



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

January 3, 2011

Mr. George H. Gellrich, Vice President
Calvert Cliffs Nuclear Power Plant, LLC
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 -
ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT
IMPACT FOR USE OF M5 CLADDING (TAC NOS. ME5154 AND ME5155)

Dear Mr. Gellrich:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for an exemption dated November 23, 2009. The proposed exemption would allow the use of M5 advanced alloy at the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2.

The assessment is being forwarded to the Office of the Federal Register for publication.

Sincerely,

A handwritten signature in cursive script that reads "Douglas V. Pickett".

Douglas V. Pickett, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosure:
Environmental Assessment

cc w/encl: Distribution via Listserv

UNITED STATES NUCLEAR REGULATORY COMMISSION
CALVERT CLIFFS NUCLEAR POWER PLANT, LLC
DOCKET NOS. 50-317 AND 50-318
CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2
ENVIRONMENTAL ASSESSMENT AND FINDING OF
NO SIGNIFICANT IMPACT

The Nuclear Regulatory Commission (NRC) is considering issuance of an exemption from Title 10 of the *Code of Federal Regulations* (10 CFR) 50.46 and 10 CFR Part 50, Appendix K, for Facility Operating License Nos. DPR-53 and DPR-69, issued to Calvert Cliffs Nuclear Power Plant, LLC, the licensee, for operation of the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (Calvert Cliffs), located in Calvert County, Maryland. Therefore, as required by 10 CFR 51.21, the NRC is issuing this environmental assessment and finding of no significant impact.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action:

The proposed action would provide an exemption from the requirements of: (1) 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," which requires that the calculated emergency core cooling system (ECCS) performance for reactors with zircaloy or ZIRLO fuel cladding meet certain criteria, and (2) 10 CFR Part 50, Appendix K, "ECCS Evaluation Models," which 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.

The proposed action would allow the licensee to use M5, an advanced alloy fuel cladding material for pressurized-water reactors (PWRs), in lieu of zircaloy or ZIRLO, the materials assumed to be used in the cited regulations, at Calvert Cliffs. The proposed action is in accordance with the licensee's application dated November 23, 2009 (Agencywide Document Access and Management System (ADAMS) Accession No. ML093350189).

The Need for the Proposed Action:

The Commission's regulations in 10 CFR 50.46 and 10 CFR Part 50, Appendix K require the demonstration of adequate ECCS performance for light-water reactors that contain fuel consisting of uranium oxide pellets enclosed in zircaloy or ZIRLO tubes. Each of these regulations, either implicitly or explicitly, assumes that either zircaloy or ZIRLO is used as the fuel rod cladding material.

In order to accommodate the high fuel rod burnups that are required for modern fuel management and core designs, Framatome developed the M5 advanced fuel rod cladding material. M5 is an alloy comprised primarily of zirconium (~99 percent) and niobium (~1 percent) that has demonstrated superior corrosion resistance and reduced irradiation-induced growth relative to both standard and low-tin zircaloy. However, since the chemical composition of the M5 advanced alloy differs from the specifications of either zircaloy or ZIRLO, use of the M5 advanced alloy falls outside of the strict interpretation of these regulations. Therefore, approval of this exemption request is needed to permit the use of the M5 advanced alloy as a fuel rod cladding material at Calvert Cliffs.

Environmental Impacts of the Proposed Action:

The NRC has completed its environmental assessment of the proposal to use M5 advanced alloy for fuel rod cladding at Calvert Cliffs and has concluded that the proposed exemption will not present any undue risk to public health and safety. The underlying purposes of 10 CFR 50.46 and 10 CFR Part 50, Appendix K, are to ensure that facilities have adequate

acceptance criteria for the ECCS, and to ensure that cladding oxidation and hydrogen generation are appropriately limited during a loss-of-coolant accident (LOCA) and conservatively accounted for in the ECCS evaluation model, respectively. Topical Report (TR) BAW-10227P, "Evaluation of Advanced Cladding and Structural Material (M5) in PWR Reactor Fuel," which was approved by the NRC on February 4, 2000, demonstrated that the effectiveness of the ECCS will not be affected by a change from zircaloy to M5. In addition, TR BAW-10227P demonstrated that the Baker-Just equation (used in the ECCS evaluation model to determine the rate of energy release, cladding oxidation, and hydrogen generation) is conservative in all post-LOCA scenarios with respect to M5 advanced alloy as a fuel rod cladding material or in other assembly structural components. The licensee will use NRC-approved methods for the reload design process for Calvert Cliffs reloads with M5. The details of the staff's safety evaluation will be provided in the exemption that will be issued as part of the letter to the licensee approving the exemption to the regulation, if granted.

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.

The proposed action does not result in changes to land use or water use, or result in changes to the quality or quantity of non-radiological effluents. No changes to the National Pollution 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. There are no impacts to the air or ambient air quality. There are no impacts to historical and cultural resources. There would be no noticeable effect

on socioeconomic conditions in the region. Therefore, no changes or different types of non-radiological environmental impacts are expected as a result of 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 staff considered denial of the proposed action (i.e., the "no-action" alternative). Denial of the application would result in no change in current environmental impacts. The environmental impacts of the proposed action and the alternative action are similar.

Alternative Use of Resources:

The action does not involve the use of any different resources than those previously considered in the Final Environmental Statement for Calvert Cliffs dated April 1973, and the Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Calvert Cliffs Nuclear Power Plant (NUREG-1437, Supplement 1), dated October 1999.

Agencies and Persons Consulted:

In accordance with its stated policy, on November 29, 2010, the staff consulted with the Maryland State official, Susan Gray of the Maryland Department of Natural Resources, regarding the environmental impact of the proposed action. The State official had no comments.

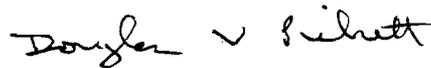
FINDING OF NO SIGNIFICANT IMPACT

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 November 23, 2009 (ADAMS Accession No. ML093350189). 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 O1 F21, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be accessible electronically from the Agencywide Documents Access and Management System (ADAMS) Public Electronic Reading Room on the Internet at the NRC Web site, <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@nrc.gov.

Dated at Rockville, Maryland, this 3rd day of January 2011.

FOR THE NUCLEAR REGULATORY COMMISSION



Douglas V. Pickett, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

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Sincerely,

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Douglas V. Pickett, Senior Project Manager
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Enclosure:
Environmental Assessment

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ACCESSION NO.: Package ML103370111
LTR (NRR-106) ML101760523
EA (NRR-042) ML103370097

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