coolant system were designed to allow inspections in accordance with Section XI of the ASME Code. The NRC staff's evaluation approving the programs and their implementation with respect to these components are contained in NUREG-0853, "Safety Evaluation Report related to the operation of Clinton Power Station, Unit No. 1," dated February 1982,² and its eight supplements.

Over the operating life of a reactor vessel, ferritic materials exposed to neutron irradiation will undergo changes in material properties and a decrease in fracture toughness. The decrease in fracture toughness is of particular importance because the ability to resist failure caused by the propagation of a crack decreases with increasing irradiation. The fracture toughness of the vessel is monitored by a surveillance program in accordance with the requirements of 10 CFR Part 50, Appendix H, "Reactor Vessel Materials Surveillance Program Requirements." The purpose of the materials surveillance program is to help ensure vessel integrity by monitoring changes in the fracture toughness properties of the reactor vessel beltline materials. The ferritic materials must meet the fracture toughness properties of Section III of the ASME Code and 10 CFR, Part 50, Appendix G, "Fracture Toughness Requirement." This surveillance program aids in adjusting the operational conditions in order to maintain sufficient safety margin for the prevention of brittle failure of the reactor vessel. In accordance with this surveillance program, a material specimen is scheduled to be withdrawn from the reactor vessel in 2025.

The Clinton, Unit No. 1, Updated Safety Analysis Report (USAR), Revision 19, dated October 31, 2016 (ADAMS Accession No. ML16306A074), discusses the RPV design. The following are discussed in Section 5.3:

The materials, fabrication procedures, and testing methods used in the construction of boiling water RPVs meet or exceed requirements of ASME Section III Class 1 vessels.

Predictions for changes in transition temperature and upper shelf energy were made in accordance with the requirements of Regulatory Guide 1.99, Revision 2. The predicted value in transition of adjusted reference temperature will not exceed 200°F.

Compliance with Appendices G and H of 10 CFR Part 50.

The RPV was also designed to withstand a variety of transient and cyclic loads which occur throughout the operational life of the plant. Table 3.9-1(b) of the USAR (ADAMS Accession No. ML16305A308) provides the cyclic and transient limits for the RPV.

The current pressure/temperature limit curves in Technical Specification (TS) 3.4.11 are valid for 32 effective full-power years (EFPY). In its letter dated September 17, 2018, the licensee states that as of June 11, 2018, the RPV has accumulated 23.3 EFPY exposure. The licensee

² NUREG-0853 and its eight supplements are available for examination or purchase from the NRC's Public Document Room (PDR), Room O1-F21, One White Flint North, 11555, Rockville Pike, Rockville Maryland 20852. The PDR reference staff may be contacted at 800-397-4209, 301-415-4737, or by email to pdr.resource@nrc.gov.

further states that based on the expected future operating status, the proposed approximately 6.5-month extension of the FPOL will remain within the current 32 EFPY period of validity.

Based on the above, the NRC staff concludes that there is reasonable assurance that the RPV will not be adversely impacted by the proposed extension requested by the licensee. The NRC staff therefore finds that the RPV will continue to meet the requirements of 10 CFR, Part 50, Appendix G and Appendix H.

3.2 Structures

The concrete and steel Seismic Category I structures at CPS were designed and constructed in accordance with the General Design Criteria of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR, Part 50. This is discussed in Sections 3.1 and 3.2 of the CPS USAR, Revision 19, dated October 31, 2016 (ADAMS Accession No. ML16305A308). The licensee's design basis, fabrication, construction, and implementation of quality assurance criteria for the plant were reviewed by the staff when the plant was being licensed for low-power operation. The NRC staff's evaluation approving the programs and their implementation with respect to these structures are contained in NUREG-0853 and its eight supplements.

The CPS USAR, Table 3.2-1, Item XXXV, "Civil Structures," identifies which structures are classified as Seismic Category I. The CPS USAR, Section 3.8, "Design of Seismic Category I Structures," describes the design. The NRC staff documented its review of the Seismic Category I structures in NUREG-0853, Section 3.8, as follows:

The criteria used in the analysis, design, and construction of all the plant Category I structures to account for anticipated loadings and postulated conditions that may be imposed on each structure during its service lifetime are in conformance with the established criteria, codes, standards, and specifications acceptable to the staff.

Based on the licensee's use of the indicated codes, standards, and specifications in the plant's design, analyses, and construction and the licensee's quality assurance program required by Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR, Part 50, as approved by NUREG-0853 and its supplements, the NRC staff finds that there is reasonable assurance that the concrete and steel structures will, for the proposed license term extension requested by the licensee, be in conformity with the applicable provisions of the rules and regulations of the NRC, and the CPS license.

3.3 Mechanical Equipment

In its letter dated September 17, 2018, the licensee stated that surveillance, maintenance, and testing requirements for mechanical equipment are in place at the plant to verify operability or to detect degradation and ensure that the equipment that does degrade is replaced or other corrective actions are taken. In addition, subcomponents such as nonmetallics (e.g., gaskets and o-rings) are inspected and replaced as necessary, as part of routine maintenance or equipment operator observations in order to ensure the design life of equipment.

In its letter dated September 17, 2018, the licensee stated that surveillance, inspection, and testing requirements at CPS, which will apply during the operating life of the plant, include the following:

ASME Code Section XI: Equipment that is safety-related is ASME Code Class 1, 2, or 3 and is subject to the inservice inspection and testing requirements of Section XI and 10 CFR 50.55a, except where relief has been granted in writing from these requirements. These requirements apply throughout the operating life of a plant and will provide reasonable assurance that mechanical components will be properly monitored throughout the plant lifetime.

Technical Specifications (TSs): 10 CFR 50.36 requires the establishment of limiting conditions for operation (LCOs) for certain equipment. (LCOs are the lowest functional capability or performance levels of equipment required for safe operation of the facility). This equipment is subject to the surveillance and testing requirements in the TSs to assure systems are operable. These surveillance requirements include calibration and inspection of systems and components to ensure that operation of the plant will remain in accordance with the limiting conditions for operation.

10 CFR Part 50, Appendix J: Equipment and components associated with containment penetrations, including containment isolation valves, are subject to the leak testing requirements in Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." This is for Type B and C testing of valves and penetrations, and Type A testing of the overall containment structure.

Mechanical Equipment Qualification (MEQ): Mechanical equipment that is environmentally qualified includes all safety-related active equipment located in harsh environmental zones. Components of the mechanical equipment in the MEQ program contain predominately metallic and some non-metallic materials. Since the effects of temperature, humidity, and radiation are relatively insignificant for metallic components, the environmental qualification is based only on their non-metallic materials. These lifetimes have been incorporated into plant equipment maintenance and replacement practices to ensure that all mechanical equipment important to safety remains qualified and available to perform its safety function regardless of the overall age of the plant. If a component has a qualified life of less than 40 years, then its replacement is scheduled through the maintenance program. Therefore, the MEQ program supports the proposed amendment.

Based on the above, the NRC staff finds that compliance with the codes, standards, and regulatory requirements to which mechanical equipment are analyzed, constructed, tested, and inspected provides adequate assurance that the structural integrity of equipment important to safety will be maintained during the operating lifetime of the plant and during the additional period authorized by this amendment. Any significant degradation by such equipment would be discovered and the equipment restored to an acceptable, and operable, condition.

3.4 Electrical Equipment

In its letter dated September 17, 2018, the licensee stated that aging analysis has been performed for all safety-related electrical equipment in accordance with 10 CFR 50.49, "Environmental qualification of electric equipment important to safety for nuclear power plants," and has identified qualified lifetimes for this equipment. These lifetimes have been incorporated into plant equipment maintenance and replacement practices to ensure that all electrical

equipment important to safety remains qualified and available to perform its safety function regardless of the overall age of the plant. If a component has a qualified life of less than 40 years, then its replacement is scheduled through the maintenance program.

Based on the above, the NRC staff finds that electrical equipment will continue to perform its design functions during the approximately 6.5 month requested extension and finds that 10 CFR 50.49 is met.

3.5 Quality Assurance and Maintenance Programs

The NRC staff documented its initial licensing review of the quality assurance program, including procedures and instructions for maintenance, in NUREG-0853. The NRC staff concluded that the quality assurance program is acceptable. Since licensing, the quality assurance program, including maintenance procedures and instructions, has been subject to NRC inspection. Any regulatory violations are subject to resolution in accordance with the licensee's quality assurance program and subject to further review by the NRC staff in accordance with the Reactor Oversight Process and NRC's enforcement program, as appropriate.

Based on the above and since the amendment does not change the quality assurance program, the NRC staff finds that there is reasonable assurance that the quality assurance program and maintenance procedures and instructions will continue to be appropriately implemented during the approximately 6.5 month extension and 10 CFR, Part 50, Appendix B, continues to be met.

3.6 Conclusion

Based on the discussion above, there are no safety issues that would preclude an additional approximately 6.5-month period of operation, from September 29, 2026, to April 17, 2027, extending the term of the license. Based on the above the NRC staff finds that the proposed amendment is acceptable; however, it should be noted that the above evaluation would not be sufficient for license renewal under 10 CFR, Part 54.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the NRC staff notified the Illinois State official on May 1, 2019, of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an environmental assessment and finding of no significant impact was published in the Federal Register on May 21, 2019 (84 FR 23085). Accordingly, based upon the environmental assessment, the Commission has determined that issuance of this amendment will not have a significant effect on the quality of the human environment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be

conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: J. Wiebe, NRR

Date of issuance: June 12, 2019

SUBJECT: CLINTON POWER STATION, UNIT NO. 1 - ISSUANCE OF AMENDMENT REGARDING RECAPTURE OF LOW-POWER TESTING TIME (EPID L-2018-LLA-0250) DATE JUNE 12, 2019

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***via e-mail**

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DATE	6/10/19	6/12/19		

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