



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

August 23, 2016

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

SUBJECT: LASALLE COUNTY STATION, UNITS 1 AND 2, ISSUANCE OF AMENDMENTS  
RE: REDUCTION IN THE REACTOR STEAM DOME PRESSURE SPECIFIED  
IN THE TECHNICAL SPECIFICATION 2.1.1, "REACTOR CORE SLS"  
(CAC NOS. MF7109 AND MF7110)

Dear Mr. Hanson:

The U.S. Nuclear Regulatory Commission (NRC or Commission) has issued the enclosed Amendment No. 220 to Facility Operating License No. NPF-11 and Amendment No. 206 to Facility Operating License No. NPF-18 for the LaSalle County Station (LSCS), Units 1 and 2, respectively. The amendments are in response to your application dated November 19, 2015, as supplemented by letter dated April 11, 2016.

The supplement dated April 11, 2016, 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 February 2, 2016, (81 FR 5497).

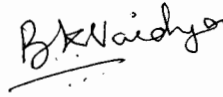
The amendments revised LSCS technical specifications (TSs), Section 2.1.1, "Reactor Core SLs [safety limits]," to reflect a lower reactor steam dome pressure stated for reactor core SLs 2.1.1.1 and 2.1.1.2. Specifically, the amendment reduced the reactor steam dome pressure in TS SLs 2.1.1.1 and 2.1.1.2 from 785 psig [pounds per square inch gage] to 700 psia [pounds per square inch absolute]. This change to TS Section 2.1.1 was identified as a result of General Electric Title 10 of the *Code of Federal Regulations* Part 21 report SC05-03, "Potential to Exceed Low Pressure Technical Specification Safety Limit." This change is valid for the NRC-approved pressure range pertinent to the critical power correlations applied to the fuel types in use at LSCS.

B. Hanson

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

Sincerely,

A handwritten signature in black ink, appearing to read "B. K. Vaidya". The signature is written in a cursive style with a horizontal line underneath.

Bhalchandra K. Vaidya, Project Manager  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-373 and 50-374

Enclosures:

1. Amendment No. 220 to NPF-11
2. Amendment No. 206 to NPF-18
3. Safety Evaluation

cc w/encls: Distribution via Listserv



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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-373

LASALLE COUNTY STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 220  
License No. NPF-11

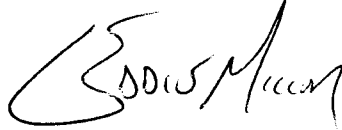
1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by the Exelon Generation Company, LLC (the licensee), dated November 19, 2015, as supplemented by letter dated April 11, 2016, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's 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 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 set forth in 10 CFR Chapter I;
  - 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 the Facility Operating License No. NPF-11 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised Through Amendment No. 220 , and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the 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 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read "G. Edward Miller". The signature is stylized and cursive.

G. Edward Miller, Acting Chief  
Plant Licensing III-2 Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications and Facility Operating License

Date of Issuance: August 23, 2016



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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-374

LASALLE COUNTY STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 206  
License No. NPF-18

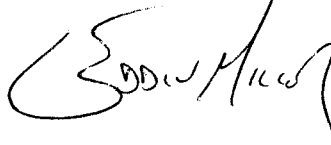
1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by the Exelon Generation Company, LLC (the licensee), dated November 19, 2015, as supplemented by letter dated April 11, 2016, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's 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 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 set forth in 10 CFR Chapter I;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the enclosure to this license amendment and paragraph 2.C.(2) of the Facility Operating License No. NPF-18 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 206 , and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the 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 for Unit 2 prior to startup following refueling outage L2R16 in February 2017.

FOR THE NUCLEAR REGULATORY COMMISSION



G. Edward Miller, Acting Chief  
Plant Licensing III-2 Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications and Facility Operating License

Date of Issuance: August 23, 2016

ATTACHMENT TO LICENSE AMENDMENT NOS. 220 AND 206

LASALLE COUNTY STATION

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

DOCKET NOS. 50-373 AND 50-374

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

Remove

License NPF-11

Page 3

License NPF-18

Page 3

TSs

TS 2.0-1

Insert

License NPF-11

Page 3

License NPF-18

Page 3

TSs

TS 2.0-1

Am. 146  
01/12/01 (4) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

Am. 202  
07/21/11 (5) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of LaSalle County Station, Units 1 and 2, and such Class B and Class C low-level radioactive waste as may be produced by the operation of Braidwood Station, Units 1 and 2, Byron Station, Units 1 and 2, and Clinton Power Station, Unit 1.

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

Am. 198  
09/16/10 (1) Maximum Power Level  
The licensee is authorized to operate the facility at reactor core power levels not in excess of full power (3546 megawatts thermal).

Am.219  
12/17/15 (2) Technical Specifications and Environmental Protection Plan  
The Technical Specifications contained in Appendix A, as revised Through Amendment No. 220 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the 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

Am. 194  
08/28/09 (6) DELETED

Am. 194  
08/28/09 (7) DELETED



Am. 189  
07/21/11 (5) Pursuant to the Act and 10 CFR Parts 30, 40, and 70 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 license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

Am. 185  
09/16/10 (1) Maximum Power Level  
The licensee is authorized to operate the facility at reactor core power levels not in excess of full power (3546 megawatts thermal). Items in Attachment 1 shall be completed as specified. Attachment 1 is hereby incorporated into this license.

Am.205  
12/17/15 (2) Technical Specifications and Environmental Protection Plan  
The Technical Specifications contained in Appendix A, as revised through Amendment No. 206 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

Am. 181  
08/28/09 (3) DELETED

Am. 181  
08/28/09 (4) DELETED

Am. 181  
08/28/09 (5) DELETED

Am. 181  
08/28/09 (6) DELETED

Am. 181  
08/28/09 (7) DELETED

Am. 181  
08/28/09 (8) DELETED

Am. 181  
08/28/09 (9) DELETED

## 2.0 SAFETY LIMITS (SLs)

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### 2.1 SLs

#### 2.1.1 Reactor Core SLs

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

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

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

For Unit 1, MCPR shall be  $\geq$  1.13 for two recirculation loop operation or  $\geq$  1.15 for single recirculation loop operation.

For Unit 2, MCPR shall be  $\geq$  1.14 for two recirculation loop operation or  $\geq$  1.17 for single recirculation loop operation.

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

#### 2.1.2 Reactor Coolant System Pressure SL

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

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### 2.2 SL Violations

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

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 220 TO FACILITY OPERATING LICENSE NO. NPF-11  
AND AMENDMENT NO. 206 TO FACILITY OPERATING LICENSE NO. NPF-18  
EXELON GENERATION COMPANY, LLC  
LASALLE COUNTY STATION, UNITS 1 AND 2  
DOCKET NOS. 50-373 AND 50-374

1.0 INTRODUCTION

By letter to the U.S. Nuclear Regulatory Commission (NRC or Commission) dated November 19, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15324A309) (Reference 1), as supplemented by letter dated April 11, 2016. (ADAMS Accession No. ML16102A329) (Reference 2), Exelon Generation Company, LLC (the licensee), requested changes to the technical specifications (TSs), and facility operating license, for LaSalle County Station (LSCS), Units 1 and 2.

The proposed amendments would revise LSCS Technical Specifications (TS) Section 2.1.1, "Reactor Core SLs [safety limits]," to reflect a lower reactor steam dome pressure stated for reactor core SLs 2.1.1.1 and 2.1.1.2. Specifically, the proposed amendment will reduce the reactor steam dome pressure in TS SLs 2.1.1.1 and 2.1.1.2 from 785 psig [pounds per square inch gage] to 700 psia [pounds per square inch absolute]. This change to TS Section 2.1.1 was identified as a result of General Electric (GE) Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21 report SC05-03, "Potential to Exceed Low Pressure Technical Specification Safety Limit." This change is evaluated only for the NRC-approved pressure range pertinent to the critical power correlations currently applied to the fuel types in use at LSCS.

The supplement dated April 11, 2016, 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 February 2, 2016, (81 FR 5497).

## 2.0 REGULATORY EVALUATION

### 2.1 Background:

LSCS, Units 1 and 2, TS 2.1.1.1 currently requires that when steam dome pressure is less than 785 pounds per square inch gauge (psig), or core flow is less than 10 percent of rated core flow, thermal power shall be less than or equal to 25 percent of rated thermal power (RTP).

In a letter dated March 29, 2005 (Reference 3), GE submitted a 10 CFR Part 21 notification to the NRC. The 10 CFR Part 21 notification discussed how applying newer computer analysis codes to a pressure regulator failure on demand (open) (PRFO) transient could result in a condition where the reactor steam dome pressure could momentarily decrease below 785 psig, while RTP was above the plant-specific thermal power limit specified in TS 2.1.1.1. As such, this condition would result in a violation of the reactor core SL in TS 2.1.1.1. The notification indicated that a number of boiling-water reactor (BWR) plants, including LSCS, Units 1 and 2, were affected. Initially, the Boiling Water Reactor Owners Group (BWROG) attempted to resolve the 10 CFR Part 21 issue. On July 18, 2006, the Technical Specifications Task Force (TSTF) and the BWROG submitted TSTF-495, Revision 0, "Bases Change to Address GE Part 21 SC05-03" (Reference 4), to the NRC for review. The letter stated, in part, that TSTF-495 only affects the TS bases and would be able to be adopted by plants without requesting a license amendment from the NRC. Specifically, the proposed change would modify the "Applicable Safety Analysis" portion of the TS Bases for TS 2.1.1, "Reactor Core SLs [Safety Limits]." This change proposed to clarify that the SL was considered not to apply to momentary depressurization transients. In a letter dated August 27, 2007 (Reference 5), the NRC staff stated that TSTF-495, Revision 0, could not be approved. The staff's safety evaluation (SE) enclosed with the letter stated, in part:

The staff agrees with the applicant's position that the PRFO transient does not threaten fuel cladding integrity, since the margin to SLMCPR [safety limit for minimum critical power] increases with decreasing reactor pressure. However, the staff is concerned that in some depressurization events which occur at or near full power, there may be enough bundle stored energy to cause some fuel damage. If a reactor scram does not occur automatically, the operator may have insufficient time to recognize the condition and to take the appropriate actions to bring the reactor to a safe configuration.

Based on the above considerations, the NRC staff's SE concluded that TSTF-495, Revision 0, was unacceptable. Consequently, the BWROG discontinued the effort to resolve the issue generically. Several approaches to resolve this issue were considered at periodic BWROG meetings but not adopted, because a generic approach applicable to all BWROG members and fuel vendors could not be identified.

Subsequently, affected BWR licensees have proposed resolution of the 10 CFR Part 21 issue on a plant-specific basis by submittal of license amendment requests (LARs) that lower the reactor steam dome pressure SL value in the TSs. This approach takes advantage of the fact that some advanced fuel designs have an NRC-approved critical power correlation with a lower-bound pressure significantly below the reactor steam dome pressure specified in TS 2.1.1. With respect to LSCS, Units 1 and 2, the licensee proposes to utilize this approach and reduce the reactor steam dome pressure, consistent with the approved lower-bound pressure for the critical

power correlation for the Global Nuclear Fuel2 (GNF2) fuel currently used in the LSCS, Units 1 and 2, cores.

## 2.2 Proposed Changes

The licensee's application dated November 19, 2015, proposed changes that would reduce the reactor steam dome pressure specified in TS SLs 2.1.1.1 and 2.1.1.2 from 785 psig to 700 psia. The TS SL 2.1.1.1 and TS SL 2.1.1.2 would then read:

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

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

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

For Unit 1, MCPR shall be  $\geq$  1.13 for two recirculation loop operation or  $\geq$  1.15 for single recirculation loop operation.

For Unit 2, MCPR shall be  $\geq$  1.14 for two recirculation loop operation or  $\geq$  1.17 for single recirculation loop operation.

## 2.3 Regulatory Requirements and Guidance

The regulatory requirements and guidance documents the NRC staff considered in its review of the proposed amendment included the following:

- The regulation in 10 CFR 50.36, "Technical specifications," provides the regulatory requirements for the content required in the TSs. As stated in 10 CFR 50.36(c)(1)(i)(A),

"Safety limits for nuclear reactors are limits upon important process variables that are found to be necessary to reasonably protect the integrity of certain of the physical barriers that guard against the uncontrolled release of radioactivity. If any safety limit is exceeded, the reactor must be shut down. The licensee shall notify the Commission, review the matter, and record the results of the review, including the cause of the condition and the basis for corrective action taken to preclude recurrence. Operation must not be resumed until authorized by the Commission."

- The requirements in 10 CFR 50, Appendix A, General Design Criteria (GDC) 10, "Reactor design," states:

"The reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits [SAFDLs] are not exceeded during any

condition of normal operation, including the effects of anticipated operational occurrences.”

Section 3.1 of the LSCS UFSAR discusses conformance with this GDC.

- NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition” (hereinafter referred to as “SRP”), provides guidance on, among other things, the acceptability of the reactivity control systems, the reactor core, and fuel system design. Relevant sections of the SRP used in review of this LAR include the following:
- Chapter 4, Section 4.2, “Fuel System Design,” Revision 3, dated March 2007 (ADAMS Accession No. ML070740002). Section 4.2 specifies the criteria for evaluation of fuel damage and whether fuel designs meet the SAFDLs.
- Chapter 4, Section 4.4, “Thermal and Hydraulic Design,” Revision 2, dated March 2007 (ADAMS Accession No. ML070550060). Section 4.4 provides guidance on the review of thermal-hydraulic design in meeting the requirements of GDC-10 and the fuel design criteria established in SRP, Section 4.2. It states that the critical power ratio (CPR) is to be established such that at least 99.9 percent of fuel rods in the core would not be expected to experience departure from nucleate boiling or onset of transitional boiling (OTB) during normal operation anticipated operational occurrences (AOOs).

### 3.0 TECHNICAL EVALUATION

Each fuel vendor has developed critical power correlations valid over specified pressure and flow ranges (mass flow rates) that are approved by the NRC. These critical power (CP) correlations have become increasingly fuel design dependent as advanced fuel designs have evolved. The CP correlations for some advanced fuel designs have received NRC approval down to a lower pressure than those approved previously. If justified, the lower-bound of the extended pressure ranges for these advanced fuel designs can be used to establish a lower reactor steam dome pressure than specified in the TSs for previous fuel designs. As such, a wider pressure range would be available for a PRFO transient to demonstrate compliance with minimum critical power ratio (MCPR) limits. As discussed above in Sections 2.1 and 2.2, the licensee proposes to reduce the reactor steam dome pressure specified in TS 2.1.1.1 and TS 2.1.1.2 from 785 psig to 700 psia based on the lower-bound pressure for the critical power correlation for the GNF2 fuel currently used in the LSCS, Units 1 and 2, cores.

The OTB in BWR fuel assemblies, during both steady-state and reactor transient conditions, can be predicted by the GE critical quality – boiling length correlation, better known as the GEXL correlation. The critical power correlation (i.e., GEXL correlation) for GNF2 fuel (referred to as the GEXL17 correlation) is documented in GNF report NEDC-33292P, “GEXL17 Correlation for GNF2 Fuel,” Revision 3, dated June 2009 (Reference 6). As discussed in this report, in the core design process, the GEXL17 correlation is used to determine the expected thermal margin for the operating cycle. In the safety analysis process, the GEXL17 correlation, is used in the determination of the change in CPR during postulated transients and in the determination of an acceptable MCPR safety limit.

GNF Licensing Topical Report (LTR) NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" (Reference 7), provides generic information relative to the fuel design and analyses of BWRs that use the GE and GNF fuel designs. This LTR (referred to as GESTAR II) consists of a description of the fuel licensing criteria and fuel thermal-mechanical, nuclear, and thermal-hydraulic analyses bases. In accordance with LSCS, Units 1 and 2, TS 5.6.5, "Core Operating Limits Report (COLR)," the analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, as described in the latest approved version of GESTAR II (LSCS TS 5.6.5(b)(11)).

In a letter dated March 5, 2010 (Reference 11), GNF submitted proposed Amendment No. 33 to GESTAR II for NRC review and approval. The letter also provided GNF Report NEDC-33270P, "GNF2 Advantage Generic Compliance with NEDE-24011-P-A (GESTAR II)," Revision 3, dated March 2010. The GNF report documented the completion of the requirements for the new GNF2 fuel design per the criteria in GESTAR II. In a letter dated August 30, 2010 (Reference 12), the NRC staff approved Amendment No. 33 to GESTAR II. Amendment No. 33 was incorporated in Revision 17 to GESTAR II by GNF letter dated September 22, 2010 (Reference 10).

Section 3.8.3 of GNF report NEDC-33270P discusses the CP correlation for GNF2 fuel (i.e., the GEXL17 correlation). This section includes the pressure range over which the GEXL17 correlation is valid for GNF2 fuel, consistent with the information provided in Table 5-4 of GNF2 report NEDC-33292P. As discussed in Section 3.0 of Attachment 1 of the licensee's application (Reference 1), the lower bound pressure limit for the GEXL17 correlation is 700 per square inch (psia). The proposed reactor steam dome pressure in TS 2.1.1.1 and TS 2.1.1.2 of 700 psia is based on the lower bound pressure for the GEXL17 correlation. In addition, the licensee's application stated that an assessment was performed that determined that reactor steam dome pressure would not fall below 700 psia while above 25 percent RTP during a PRFO transient.

Based on the above, the NRC staff finds that:

- 1) The use of the GEXL17 correlation for GNF2 fuel is considered an NRC-approved method, consistent with the latest approved version of GESTAR II.
- 2) The use of GESTAR II for development of the LSCS, Units 1 and 2, core operating limits is consistent with the provisions in TS 5.6.5.
- 3) The use of the GEXL17 correlation will ensure that valid CPR calculations are performed for the AOOs applicable to LSCS, Units 1 and 2, including the PRFO transient.
- 4) The proposed 700 psia reactor steam dome pressure in TS 2.1.1.1 and TS 2.1.1.2 is justified based on the lower bound pressure associated with the GEXL17 correlation for GNF2 fuel.
- 5) Since the licensee's assessment determined that reactor steam dome pressure would not fall below 700 psia while above 25 percent RTP during a PRFO transient, revising the reactor steam dome pressure in TS 2.1.1.1 and TS 2.1.1.2 from 785 psig to 700 psia resolves the 10 CFR Part 21 issue discussed above in SE Section 2.1.

Based on the above findings, the NRC staff concludes that as long as the core pressure and flow are within the range of validity of the GEXL17 correlation, the proposed reactor steam dome pressure changes to the reactor core SLs in TSs 2.1.1.1 and 2.1.1.2 provide reasonable assurance that 99.9 percent of the fuel rods in the core are not expected to experience OTB during normal operation or AOOs. As such, this will continue to ensure that SAFDLs are not exceeded during normal operation or AOOs, consistent with the requirements in final GDC-10, as incorporated into the LSCS UFSAR. Furthermore, the NRC staff concludes that the proposed change establishes reactor core SLs, reasonably certain to protect the integrity of the fuel cladding barrier and guard against an uncontrolled release of radioactivity, consistent with the requirements in 10 CFR 50.36(c)(1). Based on the above conclusions, the NRC staff further concludes that the proposed amendments are acceptable.

The licensee further stated in the submittal dated November 19, 2015, that four GNF3 lead-use assemblies (LUAs) in the LSCS, Unit 2, reactor core are inserted into core locations that are projected to be non-limiting with respect to compliance with linear heat generation rate (LHGR), maximum average planar linear heat generation rate (MAPLHGR), and MCPR limits with planned, steady state control rod patterns by conservatively applying the NRC-approved GEXL17 correlation limits Reference 6).

The GNF3 fuel bundle mentioned above, is a new fuel design that was loaded as part of the LSCS, Unit 2, Reload 15, Cycle 16, during the spring 2015, refueling outage. These bundles, also referred to as GNF3 LUAs, were designed for mechanical, nuclear, and thermal-hydraulic compatibility with previous GE/GNF fuel designs. On January 20, 2015, the licensee transmitted a letter to the NRC (Reference 8) notifying the NRC that the licensee intended to load four GNF3 LUAs as part of the LSCS, Unit 2, Reload 15, Cycle 16. Reference 8 provided a description of the GNF3 LUAs, a discussion of the licensing analyses, a description of the LUA program objectives, an outline of the kinds of measurements planned for the GNF3 LUAs, and technical basis in support of applicability of GEXL17 correlation to the GNF3 LUAs. All evaluations performed in support of the introduction of the GNF3 LUAs were performed in accordance with the NRC-approved licensing methodology in GESTAR II (Reference 9). In response to the NRC staff request for additional information, the licensee's April 11, 2016, submission confirmed that in consistent with the GESTAR II, cycle-specific analyses were performed for LSCS, Unit 2, Cycle 16, to establish fuel operating limits for the LUAs. The analyses ensured that the core loading had been designed such that the GNF3 LUAs would not be the most limiting fuel assemblies at any time during Cycle 16 with respect to compliance with LHGR, MAPLHGR, and MCPR limits with planned, steady state control rod patterns. Consistent with the GESTAR II, licensing analysis will be performed for GNF3 LUAs for each cycle of their operation, wherein the effect of the GNF3 LUAs is considered for each of the appropriate licensing events and AOOs to establish appropriate reactor core operating limits. Furthermore, in accordance with the LSCS TS Section 4.2, "Reactor Core," the GNF3 LUAs will be loaded in non-limiting core regions. Therefore, the NRC staff determined that use of GNF3 fuel in LSCS Unit 2 as LUAs is acceptable because the analysis to determine thermal limits for GNF3 LUAs are based on NRC approved GESTARII methodology, and that the GNF3 LUAs will be loaded in non-limiting core regions, as required by LSCS TS, Section 4.2, "Reactor Core," such that the MCPR for GNF3 LUAs will not be limiting.

Revising the reactor steam dome pressure value in reactor core SLs TS 2.1.1.1 and TS 2.1.1.2, from 785 psig to 700 psia provides additional margin to the concern of the reported potential to violate the lower limiting value for the reactor dome pressure during a PRFO transient.



Lowering the value of reactor steam dome pressure in the TS has no physical effect on plant equipment and, therefore, no impact on the course of plant transients.

The NRC staff concludes that the proposed change to the reactor core SLs continues to ensure that a valid CPR calculation is performed by using the NRC-approved GEXL-17 correlation for the AOs described in the UFSAR, including the PRFO transient, and that with the value of 700 psia proposed for the reactor steam dome pressure would not result in a violation of reactor core SL 2.1.1.1 during a PRFO transient. Furthermore, consistent with TS 2.1.1.1, the proposed change will continue to provide protection during startup conditions to ensure that operation at less than 700 psia or less than 10 million lbm/hr (pound mass per hour) core flow while greater than 25 percent RTP for LSCS would not occur. Based on the above discussion, The NRC staff finds that this approach appropriately addresses the 10 CFR Part 21 condition, and therefore, the NRC staff finds it acceptable.

The NRC notes that this approval only considered the fuel types currently approved for use at LSCS and that the NRC approval would be required prior to transitioning to different fuel design in the future where the lower bound of that fuel design's CPR correlation has not been approved for use down to the lower reactor steam dome pressure specified in the TS reactor core SLs.

The NRC staff evaluated the proposed changes against the applicable regulatory requirements and acceptance criteria. The staff concluded that as long as the core pressure and flow are within the range of validity of the NRC-approved GEXL-17 CPR correlation, the proposed reactor steam dome pressure change to reactor core SLs, 2.1.1.1 and 2.1.1.2, will continue to ensure that 99.9 percent of the fuel rods in the core are not expected to experience OTB in accordance with Section 4.4 of SRP NUREG-0800. This satisfies the regulatory requirements regarding acceptable fuel design limits and continues to assure that the underlying criteria of the SL is met consistent with GDC 10 and 10 CFR Section 50.36(c)(1)(i)(A); and, therefore, the proposed amendment is acceptable. The NRC staff further concludes that there is reasonable assurance that the health and safety of the public, following approval of this TS change, will be protected.

#### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of the amendments. The State official had no comments.

#### 5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of the facilities components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (81 FR 5497; February 2, 2016). 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) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

## 7.0 REFERENCES

1. Letter from D.M. Gullott (Exelon) to U.S. NRC, "Request for License Amendment to Reduce the Reactor Steam Dome Pressure Specified in the Technical Specification 2.1.1, "Reactor Core SLs," November 19, 2015.
2. Letter from D.M. Gullott (Exelon) to U.S. NRC, "Response to Request for Additional Information Regarding License Amendment Request to Reduce the Reactor Steam Dome Pressure Specified in the Technical Specification 2.1.1, "Reactor Core SLs," April 11, 2016.
3. Letter from Jason Post (GE Energy Nuclear) to U.S. NRC, "10CFR21 Reportable Condition Notification: Potential to Exceed Low Pressure Technical Specification Safety Limit," dated March 29, 2005 (ADAMS Accession No. ML050950428).
4. Technical Specifications Task Force letter to the NRC transmitting TSTF-495, Revision 0, "Bases Change to Address GE Part 21 SC05-03," dated July 18, 2006 (ADAMS Accession No. ML061990227).
5. NRC letter to Technical Specification Task Force, "Denial of TSTF-495, Revision 0, 'Bases Change to Address GE Part 21 SC05-03'," dated August 27, 2007 (ADAMS Accession No. ML072340113).
6. Global Nuclear Fuel, letter MFN 09-436, Enclosure 4, GNF report NEDC-33292P, "GEXL17 Correlation for GNF2 Fuel," Revision 3, dated June 2009 (ADAMS Accession No. ML091830641 (non-publicly available)), and Enclosure 5, Non-Proprietary Information (ADAMS Accession No. ML091830624).<sup>1</sup>
7. NEDE-24011P-A, "General Electric Standard Application for Reactor Fuel" (GESTAR II) Revision 17 (latest NRC-approved revision referenced in the Cycle-specific COLR Report).
8. Letter from D.M. Gullott (Exelon) to U.S. NRC, "LaSalle County Station Introduction of Lead Use Assemblies," January 20, 2015 (ADAMS Package Accession No. ML15020A660).

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<sup>1</sup> This proprietary report was submitted to the NRC as Enclosure 4 to GNF letter MFN 09-436 dated June 30, 2009 (ADAMS Accession No. ML091830614). Enclosure 5 to the letter (ADAMS Accession No. ML091830624) is a publicly available version of the report.

9. Global Nuclear Fuel, letter MFN 13-084, Enclosures 3 and 4, "General Electric Standard Application for Reactor Fuel (GESTAR II, Main and U.S. Supplement)," NEDE-24011-P-A-20, December 18, 2013 (ADAMS Accession Nos. ML133352A461 and ADAMS Accession No. ML133352A462).
10. GNF letter MFN 10-250 to the NRC, "Accepted Proprietary and Non-Proprietary Versions of Revision 17 to NEDE-24011-P, 'General Electric Standard Application for Reactor Fuel (GESTAR II), Main and United States Supplement,'" dated September 22, 2010 (ADAMS Package Accession No. ML102660094).
11. GNF letter MFN 10-045 to the NRC, "Amendment 33 to NEDE-24011-P, General Electric Standard Application for Reactor Fuel (GESTAR II) and GNF2 Advantage Generic Compliance with NEDE-24011-P-A (GESTAR II), NEDC-33270P, Revision 3, March 2010," dated March 5, 2010 (ADAMS Package Accession No. ML100700464).
12. NRC letter to GNF, "Final Safety Evaluation for Amendment 33 to Global Nuclear Fuel Topical Report NEDE-24011-P, General Electric Standard Application for Reactor Fuel (GESTAR II)," dated August 30, 2010 (ADAMS Accession No. ML102280144).

Principal Contributor: M. Razzaque, NRR/SRXB

Date of issuance: August 23, 2016

B. Hanson

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

Sincerely,

*/RA/*

Bhalchandra K. Vaidya, Project Manager  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-373 and 50-374

Enclosures:

1. Amendment No. 220 to NPF-11
2. Amendment No. 206 to NPF-18
3. Safety Evaluation

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