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 – EXEMPTION FROM THE REQUIREMENTS OF 10 CFR 50.46 AND APPENDIX K TO 10 CFR PART 50 TO ALLOW THE USE OF OPTIMIZED ZIRLO™ CLAD FUEL RODS (TAC NOS. MF1453 AND MF1454)

Dear Mr. Nazar:

The U.S. Nuclear Regulatory Commission (NRC or the Commission) has granted the enclosed exemption from specific 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 Appendix K, "ECCS Evaluation Models," to 10 CFR Part 50, for the Turkey Point Nuclear Generating Unit Nos. 3 and 4. This action is in response to Florida Power & Light Company's (the licensee's) application dated March 22, 2013, for an exemption and amendment regarding the use of Optimized ZIRLO™ clad fuel rods. The NRC addressed the requested amendment in separate correspondence (Agencywide Documents Access and Management System Accession No. ML14024A547).

A copy of the exemption is enclosed.

The exemption has been forwarded to the Office of the Federal Register for publication.

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

Enclosure: Exemption

cc w/encls.: Distribution via Listserv

[7590-01-P]

NUCLEAR REGULATORY COMMISSION

Docket Nos. 50-250 and 50-251; NRC-2014-####

License Exemption Request for Florida Power & Light Company

Turkey Point Nuclear Generating Unit Nos. 3 and 4

AGENCY: Nuclear Regulatory Commission.

ACTION: Exemption; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is granting an exemption in response to a March 22, 2013, request from Florida Power & Light Company for an exemption for the use of a different fuel rod cladding material (Optimized ZIRLO™).

ADDRESSES: Please refer to Docket ID **NRC-2014-XXXX** when contacting the NRC about the availability of information regarding this document. You may access publicly-available information related to this document using any of the following methods:

- **Federal Rulemaking Web site:** Go to http://www.regulations.gov and search for Docket ID NRC-2014-XXXX. Address questions about NRC dockets to Carol Gallagher; telephone: 301-287-3422; e-mail: Carol.Gallagher@nrc.gov. For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.
- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may access publicly available documents online in the NRC Library at http://www.nrc.gov/reading-rm/adams.html. To begin the search, select "ADAMS Public

Documents," and then select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. The ADAMS accession number for each document referenced in this document (if that document is available in ADAMS) is provided the first time that a document is referenced.

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

FOR FURTHER INFORMATION CONTACT: Audrey L. Klett, Office of Nuclear Reactor Regulation, telephone: 301-415-0489; e-mail: Audrey.Klett@nrc.gov, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001.

I. Background.

Florida Power & Light Company (the licensee) is the holder of Renewed Facility Operating License Nos. DPR-31 and DPR-41, which authorize operation of the Turkey Point Nuclear Generating Unit Nos. 3 and 4 (Turkey Point 3 and 4), respectively. 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 Miami-Dade County, Florida.

II. Request/Action.

Pursuant to Section 50.12, "Specific exemptions," of Title 10 of the *Code of Federal Regulations* (10 CFR), the licensee has, by letter dated March 22, 2013 (ADAMS Accession No. ML13100A131), requested an exemption from the requirements of 10 CFR 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 regulations in 10 CFR 50.46 contain acceptance criteria for the ECCS for reactors fueled with zircaloy or ZIRLO fuel rod cladding material. In addition, Appendix K to 10 CFR Part 50 requires that the Baker-Just equation be used to predict the rates of energy release, hydrogen concentration, and cladding oxidation from the metal/water reaction. The Baker-Just equation assumes the use of a zirconium alloy, which is a material different from Optimized ZIRLO™. The licensee requested the exemption because these regulations do not have provisions for the use of fuel rods clad in a material other than zircaloy or ZIRLO™. Because the material specifications of Optimized ZIRLO™ differ from the specification for zircaloy or ZIRLO™, a plant-specific exemption is required to support the reload applications for Turkey Point 3 and 4.

The exemption request relates solely to the cladding material specified in these regulations (i.e., fuel rods with Zircaloy or ZIRLO™ cladding material). This exemption would provide for the application of the acceptance criteria of 10 CFR 50.46 and Appendix K to 10 CFR Part 50 to fuel assembly designs using Optimized ZIRLO™ fuel rod cladding material. In its letter dated March 22, 2013, the licensee clarified that it was not seeking an exemption from the acceptance and analytical criteria of these regulations. The intent of the request is to allow the use of criteria set forth in these regulations for application to the Optimized ZIRLO™ fuel rod cladding material.

III. Discussion.

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person, grant exemptions from the requirements of 10 CFR Part 50, which are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security. Paragraph (a)(2)(ii) of 10 CFR 50.12 states that the Commission will not consider granting an exemption unless special circumstances are present, such as when application of the regulation in the particular circumstance is not necessary to achieve the underlying purpose of the rule.

A. Special Circumstances.

Special circumstances, in accordance with 10 CFR 50.12(a)(2)(ii), are present whenever application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule. The underlying purpose of 10 CFR 50.46 and Appendix K to 10 CFR Part 50 is to establish acceptance criteria for ECCS performance. The regulations in 10 CFR 50.46 and Appendix K are not directly applicable to Optimized ZIRLO™, even though the evaluations described in the following sections of this exemption show that the intent of the regulation is met. Therefore, because the underlying purposes of 10 CFR 50.46 and Appendix K of 10 CFR Part 50 are achieved through the use of Optimized ZIRLO™ fuel rod cladding material, the special circumstances required by 10 CFR 50.12(a)(2)(ii) for the granting of an exemption exist.

B. Authorized by Law

This exemption would allow the use of Optimized ZIRLO™ fuel rod cladding material for future reload applications at Turkey Point 3 and 4. Section 10 CFR 50.12 allows the NRC to grant exemptions from the requirements of 10 CFR Part 50. The NRC staff determined that granting the licensee's proposed exemption would not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations. Therefore, the exemption is authorized by law.

C. No Undue Risk to Public Health and Safety.

Section 10 CFR 50.46 requires that each boiling or pressurized light-water nuclear power reactor fueled with uranium oxide pellets within cylindrical zircaloy or ZIRLO cladding must be provided with an ECCS that must be designed so that its calculated cooling performance following postulated loss-of-coolant accidents (LOCAs) conforms to the criteria set forth in paragraph (b) of this section. The underlying purpose of 10 CFR 50.46 is to establish acceptance criteria for adequate ECCS performance. As previously documented in the NRC staff's safety evaluation dated June 10, 2005 (ADAMS Accession No. ML051670395), of topical reports submitted by Westinghouse, and subject to compliance with the specific conditions of approval established in the safety evaluation, the NRC staff found that Westinghouse demonstrated the applicability of these ECCS acceptance criteria to Optimized ZIRLO™. Ring compression tests performed by Westinghouse on Optimized ZIRLO™ (see WCAP-14342-A & CENPD-404-NP-A at ADAMS Accession No. ML062080569) demonstrate an acceptable retention of postquench ductility up to 10 CFR 50.46 limits of 2200 degrees Fahrenheit and 17 percent equivalent clad reacted. Furthermore, the NRC staff concluded that oxidation

measurements provided by the licensee by letter LTR-NRC-07-58 from Westinghouse to the NRC, "SER Compliance with WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, 'Optimized ZIRLO™,'" dated November 6, 2007 (public version is at ADAMS Accession No. ML073130560), illustrate that oxide thickness and associated hydrogen pickup for Optimized ZIRLO™ at any given burnup would be less than both zircaloy-4 and ZIRLO™. Hence, the NRC staff concludes that Optimized ZIRLO™ would be expected to maintain better postquench ductility than ZIRLO™. This finding is further supported by an ongoing LOCA research program at Argonne National Laboratory, which has identified a strong correlation between cladding hydrogen content (caused by in-service corrosion) and postquench ductility.

In its letter dated March 22, 2013, the licensee stated that its reload evaluations will ensure that acceptance criteria are met for the insertion of assemblies with fuel rods clad with Optimized ZILRO™. The licensee stated that it will evaluate fuel assemblies using Optimized ZIRLO™ fuel rod cladding material using NRC-approved analytical methods and plant-specific models to address the changes in the cladding material properties. The licensee stated that Westinghouse will perform an evaluation of the Turkey Point 3 and 4 cores using LOCA methods approved for the site to ensure that assemblies with Optimized ZIRLO™ fuel rod cladding material meet all LOCA safety criteria. For these reasons, the NRC staff determined that the underlying purpose of 10 CFR 50.46 would be achieved if the NRC granted this exemption for Turkey Point 3 and 4.

Paragraph I.A.5 of 10 CFR Part 50, Appendix K requires that the rate of energy release, hydrogen generation, and cladding oxidation from the metal/water reaction shall be calculated using the Baker-Just equation. Because the Baker-Just equation presumes the use of zircaloy clad fuel, strict application of the rule would not permit use of the equation for Optimized ZIRLO™ fuel rod cladding material for determining acceptable fuel performance. However, the NRC staff found that metal-water reaction tests performed by Westinghouse on Optimized

ZIRLO™, which were NRC-reviewed, approved, and documented in Appendix B of Addendum 1-A to WCAP-12610-P-A & CENPD-404-P-A, demonstrate conservative reaction rates relative to the Baker-Just equation. Thus, the NRC staff determined that application of Appendix K, Paragraph I.A.5 is not necessary to achieve the underlying purpose of the rule in these circumstances. Because these evaluations demonstrate that the underlying purpose of the regulations will be met, there will be no undue risk to public health and safety.

D. Consistent with the Common Defense and Security.

The licensee's exemption request is only to allow the application of the aforementioned regulations to an improved fuel rod cladding material. In its letter dated March 22, 2013, the licensee stated that all the requirements and acceptance criteria will be maintained. The licensee is required to handle and control special nuclear material in these assemblies in accordance with its approved procedures. The licensee stated that use of full regions of Optimized ZIRLO™ fuel rod cladding material in the Turkey Point 3 and 4 cores will not affect plant operations. This change to the plant configuration is not related to security issues. Therefore, the NRC staff determined that this exemption does not impact common defense and security.

E. Environmental Considerations.

The NRC staff determined that the exemption discussed herein meets the eligibility criteria for the categorical exclusion set forth in 10 CFR 51.22(c)(9) because it is related to a requirement concerning the installation or use of a facility component located within the restricted area, as defined in 10 CFR Part 20, and the granting of this exemption involves: (i) no

significant hazards consideration, (ii) no significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, and (iii) no significant increase in individual or cumulative occupational radiation exposure. Therefore, in accordance with 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the NRC's consideration of this exemption request. The basis for the NRC staff's determination is discussed as follows with an evaluation against each of the requirements in 10 CFR 51.22(c)(9).

Requirements in 10 CFR 51.22(c)(9)(i)

The NRC staff evaluated the issue of no significant hazards consideration, using the standards described in 10 CFR 50.92(c), as presented as follows:

1. Does the proposed exemption involve a significant increase in the probability or consequences of an accident previously evaluated?

The proposed exemption would allow the use of Optimized ZIRLO™ fuel rod cladding material in the reactors. The NRC-approved topical report, WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, addresses Optimized ZIRLO™ and demonstrates that Optimized ZIRLO™ has essentially the same properties as currently licensed ZIRLO®. The fuel cladding itself is not an accident initiator and does not affect accident probability. Use of Optimized ZIRLO™ fuel rod cladding material will continue to meet all 10 CFR 50.46 acceptance criteria and, therefore, will not increase the consequences of an accident. Therefore, the proposed exemption does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed exemption create the possibility of a new or different kind of accident from any accident previously evaluated?

The use of Optimized ZIRLO™ fuel rod cladding material will not result in changes in the

operation or configuration of the facility. Topical report WCAP-12610-P-A & CENPD-404-P-A demonstrated that the material properties of Optimized ZIRLO™ are similar to those of standard ZIRLO™. Therefore, Optimized ZIRLO™ fuel rod cladding material will perform similarly to those fabricated from standard ZIRLO™, thus precluding the possibility of the fuel cladding becoming an accident initiator and causing a new or different type of accident. Therefore, the proposed exemption does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed exemption involve a significant reduction in a margin of safety?

The proposed exemption does not involve a significant reduction in a margin of safety because it has been demonstrated that the material properties of the Optimized ZIRLO™ are not significantly different from those of standard ZIRLO™. Optimized ZIRLO™ is expected to perform similarly to standard ZIRLO™ for all normal operating and accident scenarios, including both LOCA and non-LOCA scenarios. For LOCA scenarios, where the slight difference in Optimized ZIRLO™ material properties relative to standard ZIRLO™ could have some impact on the overall accident scenario, plant-specific LOCA analyses using Optimized ZIRLO™ properties will demonstrate that the acceptance criteria of 10 CFR 50.46 have been satisfied. Therefore, the proposed exemption does not involve a significant reduction in a margin of safety.

Based on the above, the NRC staff concludes that the proposed exemption presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of no significant hazards consideration is justified.

Requirements in 10 CFR 51.22(c)(9)(ii)

The proposed exemption would allow the use of Optimized ZIRLO™ fuel rod cladding material in the reactors. Optimized ZIRLO™ has essentially the same properties as the

currently licensed ZIRLO®. The use of the Optimized ZIRLO™ fuel rod cladding material will not significantly change the types of effluents that may be released offsite, or significantly increase the amount of effluents that may be released offsite. Therefore, the provision of 10 CFR 51.22(c)(9)(ii) is satisfied.

Requirements in 10 CFR 51.22(c)(9)(iii)

The proposed exemption would allow the use of the Optimized ZIRLO™ fuel rod cladding material in the reactors. Optimized ZIRLO™ has essentially the same properties as the currently licensed ZIRLO®. The use of the Optimized ZIRLO™ fuel rod cladding material will not significantly increase individual occupational radiation exposure, or significantly increase cumulative occupational radiation exposure. Therefore, the provision of 10 CFR 51.22(c)(9)(iii) is satisfied.

IV. Conclusions.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, 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. Therefore, the Commission hereby grants the licensee an exemption from the requirements of 10 CFR 50.46 and Appendix K to 10 CFR Part 50, to allow the use of Optimized ZIRLO™ fuel rod cladding material at Turkey Point 3 and 4.

This exemption is effective upon issuance.

Dated at Rockville, Maryland, this 20th day of February 2014.

FOR THE NUCLEAR REGULATORY COMMISSION

Michele G. Evans

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

The exemption has been forwarded to the Office of the Federal Register for publication.

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

Enclosure:
Exemption

cc w/encls.: Distribution via Listserv

DISTRIBUTION:
PUBLIC
LPL2-2 R/F
RidsNrrDorlLpl2-2 Resource
RidsNrrLABClayton (Hard Copy)
RidsAcrsAcnwMailCenter
RidsNrrDorlDpr Resource
JDean
RidsNrrDssStsb
RidsNrrDssSpnb
RidsNrrPMTurkeypoint
RidsRgn2MailCenter
EQuinones, OEDO

Package Accession No.: **ML14024A547**
Letter Accession No.: **ML13329A348**
Exemption Accession No.: **ML13329A206** ***Via Memorandum**

OFFICE	LPLII-2/PM	LPLII-2/LA	DSS/SNPB/BC (A)*	OGC (NLO)	LPLII-2/BC
NAME	AKlett	BClayton	JDean	BHarris	JQuichocho (LRegner for)
DATE	02/06/14	02/06/14	10/22/2013	02/11/14	02/19/14
OFFICE	DORL/D	LPLII-2/PM			
NAME	MEvans	AKlett			
DATE	02/20/14	02/20/14			

OFFICIAL RECORD COPY