

May 5, 2004

Mr. H. B. Barron
Executive Vice President
Nuclear Generation
Duke Energy Corporation
526 South Church Street
Charlotte, North Carolina 28202

SUBJECT: SUPPLEMENT 1 TO SAFETY EVALUATION FOR PROPOSED AMENDMENTS
TO THE FACILITY OPERATING LICENSE AND TECHNICAL
SPECIFICATIONS TO ALLOW INSERTION OF MIXED OXIDE FUEL LEAD
ASSEMBLIES (TAC NOS. MC0824 AND MC0825)

Dear Mr. Barron:

Enclosed is a copy of Supplement No. 1 to Nuclear Regulatory Commission (NRC) staff's Safety Evaluation (SE) regarding your application submitted on February 27, 2003, as supplemented, to revise the Technical Specifications for the Catawba Nuclear Station (Catawba) to allow the use of four mixed oxide (MOX) fuel lead test assemblies in one of the two Catawba units. The NRC staff's SE that was issued on April 5, 2004, on this matter stated that subsequent supplements to the SE would be issued to address the evaluation of security related issues and other matters as may be appropriate. This supplement provides the NRC staff's evaluation of the changes to the physical security plan for the protection of MOX fuel. It also provides the NRC staff's evaluation of your request for exemptions from certain parts of NRC regulations related to the physical security plan for Catawba.

The issuance of this SE Supplement does not constitute NRC approval of your application to modify the licensing basis for the Catawba Nuclear Station. This SE Supplement documents the technical and regulatory disposition of the subject discussed within. NRC approval of your application, should it be appropriate, will be under separate correspondence. A more detailed

H. B. Barron

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version of the attached SE Supplement is provided in Enclosure 2, that is not provided to the public, since it contains safeguards information.

In the event of any comments or questions, please contact me at (301) 415-1842.

Sincerely,

/RA/

Robert E. Martin, Senior Project Manager
Project Directorate II-1
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-413 and 50-414

Enclosures: 1. Safety Evaluation (Non-Safeguards)
2. Safety Evaluation (Safeguards)

cc w/o Enclosure 2: See next page

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cc w/o Enclosure 2: See next page

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** No Significant Changes to SE input NRR-058

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SUPPLEMENT NO. 1 TO SAFETY EVALUATION FOR PROPOSED AMENDMENTS TO THE FACILITY OPERATING LICENSE AND TECHNICAL SPECIFICATIONS TO ALLOW USE OF MIXED OXIDE FUEL LEAD ASSEMBLIES AND REQUEST FOR EXEMPTION FROM CERTAIN REGULATIONS (TAC NOS. MB7863, MB7864, MC0824, AND MC0825)

Dated: May 5, 2004

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SAFETY EVALUATION BY THE
OFFICE OF NUCLEAR SECURITY AND INCIDENT RESPONSE
RENEWED FACILITY OPERATING LICENSE NPF-35
AND
RENEWED FACILITY OPERATING LICENSE NPF-52
DUKE ENERGY CORPORATION, ET AL.
CATAWBA NUCLEAR STATION, UNITS 1 AND 2
DOCKET NOS. 50-413 AND 50-414

1.0 INTRODUCTION

By letter dated February 27, 2003, as supplemented by letters dated September 15 and 23, 2003; March 1 and 9, 2004; and April 13, 2004, Duke Energy Corporation (Duke) submitted a request for changes to the Catawba Nuclear Station, Units 1 and 2 (Catawba) operating license and physical security plan (PSP). These documents describe the additional security measures that will be implemented when four unirradiated mixed oxide (MOX) fuel lead test assemblies (LTAs) are received at Catawba, until placed into the reactor vessel.

The purpose of the LTA effort at Catawba is to confirm that the MOX fuel performs as expected in a nuclear power reactor. This effort is part of the Department of Energy (DOE) Surplus Plutonium Disposition Project, an ongoing plutonium (Pu) disposition program of the United States and the Russian Federation. The goal of this non-proliferation program is to dispose of surplus Pu from nuclear weapons by converting the material into MOX fuel and using that fuel in nuclear power reactors.

2.0 BACKGROUND

By letter dated September 15, 2003, Duke supplemented its February 27, 2003, application by submitting a proposed revision to the PSP and a request for exemptions from certain regulations in Title 10 of the *Code of Federal Regulations*, Part 11, "Criteria and Procedures for Determining Eligibility for Access to or Control Over Special Nuclear Material" and Part 73, "Physical Protection of Plants and Materials," for the Catawba and McGuire stations. In accordance with the Nuclear Regulatory Commission (NRC) staff's letter dated October 31, 2003, the NRC staff's review and findings regarding the submittal dated September 15, 2003, as supplemented, are applicable only to the LTA program at Catawba.

Duke has requested relief from certain regulations in 10 CFR Part 11 and Part 73. Duke's request for exemptions from Part 11 was evaluated against the standard specified in

10 CFR 11.9, "Specific Exemptions," and the request for exemptions from Part 73 was evaluated against the standard specified in 10 CFR 73.5, "Specific Exemptions."

Pursuant to 10 CFR 73.6, "Exemptions for certain quantities and kinds of special nuclear material," in part, nuclear power reactors licensed under 10 CFR Part 50 possessing special nuclear material (SNM) in certain forms are currently exempt from the physical protection requirements of 10 CFR 73.20, "General performance objective and requirements," 73.25, "Performance capabilities for physical protection of strategic special nuclear material in transit," 73.45, "Performance capabilities for fixed site physical protection systems," and 73.46, "Fixed site physical protection systems, subsystems, components, and procedures," and thus are not subject to the requirements of 10 CFR 11.11, "General requirements." The specific forms of SNM at power reactors that are exempt include: (1) uranium enriched to less than 20-percent in the uranium-235 isotope, (2) SNM that is not readily separable from other nuclear material and which has an external dose rate of 100 rem per hour at a distance of 3 feet, (3) SNM in a quantity not exceeding 350 grams of uranium-235, uranium-233, plutonium, or any combination thereof, and (4) SNM that is being transported by the DOE transport system. The fresh MOX LTAs will not meet the exemption criteria stated in 10 CFR 73.6 because the Pu content in the MOX fuel will exceed 350 grams. Consequently, in accordance with the requirements in 10 CFR 73.2, "Definitions," the material in the fresh MOX LTAs is a formula quantity of strategic special nuclear material (SSNM) due to the Pu content.

3.0 TECHNICAL EVALUATION

The NRC staff reviewed the proposed exemptions using information provided in Duke's license amendment request that included Revision 16 of the *Duke Power Company Nuclear Security and Contingency Plan* (Physical Security Plan (PSP)), Section 13.3; and Duke's responses to staff requests for additional information. To determine whether the specific exemptions should be granted, the staff utilized the criteria specified in the *Review Plan for Evaluating the Physical Security Protection Measures Needed for Mixed Oxide Fuel and Its Use in Commercial Nuclear Power Reactors*, dated January 29, 2004. The NRC staff review was consistent with the Commission Memorandum and Order, CLI-04-06, dated February 18, 2004. The NRC staff assumed as a baseline, that the Catawba facility will comply with all applicable general security requirements, both those prescribed in NRC rules and those prescribed by NRC order. Specifically, the NRC staff reviewed the appropriate heightening of security measures necessitated by the proposed presence of MOX LTAs at Catawba. The NRC staff found that the MOX material, while technically meeting the criteria of a formula quantity, is not attractive to potential adversaries from a proliferation standpoint due to its low Pu concentration, composition, and form (size and weight). The MOX fuel consists of Pu oxide particles dispersed in a ceramic matrix of depleted uranium oxide with a Pu concentration of less than six weight percent. The MOX LTAs will consist of conventional fuel assemblies designed for a commercial light-water power reactor that are over 12 feet long and weigh approximately 1500 pounds. Therefore, the MOX LTAs represent a significantly less attractive theft or diversion target, from a proliferation standpoint, as compared to the materials at the Category I fuel fabrication facilities, which 10 CFR 73.45 and 73.46 were primarily intended to address. A large quantity of MOX fuel and an elaborate extraction process would be required to yield enough material for use in an improvised nuclear device or weapon.

4.0 CONCLUSION

Based on its review, the NRC staff found that the proposed additional protective measures will provide enhanced physical security for MOX LTAs, beyond those measures that are currently in place for low-enriched uranium fuel.

Pursuant to 10 CFR 11.9, the requested exemptions are authorized by law and will not constitute an undue risk to the common defense and security. In addition, pursuant to 10 CFR Part 73.5, the exemptions are authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest. Therefore, the staff found the requested exemptions from the requirements of 10 CFR Parts 11 and 73 to be acceptable for the MOX LTA program at Catawba Nuclear Station, Units 1 and 2. In addition, the staff approves the proposed revision to the licensee PSP, dated April 13, 2004.

5.0 REFERENCES

1. Letter K.L. Heitner, NRC, to R.O. Williams, Jr., "Fort St. Vrain Nuclear Generating Station - Exemption from Recently Enacted Safeguards Requirements," dated January 19, 1989.
2. Letter, M.S. Tuckman, Duke, to NRC, "Revision 16 to Duke Energy Corporation Physical Security Plan and Request for Exemption from Certain Regulatory Requirements in 10 CFR 11 and 73 to Support MOX Fuel Use," dated September 15, 2003.
3. Letter, M.S. Tuckman, Duke, to NRC, "Catawba Units 1 and 2, McGuire, Units 1 and 2, Mixed Oxide Fuel Lead Assembly Licensee Amendment Request," dated September 23, 2003.
4. Letter, R.E. Martin, NRC, to M.S. Tuckman, Duke, "William B. McGuire Nuclear Station, Units 1 and 2 and Catawba Nuclear Station, Units 1 and 2 re: Mixed Oxide Lead Fuel Assemblies," dated October 31, 2003.
5. Letter, J.W. Shea, NRC, to G.M. Tracy, NRC, "Review Plan for Evaluating the Physical Security Protection Measures Needed for Mixed Oxide Fuel and Its Use in Commercial Nuclear Power Reactors," dated January 29, 2004.
6. Letter, R.E. Martin, NRC, to H.B. Barron, Duke, "Catawba Nuclear Station, Units 1 and 2 - Request for Additional Information re: Mixed Oxide Lead Fuel Assemblies," dated January 30, 2004.
7. Nuclear Regulatory Commission Memorandum and Order, CLI-04-06, dated February 18, 2004.
8. Letter, H.B. Barron, Duke, to NRC, "Catawba Nuclear Station, Units 1 and 2, Response to Request for Additional Information Mixed Oxide Fuel Lead Assemblies (Security) dated March 1, 2004.

9. Letter, H.B. Barron, Duke, to NRC, "Duke Energy Corporation Catawba Nuclear Station Units 1 & 2, Docket Nos. 50-413, 50-414 Response to Request for Additional Information," dated March 9, 2004.
10. Letter, H.B. Barron, Duke, to NRC, "Duke Energy Corporation Catawba Nuclear Station Units 1 & 2, Docket Nos. 50-413, 50-414 Response to Request for Additional Information (TAC Nos. MB7863, MB7864) Mixed Oxide Fuel Lead Assemblies (Security)," dated April 13, 2004.

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Date: May 5, 2004

Catawba Nuclear Station

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