



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

January 27, 2015

Mr. Benjamin C. Waldrep, Vice President  
Shearon Harris Nuclear Power Plant  
5413 Shearon Harris Rd.  
New Hill, NC 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 – REQUEST FOR  
ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT  
REQUEST TO REVISE TECHNICAL SPECIFICATION TABLE 3.3-4,  
LOSS-OF-OFFSITE POWER 6.9 kV EMERGENCY UNDERVOLTAGE –  
PRIMARY SETPOINTS (TAC NO. MF4294)

Dear Mr. Waldrep:

By letter dated June 19, 2014 (Agencywide Documents Access and Management System Accession No. ML14174A118), Duke Energy Progress, Inc. (the licensee), proposed to amend Shearon Harris Nuclear Power Plant, Unit 1 Technical Specifications (TSs) to revise TS 3.3.2, "Engineered Safety Features Actuation System Instrumentation," Table 3.3-4, "Engineered Safety Features Actuation System Instrumentation Trip Setpoints." Specifically, the Functional Unit 9.a, Loss-of-Offsite Power 6.9 kilovolt Emergency Bus Undervoltage – Primary, instrument trip setpoint and associated allowable value are being revised to correct a nonconservative TS. The proposed amendment requests TS changes consistent with TS Task Force Traveler-493, Revision 4, "Clarify Application of Setpoint Methodology for LSSS [Limiting Safety System Setting] Functions."

The U.S. Nuclear Regulatory Commission staff has reviewed the licensee's submittal and determined that additional information is needed in order to complete its review. The enclosed document describes this request for additional information (RAI). The RAI was e-mailed to the licensee in draft form on December 9, 2014 (ADAMS Accession No. ML15020A479), and a clarification call was held on January 8, 2015. The licensee agreed to provide a response to the enclosed RAI by January 30, 2015.

B. Waldrep

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If you have any questions, please call me at 301-415-2760, or by e-mail to [Martha.Barillas@nrc.gov](mailto:Martha.Barillas@nrc.gov).

Sincerely,

*/RA/*

Martha Barillas, Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-400

Enclosure:  
Request for Additional Information

cc w/enclosure: Distribution via Listserv

## REQUEST FOR ADDITIONAL INFORMATION

### SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1, LICENSE AMENDMENT REQUEST

#### TO REVISE TECHNICAL SPECIFICATION TABLE 3.3-4, LOSS OF OFFSITE POWER

#### 6.9 KILOVOLTS EMERGENCY UNDERVOLTAGE PRIMARY SETPOINTS (TAC NO. MF4294)

The U.S. Nuclear Regulatory Commission staff notes that the license amendment request (LAR) dated June 19, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14174A118), is in response to deficiencies identified in a Component Design Bases Inspection documented in Inspection Report (IR) 05000400-11-008, dated August 9, 2011 (ADAMS Accession No. ML112220337). Specifically, on page 11 of the IR, the following is stated:

UFSAR [updated final safety analysis report] 8.3.1.1.3 states that motors can operate at 75% voltage for one minute without damage. Technical Specification (TS) Table 3.3-4 establishes the setpoint for the Secondary Loss of Offsite Power (degraded voltage) relay non-accident time delay as  $\leq 60$  seconds. It also established the setpoint for the Primary Loss of Offsite Power relay as  $\geq 4692\text{V}$  [Volts] (68% of 6900V). This scheme would allow motors to be subjected to voltage below 75% for up to one minute, which is in excess of the capability claimed in the UFSAR [updated final safety analysis report]. HNP [Harris Nuclear Plant] was not able to provide a calculation to justify this condition.

In the LAR, the settings of the 6.9 kilovolts (kV) Emergency Bus Undervoltage – Primary (Loss of Voltage) (LOV) are proposed to be revised. The staff requests the following additional information for its evaluation of the LAR:

#### EEEE RAI:

1. On page 2 of the LAR, the licensee stated: “Specifically, the team determined that the trip setpoint and allowable value specified in the TS for the second time delay for the degraded voltage relays (i.e., the primary undervoltage protection) would allow motors to be subjected to voltage below 75% for up to one minute, which is in excess of the capability cited in the FSAR [final safety analysis report].”

The staff finds elsewhere in the LAR that the term “primary undervoltage protection” is used for LOV protection. The degraded voltage protection is typically considered a secondary protection. Please clarify the above sentence in the LAR, and provide a copy of the revised page of the LAR.

2. On page 2 of the LAR, the licensee stated:

Upon actuation, the primary undervoltage protection logic automatically initiates separation of the emergency power system from the upstream balance-of-plant buses (i.e., the offsite source), load shedding and

Enclosure

starting of the Emergency Diesel Generators (EDGs). When the EDGs attain adequate voltage and speed, the EDG supply breakers to the 6.9 kV Emergency Buses close and safety-related loads are connected to the buses automatically by the emergency load sequencer. Once EDG loading begins, the primary undervoltage protection scheme logic is blocked. The dropout setting of the primary undervoltage protection scheme is such that bus voltage does not drop below the setpoint during "normal" transient conditions such as during motor starting.

Please clarify whether the LOV protection logic is unblocked after the EDG loading is completed. Provide a copy of the logic diagram of LOV and degraded voltage protection when a 6.9 kV emergency bus is fed from an offsite source and when fed from an EDG.

3. On page 3 of the LAR, the licensee stated:

75% of motor rated voltage is 4950 V. Therefore, based on motor voltage ratings, the UV [same as LOV] relay setpoint should be based on 4950 V at the motor terminals in consideration of protecting the motors against low voltage (below the motor voltage ratings). The existing settings are less than the motor voltage ratings and, therefore, do not assure adequate motor voltage under low system voltage conditions. The new proposed settings are based on 4950 V at the motor terminals. Voltage drop in the feeder cable from 6.9 kV bus to the motor is added to the motor terminal voltage of 4950 V; this is the new Analytical Limit for the UV relays.

- a. According to the FSAR, the motors are rated 75% voltage for one minute. Please confirm whether during running conditions, the motors can be considered to act as approximate constant load (constant kVA).
- b. At lower voltage, the current increase will be in proportion to decrease in voltage. However, the motors will be able to handle lower voltages (up to the motor stalling voltage) for shorter durations (i.e., a few seconds), considering constant thermal capacity of motors for the short duration. The staff's concern is that raising the lower analytic voltage limit for the LOV relays could result in unnecessary separation from the grid. Please describe why this consideration was not accounted for while deriving the lower analytical voltage limit for the LOV relays.

4. General Design Criterion 17 states that provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies. Generic Letter 2006-02 defines degraded grid reliability conditions as those conditions on the grid caused by load flow, operation of a transmission element, or maintenance on a transmission element that could significantly increase the probability of a nuclear power plant trip or loss of adequate offsite power supply. Demonstrate the proposed LOV relay time setting is long enough to ride through short time system transients such as transmission system faults. Also, describe the maximum fault

clearing time of the transmission lines connected to HNP and any impacts to the LOV relay timing.

5. The LOV relay at HNP is of an instantaneous type with a separate timer. Explain how the licensee covers the voltage gap between the voltage setting of LOV relay and degraded voltage relay setting.

B. Waldrep

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If you have any questions, please call me at 301-415-2760, or by e-mail to [Martha.Barillas@nrc.gov](mailto:Martha.Barillas@nrc.gov).

Sincerely,

*/RA/*

Martha Barillas, Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

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**ADAMS Accession No.: ML15023A315**

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