



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

February 20, 2014

Mr. Mano Nazar
Executive Vice President
and Chief Nuclear Officer
NextEra Energy
P. O. Box 14000
Juno Beach, FL 33408-0420

SUBJECT: TURKEY POINT NUCLEAR GENERATING UNIT NOS. 3 AND 4 –
ISSUANCE OF AMENDMENTS REGARDING THE USE OF OPTIMIZED
ZIRLO™ FUEL ROD CLADDING MATERIAL (TAC NOS. MF1451 AND MF1452)

Dear Mr. Nazar:

The U.S. Nuclear Regulatory Commission (NRC or the Commission) has issued the enclosed Amendment No. 259 to Renewed Facility Operating License No. DPR-31 and Amendment No. 254 to Renewed Facility Operating License No. DPR-41 for the Turkey Point Nuclear Generating Unit Nos. 3 and 4, respectively. The amendments consist of changes to the facility Technical Specifications in response to your application dated March 22, 2013.

The amendments modify the Technical Specifications to allow the use of Optimized ZIRLO™ as an approved fuel rod cladding. This change is consistent with the NRC's allowed use of Optimized ZIRLO™ fuel rod cladding material as documented in its safety evaluation for the Westinghouse topical report WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™."

The NRC's safety evaluation of the amendments is enclosed.

M. Nazar

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The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,



Audrey L. Klett, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosures:

1. Amendment No. 259 to DPR-31
2. Amendment No. 254 to DPR-41
3. Safety Evaluation

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

FLORIDA POWER & LIGHT COMPANY

DOCKET NO. 50-250

TURKEY POINT NUCLEAR GENERATING UNIT NO. 3

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 259
Renewed License No. DPR-31

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Florida Power & Light Company (the licensee) dated March 22, 2013, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Renewed Facility Operating License No. DPR-31 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 259 are hereby incorporated into this renewed license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'JF Quichocho', followed by the word 'for' written in a cursive script.

Jessie F. Quichocho, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Operating License
and Technical Specifications

Date of Issuance: February 20, 2014



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

FLORIDA POWER & LIGHT COMPANY

DOCKET NO. 50-251

TURKEY POINT NUCLEAR GENERATING UNIT NO. 4

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 254
Renewed License No. DPR-41

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Florida Power & Light Company (the licensee) dated March 22, 2013, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.


2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Renewed Facility Operating License No. DPR-41 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 254 are hereby incorporated into this renewed license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'JMQ for', is written over the typed name.

Jessie F. Quichocho, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Operating License
and Technical Specifications

Date of Issuance: February 20, 2014

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 259 RENEWED FACILITY OPERATING LICENSE NO. DPR-31

AMENDMENT NO. 254 RENEWED FACILITY OPERATING LICENSE NO. DPR-41

DOCKET NOS. 50-250 AND 50-251

Replace the following page of Renewed Facility Operating License DPR-31 with the attached Page 3. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Replace the following page of Renewed Facility Operating License DPR-41 with the attached Page 3. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

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

Remove

5-4

6-22

Insert

5-4

6-22

- E. Pursuant to the Act and 10 CFR Parts 40 and 70 to receive, possess, and use at any time 100 milligrams each of any source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactively contaminated apparatus;
 - F. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of Turkey Point Units Nos. 3 and 4.
3. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Sections 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

The applicant is authorized to operate the facility at reactor core power levels not in excess of 2644 megawatts (thermal).
 - B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 259 are hereby incorporated into this renewed license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.
 - C. Final Safety Analysis Report

The licensee's Final Safety Analysis Report supplement submitted pursuant to 10 CFR 54.21(d), as revised on November 1, 2001, describes certain future inspection activities to be completed before the period of extended operation. The licensee shall complete these activities no later than July 19, 2012.

The Final Safety Analysis Report supplement as revised on November 1, 2001, described above, shall be included in the next scheduled update to the Final Safety Analysis Report required by 10 CFR 50.71(e)(4), following the issuance of this renewed license. Until that update is complete, the licensee may make changes to the programs described in such supplement without prior Commission approval, provided that the licensee evaluates each such change pursuant to the criteria set forth in 10 CFR 50.59 and otherwise complies with the requirements in that section.

- E. Pursuant to the Act and 10 CFR Parts 40 and 70 to receive, possess, and use at any time 100 milligrams each of any source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactively contaminated apparatus;
 - F. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of Turkey Point Units Nos. 3 and 4.
3. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Sections 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

The applicant is authorized to operate the facility at reactor core power levels not in excess of 2644 megawatts (thermal).
 - B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 254 are hereby incorporated into this renewed license. The Environmental Protection Plan contained in Appendix B is hereby incorporated into this renewed license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.
 - C. Final Safety Analysis Report

The licensee's Final Safety Analysis Report supplement submitted pursuant to 10 CFR 54.21(d), as revised on November 1, 2001, describes certain future inspection activities to be completed before the period of extended operation. The licensee shall complete these activities no later than April 10, 2013.

The Final Safety Analysis Report supplement as revised on November 1, 2001, described above, shall be included in the next scheduled update to the Final Safety Analysis Report required by 10 CFR 50.71(e)(4), following the issuance of this renewed license. Until that update is complete, the licensee may make changes to the programs described in such supplement without prior Commission approval, provided that the licensee evaluates each such change pursuant to the criteria set forth in 10 CFR 50.59 and otherwise complies with the requirements in that section.

DESIGN FEATURES

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The core shall contain 157 fuel assemblies with each fuel assembly containing 204 fuel rods clad with Zircaloy-4, ZIRLO[®], or Optimized ZIRLO[™], except that replacement of fuel rods by filler rods consisting of stainless steel, or by vacant rod positions, may be made in fuel assemblies if justified by cycle-specific reload analysis using NRC-approved methodology. The reactor core contains approximately 71 metric tons of uranium in the form of natural or slightly enriched uranium dioxide pellets. Each fuel rod shall have a nominal active fuel length of 144 inches. Should more than 30 individual rods in the core, or 10 fuel rods in any fuel assembly, be replaced per refueling, a Special Report discussing the rod replacements shall be submitted to the Commission within 30 days after cycle startup.

CONTROL ROD ASSEMBLIES

5.3.2 The core shall contain 45 full-length control rod assemblies. The full-length control rod assemblies shall contain a nominal 142 inches of absorber material. The absorber material shall be silver, indium, and cadmium. All control rods shall be clad with stainless steel tubing.

5.4 DELETED

ADMINISTRATIVE CONTROLS

3. WCAP-10054-P-A, Addendum 2, Revision 1 (proprietary), "Addendum to the Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code: Safety Injection into the Broken Loop and COSI Condensation Model," July 1997.
4. WCAP-16009-P-A, "Realistic Large-break LOCA Evaluation Methodology Using the Automated Statistical Treatment of Uncertainty Method (ASTRUM)", January 2005.
5. USNRC Safety Evaluation Report, Letter from R. C. Jones (USNRC) to N. J. Liparulo (W), "Acceptance for Referencing of the Topical Report WCAP-12945(P) 'Westinghouse Code Qualification Document for Best Estimate Loss of Coolant Analysis,' " June 28, 1996.**
6. Letter dated June 13, 1996, from N. J. Liparulo (W) to Frank R. Orr (USNRC), "Re-Analysis Work Plans Using Final Best Estimate Methodology."***
7. WCAP-12610-P-A, "VANTAGE+ Fuel Assembly Reference Core Report," S. L. Davidson and T. L. Ryan, April 1995.
8. WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," July 2006.

The analytical methods used to determine Overtemperature ΔT and Overpower ΔT shall be those previously reviewed and approved by the NRC in:

1. WCAP-8745-P-A, " Design Basis for the Thermal Overtemperature ΔT and Overpower ΔT Trip Functions," September 1986
2. WCAP-9272-P-A, " Westinghouse Reload Safety Evaluation Methodology," July 1985

The analytical methods used to determine Safety Limits, Shutdown Margin - $T_{avg} > 200^\circ F$, Shutdown Margin - $T_{avg} \leq 200^\circ F$, Moderator Temperature Coefficient, DNB Parameters, Rod Bank Insertion Limits and the All Rods Out position shall be those previously reviewed and approved by the NRC in:

1. WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985.

The ability to calculate the COLR nuclear design parameters are demonstrated in:

1. Florida Power & Light Company Topical Report NF-TR-95-01, "Nuclear Physics Methodology for Reload Design of Turkey Point & St. Lucie Nuclear Plants."

Topical Report NF-TR-95-01 was approved by the NRC for use by Florida Power & Light Company in:

1. Safety Evaluation by the Office of Nuclear Reactor Regulations Related to Amendment No. 174 to Facility Operating License DPR-31 and Amendment No. 168 to Facility Operating License DPR-41, Florida Power & Light Company Turkey Point Units 3 and 4, Docket Nos. 50-250 and 50-251.

The AFD, $F_Q(Z)$, $F_{\Delta H}$, $K(Z)$, Safety Limits, Overtemperature ΔT , Overpower ΔT , Shutdown Margin - $T_{avg} > 200^\circ F$, Shutdown Margin - $T_{avg} \leq 200^\circ F$, Moderator Temperature Coefficient, DNB Parameters, and Rod Bank Insertion Limits shall be determined such that all applicable limits of the safety analyses are met. The CORE OPERATING LIMITS REPORT, including any mid-cycle revisions or supplements thereto, shall be provided upon issuance, for each reload cycle, to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector, unless otherwise approved by the Commission.

**As evaluated in NRC Safety Evaluation dated December 20, 1997.



UNITED STATES
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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION FOR
AMENDMENT NO. 259 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-31 AND
AMENDMENT NO. 254 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-41
FLORIDA POWER & LIGHT COMPANY
TURKEY POINT NUCLEAR GENERATING UNIT NOS. 3 AND 4
DOCKET NOS. 50-250 AND 50-251

1.0 INTRODUCTION

By letter to the U.S. Nuclear Regulatory Commission (NRC or the Commission) dated March 22, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13100A131), Florida Power & Light Company (FPL, the licensee) requested changes to the Technical Specifications (TSs) for the Turkey Point Nuclear Generating Unit Nos. 3 and 4 (Turkey Point 3 and 4). The licensee proposed to add Optimized ZIRLO™ as an acceptable fuel rod cladding material to TS 5.3.1, "Fuel Assemblies." The licensee also proposed to add a reference to WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO," dated July 2006, to TS 6.9.1.7, "Core Operating Limits Report (COLR)."

The Westinghouse Electric Company, LLC (Westinghouse) manufactures Optimized ZIRLO™ fuel rod cladding material, which is a new version of the ZIRLO material. By letter and safety evaluation (SE) dated June 10, 2005 (ADAMS Accession No. ML051670395), the NRC approved the use of Optimized ZIRLO™ fuel rod cladding material for Westinghouse and Combustion Engineering (CE) fuel designs, as described in the topical report WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO," dated July 2006 (the public version is WCAP-14342-A & CENPD-404-NP-A at ADAMS Accession No. ML062080569). The NRC approved fuel rod burnup limits to a peak rod average of 62,000 megawatt-days per metric ton of uranium metal (MWD/MTU) for Westinghouse fuel and 60,000 MWD/MTU for CE fuel. However, in Section 5.0 of its SE dated June 10, 2005, the NRC stated that licensees referencing Addendum 1 to implement Optimized ZIRLO™ fuel rod cladding material must ensure compliance with the conditions and limitations listed in Section 5.0 of the SE.

The licensee also requested an exemption from the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.46, "Acceptance Criteria for Emergency Core Cooling Systems (ECCS) for Light-Water Nuclear Power Reactors," and 10 CFR Part 50, Appendix K, "ECCS Evaluation Models," to allow the use of fuel rods clad with Optimized ZIRLO™ alloy for future reload applications. The NRC addressed this exemption in separate correspondence (ADAMS Accession No. ML14024A547).

Enclosure

2.0 REGULATORY EVALUATION

The NRC reviewed the licensee's application to ensure 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) activities proposed will be conducted in compliance with the Commission's Regulations and (3) the issuance of the amendment will not be inimical to the common defense and security or the health and safety of the public. The NRC considered the following regulatory requirements, guidance, and design basis information during its review of the proposed change.

Title 10 of the CFR, Part 50, "Domestic Licensing of Production and Utilization Facilities," (10 CFR Part 50) provides the regulatory requirements for the licensing of production and utilization facilities.

Section 10 CFR 50.92, "Issuance of amendment," Paragraph 50.92(a) states that in determining whether an amendment to a license will be issued to the applicant, the Commission will be guided by the considerations that govern the issuance of initial licenses to the extent applicable and appropriate. The licensee requested a license amendment to add Optimized ZIRLO™ as an acceptable fuel rod cladding material in the TSs.

By letter dated June 10, 2005, the NRC issued an SE approving Addendum 1 to Westinghouse Topical Report WCAP-12610-P-A & CENPD-404-P-A, "Optimized ZIRLO™," wherein the NRC approved the use of Optimized ZIRLO™ as an acceptable fuel rod cladding material. The NRC approved the use of Optimized ZIRLO™ as a fuel rod cladding material based on similarities to standard ZIRLO™, demonstrated material performance, and a commitment to provide irradiated data and validate fuel performance models ahead of burnups achieved in batch application. The NRC's SE of Optimized ZIRLO™ fuel rod cladding material included 10 conditions and limitations for its use.

The Turkey Point TS 6.9.1.7 requires core operating limits to be established and documented in the COLR before each reload cycle or any remaining part of the reload cycle for the specifications listed this TS. This TS also lists the approved methodologies for determining core operating limits.

3.0 TECHNICAL EVALUATION

The licensee proposed to add Optimized ZIRLO™ as an acceptable fuel rod cladding material to TS 5.3.1, "Fuel Assemblies," and TS 6.9.1.7, "Core Operating Limits Report (COLR)." The NRC's SE of Optimized ZIRLO™ fuel rod cladding material included 10 conditions and limitations for its use. The NRC reviewed the licensee's descriptions of how it met the 10 conditions and limitations and the TS changes.

3.1 Conditions and Limitations

By letter dated June 10, 2005, the NRC issued an SE for Addendum 1 to the topical report, WCAP-12610-P-A & CENPD-404-P-A for Optimized ZIRLO™. The SE concluded, "Based upon demonstrated material performance in Addendum 1 and in response to RAIs [Requests for

Additional Information] [...] and the irradiated database, the NRC staff has approved Optimized ZIRLO™ for full batch implementation.” The SE also stated:

The NRC staff reviewed the effects of Optimized ZIRLO™ using the appropriate fuel design requirements of SRP [Standard Review Plan] 4.2 and 10 CFR Part 50, Appendix A, General Design Criteria and found that the TR [topical report] provided reasonable assurance that under both normal and accident conditions, Westinghouse and CE fuel assembly designs implementing Optimized ZIRLO™ fuel cladding would be able to safely operate and comply with NRC regulations.

The NRC's June 10, 2005, SE also stated that licensees referencing Addendum 1 to the topical report for implementing Optimized ZIRLO™ fuel rod cladding material must ensure compliance with the 10 conditions specified in the SE. In its letter dated March 22, 2013, the licensee described its compliance with these 10 conditions and limitations. A summary of the licensee's statements of how it meets the conditions, and the NRC's evaluation of the licensee's statements follows.

Condition 1

The first condition in the NRC's SE dated June 10, 2005, states:

Until rulemaking to 10 CFR Part 50 addressing Optimized ZIRLO™ has been completed, implementation of Optimized ZIRLO™ fuel clad requires an exemption from 10 CFR 50.46 and 10 CFR Part 50 Appendix K.

In its letter dated March 22, 2013, the licensee requested the subject exemption. The NRC addresses this exemption in separate correspondence. Therefore, the NRC considers this condition met.

Condition 2

The second condition in the NRC's SE dated June 10, 2005, states:

The fuel rod burnup limit for this approval remains at currently established limits: 62 GWd/MTU [gigawatt-days per metric ton of uranium metal] for Westinghouse fuel designs and 60 GWd/MTU for CE fuel designs.

In its letter dated March 22, 2013, the licensee stated that for any fuel using Optimized ZIRLO™ fuel rod cladding material, the maximum fuel rod burnup limit for Westinghouse fuel designs will continue to be 62 GWd/MTU. Because this value meets the second condition/limitation, the NRC considers this acceptable.

Condition 3

The third condition in the NRC's SE dated June 10, 2005, states:

The maximum fuel rod waterside corrosion, as predicted by the best-estimate

model, will [] of hydrides for all locations of the fuel rod. [The information in the bolded brackets are proprietary limits that are not publicly available.]

In its letter dated March 22, 2013, the licensee stated that the maximum fuel rod waterside corrosion for fuel using the Optimized ZIRLO™ fuel rod cladding material will be confirmed to be less than the specified proprietary limits for all locations of the fuel rod. The licensee stated that evaluations are performed to confirm that appropriate corrosion limits are satisfied as part of the normal reload design process. Approval of the licensee's proposed change to TS 6.9.1.7 ensures that the Optimized ZIRLO™ methodology, including these corrosion limits, are incorporated into Turkey Point 3 and 4's reload design process. Therefore, the NRC agrees that the licensee's stated action meets this condition.

Condition 4

The fourth condition in the NRC's SE dated June 10, 2005, states:

All the conditions listed in previous NRC SE approvals for methodologies used for standard ZIRLO™ and Zircaloy-4 fuel analysis will continue to be met, except that the use of Optimized ZIRLO™ cladding in addition to standard ZIRLO™ and Zircaloy-4 cladding is now approved.

In its letter dated March 22, 2013, the licensee stated that the fuel analysis of Optimized ZIRLO™ fuel rod cladding material will continue to meet all conditions associated with approved methods. The licensee stated that this is a current requirement for both units and that confirmation of these conditions is required as part of the normal reload design process. The NRC notes this confirmation is required per TS 6.9.1.7. Therefore, the NRC finds this acceptable.

Condition 5

The fifth condition in the NRC's SE dated June 10, 2005, states:

All methodologies will be used only within the range for which ZIRLO™ and Optimized ZIRLO™ data were acceptable and for which the verifications discussed in Addendum 1 and responses to RAIs were performed.

In its letter dated March 22, 2013, the licensee stated that the application of ZIRLO® and Optimized ZIRLO™ fuel rod cladding material in approved methodologies will be made consistent with the approach accepted in WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," dated July 2006. The licensee stated that for both units, this is a current requirement and that confirmation of these conditions is required as part of the normal reload design process. The NRC agrees that the licensee's stated action meets this condition. Approval of the licensee's proposed change to TS 6.9.1.7 ensures that the Optimized ZIRLO™ methodology, including the range of applicability, are incorporated into Turkey Point 3 and 4's reload design process. Therefore, the NRC finds this acceptable.

Condition 6

The sixth condition in the NRC's SE dated June 10, 2005, states:

The licensee is required to ensure that Westinghouse has fulfilled the following commitment: Westinghouse shall provide the NRC staff with a letter(s) containing the following information (Based on the schedule described in response to RAI #3 [...]):

- a. Optimized ZIRLO™ LTA [lead test assembly] data from Byron, Calvert Cliffs, Catawba, and Millstone.
 - i. Visual
 - ii. Oxidation of fuel rods
 - iii. Profilometry
 - iv. Fuel rod length
 - v. Fuel assembly length

- b. Using the standard and Optimized ZIRLO™ database including the most recent LTA data, confirm applicability with currently approved fuel performance models (e.g., measured vs. predicted).

Confirmation of the approved models' applicability up through the projected end of cycle burnup for the Optimized ZIRLO™ fuel rods must be completed prior to their initial batch loading and prior to the startup of subsequent cycles. For example, prior to the first batch application of Optimized ZIRLO™, sufficient LTA data may only be available to confirm the models' applicability up through 45 GWd/MTU. In this example, the licensee would need to confirm the models up through the end of the initial cycle. Subsequently, the licensee would need to confirm the models, based upon the latest LTA data, prior to re-inserting the Optimized ZIRLO™ fuel rods in future cycles. Based upon the LTA schedule, it is expected that this issue may only be applicable to the first few batch implementations since sufficient LTA data up through the burnup limit should be available within a few years.

In its letter dated March 22, 2013, the licensee stated that Westinghouse has provided the NRC with information related to test data and models in the following letters and thus fulfilled its obligation to provide additional data from the Optimized ZIRLO™ LTA programs to the NRC:

- Letter LTR-NRC-07-1 from Westinghouse to NRC, "SER [Safety Evaluation Report] Compliance with WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A 'Optimized ZIRLO™'" (contains proprietary information), January 4, 2007 (non-public).

- Letter LTR-NRC-07-58 from Westinghouse to NRC, "SER Compliance with WCAP-12610-P-A & CENPD- 404-P-A Addendum 1-A, 'Optimized ZIRLO™'" (contains proprietary information), November 6, 2007 (non-public).

- Letter LTR-NRC-07-58 from Westinghouse to NRC, "SER Compliance with WCAP-12610-P-A & CENPD-404-P-A Addendum 1-A, 'Optimized ZIRLO™,'" Rev. 1, February 5, 2008, ADAMS Accession No. ML080390452.
- Letter LTR-NRC-08-60 from Westinghouse to NRC, "SER Compliance of WCAP-12610-P-A & CENPD-404-P-A Addendum 1-A, 'Optimized ZIRLO™'" (contains proprietary information), December 30, 2008 (non-public).
- Letter LTR-NRC-10-43 from Westinghouse to NRC, "SER Compliance of WCAP-12610-P-A & CENPD-404-P-A Addendum 1-A, 'Optimized ZIRLO™,'" July 26, 2010, ADAMS Accession Nos. ML102140213 and ML102140214.
- Letter LTR-NRC-13-6 from James A. Gresham (Westinghouse) to USNRC, "SER Compliance of WCAP-12610-P-A & CENPD-404-P-A Addendum 1-A, 'Optimized ZIRLO,'" February 25, 2013, ADAMS Accession No. ML13070A188.

In its letter dated March 22, 2013, the licensee stated that the LTA measured data and favorable results from visual examinations of once, twice, and thice-burned LTA confirm, up to the fuel rod burnup limit, that the current fuel performance models are applicable for Optimized ZIRLO™ clad fuel rods. The licensee stated that it will continue to use the currently approved fuel performance models for all Optimized ZIRLO™ fuel assemblies up to the approved fuel burnup.

The NRC confirmed that the letters listed in this section provided the information described in Condition 6. The NRC agrees that the licensee's stated action meets this condition.

Condition 7

The seventh condition in the NRC's SE dated June 10, 2005, states:

The licensee is required to ensure that Westinghouse has fulfilled the following commitment: Westinghouse shall provide the NRC staff with a letter containing the following information (Based on the schedule described in response to RAI #11 [...]):

- a. Vogtle growth and creep data summary reports.
- b. Using the standard ZIRLO™ and Optimized ZIRLO™ database including the most recent Vogtle data, confirm applicability with currently approved fuel performance models (e.g., level of conservatism in [Westinghouse] rod pressure analysis, measured vs. predicted, predicted minus measured vs. tensile and compressive stress).

Confirmation of the approved models' applicability up through the projected end of cycle burnup for the Optimized ZIRLO™ fuel rods must be completed prior to their initial batch loading and prior to the startup of subsequent cycles. For example, prior to the first batch application of Optimized ZIRLO™, sufficient LTA data may only be available to confirm the models' applicability up through

45 GWd/MTU. In this example, the licensee would need to confirm the models up through the end of the initial cycle. Subsequently, the licensee would need to confirm the models, based upon the latest LTA data, prior to re-inserting the Optimized ZIRLO™ fuel rods in future cycles. Based upon the LTA schedule, it is expected that this issue may only be applicable to the first few batch implementations since sufficient LTA data up through the burnup limit should be available within a few years.

In its letter dated March 22, 2013, the licensee stated that Westinghouse has provided the NRC with information related to test data and models in the same letters referenced in Condition 6 and, thus, fulfilled its obligation to provide additional data from the Optimized ZIRLO™ LTA programs to the NRC. The licensee stated that it evaluated the data from three cycles of operation, and used the fuel rod creep models from fuel rod design codes to predict the growth and creep performance of the samples. The licensee stated that it will continue to use the currently approved fuel performance models for all Optimized ZIRLO™ fuel assemblies up to the approved fuel burnup limit.

The NRC confirmed that the letters listed in this section provided the information described in Condition 7. The NRC also confirmed that the evaluated data from previous cycles and the updated model used to predict growth and creep in the fuel rod performance were favorable. The NRC determined that the licensee's stated action meets this condition.

Condition 8

The eighth condition in the NRC's SE dated June 10, 2005, states:

The licensee shall account for the relative differences in unirradiated strength (YS [yield strength] and UTS [ultimate tensile strength]) between Optimized ZIRLO™ and standard ZIRLO™ in cladding and structural analyses until irradiated data for Optimized ZIRLO™ have been collected and provided to the NRC staff.

- a. For the Westinghouse fuel design analyses:
 - i. The measured, unirradiated Optimized ZIRLO™ strengths shall be used for BOL [beginning-of-life] analyses.
 - ii. Between BOL up to a radiation fluence of 3.0×10^{21} n/cm² [neutrons per square centimeters] ($E > 1$ MeV [for neutron energies greater than one megaelectron volt]), pseudo-irradiated Optimized ZIRLO™ strength set equal to linear interpolation between the following two strength level points: At zero fluence, strength of Optimized ZIRLO™ equal to measured strength of Optimized ZIRLO™ and at a fluence of 3.0×10^{21} n/cm² ($E > 1$ MeV), irradiated strength of standard ZIRLO™ at the fluence of 3.0×10^{21} n/cm² ($E > 1$ MeV) minus 3 ksi [kilopound per square inch].
 - iii. During subsequent irradiation from 3.0×10^{21} n/cm² up to

12 x 10²¹ n/cm², the differences in strength (the difference at a fluence of 3 x 10²¹ n/cm² due to tin content) shall be decreased linearly such that the pseudo-irradiated Optimized ZIRLO™ strengths will saturate at the same properties as standard ZIRLO™ at 12 x 10²¹ n/cm².

- b. For the CE fuel design analyses, the measured, unirradiated Optimized ZIRLO™ strengths shall be used for all fluence levels (consistent with previously approved methods).

In its letter dated March 22, 2013, the licensee stated that its fuel analysis of Optimized ZIRLO™ clad rods will use the YS and UTS as modified by Conditions 8.a.i, 8.a.ii, and 8.a.iii until such time that irradiated data for Optimized ZIRLO™ strengths have been collected and provided to the NRC. The licensee stated that it will confirm that the requirements of Condition 8 will be met as it applies to Turkey Point 3 and 4. The licensee also stated that because Turkey Point 3 and 4 use a Westinghouse fuel design, Condition 8.b does not apply. The NRC agrees that the licensee's stated action meets this condition and that Condition 8.b does not apply to Turkey Point 3 and 4. Therefore, the NRC finds the licensee's response acceptable.

Condition 9

The ninth condition in the NRC's SE dated June 10, 2005, states:

As discussed in response to RAI #21 [...], for plants introducing Optimized ZIRLO™ that are licensed with LOCBART or STRIKIN-II and have a limiting PCT [peak clad temperature] that occurs during blowdown or early reflood, the limiting LOCBART or STRIKIN-II calculation will be rerun using the specified Optimized ZIRLO™ material properties. Although not a condition of approval, the NRC staff strongly recommends that, for future evaluations, Westinghouse update all computer models with Optimized ZIRLO™ specific material properties.

In its letter dated March 22, 2013, the licensee stated that this condition is not applicable to Turkey Point 3 and 4 because these units are not licensed with LOCBART or STRIKIN-II. The NRC did not identify any references to the LOCBART or STRIKIN-II loss-of-coolant accident methodology in the Turkey Point 3 and 4 licensing basis documents. Based on the licensee's statement in its March 22, 2013, letter and the NRC's review of Turkey Point 3 and 4 licensing basis documentation, the NRC considers this condition not applicable to Turkey Point 3 and 4.

Condition 10

The tenth condition in the NRC's SE dated June 10, 2005, states:

Due to the absence of high temperature oxidation data for Optimized ZIRLO™, the Westinghouse coolability limit on PCT during the locked rotor event shall be []. [The information in the bolded brackets are proprietary limits that are not publicly available.]

In its letter dated March 22, 2013, the licensee stated that the PCT calculated by Westinghouse for the locked rotor event has been assessed relative to the Optimized ZIRLO™ PCT limit as part of the Turkey Point 3 and 4 extended power uprate, which was approved by NRC letter dated June 15, 2012 (ADAMS Accession No. ML11293A365). The licensee stated that this will be reassessed as part of the normal reload design process. The NRC determined that the licensee's stated action meets this condition. Approval of the licensee's proposed change to TS 6.9.1.7 ensures that the Optimized ZIRLO™ methodology, including these PCT limits, are incorporated into Turkey Point 3 and 4's reload design process. Therefore, the NRC finds this acceptable.

3.2 TS Revisions

3.2.1 TS 5.3.1, Reactor Core, Fuel Assemblies

In its letter dated March 22, 2013, the licensee proposed to add Optimized ZIRLO™ as an acceptable fuel rod cladding material. Technical Specification 5.3.1 would be revised as follows (additions shown in bolded text, deletions shown as struck out):

“[...] each fuel assembly containing 204 fuel rods clad with of Zircaloy-4, **ZIRLO®**, **or Optimized ZIRLO™** ~~or ZIRLO™~~, except that [...]”

Based on the NRC's acceptance of the licensee's use of Optimized ZIRLO™ fuel rod cladding material, as documented in Section 3.1 of this evaluation, the NRC concludes that this revision to TS 5.3.1 is acceptable.

3.2.2 TS 6.9.1.7, Core Operating Limits Report

In its letter dated March 22, 2013, the licensee proposed to add the approved Westinghouse topical report, Addendum 1-A to WCAP-12610-P-A and CENPD-404-P-A, “Optimized ZIRLO,” dated July 2006, to the list of references in COLR as reference No. 8. Based on the NRC's approval of this topical report, the NRC concludes that this revision to TS 6.9.1.7 is acceptable.

3.3 Technical Evaluation Conclusion

Based on its review of the information provided by the licensee in its letter dated March 22, 2013, the NRC finds that the licensee meets the requirements of all of the conditions and limitations set forth in the SE dated June 10, 2005. The NRC concludes that the Optimized ZIRLO™ fuel design is acceptable for use to a peak rod average burnup limit of 62 GWD/MTU. Therefore, the NRC also concludes that the licensee's proposed TS changes are acceptable.

4.0 STATE CONSULTATION

By letter dated May 2, 2003 (ADAMS Accession No. ML032470912), from Michael N. Stephens of the Florida Department of Health, Bureau of Radiation Control, to Brenda L. Mozafari, Senior Project Manager, U.S. Nuclear Regulatory Commission, the State of Florida indicated it does not desire notification of issuance of license amendments. By electronic mail dated July 25, 2012 (ADAMS Accession No. ML12208A014), from Cynthia Becker of the Florida Department of Health, Bureau of Radiation Control, to Farideh E. Saba, Senior Project

Manager, U.S. Nuclear Regulatory Commission, the State of Florida confirmed that the May 2003 letter continues to reflect the State's position on notification of issuance of license amendments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments involve a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC 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. By *Federal Register* notice 78 FR 51227 dated August 20, 2013, the Commission previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on these findings. 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), the NRC did not prepare an environmental impact statement or environmental assessment in connection with the issuance of the amendments.

6.0 CONCLUSION

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

Principal Contributor: Shih-Liang Wu

Date: February 20, 2014

M. Nazar

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The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Audrey L. Klett, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosures:

1. Amendment No. 259 to DPR-31
2. Amendment No. 254 to DPR-41
3. Safety Evaluation

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***Via Email**

OFFICE	LPLII-2/PM	LPLII-2/LA	DSS/SNPB/BC (A)*	DSS/STSB/BC	OGC (NLO)
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DATE	02/06/14	02/06/14	01/30/2014	02/06/14	02/11/14
OFFICE	LPLII-2/BC	LPLII-2/PM			
NAME	JQuichocho (LRegner for)	AKlett			
DATE	02/14/14	02/20/14			

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