January 13, 2003

Mr. Dhiaa Jamil
Vice President, McGuire Site
Duke Energy Corporation
12700 Hagers Ferry Road
Huntersville, NC 28078-8985

SUBJECT: McGUIRE NUCLEAR STATION, UNIT 1- REQUEST FOR DEVIATION FROM FIRE PROTECTION PROGRAM INCORPORATING REQUIREMENTS OF APPENDIX R TO PART 50 OF TITLE 10 OF THE CODE OF FEDERAL REGULATIONS (TAC NO. MB6528)

Dear Mr. Jamil:

By letter dated October 3, 2002, as supplemented on November 21, 2002, Duke Energy Corporation, the licensee for the McGuire Nuclear Station, Unit 1 (McGuire, Unit 1), submitted a request for deviation from its approved fire protection program as it incorporates Section III.G.2 and III.G.3 of Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50. Specifically, the licensee proposes the use of fire resistive electrical cable, manufactured by Meggitt Safety Systems, Inc., in lieu of the alternatives provided in Appendix R for several cables in Fire Area 11 associated with redundant trains of systems necessary to achieve and maintain hot shutdown conditions.

The Nuclear Regulatory Commission staff has reviewed the request and has concluded that the change to the approved fire protection program does not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire and, therefore, does not require prior approval of the Commission under Paragraph 2.C.4 of Facility Operating License NPF-9. Our Safety Evaluation is enclosed.

Sincerely,

/***RA***/

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

Docket No. 50-369

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO LICENSEE REQUEST FOR DEVIATION FROM

FIRE PROTECTION PROGRAM INCORP0RATING

SECTION III.G OF APPENDIX R TO 10 CFR PART 50

DUKE ENERGY CORPORATION

MCGUIRE NUCLEAR STATION, UNIT 1

DOCKET NO. 50-369

1.0 INTRODUCTION

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," establishes fire protection features required to satisfy General Design Criterion 3, "Fire protection," of Appendix A to 10 CFR Part 50 with respect to certain generic issues for nuclear power plants licensed to operate prior to January 1, 1979. McGuire Nuclear Station, Unit 1 (McGuire, Unit 1) was licensed to operate on July 8, 1981, and thus is not directly subject to Appendix R. However, McGuire, Unit 1 must follow certain requirements of Appendix R to the extent incorporated into its required fire protection program, including those in Section III.G of Appendix R.

By letter dated October 3, 2002, Duke Energy Corporation (the licensee) submitted a request for deviation from its approved fire protection program for McGuire, Unit 1. Specifically, the licensee proposes the use of fire resistive electrical cable, manufactured by Meggitt Safety Systems Inc. (previously known as Whittaker Electronic Resources Unit of Whittaker Electronic Systems) for several cables in Fire Area 11 associated with redundant trains of systems necessary to achieve and maintain hot shutdown conditions. The licensee proposes the use of these fire resistive electrical cables in lieu of the alternatives provided in its approved fire protection program, which incorporates by reference the alternatives specified in Section III.G of Appendix R. The licensee provided additional information regarding this deviation in a letter dated November 21, 2002.

2.0 REGULATORY EVALUATION

Section 2.C.4 of the McGuire, Unit 1 Facility Operating License No. NPF-9, states that the licensee shall implement and maintain all provisions of the approved fire protection program as described in the Final Safety Analysis Report including the provisions contained in Supplement 5 (SSER-5) of the Safety Evaluation Report for the operation of McGuire (NUREG-0422), dated April 1981. Section 9.5.1 of SSER-5 includes a reference to a licensee commitment contained in the licensee's letter dated January 9, 1981, as a basis for the Nuclear Regulatory Commission (NRC) staff's conclusion that the McGuire, Unit 1 fire protection program met all of the requirements of Sections III.G, III.J and III.O of Appendix R to 10 CFR Part 50.

Section III.G.2 of 10 CFR Part 50, Appendix R, provides fire protection requirements for electrical cables located within the same fire area whose failure could cause the maloperation

of redundant trains of systems necessary to achieve and maintain hot shutdown conditions. These areas are required to have fire protection features such that one of the redundant trains will be free of fire damage in the event of a fire. One method described in Section III.G.2 for ensuring compliance with this requirement is to separate the redundant train cables by a fire barrier having a 3-hour rating.

The McGuire, Unit 1 Fire Area 11 Train B Switchgear Room contains electrical cables associated with Unit 1 Train B components that are required in order for the plant to achieve and maintain hot shutdown conditions. In the event of an unmitigated fire in this area, Unit 1 Train A components are credited with providing an assured means of achieving and maintaining hot shutdown conditions. Fire Area 11 is traversed by electrical cables associated with the following credited Train A components:

Centrifugal Charging Pump 1A,
Nuclear Service Water Pump 1A,
Motor Driven Auxiliary Feedwater Pump 1A.

A 3-hour fire barrier as described in Section III.G.2 of 10 CFR Part 50, Appendix R is not provided. Instead, these credited Train A components utilize silicon dioxide insulated electrical cables. This cable is a fire resistive mineral insulated cable that has been tested in accordance with American Society for Testing and Materials (ASTM) E-119, "Standard Test Methods for Fire Tests of Building Construction Materials."

The NRC staff reviewed this issue with respect to determining that the fire rated cables would be capable of providing an equivalent level of protection as would be provided by a 3-hour rated fire barrier as described by 10 CFR Part 50, Appendix R, Section III.G.2.

3.0 TECHNICAL EVALUATION

3.1.1 Test Results

Generic Letter 86-10, Supplement 1, “Implementation of Fire Protection Requirements”, provides the NRC's current guidance on cable wrap performance. Temperatures within a cable wrap are expected to remain below 325 degrees Farenheit, on average, during an ASTM E-119 specified fire exposure. At this temperature, it is expected that cables will be free of fire damage and will generally be operable during the fire exposure.

The licensee provided copies of two tests, "Summary Report, Three Hour Qualification of Whittaker Electronics Resources Appendix R and SI 2400 Silicon Dioxide Insulated Fire Cable," dated December 1994, and "Summary Test Report for Appendix R Fire Test," ER 98-033, dated October 29, 1998, in its submittal.

The application of these cables at McGuire, Unit 1 uses voltages of 125 volts direct-current (VDC) and currents of up to 0.4 amperes (amps). The licensee’s reports, listed above, includes the test performance results for the cables under ASTM E-119 specified test temperatures at 125 VDC and 2.0 amps. The test results demonstrate that the silicon dioxide insulated cables are capable of maintaining electrical integrity and operability and remain functional during and after exposure to ASTM E-119 fire temperatures with this voltage and

current. The licensee also concluded in its submittal of November 21, 2002, that the test loads bound the expected loads at McGuire, Unit 1.

The staff concludes that, for the specific application of this material, the licensee has adequately demonstrated that this cable will perform in an equivalent manner when compared

to a rated barrier for this use.

3.1.2 Cable Support

Rated 3-hour barriers are tested in a furnace and subjected to a hose stream test that ensures the raceway and the barriers will stay in place following a fire exposure. Fire resistive cables have been tested in similar circumstances and were exposed to a hose stream. Since the fire resistive cables themselves are the barrier, any mechanical damage that occurs to the cables may cause the cables to fail. This is less conservative than a raceway fire barrier system since the cables in a raceway fire barrier system are protected by the raceway fire barrier system and the conduit or cable tray components. The licensee's letter dated November 21, 2002, stated that the cables are run vertically down the length of a wall through the area of interest. The cables are not supported by hangers, rather they are supported by cable sheathing at the penetrations through which the cables pass. The licensee reports that there is a small amount of non-fire rated equipment in the vicinity of the fire rated cables, but the cables would be protected from mechanical damage due to the cable's close proximity to the wall.

The staff concludes, based on the information provided, that there is adequate support and protection from mechanical damage to demonstrate equivalence to a raceway fire barrier system.

3.1.3 Splices

Test report ER 98-033, states in section 4.3 that, "The factory splice is not considered ASTM E-119 fire qualified." The licensee's letter dated November 21, 2002, states that there are no factory splices in the area of concern (Fire Area 11). The staff finds, based on the fact that there no splices installed, that this is acceptable.

3.1.4 Summary

The licensee has not identified any other deviations from the fire testing methodology.

The following are the fire protection defense-in-depth objectives: 1) to prevent fires from starting; 2) to detect rapidly, control, and extinguish promptly those that do occur; and 3) to provide protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by the fire suppression activities will not prevent the safe shutdown of the plant. The use of fire resistive cables is a substitute for rated fire barriers that are described in 10 CFR Part 50, Appendix R, and supports the third defense-in-depth objective. For this specific application, the licensee has demonstrated that the fire resistive cables used are a suitable alternative to the fire rated wrap as described in 10 CFR Part 50, Appendix R.

4.0 CONCLUSION

The NRC staff finds that the licensee has adequately demonstrated that the protection provided by the silicon dioxide insulated cable in this specific application is equivalent to the protection provided by a 3-hour rated fire barrier. Accordingly, the deviation from the approved fire protection program commitments to 10 CFR Part 50, Appendix R, Section III.G.2, with respect to having a three hour rated fire barrier, in these particular circumstances for Fire Area 11, provides an equivalent level of protection necessary to achieve the underlying purpose of the rule. Based on the NRC staff's review, as described above, the NRC staff concludes that the licensee's identified deviation from its fire protection program as it incorporates Section III.G.2 of Appendix R to 10 CFR Part 50, with respect to the enclosure of cables of one redundant train of safe shutdown equipment in a 3-hour fire rated barrier, is a change to the approved fire

protection program that does not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire. Therefore, this deviation does not require prior approval of the Commission under Paragraph 2.C.4 of Facility Operating License No. NPF-9.

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