



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

March 22, 2022

Mr. David P. Rhoades
Senior Vice President
Constellation Energy Generation, LLC
President and Chief Nuclear Officer (CNO)
Constellation Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2; BYRON STATION, UNIT NOS. 1 AND 2; AND R. E. GINNA NUCLEAR POWER PLANT - ISSUANCE OF AMENDMENTS NOS. 225, 225, 227, 227, AND 148, RESPECTIVELY, REGARDING ISSUES IDENTIFIED IN WESTINGHOUSE DOCUMENTS (EPID L-2021-LLA-0066)

Dear Mr. Rhoades:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 225 to Renewed Facility Operating License No. NPF-72 and Amendment No. 225 to Renewed Facility Operating License No. NPF-77 for the Braidwood Station, Units 1 and 2, respectively; Amendment No. 227 to Renewed Facility Operating License No. NPF-37 and Amendment No. 227 to Renewed Facility Operating License No. NPF-66 for the Byron Station, Unit Nos. 1 and 2, respectively; and Amendment No. 148 to Renewed Facility Operating License No. DPR-18 for the R. E. Ginna Nuclear Power Plant. The amendments are in response to your application dated April 7, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21097A226), as supplemented by letter dated August 13, 2021 (ADAMS Accession No. ML21225A005).

These amendments revise the above nuclear power plants' technical specifications (TSs) to relocate required operating space reductions (power and Axial Flux Difference limits) from the TSs to the core operating limits report, accompanied by verification for each reload when required and to define TS surveillance requirements for steady-state and transient $F_Q(Z)$ and corresponding actions with which to apply an appropriate penalty factor to measured results.

Enclosure 6 to this letter contains Proprietary information. When separated from Enclosure 6, this document is DECONTROLLED.

D. Rhoades

- 2 -

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

Sincerely,

/RA/

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

Docket Nos. STN 50-456, STN 50-457,
STN 50-454, STN 50-455, and 50-244

Enclosures:

1. Amendment No. 225 to NPF-72
2. Amendment No. 225 to NPF-77
3. Amendment No. 227 to NPF-37
4. Amendment No. 227 to NPF-66
5. Amendment No. 148 to DPR-18
6. Safety Evaluation (Proprietary)
7. Safety Evaluation (Nonproprietary)

cc w/o Enclosure 6:

Listserv



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

CONSTELLATION ENERGY GENERATION COMPANY, LLC

DOCKET NO. STN 50-456

BRAIDWOOD STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 225
Renewed License No. NPF-72

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee, on February 1, 2022, Exelon Generation Company, LLC was renamed Constellation Energy Generation, LLC) dated April 7, 2021, as supplemented by letter dated August 13, 2021, 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-72 is hereby amended to read as follows:

- (2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 225, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into 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 within 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Nancy L. Salgado, 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: March 22, 2022



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

CONSTELLATION ENERGY GENERATION COMPANY, LLC

DOCKET NO. STN 50-457

BRAIDWOOD STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 225
Renewed License No. NPF-77

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee, on February 1, 2022, Exelon Generation Company, LLC was renamed Constellation Energy Generation, LLC) dated April 7, 2021, as supplemented by letter dated August 13, 2021, 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-77 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 225, and the Environmental Protection Plan contained in Appendix B, both of which are attached to Renewed License No. NPF-72, dated January 27, 2016, are hereby incorporated into 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 within 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Nancy L. Salgado, 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: March 22, 2022

ATTACHMENT TO LICENSE AMENDMENT NOS. 225 AND 225

RENEWED FACILITY OPERATING LICENSE NOS. NPF-72 AND NPF-77

BRAIDWOOD STATION, UNITS 1 AND 2

DOCKET NOS. STN 50-456 AND STN 50-457

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

REMOVE

INSERT

License No. NPF-72
Page 3

License No. NPF-72
Page 3

License No. NPF-77
Page 3

License No. NPF-77
Page 3

TSs

3.2.1 - 1
3.2.1 - 2
3.2.1 - 4

TSs

3.2.1 - 1
3.2.1 - 2
3.2.1 - 4

- (2) Constellation Energy Generation, LLC, 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) Constellation Energy Generation, 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;
- (4) Constellation Energy Generation, 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
- (5) Constellation Energy Generation, 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 the facility.

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:

(1) Maximum Power Level

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3645 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 225 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

- (2) Constellation Energy Generation, LLC, 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) Constellation Energy Generation, 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;
 - (4) Constellation Energy Generation, 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
 - (5) Constellation Energy Generation, 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 the facility.
- C. The 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:
- (1) **Maximum Power Level**

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3645 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.
 - (2) **Technical Specifications**

The Technical Specifications contained in Appendix A as revised through Amendment No. 225 and the Environmental Protection Plan contained in Appendix B, both of which are attached to Renewed License No. NPF-72, dated January 27, 2016, are hereby incorporated into the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3.2 POWER DISTRIBUTION LIMITS

3.2.1 Heat Flux Hot Channel Factor (F₀(Z))

LC0 3.2.1 F₀(Z), as approximated by F₀^C(Z) and F₀^W(Z), shall be within the limit specified in the COLR.

APPLICABILITY: MODE 1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. F ₀ ^C (Z) not within limit.	A.1 Reduce THERMAL POWER ≥ 1% RTP for each 1% F ₀ ^C (Z) exceeds limit.	15 minutes
	<u>AND</u>	
	A.2 Reduce Power Range Neutron Flux-High trip setpoints ≥ 1% for each 1% F ₀ ^C (Z) exceeds limit.	72 hours
	<u>AND</u>	
	A.3 Reduce Overpower ΔT trip setpoints ≥ 1% for each 1% F ₀ ^C (Z) exceeds limit.	72 hours
<u>AND</u>		
A.4 Perform SR 3.2.1.1 and SR 3.2.1.2.	Prior to increasing THERMAL POWER above the limit of Required Action A.1	

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. $F_Q^W(Z)$ not within limit.</p>	<p>B.1 Reduce THERMAL POWER as specified in the COLR.</p>	<p>4 hours</p>
	<p><u>AND</u></p>	
	<p>B.2 Reduce AFD limits as specified in the COLR.</p>	<p>4 hours</p>
	<p><u>AND</u></p>	
	<p>B.3 Reduce Power Range Neutron Flux-High trip setpoints $\geq 1\%$ for each 1% that THERMAL POWER is limited below RATED THERMAL POWER by Required Action B.1.</p>	<p>72 hours</p>
	<p><u>AND</u></p>	
	<p>B.4 Reduce Overpower ΔT trip setpoints $\geq 1\%$ for each 1% that THERMAL POWER is limited below RATED THERMAL POWER by Required Action B.1.</p>	<p>72 hours</p>
	<p><u>AND</u></p> <p>B.5 Perform SR 3.2.1.1 and SR 3.2.1.2.</p>	<p>Prior to increasing THERMAL POWER and AFD limits above the limits of Required Actions B.1 and B.2</p>
<p>C. Required Action and associated Completion Time not met.</p>	<p>C.1 Be in MODE 2.</p>	<p>6 hours</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.2.1.2 -----NOTES-----</p> <p>1. During power escalation at the beginning of each cycle, THERMAL POWER may be increased until an equilibrium power level has been achieved, at which a power distribution map is obtained.</p> <p>2. If $F_Q^W(Z)$ measurements indicate that either the maximum over $z \left[\frac{F_Q^C(Z)}{K(Z)} \right]$</p> <p><u>OR</u></p> <p>maximum over $z \left[\frac{F_Q^W(Z)}{K(Z)} \right]$</p> <p>has increased since the previous evaluation of $F_Q^C(Z)$ or if $F_Q^W(Z)$ is expected to increase prior to the next evaluation of $F_Q^C(Z)$:</p>	
<p>a. Increase $F_Q^W(Z)$ by the appropriate factor specified in the COLR and reverify $F_Q^W(Z)$ is within limits specified in the COLR; or</p> <p>b. Repeat SR 3.2.1.2 once per 7 EFPD until either a. above is met or two successive flux maps indicate that the</p> <p>maximum over $z \left[\frac{F_Q^C(Z)}{K(Z)} \right]$</p> <p>and</p> <p>maximum over $z \left[\frac{F_Q^W(Z)}{K(Z)} \right]$</p> <p>has not increased.</p> <p>-----</p>	<p>(continued)</p>



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

CONSTELLATION ENERGY GENERATION COMPANY, LLC

DOCKET NO. STN 50-454

BYRON STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 227
Renewed License No. NPF-37

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee, on February 1, 2022, Exelon Generation Company, LLC was renamed Constellation Energy Generation, LLC) dated April 7, 2021, as supplemented by letter dated August 13, 2021, 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-37 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 227, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this 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 within 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Nancy L. Salgado, 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: March 22, 2022



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

CONSTELLATION ENERGY GENERATION COMPANY, LLC

DOCKET NO. STN 50-455

BYRON STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 227
Renewed License No. NPF-66

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee, on February 1, 2022, Exelon Generation Company, LLC was renamed Constellation Energy Generation, LLC) dated April 7, 2021, as supplemented by letter dated August 13, 2021, 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 renewed operating 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-66 is hereby amended to read as follows:

- (2) Technical Specifications

The Technical Specifications contained in Appendix A (NUREG-1113), as revised through Amendment No. 227, and the Environmental Protection Plan contained in Appendix B, both of which were attached to Renewed License No. NPF-37, dated November 19, 2015, are hereby incorporated into this 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 within 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Nancy L. Salgado, 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: March 22, 2022

ATTACHMENT TO LICENSE AMENDMENT NOS. 227 AND 227

RENEWED FACILITY OPERATING LICENSE NOS. NPF-37 AND NPF-66

BYRON STATION, UNIT NOS. 1 AND 2

DOCKET NOS. STN 50-454 AND STN 50-455

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

REMOVE

License No. NPF-37
Page 3

License No. NPF-66
Page 3

3.2.1 - 1
3.2.1 - 2
3.2.1 - 4

INSERT

License No. NPF-37
Page 3

License No. NPF-66
Page 3

3.2.1 - 1
3.2.1 - 2
3.2.1 - 4

- (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 Updated 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) 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.

C. The 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:

(1) Maximum Power Level

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3645 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 227 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Deleted.

(4) 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 Updated 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) 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.

C. The 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:

(1) Maximum Power Level

The licensee is authorized to operate the facility at reactor core power levels not in excess of 3645 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A (NUREG-1113), as revised through Amendment No. 227, and the Environmental Protection Plan contained in Appendix B, both of which were attached to Renewed License No. NPF-37, dated November 19, 2015, are hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Deleted.

3.2 POWER DISTRIBUTION LIMITS

3.2.1 Heat Flux Hot Channel Factor (F_q(Z))

LC0 3.2.1 F_q(Z), as approximated by F_q^C(Z) and F_q^W(Z), shall be within the limit specified in the COLR.

APPLICABILITY: MODE 1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. F _q ^C (Z) not within limit.	A.1 Reduce THERMAL POWER ≥ 1% RTP for each 1% F _q ^C (Z) exceeds limit.	15 minutes
	<u>AND</u>	
	A.2 Reduce Power Range Neutron Flux-High trip setpoints ≥ 1% for each 1% F _q ^C (Z) exceeds limit.	72 hours
	<u>AND</u>	
	A.3 Reduce Overpower ΔT trip setpoints ≥ 1% for each 1% F _q ^C (Z) exceeds limit.	72 hours
	<u>AND</u>	
	A.4 Perform SR 3.2.1.1 and SR 3.2.1.2.	Prior to increasing THERMAL POWER above the limit of Required Action A.1

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. F₀^w(Z) not within limit.</p>	<p>B.1 Reduce THERMAL POWER as specified in the COLR.</p>	<p>4 hours</p>
	<p><u>AND</u></p>	
	<p>B.2 Reduce AFD limits as specified in the COLR.</p>	<p>4 hours</p>
	<p><u>AND</u></p>	
	<p>B.3 Reduce Power Range Neutron Flux-High trip setpoints ≥ 1% for each 1% that THERMAL POWER is limited below RATED THERMAL POWER by Required Action B.1.</p>	<p>72 hours</p>
	<p><u>AND</u></p>	
	<p>B.4 Reduce Overpower ΔT trip setpoints ≥ 1% for each 1% that THERMAL POWER is limited below RATED THERMAL POWER by Required Action B.1.</p>	<p>72 hours</p>
	<p><u>AND</u></p> <p>B.5 Perform SR 3.2.1.1 and SR 3.2.1.2.</p>	<p>Prior to increasing THERMAL POWER and AFD limits above the limits of Required Actions B.1 and B.2</p>
<p>C. Required Action and associated Completion Time not met.</p>	<p>C.1 Be in MODE 2.</p>	<p>6 hours</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.2.1.2 -----NOTES-----</p> <ol style="list-style-type: none"> 1. During power escalation at the beginning of each cycle, THERMAL POWER may be increased until an equilibrium power level has been achieved, at which a power distribution map is obtained. 2. If $F_0^W(Z)$ measurements indicate that either the maximum over $z \left[\frac{F_0^C(Z)}{K(Z)} \right]$ <u>OR</u> maximum over $z \left[\frac{F_0^W(Z)}{K(Z)} \right]$ has increased since the previous evaluation of $F_0^C(Z)$ or if $F_0^W(Z)$ is expected to increase prior to the next evaluation of $F_0^C(Z)$: <ol style="list-style-type: none"> a. Increase $F_0^W(Z)$ by the appropriate factor specified in the COLR and reverify $F_0^W(Z)$ is within limits specified in the COLR; or b. Repeat SR 3.2.1.2 once per 7 EFPD until either a. above is met or two successive flux maps indicate that the maximum over $z \left[\frac{F_0^C(Z)}{K(Z)} \right]$ and maximum over $z \left[\frac{F_0^W(Z)}{K(Z)} \right]$ has not increased. <p>-----</p>	<p>(continued)</p>



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

CONSTELLATION ENERGY GENERATION, LLC

DOCKET NO. 50-244

R. E. GINNA NUCLEAR POWER PLANT

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 148
Renewed License No. DPR-18

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee, on February 1, 2022, Exelon Generation Company, LLC was renamed Constellation Energy Generation, LLC) dated April 7, 2021, as supplemented by letter dated August 13, 2021, 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-18 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 148 are hereby incorporated in the renewed license. Exelon Generation 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 within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Nancy L. Salgado, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the License and Technical
Specifications

Date of Issuance: March 22, 2022

ATTACHMENT TO LICENSE AMENDMENT NO. 148
RENEWED FACILITY OPERATING LICENSE NO. DPR-18
R. E. GINNA NUCLEAR POWER PLANT
DOCKET NO. 50-244

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

REMOVE

License No. DPR-18
Page 4

TSs
3.2.1 - 2
3.2.1 - 4
3.2.1 - 5

INSERT

License No. DPR-18
Page 4

TSs
3.2.1 - 2
3.2.1 - 4
3.2.1 - 5

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 148, are hereby incorporated in the renewed license. Constellation Energy Generation, LLC shall operate the facility in accordance with the Technical Specifications.

(3) Fire Protection

Constellation Energy Generation, LLC shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee's amendment request dated March 28, 2013, supplemented by letters dated December 17, 2013; January 29, 2014; February 28, 2014; September 5, 2014; September 24, 2014; December 4, 2014; March 18, 2015; June 11, 2015; August 7, 2015; and as approved in the safety evaluation report dated November 23, 2015. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no other regulation, technical specification, license condition or requirement would require prior NRC approval, the licensee may make changes to the fire protection program without prior approval of the Commission if those changes satisfy the provisions set forth in 10 CFR 50.48(a) and 10 CFR 50.48(c), the change does not require a change to a technical specification or a license condition, and the criteria listed below are satisfied.

(a) Risk-Informed Changes that May Be Made Without Prior NRC Approval

A risk assessment of the change must demonstrate that the acceptance criteria below are met. The risk assessment approach, methods, and data shall be acceptable to the NRC and shall be appropriate for the nature and scope of the change being evaluated; be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant. Acceptable methods to assess the risk of the change may include methods that have been used in the peer-reviewed fire PRA model, methods that have been approved by NRC through a plant-specific license amendment or NRC approval of generic methods specifically for use in NFPA 805 risk assessments, or methods that have been demonstrated to bound the risk impact.

1. Prior NRC review and approval is not required for changes that clearly result in a decrease in risk. The proposed change must also be consistent with the defense in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

SURVEILLANCE	FREQUENCY
<p>SR 3.2.1.2 -----</p> <p style="text-align: center;">- NOTE -</p> <p>If $F_Q^w(Z)$ measurements indicate that either the</p> <p style="padding-left: 40px;">maximum over $Z \left[\frac{F_Q^c(Z)}{K(Z)} \right]$</p> <p style="padding-left: 40px;">or</p> <p style="padding-left: 40px;">maximum over $Z \left[\frac{F_Q^w(Z)}{K(Z)} \right]$</p> <p>has increased since the previous evaluation of $F_Q^c(Z)$ or if $F_Q^w(Z)$ is expected to increase prior to the next evaluation $F_Q^c(Z)$:</p> <p>a. Increase $F_Q^w(Z)$ by the appropriate factor specified in the COLR and reverify $F_Q^w(Z)$ is within limits specified in the COLR; or</p> <p>b. Repeat SR 3.2.1.2 once per 7 EFPD until either</p> <p style="padding-left: 40px;">a. above is met or two successive flux maps indicate that the</p> <p style="padding-left: 80px;">maximum over over $Z \left[\frac{F_Q^c(Z)}{K(Z)} \right]$</p> <p style="padding-left: 80px;">and</p> <p style="padding-left: 80px;">maximum over $Z \left[\frac{F_Q^w(Z)}{K(Z)} \right]$</p> <p style="padding-left: 40px;">has not increased.</p> <p>-----</p> <p>Verify $F_Q^w(Z)$ is within limit.</p>	<p>Once after each refueling prior to THERMAL POWER exceeding 75% RTP</p> <p><u>AND</u></p> <p style="text-align: right;">(continued)</p>

SURVEILLANCE	FREQUENCY
SR 3.2.1.2 (continued)	Once within 12 hours after achieving equilibrium conditions after exceeding, by $\geq 10\%$ RTP, the THERMAL POWER at which $F_Q^w(Z)$ was last verified <u>AND</u> In accordance with the Surveillance Frequency Control Program

ENCLOSURE 7

(NON-PROPRIETARY)

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED

TO AMENDMENT NO. 225 TO RENEWED FACILITY OPERATING

LICENSE NO. NPF-72, AMENDMENT NO. 225 TO RENEWED FACILITY
OPERATING LICENSE NO. NPF-77, AMENDMENT NO. 227 TO RENEWED

FACILITY OPERATING LICENSE NO. NPF-37, AMENDMENT NO. 227 TO
RENEWED FACILITY OPERATING LICENSE NO. NPF-66, AMENDMENT

NO. 148 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-18

CONSTELLATION ENERGY COMPANY, LLC

BRAIDWOOD STATION, UNITS 1 AND 2

BYRON STATION, UNIT NOS. 1 AND 2

R. E. GINNA NUCLEAR POWER PLANT

DOCKET NOS. STN 50-456, STN 50-457, STN 50-454,

STN 50-455, AND 50-244

Proprietary information has been redacted from this document pursuant to

Section 2.390 of Title 10 of the *Code of Federal Regulations*.

Redacted information is identified by blank text enclosed within [[double brackets]].



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 RENEWED FACILITY OPERATING
LICENSE NO. NPF-72, AMENDMENT NO. 225 TO RENEWED FACILITY
OPERATING LICENSE NO. NPF-77, AMENDMENT NO. 227 TO RENEWED
FACILITY OPERATING LICENSE NO. NPF-37, AMENDMENT NO. 227 TO
RENEWED FACILITY OPERATING LICENSE NO. NPF-66, AMENDMENT
NO. 148 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-18

CONSTELLATION ENERGY COMPANY, LLC

BRAIDWOOD STATION, UNITS 1 AND 2

BYRON STATION, UNIT NOS. 1 AND 2

R. E. GINNA NUCLEAR POWER PLANT

DOCKET NOS. STN 50-456, STN 50-457, STN 50-454,

STN 50-455, AND 50-244

1.0 INTRODUCTION

By letter dated April 7, 2021 (Agencywide Document Access and Management System (ADAMS) Accession No. ML21097A226), as supplemented by letter dated August 13, 2021 (ADAMS Accession No. ML21225A005), Exelon Generation (Exelon, the licensee) requested changes to the technical specifications (TSs) for Braidwood Station, Units 1 and 2, Byron Station, Unit Nos. 1 and 2, and R. E. Ginna Nuclear Power Plant (Braidwood, Byron, and Ginna, respectively). On February 1, 2022 (ADAMS Accession No. ML22032A333), Exelon Generation Company, LLC was renamed Constellation Energy Generation, LLC. The proposed changes would revise Required Actions and surveillance requirements (SRs) associated with TS 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$).” These revisions implement a series of more restrictive required actions and more thorough SRs that are used in instances where the transient heat flux hot channel factor, $F_Q^W(Z)$, is not within its operating limits.

Similar required actions and SRs had been administratively implemented at each facility under the auspices of U.S. Nuclear Regulatory Commission (NRC or Commission) Administrative Letter (AL) 89-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," dated December 29, 1998 (ADAMS Accession No. ML031110108). These actions had been implemented since Westinghouse notified its customers, including the licensee, that the existing required actions and SRs associated with TS 3.2.1 may not restore adequate operating margin to ensure that the F_Q operating limit would prevent any of the facilities from exceeding the linear heat rate assumed in the plants' emergency core cooling system (ECCS) evaluations. Regulatory Guide (RG) 1.239, "Licensee Actions to Address Nonconservative Technical Specifications," dated November 2020 (ADAMS Accession No. ML20294A510) subsequently withdrew AL 89-10, however, licensees are not required to implement RGs.

The supplement dated August 13, 2021, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on June 15, 2021 (86 FR 31742).

2.0 REGULATORY EVALUATION

The specification of and adherence to limits on F_Q ensures that the value of the initial total peaking factor assumed in the accident and transient analyses remains valid. As noted in NUREG-1431, "Standard Technical Specifications – Westinghouse Plants," Volume 2, "Bases," the F_Q limits assumed in the ECCS performance evaluation are typically limiting relative to the F_Q limits assumed in safety analyses for other postulated accidents and anticipated operational occurrences (ADAMS Accession No. ML21259A159). Even if the ECCS limits are less limiting than those determined by another safety analysis, specification of and adherence to the F_Q limits still ensures that facility operation remains bounded by the safety analyses.

This regulatory evaluation thus identifies performance requirements and design criteria contained within Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, "Domestic Licensing of Production and Utilization Facilities." The applicable requirements related to the specific content of TSs relative to the facility safety analysis are also identified including appropriate guidance for administratively controlling such specifications. Finally, Section 2.3 of this safety evaluation summarizes the way in which the regulatory requirements apply specifically to the revised TS for F_Q .

2.1 Performance Requirements and Design Criteria

The performance requirements and design criteria applicable to the power distribution assumed in the safety analysis are those that pertain to accident and transient analysis. Primarily, these include the requirements contained in 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," and General Design Criterion (GDC) 10, contained in Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR 50. Since the TS also prescribe appropriate remedial action to follow if TS limitations are not met, some additional GDCs relative to the reactor protection and reactivity control systems also apply, as listed below.

The requirements in 10 CFR 50.46 state, in part, that the ECCS shall be designed such that an evaluation performed using an acceptable evaluation model demonstrates that acceptance criteria, set forth in 10 CFR 50.46(b), including peak cladding temperature, cladding oxidation, hydrogen generation, maintenance of coolable core geometry, and long-term cooling are met for a variety of hypothetical loss-of-coolant accidents (LOCAs), including the most severe hypothetical LOCA.

GDC 10, "Reactor Design," states, as follows:

The reactor 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 20, "Protection System Functions," states, as follows:

The protection system shall be designed (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences and (2) to sense accident conditions and to initiate the operation of systems and components important to safety.

GDC 26, "Reactivity Control System Redundancy and Capability," states, as follows:

Two independent reactivity control systems of different design principles shall be provided. One of the systems shall use control rods, preferably including a positive means for inserting the rods, and shall be capable of reliably controlling reactivity changes to assure that under conditions of normal operation, including anticipated operational occurrences, and with appropriate margin for malfunctions such as stuck rods, specified acceptable fuel design limits are not exceeded. The second reactivity control system shall be capable of reliably controlling the rate of reactivity changes resulting from planned, normal power changes (including xenon burnout) to assure acceptable fuel design limits are not exceeded. One of the systems shall be capable of holding the reactor core subcritical under cold conditions.

2.2 Technical Specifications (TSs)

The requirements for TSs are set forth in 10 CFR 50.36, "Technical Specifications." Specific categories of TSs are provided in 10 CFR 50.36(c). These include limiting conditions for operation (LCO) and SRs. If an LCO is not met, the facility must be shut down, or other acceptable remedial action must be taken. SRs are intended to ensure that facility operation remains within the LCOs. Paragraph (c)(3) of 10 CFR 50.36 states:

Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met.

In Generic Letter (GL) 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," the NRC staff documented its position that licensees could remove the cycle-specific values of certain operating limits from the TS and maintain them in a core operating limits report (COLR), provided that certain requirements were met. The guidance contained in GL 88-16 provides a means by which the values of certain parameters could be determined and modified on a cycle-specific basis without prior NRC review and approval. In order to implement this guidance, licensees are required to do the following: (1) use NRC-approved methodology to determine the operating limits; (2) include a list, in the TS Administrative Controls section, of the references used to determine the operating limits; and (3) maintain the limits in a COLR, which must be submitted to the NRC for information.

2.3 Discussion

The safety analyses required to establish that a facility will comply with the requirements of 10 CFR 50.46, and with GDC 10, require as input the peak fuel power and the power distribution. Since the peak power and the power distribution are initial conditions of a design basis accident and transient analyses, facility operation must be controlled by LCOs that are established based on these parameters. Hence, Westinghouse pressurized-water reactors like Byron, Braidwood, and Ginna, have LCOs relative to F_Q . In accordance with 10 CFR 50.36(c)(3), the LCO is accompanied by SRs to ensure that the LCO is satisfied. At plants that have implemented GL 88-16, specific parameter values may be administratively controlled, and in such cases, these parameters must be determined in accordance with an NRC-approved methodology and contained in the facility COLR.

If during performance of an SR, F_Q is determined not to be within the limit then the LCO is not met, and the TS remedial actions must be followed to ensure that facility operation remains safe. The remedial actions associated with TS 3.2.1 are based on: (1) restoring compliance with the LCO, and (2) adjusting the reactor protection system settings so that the functionality required by GDCs 20 and 26 is maintained.

The value of the $F_Q^W(Z)$ limit is a cycle-specific parameter limit, which is specified in the COLR for each plant, in accordance with GL 88-16. The plants use the methodology described in WCAP-10216-P-A, Revision 1-A, "Relaxation of Constant Axial Offset Control (and) F_Q Surveillance Technical Specification," to calculate the $F_Q^W(Z)$ limit. The licensee stated that the newly proposed Required Actions will be formulated using the same methodology and associated, cycle-specific values will be contained in the COLR.

The NRC staff evaluation of the modified TSs Required Actions, Completion Times, and SRs considered whether the modified TSs are consistent with the regulatory requirements identified above. In particular, the NRC staff evaluated whether the required actions and completion times, applicable if the LCO for $F_Q^W(Z)$ is not met, are appropriate to ensure that compliance with the unmet LCO is restored, and that facility operation remains safe. The NRC staff also evaluated whether the revised SRs will provide assurance that the LCOs are met.

2.4 Summary of Proposed Changes

2.4.1 Changes to Braidwood and Byron TSs

2.4.1.1 Changes to Braidwood and Byron LCO 3.2.1

TS LCO 3.2.1 is revised to add a new Condition A.4 to require the performance of SRs 3.2.1.1 and 3.2.1.2 prior to increasing thermal power above the limit of required action A.1.

TS LCO 3.2.1 is revised to replace Conditions B.1, B.2, and B.3 with new Conditions B.1, B.2, B.3, and B.4 that reference the Core Operating Limits Report (B.1 and B.2), that that reference B.1 (B.3 and B.4), and to add a new Condition B.5 to require performance of SRs 3.2.1.1 and 3.2.1.2 prior to increasing thermal power above the limits of required actions B.1 and B.2.

2.4.1.2 Changes to Braidwood and Byron SR 3.2.1.2

Note 2 is revised to add monitoring of the increase in maximum over $z \left[\frac{F_Q^W(Z)}{K(Z)} \right]$ and to add verification in Note 2.b. that maximum over $z \left[\frac{F_Q^W(Z)}{K(Z)} \right]$ has not increased prior to ending the repeat of SR 3.2.1.2 oncer per 7 EFPD.

2.4.2 Changes to Ginna TSs

2.4.2.1 Changes to Ginna LCO 3.2.1

TS LCO 3.2.1 is revised to replace Conditions B.1, B.2, and B.3 with new Conditions B.1, B.2, B.3, and B.4 that reference the Core Operating Limits Report (B.1 and B.2), that that reference B.1 (B.3 and B.4), and to add a new Condition B.5 to require performance of SRs 3.2.1.1 and 3.2.1.2 prior to increasing thermal power above the limits of required actions B.1 and B.2.

2.4.2.2 Changes to Ginna SR 3.2.1.2

The Note is revised to add monitoring of the increase in maximum over $z \left[\frac{F_Q^W(Z)}{K(Z)} \right]$ and to add verification in b. that maximum over $z \left[\frac{F_Q^W(Z)}{K(Z)} \right]$ has not increased prior to ending the repeat of SR 3.2.1.2 oncer per 7 EFPD.

3.0 TECHNICAL EVALUATION

The license amendment requested by Exelon would make changes associated with the Required Actions and Completion Times associated with a parameter known as the Heat Flux Hot Channel Factor, or $F_Q(Z)$. As noted in Section 1, above, this parameter is a measure of the three-dimensional power distribution. In the formulation used at Braidwood, Byron, and Ginna, the parameter is the ratio of the highest radial power at the peak power elevation to the average power. There are two components used to approximate $F_Q(Z)$: the instantaneous factor, which is measured and augmented for uncertainty, $F_Q^C(Z)$, and the transient factor, which provides a

transient margin to account for changes that may occur to $F_Q(Z)$ over the $F_Q^C(Z)$ surveillance interval due to power swings and the buildup and decay of transient reactivity poisons like xenon and samarium. The transient factor is known as $F_Q^W(Z)$. While $F_Q^C(Z)$ provides an immediate measure of $F_Q(Z)$, $F_Q^W(Z)$ provides a measure that is valid over the surveillance interval, which is nominally 30 days.

The value of $F_Q^W(Z)$ is determined using a probabilistic analysis that simulates the possible changes in power shape associated with various transients conceivable over a nominal, 30-day operating cycle. The methods used to determine $F_Q^W(Z)$ are described in the NRC-approved topical report WCAP-10216-P-A, Revision 1, "Relaxation of Constant Axial Offset Control (and) F_Q Surveillance Technical Specification" (WCAP-10216-P-A, ML19311B181).^{1,2}

The requirements in TS 3.2.1 contain operating limits, Required Actions, and SRs for both $F_Q^C(Z)$ and $F_Q^W(Z)$. Exelon proposed mainly to address issues associated with $F_Q^W(Z)$, as no issues have been identified with the present formulation of $F_Q^C(Z)$ and the associated Required Actions and SRt. Condition A of TS 3.2.1 applies if $F_Q^C(Z)$ is not met, whereas, Condition B applies if $F_Q^W(Z)$ is not met. Therefore, Exelon did not propose changes to the Required Actions for Condition A, except to add a new requirement to the Byron and Braidwood TS to complete SRs 3.2.1.1 and 3.2.1.2 prior to increasing thermal power above the level required by existing Required Action A.1. The remainder of proposed changes related to $F_Q^W(Z)$.

3.1 Braidwood and Byron Changes to Required Actions for Condition A

The licensee stated that new Required Action A.4 for Braidwood and Byron is added for consistency with the NUREG-1431 Standard Technical Specifications (STS) for LCO 3.2.1. In evaluating this proposed change, the NRC staff considered the consistency with the STS. The NRC staff also considered the fact that this new Required Action will add SRs that confirm that, prior to increasing thermal power and trip setpoints following entry into Condition A, appropriate thermal margins have been restored. Relative to the current TSs at Byron and Braidwood, this new requirement increases assurance that the plants operate within the limiting initial conditions assumed in the safety analysis, consistent with the requirements of 10 CFR 50.36, 10 CFR 50.46, and GDC 10. As such, the NRC staff determined that the proposed changes are acceptable.

3.2 Braidwood and Byron Changes to Required Actions for Condition B

Currently at Braidwood and Byron, the Required Actions for LCO 3.2.1, Condition B, require a reduction in thermal power by one percent for each percent that $F_Q^W(Z)$ exceeds its limit, and a corresponding reduction in the Power Range Neutron Flux – High and Overpower Δ Temperature (OP Δ T) trip setpoints. The proposed revision would: (1) relocate the amount of the required reduction in thermal power to the COLR; (2) include a new requirement to reduce

¹ There are slight differences in the citation among the Braidwood, Byron, and Ginna units, e.g., referring to "Revision 1" listed in TS 5.6.5.b for both Braidwood and Byron, and "Rev. 1A" listed in TS 5.6.5.b for Ginna. Though slightly different, the citations are to the same NRC-approved revision of the report.

² A publicly available version of the report, WCAP-10217-A, was not located in ADAMS.

Axial Flux Difference (AFD) limits, the specific values for which will be contained in the COLR; and (3) include a requirement to perform SRs 3.2.1.1 and 3.2.1.2. The adjustments to the reactor trip setpoints will be unchanged, except that the wording will cross-reference Required Action B.1.

The licensee stated that RAOC power distribution analysis would be performed using discrete maximum power levels and AFD bands, which will be used to quantify the expected margin improvement obtained by implementing the proposed, required actions. The licensee also identified that the RAOC methodology (WCAP-10216-P-A) would allow for the evaluation of these margin improvements. The RAOC methodology has been approved for use by the NRC staff as an acceptable means to assure the $F_Q^W(Z)$ limits provide appropriate margin to assure that the limiting initial conditions of the plant design basis accident and transient analyses are met. This methodology relies, in part, on thermal power and AFD as inputs. Therefore, the NRC staff determined that the licensee's proposal to use the RAOC methodology to determine thermal power and AFD limitations in the event surveillance indicates that the current $F_Q^W(Z)$ limit is not met, is an acceptable action to ensure continued compliance with the requirements of 10 CFR 50.46 and GDC 10. Since WCAP-10216-P-A is already listed in each facility's TSs as a COLR methodology, the inclusion of the specific values of the thermal power reduction and AFD limits in the COLR is consistent with GL 88-16, and acceptable on that basis.

The licensee stated that the required thermal power and AFD reductions, which were proposed to be relocated to the COLR, would initially be those contained in Table 1 of Attachment 1 to the licensee's April 7, 2021, submittal. These were based on interim, compensatory measures that had been recommended from Westinghouse, the vendor for the RAOC analysis methods, when the current required actions, and completion times were deemed inadequate. In its supplemental letter dated August 13, 2021, Exelon provided additional information describing how the proposed operating space restrictions (i.e., Required Actions) included in its April 7, 2021, submittal, assure that adequate margin to the $F_Q^W(Z)$ limits is restored. **[[**

]] Based on its review of Exelon's analysis, which concluded that the proposed, Required Actions restored positive margin to the $F_Q^W(Z)$ limits, the NRC staff determined that the response was acceptable. Therefore, the NRC staff determined that the specific values contained in Table 1 of Attachment 1 to the licensee's April 7, 2021, submittal were acceptable in that **[[**

]], and they will establish an operating space that, once implemented, will assure continued compliance with the requirements of 10 CFR 50.46 and GDC 10, in the event a surveillance indicates that the $F_Q^W(Z)$ limit is not met.

The NRC staff considered that the proposed, Required Actions to perform SRs 3.2.1.1 and 3.2.1.2 will add SRs that confirm that, prior to increasing thermal power and trip setpoints following entry into Condition B, appropriate thermal margins have been restored. Relative to the current TS at Byron and Braidwood, this new requirement increases assurance that the plants operate within the limiting initial conditions assumed in the safety analysis, consistent

with the requirements of 10 CFR 50.36, 10 CFR 50.46, and GDC 10. As such, the NRC staff determined that the proposed changes are acceptable.

The current Byron and Braidwood TSs contain requirements to reduce the reactor trip setpoints for the Power Range Neutron Flux – High and OPΔT commensurate with the reduction in thermal power required by current Required Action B.1. This assures that the reactor protection system will act to terminate any abnormal occurrences within the newly constrained operating space and assures compliance with the requirements of GDCs 20 and 26. The proposed revision to these requirements preserves the commensurate adjustments to the reactor protection system setpoints, but refers to the operating space reductions required by Required Action B.1, since the specific amounts are proposed for relocation to the COLR. The NRC staff determined that this change is appropriate, given the proposed relocation. As such, the NRC staff determined that these proposed revisions to the Required Actions remain compliant with GDC 20 and 26 requirements and are hence acceptable.

Based on the review described above, the NRC staff determined that the proposed changes to the Required Actions under Condition B of TS 3.2.1 are acceptable for Braidwood and Byron.

3.3 GINNA Changes to Required Actions for Condition B

The proposed changes to the Required Actions for Condition B of Ginna TS 3.2.1 will result in the same Required Actions as proposed for Braidwood and Byron. However, the current Ginna TSs Required Action B.1 applies a reduction in the AFD instead of a reduction in allowable thermal power, and the trip setpoint adjustments are commensurate with the AFD reduction. For Ginna, because the proposed AFD reduction is less in magnitude than the proposed thermal power reduction, the requirements to reduce the reactor protection system setpoints will be more restrictive than the current requirements. Since the proposed Required Actions align with those for Braidwood and Byron, and in the case of proposed Required Actions B.3 and B.4, are more conservative than presently required for Ginna, the same considerations discussed in Section 3.2 are applicable to Ginna. Therefore, the NRC staff determined that the proposed changes to the Required Actions under Condition B of TS 3.2.1 are acceptable for Ginna.

3.4 Proposed Changes to SR 3.2.1.2

In its April 7, 2021, request, Exelon proposed to modify the note preceding SR 3.2.1.2 for Braidwood, Byron, and Ginna, to add trending of $F_Q^W(Z)$ in addition to $F_Q^C(Z)$. Exelon stated that this change is required due to a possibility of observing a decreasing nominal $F_Q^C(Z)$ value while $F_Q^W(Z)$ increases. The existing SR requires the application of additional margin to the observed, transient $F_Q^W(Z)$ value to account for an observed degradation in margin of the instantaneous parameter, $F_Q^C(Z)$. Adding a requirement to implement similar trending of the $F_Q^W(Z)$, ensures that the licensee will identify any scenario, whether by direct observation (i.e., existing SR requiring trending of $F_Q^C(Z)$), or by predictive estimation (i.e., new requirement to trend $F_Q^W(Z)$, as well). The licensee also proposed to change the SR to modify the phrase “Increase $F_Q^W(Z)$ by the greater of a factor of 1.02 or by an appropriate factor specified in the COLR...” to eliminate “grater of a factor of 1.02 or by an,” so that the note references only the value contained in the COLR. The licensee stated that the values of the appropriate penalty factor will

be determined using NRC-approved methods and are listed in Table 2.6.2.c in the Byron and Braidwood COLRs and Table COLR-2 for Ginna.

The NRC staff reviewed recently submitted COLRs for Braidwood, Unit 2, and Ginna, and confirmed that the penalty factors are contained in the COLRs. Although the existing TSs effectively specify a minimum value, the NRC staff also reviewed the applicable, NRC-approved methodology (i.e., WCAP-10216-P-A) and determined that [[

]] and that the practical effect of eliminating the proposed phrase is negligible. Based on this consideration, and on the fact that in general the proposed SR increases assurance that the F_Q parameters are appropriately treated when indications of adverse trending are identified, the NRC staff determined that the proposed revision to SR 3.2.1.2 is acceptable and consistent with 10 CFR 50.36 requirements.

3.5 Technical Conclusion

Based on the considerations discussed above, the NRC staff determined that the proposed changes to the Braidwood, Byron, and Ginna TS were acceptable. The new Required Actions provide assurance that the initial conditions assumed in the safety analyses are met, which provides assurance that the facilities will meet the requirements of 10 CFR 50.46 and GDC 10. The new Required Actions also ensure that the reactor protection system settings will be adjusted to ensure that the system actuates while preserving adequate initial conditions to ensure margin for abnormal occurrences and accidents is maintained, consistent with GDC 20 and 26 requirements. Finally, the licensee's proposal to include the required operating space reductions in each facilities' COLR is acceptable because those reductions are based on the NRC-approved methods described in WCAP-10216-P-A, Revision 1-A, which is already referenced in each of the facilities' COLR References section of the applicable TS, consistent with the guidance set forth in GL 88-16.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois and New York State officials were notified of the proposed issuance of the amendment on January 21, 2022. Both State officials had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendments involve no significant change in the types or significant increase in the amounts 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 that the amendments involve no significant hazards consideration, and there has been no public comment on such finding published in the *Federal Register* on June 15, 2021 (86 FR 31742). 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 amendment(s) will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: B. Parks, NRR

Date: March 22, 2022

D. Rhoades

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SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2; BYRON STATION, UNIT NOS. 1 AND 2; AND R. E. GINNA NUCLEAR POWER PLANT - ISSUANCE OF AMENDMENTS NOS. 225, 225, 227, 227, AND 148, RESPECTIVELY, REGARDING ISSUES IDENTIFIED IN WESTINGHOUSE DOCUMENTS (EPID L-2021-LLA-0066) DATED MARCH 22, 2022

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