



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

February 6, 2012

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 – ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT REGARDING USE OF M5<sup>TM</sup> ALLOY FUEL ROD CLADDING (TAC. NO ME5410)

Dear Mr. Burton:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for an exemption dated January 19, 2011, (Agencywide Document Management System (ADAMS) Accession No. ML110250473) for the Shearon Harris Nuclear Power Plant (HNP), Unit 1, for the Carolina Power & Light Company (the licensee), doing business as Progress Energy Carolinas Inc. The proposed action would exempt the licensee from certain requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," and Appendix K to 10 CFR 50, "ECCS [Emergency Core Cooling System] Evaluation Models," to allow for the use of M5<sup>TM</sup> alloy fuel rod cladding. Specifically, 10 CFR 50.46, paragraph (a)(1)(i) provides requirements for reactors containing uranium oxide fuel pellets clad in either zircaloy or ZIRLO. Additionally, Appendix K to 10 CFR Part 50 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. Therefore, both of these regulations state or assume that either zircaloy or ZIRLO is used as the fuel rod cladding material. The proposed exemption would allow the licensee to use M5<sup>TM</sup> clad fuel assemblies in the core of HNP, Unit 1.

The assessment is being forwarded to the Office of the Federal Register for publication. If you have any questions, please contact me at (301)-415-3302.

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

Enclosure: Environmental Assessment

cc w/enclosure: Distribution via ListServ

NUCLEAR REGULATORY COMMISSION  
CAROLINA POWER & LIGHT COMPANY  
SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1  
DOCKET NO. 50-400  
ENVIRONMENTAL ASSESSMENT AND  
FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (NRC) is considering issuance of an exemption pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," and 10 CFR Part 50, Appendix K, "ECCS [Emergency Core Cooling System] Evaluation Models," to allow for the use of M5™ alloy fuel rod cladding for Renewed Facility Operating License No. NPF-63, issued to Carolina Power & Light Company (the licensee), doing business as Progress Energy Carolinas Inc., for operation of the Shearon Harris Nuclear Power Plant, Unit 1 (HNP), located in New Hill, North Carolina. In accordance with 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments," the NRC staff prepared an environmental assessment documenting its finding. The NRC staff concluded that the proposed action will have no significant environmental impact.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action:

The proposed action would exempt the licensee from certain requirements of 10 CFR 50.46 and Appendix K to 10 CFR Part 50. Specifically, 10 CFR 50.46, paragraph (a)(1)(i) provides requirements for reactors containing uranium oxide fuel pellets clad in either zircaloy or ZIRLO. Additionally, Appendix K to 10 CFR Part 50 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. Therefore, both of these regulations state or assume that either zircaloy or ZIRLO is used as the fuel rod cladding material. The proposed exemption would allow the licensee use of M5<sup>TM</sup> cladding fuel assemblies into the core of HNP Unit 1. The proposed action is in accordance with the licensee's application dated January 19, 2011.

The Need for the Proposed Action:

The proposed exemption is needed to allow the licensee the use of M5<sup>TM</sup> alloy fuel rod cladding at HNP. The licensee has requested an exemption from the requirements of 10 CFR 50.46 and 10 CFR 50, Appendix K to 10 CFR Part 50 to allow for loading of M5<sup>TM</sup> cladding fuel assemblies, in lieu of zircaloy or ZIRLO, into the core during Refueling Outage 17 that is currently scheduled for spring 2012.

Environmental Impacts of the Proposed Action:

The NRC has completed its evaluation of the proposed action and concludes that there are no environmental impacts associated with the proposed exemption. The details of the NRC staff's safety evaluation will be provided in the exemption that, if approved by the NRC, will be issued as part of the letter to the licensee approving the exemption to the regulation.

The proposed action will not significantly increase the probability or consequences of accidents. No changes are being made in the types of effluents that may be released offsite. There is no significant increase in the amount of any effluent released offsite. There is no significant increase in occupational or public radiation exposure. Therefore, there are no significant radiological environmental impacts associated with the proposed action.

With regard to potential nonradiological impacts, the proposed action does not result in changes to land use or water use, or result in changes to the quality or quantity of nonradiological effluents. No changes to the National Pollutant Discharge Elimination System permit are needed. No effects on the aquatic or terrestrial habitat in the vicinity of the plant, or

to threatened, endangered, or protected species under the Endangered Species Act, or impacts to essential fish habitat covered by the Magnuson-Stevens Act are expected. No impacts to the air or ambient air quality are expected. There are no impacts to historic and cultural resources. In addition, there are also no known socioeconomic or environmental justice impacts associated with the proposed action. Therefore, there are no significant nonradiological environmental impacts associated with the proposed action.

Accordingly, the NRC concludes that there are no significant environmental impacts associated with the proposed action.

Environmental Impacts of the Alternatives to the Proposed Action:

As an alternative to the proposed action, the NRC staff considered denial of the proposed action (i.e., the “no action” alternative). Denial of the exemption request would result in no change in current environmental impacts. If the proposed action was denied, the licensee would have to comply with the ECCS rules in 10 CFR 50.46 and Appendix K to 10 CFR Part 50 and would not be able to use M5™ clad fuel in the HNP core during the upcoming refueling outage. The environmental impacts of the proposed exemption and the “no action” alternative are similar.

Alternative Use of Resources:

The action does not involve the use of any different resources than those considered in the Final Environmental Statement for HNP, NUREG-0972, dated October 31, 1983, as supplemented through the “Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Shearon Harris Nuclear Power Plant, Unit 1 - Final Report (NUREG-1437, Supplement 33).”

Agencies and Persons Consulted:

In accordance with its stated policy, on January 19, 2012 the NRC staff consulted with the North Carolina State official, Mr. Lee Cox of the Division of Radiation Protection, with the

North Carolina Department of Environment and Natural Resources, regarding the environmental impact of the proposed action. The State official had no comments.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the environmental assessment, the NRC concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's letter dated January 19, 2011. These documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, Public File Area O-1F21, 11555 Rockville Pike (first floor), Rockville, Maryland 20852. Publicly available documents created or received at the NRC are accessible electronically through the Agencywide Document Access and Management System (ADAMS) in the NRC Library at <http://www.nrc.gov/reading-rm/adams.html>.

Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC PDR Reference staff by telephone at 1-800-397-4209 or 301-415-4737, or send an e-mail to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov).

Dated at Rockville, Maryland, this 6th day of February 2012.

FOR THE NUCLEAR REGULATORY COMMISSION

*Araceli T. Billoch Colón*

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

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Docket No. 50-400

Enclosure: Environmental Assessment

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