



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

April 13, 2015

Mr. Benjamin C. Waldrep, Site 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 (ADAMS) 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 non-conservative TS.

By letter dated January 30, 2015 (ADAMS Accession No. ML15030A358), you provided a response to a request for additional information (RAI) letter issued on January 27, 2015, by the U.S. Nuclear Regulatory Commission staff (ADAMS Accession No. ML15023A315).

The staff has reviewed the licensee's submittal and determined that additional information is needed in order to complete its review. The enclosed RAI was e-mailed to the licensee in draft form on March 11, 2015 (ADAMS Accession No. ML15090A729). A public teleconference call was held on March 30, 2015, in which the draft RAI was discussed. A public meeting summary will be issued for the teleconference call.

The licensee agreed to provide a response to the enclosed RAI by April 24, 2015.

B. Waldrep

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If you have any questions, please call me at 301-415-2760 or [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

LICENSE AMENDMENT REQUEST TO REVISE TECHNICAL SPECIFICATION TABLE 3.3-4,

LOSS OF OFFSITE POWER 6.9 KV EMERGENCY UNDERVOLTAGE PRIMARY SETPOINTS

DUKE ENERGY PROGRESS, INC.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

**EICB RAI 2**

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(c)(1)(ii)(A), states, "Where a limiting safety system setting is specified for a variable on which a safety limit has been placed, the setting must be so chosen that automatic protective action will correct the abnormal situation before a safety limit is exceeded. If, during operation, it is determined that the automatic safety system does not function as required, the licensee shall take appropriate action, which may include shutting down the reactor."

Additionally, 10 CFR 50.36(c)(3) states, "Surveillance requirements are requirements 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."

General Design Criterion 13, "Instrumentation and Control," of Appendix A to 10 CFR Part 50 requires that instrumentation be provided to monitor variables and systems and that controls be provided to maintain these variables and systems within prescribed operating ranges.

General Design Criteria 20, "Protection System Functions," of Appendix A to 10 CFR Part 50 requires that the protection system be designed to initiate the operation of appropriate systems to ensure that specified acceptable fuel design limits are not exceeded.

The licensee calculated the maximum pickup of the primary undervoltage relay. As per the vendor's manual, the pickup voltage of the primary undervoltage relay is 110 percent or less of the dropout setpoint. With this condition, the licensee stated the maximum pickup of the primary undervoltage relay can be as high as 105.23 volts (V). This was calculated by multiplying the maximum as left tolerance (ALT) by a factor of 1.1 (110 percent) and adding the total loop uncertainty.

The U.S. Nuclear Regulatory Commission (NRC) staff notes that including drift by using the as found tolerance (AFT) value to calculate the maximum dropout for the primary relay would result in a dropout occurring at 106.519V, which is also less than the minimum secondary level degraded voltage actuation level of 106.73V. The NRC staff noted that using the AFT value for calculating the maximum dropout value yields a higher voltage than using the ALT value.

Enclosure

Please explain the reason for using the ALT instead of the AFT for determining the maximum reset voltage for the primary undervoltage relay. Please confirm adequate separation between the settings of the undervoltage and degraded voltage relays.

### **EEEE RAI 2**

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.

1. The staff finds that the methodology considered by the licensee to calculate analytical voltage values of loss of voltage (LOV) relay has resulted in lower analytical voltage value of 5279V (76.5 percent of 6900V) and upper analytical voltage value of 5773V (83.7 percent of 6900V), with a nominal voltage setpoint of 5526V (80.0 percent of 6900V). The staff finds that these voltage values are high, which can result in unnecessary separation of safety-related buses from offsite power on transient transmission faults. Please confirm that:
  - (a) The lower analytical voltage limit for LOV relay is such that none of the safety-related, normally running motors would stall when subjected to this voltage.
  - (b) The upper analytical voltage limit for LOV relay is such that the minimum expected voltage during loss-of-coolant accident (LOCA) start of all safety-related loads remains above this voltage.
2. Please confirm that a momentary voltage dip lasting to clear a fault, lightning strike, or switching transient in the grid does not cause spurious separation of safety buses from offsite power. In addition, please confirm that the proposed LOV settings do not increase loss of offsite power frequency.
3. In the calculation No. 0054-JRG attached to LAR, the licensee calculated a maximum pickup/reset value of LOV as high as 105.23V. The licensee stated that a pickup value of 105.23V is acceptable because it is less than the minimum degraded voltage relay dropout setting of 106.73V.

The staff finds the pickup (reset) voltage value as 105.23V of 120V = 87.7 percent very high, which does not provide an adequate margin from the degraded voltage relay dropout setting of 106.73 of 120V = 88.9 percent. The staff considers that the analytical and reset voltage values of LOV relay should be lower than the minimum voltage calculated at the 6.9 kilovolts (kV) safety-related buses during starting of LOCA sequencing loads any time after the safety injection signal, based on the minimum switchyard voltage (after the unit trip). Please provide a curve showing the minimum voltages at the 6.9kV safety-related buses during 55 seconds of starting of LOCA loads after the safety injection signal based on the minimum switchyard voltage. Super-impose on this curve the analytical and reset voltage values of LOV relay settings to confirm that adequate margin exists so that the motors would not trip out by the LOV relay during LOCA loads sequencing.

B. Waldrep

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If you have any questions, please call me at 301-415-2760 or [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

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**ADAMS Accession No.: ML15091A342**

\*via email \*\* via memo

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