



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

June 21, 2017

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

SUBJECT: R. E. GINNA NUCLEAR POWER PLANT – ISSUANCE OF AMENDMENT
REGARDING USE OF OPTIMIZED ZIRLO™ (CAC NO. MF8299)

Dear Mr. Hanson:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 125 to Renewed Facility Operating License No. DPR-18 for the R. E. Ginna Nuclear Power Plant (Ginna). This amendment is in response to your application dated August 22, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16236A300).

The amendment revises Technical Specification (TS) 4.2.1, "Reactor Core, Fuel Assemblies," and TS 5.6.5, "Reporting Requirements, Core Operating Limits Report (COLR)," paragraph b, which allows the use of Optimized ZIRLO™ fuel cladding material at Ginna. This amendment is also supported by an exemption from certain requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," and 10 CFR Part 50, Appendix K, "ECCS [Emergency Core Cooling System] Evaluation Models," for Ginna. The NRC has addressed the requested exemption in separate correspondence (ADAMS Accession No. ML17136A221).

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

Sincerely,

A handwritten signature in black ink, appearing to read "V. Sreenivas".

V. Sreenivas, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-244

Enclosures:

1. Amendment No. 125 to Renewed License No. DPR-18
2. Safety Evaluation

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R. E. GINNA NUCLEAR POWER PLANT, LLC

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-244

R. E. GINNA NUCLEAR POWER PLANT

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 125
Renewed License No. DPR-18

1. The U.S. Nuclear Regulatory Commission (the Commission or the NRC) has found that:
 - A. The application for amendment filed by the Exelon Generation Company, LLC (Exelon, the licensee) dated August 22, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-18 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 125, are hereby incorporated in the renewed license. Exelon Generation shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION



James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Facility Operating License
and Technical Specifications

Date of Issuance: June 21, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 125

R. E. GINNA NUCLEAR POWER PLANT

RENEWED FACILITY OPERATING LICENSE NO. DPR-18

DOCKET NO. 50-244

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove
3

Insert
3

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

Remove
4.2-1
5.6-3
5.6-4

Insert
4.2-1
5.6-3
5.6-4

- (b) Exelon Generation pursuant to the Act and 10 CFR Part 70, to possess and use four (4) mixed oxide fuel assemblies in accordance with the RG&E's application dated December 14, 1979 (transmitted by letter dated December 20, 1979), as supplemented February 20, 1980, and March 5, 1980;
- (3) Exelon Generation pursuant to the Act and 10 CFR Parts 30, 40, and 70 to receive, possess, and use at any time any byproduct, source, and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required.
- (4) Exelon Generation pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Exelon Generation 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 the facility.

C. This license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

(1) Maximum Power Level

Exelon Generation is authorized to operate the facility at steady-state power levels up to a maximum of 1775 megawatts (thermal).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 125, are hereby incorporated in the renewed license. Exelon Generation shall operate the facility in accordance with the Technical Specifications.

(3) Fire Protection

Exelon Generation shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee's amendment request dated March 28, 2013, supplemented by letters dated December 17, 2013; January 29, 2014; February 28, 2014; September 5, 2014; September 24, 2014; December 4, 2014; March 18, 2015; June 11, 2015; August 7, 2015; and as approved in the safety evaluation report dated November 23, 2015. Except where NRC approval for changes or deviations is required by 10 CFR 50.48(c), and provided no

4.0 DESIGN FEATURES

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 121 fuel assemblies. Each assembly shall consist of a matrix of zircaloy, ZIRLO[®], or Optimized ZIRLO[™] clad fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO₂) as fuel material. Limited substitutions of zircaloy, ZIRLO, or stainless steel filler rods for fuel rods, in accordance with NRC approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or cycle specific analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions.

4.2.2 Control Rod Assemblies

The reactor core shall contain 29 control rod assemblies. The control material shall be silver indium cadmium.

- b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:
1. WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985.
(Methodology for 2.1, LCO 3.1.1, LCO 3.1.3, LCO 3.1.5, LCO 3.1.6, LCO 3.2.1, LCO 3.2.2, LCO 3.2.3, and LCO 3.9.1.)
 2. WCAP-16009-P-A, "Realistic Large-Break LOCA Evaluation Methodology Using the Automated Statistical Treatment of Uncertainty (ASTRUM)," January 2005.
 3. WCAP-10216-P-A, Rev. 1A, "Relaxation of Constant Axial Offset Control / FQ Surveillance Technical Specification," February 1994.
(Methodology for LCO 3.2.1 and LCO 3.2.3.)
 4. WCAP-12610-P-A, "VANTAGE + Fuel Assembly Reference Core Report," April 1995.
(Methodology for LCO 3.2.1.)
 5. WCAP 11397-P-A, "Revised Thermal Design Procedure," April 1989.
(Methodology for LCO 3.4.1 when using RTDP.)
 6. WCAP-10054-P-A and WCAP-10081-A, "Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code," August 1985.
(Methodology for LCO 3.2.1.)
 7. WCAP-10054-P-A, Addendum 2, Revision 1, "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.
(Methodology for LCO 3.2.1)
 8. WCAP-11145-P-A, "Westinghouse Small Break LOCA ECCS Evaluation Model Generic Study With the NOTRUMP Code," October 1986.
(Methodology for LCO 3.2.1)
 9. WCAP-10079-P-A, "NOTRUMP - A Nodal Transient Small Break and General Network Code," August 1985.
(Methodology for LCO 3.2.1)
 10. WCAP-8745-P-A, "Design Basis for the Thermal Overpower Delta T and Thermal Overtemperature Delta T Trip Functions," September 1986.
(Methodology for LCO 3.3.1.)

11. WCAP-14710-P-A, "1-D Heat Conduction Model for Annular Fuel Pellets," May, 1998.
(Methodology for LCO 3.2.1)
 12. WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," July 2006.
(Methodology for LCO 3.2.1)
- c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.
 - d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.6.6

Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

The following administrative requirements apply to the PTLR:

- a. RCS pressure and temperature limits for heatup, cooldown, criticality, and hydrostatic testing as well as heatup and cooldown rates shall be established and documented in the PTLR for the following:

LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits"
- b. The power operated relief valve lift settings required to support the Low Temperature Overpressure Protection (LTOP) System, and the LTOP enable temperature shall be established and documented in the PTLR for the following:

LCO 3.4.6, "RCS Loops - MODE 4";

LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled";

LCO 3.4.10, "Pressurizer Safety Valves"; and

LCO 3.4.12, "LTOP System."
- c. The analytical methods used to determine the RCS pressure and temperature and LTOP limits shall be those previously reviewed and approved by the NRC. Specifically, the methodology is described in the following documents:
 1. WCAP-14040-A, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves," Revision 4.



UNITED STATES
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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 125

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-18

R. E. GINNA NUCLEAR POWER PLANT, LLC

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-244

1.0 INTRODUCTION

By application dated August 22, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16236A300), Exelon Generation Company, LLC (Exelon or the licensee) requested changes to the Technical Specifications (TS) for the R. E. Ginna Nuclear Power Plant (Ginna). The proposed changes would revise TS 4.2.1, "Reactor Core, Fuel Assemblies" and TS 5.6.5, "Reporting Requirements, Core Operating Limits Report (COLR)," paragraph b, which will allow the use of Optimized ZIRLO™ fuel cladding material at Ginna.

The proposed changes would revise TS 4.2.1 to allow Optimized ZIRLO™ fuel rod cladding at Ginna. The proposed changes would also revise TS 5.6.5.b to add Addendum 1-A to Westinghouse Topical Report WCAP-12610-P-A and CENPD-404-P-A, "Optimized ZIRLO™," July 2006 (ADAMS Accession No. ML062080576 (non-public/proprietary)), to the list of documents previously reviewed and approved by the U.S. Nuclear Regulatory Commission (NRC or the Commission).

This amendment is also supported by an exemption from certain requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," and 10 CFR Part 50, Appendix K, "ECCS [Emergency Core Cooling System] Evaluation Models," for Ginna.

2.0 REGULATORY EVALUATION

Section 50.36, "Technical specifications," of 10 CFR, requires that TSs be included by applicants for a license authorizing operation of a production or utilization facility. Section 50.36(c) of 10 CFR also requires that TSs include: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls. The proposed change to TS 4.2.1 would revise the design features for fuel assemblies listed within the reactor core TSs, and the proposed change to TS 5.6.5 would revise administrative controls TSs.

The Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition (NUREG-0800) (SRP), Section 4.2, "Fuel System Design," provides regulatory guidance for the review of fuel rod cladding materials and the fuel system. In addition, the SRP provides guidance for compliance with the applicable General Design Criteria (GDC) in 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants." According to SRP Section 4.2, the fuel system safety review provides assurance that:

- 1) the fuel system is not damaged as a result of normal operation and anticipated operational occurrences (AOOs),
- 2) fuel system damage is never so severe as to prevent control rod insertion when it is required,
- 3) the number of fuel rod failures is not underestimated for postulated accidents, and
- 4) coolability is always maintained.

Appendix A to 10 CFR Part 50 sets forth GDC that must be considered when developing the principal design criteria for a water-cooled nuclear power plant.

- GDC 10, "Reactor design," states that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.
- GDC 27, "Combined reactivity control system capability," states that the reactivity control systems shall be designed to have a combined capability, in conjunction with poison addition by the emergency core cooling system, of reliably controlling reactivity changes to assure that under postulated accident conditions and with appropriate margin for stuck rods the capability to cool the core is maintained.

3.0 TECHNICAL EVALUATION

3.1 Proposed Changes to TS 4.2.1 and TS 5.6.5.b

3.1.1 Introduction

Currently at Ginna, the fuel rods are made up of slightly enriched uranium dioxide pellets, which are clad in a tube made from zircaloy or ZIRLO[®]. The proposed change to TS 4.2.1 will add "Optimized ZIRLO[™]" to the list of cladding materials listed in the sentence describing the fuel rods. The NRC staff has approved Optimized ZIRLO[™] fuel cladding based upon (1) similarities with standard ZIRLO[®], (2) demonstrated material performance, and (3) a commitment to provide irradiated data and validate fuel performance models ahead of burnups achieved in batch applications.

The proposed change to TS 5.6.5b will add the Westinghouse Topical Report for Optimized ZIRLO[™] (i.e., Addendum 1-A to WCAP-12610-P-A & CENPD-404-P-A). The list in TS 5.6.5.b includes a list of documents that defines the NRC-approved analytical methods used to determine the core operating limits.

Additionally, Exelon provided a TS change to Reference 10 in the TS 5.6.5.b list of methodologies in its application dated August 22, 2016. The changes are editorial in nature and will provide consistency with the way the other methodologies are referenced in this list. The

editorial update to the TSs does not change the methodology; thus, the NRC staff finds this change is acceptable.

3.1.2 Treatment of Limitations and Conditions in Addendum 1-A of WCAP-12610

The NRC staff's safety evaluation (SE) dated June 10, 2005, for the topical report, WCAP-12610-P-A (ADAMS Package Accession No. ML051670395) contains ten conditions and limitations. The staff indicated in the topical report's SE that licensees referencing Addendum 1-A of WCAP-12610-P-A & CENPD 404-P-A to implement Optimized ZIRLO™ must ensure compliance with the ten conditions and limitations. The licensee has documented compliance with these ten conditions and limitations and has committed to ensuring compliance for future reloads. Each condition and limitation is restated below, along with the NRC's staff evaluation of Exelon's response.

3.1.2.1 Condition and Limitation 1

Exemption

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.

Safety Evaluation for WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A
Condition and Limitation 1

Condition and Limitation 1 states that 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. The licensee has submitted an exemption for Ginna. The exemption request will be issued simultaneously with this SE. Therefore, the NRC staff concludes that this condition and limitation has been satisfied.

3.1.2.2 Condition and Limitation 2

Burnup Limit

The fuel rod burnup limit for this approval remains at currently established limits of 62 GWd/MTU for Westinghouse fuel designs and 60 GWd/MTU for CE fuel designs.

Safety Evaluation for WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A
Condition and Limitation 2

Ginna uses a Westinghouse fuel design (and not a Combustion Engineering (CE) fuel design), and Exelon has confirmed that Ginna will continue to use a 62 gigawatt days per metric ton of uranium (GWd/MTU) rod burnup. Therefore, the NRC staff has concluded that this condition and limitation has been satisfied.

3.1.2.3 Condition and Limitation 3

Corrosion Limit

The maximum fuel rod waterside corrosion, as predicted by the best-estimate model, will [satisfy proprietary limits included in topical report and proprietary version of safety evaluation] of hydrides for all locations of the fuel rod.

Safety Evaluation for WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A
Condition and Limitation 3

Exelon confirmed that the maximum fuel rod waterside corrosion limit is verified to be less than the specified proprietary limits for all fuel rod locations as a normal part of the reload design process. Therefore, the NRC staff has concluded that this condition and limitation has been satisfied.

3.1.2.4 Condition and Limitation 4

Conditions on Approved Methodologies

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.

Safety Evaluation for WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A
Condition and Limitation 4

Exelon confirmed that future analysis using Optimized ZIRLO™ will continue to meet all conditions assorted with each approved method. Therefore, the NRC staff has concluded that this condition and limitation has been satisfied.

3.1.2.5 Condition and Limitation 5

Application Domain

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 [Requests for Additional Information] were performed.

Safety Evaluation for WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A
Condition and Limitation 5

Exelon confirmed that the application of Optimized ZIRLO™ will be consistent with the approach accepted in WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A, and that confirmation of these conditions is part of the normal reload design process. Therefore, the NRC staff has concluded that this condition and limitation has been satisfied.

3.1.2.6 Condition and Limitation 6

LTA Data

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 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.

Safety Evaluation for WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A
Condition and Limitation 6

The NRC staff, in its letter to Westinghouse, "Satisfaction of Conditions 6 and 7 of the U.S. Nuclear Regulatory Commission Safety Evaluation for Westinghouse Electric Company Addendum 1 to WCAP-12610-P-A & CENPD-404-P-A, "Optimized ZIRLO™," Topical Report," August 3, 2016 (ADAMS Accession No. ML16173A354), concluded that:

Westinghouse [WEC] provided additional information from irradiation programs to comply with Conditions 6 and 7 of the safety evaluation in LTR-NRC-13-6 (ML13070A188) submitted in February 2013. WEC provided additional information on February 9th, 2015 in LTR-NRC-15-7. WEC only intends to satisfy Conditions 6 and 7 through the information provided in LTR-NRC-13-6 and LTR-NRC-15-7. The data provided in LTR-NRC-13-6 and LTR-15-7 satisfy Condition 6 and 7 and licensees no longer need to provide additional data when referencing WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A "Optimized ZIRLO" in future license amendment requests.

Based on this, the NRC staff concludes that this condition and limitation is satisfied.

3.1.2.7 Condition and Limitation 7

Cycle Data

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 W 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.

Safety Evaluation for WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A
Condition and Limitation 7

The NRC staff, in its letter to Westinghouse, "Satisfaction of Conditions 6 and 7 of the U.S. Nuclear Regulatory Commission Safety Evaluation for Westinghouse Electric Company Addendum 1 to WCAP-12610-P-A & CENPD-404-P-A, "Optimized ZIRLO™," Topical Report," August 3, 2016 (ADAMS Accession No. ML16173A354), concluded that:

Westinghouse [WEC] provided additional information from irradiation programs to comply with Conditions 6 and 7 of the safety evaluation in LTR-NRC-13-6 (ML13070A188) submitted in February 2013. WEC provided additional information on February 9th, 2015 in LTR-NRC-15-7. WEC only intends to satisfy Conditions 6 and 7 through the information provided in LTR-NRC-13-6 and LTR-NRC-15-7. The data provided in LTR-NRC-13-6 and LTR-15-7 satisfy Condition 6 and 7 and licensees no longer need to provide additional data when referencing WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A "Optimized ZIRLO" in future license amendment requests.

Therefore, the NRC staff concludes that this condition and limitation has been met.

3.1.2.8 Condition and Limitation 8

Yield Strength

The licensee shall account for the relative differences in unirradiated strength (YS and UTS) 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 analyses.*
- ii. Between BOL up to a radiation fluence of 3.0×10^{21} n/cm² (E>1 MeV), 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.*
- iii. During subsequent irradiation from 3.0×10^{21} n/cm² up to 12×10^{21} n/cm², the differences in strength (the difference at a fluence of 3×10^{21} n/cm² due to tin content) shall be decreased linearly such that the pseudoirradiated Optimized ZIRLO™ strengths will saturate at the same properties as standard ZIRLO™ at 12×10^{21} 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).

Safety Evaluation for WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A
Condition and Limitation 8

Exelon stated that future analysis of Optimized ZIRLO™ will use the yield strength and ultimate tensile strength as modified per Conditions 8.a.i, 8.a.ii, and 8.a.iii until such time as the irradiated data for Optimized ZIRLO™ cladding strengths have been collected and accepted by the NRC and that this is confirmed as part of the normal reload design process as required by the methodologies listed in TS 5.6.5.b. Therefore, the NRC staff concludes that this condition and limitation is satisfied.

Ginna uses a Westinghouse fuel design and, therefore, Condition and Limitation 8.b does not apply.

3.1.2.9 Condition and Limitation 9

LOCBART or STRIKIN-II early PCT

As discussed in response to RAI #21 (Reference 3), for plants introducing Optimized ZIRLO™ that are licensed with LOCBART or STRIKIN-II and have a limiting PCT 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.

Safety Evaluation for WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A
Condition and Limitation 9

Ginna is not licensed with LOCBART or STRIKIN-II. Therefore, the NRC staff has concluded that this condition and limitation does not apply to Ginna.

3.1.2.10 Condition and Limitation 10

Locked Rotor PCT

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 [proprietary limits included in topical report and proprietary version of safety evaluation].

Safety Evaluation for WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A
Condition and Limitation 10

Exelon has confirmed that the peak cladding temperature (PCT) limit during the locked rotor event will be assessed relative to the Westinghouse Optimized ZIRLO™ cladding PCT temperature and that this is confirmed as part of the normal reload design process. Therefore, the NRC staff has concluded that this condition and limitation has been satisfied.

3.1.4 Technical Conclusion

Based upon the NRC staff's prior approval of Optimized ZIRLO™ and the licensee's current and future compliance with the SE conditions and limitations, the staff finds that Ginna will continue to meet the requirements of GDC 10, 27, and 35. The TSs, as amended by the proposed changes to TS 4.2.1 and TS 5.6.5.b, will continue to meet the requirements of 10 CFR 50.36 and are acceptable, along with the future use of Optimized ZIRLO™ fuel cladding at Ginna.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of New York official was notified on April 12, 2017, of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the 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 amendment involves no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (November 8, 2016; 81 FR 78648). Accordingly, the amendment meets 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 amendment.

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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: J. Borromeo

Date: June 21, 2017

SUBJECT: R. E. GINNA NUCLEAR POWER PLANT – ISSUANCE OF AMENDMENT REGARDING USE OF OPTIMIZED ZIRLO™ (CAC NO. MF8299) DATED JUNE 21, 2017

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