

September 16, 1991

Docket No. 50-369

Mr. M. S. Tuckman
Vice President - Nuclear Operations
Duke Power Company
P. O. Box 1007
Charlotte, North Carolina 28201-1007

Dear Mr. Tuckman:

SUBJECT: MCGUIRE NUCLEAR STATION, UNIT 1 - ENVIRONMENTAL ASSESSMENT
AND FINDING OF NO SIGNIFICANT IMPACT - EXEMPTION FROM
10 CFR PART 50.46 AND 10 CFR 50.44 FOR DEMONSTRATION ASSEMBLIES
(TAC NO. 80308)

Enclosed is a copy of an "Environmental Assessment and Finding of No Significant Impact" for your information. This assessment relates to your request dated April 18, 1991, for an exemption from 10 CFR 50.46 to enable the use of demonstration fuel assemblies during Cycles 8, 9, and 10 for McGuire Unit 1. Note that the staff has found it necessary to issue an exemption to Appendix K to 10 CFR 50 and 10 CFR 50.44 in addition to the exemption to 10 CFR 50.46. The enclosed assessment relates to both exemptions.

This assessment has been forwarded to the Office of the Federal Register for publication.

Sincerely,

/s/

Timothy A. Reed, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Environmental Assessment

cc w/enclosure:
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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Sincerely,

A handwritten signature in black ink, appearing to read "Timothy A. Reed", is written over the word "Sincerely,".

Timothy A. Reed, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Environmental Assessment

cc w/enclosure:
See next page

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McGuire Nuclear Station

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UNITED STATES NUCLEAR REGULATORY COMMISSION

DUKE POWER COMPANY

MCGUIRE NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-369

ENVIRONMENTAL ASSESSMENT AND

FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an exemption from the provisions of 10 CFR 50.46, Appendix K to 10 CFR 50, and 10 CFR 50.44 to Duke Power Company (the licensee) for McGuire Nuclear Station, Unit No. 1, located in Mecklenburg County, North Carolina.

ENVIRONMENTAL ASSESSMENT

Identification of Proposed Action: The proposed action would enable the licensee to use two demonstration fuel assemblies that contain some fuel rods whose zirconium based cladding composition is somewhat different from the zirconium based compound named Zircaloy. These demonstration assemblies would be loaded into McGuire Unit 1 during the upcoming September 1991 refueling outage and irradiated through fuel Cycles 8, 9, and 10.

The evaluation responds to the licensee's application dated April 18, 1991.

The Need for the Proposed Action: The proposed exemption to 10 CFR 50.46, Appendix K to 10 CFR 50, and 10 CFR 50.44 is needed because these regulations specifically refer to light-water reactors containing fuel consisting of uranium oxide pellets enclosed in Zircaloy tubes. Zircaloy is a zirconium based alloy currently in use as cladding for fuel pellets. A new zirconium based cladding has been developed which is not the same chemical composition as Zircaloy, and which the licensee wants to test in reactor operation. Since 10 CFR 50.46 and 10 CFR 50 Appendix K limit ECCS calculations to Zircaloy and

10 CFR 50.44 relates to the generation of hydrogen gas from a metal-water reaction with Zircaloy, an exemption is required in order to place two demonstration assemblies in the core. The staff has reviewed the chemical composition of the new cladding and found no significant difference between the new composition and Zircaloy. Therefore, a special circumstance exists in which application of these regulations is not necessary to achieve the underlying purpose of the regulations and thus, an exemption is authorized by 10 CFR 50.12. The underlying purpose of 10 CFR 50.46 and 10 CFR 50 Appendix K is to establish requirements for calculations of emergency core cooling systems. The licensee addressed the safety impact of the demonstration assemblies on emergency core cooling system performance as part of the application for exemption and demonstrated that the new zirconium based cladding does not affect the ECCS calculations. The underlying purpose of 10 CFR 50.44 is to ensure that means are provided for the control of hydrogen gas that may be generated following a postulated loss-of-coolant accident. The licensee previously addressed hydrogen generation following a loss-of-coolant accident. The licensee's proposed action has no significant effect on the previous assessment of hydrogen gas production.

Environmental Impacts of the Proposed Action: With regard to potential radiological impacts to the general public, the proposed exemption involves features located entirely within the restricted area as defined in 10 CFR Part 20. It does not affect the potential for radiological accidents and does not affect radiological plant effluents. The demonstration assemblies meet the same design bases as the fuel which is currently in the reactor. No safety limits have been changed or setpoints altered as a result of the use of these

assemblies. The FSAR analyses are bounding for the demonstration assemblies as well as the remainder of the core. The advanced zirconium-based alloys have been shown through testing to perform satisfactorily under conditions representative of a reactor environment. In addition, the relatively small number of fuel rods involved does not represent a prohibitively large inventory of radioactive material which could be released into the reactor coolant in the event of cladding failure. The only credible consequence of this change would be a failure of the demonstration claddings. Even in the case of gross fuel failure, the number of rods involved (a maximum of 104 rods will use advanced clad compositions) is less than 1% of the core and thus, sufficiently small that environmental impact would be minimal, and is bounded by previous assessments. The small number of fuel rods involved in conjunction with the chemical similarity of the demonstration cladding to Zircaloy cladding ensures that hydrogen production would not be significantly different from previous assessments. As a result, the proposed exemption does not affect the consequences of radiological accidents. Consequently, the Commission concludes that there are no significant radiological impacts associated with the proposed exemption.

With regard to the potential environmental impacts associated with the transportation of the demonstration assemblies, the advanced claddings have no impact on previous assessments determined in accordance with 10 CFR 51.52.

With regard to potential nonradiological impacts, the proposed exemption does not affect nonradiological plant effluents and has no other environmental impact. Therefore, the Commission concludes that there are no significant nonradiological environmental impacts associated with the proposed exemption.

Alternative to the Proposed Action: Because the Commission's staff has concluded that there is no significant environmental impact associated with the proposed exemption, any alternative to this exemption will have either no significantly different environmental impact or greater environmental impact.

The principal alternative would be to deny the requested exemption. This would not reduce environmental impacts as a result of plant operations.

Alternative Use of Resources: This action does not involve the use of resources not previously considered in connection with the "Final Environmental Statement related to the operation of William B. McGuire Nuclear Station, Units 1 and 2," dated April 1976, and its addendum dated January 1981.

Agencies and Persons Consulted: The Commission's staff has reviewed the licensee's request that supports the proposed exemption. The staff did not consult other agencies or persons.

FINDING OF NO SIGNIFICANT IMPACT

The Commission has determined not to prepare an environmental impact statement for the proposed exemption.

Based upon the foregoing environmental assessment, we conclude that the proposed action will not have a significant effect on the quality of the human environment.

For further details with respect to this action, see the request for exemption dated April 18, 1991, which is available for public inspection at the Commission's Public Document Room, 2120 L Street, NW., Washington, DC 20555 and at Atkins Library, University of North Carolina, Charlotte (UNCC Station), North Carolina 28223.

Dated at Rockville, Maryland this 16th day of September, 1991.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in cursive script, appearing to read "D B Matthews".

David B. Matthews, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation