Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

December 21, 2010
NOC-AE-10002623
File No.: G25
10 CFR 50.90
10 CFR 50.12

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2746

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, 50-499
License Amendment Request
Proposed Revision to Technical Specifications 5.3.1 and 6.9.1.6 to
Allow Fuel Assemblies with Optimized ZIRLO™ Cladding

Reference: NRC Document Control Desk to James J. Sheppard, STPNOC, "Exemption from the Requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix K and Section 50.46," dated October 19, 2004 (ML042940500)

In accordance with the provisions of 10 CFR 50.90, STP Nuclear Operating Company (STPNOC) hereby requests an amendment to South Texas Project Operating Licenses NPF-76 and NPF-80. This license amendment will revise Technical Specification (TS) 5.3.1 to add Optimized ZIRLO™ as an approved fuel rod cladding material, and TS 6.9.1.6.b to add a Westinghouse topical report to the analytical methods used to determine the core operating limits. This change is consistent with use of Optimized ZIRLO™ for fuel rod cladding material as described in Addendum 1-A to Westinghouse topical report WCAP-12610-P-A & CENPD-404-P-A, "Optimized ZIRLO™." The amendment request is provided as Enclosure 1.

The Nuclear Regulatory Commission approved a previous STPNOC request for 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 50, "ECCS Evaluation Models" (referenced above). The exemption allows use of up to eight lead test assemblies containing fuel rods with Optimized ZIRLO™ cladding. Pursuant to 10 CFR 50.12, this application includes a request to extend the exemption to allow more than the initial eight lead test assemblies in core reloads. The exemption request is provided as Enclosure 2.

STPNOC requests NRC approval of this alternate approach by October 30, 2011, with implementation to follow within 30 days, to support subsequent refueling outage activities.

The STPNOC Plant Operations Review Committee has reviewed and concurred with the proposed change.

In accordance with 10 CFR 50.91(b), STPNOC is notifying the State of Texas of this request for license amendment by providing a copy of this letter and its attachment.

A001
NRR

STI: 32790259

Commitments included with this request are listed in Enclosure 3.

If there are any questions, please contact either Mr. P. L. Walker at (361) 972-8392 or me at (361) 972-7566.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 12-21-2010.
Date

G. T. Powell
Vice President,
Technical Support & Oversight

PLW

Enclosures:
1. Evaluation of the Proposed Change
2. Request for Exemption from the Provisions of 10 CFR 50.46 and 10 CFR Part 50 Appendix K to Use Optimized ZIRLO™ Fuel Rod Cladding
3. List of Commitments

cc:
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SOUTH TEXAS PROJECT
UNITS 1 AND 2

ENCLOSURE 1

EVALUATION OF THE PROPOSED CHANGE

SUBJECT: EVALUATION OF THE PROPOSED CHANGE TO TECHNICAL SPECIFICATIONS 5.3.1 AND 6.9.1.6 TO INCORPORATE OPTIMIZED ZIRLO™ FUEL ROD CLADDING

SOUTH TEXAS PROJECT
UNITS 1 AND 2

EVALUATION OF THE PROPOSED CHANGE

1.0 SUMMARY DESCRIPTION

Acceptable fuel rod cladding material is identified in South Texas Project (STP) Technical Specification (TS) 5.3.1, "Fuel Assemblies". The proposed change adds Optimized ZIRLO™ as an acceptable fuel rod cladding material at STP.

Analytical methods used to determine core operating limits are listed in TS 6.9.1.6, "Core Operating Limits Report (COLR)." The proposed change adds Westinghouse topical report WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," July 2006, as the basis for acceptability of Optimized ZIRLO™ for fuel rod cladding at STP.

In addition, references to "ZIRLO" are correctly restated as "ZIRLO™." This is only a clarification of nomenclature.

2.0 DETAILED DESCRIPTION

Technical Specification 5.3.1 currently states:

> The reactor core shall contain 193 fuel assemblies. Each fuel assembly shall consist of a matrix of zircaloy or ZIRLO clad fuel rods with an initial composition of natural or slightly enriched uranium dioxide as fuel material. Limited substitutions of zirconium alloy, 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 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.

Technical Specification 5.3.1 will be revised to state:

> The reactor core shall contain 193 fuel assemblies. Each fuel 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 as fuel material. Limited substitutions of zirconium alloy, 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 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.

Technical Specification 6.9.1.6.b lists the following among the analytical methods used to determine core operating limits:

8. WCAP-12610-P-A, "VANTAGE+ Fuel Assembly Reference Core Report," April 1995 (W Proprietary).

Westinghouse Electric Company, LLC (Westinghouse) topical report WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," 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™. Consequently, Technical Specification 6.9.1.6.b.8 will be revised as:

8.1 WCAP-12610-P-A, "VANTAGE+ Fuel Assembly Reference Core Report," April 1995 (W Proprietary)

8.2 WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," July 2006 (W Proprietary)

As the nuclear industry pursues longer operating cycles with increased fuel discharge burnup and more aggressive fuel management, corrosion performance requirements for nuclear fuel cladding become more demanding. In addition, fuel rod internal pressures (resulting from increased fuel duty, use of integral fuel burnable absorbers and corrosion/temperature feedback effects) have become more limiting with respect to fuel rod design criteria. Available industry data from the American Nuclear Society, the International Atomic Energy Agency, the Electric Power Research Institute, and Westinghouse indicate fuel rod cladding corrosion resistance improves with a lower tin content. The optimum tin concentration provides a reduced corrosion rate while maintaining the benefits of mechanical strengthening and resistance to accelerated corrosion from abnormal chemistry conditions. Optimized ZIRLO™ was developed to meet these needs. Reducing the associated corrosion buildup and thus minimizing temperature feedback effects adds design margin over fuel rod internal pressure.

Optimized ZIRLO™ is described in Westinghouse topical report WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™."

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 50, "ECCS Evaluation Models," is required to support this change. The request for exemption is included as Enclosure 2 to this application.

3.0 TECHNICAL EVALUATION

WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, provides the details and results of material testing of Optimized ZIRLO™ compared to standard ZIRLO™, as well as the material properties to be used when analyzing Optimized ZIRLO™. By letter dated June 10, 2005, the NRC staff issued a safety evaluation (Addendum 1 SE) approving Addendum 1-A to WCAP-12610-P-A & CENPD-404-P-A (ML051670408), in which the NRC staff approved the use of Optimized ZIRLO™ as a fuel cladding material 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.

NRC approval for specific use of the topical report to incorporate Optimized ZIRLO™ requires compliance with ten conditions and limitations provided in the topical report SE. The South Texas Project will comply 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*

   RESPONSE:

   The request for exemption from 10 CFR 50.46 and 10 CFR Part 50, Appendix K is included as Attachment 2 of this application.

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.*

   RESPONSE:

   For any fuel using Optimized ZIRLO™ fuel rod cladding, the maximum fuel rod burnup limit for Westinghouse fuel designs continues to be 62 GWd/MTU until such time that a new fuel rod burnup limit is approved for use.

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.*

RESPONSE:

The maximum fuel rod waterside corrosion for the fuel product using Optimized ZIRLO™ fuel cladding will be confirmed to be less than the limits included in the topical report safety evaluation for hydrides for all locations of the fuel rod. Confirmation of these modified limits for Optimized ZIRLO™ fuel cladding is required as part of the core reload process.

4. *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.*

RESPONSE:

Analysis of Optimized ZIRLO™ fuel cladding will continue to meet all conditions associated with approved methods. This is a current requirement and confirmation of these conditions is required as part of the core reload process.

5. *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.*

RESPONSE:

Application of ZIRLO™ and Optimized ZIRLO™ 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™," July 2006. This is a current requirement and confirmation of these conditions is required as part of the core reload process.

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):

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.

RESPONSE:

a) Westinghouse has provided the NRC with information related to test data and models in the following correspondence:

- J. A. Gresham (Westinghouse) to U.S. Nuclear Regulatory Commission, "SER Compliance with WCAP-12610-P-A and CENDP-404-P-A, Addendum 1-A, "Optimized ZIRLO™," LTR-NRC-07-01, January 4, 2007
- J. A. Gresham (Westinghouse) to U.S. Nuclear Regulatory Commission, "SER Compliance with WCAP-12610-P-A and CENDP-404-P-A, Addendum 1-A, "Optimized ZIRLO™," LTR-NRC-07-58, November 6, 2007 (ML073130556)
- J. A. Gresham (Westinghouse) to U.S. Nuclear Regulatory Commission, "SER Compliance with WCAP-12610-P-A and CENDP-404-P-A, Addendum 1-A, "Optimized ZIRLO™," LTR-NRC-07-58 Rev. 1, February 5, 2008 (ML080390451)
- J. A. Gresham (Westinghouse) to U.S. Nuclear Regulatory Commission, "SER Compliance of WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," LTR-NRC-08-60, December 30, 2008

- J. A. Gresham (Westinghouse) to U.S. Nuclear Regulatory Commission, "SER Compliance of WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," LTR-NRC-10-43, July 26, 2010.

b) Lead Test Assembly (LTA) measured data and favorable results from visual examinations of once, twice, and thrice-burned LTAs confirm, for three cycles of operation, that the current fuel performance models are applicable for Optimized ZIRLO™ clad fuel rods. Westinghouse will continue to provide additional data from the Optimized ZIRLO™ LTA programs to the NRC as it becomes available. 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. Until the commitment is complete, STPNOC will confirm that, as higher burnups/fluences are achieved for Optimized ZIRLO™ clad fuel rods, the requirements of this condition are met as it applies to STP Units 1 and 2. [Commitment #1: see Enclosure 3]

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):*

   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.

RESPONSE:

a) Westinghouse provided the NRC with information related to test data and models in correspondence listed in response to Question #6.

b) Data from three cycles of operation have been evaluated and the fuel rod creep models from fuel rod design codes have been used to predict growth and creep performance of the samples. This information was provided to the NRC in the most recent informational letter (W LTR-NRC-10-43) dated July 26, 2010. 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. Until the commitment is complete, STPNOC will confirm that the requirements of this condition are met as it applies to STP Units 1 and 2. [Commitment #2: see Enclosure 3]

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 x 10^{21} n/cm^2 (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 3.0 x 10^{21} n/cm2 (E>IMeV), irradiated strength of standard ZIRLO™ at the fluence of 3.0 x 10^{21} n/cm^2 (E> 1MeV) minus 3 ksi.*
      iii. *During subsequent irradiation from 3.0 x 10^{21} n/cm^2 up to 12 x 10^{21} n/cm^2, the differences in strength (the difference at a fluence of 3 x 10^{21} n/cm^2 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 x 10^{21} n/cm^2.*

   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).*

RESPONSE:

a) The relative differences in unirradiated strength (YS and UTS) between Optimized ZIRLO™ and standard ZIRLO™ in cladding and structural analyses will be accounted for until irradiation data for Optimized ZIRLO™ is accepted by the NRC staff. Analysis of Optimized ZIRLO™ clad fuel rods 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 that irradiation data for Optimized ZIRLO™ strengths are collected and provided to the NRC. Until the values are accepted by the NRC, STPNOC will confirm that the requirements of this condition are met as it applies to STP Units 1 and 2. [Commitment #3: see Enclosure 3]

b) The South Texas Project is a Westinghouse fuel design plant; therefore, 8.b is not applicable.

9. *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 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.*

RESPONSE:

In all pertinent cases, Large Break LOCA calculations for the South Texas Project show that peak clad temperature occurs during the late reflood portion of the transient. Therefore, a LOCBART calculation using the Optimized ZIRLO™ specific heat model is not required for STP Units 1 and 2. In addition, the South Texas Project is not licensed with STRIKIN-II. Therefore, the condition and limitation do not apply.

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

RESPONSE:

The Westinghouse limit on PCT during the locked rotor event is assessed relative to the [proprietary limits included in topical report and proprietary version of safety evaluation] PCT limit as part of the core reload design process.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

The NRC has allowed use of Optimized ZIRLO™ fuel cladding material in Westinghouse reactors provided that licensees ensure compliance with the conditions and limitations set forth within the NRC SE for Westinghouse topical report WCAP-12610-P-A & CENPD-404-P-A, "Optimized ZIRLO™," Addendum 1-A. Each of the limits and conditions were specifically addressed for their applicability to STP Units 1 and 2 within the technical section of this amendment request. In summary, core reload evaluations ensure the acceptance criteria are met for all the limitations and conditions for the insertion of assemblies with fuel rods clad with Optimized ZIRLO™ in compliance with 10 CFR 50.59 requirements. These assemblies are evaluated using NRC-approved methods and models to address use of Optimized ZIRLO™. Additionally, STPNOC will confirm that prior to initial batch loading and prior to the startup of subsequent cycles for Optimized ZIRLO™ clad fuel rods, the requirement conditions of NRC Safety Evaluation items 6.b, 7.b, and 8.a are met as they apply to STP Units 1 and 2. See commitments listed in Enclosure 3.

The proposed change has been evaluated to validate those regulations and requirements continue to be met.

An exemption 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," is required. The request for exemption is provided as Attachment 2 and provides the basis and justification for relief from these regulations.

4.2 Precedent

The Nuclear Regulatory Commission approved a previous STPNOC request for 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 50, "ECCS Evaluation Models." See correspondence from the NRC Document Control Desk to James J. Sheppard, STPNOC, "Exemption from the Requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix K and Section 50.46," dated October 19, 2004 (ML042940500). The exemption allows use of up to eight lead test assemblies containing fuel rods with Optimized ZIRLO™ cladding.

4.3 Significant Hazards Consideration

STPNOC 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 proposed Technical Specification change is to add Optimized ZIRLO™ to the allowable or approved cladding materials to be used at the South Texas Project. Adding Optimized ZIRLO™ cladding material does not increase the probability or consequences of an accident previously evaluated.

   Westinghouse topical report WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A "Optimized ZIRLO™," July 2006, 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™. 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. In addition, fuel rod internal pressures (resulting from the increased fuel duty, use of integral fuel burnable absorbers, and corrosion/temperature feedback effects) have become more limiting with respect to fuel rod design criteria. Reducing the associated corrosion buildup and thus minimizing temperature feedback effects, provides additional margin to the fuel rod internal pressure design criterion. Therefore, adding Optimized ZIRLO™ to the approved fuel rod cladding materials does not significantly increase the probability or consequences of an accident previously evaluated.

   The NRC allows Optimized ZIRLO™ to be used as fuel cladding material in Westinghouse-fueled reactors provided that licensees ensure compliance with the conditions and limitations set forth within NRC Safety Evaluation for the topical report. The conditions and limitations are the current requirements and confirmation of these conditions is required as part of the core reload process.

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

Response: No.

Optimized ZIRLO™ provides a reduced fuel cladding corrosion rate while maintaining the benefits of mechanical strength and resistance to accelerated corrosion from abnormal chemistry conditions. The fuel rod design bases are established to satisfy the general and specific safety criteria addressed in UFSAR Chapter 15, Accident Analyses and in Technical Specifications. Fuel rods are designed to prevent excessive fuel temperatures, excessive internal rod gas pressures due to fission gas releases, and excessive cladding stresses and strains. WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A "Optimized ZIRLO™,' July 2006, 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 original design-basis requirements are maintained. Therefore, the change in material does not create the possibility of an accident or malfunction not previously evaluated.

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

Response: No.

The cladding material used in the fuel rods is designed and tested to prevent excessive fuel temperatures, excessive internal rod gas pressure due to fission gas releases, and excessive cladding stresses and strains. 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. Westinghouse topical report WCAP-12610-P-A & CENPD-404-P-A, "Optimized ZIRLO™," July 2006, 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 approved use of Optimized ZIRLO™ fuel cladding material as detailed in the Safety Evaluation. The original design-basis requirements are maintained.

The change in material does not significantly reduce margin required to preclude or reduce the effects of an accident or malfunction previously evaluated in the UFSAR. 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.

4.4 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) 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.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment to include Optimized ZIRLO™ would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. 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.

6.0 IMPLEMENTATION

Approval of the proposed amendment is requested by October 30, 2011, with implementation to follow within 30 days, to support subsequent refueling outage activities.

7.0 REFERENCES

1. WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," July 2006.

2. Letter from H. N. Berkow (USNRC) to J. A. Gresham (Westinghouse), "Final Safety Evaluation for Addendum 1 to Topical Report WCAP-12610-P-A & CENPD-404-P-A, 'Optimized ZIRLO™'," June 10, 2005.

3. Letter from J. A. Gresham (Westinghouse) to USNRC (Document Control Desk), "SER Compliance with WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, 'Optimized ZIRLO™'," LTR-NRC-07-1, January 4, 2007.

4. Letter from J. A. Gresham (Westinghouse) to USNRC (Document Control Desk), "SER Compliance with WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, 'Optimized ZIRLO™'," LTR-NRC-07-58, November 6, 2007.

5. Letter from J. A. Gresham (Westinghouse) to USNRC (Document Control Desk), "SER Compliance with WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, 'Optimized ZIRLO™'," LTR-NRC-07-58, Rev. 1, February 5, 2008.

6. Letter from J. A. Gresham (Westinghouse) to USNRC (Document Control Desk), "SER Compliance of WCAP-12610-P-A & CENPD-404-P-A Addendum 1-A, 'Optimized ZIRLO™'," LTR-NRC-08-60, December 30, 2008.

7. Letter from J. A. Gresham (Westinghouse) to USNRC (Document Control Desk), "SER Compliance of WCAP-12610-P-A & CENPD-404-P-A Addendum 1-A, 'Optimized ZIRLO™'," LTR-NRC-10-43, July 26, 2010.

ATTACHMENT 1

PAGES WITH PROPOSED CHANGES FOR
PROPOSED REVISION TO TECHNICAL SPECIFICATION 5.3.1 AND 6.9.1.6 TO
ALLOW FUEL ASSEMBLIES WITH OPTIMIZED ZIRLO™ CLADDING

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 193 fuel assemblies. Each fuel assembly shall consist of a matrix of zircaloy ~~or ZIRLO~~, ZIRLO™, or Optimized ZIRLO™ clad fuel rods with an initial composition of natural or slightly enriched uranium dioxide as fuel material. Limited substitutions of zirconium alloy, ~~ZIRLO~~ 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 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 ROD ASSEMBLIES

5.3.2 The core shall contain 57 full-length control rod assemblies. The full-length control rod assemblies shall contain a nominal 158.9 inches of absorber material. The absorber material within each assembly shall be silver-indium-cadmium or hafnium. Mixtures of hafnium and silver-indium-cadmium are not permitted within a bank. All control rods shall be clad with stainless steel tubing.

5.4 (NOT USED)

5.5 METEOROLOGICAL TOWER LOCATION

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

5.6 FUEL STORAGE

5.6.1 CRITICALITY

5.6.1.1 The spent fuel storage racks are designed and shall be maintained with:

6.9.1.6.b (continued)

5. Westinghouse letter NS-TMA-2198, T.M. Anderson (Westinghouse) to K. Kniel (Chief of Core Performance Branch, NRC) January 31,1980 - Attachment: Operation and Safety Analysis Aspects of an Improved Load Follow Package.

(Methodology for Specification 3.2.1 - Axial Flux Difference (Constant Axial Offset Control). Approved by NRC Supplement No. 4 to NUREG-0422, January 1981, Docket Nos. 50-369 and 50-370.)

6. NUREG-0800, Standard Review Plan, U. S. Nuclear Regulatory Commission, Section 4.3, Nuclear Design, July 1981. Branch Technical Position CPB 4.3-1, Westinghouse Constant Axial Offset Control (CAOC), Rev. 2, July 1981.

(Methodology for Specification 3.2.1 - Axial Flux Difference (Constant Axial Offset Control).)

7. WCAP-10266-P-A, Rev. 2, WCAP-11524-NP-Al Rev. 2, "The 1981 Version of the Westinghouse ECCS Evaluation Model Using the BASH Code," Kabadi, J.N., et al., March 1987; including Addendum 1-A, "Power Shape Sensitivity Studies," December 1987 and Addendum 2-A, "BASH methodology Improvements and Reliability Enhancements," May 1988.

(Methodology for Specification 3.2.2 - Heat Flux Hot Channel Factor.)

~~8. WCAP-12610-P-A, "VANTAGE+ Fuel Assembly Reference Core Report," April 1995 (W Proprietary).~~

8.1 WCAP-12610-P-A, "Vantage+ Fuel Assembly Reference Core Report," April 1995 (W Proprietary)

8.2 WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," July 2006 (W Proprietary)

(Methodology for Specification 3.2.2 - Heat Flux Hot Channel Factor.)

9. CENPD-397-P-A, Revision 01 , "Improved Flow Measurement Accuracy Using Crossflow Ultrasonic Flow Measurement Technology," May 2000.

(Methodology for operating at a RATED THERMAL POWER of 3,853 Mwt)

10. WCAP-13749-P-A, "Safety Evaluation Supporting the Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement," March 1997, (W Proprietary)

(Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient.)

11. WCAP 12472-P-A, BEACON Core Monitoring and Operations Support System, "August 1994 (W Proprietary)

(Methodology for Specification 3.2.1 – Axial Flux Difference, 3.2.2 – Heat Flux Hot Channel Factor, 3.2.3 – Nuclear Enthalpy Rise Hot Channel Factor)

ATTACHMENT 2

REVISED PAGES FOR
PROPOSED REVISION TO TECHNICAL SPECIFICATIONS 5.3.1 AND 6.9.1.6 TO
ALLOW FUEL ASSEMBLIES WITH OPTIMIZED ZIRLO™ CLADDING

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 193 fuel assemblies. Each fuel 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 as fuel material. Limited substitutions of zirconium alloy, 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 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.

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(Methodology for Specification 3.2.1 - Axial Flux Difference (Constant Axial Offset Control). Approved by NRC Supplement No. 4 to NUREG-0422, January 1981, Docket Nos. 50-369 and 50-370.)

6. NUREG-0800, Standard Review Plan, U. S. Nuclear Regulatory Commission, Section 4.3, Nuclear Design, July 1981. Branch Technical Position CPB 4.3-1, Westinghouse Constant Axial Offset Control (CAOC), Rev. 2, July 1981.

(Methodology for Specification 3.2.1 - Axial Flux Difference (Constant Axial Offset Control)

7. WCAP-10266-P-A, Rev. 2, WCAP-11524-NP-Al Rev. 2, "The 1981 Version of the Westinghouse ECCS Evaluation Model Using the BASH Code," Kabadi, J.N., et al., March 1987; including Addendum 1-A, "Power Shape Sensitivity Studies," December 1987 and Addendum 2-A, "BASH methodology Improvements and Reliability Enhancements," May 1988.

(Methodology for Specification 3.2.2 - Heat Flux Hot Channel Factor.)

8.1 WCAP-12610-P-A, "Vantage+ Fuel Assembly Reference Core Report," April 1995 (W Proprietary)

8.2 WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," July 2006 (W Proprietary)

(Methodology for Specification 3.2.2 - Heat Flux Hot Channel Factor.)

9. CENPD-397-P-A, Revision 01, "Improved Flow Measurement Accuracy Using Crossflow Ultrasonic Flow Measurement Technology," May 2000.

(Methodology for operating at a RATED THERMAL POWER of 3,853 Mwt)

10. WCAP-13749-P-A, "Safety Evaluation Supporting the Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement," March 1997, (W Proprietary)

(Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient.)

11. WCAP 12472-P-A, "BEACON Core Monitoring and Operations Support System," August 1994 (W Proprietary)

(Methodology for Specification 3.2.1 – Axial Flux Difference, 3.2.2 – Heat Flux Hot Channel Factor, 3.2.3 – Nuclear Enthalpy Rise Hot Channel Factor)

ENCLOSURE 2

SOUTH TEXAS PROJECT
UNITS 1 AND 2

REQUEST FOR EXEMPTION FROM THE PROVISIONS OF 10 CFR 50.46 AND 10 CFR PART 50 APPENDIX K TO USE OPTIMIZED ZIRLO™ FUEL ROD CLADDING

SOUTH TEXAS PROJECT
UNITS 1 AND 2

REQUEST FOR EXEMPTION FROM THE PROVISIONS OF 10 CFR 50.46 AND 10 CFR PART 50 APPENDIX K TO USE OPTIMIZED ZIRLO™ FUEL ROD CLADDING

1.0 PURPOSE

STP Nuclear Operating Company (STPNOC) requests an exemption from the provisions 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," to allow fuel rods with Optimized ZIRLO™ cladding to be used in core reloads for the South Texas Project. 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™ cladding. 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 assumes 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 allow 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 with Zircaloy or ZIRLO™ cladding). This request will 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 utilizing Optimized ZIRLO™ fuel rod cladding.

2.0 BACKGROUND

As the nuclear industry pursues longer operating cycles with increased fuel discharge burnup and more aggressive fuel management, corrosion performance requirements for nuclear fuel cladding become more demanding. In addition, fuel rod internal pressures (resulting from increased fuel duty, use of integral fuel burnable absorbers (IFBAs) and corrosion/temperature feedback effects) have become more limiting with respect to fuel rod design criteria.

Optimized ZIRLO™ was developed to meet these needs. Industry data from the American Nuclear Society, the International Atomic Energy Agency, the Electric Power Research Institute, and Westinghouse indicate corrosion resistance improves for cladding with a lower tin content. The optimum tin content provides a reduced corrosion rate while maintaining the benefits of mechanical strengthening and resistance to accelerated corrosion from abnormal chemistry conditions. Reducing the associated corrosion buildup and thus minimizing temperature feedback effects increases margin to fuel rod internal pressure design criteria.

Technical Specification (TS) changes are required to allow the use of Optimized ZIRLO™ fuel rod cladding for core reload applications. The license amendment request for these changes is provided as Enclosure 1.

3.0 TECHNICAL JUSTIFICATION

Westinghouse Electric Company LLC (Westinghouse) topical report WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™" (Reference 1), provides the details and results of 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™ fuel rod cladding. 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 (which is being requested via this letter). Westinghouse has provided the NRC with information related to test data and models (References 3 through 7) to address conditions and limitations 6 and 7. Condition and limitation 9 requires a LOCBART calculation if the limiting peak clad temperature (PCT) occurs during blowdown or early reflood. A review of the South Texas Units 1 and 2 Large Break LOCA calculations reveals that in all pertinent cases, PCT occurs during the late reflood portion of the transient. Therefore, a LOCBART calculation using the Optimized ZIRLO™ specific heat model is not required for South Texas Units 1 and 2. The remaining conditions and limitations are addressed in the South Texas Units 1 and 2 TS changes and evaluations required to support core reload activities. Since plant-specific TS changes are required prior to utilizing Optimized ZIRLO™ fuel rod cladding, no new commitments are necessary to support NRC approval of this exemption request.

The reload evaluations will ensure that acceptance criteria are met for insertion of assemblies with fuel rods clad with Optimized ZIRLO™ material under 10 CFR 50.59 requirements. These assemblies will be evaluated using NRC-approved methods and models to address use of Optimized ZIRLO™ fuel rod cladding.

4.0 JUSTIFICATION OF EXEMPTION

10 CFR 50.12, "Specific exemptions," states that the Nuclear Regulatory Commission may grant exemptions from the requirements of this part provided three conditions are met:

- The exemption is authorized by law;
- The exemption will not present an undue risk to the health and safety of the public; and
- The exemption is consistent with common defense and security.

The requested exemption to allow use of Optimized ZIRLO™ cladding material in addition to Zircaloy or ZIRLO™ for core reload applications satisfies these criteria as described below:

1. **This exemption is authorized by law.**

   The NRC has the authority under the Atomic Energy Act of 1954, as amended, to grant exemptions from its regulations if doing so would not violate the requirements of law. This exemption is authorized by law as is required by 10 CFR 50.12. Selection of a specific cladding material in 10 CFR 50.46, and implied in 10 CFR 50 Appendix K, is 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 with provision of proper justification. Furthermore, this request does not seek an exemption from the acceptance and analytical criteria of 10 CFR 50.44, 10 CFR 50.46, and 10 CFR 50 Appendix K. The request is intended only to allow application of these regulations to Optimized ZIRLO™ fuel rod cladding.

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

   The reload evaluations will ensure that these acceptance criteria are met following insertion of assemblies containing Optimized ZIRLO™. Fuel assemblies using Optimized ZIRLO™ 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 the South Texas Project is supported by the applicable technical specifications. Reload cores are required to be operated in accordance with the operating limits specified in the technical specifications. Therefore, this exemption will not pose an undue risk to public health and safety.

3. **This exemption is consistent with common defense and security.**

   The exemption will only allow application of regulatory requirements to an improved fuel rod cladding material. Requirements and acceptance criteria will be maintained. Special nuclear material in these assemblies will continue to be handled and controlled in accordance with approved procedures. Use of full regions of fuel rods with Optimized ZIRLO™ cladding in South Texas Project Units 1 and 2 will not adversely affect plant operations and is consistent with common defense and security.

5.0 SPECIAL CIRCUMSTANCES

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.

The underlying purpose of 10 CFR 50.44 is to ensure that there is an adequate means of controlling generated hydrogen. The hydrogen produced in a post-LOCA scenario comes from a reaction between water and zirconium. Using Optimized ZIRLO™ will have no significant effect on current assessments of hydrogen gas production.

10 CFR 50.46 identifies acceptance criteria for ECCS performance at nuclear power plants. Due to similarities in the material properties of Optimized ZIRLO™ and standard ZIRLO™, the current ECCS analysis approach remains applicable. Evaluation of the South Texas Project cores using existing LOCA methods will ensure the assemblies with Optimized ZIRLO™ fuel rod cladding material meet all LOCA safety criteria.

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

6.0 CONCLUSION

10 CFR 50.46 and 10 CFR 50, Appendix K, do not include use of Optimized ZIRLO™ fuel assemblies. Tin content in Optimized ZIRLO™ fuel rod cladding is below the lower bound of the licensing basis for ZIRLO™ (i.e., 0.80%) as defined in WCAP-12610-P-A. In addition, paragraph I.A.5 of 10 CFR 50 Appendix K, "ECCS Evaluation Models," references an analysis utilizing the Baker-Just equation which assumes use of a zirconium alloy different from the Optimized ZIRLO™ used in the lead test assemblies. With the approval of this exemption request, these regulations will be applied to Optimized ZIRLO™ fuel rod cladding.

In order to pursue application of Optimized ZIRLO™ fuel rod cladding material at the South Texas Project, an exemption from the requirements of 10 CFR 50.46 and

10 CFR 50, Appendix K is necessary. Approval of an exemption from the subject requirements is justified by special circumstances. 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 the common defense and security. Approval of this exemption request does not violate the underlying purpose of the rule.

7.0 IMPLEMENTATION

Approval of the requested exemption is requested by October 30, 2011, with implementation within 30 days, to support subsequent refueling activities.

8.0 References

1. WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," July 2006.

2. Letter from H. N. Berkow (USNRC) to J. A. Gresham (Westinghouse), "Final Safety Evaluation for Addendum 1 to Topical Report WCAP-12610-P-A & CENPD-404-P-A, 'Optimized ZIRLO™'," June 10, 2005.

3. Letter from J. A. Gresham (Westinghouse) to USNRC (Document Control Desk), "SER Compliance with WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, 'Optimized ZIRLO™'," LTR-NRC-07-1, January 4, 2007.

4. Letter from J. A. Gresham (Westinghouse) to USNRC (Document Control Desk), "SER Compliance with WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, 'Optimized ZIRLO™'," LTR-NRC-07-58, November 6, 2007.

5. Letter from J. A. Gresham (Westinghouse) to USNRC (Document Control Desk), "SER Compliance with WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, 'Optimized ZIRLO™'," LTR-NRC-07-58, Rev. 1, February 5, 2008.

6. Letter from J. A. Gresham (Westinghouse) to USNRC (Document Control Desk), "SER Compliance of WCAP-12610-P-A & CENPD-404-P-A Addendum 1-A, 'Optimized ZIRLO™'," LTR-NRC-08-60, December 30, 2008.

7. Letter from J. A. Gresham (Westinghouse) to USNRC (Document Control Desk), "SER Compliance of WCAP-12610-P-A & CENPD-404-P-A Addendum 1-A, 'Optimized ZIRLO™'," LTR-NRC-10-43, July 26, 2010.

ENCLOSURE 3

SOUTH TEXAS PROJECT
UNITS 1 & 2

LIST OF COMMITMENTS

SOUTH TEXAS PROJECT
UNITS 1 & 2
LIST OF COMMITMENTS

The following commitments are given in Enclosure 1.

COMMITMENT	TRACKING NUMBER	IMPLEMENTATION DATE
#1. Lead Test Assembly (LTA) measured data and favorable results from visual examinations of once, twice, and thrice-burned LTAs confirm, for three cycles of operation, that the current fuel performance models are applicable for Optimized ZIRLO™ clad fuel rods. Westinghouse will continue to provide additional data from the Optimized ZIRLO™ LTA programs to the NRC as it becomes available. 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. Until the commitment is complete, STPNOC will confirm that, as higher burnups/fluences are achieved for Optimized ZIRLO™ clad fuel rods, the requirements of this condition are met as it applies to STP Units 1 and 2.	10-24696-03	Prior to loading fuel rods with Optimized ZIRLO™ cladding
#2. Data from three cycles of operation have been evaluated and the fuel rod creep models from fuel rod design codes have been used to predict growth and creep performance of the samples. This information was provided to the NRC in the most recent informational letter (W LTR-NRC-10-43) dated July 26, 2010. 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. Until the commitment is complete, STPNOC will confirm that the requirements of this condition are met as it applies to STP Units 1 and 2.	10-24696-04	Prior to loading fuel rods with Optimized ZIRLO™ cladding
#3. The relative differences in unirradiated strength (YS and UTS) between Optimized ZIRLO™ and standard ZIRLO™ in cladding and structural analyses will be accounted for until irradiation data for Optimized ZIRLO™ is accepted by the NRC staff. Analysis of Optimized ZIRLO™ clad fuel rods 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 that irradiation data for Optimized ZIRLO™ strengths are collected and provided to the NRC. Until the values are accepted by the NRC, STPNOC will confirm that the requirements of this condition are met as it applies to STP Units 1 and 2.	10-24696-05	Prior to loading fuel rods with Optimized ZIRLO™ cladding