

NUCLEAR REGULATORY COMMISSION
DUKE ENERGY CAROLINAS, LLC
DOCKET NOS. 50-369 AND 50-370
MCGUIRE NUCLEAR STATION, UNITS 1 AND 2
ENVIRONMENTAL ASSESSMENT AND FINDING OF
NO SIGNIFICANT IMPACT
[NRC-2010-0259]

The U.S. Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Renewed Facility Operating License No. NPF-9 and Renewed Facility Operating License No. NPF-17, issued to Duke Energy Carolinas, LLC (the licensee), for operation of the McGuire Nuclear Station, Units 1 and 2 (McGuire 1 and 2), respectively, located in Mecklenburg County, North Carolina, in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Section 50.90. In accordance with 10 CFR 51.21, the NRC performed an environmental assessment documenting its findings. The NRC concluded that the proposed action would have no significant environmental impact.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action:

The proposed action would revise the Renewed Facility Operating Licenses by removing a condition in Appendix B of the Renewed Facility Operating Licenses for McGuire 1 and 2, which had limited the peak rod average burnup to 60 gigawatt-days per metric ton uranium (GWD/MTU) until completion of an NRC environmental assessment supporting an increased limit. The proposed action would allow an increase of the maximum rod average burnup to as

high as 62 GWD/MTU. The licensee has procedures in place to ensure that maximum rod burnup will not exceed 62 GWD/MTU.

The proposed action is in accordance with the licensee's application dated October 29, 2009.

The Need for the Proposed Action:

The proposed action to delete the license condition for fuel burnup is needed to allow a higher maximum rod average burnup of 62 GWD/MTU, which would allow for more effective fuel management. If the amendment is not approved, the licensee will not be provided the opportunity to increase maximum rod average burnup to as high as 62 GWD/MTU and allow fuel management flexibility.

Environmental Impacts of the Proposed Action:

In this environmental assessment regarding the impacts of the use of extended burnup fuel beyond 60 GWD/MTU, the Commission is relying on the results of the updated study conducted for the NRC by the Pacific Northwest National Laboratory (PNNL), entitled "Environmental Effects of Extending Fuel Burnup Above 60 GWD/MTU" (NUREG/CR-6703, PNNL-13257, January 2001). Environmental impacts of high burnup fuel up to 75 GWD/MTU were evaluated in the study, but some aspects of the review were limited to evaluating the impacts of the extended burnup up to 62 GWD/MTU, because of the need for additional data on the effect of extended burnup on gap release fractions. All the aspects of the fuel-cycle were considered during the study, from mining, milling, conversion, enrichment and fabrication through normal reactor operation, transportation, waste management, and storage of spent fuel.

The amendment would allow McGuire 1 and 2 to extend lead rod average burnup to 62 GWD/MTU. The NRC staff has completed its evaluation of the proposed action and concludes that such changes would not adversely affect plant safety, and would have no adverse affect on the probability of any accident. For the accidents that involve damage or melting of the fuel in

the reactor core, fuel rod integrity has been shown to be unaffected by extended burnup under consideration; therefore, the probability of an accident will not be affected. For the accidents in which core remains intact, the increased burnup may slightly change the mix of fission products that could be released in the event of a serious accident, but because the radionuclides contributing most to the dose are short-lived, increased burnup would not have an effect on the consequences of a serious accident beyond the previously evaluated accident scenarios. Increases in projected dose consequences of postulated accidents associated with fuel burnup up to 62 GWD/MTU are not considered significant, and remain well below regulatory limits.

Regulatory limits on radiological effluent releases are independent of burnup. The requirements of 10 CFR Part 20, 10 CFR 50.36a, and Appendix I to 10 CFR Part 50 ensure that routine releases of gaseous, liquid or solid radiological effluents to unrestricted areas is kept "As Low As is Reasonably Achievable." Therefore, NRC staff concludes that during routine operations, there would be no significant increase in the amount of gaseous radiological effluents released into the environment as a result of the proposed action, nor will there be a significant increase in the amount of liquid radiological effluents or solid radiological effluents released into the environment.

The proposed action will not change normal plant operating conditions. No changes are expected in the fuel handling, operational or storing processes. The fuel storage and handling, radioactive waste, and other systems which may contain radioactivity are designed to assure adequate safety under normal conditions. There will be no significant changes in radiation levels during these evolutions. No significant increase in the allowable individual or cumulative occupational radiation exposure is expected to occur.

The use of extended irradiation will not change the potential environmental impacts of incident-free transportation of spent nuclear fuel or the accident risks associated with spent fuel transportation if the fuel is cooled for 5 years after being discharged from the reactor. The

PNNL report for the NRC (NUREG/CR-6703, January 2001), concluded that doses associated with incident-free transportation of spent fuel with burnup to 75 GWD/MTU are bounded by the doses given in 10 CFR 51.52, Table S-4 for all regions of the country, based on the dose rates from the shipping casks being maintained within regulatory limits. Increased fuel burnup will decrease the annual discharge of fuel to the spent fuel pool which will postpone the need to remove spent fuel from the pool.

NUREG/CR-6703 determined that no increase in environmental effects of spent fuel transportation accidents is expected as a result of increasing fuel burnup to 75 GWD/MTU.

Based on the nature of the exemption, 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 historic 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.

For more detailed information regarding the environmental impacts of extended fuel burnup, please refer to the study conducted by PNNL for the NRC, entitled "Environmental Effects of Extending Fuel Burnup Above 60 GWD/MTU" (NUREG/CR-6073, PNL-13257, January 2001, Agencywide Documents Access and Management System (ADAMS) Accession No. ML010310298). The details of the NRC staff's Safety Evaluation will be provided in the amendment that will be issued as part of the letter to the licensee approving the amendment.

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 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 McGuire Nuclear Station, Units 1 and 2, or the Generic Environmental Impact Statement for License Renewal of Nuclear Plants:

Regarding McGuire Nuclear Station, Units 1 and 2 – Final Report (NUREG-1437, Supplement 8), dated December 2002.

Agencies and Persons Consulted:

In accordance with its stated policy, on June 16, 2010, the NRC staff consulted with the North Carolina State officials, Mr. James Albright and Mr. William Jeffries, of the North Carolina Department of Environment and Natural Resources, regarding the environmental impact of the proposed action. The State officials had no comments.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the environmental assessment, the NRC staff concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC staff 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 October 29, 2009 (ADAMS Accession No. ML093140092). 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 ADAMS Public Electronic Reading Room on the Internet at the NRC Website, <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.

Dated at Rockville, Maryland, this 15th day of July 2010.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

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