



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

October 5, 2016

Mr. Mano Nazar
President and Chief Nuclear Officer
Nuclear Division
Florida Power & Light Co.
Mail Stop: NT3/JW
15430 Endeavor Drive
Jupiter, FL 33478

**SUBJECT: ST. LUCIE PLANT, UNIT NOS. 1 AND 2 - ISSUANCE OF AMENDMENTS
REGARDING THE USE OF A NEW COMPUTER CODE TO MODEL THE
CONTAINMENT VACUUM ANALYSES (CAC NOS. MF6980 AND MF6981)**

Dear Mr. Nazar:

The U.S. Nuclear Regulatory Commission (NRC or the Commission) has issued the enclosed Amendment Nos. 236 and 186 to Renewed Facility Operating License Nos. DPR-67 and NPF-16 for the St. Lucie Plant, Unit Nos. 1 and 2 (St. Lucie 1 and 2), respectively. These amendments consist of changes to the Technical Specifications (TSs) in response to Florida Power & and Light Company's application dated October 15, 2015, as supplemented by a letter dated May 6, 2016.

The amendments update the St. Lucie 1 and 2 TSs to reflect the use of "Generation of Thermal-Hydraulic Information for Containments (GOTHIC Version 7.2b(QA))" containment vacuum analyses computer code. The change also updates the St. Lucie 1 and 2 TSs to credit the design-basis ability of the containment vessel to withstand a higher external pressure differential of 1.04 pounds per square inch (psi) for Unit No. 1 and 1.05 psi for Unit No. 2, and updates TS 3.6.1.4 for both units to revise the allowable containment operating pressure range.

M. Nazar

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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 'Perry H. Buckberg', is written over the typed name.

Perry H. Buckberg, Senior Project Manager
Plant Licensing Branch II-2
Division of Operator Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-335 and 50-389

Enclosures:

1. Amendment No. 236 to DPR-67
2. Amendment No. 186 to NPF-16
3. Safety Evaluation

cc w/enclosures: Distribution via Listserv



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

FLORIDA POWER AND LIGHT COMPANY

DOCKET NO. 50-335

ST. LUCIE PLANT UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 236
Renewed License No. DPR-67

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Florida Power & Light Company (FPL, the licensee), dated October 15, 2015, as supplemented by a letter dated May 6, 2016, 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.

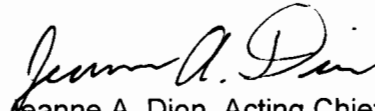
2. Accordingly, Renewed Facility Operating License No. DPR-67 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and by amending paragraph 3.B to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 236, are hereby incorporated in the renewed license. FPL shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Jeanne A. Dion, Acting Chief
Plant Licensing Branch II-2
Division of Operator Reactor Licensing
Office of Nuclear Reactor Regulation

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

Date of Issuance: October 5, 2016

ATTACHMENT TO LICENSE AMENDMENT NO. 236

ST. LUCIE PLANT UNIT NO. 1

RENEWED FACILITY OPERATING LICENSE NO. DPR-67

DOCKET NO. 50-335

Replace Page 3 of Renewed Facility Operating License No. DPR-67 with the attached revised Page 3.

Replace the following page of Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page

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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:

A. Maximum Power Level

FPL is authorized to operate the facility at steady state reactor core power levels not in excess of 3020 megawatts (thermal).

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 236 are hereby incorporated in the renewed license. FPL shall operate the facility in accordance with the Technical Specifications.

Appendix B, the Environmental Protection Plan (Non-Radiological), contains environmental conditions of the renewed license. If significant detrimental effects or evidence of irreversible damage are detected by the monitoring programs required by Appendix B of this license, FPL will provide the Commission with an analysis of the problem and plan of action to be taken subject to Commission approval to eliminate or significantly reduce the detrimental effects or damage.

C. Updated Final Safety Analysis Report

The Updated Final Safety Analysis Report supplement submitted pursuant to 10 CFR 54.21(d), as revised on March 28, 2003, describes certain future activities to be completed before the period of extended operation. FPL shall complete these activities no later than March 1, 2016, and shall notify the NRC in writing when implementation of these activities is complete and can be verified by NRC inspection.

The Updated Final Safety Analysis Report supplement as revised on March 28, 2003, described above, shall be included in the next scheduled update to the Updated Final Safety Analysis Report required by 10 CFR 50.71 (e)(4), following issuance of this renewed license. Until that update is complete, FPL may make changes to the programs described in such supplement without prior Commission approval, provided that FPL evaluates each such change pursuant to the criteria set forth in 10 CFR 50.59 and otherwise complies with the requirements in that section.

D. Sustained Core Uncovery Actions

Procedural guidance shall be in place to instruct operators to implement actions that are designed to mitigate a small-break loss-of-coolant accident prior to a calculated time of sustained core uncovery.

CONTAINMENT SYSTEMS

INTERNAL PRESSURE

LIMITING CONDITION FOR OPERATION

3.6.1.4 Primary containment internal pressure shall be maintained between -0.490 and +0.5 psig.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the containment internal pressure outside of the limits above, restore the internal pressure to within the limits within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.4 The primary containment internal pressure shall be determined to be within the limits in accordance with the Surveillance Frequency Control Program.



UNITED STATES
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WASHINGTON, D.C. 20555-0001

FLORIDA POWER AND LIGHT COMPANY

ORLANDO UTILITIES COMMISSION OF THE CITY OF ORLANDO, FLORIDA

AND

FLORIDA MUNICIPAL POWER AGENCY

DOCKET NO. 50-389

ST. LUCIE PLANT, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 186
Renewed License No. NPF-16

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Florida Power & Light Company (FPL, the licensee), dated October 15, 2015, as supplemented by a letter dated May 6, 2016, 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.

Enclosure 2

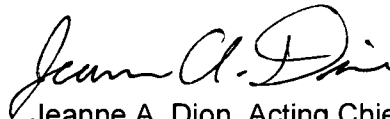
2. Accordingly, Renewed Facility Operating License No. NPF-16 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and by amending paragraph 3.B to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 186, are hereby incorporated in the renewed license. FPL shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Jeanne A. Dion, Acting Chief
Plant Licensing Branch II-2
Division of Operator Reactor Licensing
Office of Nuclear Reactor Regulation

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

Date of Issuance: October 5, 2016

ATTACHMENT TO LICENSE AMENDMENT NO. 186

ST. LUCIE PLANT UNIT NO. 2

RENEWED FACILITY OPERATING LICENSE NO. NPF-16

DOCKET NO. 50-389

Replace Page 3 of Renewed Facility Operating License No. NPF-16 with the attached revised Page 3.

Replace the following page of Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

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Insert Page

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neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

- D. Pursuant to the Act and 10 CFR Parts 30, 40, and 70, FPL 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
 - E. Pursuant to the Act and 10 CFR Parts 30, 40, and 70, FPL to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.
3. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission's regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Section 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:
- A. Maximum Power Level

FPL is authorized to operate the facility at steady state reactor core power levels not in excess of 3020 megawatts (thermal).
 - B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 186 are hereby incorporated in the renewed license. FPL shall operate the facility in accordance with the Technical Specifications.

CONTAINMENT SYSTEMS

INTERNAL PRESSURE

LIMITING CONDITION FOR OPERATION

3.6.1.4 Primary containment internal pressure shall be maintained between -0.420 and +0.400 psig.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the containment internal pressure outside of the limits above, restore the internal pressure to within the limits within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.4 The primary containment internal pressure shall be determined to be within the limits in accordance with the Surveillance Frequency Control Program.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 236 AND 186

TO RENEWED FACILITY OPERATING LICENSE NOS. DPR-67 AND NPF-16

FLORIDA POWER AND LIGHT COMPANY, ET AL.,

ST. LUCIE PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-335 AND 50-389

1.0 INTRODUCTION

By application dated October 15, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15301A765), as supplemented by letter dated May 6, 2016 (ADAMS Accession No. ML16133A037), Florida Power & Light Company (FPL, the licensee) submitted to the U.S. Nuclear Regulatory Commission (NRC, the Commission) a license amendment request (LAR) for the St. Lucie Plant, Unit Nos. 1 and 2 (St. Lucie 1 and 2).

The proposed amendments would revise the St. Lucie 1 and 2 Technical Specifications (TSs) to reflect the use of "Generation of Thermal-Hydraulic Information for Containments (GOTHIC Version 7.2b(QA))" (GOTHIC) containment vacuum analyses computer code. The amendments would also update the St. Lucie 1 and 2 TSs to credit the design-basis ability of the containment vessel to withstand a higher external pressure differential of 1.04 pounds per square inch (psi) for St. Lucie Unit No. 1 (St. Lucie 1) and 1.05 psi for St. Lucie Unit No. 2 (St. Lucie 2), and would update TS 3.6.1.4 for both units to reflect the allowable containment operating pressure range consistent with the analyses.

The supplemental letter dated May 6, 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 16, 2016 (81 FR 7839).

2.0 REGULATORY EVALUATION

2.1 Description of the St. Lucie 1 and 2 Containment Design

St. Lucie 1 and 2 are Combustion Engineering, Inc., Pressurized Water Reactors with dry, ambient pressure containments. The St. Lucie 1 and 2 containment consists of a free-standing steel containment vessel surrounded by a reinforced concrete shield building. The cylinder wall of the containment vessel and the shield building are separated by a nominal 4.0-foot annular

space. The containment vessel is a low leakage steel shell, designed to confine radioactive materials that could be released by accidental loss of integrity of the reactor coolant pressure boundary. The containment vessel is designed in accordance with the requirements of American Society of Mechanical Engineers (ASME) Code Section III, Class B for St. Lucie 1 and Class MC for St. Lucie 2.

The current licensing basis for the containment vessels conservatively utilizes 0.7 psi as the design for external pressure. External pressure is the difference between the pressure in the shield building annulus and the pressure within the containment vessel. A vacuum relief system is provided to ensure that the design external pressure is not exceeded. The design basis event that challenges the external pressure design basis is the accidental initiation of both containment spray pumps while all four (4) containment fan coolers are also in operation.

2.2 Requested Changes

The requested changes would update the St. Lucie 1 and 2 model for the containment response following the inadvertent actuation of the containment spray system during normal plant operation (containment vacuum analyses) by revising containment vacuum analyses and updating the TSs to conform to the results of the containment vacuum analyses. The changes to the containment vacuum analyses would involve incorporating the GOTHIC computer code into the licensing basis. The change in licensing basis computer code is prompted by the licensee's need to incorporate changes to input parameters. The current licensing basis computer codes, A-TEMPT for St. Lucie 1 and WATEMPT for St. Lucie 2, are no longer available for use.

GOTHIC is the state-of-the-art general purpose thermal-hydraulics computer code maintained by Numerical Applications, Inc. (NAI), for the Electric Power Research Institute for performing containment analyses. GOTHIC is qualified under the NAI Quality Assurance (QA) program, which conforms to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants" with error reporting in accordance with 10 CFR Part 21, "Reporting of Defects and Noncompliance." GOTHIC is widely used by the nuclear industry and applications of this code have been previously approved by the NRC staff on a case-by-case basis.

The NRC staff has not previously approved incorporating the GOTHIC computer code into the licensing basis for reactors such as St. Lucie 1 and 2. Therefore, the licensee is requesting a case-by-case review of this proposed action.

2.3 Regulatory Review

Section 50.59 of 10 CFR states that a licensee shall obtain a license amendment prior to implementing a proposed change to the facility if the change would result in a departure from a method of evaluation described in the Final Safety Analysis Report (FSAR) used in establishing the design bases or in the safety analyses.

In order to support an updated containment vacuum analysis, the licensee proposed revising the containment stress analysis. For St. Lucie 1, the licensee proposed using a different edition of the ASME Boiler and Pressure Vessel Code (ASME Code), which is considered a departure

from a method of evaluation described in the FSAR and, therefore, requires a license amendment.

The NRC staff acceptance criteria are based on the following General Design Criteria (GDC) in 10 CFR Part 50, Appendix A:

- GDC 16 – Containment design, as it relates to reactor containment and associated systems being provided to assure that the containment design conditions important to safety are not exceeded.
- GDC 38 – Containment heat removal, as it relates to the containment heat removal system's function to rapidly reduce the containment pressure and temperature following any loss-of-coolant accident and maintain them at acceptably low levels.
- GDC 50 – Containment design basis, as it relates to the reactor containment structure and associated heat removal system(s) being designed so that the containment structure and its internal compartments can accommodate the calculated pressure and temperature conditions resulting from any loss-of-coolant accident.

Because the St. Lucie 1 construction permit was issued prior to the publication of 10 CFR Part 50, Appendix A, the St. Lucie 1 design approval for the construction phase was based on the proposed GDC published by the Atomic Energy Commission in the *Federal Register* (32 FR 10213) on July 11, 1967. Section 1.3.2, "Comparison of Preliminary and Final Design," and Chapter 3, "Design Criteria - Structures, Components, Equipment and Systems," of the St. Lucie 1 Updated Final Safety Analysis Report (UFSAR) describe the St. Lucie 1 GDC. The St. Lucie 1 UFSAR descriptions of GDC 16, 38, and 50 reflect design requirements similar to those specified in the GDC. Therefore, St. Lucie 1 conforms to the same design standards as St. Lucie 2, which was designed and constructed in compliance with the GDC, as relevant to the evaluation of this LAR.

3.0 TECHNICAL EVALUATION

3.1 GOTHIC Benchmarking

The licensee benchmarked GOTHIC code results against its current analyses of record, which used the A-TEMPT and WATEMPT computer codes for St. Lucie 1 and 2, respectively. The licensee used the UFSAR values as key input parameters for both St. Lucie 1 and 2.

3.1.1 St. Lucie 1 GOTHIC Benchmarking Results

For St. Lucie 1, the licensee completed three benchmarking cases to verify the capability of GOTHIC. The input values for each case were identical except for the containment relative humidity value. The licensee completed calculations for 0 percent, 40 percent, and 100 percent containment relative humidity. The licensee compared the results of the maximum change in pressure between the annulus and containment and the maximum change in pressure between the atmosphere and annulus between the UFSAR reported value and the GOTHIC benchmarking analysis. The licensee determined that the GOTHIC results were more conservative than the currently reported UFSAR values.

On March 17, 2016 (ADAMS Accession No. ML16077A106), the NRC staff issued a request for additional information (RAI) to obtain containment vacuum details needed to complete the review. In RAI-MF6980/1-SCVB-01, the staff requested information regarding the proposed increase in containment spray flow rates. In its May 6, 2016, response to RAI-MF6980/1-SCVB-01 (ADAMS Accession No. ML16133A037), the licensee stated that the containment spray flows bound the calculated maximum flows for this event and are, therefore, conservative for the vacuum analysis. The licensee also stated that the system has a restricting orifice that limits the flow rate, installed when updating the plant for the extended power uprate, and that the updated flow rates will be reflected in the licensee's UFSAR.

The NRC staff determined that the benchmarking GOTHIC analyses were in good agreement with the UFSAR values except for the maximum value of differential pressure between the annulus and containment with a containment relative humidity of 0 percent. However, the lower initial containment relative humidity should lead to a faster depressurization in containment. Therefore, the GOTHIC analysis results in a more conservative prediction when compared to the current results in the UFSAR Section 6.2.1.2.

Based on the above, the NRC staff finds the use of GOTHIC acceptable for the containment vacuum analyses for St. Lucie 1.

3.1.2 St. Lucie 2 GOTHIC Benchmarking Results

For St. Lucie 2, the licensee completed one benchmarking case to verify the capability of GOTHIC. For this case, the licensee completed the calculation using a 20 percent containment relative humidity. The licensee compared the results of the maximum change in pressure between the annulus and containment and the maximum change in pressure between the atmosphere and annulus between the UFSAR reported value and the GOTHIC benchmarking analysis. The licensee determined that the GOTHIC results were more conservative than the currently reported UFSAR values.

For St. Lucie 2, as for St. Lucie 1, the containment spray flows bound the calculated maximum flows for this event and are, therefore, conservative for the vacuum analysis. The system has a restricting orifice that limits the flow rate, installed when updating the plant for the extended power uprate. The updated flow rates will be reflected in the UFSAR.

Based on the above, the NRC staff finds the use of GOTHIC acceptable for the containment vacuum analyses for St. Lucie 2.

3.2 Updated Containment Vacuum Analyses Using GOTHIC

The purpose of updating the containment vacuum analyses was to incorporate higher containment spray flow for both St. Lucie 1 and 2. The objective of the licensee was to demonstrate that the design differential pressure (difference between outside and inside pressure) of the containment structure would not be challenged during an inadvertent actuation of the containment spray system during normal plant operation. The analyses assumed both containment spray pumps actuated and all four containment fan coolers in operation. The licensee also conservatively assumed one of the two independent vacuum relief lines failed.

3.2.1 St. Lucie 1 Updated Containment Vacuum Analyses

For St. Lucie 1, the licensee presented two limiting cases for the updated containment vacuum analyses using GOTHIC. The first case was defined by an initial containment relative humidity of 40 percent and an initial annulus temperature of 56 degrees Fahrenheit. This case produced the limiting maximum change in pressure between the annulus and containment. The calculated maximum change in pressure between the annulus and containment was 0.9996 pounds per square inch differential (psid). This falls below the proposed revised structural allowable maximum value of 1.04 psid. The licensee has proposed to increase the structural allowable limit from its current value of 0.7 psid to 1.04 psid. The change in the structural allowable limit is evaluated in Section 3.3 of this safety evaluation.

Through these cases, the licensee determined that the maximum allowable initial differential pressure between the containment and the annulus is -0.49 psid. In RAI-MF6980/1-SCVB-03, the staff requested information regarding the St. Lucie 1 maximum allowable initial differential pressure. The licensee stated in its response to RAI-MF6980/1-SCVB-03 that this value, combined with the butterfly valve opening setting of less than or equal to negative 16 inches of water gauge (w.g.), will assure that the differential pressure between the containment and the annulus will not exceed -1.00 psid during the analyzed event. Since the proposed analytical limit is -1.04 psid, the licensee would maintain a margin of 4 percent.

The second case is defined by an initial containment relative humidity of 100 percent and an initial annulus temperature of 110 degrees Fahrenheit. This case produced the limiting maximum change in pressure between the atmosphere and the annulus. The calculated maximum differential pressure between the atmosphere and the annulus was 2.5112 psid. This falls below the limiting allowable maximum value of 3.0 psid.

Based on the above, the NRC staff finds the analyses for St. Lucie 1 acceptable because the licensee has demonstrated the applicability of the GOTHIC code by benchmarking with the current analysis, and has shown that the limiting annulus-to-containment and atmosphere-to-annulus differential pressures are below their design limits.

3.2.2 St. Lucie 2 Updated Containment Vacuum Analyses

For St. Lucie 2, the licensee presented two limiting cases for the updated containment vacuum analyses using GOTHIC. The first case was defined by an initial containment relative humidity of 40 percent and an initial annulus temperature of 56 degrees Fahrenheit. This case produced the limiting maximum change in pressure between the annulus and containment. The calculated maximum change in pressure between the annulus and containment was 0.9983 psid. This falls below the proposed revised structural allowable maximum value of 1.05 psid. The licensee has proposed to increase the structural allowable limit from its current value of 0.7 psid to 1.05 psid. The change in the structural allowable limit is evaluated in Section 3.3 of this safety evaluation.

Through these cases, the licensee determined that the maximum allowable initial differential pressure between the containment and the annulus is -0.42 psid. In RAI-MF6980/1-SCVB-04, the staff requested information regarding the St. Lucie 2 maximum allowable initial differential

pressure. The licensee stated in its response to RAI-MF6980/1-SCVB-04 that this value, combined with the butterfly valve opening setting of less than or equal to negative 14 inch w.g., will assure that the differential pressure between the containment and the annulus will not exceed -1.00 psid during the analyzed event. Since the proposed analytical limit is -1.05 psid, the licensee would maintain a margin of 5 percent.

The second case is defined by an initial containment relative humidity of 100 percent and an initial annulus temperature of 110 degrees Fahrenheit. This case produced the limiting maximum change in pressure between the atmosphere and the annulus. The calculated maximum change in pressure between the atmosphere and the annulus was 2.4538 psid. This falls below the limiting allowable maximum value of 3.0 psid.

Based on the above, the NRC staff finds the analysis for St. Lucie 2 acceptable because the licensee has demonstrated the applicability of the GOTHIC code by benchmarking with the current analysis, and has shown that the limiting annulus-to-containment and atmosphere-to-annulus differential pressures are below their design limits.

3.2.3 Vacuum Relief Line Butterfly Valve Opening/Closing Setpoint Change

The licensee determined that the revised values of the setpoints for the opening and closing of the butterfly valve are -16 and -14 inch w.g., respectively, for St. Lucie 1, and -14 and -12 inch w.g., respectively, for St. Lucie 2. The current values for the opening and closing setpoints of these valves are -2.25 and -0.25 inch w.g., respectively, for St. Lucie 1, and -9.85 \pm 0.35 and -75 inch w.g., respectively, for St. Lucie 2. The licensee has proposed to revise each unit's butterfly valve setpoints significantly, and has proposed to remove the setpoint range from the TSs. In RAI-MF6980/1-SCVB-06, the NRC staff requested that the licensee explain how the valve was verified to respond appropriately at these new setpoints and how changing the primary containment internal pressure range would change the operation of the valve. In response to RAI-MF6980/1-SCVB-06, the licensee provided the following explanation:

In accordance with the analysis, the butterfly valves must receive a signal to open when or before the differential pressure from the containment to the annulus reaches the values determined in order to assure the differential pressure between the annulus and containment will not exceed -1.00 PSID. If the butterfly valve opened at a lower differential pressure, the resulting containment differential pressure would be reduced. For this reason it does not seem necessary to specify a range. The AOV [air-operated valve] calculations have been reviewed. The torque requirements are mostly from the seating/unseating load and the packing load. The change in opening pressure will have limited impact on the required torque. The actuators currently have a large margin to the required torque. The AOV calculations will be revised to justify any change to the opening setting.

The NRC staff finds the licensee's explanation for not specifying the range of opening differential pressure for the butterfly valve acceptable because it opens at a pressure lower than the differential pressure of -1.00 psid; the negative pressure inside containment would be relieved and will equalize with the annulus pressure. The NRC staff also agrees with the

licensee that the valve actuator torque will not be impacted because it does not depend on its opening pressure.

3.3 Licensee's Proposal for Revised Containment Stress Analysis

In its October 15, 2015, LAR, the licensee notes that St. Lucie 1 and 2 limiting condition for operation (LCO) 3.6.1.4, "Containment Systems – Internal Pressure," currently states that primary containment internal pressure shall be maintained between -0.7 and +0.5 pounds per square inch gage (psig) for St. Lucie 1 and -0.368 and +0.4 psig for St. Lucie 2.

The amendments would revise this LCO to require maintaining containment internal pressure between -0.49 and +0.5 psig for St. Lucie 1 and -0.42 and +0.4 psig for St. Lucie 2. This change is based on updated results from the vacuum analysis based on the GOTHIC model. The amendments would also update the containment differential pressure limits in the associated TS Bases from 0.70 psi to 1.04 psi for St. Lucie 1 and 1.05 psi for St. Lucie 2 and update the predicted differential pressure from 0.66 to 1.00 psi for St. Lucie 1 and from 0.615 to 0.998 psi for St. Lucie 2. Both of the updated values are less than the respective pressure limits. In order to revise the containment pressure limits, the licensee had to update the associated containment stress analysis.

3.3.1 Containment Analysis for Revised External Pressure – St. Lucie 1

Section 3.4 of the LAR notes that the containment vessel stress analysis for St. Lucie 1 was revised to demonstrate that the containment can support a design external pressure of 1.04 psid in accordance with Section III of the ASME Code. The updated analysis was performed in accordance with the 1971 Edition of the ASME Code with the 1972 Summer Addenda. The Code of Record for St. Lucie 1 is the 1968 Edition of the ASME Code with the 1968 Winter Addenda.

The licensee noted that the current Containment Inservice Inspection Program for St. Lucie 1 uses Section XI of the 2001 Edition of the ASME Code with the 2003 Addenda. IWA-4330 allows the containment vessel to be rerated and allows for the use of later Editions of the construction code, assuming the requirements of IWA-4221 are met. IWA-4221(c) requires a reconciliation of different Code Editions in accordance with IWA-4222 through IWA-4226. Specifically for this change, IWA-4226, "Reconciliation of Design Requirements," must be followed.

IWA-4226.3(a) requires a reconciliation of material, fabrication, and examination requirements to be performed. The licensee noted that the material is not being changed and further noted that there was no change in the fabrication, installation, or examination requirements between the two editions that would affect vessel external pressure capacity.

IWA-4226.3(b) requires a reconciliation between differences in the new design provisions and the previous design provisions. The 1968 ASME Code of Record invokes Section VIII for external pressure design, while the 1971 Edition requires the use of Section III. Section VIII, paragraph UG-28, contained the original design rules for external pressure, while Section III, paragraph NE-3133, contains the design rules for external pressure in the 1971 Edition. The

licensee reviewed the paragraphs and noted that the two paragraphs are the same with the exception of step 6 in subparagraph NE-3133.3, which has a lower design margin.

The staff reviewed the information provided by the licensee as well as the relevant sections of the 1968 and 1971 Editions of the ASME Code. The staff verified that the licensee had followed the appropriate requirements for reconciling the ASME Code Editions and that the only difference between the original design provisions and the proposed provisions is the change in design margin. Although the proposed design method has a lower margin, the method still provides an adequate margin and the method has been approved for use by the NRC for similar design situations. That staff also verified that there were no significant changes in fabrication, installation, or examination requirements between the two editions that accompanied the reduction in design margin. Since the proposed method has previously been approved for use by the NRC, and since there were no significant changes between the ASME Code Editions that would impact the external pressure design, the staff finds it acceptable for the licensee to update the St. Lucie 1 containment stress analysis, and to update the associated containment external pressure limits.

3.3.2 Containment Analysis for Revised External Pressure – St. Lucie 2

The LAR notes that the containment vessel stress analysis for St. Lucie 2 was revised to demonstrate that the containment can support a design external pressure of 1.05 psid in accordance with Section III of the ASME Code. The updated analysis was performed in accordance with the 1971 Edition of the ASME Code with the 1972 Summer Addenda, which is the original Code of Record for St. Lucie 2.

The licensee notes that the current Containment Inservice Inspection Program for St. Lucie 2 uses Section XI of the 2007 Edition of the ASME Code with the 2008 Addenda. IWA-4330 allows the containment vessel to be rerated. Since the revised design was done in accordance with the original Code of Record, no additional analysis is necessary.

The NRC staff verified that the revised analysis was done in accordance with the original Code of Record and, therefore, that no additional reconciliation is necessary for St. Lucie 2 and that updating the stress analysis, and associated containment external pressure limits, is acceptable.

3.4 Technical Specification Changes

3.4.1 St. Lucie 1 Technical Specification Changes

The licensee proposed one change to the St. Lucie 1 TS in LCO 3.6.1.4. In LCO 3.6.1.4, the lower limit for primary containment internal pressure would be changed from -0.7 psig to -0.490 psig. This change decreases the allowable primary containment internal pressure range. The change is acceptable because it aligns the TS with the analysis that the staff has determined to be conservative in this safety evaluation.

The current TS LCO reads:

3.6.1.4 Primary containment internal pressure shall be maintained between -0.7 and +0.5 psig.

The revised TS LCO would read:

3.6.1.4 Primary containment internal pressure shall be maintained between -0.490 and +0.5 psig.

3.4.2 St. Lucie 2 Technical Specification Changes

The licensee proposed one change to the St. Lucie 2 TS in LCO 3.6.1.4. In LCO 3.6.1.4, the lower limit for primary containment internal pressure would be changed from -0.368 psig to -0.420 psig. This change decreases the allowable primary containment internal pressure range. The change is acceptable because it aligns the TS with the analysis that the staff has determined to be conservative in this safety evaluation.

The current TS LCO reads:

3.6.1.4 Primary containment internal pressure shall be maintained between -0.368 and +0.400 psig.

The revised TS LCO would read:

3.6.1.4 Primary containment internal pressure shall be maintained between -0.420 and +0.400 psig.

In addition to the proposed TS changes, the licensee would also update the St. Lucie 1 and 2 TS bases to incorporate the new differential pressures and butterfly valve setpoints.

The NRC staff concludes that the above requested changes are acceptable because they align with the analyses that the staff have found to be acceptable.

3.5 Summary

The staff finds that the proposed changes to the containment vacuum analyses, and conforming changes to the TSs, meet the requirements of 10 CFR Part 50, Appendix A, (1) GDC 16, "Containment design," as it relates to reactor containment and associated systems being provided to assure that the containment design conditions important to safety are not exceeded, (2) GDC 38, "Containment heat removal," as it relates to the containment heat removal system's function to rapidly reduce the containment pressure and temperature following any loss-of-coolant accident and maintain them at acceptably low levels, and (3) GDC 50, "Containment design basis," as it relates to the reactor containment structure and associated heat removal system(s) being designed so that the containment structure and its internal compartments can accommodate the calculated pressure and temperature conditions resulting from any loss-of-coolant accident.

In addition, the staff also finds that the licensee has properly addressed the ASME Code requirements for rerating the containment vessel. For St. Lucie 1, the licensee properly completed the required reconciliation and is adopting an Edition and Addenda that has been approved for use by the NRC staff. For St. Lucie 2, the licensee is updating their existing calculation in accordance with the existing Code of Record.

Therefore, the NRC staff finds it acceptable for the licensee to revise the St. Lucie 1 and 2 containment stress analysis and to change the containment vessel external pressure design limit to 1.04 psi for St. Lucie 1 and 1.05 psi for St. Lucie 2.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, on June 9, 2016, the NRC staff notified the State of Florida official (Ms. Cynthia Becker, M.P.H., Chief of the Bureau of Radiation Control, Florida Department of Health) of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments change inspection or surveillance requirements or requirements with respect to installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant change in the types, or significant increase in the amounts, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. By *Federal Register* notice dated February 16, 2016 (81 FR 7839), the Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on this finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

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

Principal Contributors: Diana Woodyatt
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Date: October 5, 2016

M. Nazar

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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/

Perry H. Buckberg, Senior Project Manager
Plant Licensing Branch II-2
Division of Operator Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-335 and 50-389

Enclosures:

1. Amendment No. 236 to DPR-67
2. Amendment No. 186 to NPF-16
3. Safety Evaluation

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