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W3F1-2007-0020

April 24, 2007

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: License Amendment Request
To Allow the Use of Optimized ZIRLO™ Fuel Rod Cladding
Waterford Steam Electric Station, Unit 3
Docket No. 50-382
License No. NPF-38

REFERENCES: 1. Westinghouse Topical Reports WCAP-12610-P-A and
CENPD-404-P-A, Addendum 1-A, *Optimized ZIRLO™*

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests the following amendment for Waterford Steam Electric Station, Unit 3 (Waterford 3). Technical Specification (TS) 5.3.1, Fuel Assemblies, identifies, in part, Zircaloy or ZIRLO™ fuel rod cladding as the allowable fuel rod cladding material. The proposed change will add Optimized ZIRLO™ as an acceptable fuel rod cladding material.

Topical report WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A "Optimized ZIRLO™," prepared by Westinghouse Electric Company, LLC (Westinghouse), addresses Optimized ZIRLO™ and demonstrates that Optimized ZIRLO™ has essentially the same properties as currently licensed ZIRLO™. The topical report has been approved by the U.S. Nuclear Regulatory Commission (NRC).

The proposed change to the TS has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and it has been determined that this change involves no significant hazards consideration. The bases for these determinations are included in Attachment 1. A markup of the affected TS pages is included in Attachment 2.

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To support the change and pursuant to 10 CFR 50.12, Entergy is also requesting an exemption from certain requirements of 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light –Water Nuclear Power Reactors," and Appendix K to 10 CFR Part 50, "ECCS Evaluation Models" for Waterford 3. The exemption request relates solely to the specific types of cladding material specified in these regulations for use in light water reactors. As written, the regulations presume the use of either Zircaloy or ZIRLO™ fuel rod cladding. The exemption request is required since Optimized ZIRLO™ has a slightly different composition than Zircaloy or ZIRLO™. In addition, in July 2004, the NRC approved a similar exemption request for Waterford 3 to allow the use of Optimized ZIRLO™ fuel rod cladding in four lead test assemblies.

The proposed change includes new commitments as summarized in Attachment 4.

Entergy plans to introduce fuel assemblies containing fuel rods fabricated with Optimized ZIRLO™ cladding in future core reload applications starting in the spring of 2008. Entergy requests approval of the proposed amendment by January 31, 2008. Once approved, the amendment shall be implemented within 60 days. Although this request is neither exigent nor emergency, your prompt review is requested.

If you have any questions or require additional information, please contact Dana Millar at 601-368-5445.

I declare under penalty of perjury that the foregoing is true and correct. Executed on April 24, 2007.

Sincerely,



KTW/DM/mem/dpg

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Proposed Technical Specification Changes (mark-up)
3. Request for Exemption to the Cladding Material Specified in 10 CFR 50.46 and 10 CFR Part 50, Appendix K to Allow Use of Optimized ZIRLO™ in Core Reload Applications
4. List of Regulatory Commitments

cc: Dr. Bruce S. Mallett
U. S. Nuclear Regulatory Commission
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NRC Senior Resident Inspector
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95 Glastonbury Blvd.
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Attachment 1

W3F1-2007-0020

Analysis of Proposed Technical Specification Change

1.0 DESCRIPTION

This letter is a request to amend Operating License NPF-38 for Waterford Steam Electric Station, Unit 3 (Waterford 3).

The proposed change will revise the Operating License to allow the use of Optimized ZIRLO™ fuel rod cladding material. Acceptable fuel rod cladding material is identified in Waterford 3 Technical Specification (TS) 5.3.1, Fuel Assemblies. The proposed change will add Optimized ZIRLO™ fuel rod cladding material as an acceptable material.

An exemption from certain requirements of 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light –Water Nuclear Power Reactors," and Appendix K to 10 CFR Part 50, "ECCS Evaluation Models" is required to support this change. The exemption request is included as Attachment 3 of this letter.

2.0 PROPOSED CHANGE

The proposed change will revise Waterford 3 TS 5.3.1 by adding Optimized ZIRLO™ fuel rod cladding material as an acceptable material.

3.0 BACKGROUND

As the nuclear industry pursues longer operating cycles with increased fuel discharge burnup and fuel duty, the corrosion performance requirements for the nuclear fuel cladding become more demanding. Optimized ZIRLO™ was developed to meet these needs and provides a reduced corrosion rate while maintaining the benefits of mechanical strength and resistance to accelerated corrosion from abnormal chemistry conditions.

Optimized ZIRLO™ is described in WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A "Optimized ZIRLO™," prepared by Westinghouse Electric Company, LLC (Westinghouse). The topical report has been reviewed and approved by the NRC by letter dated June 10, 2005.

By regulatory definition, Optimized ZIRLO™ is a niobium-tin-iron (Nb-Sn-Fe) zirconium (Zr) based alloy with a microstructure comprised of a body-centered cubic ZrNb phase and a close-packed hexagonal ZrNbFe phase homogeneously distributed throughout the zirconium matrix.

Optimized ZIRLO™ fuel cladding is different from standard ZIRLO™ in two respects: 1) the tin content is lower; and 2) the microstructure is different. This difference in tin content and microstructure can lead to differences in some material properties. Most of the material properties of standard ZIRLO™ and Optimized ZIRLO™ are the same within the uncertainty of the data and therefore use of standard ZIRLO™ properties for safety analyses is acceptable. However, the NRC Safety Evaluation for Optimized ZIRLO™ suggests that the computer codes used to perform fuel design safety analyses incorporate the material properties of Optimized ZIRLO™.

The NRC staff approved Optimized ZIRLO™ fuel cladding based on: 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 application. The NRC Safety Evaluation included ten conditions and limitations, to which Entergy's response is provided below. The conditions and limitations specifically address the commitment requirement stated above.

4.0 TECHNICAL ANALYSIS

The Final Safety Evaluation for Addendum 1 to Topical Report WCAP-12610-P-A and CENPD-404-P-A, Optimized ZIRLO™ prepared by the NRC includes ten conditions and limitations. The reload process for Waterford 3 will ensure these conditions and limitations are met when a batch of Optimized ZIRLO™ is implemented. Waterford 3 will comply with these conditions and limitations as follows:

1. *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.*

An exemption request is included as Attachment 3 to this letter.

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

The fuel rod burnup limit for Waterford 3 is 60 GWd/MTU.

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

Using the best-estimate model, the maximum fuel rod waterside corrosion at Waterford 3 will be confirmed to be less than the corrosion limit specified in the topical report for all locations of the fuel rod.

4. *All 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.*

The fuel analysis of Optimized ZIRLO™ fuel rod cladding will continue to meet all conditions associated with methods approved for Waterford 3.

5. *All methodologies will be used only with the range for which ZIRLO™ and Optimized ZIRLO™ data were acceptable and for which the verification discussed in Addendum 1 and response to RAIs were performed.*

The application of ZIRLO™ and Optimized ZIRLO™ in approved methodologies will be made consistent with the approach accepted in WCAP-12610-P-A Addendum 1-A.

6. *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 [Reference 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.

Information confirming acceptability of the approved models for the first cycle has been provided by letter dated January 4, 2007 from J. A. Gresham (Westinghouse) to the NRC, "SER Compliance with WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A "Optimized ZIRLO™," (Proprietary / Non-proprietary), LTR-NRC-07-1. Entergy will confirm that Westinghouse will provide additional confirmatory data prior to subsequent cycles.

7. *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 [Reference 3]):*

- 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, measure 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.

Information confirming acceptability of the approved models for the first cycle has been provided by letter dated January 4, 2007 from J. A. Gresham (Westinghouse) to the NRC, "SER Compliance with WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A "Optimized ZIRLO™," (Proprietary / Non-proprietary), LTR-NRC-07-1. Entergy will confirm that Westinghouse will provide additional confirmatory data prior to subsequent cycles.

8. *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>1MeV), 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 3×10^{21} n/cm² (E>1MeV) minus 3 ksi.*
 - iii. *During subsequent irradiation from 3×10^{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 pseudo-irradiated 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 measure, unirradiated Optimized ZIRLO™ strengths shall be used for all fluence levels (consistent with previously approved methods).*

The fuel analysis of Optimized ZIRLO™ for Waterford 3 (CE fuel design) will use measured, unirradiated Optimized ZIRLO™ strengths for all fluence levels.

9. *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.

Waterford 3's ECCS performance analyses were performed using the STRIKIN-II computer code. The specified Optimized ZIRLO™ material properties have been implemented in the STRIKIN-II code.

10. *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 [a proprietary value listed in the topical report].*

This condition is for Westinghouse fuel designs and is not applicable to Waterford 3.

5.0 REGULATORY ANALYSIS

5.1 Applicable Regulatory Requirements/Criteria

The proposed changes have been evaluated to determine whether applicable regulations and requirements continue to be met. Entergy has determined that the proposed change to allow the use of Optimized ZIRLO™ fuel rod cladding material requires exemptions from 10 CFR 50.46, *Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors* and 10 CFR 50, Appendix K, *ECCS Evaluation Models*. Attachment 3 provides the basis and justification for relief from these regulations.

The proposed change does not require relief from any other regulatory requirements and does not affect conformance with any General Design Criterion (GDC) differently than described in the Safety Analysis Report (SAR).

5.2 No Significant Hazards Consideration

A change is proposed to the Design Features section of the Waterford Steam Electric Station, Unit 3 (Waterford 3) Technical Specifications (TSs) to include the allowance to use Optimized ZIRLO™ as a fuel rod cladding material.

Entergy Operations, Inc. has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No.

The NRC approved topical report WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A "Optimized ZIRLO™," prepared by Westinghouse Electric Company, LLC (Westinghouse), 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 cladding has been shown to meet all 10 CFR 50.46 design criteria and, therefore, will not increase the consequences of an accident.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No.

Use of Optimized ZIRLO™ clad fuel will not result in changes in the operation or configuration of the facility. Topical report WCAP-12610-P-A and 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 will perform similarly to those fabricated from standard ZIRLO™, thus precluding the possibility of the fuel becoming an accident initiator and causing a new or different type of accident.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

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

Response: No.

The proposed change will not involve a significant reduction in the 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 loss of coolant accident (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 be performed prior to the use of fuel assemblies with fuel rods containing Optimized ZIRLO™. These LOCA analyses will demonstrate that the acceptance criteria of 10 CFR 50.46 will be satisfied when Optimized ZIRLO™ fuel rod cladding is implemented.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, Entergy concludes that the proposed amendment 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.

5.3 Environmental Considerations

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

Attachment 2

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Proposed Technical Specification Changes (mark-up)

5.0 DESIGN FEATURES

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The reactor shall contain 217 fuel assemblies. Each assembly shall consist of a matrix of Zircaloy-4 or ZIRLO or Optimized ZIRLO™ fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO₂) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with 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 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 non-limiting core regions.

CONTROL ELEMENT ASSEMBLIES

5.3.2 The reactor core shall contain 87 control element assemblies.

5.4 NOT USED

5.5 METEOROLOGICAL TOWERS LOCATION

5.5.1 The primary and backup meteorological towers shall be located as shown on Figure 5.1-1.

Attachment 3

W3F1-2007-0020

**Request for Exemption to the Cladding Material Specified in 10 CFR 50.46 and
10 CFR Part 50, Appendix K to Allow Use of Optimized ZIRLO™ in
Core Reload Applications**

Purpose

Waterford Steam Electric Station, Unit 3 (Waterford 3) requests an exemption to 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," and Appendix K to 10 CFR Part 50, "ECCS Evaluation Models" to allow the use of Optimized ZIRLO™ fuel rod cladding in future core reload applications. The regulation in 10 CFR 50.46 contains acceptance criteria for the emergency core cooling system (ECCS) for reactors that have fuel rods fabricated either with Zircaloy or ZIRLO™. Appendix K to 10 CFR Part 50, paragraph I.A.5, requires the Baker-Just equation to be used to predict the rates of energy release, hydrogen concentration, and cladding oxidation for the metal-water reaction. The Baker-Just equation assumed the use of a zirconium alloy different than Optimized ZIRLO™. Therefore, an exemption to 10 CFR 50.46 and 10 CFR Part 50, Appendix K is required to support the use of Optimized ZIRLO™ fuel rod cladding. The exemption request relates solely to the specific cladding material specified in these regulations (i.e., fuel rods clad with Zircaloy or ZIRLO™). This request will provide for the application of the acceptance criteria of 10 CFR 50.46 to fuel assembly designs utilizing Optimized ZIRLO™ fuel cladding.

Background

As the nuclear industry pursues longer operating cycles with increased fuel discharge burnup and fuel duty, the corrosion performance requirements for the nuclear fuel cladding become more demanding. Optimized ZIRLO™ was developed to meet these needs and provides a reduced corrosion rate while maintaining the benefits of mechanical strength and resistance to accelerated corrosion from abnormal chemistry conditions.

Starting in the spring of 2008 the reloads for Waterford 3 will contain fuel rods clad with Optimized ZIRLO™.

Technical Justification of Acceptability

Westinghouse Electric Company, LLC (Westinghouse) topical report WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A "Optimized ZIRLO™" (Reference 1), provides the details and results of material testing of Optimized ZIRLO™ compared to standard ZIRLO™ as well as the material properties to be used in various models and methodologies when analyzing Optimized ZIRLO™. The NRC Safety Evaluation (SE) (Reference 2) for the topical report contains ten conditions and limitations. The first condition requires an exemption from 10 CFR 50.46 and 10 CFR Part 50, Appendix K. The remaining conditions and limitations are addressed in Attachment 1 of this letter.

The reload evaluation will ensure that acceptance criteria are met for the insertion of assemblies with fuel rods clad with Optimized ZIRLO™. These assemblies will be evaluated using NRC approved methods and models to address the use of Optimized ZIRLO™.

Justification of Exemption

10 CFR 50.12, "Specific exemptions," states that the NRC may grant exemptions from the requirements of the regulations of this part provided three conditions are met. The three conditions are: 1) the exemption is authorized by law; 2) the exemption will not present an undue risk to the health and safety of the public; and 3) the exemption is consistent with the common defense and security.

The requested exemption to allow the use of Optimized ZIRLO™ fuel rod cladding material rather than Zircaloy or ZIRLO™ for core reload applications at Waterford 3 satisfies these criteria as described below.

1. This exemption is authorized by law

As required by 10 CFR 50.12 (a)(1), this requested exemption is "authorized by law." The selection of a specified cladding material in 10 CFR 50.46 and implied in 10 CFR Part 50, Appendix K, was adopted at the discretion of the Commission consistent with its statutory authority. No statute required the NRC to adopt this specification. Additionally, the NRC has the authority under Section 50.12 to grant exemptions from the requirements of Part 50 upon showing proper justification. Further, it should be noted that, by submitting this exemption request, Waterford 3 does not seek an exemption from the acceptance and analytical criteria of 10 CFR 50.46 and 10 CFR Part 50, Appendix K. The intent of the request is solely to allow the use of criteria set forth in these regulations for application to the Optimized ZIRLO™ fuel rod cladding material.

2. This exemption will not present an undue risk to public health and safety

The reload evaluations will ensure that acceptance criteria are met for the insertion of assemblies with fuel rods clad with Optimized ZIRLO™. Fuel assemblies using Optimized ZIRLO™ fuel rod cladding will be evaluated using NRC approved analytical methods and plant specific models to address the changes in the cladding material properties. The safety analysis for Waterford 3 is supported by site specific TSs. Reload cores are required to be operated in accordance with the operating limits specified in the TSs. Thus, the granting of this exemption request will not pose an undue risk to public health and safety.

3. This exemption is consistent with common defense and security

As noted above, the exemption request is only to allow the application of the aforementioned regulations to an improved fuel rod cladding material. All the requirements and acceptance criteria will be maintained. The special nuclear material in these assemblies is required to be handled and controlled in accordance with approved procedures. Use of full regions of Optimized ZIRLO™ fuel rod cladding in the Waterford 3 core will not affect plant operations and is consistent with common defense and security.

Special circumstances support the issuance of an exemption

10 CFR 50.12(a)(2) states that the NRC will not consider granting an exemption to the regulations unless special circumstances are present. The requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii) which states that, "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not

necessary to achieve the underlying purpose of the rule.” In this particular circumstance, application of the subject regulations is not necessary to achieve the underlying purpose of the rule.

10 CFR 50.46 identifies acceptance criteria for ECCS performance at nuclear power plants. Due to the similarities in the material properties of the Optimized ZIRLO™ and standard ZIRLO™, the current ECCS analysis approach remains applicable. Westinghouse will perform evaluations of the Waterford 3 core using approved LOCA methods to ensure that assemblies with Optimized ZIRLO™ fuel rod cladding material meet all LOCA safety criteria.

The intent of 10 CFR Part 50, Appendix K, paragraph I.A.5 is to apply an equation for rates of energy release, hydrogen generation, and cladding oxidation from a metal-water reaction that conservatively bounds all post-LOCA scenarios (i.e., the Baker-Just equation). Application of the Baker-Just equation has been demonstrated to be appropriate for the Optimized ZIRLO™ alloy (Reference 1). Due to the similarities in the composition of the Optimized ZIRLO™ and standard ZIRLO™ fuel rod cladding materials, the application of the Baker-Just equation will continue to conservatively bound all post-LOCA scenarios.

Conclusion

The acceptance criteria and requirements of 10 CFR 50.46 and 10 CFR Part 50, Appendix K currently are limited in applicability to the use of fuel rods clad with Zircaloy or ZIRLO™. 10 CFR 50.46 and 10 CFR Part 50, Appendix K do not apply to the proposed use of Optimized ZIRLO™ fuel rod cladding material since Optimized ZIRLO™ has a slightly different composition than Zircaloy or ZIRLO™. With the approval of this exemption request, these regulations will be applied to Optimized ZIRLO™.

In order to support the use of Optimized ZIRLO™ fuel rod cladding material, an exemption from the requirements of 10 CFR 50.46 and 10 CFR Part 50, Appendix K is requested. As required by 10 CFR 50.12, the requested exemption is authorized by law, does not present undue risk to public health and safety, and is consistent with common defense and security. Approval of this exemption request does not violate the underlying purpose of the rule. In addition, special circumstances do exist to justify the approval of an exemption from the subject requirements.

References

1. WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A “Optimized ZIRLO™,” July 2006
2. Letter dated June 10, 2005 from U.S. Nuclear Regulatory Commission to Mr. James A. Gresham (Westinghouse), “Final Safety Evaluation for Addendum 1 to Topical Report WCAP-12610-P-A and CENPD-404-P-A, “Optimized ZIRLO™,” (TAC No. MB8041)
3. Letter dated January 4, 2007 from J. A. Gresham (Westinghouse) to U. S Nuclear Regulatory Commission, “SER Compliance with WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A “Optimized ZIRLO™,” (Proprietary / Non-proprietary), LTR-NRC-07-1

Attachment 4

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List of Regulatory Commitments

List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE- TIME ACTION	CONTINUING COMPLIANCE	
The reload process for Waterford 3 will ensure the conditions and limitations of the NRC SER for Optimized ZIRLO™ as addressed in Attachment 1 are met when a batch of Optimized ZIRLO™ is implemented.		x	
Entergy will confirm that Westinghouse will provide additional confirmatory data associated with LTA programs at other facilities prior to subsequent cycles of operation with Optimized ZIRLO™ fuel rod cladding.		x	Confirmation will continue until average assembly burnup for the LTA programs at the other facilities reach the licensed average fuel rod burnup limit for Waterford 3 (60 GWD/MTU).