April 8, 2003

Mr. M. S. Tuckman
Executive Vice-President
Nuclear Generation
Duke Energy Corporation
P.O. Box 1006 EC07H
Charlotte, NC 28201-1006

SUBJECT: COMMITMENT TO IMPLEMENT THE FINAL VERSION OF THE INTERIM STAFF GUIDANCE GOVERNING THE TREATMENT OF FUSE HOLDERS FOR RENEWAL OF MCGUIRE AND CATAWBA OPERATING LICENSES

Dear Mr. Tuckman:

By a letter dated June 13, 2001, Duke Energy Corporation (Duke) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for renewal of the McGuire, Units 1 and 2, and Catawba, Units 1 and 2, operating licenses for up to an additional 20 years. In a letter dated November 7, 2002, the NRC staff requested Duke to commit to implement, at McGuire and Catawba, the final resolution of an interim staff guidance (ISG) document governing the treatment of fuse holders for license renewal that was being developed at that time. In a letter dated November 18, 2002, Duke responded to the staff's request accordingly and committed to implement the final version of the fuse holder ISG by June 12, 2021 (for McGuire, Units 1 and 2), and December 6, 2024 (for Catawba, Units 1 and 2).

On January 6, 2003, the staff issued its safety evaluation report (SER) to document the findings of the safety review of the license renewal application (LRA) and supporting documentation for McGuire, Units 1 and 2, and Catawba, Units 1 and 2. The commitment is documented in Section 2.5.2.2 and Appendix D of the SER.

In a letter to Mr. Alan Nelson, of the Nuclear Energy Institute, and to Mr. David Lochbaum, of the Union of Concerned Scientists, dated March 4, 2003, the staff issued the final fuse holder ISG document (ADAMS Accession No. ML030690492). A copy of the ISG is enclosed for your convenience. The staff requests that Duke review the enclosed ISG and confirm, by official correspondence, its plans to implement this guidance by June 12, 2021 (for McGuire, Units 1 and 2), and December 6, 2024 (for Catawba, Units 1 and 2).

If you have any questions regarding this matter, please contact me at 301-415-1868.

Sincerely,

/***RA***/

Rani Franovich, Project Manager
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos.: 50-369, 50-370, 50-413, and 50-414

Enclosure: As stated

cc w/encl: See next page

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/***RA***/

Rani Franovich, Project Manager
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INTERIM STAFF GUIDANCE (ISG)-5 ON THE IDENTIFICATION AND TREATMENT OF ELECTRICAL FUSE HOLDERS FOR LICENSE RENEWAL

Staff Position

Consistent with the requirements specified in 10 CFR 54.4(a), fuse holders (including fuse clips and fuse blocks) are considered to be passive electrical components. Fuse holders would be scoped, screened, and included in the aging management review (AMR) in the same manner as terminal blocks and other types of electrical connections that are currently being treated in the process. This staff position only applies to fuse holders that are not part of a larger assembly, but support safety-related and non safety-related functions in which the failure of a fuse precludes a safety function from being accomplished [10 CFR Part 54.4(a)(1) and (a)(2)]. Examples are fuses that are used as protective devices to ensure the integrity of containment electrical penetrations when they are challenged by electrical faults, or as isolation devices between Class 1E and non-Class 1E electrical circuits to ensure that the safety function is not compromised as a result of faults in the non-Class 1E circuits. An appropriate aging management program (AMP) should be adopted to manage the effects of aging where necessary.

Rationale

The intended functions of a fuse holder are to provide mechanical support for the fuse and to maintain electrical contact with the fuse blades or metal end caps to prevent the disruption of the current path during normal operating conditions when the circuit current is at or below the current rating of the fuse. Fuse holders perform the same primary function as connections; they provide electrical connections to specified sections of an electrical circuit to deliver rated voltage, current, or signals. The intended functions of fuse holders meet the criteria of 10 CFR 54.4(a) and are performed without moving parts or without a change in configuration or properties as described in 10 CFR 54.21(a)(1)(i). The staff concludes that fuse holders are passive, long-lived electrical components within the scope of license renewal and subject to an AMR. However, fuse holders inside the enclosure of an active component, such as switchgear, power supplies, power inverters, battery chargers, and circuit boards, are considered to be piece parts of the larger assembly. Therefore, under 10 CFR 54.21, fuse holders that are parts of a larger assembly are considered outside the scope for license renewal.

For license renewal purposes, fuse holders/blocks are classified as a specialized type of terminal block because of the similarity in design and construction. Terminal blocks are passive components subject to an AMR for license renewal. However, like fuses, terminal blocks located inside the enclosure of an active component are considered to be piece parts of the larger assembly and, thus, are outside the scope of license renewal. The fuse holders are typically constructed of blocks of rigid insulating material, such as phenolic resins. Metallic clamps are attached to the blocks to hold each end of the fuse. The clamps can be spring-loaded clips that allow the fuse ferrules or blades to slip in, or they can be bolt lugs, to which the fuse ends are bolted. The clamps are typically made of copper.

Operational experience, as discussed in NUREG-1760 (Aging Assessment of Safety-Related Fuses Used in Low- and Medium-Voltage Applications in Nuclear Power Plants), identified fuse holders as experiencing a number of age-related failures. Aging stressors such as vibration, thermal cycling, electrical transients, mechanical stress, fatigue, corrosion, chemical contamination, or oxidation of the connecting surfaces can result in fuse holder failure. On this basis, fuse holders (including both the insulation material and the metallic clamps) are subject to both an AMR and AMP for license renewal. Typical plant effects observed from fuse holder failures due to aging have resulted in: challenges to safety systems, cable insulation failure due to over-temperature, failure of a containment spray pump to start, a reactor trip, etc. Therefore, managing age-related failures of fuse holders would have a positive effect on the safety performance of a plant. Information Notices 91-78, 87-42, and 86-87 provide examples that underscore the safety significance of fuse holders and the potential problems that can arise from age-related fuse holder failures.

GALL AMP for Fuse Holders

Fuse holders, are considered as electrical connections and, thus, are subject to GALL XI.E1 "Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements." However, the AMP for fuse holders needs to include the following aging stressors, if applicable: fatigue, mechanical stress, vibration, chemical contamination, and corrosion. Where environments or operating conditions preclude such aging effects (e.g., fuse holders not subject to vibration from rotating machinery), they need not be addressed by the AMP. GALL XI.E1 is based on only a visual inspection of accessible cables and connections. Visual inspection, alone, may not be sufficient to detect the aging effects from fatigue, mechanical stress, vibration, or corrosion on the metallic clamps of the fuse holder. Other methods of aging detection may be necessary. Alternatively, plant modifications or administrative controls that have been made, which preclude these types of aging effects from occurring, would eliminate the need for an additional AMP (i.e., the GALL XI.E1 program will be adequate).