



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

August 28, 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; JAMES A. FITZPATRICK NUCLEAR POWER PLANT; LASALLE COUNTY STATION, UNITS 1 AND 2; LIMERICK GENERATING STATION, UNITS 1 AND 2; NINE MILE POINT NUCLEAR STATION, UNIT 2; AND PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3—ISSUANCE OF AMENDMENTS TO ADOPT TSTF-564, "SAFETY LIMIT MCPR" (EPID L-2019-LLA-0021)

Dear Mr. Hanson:

The U.S. Nuclear Regulatory Commission (NRC) has issued the following enclosed amendments in response to the Exelon Generation Company, LLC (Exelon) application dated February 1, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19032A624), as supplemented by letter dated March 7, 2019 (ADAMS Accession No. ML19066A162):

1. Amendment No. 225 to Facility Operating License No. NPF-62 for the Clinton Power Station, Unit No. 1;
2. Amendment No. 327 to Renewed Facility Operating License No. DPR-59 for the James A. FitzPatrick Nuclear Power Plant;
3. Amendment No. 238 to Renewed Facility Operating License No. NPF-11 and Amendment No. 224 to Renewed Facility Operating License No. NPF-18 for the LaSalle County Station, Units 1 and 2, respectively;
4. Amendment No. 236 to Renewed Facility Operating License No. NPF-39 and Amendment No. 199 to Renewed Facility Operating License No. NPF-85 for Limerick Generating Station, Units 1 and 2, respectively;
5. Amendment No. 176 to Renewed Facility Operating License No. NPF-69 for Nine Mile Point Nuclear Station, Unit 2; and
6. Amendment No. 326 to Renewed Facility Operating License No. DPR-44 and Amendment No. 329 to Renewed Facility Operating License No. DPR-56 for Peach Bottom Atomic Power Station, Units 2 and 3, respectively.

The amendments revise the technical specifications for each facility by changing requirements related to the safety limit minimum critical power ratio (MCPR) and the core operating limits report. The amendments are based on Technical Specification Task Force (TSTF) traveler TSTF-564, Revision 2, "Safety Limit MCPR" (ADAMS Accession No. ML18297A361). The

amendments for the Limerick Generating Station and the James A. FitzPatrick Nuclear Power Plant also make changes to these requirements that are outside the scope of TSTF-564.

A copy of the NRC staff's Safety Evaluations are also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,



Blake A. Purnell, Project Manager  
Plant Licensing Branch III  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-461, 50-333, 50-373, 50-374,  
50-352, 50-353, 50-410, 50-277,  
and 50-278

Enclosures:

1. Amendment No. 225 to NPF-62
2. Amendment No. 327 to DPR-59
3. Amendment No. 238 to NPF-11
4. Amendment No. 224 to NPF-18
5. Amendment No. 236 to NPF-39
6. Amendment No. 199 to NPF-85
7. Amendment No. 176 to NPF-69
8. Amendment No. 326 to DPR-44
9. Amendment No. 329 to DPR-56
10. Safety Evaluation

cc: Listserv



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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-461

CLINTON POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 225  
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 dated February 1, 2019, as supplemented by letter dated March 7, 2019, 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 Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-62 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 225, are hereby incorporated into this license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to entering Mode 4 following refueling outage C1R19.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'Lisa M. Regner', with a long horizontal flourish extending to the right.

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

Attachment: Changes to the Technical Specifications  
and Facility Operating License

Date of Issuance: August 28, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 225

FACILITY OPERATING LICENSE NO. NPF-62

CLINTON POWER STATION, UNIT NO. 1

DOCKET NO. 50-461

Replace the following pages of the Facility Operating License and Appendix A, Technical Specifications (TSs), with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

Insert

License NPF-62

License NPF-62

Page 3

Page 3

TSs

TSs

2.0-1

2.0-1

5.0-18

5.0-18

- (4) Exelon Generation Company, pursuant to the Act and to 10 CFR Parts 30, 40, and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (5) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components;
- (6) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility. Mechanical disassembly of the GE14i isotope test assemblies containing Cobalt-60 is not considered separation; and
- (7) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30, to intentionally produce, possess, receive, transfer, and use Cobalt-60.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Exelon Generation Company is authorized to operate the facility at reactor core power levels not in excess of 3473 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 225, are hereby incorporated into this license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

2.0 SAFETY LIMITS (SLs)

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2.1 SLs

2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 700 psia or core flow < 10% rated core flow:

THERMAL POWER shall be  $\leq$  21.6% RTP.

2.1.1.2 With the reactor steam dome pressure  $\geq$  700 psia and core flow  $\geq$  10% rated core flow:

MCPR shall be  $\geq$  1.07.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be  $\leq$  1325 psig.

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2.2 SL Violations

With any SL violation, the following actions shall be completed:

2.2.1 Within 1 hour, notify the NRC Operations Center, in accordance with 10 CFR 50.72.

2.2.2 Within 2 hours:

2.2.2.1 Restore compliance with all SLs; and

2.2.2.2 Insert all insertable control rods.

2.2.3 Within 24 hours, notify the plant manager and the corporate executive responsible for overall plant nuclear safety.

(continued)

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## 5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR)

- a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:
1. LCO 3.2.1, Average Planar Linear Heat Generation Rate (APLHGR),
  2. LCO 3.2.2, Minimum Critical Power Ratio (MCPR) and MCPR<sub>99.9%</sub>,
  3. LCO 3.2.3, Linear Heat Generation Rate (LHGR),
  4. LCO 3.3.1.1, RPS Instrumentation (SR 3.3.1.1.14),
  5. LCO 3.3.1.3, Oscillation Power Range Monitor (OPRM) Instrumentation, and
  6. LCO 3.7.6, Main Turbine Bypass System, (cycle dependent thermal power limits for an inoperable Main Turbine Bypass System).
- b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC in
- (1) General Electric Standard Application for Reactor Fuel (GESTAR), NEDE-24011-P-A, or
  - (2) NEDO-32465, "BWR Owners' Group Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology and Reload Applications."
- c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.
- d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

(continued)





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

EXELON FITZPATRICK, LLC

AND

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-333

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 327  
Renewed License No. DPR-59

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC dated February 1, 2019, as supplemented by letter dated March 7, 2019, 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.

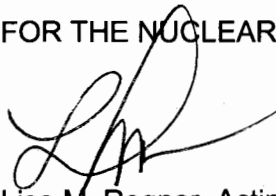
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-59 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 327, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to entering Mode 4 following refueling outage FPR24.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment: Changes to the Technical Specifications  
and Renewed Facility Operating License

Date of Issuance: August 28, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 327  
RENEWED FACILITY OPERATING LICENSE NO. DPR-59  
JAMES A. FITZPATRICK NUCLEAR POWER PLANT  
DOCKET NO. 50-333

Replace the following pages of the Renewed Facility Operating License and Appendix A, Technical Specifications (TSs), with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

License DPR-59  
Page 3

TSs  
2.0-1  
5.6-2

Insert

License DPR-59  
Page 3

TSs  
2.0-1  
5.6-2

- (4) Exelon Generation Company pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, at any time, any byproduct, source and special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration; or associated with radioactive apparatus, components or tools.
  - (5) Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.
- C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Exelon Generation Company is authorized to operate the facility at steady state reactor core power levels not in excess of 2536 megawatts (thermal).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 327, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

(3) Fire Protection

Exelon Generation Company shall implement and maintain in effect all provisions of the approved fire protections program as described in the Final Safety Analysis Report for the facility and as approved in the SER dated November 20, 1972; the SER Supplement No. 1 dated February 1, 1973; the SER Supplement No. 2 dated October 4, 1974; the SER dated August 1, 1979; the SER Supplement dated October 3, 1980; the SER Supplement dated February 13, 1981; the NRC Letter dated February 24, 1981; Technical Specification Amendments 34 (dated January 31, 1978), 80 (dated May 22, 1984), 134 (dated July 19, 1989), 135 (dated September 5, 1989), 142 (dated October 23, 1989), 164 (dated August 10, 1990), 176 (dated January 16, 1992), 177 (dated February 10, 1992), 186 (dated February 19, 1993), 190 (dated June 29, 1993), 191 (dated July 7, 1993), 206 (dated February 28, 1994), and 214 (dated June 27, 1994); and NRC Exemptions and associated safety evaluations dated April 26, 1983, July 1, 1983, January 11, 1985,

## 2.0 SAFETY LIMITS (SLs)

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### 2.1 SLs

#### 2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 685 psig or core flow < 10% rated core flow:

THERMAL POWER shall be  $\leq$  25% RTP.

2.1.1.2 With the reactor steam dome pressure  $\geq$  685 psig and core flow  $\geq$  10% rated core flow:

MCPR shall be  $\geq$  1.07.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

#### 2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be  $\leq$  1325 psig.

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### 2.2 SL Violations

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

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5.6 Reporting Requirements (continued)

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5.6.4 Not Used

5.6.5 CORE OPERATING LIMITS REPORT (COLR)

- a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:
1. The AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR) of Specification 3.2.1;
  2. The MINIMUM CRITICAL POWER RATIO (MCPR) and MCPR(99.9%) of Specification 3.2.2;
  3. The LINEAR HEAT GENERATION RATE (LHGR) of Specification 3.2.3;
  4. The Reactor Protection System (RPS) APRM Neutron Flux - High (Flow Biased) Function Allowable Value of Table 3.3.1.1-1;
  5. The Rod Block Monitor - Upscale Function Allowable Value of Table 3.3.2.1-1; and
  6. The Power/Flow Exclusion Region of Specification 3.4.1.
- b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following document:
1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR II)" and the US Supplement, NEDE-24011-P-A-US

The COLR will contain the complete identification for each of the Technical Specification referenced topical reports used to prepare the COLR (i.e., report number, title, revision, date, and any supplements).

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-373

LASALLE COUNTY STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 238  
Renewed License No. NPF-11

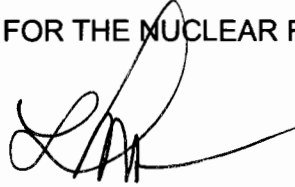
1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC dated February 1, 2019, as supplemented by letter dated March 7, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (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 Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-11 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 238, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to entering Mode 4 following refueling outage L1R18.

FOR THE NUCLEAR REGULATORY COMMISSION

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

Attachment: Changes to the Technical Specifications  
and Renewed Facility Operating License

Date of Issuance: August 28, 2019





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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-374

LASALLE COUNTY STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 224  
Renewed License No. NPF-18

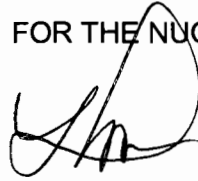
1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC dated February 1, 2019, as supplemented by letter dated March 7, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (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 Technical Specifications as indicated in the enclosure to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-18 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 224, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to LaSalle County Station, Unit 1, entering Mode 4 following refueling outage L1R18.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment: Changes to the Technical Specifications  
and Renewed Facility Operating License

Date of Issuance: August 28, 2019

ATTACHMENT TO LICENSE AMENDMENT NOS. 238 AND 224  
RENEWED FACILITY OPERATING LICENSE NOS. NPF-11 AND NPF-18  
LASALLE COUNTY STATION, UNITS 1 AND 2  
DOCKET NOS. 50-373 AND 50-374

Replace the following pages of the Renewed Facility Operating Licenses and Appendix A, Technical Specifications (TSs), with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

License NPF-11  
Page 3

License NPF-18  
Page 3

TSs  
2.0-1  
5.6-2

Insert

License NPF-11  
Page 3

License NPF-18  
Page 3

TSs  
2.0-1  
5.6-2

- (3) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- Am. 146  
01/12/01 (4) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- Am. 202  
07/21/11 (5) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of LaSalle County Station, Units 1 and 2, and such Class B and Class C low-level radioactive waste as may be produced by the operation of Braidwood Station, Units 1 and 2, Byron Station, Units 1 and 2, and Clinton Power Station, Unit 1.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

- Am. 198  
09/16/10 (1) Maximum Power Level  
The licensee is authorized to operate the facility at reactor core power levels not in excess of full power (3546 megawatts thermal).
- Am. 238  
08/28/19 (2) Technical Specifications and Environmental Protection Plan  
The Technical Specifications contained in Appendix A, as revised through Amendment No. 238, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.
- Am. 194  
08/28/09 (3) DELETED
- Am. 194  
08/28/09 (4) DELETED
- Am. 194  
08/28/09 (5) DELETED

- (2) Pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;
- (3) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (4) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of LaSalle County Station, Units 1 and 2, and such Class B and Class C low-level radioactive waste as may be produced by the operation of Braidwood Station, Units 1 and 2, Byron Station, Units 1 and 2, and Clinton Power Station, Unit 1.

Am. 189  
07/21/11

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

Am. 185  
09/16/10

- (1) Maximum Power Level  
The licensee is authorized to operate the facility at reactor core power levels not in excess of full power (3546 megawatts thermal). Items in Attachment 1 shall be completed as specified. Attachment 1 is hereby incorporated into this license.

Am. 224  
08/28/19

- (2) Technical Specifications and Environmental Protection Plan  
The Technical Specifications contained in Appendix A, as revised through Amendment No. 224, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

## 2.0 SAFETY LIMITS (SLs)

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### 2.1 SLs

#### 2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 700 psia or core flow < 10% rated core flow:

THERMAL POWER shall be  $\leq$  25% RTP.

2.1.1.2 With the reactor steam dome pressure  $\geq$  700 psia and core flow  $\geq$  10% rated core flow:

MCPR shall be  $\geq$  1.07.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

#### 2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be  $\leq$  1325 psig.

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### 2.2 SL Violations

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

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5.6 Reporting Requirements

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5.6.2 Annual Radiological Environmental Operating Report (continued)  
(ODCM), and in 10 CFR 50, Appendix I, Sections IV.B.2, IV.B.3, and IV.C.

5.6.3 Radioactive Effluent Release Report

-----NOTE-----  
A single submittal may be made for a multiple unit station. The submittal should combine sections common to all units at the station.  
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The Radioactive Effluent Release Report covering the operation of the unit shall be submitted prior to May 1 of each year in accordance with 10 CFR 50.36a. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit. The material provided shall be consistent with the objectives outlined in the ODCM and the Process Control Program and in conformance with 10 CFR 50.36a and 10 CFR 50, Appendix I, Section IV.B.1.

5.6.4 (Deleted)

5.6.5 CORE OPERATING LIMITS REPORT (COLR)

- a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:
  1. The APLHGR for Specification 3.2.1.
  2. The MCPR and MCPR<sub>99.9%</sub> for Specification 3.2.2.
  3. The LHGR for Specification 3.2.3.

(continued)

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-352

LIMERICK GENERATING STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 236  
Renewed License No. NPF-39

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC dated February 1, 2019, as supplemented by letter dated March 7, 2019, 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 Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-39 is hereby amended to read as follows:

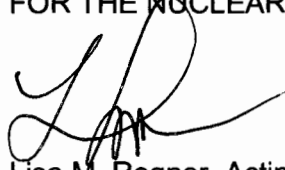
(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 236, are hereby incorporated into this renewed license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.



3. This license amendment is effective as of the date of its issuance and shall be implemented prior to entering Operational Condition 4 following refueling outage Li1R18.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to be 'L. Regner', written over a horizontal line.

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

Attachment: Changes to the Technical Specifications  
and Facility Operating License

Date of Issuance: August 28, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 236  
RENEWED FACILITY OPERATING LICENSE NO. NPF-39  
LIMERICK GENERATING STATION, UNIT 1  
DOCKET NO. 50-352

Replace the following pages of the Renewed Facility Operating License and Appendix A, Technical Specifications (TSs), with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

License NPF-39  
Page 3

TSs  
2-1  
3/4 1-18  
6-18a

Insert

License NPF-39  
Page 3

TSs  
2-1  
3/4 1-18  
6-18a

- (2) Pursuant to the Act and 10 CFR Part 70, to receive, possess and to use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;
- (3) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (4) Pursuant to the Act and 10 CFR Parts 30, 40, 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility, and to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I (except as exempted from compliance in Section 2.D. below) and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Exelon Generation Company is authorized to operate the facility at reactor core power levels not in excess of 3515 megawatts thermal (100% rated power) in accordance with the conditions specified herein and in Attachment 1 to this license. The items identified in Attachment 1 to this renewed license shall be completed as specified. Attachment 1 is hereby incorporated into this renewed license.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 236, are hereby incorporated into this renewed license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

## 2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

### 2.1 SAFETY LIMITS

#### THERMAL POWER, Low Pressure or Low Flow

2.1.1 THERMAL POWER shall not exceed 25% of RATED THERMAL POWER with the reactor vessel steam dome pressure less than 700 psia or core flow less than 10% of rated flow.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

#### ACTION:

With THERMAL POWER exceeding 25% of RATED THERMAL POWER and the reactor vessel steam dome pressure less than 700 psia or core flow less than 10% of rated flow, be in at least HOT SHUTDOWN within 2 hours and comply with the requirements of Specification 6.7.1.

#### THERMAL POWER, High Pressure and High Flow

2.1.2 The MINIMUM CRITICAL POWER RATIO (MCPR) shall not be less than 1.07 with the reactor vessel steam dome pressure greater than 700 psia and core flow greater than 10% of rated flow.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

#### ACTION:

With MCPR less than 1.07 and the reactor vessel steam dome pressure greater than 700 psia and core flow greater than 10% of rated flow, be in at least HOT SHUTDOWN within 2 hours and comply with the requirements of Specification 6.7.1.

#### REACTOR COOLANT SYSTEM PRESSURE

2.1.3 The reactor coolant system pressure, as measured in the reactor vessel steam dome, shall not exceed 1325 psig.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, and 4.

#### ACTION:

With the reactor coolant system pressure, as measured in the reactor vessel steam dome, above 1325 psig, be in at least HOT SHUTDOWN with the reactor coolant system pressure less than or equal to 1325 psig within 2 hours and comply with the requirements of Specification 6.7.1.

## REACTIVITY CONTROL SYSTEMS

### ROD BLOCK MONITOR

#### LIMITING CONDITION FOR OPERATION

---

3.1.4.3 Both rod block monitor (RBM) channels shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 30% of RATED THERMAL POWER and less than 90% of RATED THERMAL POWER with MCPR less than the limit specified in the CORE OPERATING LIMITS REPORT (COLR), or THERMAL POWER greater than or equal to 90% of rated with MCPR less than the limit specified in the COLR.

ACTION:

- a. With one RBM channel inoperable:
  1. Verify that the reactor is not operating on a LIMITING CONTROL ROD PATTERN, and
  2. Restore the inoperable RBM channel to OPERABLE status within 24 hours.Otherwise, place the inoperable rod block monitor channel in the tripped condition within the next hour.
- b. With both RBM channels inoperable, place at least one inoperable rod block monitor channel in the tripped condition within 1 hour.

#### SURVEILLANCE REQUIREMENTS

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4.1.4.3 Each of the above required RBM channels shall be demonstrated OPERABLE by performance of a:

- a. CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION for the OPERATIONAL CONDITIONS specified in Table 4.3.6-1 and at the frequencies specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.3.6-1.
- b. CHANNEL FUNCTIONAL TEST prior to control rod withdrawal when the reactor is operating on a LIMITING CONTROL ROD PATTERN.

## ADMINISTRATIVE CONTROLS

### CORE OPERATING LIMITS REPORT

6.9.1.9 Core Operating Limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the CORE OPERATING LIMITS REPORT for the following:

- a. The AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR) for Specification 3.2.1,
- b. MAPFAC(P) and MAPFAC(F) factors for Specification 3.2.1,
- c. The MINIMUM CRITICAL POWER RATIO (MCPR) and MCPR(99.9%) for Specification 3.2.3,
- d. The MCPR(P) and MCPR(F) adjustment factors for specification 3.2.3,
- e. The LINEAR HEAT GENERATION RATE (LHGR) for Specification 3.2.4,
- f. The power biased Rod Block Monitor setpoints of Specification 3.3.6 and the Rod Block Monitor MCPR OPERABILITY limits of Specification 3.1.4.3,
- g. The Reactor Coolant System Recirculation Flow upscale trip setpoint and allowable value for Specification 3.3.6,
- h. The Oscillation Power Range Monitor (OPRM) period based detection algorithm (PBDA) setpoints for Specification 2.2.1,
- i. The minimum required number of operable main turbine bypass valves for Specification 3.7.8 and the TURBINE BYPASS SYSTEM RESPONSE TIME for Specification 4.7.8.c.

6.9.1.10 The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

- a. NEDE-24011-P-A "General Electric Standard Application for Reactor Fuel" (Latest approved revision),\*
- b. NEDO-32465-A, "Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications," August 1996.

6.9.1.11 The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal-hydraulic limits, ECCS limits, nuclear limits such as SHUTDOWN MARGIN, transient analysis limits, and accident analysis limits) of the safety analysis are met.

6.9.1.12 The CORE OPERATING LIMITS REPORT, including any mid-cycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector.

### SPECIAL REPORTS

6.9.2 Special reports shall be submitted to the Regional Administrator of the Regional Office of the NRC within the time period specified for each report.

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\* For Cycle 8, specific documents were approved in the Safety Evaluation dated (5/4/98) to support License Amendment No. (127).



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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-353

LIMERICK GENERATING STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 199  
Renewed License No. NPF-85

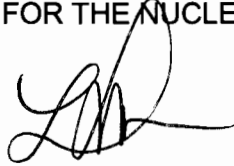
1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC dated February 1, 2019, as supplemented by letter dated March 7, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (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 Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-85 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 199, are hereby incorporated into this renewed license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to entering Operational Condition 4 following refueling outage Li2R16.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'L. Regner', is written over the text 'FOR THE NUCLEAR REGULATORY COMMISSION'.

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

Attachment: Changes to the Technical Specifications  
and Facility Operating License

Date of Issuance: August 28, 2019



ATTACHMENT TO LICENSE AMENDMENT NO. 199  
RENEWED FACILITY OPERATING LICENSE NO. NPF-85  
LIMERICK GENERATING STATION, UNIT 2  
DOCKET NO. 50-353

Replace the following pages of the Renewed Facility Operating License and Appendix A, Technical Specifications (TSs), with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

License NPF-85  
Page 3

TSs

2-1  
3/4 1-18  
6-18a

Insert

License NPF-85  
Page 3

TSs

2-1  
3/4 1-18  
6-18a

- (2) Pursuant to the Act and 10 CFR Part 70, to receive, possess and to use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;
- (3) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (4) Pursuant to the Act and 10 CFR Parts 30, 40, 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility, and to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I (except as exempted from compliance in Section 2.D. below) and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Exelon Generation Company is authorized to operate the facility at reactor core power levels of 3515 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 199, are hereby incorporated into this renewed license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

## 2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

---

### 2.1 SAFETY LIMITS

#### THERMAL POWER, Low Pressure or Low Flow

2.1.1 THERMAL POWER shall not exceed 25% of RATED THERMAL POWER with the reactor vessel steam dome pressure less than 700 psia or core flow less than 10% of rated flow.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

#### ACTION:

With THERMAL POWER exceeding 25% of RATED THERMAL POWER and the reactor vessel steam dome pressure less than 700 psia or core flow less than 10% of rated flow, be in at least HOT SHUTDOWN within 2 hours and comply with the requirements of Specification 6.7.1.

#### THERMAL POWER, High Pressure and High Flow

2.1.2 The MINIMUM CRITICAL POWER RATIO (MCPR) shall not be less than 1.07 with the reactor vessel steam dome pressure greater than 700 psia and core flow greater than 10% of rated flow.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

#### ACTION:

With MCPR less than 1.07 and the reactor vessel steam dome pressure greater than 700 psia and core flow greater than 10% of rated flow, be in at least HOT SHUTDOWN within 2 hours and comply with the requirements of Specification 6.7.1.

#### REACTOR COOLANT SYSTEM PRESSURE

2.1.3 The reactor coolant system pressure, as measured in the reactor vessel steam dome, shall not exceed 1325 psig.

APPLICABILITY: OPERATION CONDITIONS 1, 2, 3, and 4.

#### ACTION:

With the reactor coolant system pressure, as measured in the reactor vessel steam dome, above 1325 psig, be in at least HOT SHUTDOWN with reactor coolant system pressure less than or equal to 1325 psig within 2 hours and comply with the requirements of Specification 6.7.1.

## REACTIVITY CONTROL SYSTEMS

### ROD BLOCK MONITOR

#### LIMITING CONDITION FOR OPERATION

---

3.1.4.3 Both rod block monitor (RBM) channels shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 30% of RATED THERMAL POWER and less than 90% of RATED THERMAL POWER with MCPR less than the limit specified in the CORE OPERATING LIMITS REPORT (COLR), or THERMAL POWER greater than or equal to 90% of rated with MCPR less than the limit specified in the COLR.

#### ACTION:

- a. With one RBM channel inoperable:
  1. Verify that the reactor is not operating on a LIMITING CONTROL ROD PATTERN, and
  2. Restore the inoperable RBM channel to OPERABLE status within 24 hours.

Otherwise, place the inoperable rod block monitor channel in the tripped condition within the next hour.
- b. With both RBM channels inoperable, place at least one inoperable rod block monitor channel in the tripped condition within 1 hour.

#### SURVEILLANCE REQUIREMENTS

---

4.1.4.3 Each of the above required RBM channels shall be demonstrated OPERABLE by performance of a:

- a. CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION for the OPERATIONAL CONDITIONS specified in Table 4.3.6-1 and at the frequencies specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.3.6-1.
- b. CHANNEL FUNCTIONAL TEST prior to control rod withdrawal when the reactor is operating on a LIMITING CONTROL ROD PATTERN.

## ADMINISTRATIVE CONTROLS

### CORE OPERATING LIMITS REPORT

6.9.1.9 Core Operating Limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the CORE OPERATING LIMITS REPORT for the following:

- a. The AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR) for Specification 3.2.1,
- b. MAPFAC(P) and MAPFAC(F) factors for Specification 3.2.1,
- c. The MINIMUM CRITICAL POWER RATIO (MCPR) and MCPR(99.9%) for Specification 3.2.3,
- d. The MCPR(P) and MCPR(F) adjustment factor for specification 3.2.3,
- e. The LINEAR HEAT GENERATION RATE (LHGR) for Specification 3.2.4,
- f. The power biased Rod Block Monitor setpoints of Specification 3.3.6 and the Rod Block Monitor MCPR OPERABILITY limits of Specification 3.1.4.3.
- g. The Reactor Coolant System Recirculation Flow upscale trip setpoint and allowable value for Specification 3.3.6,
- h. The Oscillation Power Range Monitor (OPRM) period based detection algorithm (PBDA) setpoints for Specification 2.2.1,
- i. The minimum required number of operable main turbine bypass valves for Specification 3.7.8 and the TURBINE BYPASS SYSTEM RESPONSE TIME for Specification 4.7.8.c.

6.9.1.10 The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

- a. NEDE-24011-P-A "General Electric Standard Application for Reactor Fuel" (Latest approved revision),
- b. NEDO-32465-A, "Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications," August 1996.

6.9.1.11 The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal-hydraulic limits, ECCS limits, nuclear limits such as SHUTDOWN MARGIN, transient analysis limits, and accident analysis limits) of the safety analysis are met.

6.9.1.12 The CORE OPERATING LIMITS REPORT, including any mid-cycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector.

### SPECIAL REPORTS

6.9.2 Special reports shall be submitted to the Regional Administrator of the Regional Office of the NRC within the time period specified for each report.



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

NINE MILE POINT NUCLEAR STATION, LLC

LONG ISLAND LIGHTING COMPANY

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-410

NINE MILE POINT NUCLEAR STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 176  
Renewed License No. NPF-69

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC dated February 1, 2019, as supplemented by letter dated March 7, 2019, 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.

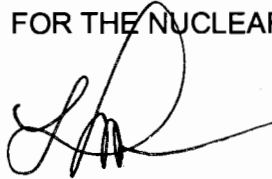
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-69 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No. 176, are hereby incorporated into this license. Exelon Generation shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to entering Mode 4 following refueling outage N2R17.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment: Changes to the Technical Specifications  
and Renewed Facility Operating License

Date of Issuance: August 28, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 176  
RENEWED FACILITY OPERATING LICENSE NO. NPF-69  
NINE MILE POINT NUCLEAR STATION, UNIT 2  
DOCKET NO. 50-410

Replace the following pages of the Renewed Facility Operating License and Appendix A, Technical Specifications (TSs), with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

License NPF-69  
Page 4

TSs  
2.0-1  
5.6-3

Insert

License NPF-69  
Page 4

TSs  
2.0-1  
5.6-3



(1) Maximum Power Level

Exelon Generation is authorized to operate the facility at reactor core power levels not in excess of 3988 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No. 176, are hereby incorporated into this license. Exelon Generation shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Fuel Storage and Handling (Section 9.1, SSER 4)\*

- a. Fuel assemblies, when stored in their shipping containers, shall be stacked no more than three containers high.
- b. When not in the reactor vessel, no more than three fuel assemblies shall be allowed outside of their shipping containers or storage racks in the New Fuel Vault or Spent Fuel Storage Facility.
- c. The above three fuel assemblies shall maintain a minimum edge-to-edge spacing of twelve (12) inches from the shipping container array and approved storage rack locations.
- d. The New Fuel Storage Vault shall have no more than ten fresh fuel assemblies uncovered at any one time.

(4) Turbine System Maintenance Program (Section 3.5.1.3.10, SER)

The operating licensee shall submit for NRC approval by October 31, 1989, a turbine system maintenance program based on the manufacturer's calculations of missile generation probabilities. (Submitted by NMPC letter dated October 30, 1989 from C.D. Terry and approved by NRC letter dated March 15, 1990 from Robert Martin to Mr. Lawrence Burkhardt, III).

\* The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report (SER) and/or its supplements wherein the license condition is discussed.

## 2.0 SAFETY LIMITS (SLs)

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### 2.1 SLs

#### 2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 700 psia or core flow < 10% rated core flow:

THERMAL POWER shall be  $\leq$  23% RTP.

2.1.1.2 With the reactor steam dome pressure  $\geq$  700 psia and core flow  $\geq$  10% rated core flow:

MCPR shall be  $\geq$  1.07.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

#### 2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be  $\leq$  1325 psig.

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### 2.2 SL Violations

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

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## 5.6 Reporting Requirements

### 5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

1. The APLHGR for Specification 3.2.1.
  2. The MCPR and  $MCPR_{99.9\%}$  for Specification 3.2.2.
  3. The LHGR for Specification 3.2.3.
  4. The Manual Backup Stability Protection (BSP) Scram Region (Region I), the Manual BSP Controlled Entry Region (Region II), the modified APRM Simulated Thermal Power - High setpoints used in the OPRM (Function 2.e), Automated BSP Scram Region, and the BSP Boundary for Specification 3.3.1.1.
  5. The Allowable Values, NTSPs, and MCPR conditions for the Rod Block Monitor – Upscale Functions for Specification 3.3.2.1.
- b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:
1. NEDE-24011-P-A-US, "General Electric Standard Application for Reactor Fuel," U.S. Supplement, (NRC approved version specified in the COLR).
- c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.
- d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

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(continued)



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

EXELON GENERATION COMPANY, LLC

PSEG NUCLEAR LLC

DOCKET NO. 50-277

PEACH BOTTOM ATOMIC POWER STATION, UNIT 2  
AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 326  
Renewed License No. DPR-44

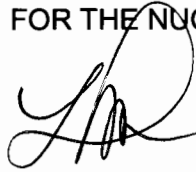
1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC dated February 1, 2019, as supplemented by letter dated March 7, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (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 Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Renewed Facility Operating License No. DPR-44 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 326, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to entering Mode 4 following refueling outage P2R23.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment: Changes to the Technical Specifications  
and Renewed Facility Operating License

Date of Issuance: August 28, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 326  
RENEWED FACILITY OPERATING LICENSE NO. DPR-44  
PEACH BOTTOM ATOMIC POWER STATION, UNIT 2  
DOCKET NO. 50-277

Replace the following pages of the Renewed Facility Operating License and Appendix A, Technical Specifications (TSs), with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

License DPR-44  
Page 3

TSs  
2.0-1  
2.0-2  
5.0-21

Insert

License DPR-44  
Page 3

TSs  
2.0-1  
--  
5.0-21

- (5) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not to separate, such byproduct and special nuclear material as may be produced by operation of the facility, and such Class B and Class C low-level radioactive waste as may be produced by the operation of Limerick Generating Station, Units 1 and 2.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Section 50.54 of Part 50, and Section 70.32 of Part 70; all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

- (1) Maximum Power Level

Exelon Generation Company is authorized to operate the Peach Bottom Atomic Power Station, Unit 2, at steady state reactor core power levels not in excess of 4016 megawatts thermal.

- (2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 326, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications.

- (3) Physical Protection

Exelon Generation Company shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822), and the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans<sup>1</sup>, submitted by letter dated May 17, 2006, is entitled: "Peach Bottom Atomic Power Station Security Plan, Training and Qualification Plan, Safeguards Contingency Plan, and Independent Spent Fuel Storage Installation Security Program, Revision 3." The set contains Safeguards Information protected under 10 CFR 73.21.

Exelon Generation Company shall fully implement and maintain in effect all provisions of the Commission-approved cyber security plan (CSP), including changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The Exelon Generation Company CSP was approved by License Amendment No. 281 and modified by Amendment No. 301.

- (4) Fire Protection

The Exelon Generation Company shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report for the facility, and as approved in the NRC Safety Evaluation Report (SER) dated May 23, 1979, and Supplements dated August 14, September 15, October 10 and November 24, 1980, and in the NRC SERs dated September 16, 1993, and August 24, 1994, subject to the following provision:

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<sup>1</sup> The Training and Qualification Plan and Safeguards Contingency Plan are Appendices to the Security Plan.

## 2.0 SAFETY LIMITS (SLs)

---

### 2.1 SLs

#### 2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 700 psia or core flow < 10% rated core flow:

THERMAL POWER shall be  $\leq$  22.6% RTP.

2.1.1.2 With the reactor steam dome pressure  $\geq$  700 psia and core flow  $\geq$  10% rated core flow:

MCPR shall be  $\geq$  1.07.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

#### 2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be  $\leq$  1340 psig.

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### 2.2 SL Violations

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

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5.6 Reporting Requirements (continued)

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5.6.5 CORE OPERATING LIMITS REPORT (COLR)

- a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:
    1. The Average Planar Linear Heat Generation Rate for Specification 3.2.1;
    2. The Minimum Critical Power Ratio (MCPR) for Specifications 3.2.2 and 3.3.2.1, and MCPR<sub>99.9%</sub> for Specification 3.2.2;
    3. The Linear Heat Generation Rate for Specification 3.2.3;
    4. The Control Rod Block Instrumentation for Specification 3.3.2.1; and
    5. The Manual Backup Stability Protection (BSP) Scram Region (Region I), the Manual BSP Controlled Entry Region (Region II), the modified APRM Simulated Thermal Power-High scram setpoints used in the Automated BSP Scram Region and the BSP Boundary for Specification 3.3.1.1.
  - b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following document:
    1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" (latest approved version as specified in the COLR).
  - c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.
  - d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

EXELON GENERATION COMPANY, LLC

PSEG NUCLEAR LLC

DOCKET NO. 50-278

PEACH BOTTOM ATOMIC POWER STATION, UNIT 3

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 329  
Renewed License No. DPR-56

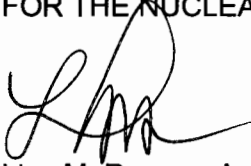
1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Exelon Generation Company, LLC dated February 1, 2019, as supplemented by letter dated March 7, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (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 Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Renewed Facility Operating License No. DPR-56 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 329, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to entering Mode 4 following refueling outage P3R22.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'L. Regner', is written over the printed name below.

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

Attachment: Changes to the Technical Specifications  
and Renewed Facility Operating License

Date of Issuance: August 28, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 329  
RENEWED FACILITY OPERATING LICENSE NO. DPR-56  
PEACH BOTTOM ATOMIC POWER STATION, UNIT 3  
DOCKET NO. 50-278

Replace the following pages of the Renewed Facility Operating License and Appendix A, Technical Specifications (TSs), with the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

License DPR-56  
Page 3

TSs

2.0-1  
2.0-2  
5.0-21

Insert

License DPR-56  
Page 3

TSs

2.0-1  
--  
5.0-21

- (5) Exelon Generation Company, pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not to separate, such byproduct and special nuclear material as may be produced by operation of the facility, and such Class B and Class C low-level radioactive waste as may be produced by the operation of Limerick Generating Station, Units 1 and 2.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Section 50.54 of Part 50, and Section 70.32 of Part 70; all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

(1) Maximum Power Level

Exelon Generation Company is authorized to operate the Peach Bottom Atomic Power Station, Unit No. 3, at steady state reactor core power levels not in excess of 4016 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 329, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications.

(3) Physical Protection

Exelon Generation Company shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822), and the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans<sup>1</sup>, submitted by letter dated May 17, 2006, is entitled: "Peach Bottom Atomic Power Station Security Plan, Training and Qualification Plan, Safeguards Contingency Plan, and Independent Spent Fuel Storage Installation Security Program, Revision 3." The set contains Safeguards Information protected under 10 CFR 73.21.

Exelon Generation Company shall fully implement and maintain in effect all provisions of the Commission-approved cyber security plan (CSP), including changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The Exelon Generation Company CSP was approved by License Amendment No. 283 and modified by Amendment No. 304.

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<sup>1</sup> The Training and Qualification Plan and Safeguards Contingency Plan and Appendices to the Security Plan.

## 2.0 SAFETY LIMITS (SLs)

---

### 2.1 SLs

#### 2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 700 psia or core flow < 10% rated core flow:

THERMAL POWER shall be  $\leq$  22.6% RTP.

2.1.1.2 With the reactor steam dome pressure  $\geq$  700 psia and core flow  $\geq$  10% rated core flow:

MCPR shall be  $\geq$  1.07.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

#### 2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be  $\leq$  1340 psig.

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### 2.2 SL Violations

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

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5.6 Reporting Requirements (continued)

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5.6.5 CORE OPERATING LIMITS REPORT (COLR)

- a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:
    - 1. The Average Planar Linear Heat Generation Rate for Specification 3.2.1;
    - 2. The Minimum Critical Power Ratio (MCPR) for Specifications 3.2.2 and 3.3.2.1, and MCPR<sub>99.9%</sub> for Specification 3.2.2;
    - 3. The Linear Heat Generation Rate for Specification 3.2.3;
    - 4. The Control Rod Block Instrumentation for Specification 3.3.2.1; and
    - 5. The Manual Backup Stability Protection (BSP) Scram Region (Region I), the Manual BSP Controlled Entry Region (Region II), the modified APRM Simulated Thermal Power-High scram setpoints used in the Automated BSP Scram Region and the BSP Boundary for Specification 3.3.1.1.
  - b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following document:
    - 1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" (latest approved version as specified in the COLR).
  - c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.
  - d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.
-



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO

AMENDMENT NO. 225 TO FACILITY OPERATING LICENSE NO. NPF-62,  
AMENDMENT NO. 327 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-59,  
AMENDMENT NO. 238 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-11,  
AMENDMENT NO. 224 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-18,  
AMENDMENT NO. 236 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-39,  
AMENDMENT NO. 199 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-85,  
AMENDMENT NO. 176 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-69,  
AMENDMENT NO. 326 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-44,  
AND AMENDMENT NO. 329 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-56.

EXELON GENERATION COMPANY, LLC

CLINTON POWER STATION, UNIT NO. 1

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

LASALLE COUNTY STATION, UNITS 1 AND 2

LIMERICK GENERATING STATION, UNITS 1 AND 2

NINE MILE POINT NUCLEAR STATION, UNIT 2

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3

DOCKET NOS. 50-461, 50-333, 50-373, 50-374, 50-352, 50-353, 50-410, 50-277, AND 50-278

1.0 INTRODUCTION

By application dated February 1, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19032A624), as supplemented by letter dated March 7, 2019 (ADAMS Accession No. ML19066A162), Exelon Generation Company, LLC (Exelon) submitted a license amendment request for Clinton Power Station (CPS), Unit No. 1; James A. FitzPatrick Nuclear Power Plant (JAF); LaSalle County Station (LSCS), Units 1 and 2; Limerick



Generating Station (LGS), Units 1 and 2; Nine Mile Point Nuclear Station, Unit 2 (NMP2); and Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3 (the facilities). Each of these facilities is a boiling-water reactor (BWR).

For each facility, the proposed amendment to the technical specifications (TSs) would revise the reactor core safety limit for the minimum critical power ratio (MCPR), which protects against boiling transition on the fuel rods in the core. The current MCPR safety limit for each facility ensures that 99.9 percent of the fuel rods in the core are not susceptible to boiling transition. The revised MCPR safety limit would ensure that there is a 95-percent probability at a 95-percent confidence level (95/95) that no fuel rods will be susceptible to boiling transition based on a statistical analysis of critical power ratio (CPR) data. The TS requirements for the core operating limits report (COLR) would also be modified.

The proposed amendments are based on Technical Specification Task Force (TSTF) traveler TSTF-564, Revision 2, "Safety Limit MCPR" (ADAMS Accession No. ML18297A361). The U.S. Nuclear Regulatory Commission (NRC or the Commission) approved TSTF-564, Revision 2, by letter dated November 16, 2018 (ADAMS Package Accession No. ML18299A048). The NRC staff's safety evaluation (SE) for the TSTF traveler is included with the staff's approval letter. Separately, the proposed amendments for LGS and JAF would also make changes to the MCPR and COLR requirements in the TSs that are outside the scope of TSTF-564, Revision 2.

### 1.1 Background on Boiling Transition

During steady-state operation in a BWR, most of the coolant in the core is in a flow regime known as annular flow. In this flow regime, a thin liquid film is pushed up the surface of the fuel rod cladding by the bulk coolant flow, which is mostly water vapor with some liquid water droplets. This provides effective heat removal from the surface of the fuel cladding. However, under certain conditions, the annular film may dissipate, which reduces the heat transfer and results in an increase in fuel cladding surface temperature. This phenomenon is known as boiling transition or dryout. The elevated surface temperatures resulting from dryout may cause damage or failure of the fuel cladding.

### 1.2 Background on Critical Power Correlations

For a given set of reactor operating conditions (pressure, flow, etc.), dryout will occur on a fuel assembly at a certain power, known as the critical power. Because the phenomena associated with boiling transition are complex and difficult to model purely mechanistically, thermal-hydraulic testing is performed using electrically heated prototypical fuel bundles to establish a comprehensive database of critical power measurements for each BWR fuel product. These data are used to develop a critical power correlation that can be used to predict the critical power for assemblies in operating reactors. This prediction is usually expressed as the CPR, which is the ratio of the critical power predicted using the correlation to the actual assembly power.

One measure of the correlation's predictive capability is based on its validation using test data. For each point  $j$  in a correlation's test database, the experimental critical power ratio (ECPR) is defined as the ratio of the measured critical power to the calculated critical power:

$$ECPR_j = \frac{\text{Measured Critical Power}_j}{\text{Calculated Critical Power}_j}$$

For ECPR values less than or equal to 1, the calculated critical power is greater than or equal to the measured critical power and the prediction is non-conservative. Because the measured critical power includes random variations due to various uncertainties, evaluating the ECPR for all the points in the dataset (or, ideally, a subset of points that were not used in the correlation's development) results in a probability distribution. This ECPR distribution allows the predictive uncertainty of the correlation to be determined. This uncertainty can then be used to establish a limit above which it can be assumed that boiling transition will not occur with a certain probability and confidence level.

### 1.3 Background on Thermal-Hydraulic Safety Limits

To protect against boiling transition, BWRs have established MCPR safety limits in their TSs. The current MCPR safety limits at Exelon's facilities are based on preventing 99.9 percent of the fuel in the core from being susceptible to boiling transition. Such limits are typically developed by considering various cycle-specific power distributions and uncertainties, and they are highly dependent on the cycle-specific radial power distribution in the core. As such, the MCPR safety limits may need to be updated as frequently as every cycle.

The TSs for Exelon's facilities also include MCPR operating limits as limiting conditions for operation (LCOs), which must be met to ensure that anticipated operational occurrences do not result in fuel damage. Currently, the MCPR operating limits are calculated by combining the largest change in CPR from all analyzed transients with the MCPR safety limit.

## 2.0 REGULATORY EVALUATION

### 2.1 Description of Proposed Changes

#### 2.1.1 Changes Based on TSTF-564, Revision 2

Exelon proposed to revise the MCPR safety limit for each facility to make it cycle-independent, consistent with the method described in TSTF-564, Revision 2. The current MCPR safety limit (also referred to as the  $MCPR_{99.9\%}$  or  $MCPR(99.9\%)$  safety limit) ensures that 99.9 percent of the fuel rods in the core are not susceptible to boiling transition. The revised MCPR safety limit (also referred to as the  $MCPR_{95/95}$  safety limit) would ensure that there is a 95-percent probability at a 95-percent confidence level that no fuel rods will be susceptible to boiling transition.

The proposed TS changes replace the current MCPR safety limit value for each facility with the  $MCPR_{95/95}$  value associated with the current fuel loading. Since the revised MCPR safety limit is no longer dependent on the number of recirculation loops in operation, Exelon also proposed to eliminate the separate MCPR safety limit for single and two recirculation loop operation. These changes are shown in Table 1 below.

**Table 1: Changes to the TS MCPR Safety Limit<sup>1</sup>**

Current TS	Proposed TS
<b>CPS TS 2.1.1.2</b>	
<p>With the reactor steam dome pressure <math>\geq 700</math> psia and core flow <math>\geq 10\%</math> rated core flow:</p> <p>MCPR shall be <math>\geq 1.09</math> for two recirculation loop operation or <math>\geq 1.12</math> for single recirculation loop operation.</p>	<p>With the reactor steam dome pressure <math>\geq 700</math> psia and core flow <math>\geq 10\%</math> rated core flow:</p> <p>MCPR shall be <math>\geq 1.07</math>.</p>
<b>JAF TS 2.1.1.2</b>	
<p>With the reactor steam dome pressure <math>\geq 685</math> psig and core flow <math>\geq 10\%</math> rated core flow:</p> <p>MCPR shall be <math>\geq 1.07</math> for two recirculation loop operation or <math>\geq 1.09</math> for single recirculation loop operation.</p>	<p>With the reactor steam dome pressure <math>\geq 685</math> psig and core flow <math>\geq 10\%</math> rated core flow:</p> <p>MCPR shall be <math>\geq 1.07</math>.</p>
<b>LCS TS 2.1.1.2</b>	
<p>With the reactor steam dome pressure <math>\geq 700</math> psia and core flow <math>\geq 10\%</math> rated core flow:</p> <p>For Unit 1, MCPR shall be <math>\geq 1.11</math> for two recirculation loop operation or <math>\geq 1.13</math> for single recirculation loop operation.</p> <p>For Unit 2, MCPR shall be <math>\geq 1.12</math> for two recirculation loop operation or <math>\geq 1.15</math> for single recirculation loop operation.</p>	<p>With the reactor steam dome pressure <math>\geq 700</math> psia and core flow <math>\geq 10\%</math> rated core flow:</p> <p>MCPR shall be <math>\geq 1.07</math>.</p>
<b>LGS TS 2.1.2</b>	
<p>The MINIMUM CRITICAL POWER RATIO (MCPR) shall not be less than 1.10 for two recirculation loop operation and shall not be less than 1.14 for single recirculation loop operation with the reactor vessel steam dome pressure greater than 700 psia and core flow greater than 10% of rated flow.</p>	<p>The MINIMUM CRITICAL POWER RATIO (MCPR) shall not be less than 1.07 with the reactor vessel steam dome pressure greater than 700 psia and core flow greater than 10% of rated flow.</p>
<b>NMP2 TS 2.1.1.2</b>	
<p>With the reactor steam dome pressure <math>\geq 700</math> psia and core flow <math>\geq 10\%</math> rated core flow:</p> <p>MCPR shall be <math>\geq 1.17</math> for two recirculation loop operation or <math>\geq 1.17</math> for single recirculation loop operation.</p>	<p>With the reactor steam dome pressure <math>\geq 700</math> psia and core flow <math>\geq 10\%</math> rated core flow:</p> <p>MCPR shall be <math>\geq 1.07</math>.</p>

<sup>1</sup> The pressure units are pounds per square inch atmospheric (psia) and pounds per square inch gauge (psig).

Current TS	Proposed TS
<b>PBAPS TS 2.1.1.2</b>	
With the reactor steam dome pressure $\geq 700$ psia and core flow $\geq 10\%$ rated core flow:  MCPR shall be $\geq 1.15$ for two recirculation loop operation or $\geq 1.15$ for single recirculation loop operation.	With the reactor steam dome pressure $\geq 700$ psia and core flow $\geq 10\%$ rated core flow:  MCPR shall be $\geq 1.07$ .

For LGS, Exelon also proposed the following conforming change to the remedial action requirements for TS 2.1.2 (strikethrough text indicates deletions and bold text indicates additions):

With MCPR less than ~~1.10 for two recirculation loop operation or less than 1.14 for single recirculation loop operation~~ **1.07** and the reactor vessel steam dome pressure greater than 700 psia and core flow greater than 10% of rated flow, be in at least HOT SHUTDOWN within 2 hours and comply with the requirements of Specification 6.7.1.

The  $MCPR_{99.9\%}$  is also used to determine the MCPR operating limits in LCO 3.2.2 for CPS, JAF, LCS, NMP2, and PBAPS and in LCO 3.2.3 for LGS. Exelon did not propose any changes to the MCPR definition nor the methods for calculating the  $MCPR_{99.9\%}$  value and the MCPR operating limits. Rather, Exelon proposed to change the TS requirements for the core operating limits report (COLR) to require the  $MCPR_{99.9\%}$  value used in calculating the MCPR operating limits to be included in the cycle-specific COLR. These changes affect CPS, JAS, LCS, NMP2, and PBAPS TS 5.6.5.a.2 and LGS TS 6.9.1.9.c

### 2.1.2 Additional Changes for LGS

LGS LCO 3.1.4.3 requires both rod block monitor channels to be operable. Exelon proposed to revise the applicability of this LCO by replacing the specific MCPR limits with a reference to the MCPR limits listed in the COLR. Specifically, Exelon proposed the following revision to the LCO 3.1.4.3 applicability (strikethrough text indicates deletions and bold text indicates additions):

OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 30% of RATED THERMAL POWER and less than 90% of RATED THERMAL POWER with MCPR less than ~~1.70~~ **the limit specified in the CORE OPERATING LIMITS REPORT (COLR)**, or THERMAL POWER greater than or equal to 90% of rated with MCPR less than ~~1.40~~ **the limit specified in the COLR**.

Exelon also proposed to revise LGS TS 6.9.1.9.f, which currently requires core operating limits to be established and documented in the COLR for: "The power biased Rod Block Monitor setpoints and the Rod Block Monitor MCPR OPERABILITY limits of Specification 3.3.6." Exelon proposed to revise this sentence to state: "The power biased Rod Block Monitor setpoints of Specification 3.3.6 and the Rod Block Monitor MCPR OPERABILITY limits of Specification 3.1.4.3."

### 2.1.3 Additional Changes for JAF

In its March 7, 2019, supplement, Exelon requested to revise the analytical methods listed in JAF TS 5.6.5.b which are used to determine the core operating limits. Currently, JAF TS 5.6.5.b states, in part:

The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following document:

1. NEDE-24011-P-A, General Electric Standard Application for Reactor Fuel;
2. NEDC-31317P, James A. FitzPatrick Nuclear Power Plant SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis; and
3. NEDO-31960-A, BWR Owners' Group Long-Term Stability Solutions Licensing Methodology.

Exelon proposed to delete references 2 and 3 and to revise reference 1 to include the U.S. supplement (NEDE-24011-P-A-US). Thus, the revised JAF TS 5.6.5.b would include only the following reference:

1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR II)" and the US Supplement, NEDE-24011-P-A-US

### 2.1.4 Additional Changes for PBAPS

Exelon proposed to delete PBAPS TS page 2.0-2 and the indication on page 2.0-1 that Section 2.0 is continued on the next page. Currently, PBAPS TS page 2.0-2 does not contain any TS requirements, it only has headers, footers, and dividing lines. The NRC staff finds this change acceptable because it does not change any TS requirements.

For PBAPS TS 5.6.5.a.2, Exelon proposed to add "(MCPR)" after "Minimum Critical Power Ratio." The NRC staff finds this change acceptable because it does not alter the TS requirements.

## 2.2 Regulatory Requirements and Guidance

Title 10 to the *Code of Federal Regulations* (10 CFR) 50.36, "Technical specifications," establishes the regulatory requirements related to the content of TSs. Section 50.36(a)(1) requires an application for an operating license to include proposed TSs. A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the TSs.

Pursuant to 10 CFR 50.36, TSs for operating reactors are required to include items in the following five specific categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) LCOs; (3) surveillance requirements; (4) design features; and (5) administrative controls. Section 50.36(c)(1)(i)(A) of 10 CFR states, in part:

Safety limits for nuclear reactors are limits upon important process variables that are found to be necessary to reasonably protect the integrity of certain of the physical barriers that guard against the uncontrolled release of radioactivity. If any safety limit is exceeded, the reactor must be shut down. The licensee shall

notify the Commission, review the matter, and record the results of the review, including the cause of the condition and the basis for corrective action taken to preclude recurrence. Operation must not be resumed until authorized by the Commission.

In accordance with 10 CFR 50.36(c)(2), LCOs are the lowest functional capability or performance level of equipment required for safe operation of the facility. When LCOs are not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the LCO can be met. Section 50.36(c)(5) of 10 CFR states that “[a]dministrative controls are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner.”

Appendix A, “General Design Criteria (GDC) for Nuclear Power Plants,” to 10 CFR Part 50 establishes the minimum requirements for the principal design criteria for water-cooled nuclear power plants. The GDC were originally published in the *Federal Register* (36 FR 12733) on February 20, 1971, and became effective on May 21, 1971. GDC 10, “Reactor design,” states:

The reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.

GDC 10 is applicable to CPS, LCS, LGS, and NMP2, but is not applicable to JAF and PBAPS as they received their construction permit prior to May 21, 1971. Although GDC 10 is not applicable to JAF and PBAPS, both plants have principal design criteria<sup>2</sup> that, within the scope of this application, are equivalent to GDC 10. The limits placed on the MCPR are specified acceptable fuel design limits to prevent boiling transition used to meet GDC 10 or its equivalent.

Acceptance criteria for the NRC staff’s review of fuel design limits is provided in Section 4.4, “Thermal and Hydraulic Design,” Revision 2 (ADAMS Accession No. ML070550060), of NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition” (SRP). This guidance provides the following two examples of acceptable approaches to meeting the SRP acceptance criteria for establishing fuel design limits:

- A. For the departure from nucleate boiling ratio, critical heat flux ratio, or CPR correlations, there should be a 95-percent probability at the 95-percent confidence level that the hot rod in the core does not experience a departure from nucleate boiling or boiling transition condition during normal operation or anticipated operational occurrences.
- B. The limiting (minimum) value of the departure from nucleate boiling ratio, critical heat flux ratio, or CPR correlations is to be established such that at least 99.9 percent of the fuel rods in the core will not experience a departure from nucleate boiling or boiling transition during normal operation or anticipated operational occurrences.

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<sup>2</sup> See Section 1.5, “Principal Design Criteria,” and Appendix H, “Conformance to AEC (NRC) Criteria,” of the updated final safety analysis reports for JAF and PBAPS, respectively.

### 3.0 TECHNICAL EVALUATION

The proposed amendments are primarily based on the NRC-approved TSTF-564, Revision 2. The NRC staff's evaluation of the proposed amendments relies upon the staff's previous approval of the methodology and MCPR<sub>95/95</sub> safety limits for certain fuel types described in TSTF-564, Revision 2. The staff also considered the regulations and guidance discussed in Section 2.2 of this SE in its review.

Exelon identified differences between the TSs for each of the facilities and the BWR standard technical specifications,<sup>3</sup> upon which TSTF-564 is based. These differences included TS numbering and the steam dome pressure value listed in the safety limit. The NRC staff determined that these differences do not affect the applicability of TSTF-564 for Exelon's facilities.

#### 3.1 MCPR Safety Limit Bases

As discussed in SE Section 1.3, the current MCPR safety limits (i.e., the MCPR<sub>99.9%</sub> safety limits) for each facility are dependent on the cycle-specific core design, especially the core power distribution, fuel types, and the power-to-flow operating domain. As such, it is often necessary to change the MCPR safety limit to accommodate new core designs. Changes to the MCPR safety limit are usually determined late in the design process and necessitate an accelerated NRC review and approval of an amendment to support the subsequent fuel cycle.

Exelon proposed to change the bases for the MCPR safety limits for CPS, JAF, LCS, LGS, NMP2, and PBAPS so that they are no longer cycle dependent. The proposed bases for the MCPR safety limits aligns it with the departure from nucleate boiling ratio safety limit used in pressurized-water reactors, which ensures that no fuel rods will experience departure from nucleate boiling with a 95-percent probability at a 95-percent confidence level.

The intent of the proposed basis for the revised MCPR safety limit is acceptable to the NRC staff as it is consistent with the SRP Section 4.4 acceptance criteria for establishing fuel design limits (see Example A in Section 2.2 of this SE).

#### 3.2 Revised MCPR Safety Limit Calculational Method

As discussed in SE Section 1.2, the ECPR distribution is used to quantify the uncertainty associated with the critical power correlation. TSTF-564, Revision 2, provides the following formula for determining MCPR<sub>95/95</sub> for a given fuel type (*i*):

$$\text{MCPR}_{95/95}(i) = \mu_i + \kappa_i \sigma_i$$

where  $\mu_i$  is the mean ECPR and  $\sigma_i$  is the standard deviation of the ECPR distribution. The statistical parameter ( $\kappa_i$ ) is selected, based on the number of samples in the critical power database, to provide the one-sided upper tolerance limit with a 95-probability at a 95-percent confidence level. This is a commonly used statistical formula to determine a one-sided upper

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<sup>3</sup> U.S. Nuclear Regulatory Commission, "Standard Technical Specifications, General Electric Plants BWR/4," NUREG-1433, Volume 1, "Specifications," and Volume 2, "Bases," Revision 4.0, April 2012 (ADAMS Accession Nos. ML12104A192 and ML12104A193).

U.S. Nuclear Regulatory Commission, "Standard Technical Specifications, General Electric Plants BWR/6," NUREG-1434, Volume 1, "Specifications," and Volume 2, "Bases," Revision 4.0, April 2012 (ADAMS Accession Nos. ML12104A195 and ML12104A196).

tolerance limit for a normal distribution, which is appropriate for the situation under consideration. For reactor cores loaded with a single fuel type, the  $\text{MCPR}_{95/95}$  safety limit is the  $\text{MCPR}_{95/95(i)}$  value for the fuel type.

In the SE approving TSTF-564, the NRC staff determined that the formula for determining  $\text{MCPR}_{95/95}$  will appropriately establish a 95/95 upper tolerance limit on the critical power correlation and that any issues in the underlying correlation will be addressed through adjustments to the correlation mean and standard deviation, as necessary to ensure appropriate conservatism. Therefore, the NRC staff concluded that the proposed method of determining  $\text{MCPR}_{95/95}$  can be used to establish acceptable fuel design limits.

### 3.3 Determination of Revised MCPR Safety Limit for Mixed Cores

Section 3.1 of TSTF-564, Revision 2, states, in part:

For cores with a mix of fuel products, the corresponding [ $\text{MCPR}_{95/95}$  safety limit] is based on the largest (i.e., most limiting) of the  $\text{MCPR}_{95/95(i)}$  values for the product lines that are fresh or once-burnt at the start of the cycle. The  $\text{MCPR}_{95/95(i)}$  values for product lines that are twice-burnt or more at the start of the cycle may be ignored, as these higher exposure bundles operate with considerable MCPR margin relative to the more limiting fresh and once-burnt bundles.

Fuel that is twice-burnt or more has a probability of boiling transition that is very small compared to the limiting bundle and can be neglected in determining the safety limit. In its letter dated May 29, 2018 (ADAMS Accession No. ML18149A320), the TSTF provided results of a study that confirmed this is valid even for fuel operated on short (12-month) reload cycles. Fuel that is twice-burnt or more is included in the cycle-specific evaluation of the  $\text{MCPR}_{99.9\%}$  value and the MCPR operating limits. If a fuel bundle that is twice-burnt or more is found to be limiting, it would be governed by the MCPR operating limits, which will always be more restrictive than both the  $\text{MCPR}_{95/95}$  safety limit and the  $\text{MCPR}_{99.9\%}$  value.

The NRC staff reviewed the information provided by the TSTF and determined that the process for establishing the  $\text{MCPR}_{95/95}$  safety limit for mixed cores is acceptable. Specifically, the NRC staff found it acceptable, based on the information above, to determine the  $\text{MCPR}_{95/95}$  safety limit for the core based on the most limiting  $\text{MCPR}_{95/95}$  value for fresh and once-burnt fuel in the core.

### 3.4 Relationship between MCPR Safety and Operating Limits

As discussed in the TSTF letter dated May 29, 2018, the current  $\text{MCPR}_{99.9\%}$  safety limits are greater than the proposed  $\text{MCPR}_{95/95}$  safety limits because (1) the  $\text{MCPR}_{99.9\%}$  includes uncertainties not factored into the  $\text{MCPR}_{95/95}$  and (2) even if these additional uncertainties are neglected, a statistical comparison shows that the  $\text{MCPR}_{99.9\%}$  is more conservative than the  $\text{MCPR}_{95/95}$ . The level of conservatism in the  $\text{MCPR}_{95/95}$  safety limit is appropriate because the lead fuel rod in the core (i.e., the limiting fuel rod for the MCPR) is used to evaluate whether any fuel rods in the core are susceptible to boiling transition. This is consistent with evaluations performed for pressurized-water reactors using a 95/95 upper tolerance limit on the correlation uncertainty as a safety limit.

Consistent with TSTF-564, Revision 2, Exelon would continue to determine the MCPR operating limits for LCO 3.2.2 at CPS, JAF, LCS, NMP2, and PBAPS and LCO 3.2.3 at LGS using the



MCPR<sub>99.9%</sub> as an input. Exelon proposed to revise the COLR TSs (i.e., TS 5.6.5 for CPS, JAF, LCS, NMP2, and PBAPS and TS 6.9.1.9 for LGS) to require the cycle-specific value of the MCPR<sub>99.9%</sub> to be determined for the LCO for the MCPR operating limits and included in the COLR. Exelon did not propose any changes to how it determines the MCPR<sub>99.9%</sub>. The analytical methods for determining MCPR<sub>99.9%</sub> are included in the list of COLR references currently contained in the COLR TSs. These proposed changes to the COLR TSs will ensure that the uncertainties being removed from the MCPR safety limits are still included as part of the MCPR operating limits and will continue to appropriately inform plant operation. Therefore, the NRC staff concludes that the TSs for each facility would continue to provide appropriate administrative controls in accordance with 10 CFR 50.36(c)(5).

In its February 1, 2019, application, Exelon proposed to revise the JAF TS 5.6.5.2 as follows (added text in bold): "The MINIMUM CRITICAL POWER RATIO (MCPR), and **MCPR(99.9%)** of Specification 3.2.2." In its March 7, 2019 supplement, Exelon provided a revised markup for JAF TS 5.6.5.2, which included the comma but did not identify it as added text. The addition of the comma is grammatically incorrect as this revised sentence contains a list with only two items. Exelon proposed similar changes to the CORL TSs for the other facilities without the comma. The NRC staff will issue the change to JAF TS 5.6.5.2 without the comma so that it is grammatically correct.

The NRC staff determined that, with the proposed changes, the TS safety limits for the MCPR will retain an adequate level of conservatism and the plant- and cycle-specific uncertainties will be appropriately retained in the MCPR operating limits. The MCPR<sub>95/95</sub> safety limit represents a lower limit on the value of the MCPR<sub>99.9%</sub>, because the MCPR<sub>99.9%</sub> should always be higher since it accounts for numerous uncertainties that are not included in the MCPR<sub>95/95</sub>.

### 3.5 Implementation of the Revised MCPR Safety Limit in the TSs

Exelon proposed to replace the MCPR safety limit in the TSs for each facility with the MCPR<sub>95/95</sub> safety limit associated with the current fuel loading. Since the revised MCPR safety limit is no longer dependent on the number of recirculation loops in operation, Exelon also proposed to eliminate the separate MCPR safety limits for single and two recirculation loop operation. Table 1 of TSTF-564, Revision 2, states that the MCPR<sub>95/95</sub> safety limit is 1.06 for GE14 fuel and 1.07 for GNF2 fuel. As discussed in TSTF-564, Revision 2, the derivation of these values using the methodology described in the TSTF traveler was provided to the NRC in a proprietary letter from the fuel vendor (ADAMS Package Accession No. ML18212A017).

Exelon stated that CPS, JAF, LCS, LGS, and PBAPS are currently fueled with GNF2 fuel bundles, and proposed to revise the TS MCPR safety limit to 1.07 consistent with Table 1 of TSTF-564, Revision 2. For LGS, Exelon also proposed a conforming change to the action requirements for TS 2.1.2 to make it consistent with the revised MCPR safety limit. Exelon also stated:

The NMP, Unit 2, reactor is currently fueled with GE14 and GNF2 fuel bundles, for cores loaded with a mix of applicable fuel types the [MCPR<sub>95/95</sub> safety limit] is based on the largest MCPR<sub>95/95</sub> value for the fuel types used. The NMP, Unit 2, reactor is planned to be fueled with only GNF2 fuel bundles following the N2R17 refueling outage in 2020. The proposed Safety Limit in [TS] 2.1.1.2 is 1.07, consistent with Table 1 of TSTF-564.

The NRC staff reviewed Exelon's proposed TS changes the MCPR safety limits for each plant to reflect the change to MCPR<sub>95/95</sub> safety limits. The staff found the proposed changes acceptable because they are consistent with TSTF-564, Revision 2, as approved by the NRC staff. Specifically, Exelon appropriately eliminated the separate MCPR safety limits for single and two recirculation loop operation as the MCPR<sub>95/95</sub> safety limits do not depend on the number of recirculation loops in operation. In addition, the proposed MCPR<sub>95/95</sub> safety limit values for CPS, JAF, LCS, LGS, and PBAPS are consistent with the value in Table 1 of TSTF-564, Revision 2, for reactors fueled with GNF2 fuel. For NMP2, Exelon appropriately selected the more limiting MCPR<sub>95/95</sub> safety limit value for the mixed core of GE14 and GNF2 fuel currently in the reactor, and this value will also be appropriate for the full core of GNF2 fuel planned for the 2020 refueling outage. Therefore, the NRC staff concludes that the proposed MCPR<sub>95/95</sub> safety limit for each facility is an acceptable fuel design limit, and 10 CFR 50.36(c)(1)(i)(A) will be met since the limit will reasonably protect the integrity of the fuel cladding to guard against the uncontrolled release of radioactivity. In addition, the NRC staff finds the change to the action requirements for LGS TS 2.1.2 acceptable because the change is consistent with the proposed changes to the LGS safety limits.

### 3.6 Proposed Changes to the Applicability of LGS LCO 3.1.4.3

At LGS, each rod block monitor channel monitors the local neutron flux during selection and movement of a control rod. Each channel will generate a rod withdrawal block signal to the reactor protection system if the monitored neutron flux exceeds preset limits. The purpose is to prevent a control rod withdrawal that could cause MCPR limits to be violated. LGS LCO 3.1.4.3 currently requires both rod block monitor channels to be operable under the following conditions:

OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 30% of RATED THERMAL POWER and less than 90% of RATED THERMAL POWER with MCPR less than 1.70 or THERMAL POWER greater than or equal to 90% of rated with MCPR less than 1.40.

Exelon proposed to revise the applicability of this LCO by replacing the specific MCPR limits with a reference to the MCPR limits listed in the COLR (see SE Section 2.1.2). Thus, the MCPR limits which define when this LCO is applicable would no longer be explicitly listed in the TSs.

LGS TS 6.9.1.9.f currently requires core operating limits to be established and documented in the COLR for "[t]he power biased Rod Block Monitor setpoints and the Rod Block Monitor MCPR OPERABILITY limits of Specification 3.3.6." Exelon proposed to revise this sentence to state: "The power biased Rod Block Monitor setpoints of Specification 3.3.6 and the Rod Block Monitor MCPR OPERABILITY limits of Specification 3.1.4.3." This change clarifies that the rod block monitor MCPR operability limits are used in LGS LCO 3.1.4.3.

The NRC staff determined that the proposed change to LGS LCO 3.1.4.3 is acceptable because referring to the MCPR limits in the COLR instead of specifying the limits in TS does not change the applicability of the LCO. In addition, the change to LGS TS 6.9.1.9.f is acceptable because it clarifies that the rod block monitor MCPR operability limits must be determined for LCO 3.1.4.3 and documented in the COLR. Exelon did not propose any changes to how it determines the rod block monitor MCPR operability limits. Therefore, with these proposed changes, LGS will have adequate administrative controls in accordance with 10 CFR

50.36(c)(5) to ensure that the rod block monitor channels will be required to be operable under the appropriate conditions.

### 3.7 Additional Changes for JAF

In its March 7, 2019, supplement, Exelon requested to revise the analytical methods listed in JAF TS 5.6.5.b which are used to determine the core operating limits (see SE Section 2.1.3). Specifically, Exelon proposed to delete NEDC-31317P and NEDO-31960-A from the list of allowed analytical methods in TS 5.6.5.b. Exelon also requested to add the U.S. supplement to NEDE-24011-P-A as an allowed method. Thus, the revised JAF TS 5.6.5.b would include only the following reference:

1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR II)" and the US Supplement, NEDE-24011-P-A-US

Exelon stated that NEDC-31317P is "a historical analysis and not a methodology as stated." In addition, NEDO-31960-A has been incorporated into NEDE-24011-P-A by the U.S. supplement. Thus, the addition of NEDE-24011-P-A-US to reference 1 would replace the specific reference to NEDO-31960-A.

The NRC staff has reviewed the proposed changes to JAF TS 5.6.5.b and found they are acceptable because NEDE-24011-P-A, as revised and supplemented, will provide the complete methodology for determining the core operating limits. The added annotation to the U.S. supplement to NEDE-24011-P-A does not provide any additional methodologies beyond what are currently listed in TS 5.6.5.b, but rather makes clear that the U.S. Supplement is part of the approved GESTAR methodology. Therefore, with the proposed change, JAF will continue to have adequate administrative controls in accordance with 10 CFR 50.36(c)(5) to ensure that core operating limits, including specified acceptable fuel design limits, are appropriately determined.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois, Pennsylvania, and New York State officials were notified of the proposed issuance of the amendments on June 24, 2019. The State officials had no comments.

### 5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to the installation or use of facility components located within the restricted areas as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding, which was published in the *Federal Register* on April 9, 2019 (84 FR 14146), that the amendments involve no significant hazards consideration, and there has been no public comment on such finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

## 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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: Shie-Jeng Peng, NRR

Date of issuance: August 28, 2019

SUBJECT: CLINTON POWER STATION, UNIT NO. 1; JAMES A. FITZPATRICK NUCLEAR POWER PLANT; LASALLE COUNTY STATION, UNITS 1 AND 2; LIMERICK GENERATING STATION, UNITS 1 AND 2; NINE MILE POINT NUCLEAR STATION, UNIT 2; AND PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3— ISSUANCE OF AMENDMENTS TO ADOPT TSTF-564, "SAFETY LIMIT MCPR" (EPID L-2019-LLA-0021) DATED AUGUST 28, 2019

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