



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

February 4, 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: LASALLE COUNTY STATION, UNITS 1 AND 2 - ISSUANCE OF  
AMENDMENT NOS. 255 AND 241 RE: REVISION TO TECHNICAL  
SPECIFICATIONS TO INCORPORATE LICENSING TOPICAL REPORT  
NEDE-33885P-A, REVISION 1, "GNF CRDA APPLICATION  
METHODOLOGY" (EPID L-2021-LLA-0016)

Dear Mr. Rhoades:

The U.S. Nuclear Regulatory Commission (NRC, the Commission) has issued the enclosed Amendment Nos. 255 and 241 to Renewed Facility Operating License Nos. NPF-11 and NPF-18, respectively, for the LaSalle County Station, Units 1 and 2 (LaSalle). The amendments consist of changes to the LaSalle technical specifications (TSs) in response to your application dated February 10, 2021 (Agencywide Documents Access Management System (ADAMS) Accession No. ML21041A490), as supplemented by letter dated August 17, 2021 (ADAMS Accession No. ML21229A127).

The amendments revise LaSalle's TSs to incorporate licensing topical report, "GNF CRDA Application Methodology," NEDE-33885P-A, Revision 1, by modifying TS Sections 3.1.3, "Control Rod Operability," 3.1.6, "Rod Pattern Control," and 3.3.2.1, "Control Rod Block Instrumentation," to allow for greater flexibility in rod control operations during various stages of reactor power operation at LaSalle.

On February 1, 2022 (ADAMS Accession No. ML22032A333), Exelon Generation Company, LLC was renamed Constellation Energy Generation, LLC. Also, effective February 1, 2022, the renewed facility operating licenses for LaSalle were transferred to Constellation Energy Generation, LLC (ADAMS Accession No. ML22021B660). Upon completion of this license transfer, Constellation Energy Generation, LLC assumed the responsibility for all licensing actions under NRC review at the time of the transfer and requested that the NRC continue its review of these actions (ADAMS Accession No. ML22032A333).

A copy of our related safety evaluation is also enclosed. A Notice of Issuance will be included in the Commission's monthly *Federal Register* notice.

Sincerely,

***/RA/***

Bhalchandra K. Vaidya, Project Manager  
Plant Licensing Branch III  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-373 and 50-374

Enclosure:

1. Amendment No. 255 to NPF-11
2. Amendment No. 241 to NPF-18
3. Safety Evaluation

cc: Listserv



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

CONSTELLATION ENERGY GENERATION, LLC

DOCKET NO. 50-373

LASALLE COUNTY STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 255  
Renewed License No. NPF-11

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Constellation Energy Generation, LLC] (the licensee) dated February 10, 2021, as supplemented by letter dated August 17, 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 paragraphs 2.C.(2) of Renewed Facility Operating License No. NPF-11 are 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. 255, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed operating 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 its date of issuance and shall be implemented prior to achieving MODE 2 following the Unit 1 refueling outage in 2022.

FOR THE NUCLEAR REGULATORY COMMISSION

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

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

Date of Issuance: February 4, 2022



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

CONSTELLATION ENERGY GENERATION, LLC

DOCKET NO. 50-374

LASALLE COUNTY STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 241  
Renewed License No. NPF-18

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Constellation Energy Generation, LLC] (the licensee) dated February 10, 2021, as supplemented by letter dated August 17, 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 paragraphs 2.C.(2) of Renewed Facility Operating License No. NPF-18 are 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. 241, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed operating 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 its date of issuance and shall be implemented prior to achieving MODE 2 following the Unit 2 refueling outage in 2023.

FOR THE NUCLEAR REGULATORY COMMISSION

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

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

Date of Issuance: February 4, 2022

ATTACHMENT TO LICENSE AMENDMENT NOS. 255 AND 241

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, with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Renewed Facility Operating License No. NPF-11

REMOVE

INSERT

Page 3

Page 3

Renewed Facility Operating License No. NPF-18

REMOVE

INSERT

Page 3

Page 3

Technical Specifications

REMOVE

INSERT

TS 3.1.3-3

TS 3.1.3-3

TS 3.1.6-1

TS 3.1.6-1

TS 3.1.6-2

TS 3.1.6-2

TS 3.3.2.1-4

TS 3.3.2.1-4

TS 3.3.2.1-5

TS 3.3.2.1-5

TS 3.3.2.1-6

TS 3.3.2.1-6

- (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 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).

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 255, 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) 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. 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.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 241, 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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A or C not met.  <u>OR</u>  Nine or more control rods inoperable.	D.1 Be in MODE 3.	12 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Rod Pattern Control

LCO 3.1.6 Control rods shall comply with the requirements of the analyzed rod position sequence.

APPLICABILITY: MODE 2 with THERMAL POWER  $\leq$  5% RTP and reactor steam dome pressure  $\leq$  300 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One or more control rods not in compliance with the analyzed rod position sequence.</p>	<p>A.1 -----NOTE----- Rod Worth Minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation." -----</p>	<p>8 hours</p>
	<p>Move associated control rod(s) to correct position.</p> <p><u>OR</u></p> <p>A.2 Fully insert associated control rod(s).</p>	

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. Nine or more fully inserted control rods not in compliance with the analyzed rod position sequence.</p>	<p>B.1 -----NOTE----- RWM may be bypassed as allowed by LCO 3.3.2.1. -----</p> <p>Suspend withdrawal of control rods.</p> <p><u>AND</u></p> <p>B.2 Place the reactor mode switch in the shutdown position.</p>	<p>Immediately</p> <p>1 hour</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.6.1 Verify all control rods comply with the analyzed rod position sequence.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.3.2.1.2 -----NOTE----- Not required to be performed until 1 hour after any control rod is withdrawn at <math>\leq 5\%</math> RTP and <math>\leq 300</math> psig reactor steam dome pressure in MODE 2. ----- Perform CHANNEL FUNCTIONAL TEST.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.3.2.1.3 -----NOTE----- Not required to be performed until 1 hour after THERMAL POWER is <math>\leq 5\%</math> RTP and reactor steam dome pressure is <math>\leq 300</math> psig in MODE 2. ----- Perform CHANNEL FUNCTIONAL TEST.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.3.2.1.4 -----NOTE----- Neutron detectors are excluded. ----- Perform CHANNEL CALIBRATION.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.3.2.1.5 -----NOTE----- Neutron detectors are excluded. -----</p> <p>Verify the RBM is not bypassed when THERMAL POWER is <math>\geq</math> 30% RTP and a peripheral control rod is not selected.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.3.2.1.6 Verify the RWM is not bypassed when THERMAL POWER is <math>\leq</math> 5% RTP.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.3.2.1.7 -----NOTE----- Not required to be performed until 1 hour after reactor mode switch is in the shutdown position. -----</p> <p>Perform CHANNEL FUNCTIONAL TEST.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.3.2.1.8 Verify control rod sequences input to the RWM are in conformance with analyzed rod position sequence.</p>	<p>Prior to declaring RWM OPERABLE following loading of sequence into RWM</p>
<p>SR 3.3.2.1.9 Verify the bypassing and position of control rods required to be bypassed in RWM by a second licensed operator or other qualified member of the technical staff.</p>	<p>Prior to and during the movement of control rods bypassed in RWM</p>

Control Rod Block Instrumentation  
3.3.2.1

Table 3.3.2.1-1 (page 1 of 1)  
Control Rod Block Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Rod Block Monitor				
a. Upscale	(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.5	As specified in the COLR
b. Inop	(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.5	NA
c. Downscale	(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.5	≥ 1.25% RTP
2. Rod Worth Minimizer	2 <sup>(b)</sup>	1	SR 3.3.2.1.2 SR 3.3.2.1.3 SR 3.3.2.1.6 SR 3.3.2.1.8 SR 3.3.2.1.9	NA
3. Reactor Mode Switch—Shutdown Position	(c)	2	SR 3.3.2.1.7	NA

- (a) THERMAL POWER ≥ 30% RTP and no peripheral control rod selected.
- (b) With THERMAL POWER ≤ 5% RTP and reactor steam dome pressure ≤ 300 psig.
- (c) Reactor mode switch in the shutdown position.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 255 AND 241 TO RENEWED

FACILITY OPERATING LICENSE NOS. NPF-11 AND NPF-18

CONSTELLATION ENERGY GENERATION, LLC

LASALLE COUNTY STATION, UNITS 1 AND 2

DOCKET NOS. 50-373 AND 50-374

1.0 INTRODUCTION

By application dated February 10, 2021 (Agencywide Documents Access Management System (ADAMS) Accession No. ML21041A490), as supplemented by letter dated August 17, 2021 (ADAMS Accession No. ML21229A127) Constellation Energy Generation, LLC (the licensee) requested changes to the technical specifications (TSs) for LaSalle County Station, Units 1 and 2 (LaSalle).

On February 1, 2022 (ADAMS Accession No. ML22032A333), Exelon Generation Company, LLC was renamed Constellation Energy Generation, LLC. Also, effective February 1, 2022, the renewed facility operating licenses for LaSalle were transferred to Constellation Energy Generation, LLC (ADAMS Accession No. ML22021B660). Upon completion of this license transfer, Constellation Energy Generation, LLC assumed the responsibility for all licensing actions under NRC review at the time of the transfer and requested that the NRC continue its review of these actions (ADAMS Accession No. ML22032A333).

The proposed amendment would revise LaSalle's TSs to incorporate U.S. Nuclear Regulatory Commission (NRC or Commission) approved methodology described in licensing topical report, "[Global Nuclear Fuel – Americas LLC] (GNF-A) CRDA [control rod drop accident] Application Methodology," NEDE-33885P-A, Revision 1 (ADAMS Package Accession No. ML20091K212, containing non-publicly available safety evaluation in ADAMS Accession No. ML20091K218 and publicly available safety evaluation in ADAMS Accession No. ML20023A285), by modifying LaSalle TS Sections 3.1.3, "Control Rod Operability," 3.1.6, "Rod Pattern Control," and 3.3.2.1, "Control Rod Block Instrumentation." The proposed TS changes would allow for greater flexibility in rod control operations during various stages of reactor power operation at LaSalle. The proposed amendment will modify the requirements on control rod withdrawal order and conditions to protect against a postulated CRDA during startup and low power conditions. The proposed amendment will also eliminate the control rod operability separation criterion while operating in those conditions.

The supplemental letter dated August 17, 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 proposed no significant hazards consideration determination, which was published in the *Federal Register* on April 20, 2021 (86 FR 20530).

## 2.0 REGULATORY EVALUATION

The historical basis for GNF-A analysis methodologies for the CRDA event is the Banked Position Withdrawal Sequence (BPWS), as described in General Electric Company Report NEDO-21231, "Banked Position Withdrawal Sequence," dated January 1977 (ADAMS Accession No. ML090771242 (non-public)). The intent of this approach was to establish a generic control rod withdrawal sequence that would ensure that control rod worths from dropped rod would, in all cases, be sufficiently limited to meet the legacy CRDA acceptance criteria (a peak enthalpy of no greater than 280 calories (cal)/gram (g), and rarely exceeding 170 cal/g for fuel cladding failure). The control rod worths are minimized through banking of control rod banks at specified positions and generic analyses are used to demonstrate that the fuel rod enthalpies will be adequately limited by the given control rod worths. As discussed in Updated Final Safety Analysis Report (UFSAR) Chapter 15.4.9 for LaSalle (ADAMS Accession No. ML20111A269), the licensee subsequently received NRC approval to perform cycle-specific analyses to modify the BPWS, while still ensuring that the above enthalpy criteria were met.

Since the methods and criteria described in UFSAR Chapter 15.4.9 were incorporated into the LaSalle licensing basis, additional research in reactivity-initiated accidents have identified that the previously mentioned legacy acceptance criteria (e.g., 280 cal/g peak enthalpy) are not adequate. In particular, two separate failure mechanisms were identified, high temperature cladding failure (HTCF) and pellet-clad mechanical interaction (PCMI). The former mechanism is sensitive to the differential pressure across the cladding, while the latter mechanism is sensitive to the hydrogen concentration within the cladding.

This information was used to develop new interim CRDA acceptance criteria, as captured in Appendix B, "Interim Acceptance Criteria and Guidance for the Reactivity Initiated Accidents," to Chapter 4.2, "Fuel System Design," of the NRC guidance NUREG-0800, "Standard Review Plan [SRP] for the Review of Safety Analysis Reports for Nuclear Power Plants: Light Water Reactor Edition," March 2007 (ADAMS Accession No. ML070660036). These criteria have been refined using more updated knowledge and published as part of a proposed draft guidance, dated November 2016, Draft Regulatory Guide [RG] DG-1327, "Pressurized Water Reactor Control Rod Ejection and Boiling-Water Reactor Control Drop Accidents." (ADAMS Accession No. ML16124A200).

RG 1.236, "Pressurized-Water Reactor Control Rod Ejection and Boiling-Water Reactor Control Drop Accidents," dated June 2020 (ADAMS Accession No. ML20055F490), was published after the NRC reviewed NEDE-33885P-A, Revision 0, and made a finding of acceptability for its intended purpose. As discussed in the NRC staff's "Final Safety Evaluation (SE) for Global Nuclear Fuel – Americas LLC (GNF-A) Licensing Topical Report, NEDE-33885P, Revision 0, "GNF Control Rod Drop Accident Application Methodology, dated January 16, 2020, (ADAMS Accession No. ML20023A285 (non-proprietary public) and ML19345E185 (proprietary non-public)), the NRC staff review considered draft guide DG-1327, which was the predecessor to RG 1.236. The relationship between the RG 1.236 and DG-1327 is discussed further in Section 3.3 of this SE. This RG 1.236 describes methods and procedures that the NRC staff considers acceptable when analyzing the nuclear reactor's initial response to a postulated control rod ejection accident for pressurized-water reactors and a postulated control rod drop accident for boiling-water reactors. It describes analytical limits and guidance for analyzing the short-term reactivity insertion and demonstrating compliance with Title 10 of the *Code of Federal*

*Regulations* (10 CFR) Part 50, Appendix A, “General Design Criteria [GDC] for Nuclear Power Plants,” GDC 28, “Reactivity Limits.” It also defines fuel cladding failure thresholds, including ductile failure, brittle failure, and pellet-clad mechanical interaction, to support radiological consequence assessments. To facilitate implementation, RG 1.236 also provides acceptable analytical models for cladding hydrogen uptake and transient fission gas release.

NEDE-33885P-A describes a new methodology for analysis of the CRDA event. NEDE-33885P-A would allow the licensee to utilize this methodology in their licensing basis and in development of their own rod withdrawal sequences that can be demonstrated to comply with the revised CRDA acceptance criteria, in lieu of the BPWS. In the application for license amendment, dated February 10, 2021, the licensee noted that “the NRC reviewed and approved NEDE-33885P-A, Revision 0 but that the issued NEDE-33885P-A, Revision 1 adds the NRC Safety Evaluation and the associated Requests for Additional Information (RAIs) on the Revision 0 document. No physical changes to the plant will be required to implement this proposed amendment.” The NRC staff notes that NEDE-33885P-A, Revision 0, does not exist, and that the reference should be to NEDE-33885P, Revision 0. NEDE-33885P-A, Revision 1, is the version that has been found to be acceptable by the NRC staff, which incorporates certain commitments in RAI responses to make changes to NEDE-33885P, Revision 0 along with appending the NRC SE and RAI responses.

## 2.1 Performance Requirements and Design Criteria

LaSalle was designed to comply with the NRC GDC for nuclear power plant construction permits. The applicable criteria listed below related to this change are individually addressed. The regulatory requirements and guidance documents that the NRC staff considered in its review of the proposed amendment included the following:

- General Design Criterion 13, “Instrumentation and Control” requires that instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges.
- General Design Criterion 28, “Reactivity limits” requires that the reactivity control systems shall be designed with appropriate limits on the potential amount and rate of reactivity increase to assure that the effects of postulated reactivity accidents can neither (1) result in damage to the reactor coolant pressure boundary greater than limited local yielding nor (2) sufficiently disturb the core, its support structures or other reactor pressure vessel internals to impair significantly the capability to cool the core. These postulated reactivity accidents shall include consideration of rod ejection (unless prevented by positive means), rod dropout, steam line rupture, changes in reactor coolant temperature and pressure, and cold water addition.
- RG 1.236, “Pressurized-Water Reactor Control Rod Ejection and Boiling-Water Reactor Control Drop Accidents,” dated June 2020, provides guidance on what would be needed to find an analysis approach for reactivity-initiated accidents, such as control rod drop accidents, to be acceptable.

## 2.2 Technical Specifications

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 (LCOs) and surveillance requirements (SRs). Section (c)(2) of 10 CFR 50.36 states LCOs are the lowest functional capability or performance levels of equipment required for safe operation of the facility. If an LCO is not met, the facility must be shut down, or other acceptable remedial action must be taken.

Section (c)(3) of 10 CFR 50.36 states SRs 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.

## 2.3 Discussion

The control rod drop accident safety analyses are required to establish that a facility will comply with the requirements of GDC 13 and GDC 28. Since the initial reactor conditions and control rod pattern are initial conditions of the control rod drop accident analyses, facility operation must be controlled by LCOs that are established based on these parameters.

If the LCO is not met, then the TS remedial actions must be followed to ensure that facility operation remains safe, or the reactor must be shut down. These remedial actions are based on: (1) restoring compliance with the LCO, and (2) adjusting the reactor protection system settings so that the functionality required by GDCs 13 and 28 are maintained.

## 2.4 Proposed Changes

The licensee proposed changes to the TS. The licensee described the proposed changes in Section 2.0 of Attachment 1 of the LAR. The licensee provided a set of marked up TS illustrating the proposed changes in Attachment 2 of the LAR. A summary of the proposed changes is provided below.

### 2.4.1 Changes to TS 3.1.3

The current description for Condition D is: "Two or more inoperable control rods not in compliance with analyzed rod position sequence and not separated by two or more OPERABLE control rods." The description is preceded by a NOTE which states: "Not applicable when THERMAL POWER > 10% RTP." Required Action D.1 requires restoration of compliance with analyzed rod position sequence within a Completion Time of 4 hours. Required Action D.2 requires restoration of a control rod to operable status within a Completion Time of 4 hours. The Required Actions are separated by a logical "OR." The current description for Condition E is stated as: "Required Action and associated Completion Time of Condition A, C, or D not met. OR Nine or more control rods inoperable." Current Required Action E.1 requires the plant to be in MODE 3 within a Completion Time of 12 hours.

The licensee proposed deleting Condition D and its associated Required Actions and Completion Times from the ACTIONS table of TS 3.1.3. The licensee also proposed conforming changes to the remaining elements in the ACTIONS table to ensure consistent lettering and referencing. Current Condition E and its associated Required Action would be re-lettered to CONDITION D and Required Action D.1. References to Condition D would be removed from the

first part of the description of the Condition, which would be reworded to state: "Required Action and Associated Completion Time for Condition A or C not met."

#### 2.4.2 Changes to TS 3.1.6

The licensee proposed changes to the LCO statement, APPLICABILITY statement, Conditions and Required Actions and SR for current TS 3.1.6.

LCO 3.1.6 is currently stated as: "OPERABLE control rods shall comply with the requirements of the analyzed rod position sequence." The licensee proposed removing the term OPERABLE from the LCO statement so it would state: "Control rods shall comply with the requirements of the analyzed rod position sequence."

The APPLICABILITY statement is: "MODES 1 and 2 with THERMAL POWER  $\leq$  10% RTP." The licensee proposed removing MODE 1, reducing the THERMAL POWER value and adding a steam dome pressure limit to the APPLICABILITY statement so it would state: "MODE 2 with THERMAL POWER  $\leq$  5% RTP and reactor steam dome pressure  $\leq$  300 psig."

The current description for Condition A is stated as: "One or more OPERABLE control rods not in compliance with the analyzed rod position sequence." The licensee proposed removing the term OPERABLE from the description for Condition A so it would state: "One or more control rods not in compliance with the analyzed rod position sequence."

The current Required Action A.2 states: "Declare associated control rod(s) inoperable." The licensee proposed changing the Required Action to state: "Fully insert associated control rod(s)."

The current description for Condition B is stated as: "Nine or more OPERABLE control rods not in compliance with the analyzed rod position sequence." The licensee proposed replacing the term OPERABLE with the words "fully inserted" in the description so it would state: "Nine or more fully inserted control rods not in compliance with the analyzed rod position sequence."

SR 3.1.6.1 currently states: "Verify all OPERABLE control rods comply with the analyzed rod position sequence." The licensee proposed deleting the term OPERABLE from the description of the SR so it would state: "Verify all control rods comply with the analyzed rod position sequence."

#### 2.4.3 Changes to TS 3.3.2.1

The current NOTE above SR 3.3.2.1.2 states: "Not required to be performed until 1 hour after any control rod is withdrawn at  $\leq$  10% RTP in MODE 2." The licensee proposed reducing the THERMAL POWER value and adding a steam dome pressure limit to the NOTE. The NOTE would state: "Not required to be performed until 1 hour after any control rod is withdrawn at  $\leq$  5% RTP and  $\leq$  300 psig reactor steam dome pressure in MODE 2."

The current NOTE above SR 3.3.2.1.3 states: "Not required to be performed until 1 hour after THERMAL POWER is  $\leq$  10% RTP in MODE 1." The licensee proposed reducing the THERMAL POWER value and adding a steam dome pressure limit to the NOTE above the SR. The NOTE would state: "Not required to be performed until 1 hour after THERMAL POWER is  $\leq$  5% RTP and  $\leq$  300 psig reactor steam dome pressure in MODE 2."

The current SR 3.3.2.1.6 states: "Verify the RWM is not bypassed when THERMAL POWER  $\leq$  10% RTP." The licensee proposed reducing the THERMAL POWER value in the SR. The SR would state: "Verify the RWM is not bypassed when THERMAL POWER  $\leq$  5% RTP."

The current information in the APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS column in Table 3.3.2.1-1 for FUNCTION 2, Rod Worth Minimizer is "1<sup>(b)</sup>2<sup>(b)</sup>." The licensee proposed deleting the MODE 1 and footnote (b) indicators. The information in the column for the Rod Worth Minimizer would state "2<sup>(b)</sup>."

Footnote (b) for Table 3.3.2.1-1 currently states: "With THERMAL POWER  $\leq$  10% RTP." The licensee proposed reducing the THERMAL POWER limit and adding a steam dome pressure limit to footnote (b) for Table 3.3.2.1-1. Footnote (b) would state: "With THERMAL POWER  $\leq$  5% RTP and reactor steam dome pressure  $\leq$  300 psig."

### 3.0 TECHNICAL EVALUATION

NEDE-33885P-A, Revision 1, was incorporated into the overall General Electric Standard Application for Reactor Fuel (GESTAR II) methodology using GE Hitachi Nuclear Fuel (GEH)'s normal administrative processes. The licensee accomplished this for LaSalle by virtue of the reference to GESTAR II in their core operating limits report. Therefore, the amendment did not request NRC approval to use the NEDE-33885P-A methodology for licensing analysis of the control rod drop accident. Rather, the amendment is requesting TS changes to allow full advantage of the flexibility that the new methodology can provide in determining acceptable rod withdrawal sequences to be taken. In order to make a finding that this increased operating flexibility will not affect safety margins, the NRC staff reviewed the implementation of the methodology at LaSalle, as discussed below.

#### 3.1 Technical Models for the PANACEA, TRACG, and PRIME Codes

The NRC has previously approved specific applications of the PANACEA, TRACG, and PRIME codes as part of the GESTAR II methodology. Since the technical models for the PANACEA, TRACG, and PRIME codes have been previously reviewed and approved by the NRC for general neutronics, transient analysis, and fuel thermal performance applications, any limitations and conditions associated with these analysis codes remain applicable. No changes were necessary to the technical models as previously reviewed and approved by the NRC. Therefore, NEDE-33885P-A, Revision 1, focuses on validation of the PANACEA and TRACG methods for fast reactivity transients, a description of the key technical models used to confirm the acceptance criteria for the CRDA event, and a discussion of the analysis procedure that will be used to identify and analyze all configurations that need to be evaluated. The licensee confirmed in the license amendment request dated February 10, 2021, as supplemented, that use of the above codes at LaSalle, consistent with previously approved NRC applications, will be controlled as part of the overall GESTAR-II methodology as maintained by GNF-A.

#### 3.2 Evaluation of Conditions and Limitations for NEDE-33885P-A, Revision 1

In addition to the conditions and limitations associated with the codes, these conditions and limitations from NEDE-33885P-A must also be addressed.

1. "For each application of this methodology to perform licensing basis evaluations of the CRDA event, the maximum drop speed for all control rods shall be confirmed to be bounded by the 3.11

ft/s [feet per second] speed assumed in this LTR [Licensing Topical Report, i.e., NEDE-33885P-A] or the actual maximum drop speed shall be applied.”

Each control rod blade in use at LaSalle is equipped with a velocity limiter that limits the drop speed to a maximum of 3.11 ft/s. LaSalle UFSAR, Section 4.2.2.7.2, “Velocity Limiter,” (ADAMS Accession No. ML20111A251) describes the use of the control rod blade velocity limiter: “Because this water is jetted in a partially reversed direction into water flowing upward in the annulus, a severe turbulence is created, thereby slowing the descent of the control rod assembly to less than 3.11 ft/sec for current control blade designs.”

Therefore, the NRC staff confirms this limitation and condition is met.

2. “ When utilizing Option 2 in prescribing the control rod withdrawal order within a group, as described in Section 4.3.5.1 of this LTR, if control rods other than the highest worth rod [proprietary to the methodology].”

The order of control rod withdrawal within each group is an important factor in a CRDA evaluation because it affects the worth of potential accident control rods. The licensee stated that if the Option 2 method is used to prescribe control rod withdrawal order within a group, as described in NEDE-33885P-A, Section 4.3.5.1, the licensee will include applicable consideration of the potential conditions identified in the SE. Since the licensee confirmed that they will follow the requirements outlined by this limitation and condition, the NRC staff confirms that the limitation and condition is met.

3. “When utilizing Option 3 in prescribing the control rod withdrawal order within a group, as described in Section 4.3.5.1 of this LTR, [proprietary to the methodology] control rod withdrawal sequences (i.e., all control rods within a group are withdrawn to the same intermediate position before any control rod is withdrawn past that position).”

At LaSalle, the licensee utilizes the Rod Worth Minimizer and plant procedures to control the withdrawal of control rods at all power levels. The licensee stated that the sequence of control rod withdrawal order is developed by using procedures that describe the conditions and limitations required to meet the CRDA requirements. The Rod Worth Minimizer enforces the sequence, including rod withdrawal order and notch position. The NRC staff reviewed the information and confirms that this is an acceptable approach to satisfy the limitation and condition.

4. “If updated models, elements, or codes are used with this methodology as described in Section 7.3 of this LTR, the validation results shall be similar to the results for the specific models, elements, and codes referenced in this LTR. Within this context, validation results [proprietary to the methodology] with consistent results, but also code/model uncertainties that are similar to, or less than, those determined for the models, elements, and codes referenced in this LTR.”

The basis for this limitation and condition is to ensure that any changes are verified to be consistent with the validation basis for the methodology. The licensee stated that they would confirm this consistency via validation of any new models, elements, and codes, and comparison to NEDE-33885P-A, Revision 1. Therefore, the NRC staff finds that the licensee has demonstrated how they will meet this limitation and condition.

### 3.3 Regulatory Guide 1.236 and Draft Regulatory Guide DG-1327 Relationship

In the LAR, the licensee referenced both interim acceptance criteria in Appendix B of SRP Chapter 4, Section 4.2 and DG-1327. Since the NRC review and regulatory finding on NEDE-33885P-A was completed, DG-1327 was revised further prior to being published as RG 1.236. The NRC staff reviewed the changes made in response to the second round of public comment on DG-1327 and confirmed that NEDE-33885P-A is generally consistent with RG 1.236. The SE for NEDE-33885-A, dated January 16, 2020, discusses a relevant concern, which is that the acceptance criteria in the methodology are based on the assumption that the rod failure probability will be correlated in a certain way. That is, likely rod failures are identified via enthalpy-based thresholds that are a function of rod internal pressure or cladding hydrogen concentration. The licensee intends to use the enthalpy-based acceptance criteria specified in NEDE-33885-A for use in the licensing determinations for control rod drop accidents. These criteria consist of two separate failure mechanisms. Both are used to show compliance with the acceptance criteria. The PCMI and HTCF acceptance criteria specified in NEDE-33885-A are taken from DG-1327. NEDE-33885-A, Sections 3.2 and 3.3, provide the technical detail for each of the failure mechanisms. The PCMI acceptance criteria in NEDE-33885-A and DG-1327 were refined and finalized in RG 1.236. The PCMI acceptance criteria was changed from a piecewise linear fit of the enthalpy vs. hydrogen content data in NEDE-33885-A to a curve fit in RG 1.236. The enthalpy and hydrogen data are unchanged. The HTCF acceptance criteria is identical between NEDE-33885-A and RG 1.236.

In addition to the above discussion, a change was incorporated into RG 1.236 related to the use of separate thresholds for lined and unlined cladding. The acceptance criteria from NEDE-33885-A are consistent with the criteria in RG 1.236 for specific fuel types which utilize lined cladding. LaSalle is currently using GEH fuel, which incorporates lined cladding. Therefore, the NEDE-33885-A criteria are appropriate for the fuel currently being used at LaSalle. If the licensee elects to load fuel with unlined cladding or other fuel types that are not consistent with the fuel types assumed for the NEDE-33885-A criteria, and use this methodology, the licensee would be required to address this via the applicable change control process. Since the differences between the NEDE-33885-A and RG 1.236 are minor for existing fuel products with lined cladding such as the fuel currently used at LaSalle, the NRC staff determined that use of the NEDE-33885-A acceptance criteria for determining when fuel failure is expected to occur is acceptable.

### 3.4 Proposed Changes to TS 3.1.3 “Control Rod Operability,” 3.1.6 “Rod Pattern Control,” and 3.3.2.1 “Control Rod Block Instrumentation”

Approval of NEDE-33885P-A allows licensees to utilize this methodology in their licensing basis and in development of their own rod withdrawal sequences that can be demonstrated to comply with the revised CRDA acceptance criteria, in lieu of the BPWS. This CRDA methodology supersedes the BPWS methodology that is currently in use at LaSalle. By incorporating the NEDE-33885P-A, Revision 1, methodology, changes to the applicability region and the out-of-sequence control rod requirements are proposed to be made. The proposed amendment deletes TS 3.1.3 Condition D for “Two or more inoperable control rods not in compliance with analyzed rod position sequence and not separated by two or more OPERABLE control rods.” This was a generic BPWS requirement that is superseded in the NEDE-33885P-A, Revision 1, methodology. There are no generic separation criteria required with the NEDE 33885P-A, Revision 1, methodology. The proposed amendment replaces the minimum Thermal Power requirement above which there are no constraints on control rod withdrawal order required to

protect against a CRDA with a new minimum thermal power or a reactor steam dome pressure threshold.

The proposed amendment modifies TS 3.1.6, "Rod Pattern Control," to apply to all control rods. The reactor steam dome pressure condition would be exceeded in MODE 2, so there is no longer a need for MODE 1 applicability. Additionally, TS 3.1.6 is being modified to align with the new minimum thermal power limit and reactor steam dome pressure limit as described in section 2.4 of this SE.

TS 3.3.2.1, "Control Rod Block Instrumentation," is being modified to incorporate the new minimum thermal power limit and reactor steam dome pressure limit. The proposed amendment replaces the minimum thermal power requirement above which there are no constraints on control rod withdrawal order required to protect against a CRDA with a new minimum thermal power or a reactor steam dome pressure.

Accordingly, the NRC staff determined that the proposed changes align the LaSalle TSs with previously approved changes to the TSs, and do not impact the applicability or the conclusions presented in the SE incorporated into NEDE-33885P-A, Revision 1. The NRC staff confirms the changes are, therefore, acceptable.

### 3.5 Variations

The change to SR 3.3.2.1.6 in LaSalle TS pages will vary from the proposed changes in the approved NEDE-33885P-A, TS pages. The NEDE-33885P-A, TS pages delete the "when THERMAL POWER is  $\leq$  10% RTP." LaSalle TS SR will deviate from this change as the Rod Worth Minimizer is required to not be bypassed when thermal power is less than or equal to 5%. Wording changes throughout the NEDE-33885P-A, where BPWS was replaced with "analyzed rod position sequence" will not be incorporated through the proposed amendment because these changes have already been implemented in the LaSalle TSs (ADAMS Accession No. ML011130202). The licensee concludes this variation from the NEDE-33885P-A, does not affect the justification for incorporation of this methodology. These variations are editorial and do not affect the justification for incorporation of this NEDE-33885P-A, Revision 1, for LaSalle. Accordingly, the staff determined that the proposed changes align LaSalle, TSs with previously approved changes to the TSs, and do not impact the applicability or the conclusions presented in the SE of NEDE-33885P-A, Revision 1. The NRC staff confirms the changes are, therefore, acceptable.

## 4.0 TECHNICAL CONCLUSION

Based on the following considerations, the NRC staff concludes the following:

1. The licensee's proposed implementation for LaSalle is consistent with the TSs approved by the NRC staff in NEDE-33885P-A, Revision 1.
2. The licensee addressed the conditions and limitations for LaSalle included in the NRC staff SE appended to NEDE-33885P-A, Revision 1, in a manner acceptable to the NRC staff.
3. The proposed fuel failure acceptance criteria from NEDE-33885P-A, Revision 1, are consistent with the acceptance criteria in current RG 1.236 for existing fuel products



utilizing lined cladding, and that the licensee is currently utilizing such fuel products at LaSalle.

NEDE-33885P-A, Revision 1, provides an acceptable method to determine core operating limits. Therefore, provided that appropriate acceptance criteria are used consistent with the fuel being loaded at LaSalle to perform core surveillance in a way that demonstrates compliance with the requirements identified in Section 2.1 of this SE, the NRC staff concludes that the proposed license amendments are acceptable for the fuel currently being used at LaSalle.

The NRC staff concludes that the TSs, as amended by the proposed changes, will continue to meet the requirements of 10 CFR 50.36(c)(2) because the LCOs will continue to state the lowest functional capability or performance levels of equipment required for safe operation of the facility. The TSs will continue to stipulate that if an LCO is not met, the facility must be shut down, or other acceptable remedial action must be taken. The NRC staff concludes that the remedial actions, as amended by the proposed change, will ensure that facility operation remains safe during the time the LCOs are not met. The NRC staff also concludes that the TSs, as amended by the proposed changes, will continue to meet the requirements of 10CFR 50.36(c)(3) because the SRs will continue 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. Therefore, the proposed changes to the TSs are acceptable.

#### 5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of Illinois official was notified of the proposed issuance of the amendment on January 13, 2022. The State official had no comments.

#### 6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes 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 amendment involves 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 that the amendment involves no significant hazards consideration, and there has been no public comment on such finding since its publication on April 20, 2021 (86 FR 20530). Accordingly, the amendment meets 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 amendment.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Date of Issuance: February 4, 2022

SUBJECT: LASALLE COUNTY STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 255 AND 241 RE: REVISION TO TECHNICAL SPECIFICATIONS TO INCORPORATE LICENSING TOPICAL REPORT NEDE-33885P-A, REVISION 1, "GNF CRDA APPLICATION METHODOLOGY" (EPID L-2021-LLA-0016) DATED FEBRUARY 4, 2022

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