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Serial: RA-21-0017  
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10 CFR 50.90

United States Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

CATAWBA NUCLEAR STATION, UNIT NOS. 1 AND 2  
RENEWED FACILITY OPERATING LICENSE NOS. NPF-35 AND NPF-52  
DOCKET NOS. 50-413 AND 50-414

MCGUIRE NUCLEAR STATION, UNIT NOS. 1 AND 2  
RENEWED FACILITY OPERATING LICENSE NOS. NPF-9 AND NPF-17  
DOCKET NOS. 50-369 AND 50-370

**SUBJECT: Response to Request for Additional Information (RAI) regarding License  
Amendment Request to Revise Technical Specification 3.8.1 to Reduce  
Emergency Diesel Generator Maximum Steady State Voltage**

Ladies and Gentlemen:

By letter dated August 19, 2020 (ADAMS Accession No. ML20233A258), Duke Energy submitted a license amendment request (LAR) for Catawba Nuclear Station, Units 1 and 2 (CNS) and McGuire Nuclear Station, Units 1 and 2 (MNS). The proposed change would reduce the Emergency Diesel Generators' maximum allowed steady state voltage from 4580 V to 4320 V as specified in several TS 3.8.1 Surveillance Requirements.

By correspondence dated December 10, 2020 (ADAMS Accession No. ML20346A021), the Nuclear Regulatory Commission (NRC) staff requested additional information from Duke Energy to complete the LAR review.

The Enclosure to this letter provides Duke Energy's response to the NRC RAI. The conclusions of the original No Significant Hazards Consideration and Environmental Consideration in the original LAR are unaffected by this RAI response.

There are no regulatory commitments contained in this letter.

In accordance with 10 CFR 50.91, Duke Energy is notifying the States of North and South Carolina of this LAR by transmitting a copy of this letter and enclosure to the designated State Officials.

Should you have any questions concerning this letter, or require additional information, please contact Art Zaremba, Director – Nuclear Fleet Licensing, at 980-373-2062.

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I declare under penalty of perjury that the foregoing is true and correct. Executed on  
January 29, 2021.

Sincerely,

A handwritten signature in black ink, appearing to read "Steve Snider", written in a cursive style.

Steve Snider  
Vice President – Nuclear Engineering

SS/nde

Enclosure: Response to NRC Request for Additional Information

cc : L. Dudes, Regional Administrator USNRC Region II  
J. Klos, USNRC NRR Project Manager - MNS  
K. Cotton, USNRC NRR Project Manager - CNS  
J. Austin, USNRC Senior Resident Inspector – CNS  
A. Hutton, USNRC Senior Resident Inspector - MNS

Chair - North Carolina Utilities Commission  
W. L. Cox, III Section Chief, Div. of Environmental Health, RP Section (NCDENR)  
A. Nair, Bureau of Environmental Health Services (SCDHEC)  
H. Kirkland, Office of Attorney General (SC)

Enclosure

Response to NRC Request for Additional Information (RAI)  
Regarding License Amendment Request to Revise Technical Specification 3.8.1 to  
Reduce Emergency Diesel Generator Maximum Steady State Voltage

Catawba Nuclear Station, Unit Nos. 1 and 2  
Renewed License Nos. NPF-35 and NPF-52  
Docket Nos. 50-413 and 50-414

McGuire Nuclear Station, Unit Nos. 1 and 2  
Renewed License Nos. NPF-9 and NPF-17  
Docket Nos. 50-369 and 50-370

### **NRC Request for Additional Information**

By letter dated August 19, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20233A258), Duke Energy Carolinas, LLC (the licensee) dba Duke Energy submitted a license amendment request (LAR) for Catawba Nuclear Station (CNS) and McGuire Nuclear Station (MNS). Specifically, the LAR proposes to reduce the Emergency Diesel Generators (EDG) maximum allowed steady state voltage from 4580 V to 4320 V as specified in several Technical Specifications (TS) 3.8.1 Surveillance Requirements.

The U.S. Nuclear Regulatory Commission (NRC) staff requests the licensee to provide additional information as stated below:

### **Regulatory Requirement**

The regulations at 10 CFR 50.36, "Technical specifications," establish the requirements related to the content of the TS. Pursuant to 10 CFR 50.36(c), TS are required to include items in five specific categories related to station operation: (1) Safety limits, limiting safety system settings, and limiting control settings, (2) Limiting conditions for operation (LCOs), (3) Surveillance requirements (SRs), (4) Design features; and (5) Administrative controls. The proposed changes in this LAR relate to the SRs category.

10 CFR Part 50.36(c)(3), "Surveillance requirements," requires surveillance relating "to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."

### **RAI No. 1**

In the LAR, the licensee stated that "during the 2018 Design Basis Assurance Inspection at MNS, the NRC inspectors questioned the [EDG] maximum steady state voltage limit of 4580 V stated in the TS 3.8.1 SRs. As a result, a Nuclear Condition Report (NCR) was generated to provide for and document a review of the issue within the Corrective Action Program (CAP). Administrative controls were implemented at MNS to limit the maximum steady state voltage. Based on the operating experience from MNS, CNS also initiated an NCR to provide for a similar review. As a result of this review, CNS also established administrative controls to limit the maximum steady state voltage."

The NRC staff reviewed the "McGuire Nuclear Station – NRC Design Bases Assurance Inspection (Team) Report 05000369/2018010 AND 05000370/2018010," dated April 12, 2018 (ADAMS Accession no. ML18103A158)" but this report, nor the LAR, documents a discussion of the EDG maximum steady state voltage issue.

Please provide a brief discussion explaining the reasons for considering the current TS EDG maximum steady state voltage limit of 4580 V as non-conservative. Also describe the administrative controls implemented to limit the maximum steady state voltage at both MNS and CNS power plants.

### **Duke Energy Response to RAI No. 1**

Current Technical Specification 3.8.1 EDG maximum steady state voltage limit is 4580 V which is 4160 V plus 10%. Technical Specification Bases 3.8.1 states "The specified maximum steady state output voltage of 4580 V is equal to the maximum operating voltage specified for 4000 V motors. It ensures that for a lightly loaded distribution system, the voltage at the terminals of 4000 V motors is no more than the maximum rated operating voltages." However, NEMA MG 1, Section 12.44.1 requires ac induction motors to operate at plus or minus 10 percent of rated voltage, which equates to an operating voltage range of 3600 - 4400 V for 4000 V motors. Overvoltage studies were performed at MNS and CNS that concluded no overvoltage condition was identified for loads (required for a loss of offsite power with or without a loss of coolant accident) on the 4160 V and corresponding 600 V level when the EDG is set to 104.1 % (MNS) and 104% (CNS) of nominal voltage. Although MNS and CNS have not experienced any 4000 V motor failures as a result of operating equipment at higher voltages, Technical Specification 3.8.1 was identified as being non-conservative because it allowed operating 4000 V motors up to 4580 V (steady state) when powered by EDGs, which exceeded the standard design limit of 4400 V. MNS NCR 2185262 (2018 DBAI -Tech Spec 3.8.1 DG Max Steady-State Voltage Limit) was initiated during the 2018 DBAI and is listed in the McGuire Nuclear Station – NRC Design Bases Assurance Inspection (Team) Report 05000369/2018010 and 05000370/2018010," dated April 12, 2018 (ADAMS Accession no. ML18103A158) in the section for Condition Reports written due to this Inspection.

Administrative controls included procedure revisions to establish a reduced upper EDG output voltage limit.

### **RAI No. 2**

In the LAR, the licensee stated that "the MNS and CNS EDG loading calculations assume a maximum voltage of 4580 V, which bounds the proposed change to the TS SRs."

Please provide a summary of worst case MNS and CNS EDG loadings corresponding to the current TS maximum EDG voltage of 4580 V, and the proposed TS maximum EDG voltage of 4320 V for comparison purposes.

### **Duke Energy Response to RAI No. 2**

EDG loading analyses were performed at MNS and CNS for the LOCA and Blackout loading configurations. Below is a summary of EDG loading at MNS and CNS. Since EDG loading (kW) is proportional to operating voltage and the current calculations used 110% rated voltage (4580V), EDG loading (kW) at the proposed voltage limit (4320V) is bounded by the values shown below for 4580V. In addition, the kW load margin shown below is more conservative than a value calculated using 4320V. Therefore, these analyses have not been revised using the proposed Technical Specification 3.8.1 maximum EDG voltage of 4320V.

MNS EDG loading during LOCA/Blackout Condition

EDG	Continuous Rating (kW)	Loading (kW)	Margin Remaining (kW)
EDG 1A	4000	3941	59
EDG 1B	4000	3948	52
EDG 2A	4000	3950	50
EDG 2B	4000	3941	59

- EDG set to 110% of Rated Voltage and 102% of Rated Frequency

MNS EDG loading during Blackout Condition

EDG	Continuous Rating (kW)	Loading (kW)	Margin Remaining (kW)
EDG 1A	4000	3671	329
EDG 1B	4000	3802	198
EDG 2A	4000	3700	300
EDG 2B	4000	3890	110

- EDG set to 110% of Rated Voltage and 102% of Rated Frequency

CNS EDG loading during LOCA/Blackout Condition

EDG	Continuous Rating (kW)	Loading (kW)	Margin Remaining (kW)
EDG 1A	5750	5197	553
EDG 1B	5750	5193	557
EDG 2A	5750	5195	555
EDG 2B	5750	5194	556

- EDG set to 110% of Rated Voltage and 102% of Rated Frequency

CNS EDG loading during Blackout Condition

EDG	Continuous Rating (kW)	Loading (kW)	Margin Remaining (kW)
EDG 1A	5750	5274	476
EDG 1B	5750	5211	539
EDG 2A	5750	5164	586
EDG 2B	5750	5218	532

- EDG set to 110% of Rated Voltage and 102% of Rated Frequency