



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

March 30, 2012

Mr. Christopher L. Burton  
Vice President  
Shearon Harris Nuclear Power Plant  
Progress Energy Carolinas, Inc.  
Post Office Box 165, Mail Code: Zone 1  
New Hill, North Carolina 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 – ISSUANCE OF  
AMENDMENT RE: THE USE OF AREVA'S M5™ ADVANCED ALLOY IN FUEL  
CLADDING AND FUEL ASSEMBLY COMPONENTS (TAC NO. ME5409)

Dear Mr. Burton:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 137 to Renewed Facility Operating License No. NPF-63 for the Shearon Harris Nuclear Power Plant Unit 1 (HNP). This amendment changes the HNP Technical Specifications (TSs) in response to your application dated January 13, 2011, as supplemented by letters dated October 6, 2011, February 24, and March 20, 2012.

The amendment revises HNP TS 5.3.1 "Fuel Assemblies" to change the description of fuel assemblies and adds the AREVA NP Inc. Topical Report BAW-10240(P)-A, "Incorporation of M5™ Properties in Framatome ANP Approved Methods," to the analytical methods referenced in TS 6.9.1.6. "Core Operating Limits Report." The amendment also deletes existing analytical methodologies that are no longer planned to be used by the licensee in TS 6.9.1.6.2 to allow the use of M5™ alloy for fuel rod cladding in future operating cycles.

A copy of the related safety evaluation is enclosed. A notice of issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

*Araceli T. Billoch Colón*

Araceli T. Billoch Colón, Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-400

Enclosures:

1. Amendment No. 137 to NPF-63
2. Safety Evaluation

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

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-400

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 137  
Renewed License No. NPF-63

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Carolina Power & Light Company (the licensee), dated January 13, 2011, as supplemented by letters dated October 6, 2011, February 24, and March 20, 2012, 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 Title 10 of the *Code of Federal Regulations* (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 Renewed Facility Operating License and Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Facility Operating License No. NPF-63 are hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No.137 , are hereby incorporated into this license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

This license amendment is effective as of the date of its issuance and shall be implemented within 90 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Douglas A. Broaddus, Chief  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Renewed License,  
and Technical Specifications

Date of Issuance: March 30, 2012

ATTACHMENT TO LICENSE AMENDMENT NO. 137

RENEWED FACILITY OPERATING LICENSE NO. NPF-63

DOCKET NO. 50-400

Replace the following page of the renewed facility operating license with the revised page. The revised page is identified by amendment number and contains a line in the margin indicating the area of change.

Remove  
Page 4

Insert  
Page 4

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 lines in the margin indicating the area of change.

Remove  
5-6  
6-24b

Insert  
5-6  
6-24b

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified or incorporated below.

(1) Maximum Power Level

Carolina Power & Light Company is authorized to operate the facility at reactor core power levels not in excess of 2900 megawatts thermal (100 percent rated core power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No. 137, are hereby incorporated into this license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Antitrust Conditions

Carolina Power & Light Company shall comply with the antitrust conditions delineated in Appendix C to this license.

(4) Initial Startup Test Program (Section 14)<sup>1</sup>

Any changes to the Initial Test Program described in Section 14 of the FSAR made in accordance with the provisions of 10 CFR 50.59 shall be reported in accordance with 50.59(b) within one month of such change.

(5) Steam Generator Tube Rupture (Section 15.6.3)

Prior to startup following the first refueling outage, Carolina Power & Light Company shall submit for NRC review and receive approval if a steam generator tube rupture analysis, including the assumed operator actions, which demonstrates that the consequences of the design basis steam generator tube rupture event for the Shearon Harris Nuclear Power Plant are less than the acceptance criteria specified in the Standard Review Plan, NUREG-0800, at 15.6.3 Subparts II(1) and (2) for calculated doses from radiological releases. In preparing their analysis Carolina Power & Light Company will not assume that operators will complete corrective actions within the first thirty minutes after a steam generator tube rupture.

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<sup>1</sup> The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

## DESIGN FEATURES

### DESIGN PRESSURE AND TEMPERATURE

- 5.2.2 The containment building is designed and shall be maintained for a maximum internal pressure of 45.0 psig and a peak air temperature of 380°F.

### 5.3 REACTOR CORE

#### FUEL ASSEMBLIES

- 5.3.1 The core shall contain 157 fuel assemblies with each fuel assembly normally containing 264 fuel rods clad with Zircaloy-4 or M5. Limited substitution of fuel rods by filler rods (consisting of Zircaloy-4 or M5 clad stainless steel or zirconium), or vacancies may be made in fuel assemblies if justified by a cycle specific evaluation. Should more than a total of 30 fuel rods or more than 10 fuel rods in any one assembly be replaced per refueling, a Special Report describing the number of rods replaced will be submitted to the Commission, pursuant to Specification 6.9.2, within 30 days after cycle startup. Each fuel rod shall have a nominal active fuel length of 144 inches. The initial core loading shall have a maximum enrichment of 3.5 weight percent U 235. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 5.0 weight percent U-235.

#### CONTROL ROD ASSEMBLIES

- 5.3.2 The core shall contain 52 shutdown and control rod assemblies. The shutdown and control rod assemblies shall contain a nominal 142 inches of absorber material. The nominal values of absorber material shall be 80% silver, 15% indium, and 5% cadmium, or 95% hafnium with the remainder zirconium. All control rods shall be clad with stainless steel tubing.

### 5.4 REACTOR COOLANT SYSTEM

#### DESIGN PRESSURE AND TEMPERATURE

- 5.4.1 The Reactor Coolant System is designed and shall be maintained:
- In accordance with the Code requirements specified in Section 5.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements,
  - For a pressure of 2485 psig, and
  - For a temperature of 650°F, except for the pressurizer which is 680°F.

#### VOLUME

- 5.4.2 The total water and steam volume of the Reactor Coolant System is approximately 10,300 cubic feet at a nominal  $T_{avg}$  of 588.8°F.

## ADMINISTRATIVE CONTROLS

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### 6.9.1.6 CORE OPERATING LIMITS REPORT (Continued)

- h. ANF-88-054(P)(A), "PDC-3: Advanced Nuclear Fuels Corporation Power Distribution Control for Pressurized Water Reactors and Application of PDC-3 to H. B. Robinson Unit 2," approved version as specified in the COLR.

(Methodology for Specification 3.2.1 - Axial Flux Difference, and 3.2.2 - Heat Flux Hot Channel Factor).
- i. EMF-92-081(P)(A), "Statistical Setpoint/Transient Methodology for Westinghouse Type Reactors," approved version as specified in the COLR.

(Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient, 3.1.3.5 - Shutdown Bank Insertion Limits, 3.1.3.6 - Control Bank Insertion Limits, 3.2.1 - Axial Flux Difference, 3.2.2 - Heat Flux Hot Channel Factor, and 3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor).
- j. EMF-92-153(P)(A), "HTP: Departure from Nucleate Boiling Correlation for High Thermal Performance Fuel," approved version as specified in the COLR.

(Methodology for Specification 3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor).
- k. BAW-10240(P)(A), "Incorporation of M5 Properties in Framatome ANP Approved Methods."

(Methodology for Specification 3.1.1.2 - SHUTDOWN MARGIN - MODES 3, 4 and 5, 3.1.1.3 - Moderator Temperature Coefficient, 3.1.3.5 - Shutdown Bank Insertion Limits, 3.1.3.6 - Control Bank Insertion Limits, 3.2.1 - Axial Flux Difference, 3.2.2 - Heat Flux Hot Channel Factor, 3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor, and 3.9.1 - Boron Concentration).
- l. EMF-96-029(P)(A), "Reactor Analysis Systems for PWRs," approved version as specified in the COLR.

(Methodology for Specification 3.1.1.2 - SHUTDOWN MARGIN - MODES 3, 4 and 5, 3.1.1.3 - Moderator Temperature Coefficient, 3.1.3.5 - Shutdown Bank Insertion Limits, 3.1.3.6 - Control Bank Insertion Limits, 3.2.1 - Axial Flux Difference, 3.2.2 - Heat Flux Hot Channel Factor, 3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor, and 3.9.1 - Boron Concentration).
- m. EMF-2328(P)(A) PWR Small Break LOCA Evaluation Model, S-RELAP5 Based, approved version as specified in the COLR.

(Methodology for Specification 3.2.1 - Axial Flux Difference, 3.2.2 - Heat Flux Hot Channel Factor, and 3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor).
- n. EMF-2310(P)(A), "SRP Chapter 15 Non-LOCA Methodology for Pressurized Water Reactors", approved version as specified in the COLR.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 137 TO RENEWED FACILITY

OPERATING LICENSE NO. NPF-63

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

1.0 INTRODUCTION

By letter to the U.S. Nuclear Regulatory Commission (NRC, the Commission) dated January 13, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML110250265), as supplemented by letters dated October 6, 2011 (ML11286A254), February 24 (ML12065A017), and March 20, 2012 (ML12080A217), the Carolina Power & Light Company (the licensee), doing business as Progress Energy Carolinas Inc., submitted a license amendment request (LAR) to revise the Technical Specifications (TSs) to the Renewed Facility Operating License No. NPF-63 for Shearon Harris Nuclear Plant, Unit 1 (HNP). The amendment revises HNP TS 5.3.1 "Fuel Assemblies" to change the description of fuel assemblies and adds the AREVA NP Inc. Topical Report BAW-10240(P)-A, "Incorporation of M5™ Properties in Framatome ANP [FANP] Approved Methods," (Reference 1) to the analytical methods referenced in TS 6.9.1.6 "Core Operating Limits Report."

The amendment also deletes existing analytical methodologies that are no longer planned to be used by the licensee in TS 6.9.1.6.2 to allow the use of M5™ alloy for fuel rod cladding in future operating cycles.

The October 6, 2011, February 24, and March 20, 2012, supplements provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's initial proposed no significant hazards consideration, as published in the *Federal Register* on April 19, 2011.

2.0 REGULATORY EVALUATION

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.90, "Application for amendment of license, construction permit, or early site permit," allow a licensee to file an application for an amendment. Section 50.92, "Issuance of Amendment," of 10 CFR specifies that, when considering an LAR the Commission will be guided by the considerations that govern the issuance of initial licenses to the extent applicable and appropriate in determining whether an amendment to a license will be issued to the applicant.

The proposed TS changes will be evaluated to ensure continued compliance with the requirements of 10 CFR 50.36(c)(2)(ii). This regulation provides that:



*(ii) A technical specification limiting condition for operation of a nuclear reactor must be established for each item meeting one or more of the following criteria:*

*(A) Criterion 1. Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.*

*(B) Criterion 2. A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.*

*(C) Criterion 3. A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.*

*(D) Criterion 4. A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.*

Compliance with this regulation requires a licensee to maintain a list of approved analytical methods used to establish potentially cycle-specific core operating limits, per Generic Letter (GL) 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications."

The regulations for the review of the fuel rod cladding materials and fuel system designs are provided in 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems [ECCS] for light-water nuclear power reactors," and Appendix A, "General Design Criteria [GDC] for Nuclear Power Plants," to 10 CFR Part 50, GDC 4 "Environmental and dynamic effects design bases," GDC 10 "Reactor design," GDC 20 "Protection system functions," GDC 25 "Protection system requirements for reactivity control malfunctions," GDC 27 "Combined Reactivity Control Systems Capability," GDC 28 "Reactivity limits," and GDC 35 "Emergency Core Cooling Systems."

The NRC staff also reviewed the fuel system in accordance to Section 4.2 "Fuel System Design" of the Standard Review Plan (SRP) to ensure: (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.

Section 50.46 of 10 CFR Part 50 requires that the calculated ECCS performance for reactors with zircaloy or ZIRLO fuel cladding meet certain criteria. Appendix K to 10 CFR Part 50, "ECCS Evaluation Models," presumes the use of zircaloy or ZIRLO fuel cladding when doing calculations for energy release, cladding oxidation, and hydrogen generation after a postulated loss-of-coolant accident (LOCA). On February 24, 2012, the NRC granted an exemption to HNP from these requirements of 10 CFR Part 50, Section 50.46, and Appendix K to 10 CFR Part 50 to allow use of M5™ Fuel Cladding (ADAMS Accession No. ML12025A161).

The properties of the M5™ alloy material relevant to fuel design and safety analyses are

documented in the NRC-approved Topical Report BAW-10227(P)-A, "Evaluation of Advanced Cladding and Structural Material (M5™) in PWR [pressurized-water reactor] Reactor Fuel" (Reference 2). This report describes the use AREVA M5™ to replace Zircaloy-4 in the construction of fuel assembly cladding in PWRs core structural components such as fuel rod cladding, guide tubes and spacer grids.

### 3.0 TECHNICAL EVALUATION

#### 3.1 TS 5.3.1 "Fuel Assemblies"

HNP core consists of 157 fuel assemblies. Each fuel assembly consists of 264 fuel rods that are arranged in 17 x 17 arrays. The fuel rods consist of slightly enriched uranium dioxide cylindrical ceramic pellets, encapsulated or "clad" with a cylindrical Zircaloy or ZIRLO tube. The licensee is proposing to use the M5™ alloy for fuel rod cladding in future operating cycles. The LAR proposes modifying the fuel assembly description within TS 5.3.1. The NRC staff reviewed the LAR to ensure that operation with M5™ fuel cladding, in accordance with the proposed changes, will be within conditions of operation necessary for application of Topical Report BAW-10227(P)-A.

The current fuel cladding used at HNP is Zircaloy-4, as stated in HNP TS 5.3.1. M5™ is a zirconium alloy FANP proprietary material composed of zirconium and niobium developed by AREVA. M5™ cladding provides improved performance in fuel cladding corrosion and hydrogen pickup as compared with standard Zircaloy-4. The licensee stated in the application that the proposed change will have no adverse impact on safety since all required safety limits for future operating cycles at HNP with M5™ clad fuel would continue to be analyzed using NRC-approved methodologies.

##### 3.1.1 Structural Properties and Failure Mechanisms

Framatome Cogema Fuels (FCF) evaluated the structural and material properties of M5™ in Topical Report BAW-10227(P)-A. The NRC staff in the safety evaluation (SE) dated February 2, 2000, concluded that the use of M5™ as cladding would have either no significant impact or would produce an improvement in performance and increased margins for the following parameters and analyses: (1) fuel rod internal pressure, (2) cladding strain and stress criteria, (3) fuel centerline melting temperature, (4) fuel rod cladding fatigue, (5) cladding creep collapse, (6) fuel rod bow, (7) high temperature swelling and rupture, and (8) high temperature oxidation and crud buildup.

FCF evaluated fuel failure thresholds and analysis methods for failure mechanism listed in Section 4.2 of the NRC SRP. When failure thresholds are applied for normal operation, including AOOs, they are used as specified acceptance fuel design limits since fuel failure under these conditions should not occur according to the traditional conservative interpretation of GDC 10. When these thresholds are used for postulated accidents, fuel failures are permitted and must be accounted for in the dose assessments required by 10 CFR Part 100 "Reactor Site Criteria." The NRC staff concluded in the SE dated February 2, 2000 that FCF has shown that the use of M5™ alloy will have no significant adverse impact on radiological doses calculated for those accidents for which the release of radionuclides is postulated.

The licensee stated in the submittal that no new failure mechanism will be introduced by the changes being requested. Topical Report BAW-10240(P)-A describes that the material

properties of the M5<sup>TM</sup> clad fuel are similar to or better than those of Zircaloy-4 and that the possibility of the fuel becoming an accident initiator and causing a new or different type of accident are precluded. The NRC staff evaluated Topical Report BAW-10240(P)-A by considering the criteria to maintain core coolability during postulated accidents as required by the GDC criteria and the failure mechanisms that are listed in the Section 4.2 of the SRP. The NRC staff found Topical Report BAW-10240(P)-A acceptable in the SE dated May 5, 2004. Therefore, since HNP meets the criteria for Topical Report BAW-10240(P)-A, the NRC staff finds the structural properties and failure mechanisms of M5<sup>TM</sup> acceptable for HNP.

### 3.1.2 Material Properties

Topical Report BAW-10240(P)-A describes the incorporation of the NRC-approved M5<sup>TM</sup> material properties into a set of AREVA approved mechanical analyses, LOCA, small break LOCA (SBLOCA), and non-LOCA methodologies. AREVA concluded that the results of accident evaluations will approximate those for current cladding and not comprise a decrease in the safety performance for plants using the M5<sup>TM</sup> cladding. Topical Report BAW-10240(P)-A also demonstrates that the effectiveness of the ECCS will not be affected by a change of cladding from Zircaloy to M5<sup>TM</sup>.

The NRC Staff's approval of BAW-10240(P)-A was subject to four conditions.

Condition 1: *The corrosion limit, as predicted by the best-estimate model will remain below 100 microns for all locations of the fuel.*

The licensee stated in its October 6, 2011, letter that the restriction that corrosion limit, as predicted by the best-estimate model, will remain below 100 microns for all locations of the fuel is implemented in AREVA design processes. A scoping study of M5<sup>TM</sup> implementation was performed by AREVA and confirmed that the fuel mechanical limits can be satisfied for the HNP 17 x 17 HTP fuel design.

Condition 2: *All of the conditions listed in the SEs for all FANP methodologies used for M5<sup>TM</sup> fuel analysis will continue to be met, except that the use of M5<sup>TM</sup> cladding in addition to Zircaloy-4 cladding is now approved.*

The licensee has incorporated the conditions from the approved safety evaluations as restrictions in AREVA design procedures and guidelines that control the core reload designs provided to the HNP as stated in its October 6, 2011, letter.

Condition 3: *All FANP methodologies will be used only within the range for which M5<sup>TM</sup> data was acceptable and for which the verifications discussed in BAW-10240 (P) was performed.*

The licensee stated in its October 6, 2011, letter that the limitations to ensure FANP methodologies will be used only within the range for which M5<sup>TM</sup> data were acceptable and for which the verifications discussed in BAW-10240(P) was performed are incorporated as restrictions in AREVA design procedures and guidelines that control the core reload designs provided to HNP.

Condition 4: *The burnup limit for this approval is 62 GWd/MTU [gigawatt-days per metric ton uranium].*

The licensee stated in its October 6, 2011, letter that the burnup limitation is not changed for the 17 x 17 HTP fuel assemblies. Burnup limits identified in approved methodologies are contained in HNP core functional requirements and AREVA design processes, which are currently limited to 62 (GWd/MTU).

Based on the above evaluation, HNP meets the conditions established in Topical Report BAW-10227(P)-A. The NRC staff SE dated February 4, 2000 approved Topical Report BAW-10227(P)-A and found the use of M5<sup>TM</sup> cladding acceptable; therefore, the use of M5<sup>TM</sup> cladding at HNP and the proposed change to TS 5.3.1 are acceptable.

### 3.2 Core Operating Limit Report

HNP TS 6.9.1.6.2 provides a list of approved analytical methods used in the design and safety analysis of core reloads. The licensee proposes to revise HNP TS 6.9.1.6.2 to add Topical Report BAW-10240(P)-A, to the list of approved methodologies to permit the use of M5<sup>TM</sup> alloy for fuel rod cladding in future operating cycles. Section 3.1, above, documents that the new analytical methods are applicable to the licensee and will be used in accordance with established conditions and limitations. The NRC staff finds that the proposed changes to TS 6.9.1.6.2 maintain compliance with the requirements of 10 CFR 50.36(c)(2)(ii) and are, therefore, acceptable.

The licensee also proposes to delete Topical Report XN-NF-82-49(P)-A, "Exxon Nuclear Company Evaluation Model EXEM PWR Small Break Model," from HNP TS 6.9.1.6.2.k upon implementation of this proposed change. Topical Report XN-NF-82-49(P)-A methodologies are used to perform the SBLOCA analysis at HNP and will no longer be applicable to HNP upon the implementation of the proposed amendment and transition to M5<sup>TM</sup> fuel cladding. Instead, the SBLOCA analysis will be performed using the methodology of EMF-2328(P)-A, "PWR Small Break LOCA evaluation Model, S-RELAP Based" (Reference 3), which was approved for use at HNP in license Amendment No. 114 on March 23, 2008 (Reference 4).

Based on the above evaluation, the NRC staff finds the proposed HNP TS 6.9.1.2 changes to be acceptable. The changes to the TS maintain compliance with the requirements of 10 CFR 50.36(c)(2)(ii) and are consistent with the guidance contained in GL 88-16.

### 3.3 Conclusion

The NRC staff has reviewed the licensee's request to use the M5<sup>TM</sup> advanced alloy for fuel rod cladding in lieu of zircaloy or ZIRLO. Based on its review, the NRC staff concludes that the use of M5<sup>TM</sup> clad fuel for HNP as specified in the HNP TSs, is acceptable.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of North Carolina official was notified 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 installation or use of a facility component 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 (April 19, 2011; 76 FR 21922). 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 NRC 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) such activities will be conducted in compliance with the NRC'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.

## 7.0 REFERENCES

1. Letter from NRC to Framatome ANP, Final SE for Topical Report BAW-10240(P)-A, "Incorporation of M5™ Properties in Framatome ANP Approved Methods," May 5, 2004, ADAMS Accession No. ML041260560.
2. Revised Safety Evaluation for Topical Report BAW-10227(P)-A, "Evaluation of Advanced Cladding and Structural Material (M5™) in PWR Reactor Fuel," February 4, 2000, ADAMS Accession No ML003681490.
3. EMF-2329(P)-A, "PWR Small Break LOCA Evaluation Model, S-RELAP5 Based," Framatome AREVA ANP Richland, Inc. January 2000.
4. Letter from NRC to J. Scarola, "Shearon Harris Nuclear Power Plant, Unit 1 – Issuance of Amendment Re: Addition of Methodology References to Core Operating Limits Report (TAC. No. MB6226)," March 28, 2003, ADAMS Accession No. ML030940153.

Principal Contributor: Mathew Panicker

Date: March 30, 2012

March 30, 2012

Mr. Christopher L. Burton  
Vice President  
Shearon Harris Nuclear Power Plant  
Progress Energy Carolinas, Inc.  
Post Office Box 165, Mail Code: Zone 1  
New Hill, North Carolina 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 – ISSUANCE OF  
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Sincerely,

*/RA/*

Araceli T. Billoch Colón, Project Manager  
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ADAMS Accession No.: ML12058A133

\*By memo

OFFICE	LPL2-2/PM	LPL2-2/LA	SNPB/BC*	STSB/BC	OGC NLO	LPL2-2/BC	LPL2-2/PM
NAME	ABillochColón	BClayton	AMendiola	RElliott w/ comment	CKanatas	DBroadus	ABillochColón
DATE	03/22/12	03/22/12	02/23/12	03/27/12	03/27/12	03/30/12	03/30/12

OFFICIAL RECORD COPY