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

April 30, 2012

Mr. Mano Nazar
Executive Vice President, and
Chief Nuclear Officer
Florida Power & Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: ST. LUCIE PLANT, UNIT NO. 2 - EXEMPTION FROM THE REQUIREMENTS OF 10 CFR PART 50, APPENDIX G (TAC NO. ME6118)

Dear Mr. Nazar:

The U.S. Nuclear Regulatory Commission has approved the enclosed exemption from specific requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix G, for the St. Lucie Plant, Unit 2. This action is in response to your application dated April 28, 2011.

Pursuant to 10 CFR 50.12, Florida Power & Light Company requested an exemption from the requirements of 10 CFR Part 50, Appendix G, to use the methodology of Topical Report CE NPSD-683-A, Rev 06, "Development of a RCS Pressure and Temperature Limits Report for the Removal of P-T [pressure and temperature] Limits and LTOP [low-temperature overpressure protection] Requirements from the Technical Specifications," for the generation of P-T limits for the reactor coolant pressure boundary during normal operating and hydrostatic or leak rate testing conditions. Specifically, use of the methodology above requires an exemption from the requirements of 10 CFR Part 50, Appendix G, Section IV.A.2, "Pressure-Temperature Limits and Minimum Temperature Requirements."

A copy of the exemption is enclosed. The exemption has been forwarded to the Office of the *Federal Register* for publication.

Sincerely,

Tracy J. Orf

Tracy J. Orf, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-389

Enclosure:
Exemption

cc w/encl: Distribution via Listserv

7590-01-P

NUCLEAR REGULATORY COMMISSION

[NRC-20XX-XXXX]

FLORIDA POWER & LIGHT COMPANY

ST. LUCIE PLANT, UNIT NO. 2

DOCKET NO. 50-389

EXEMPTION

1.0 BACKGROUND

The Florida Power & Light Company (FPL, the licensee) is the holder of Renewed Facility Operating License No. NPF-16, which authorizes operation of St. Lucie Plant, Unit No. 2 (St. Lucie, Unit 2). The license provides, among other things, that the facility is subject to all rules, regulations, and orders of the U.S. Nuclear Regulatory Commission (NRC, or the Commission) now or hereafter in effect. The facility consists of two pressurized-water reactors located in Jensen Beach, Florida. However, this exemption is applicable only to St. Lucie, Unit 2.

By letter dated April 28, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11119A136), the licensee submitted a request for an exemption from Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix G, to implement a revision of the pressure-temperature (P-T) operating limits for St. Lucie, Unit 2. In requesting the revisions to the P-T operating limits, the licensee referenced a topical report with a methodology for the P-T curves that did not meet some of the requirements of Title 10 CFR Part 50, Appendix G, thus requiring the exemption pursuant to 10 CFR 50.12.

2.0 REQUEST/ACTION

Part 50 of 10 CFR, Appendix G, "Fracture Toughness Requirements," which is invoked by 10 CFR 50.60, requires that P-T limits be established for the reactor coolant pressure boundary during normal operating and hydrostatic or leak rate testing conditions. Specifically, 10 CFR Part 50, Appendix G, Section IV.A.2, states that "[t]he appropriate requirements on both the pressure-temperature limits and the minimum permissible temperature must be met for all conditions," and "[t]he pressure-temperature limits identified as 'ASME [American Society for Mechanical Engineers] Appendix G limits' in [T]able 3 require that the limits must be at least as conservative as limits obtained by following the methods of analysis and the margins of safety of Appendix G of Section XI of the ASME Code [Boiler and Pressure Vessel Code]." The regulations in 10 CFR Part 50, Appendix G also specify the use of the applicable editions and addenda of the ASME Code, Section XI, which are incorporated by reference in 10 CFR 50.55a. In the 2009 Edition of 10 CFR, the 1977 Edition through the 2004 Edition of the ASME Code, Section XI, are incorporated by reference in 10 CFR 50.55a. Finally, 10 CFR 50.60(b) states that, "[p]roposed alternatives to the described requirements in Append[ix] G of this part or portions thereof may be used when an exemption is granted by the Commission under [10 CFR] 50.12."

In its January 23, 2008, LAR to implement the current St. Lucie 2 technical specification (TS) P-T limits, the licensee provided the technical basis document for developing these P-T limits, Westinghouse Commercial Atomic Power report WCAP-16817-NP, Revision 2, "St. Lucie Unit 2 RCS [reactor coolant system] Pressure and Temperature Limits and Low Temperature Overpressure Protection Report for 55 Effective Full Power Years" (ADAMS Accession No. ML080290135). WCAP-16817-NP, Revision 2, references Combustion Engineering (CE) Owners Group Topical Report CE NPSD-683-A, Revision 6, "Development of a RCS Pressure

and Temperature Limits Report (PTLR) for the Removal of P-T Limits and LTOP Requirements from the Technical Specifications" (ADAMS Accession No. ML011350387), as the methodology for determining the P-T limits. While WCAP-16917-NP, Revision 2, did not develop a separate PTLR for removal of the P-T limits from the St. Lucie 2 TSs, this report did utilize the methodology of CE NPSD-683-A, Revision 6, as the basis for calculating the P-T limits currently established in the St. Lucie 2 TSs. Use of the CE topical report requires an exemption.

By letter dated April 28, 2011, the licensee requested an exemption from 10 CFR Part 50, Appendix G, consistent with the requirements of 10 CFR 50.12 and 50.60, to apply the K_{Im} calculational methodology of CE NPSD-683-A, Revision 6, in the development of the St. Lucie, Unit 2, P-T limits. If a licensee proposes to use the methodology in CE NPSD-683-A, Revision 6, for the calculation of K_{Im}, an exemption is required since the methodology for the calculation of K_{Im} values in CE NPSD-683-A, Revision 6, cannot be shown to be equally or more conservative than the methodology for the determination of K_{Im} provided in editions and addenda of the ASME Code, Section XI, Appendix G, through the 2004 Edition.

The NRC staff evaluated the specific PTLR methodology in CE NPSD-683, Revision 6. This evaluation was documented in the NRC safety evaluation (SE) of March 16, 2001 (ADAMS Accession No. ML010780017), which specified additional licensee actions that are necessary to support a licensee's adoption of CE NPSD-683, Revision 6. The final approved version of this report was reissued as CE NPSD-683-A, Revision 6, which included the NRC SE and the required additional action items as an attachment to the report. One of the additional specified actions (#21) stated, "(applicable only if the CE NSSS [nuclear steam supply system] methods for calculating K_{Im} and K_{It} factors, as stated in Section 5.4 of CE NPSD-683, Revision 6, are being used as the basis for generating the P-T limits for their facilities) [licensees will need to] apply for an exemption against requirements of Section IV.A.2.of Appendix G to Part 50 to apply

the CE NSSS methods to their P-T curves." The action item further stated, "Exemption requests to apply the CE NSSS to the generation of P-T limit curves should be submitted pursuant to the provision of 10 CFR 50.60(b) and will be evaluated on a case-by-case basis against the exemption request acceptance criteria of 10 CFR 50.12."

An exemption to use the methodology of CE NPSD-683-A to calculate the K_{It} factors is no longer necessary because editions and addenda of the ASME Code, Section XI, that have been incorporated by reference into 10 CFR 50.55a subsequent to the issuance of the final SE of CE NPSD-683-A, allow methods for determining the K_{It} factors that are equivalent to the methods described in CE NPSD-683-A.

During the NRC staff's review of CE NPSD-683, Revision 6, the NRC staff evaluated the K_{Im} calculational methodology of that report versus the methodologies for the calculation of K_{Im} given in the ASME Code, Section XI, Appendix G. In the NRC's March 16, 2001, SE, the staff noted, "[t]he CE NSSS methodology does not invoke the methods in the 1995 edition of Appendix G to the Code for calculating K_{Im} factors, and instead applies FEM [finite element modeling] methods for estimating the K_{Im} factors for the RPV [reactor pressure vessel] shell ... the staff has determined that the K_{Im} calculation methods apply FEM modeling that is similar to that used for the determination of the K_{It} factors [as codified in the ASME Code, Section XI, Appendix G]. The staff has also determined that there is only a slight non-conservative difference between the P-T limits generated from the 1989 edition of [the ASME Code, Section XI,] Appendix G to the Code and those generated from CE NSSS methodology as documented in [CE/ABB] Evaluation No. 063-PENG-ER-096, Revision 00, ['Technical Methodology Paper Comparing ABB/CE PT Curve to ASME Section III, Appendix G,' dated January 22, 1998 (ADAMS Accession No. ML100500514, nonproprietary version)]. The staff considers this difference to be reasonable and should be consistent with the expected improvements in P-T

generation methods that have been incorporated into the 1995 edition of Appendix G to the Code." This conclusion regarding the comparison between the CE NSSS methodology and the 1995 Edition of the ASME Code, Section XI, Appendix G, methodology also applies to the 2004 Edition of the ASME Code, Section XI, Appendix G, methodology because there were no significant changes in the method of calculating the K_{Im} factors required by the ASME Code, Section XI, Appendix G, between the 1995 edition (through 1996 addenda) and the 2004 editions of the ASME Code. In summary, the staff concluded in its March 16, 2001, SE that the calculation of K_{Im} using the CE NPSD-683, Revision 6 methodology would lead to the development of P-T limit curves that may be slightly nonconservative with respect to those that would be calculated using the ASME Code, Section XI, Appendix G, methods, and that such a difference was to be expected with the development of more refined calculational techniques. Furthermore, the staff concluded in its March 16, 2001, SE that P-T limit curves that would be developed using the methodology of CE NPSD-683, Revision 6, would be adequate for protecting the RPV from brittle fracture under all normal operating and hydrostatic/leak test conditions.

3.0 DISCUSSION

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50 when (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, are consistent with the common defense and security; and (2) when special circumstances are present.

Authorized by Law

This exemption allows the use of an alternative methodology for calculating flaw stress intensity factors in the RPV due to membrane stress from pressure loadings in lieu of meeting the requirements in 10 CFR 50.60 and 10 CFR Part 50, Appendix G. As stated above, 10 CFR 50.12 allows NRC to grant exemptions from the requirements of 10 CFR Part 50. In addition, the granting of the exemption will not result in violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations. Therefore, the exemption is authorized by law.

No Undue Risk to Public Health and Safety

The underlying purpose of 10 CFR 50.60 and 10 CFR Part 50, Appendix G, is to provide an acceptable margin of safety against brittle failure of the RCS during any condition of normal operation to which the pressure boundary may be subjected over its service lifetime. Appropriate P-T limits are necessary to achieve this underlying purpose. The licensee's alternative methodology for establishing the P-T limits and the LTOP setpoints is described in CE NPSD-683-A, Revision 6, which has been approved by the NRC staff. Based on the above, no new accident precursors are created by using the alternative methodology. Thus, the probability of postulated accidents will not increase. Also, based on the above, the consequences of postulated accidents will not increase. In addition, the licensee used an NRC-approved methodology for establishing P-T limits and minimum permissible temperatures for the RPV. Therefore, there is no undue risk to the public health and safety.

Consistent with Common Defense and Security

The exemption results in changes to the plant by allowing an alternative methodology for calculating flaw stress intensity factors in the RPV. This change to the calculation of stress

intensity factors in the RPV material has no negative implications for security issues. Therefore, this exemption is consistent with the common defense and security.

Special Circumstances

Special circumstances, pursuant to 10 CFR 50.12(a)(2)(ii), are present in that continued operation of St. Lucie, Unit 2, with P-T limit curves developed in accordance with the ASME Code, Section XI, Appendix G, is not necessary to achieve the underlying purpose of 10 CFR Part 50, Appendix G. Application of the K_{Im} calculational methodology of CE NPSD-683-A, Revision 6, in lieu of the calculational methodology specified in the ASME Code, Section XI, Appendix G, provides an acceptable alternative evaluation procedure that will continue to meet the underlying purpose of 10 CFR Part 50, Appendix G. The underlying purpose of the regulations in 10 CFR Part 50, Appendix G, is to provide an acceptable margin of safety against brittle failure of the reactor coolant system during any condition of normal operation to which the pressure boundary may be subjected over its service lifetime.

Based on the staff's March 16, 2001, SE regarding CE NPSD-683, Revision 6, and the licensee's rationale to support the exemption request, the staff determined that an exemption is required to approve the use of the K_{Im} calculational methodology of CE NPSD-683-A, Revision 6. By letter dated January 29, 2009, in response to the licensee's January 23, 2008, LAR, the NRC staff issued an SE that provided its review of the licensee's calculations in WCAP-16917-NP, Revision 2, which referenced CE NPSD-683-A, Revision 6. Informed by these previous evaluations, the staff concludes that the application of the K_{Im} calculational methodology of CE NPSD-683-A, Revision 6, for St. Lucie, Unit 2, provides sufficient margin in the development of RPV P-T limit curves such that the underlying purpose of the regulations (10 CFR Part 50, Appendix G) continues to be met. Therefore, the NRC staff concludes that the exemption

requested by the licensee is justified based on the special circumstances of 10 CFR 50.12(a)(2)(ii), "[a]pplication of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule." Based upon a consideration of the conservatism that is incorporated into the methodologies of 10 CFR Part 50, Appendix G, and ASME Code, Section XI, Appendix G, the staff concludes that application of the K_{Im} calculational methodology of CE NPSD-683-A, Revision 6, as described, would provide an adequate margin of safety against brittle failure of the RPV. Therefore, the staff concludes that the exemption is appropriate under the special circumstances of 10 CFR 50.12(a)(2)(ii), and that the application of the K_{Im} calculational methodology of CE NPSD-683-A, Revision 6, is acceptable for use as the basis for generating the St. Lucie, Unit 2, P-T limits.

4.0 CONCLUSION

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), the exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security. Also, special circumstances are present under 10 CFR 50.12(a)(2)(ii). Therefore, the Commission hereby grants FPL an exemption from the requirements of 10 CFR Part 50, Appendix G, to allow application of the K_{Im} calculational methodology of CE NPSD-683-A, Revision 6, as the basis for the St. Lucie, Unit 2, P-T limits.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will not have a significant effect on the quality of the human environment (76 FR 53497; August 26, 2011). This exemption is effective upon issuance.

Dated at Rockville, Maryland, this 30th day of April 2012.

FOR THE NUCLEAR REGULATORY COMMISSION

Michele G. Evans, Director
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

April 30, 2012

Mr. Mano Nazar
Executive Vice President, and
Chief Nuclear Officer
Florida Power & Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: ST. LUCIE PLANT, UNIT NO. 2 - EXEMPTION FROM THE REQUIREMENTS OF 10 CFR PART 50, APPENDIX G (TAC NO. ME6118)

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Sincerely,

/RA/

Tracy J. Orf, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-389

Enclosure:
Exemption

cc w/encl: Distribution via Listserv

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