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

August 2, 2016

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 – SECOND REQUEST FOR ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT REQUEST FOR A TEMPORARY CHANGE TO TECHNICAL SPECIFICATIONS FOR THE 'A' EMERGENCY SERVICE WATER PUMP REPLACEMENT (CAC NO. MF7017)

Dear Mr. Waldrep:

By letter dated October 29, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15302A542), Duke Energy Progress, Inc. (Duke Energy, the licensee), submitted a license amendment request, in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.90, for Shearon Harris Nuclear Power Plant, Unit 1, for a temporary change to associated Technical Specifications to allow the 'A' Train emergency service water (ESW) pump to be inoperable for 14 days to implement 'A' Train ESW pump design changes.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed Duke Energy's response to the NRC request for additional information (RAI) provided in its letter dated February 16, 2016 (ADAMS Accession No. ML16047A389) 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 July 7, 2016, and no clarification call was requested by Duke Energy. Please note that if a response to this letter is not received by the agreed-upon date of August 8, 2016, or an acceptable alternate date is not provided in writing, we may deny the application for amendment under the provisions of 10 CFR 2.108.

If you have any questions, please call me at 301-415-2760 or Martha.Barillas@nrc.gov.

Sincerely,

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

SECOND REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST FOR A TEMPORARY TECHNICAL SPECIFICATION CHANGE ASSOCIATED WITH THE 'A' EMERGENCY SERVICE WATER PUMP REPLACEMENT

DUKE ENERGY PROGRESS, INC.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

By letter dated October 29, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15302A542), Duke Energy Progress, Inc. (Duke Energy, the licensee), submitted a license amendment request (LAR), in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.90, for Shearon Harris Nuclear Power Plant, Unit 1 (Harris), for a temporary change to associated Technical Specifications to allow the 'A' Train emergency service water (ESW) pump to be inoperable for 14 days to implement 'A' Train ESW pump design changes. The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed Duke Energy's response to the NRC request for additional information (RAI) provided in its letter dated February 16, 2016 (ADAMS ML16047A389), and determined the following supplemental RAI is needed in order to complete its review.

1. In its LAR, Duke Energy provided analyses that demonstrated, during the proposed 14-day allowed outage time (AOT) to allow maintenance on a train of ESW, Harris could start the 'A' emergency diesel generator (EDG) within approximately 1 hour after a postulated design basis loss of offsite power (LOOP) with a single failure and then perform the safety function of decay heat removal. In addressing decay heat removal, the licensee responded to RAI-EEEB-2 describing a process that will allow the reactor to cool down to hot shutdown, which can be sustained for an extended time period. However, the licensee should provide more information on the licensee's process of decay heat removal and plant stability.

    a. Considering an extended LOOP, provide an evaluation for how long the reactor can be maintained in hot shutdown. Further, describe how and when the capability to achieve cold shutdown using residual heat removal is achieved, including how service water is supplied to the component cooling water heat exchangers.

    b. Demonstrate that there is sufficient capability in the completion time maintenance configuration to ensure that pressurizer levels are maintained at acceptable levels, including the prevention of water relief through the pressurizer power operated relief valves and primary system voiding. Specifically address the availability of primary inventory controls in the discussion.

Enclosure

c. Demonstrate that the FLEX pump will reliably perform its intended compensatory defense-in-depth safety function of supplying service water to the operating EDG and other essential loads during a LOOP with a single failure, including:

   i. Describe the ESW flow path to the operating EDG and other essential loads using the FLEX pump. Include a description of valve repositioning(s) necessary to support the cooling water lineup, including the valve manipulation(s) necessary to ensure water inventory only goes to the intended loads, and the estimated time needed to accomplish the lineup.

   ii. Provide the results of analyses or testing performed to demonstrate that FLEX cooling inventory loss expected due to leakage past the repositioned valves and back leakage via the ESW/Nuclear Service Water pump discharge check valves would not impair the ability of the FLEX pump to perform its intended compensatory defense-in-depth safety function of providing sufficient cooling flow to the loads assumed in this LAR.

   iii. Describe the alignment and flow testing that will be performed or has been performed prior to starting the 'A' ESW pump replacement maintenance activity, which verifies the FLEX pump provides the required flow to the operating EDG and other required loads. Any testing performed should demonstrate that the FLEX pump hook up and associated system lineup could be accomplished within the 1 hour credited in the LAR.

   iv. Assuming an extended LOOP, provide the following information:

   (A) Identify all ESW cooling loads that will not be receiving service water during this event.

   (B) Explain whether these loads will be secured or are credited to continue operating.

   (C) Provide a justification for why these loads are either not necessary during this event or why they can be credited to continue performing their design basis safety function without ESW cooling.

   (D) The LAR appears to indicate that heating, ventilation, and air conditioning (HVAC) will not be supplied to necessary equipment rooms including the EDG building. Provide a discussion on how the EDG building HVAC will be cooled since an EDG will be operating for an extended period.

(E) Considering the probabilistic risk assessment does not evaluate an event beyond a 24-hour mission time, discuss the heating effects on equipment rooms including the OPERABILITY of associated electrical switchboards, batteries, and their associated loads beyond 24 hours after the LOOP.

(F) Demonstrate sufficient safety related containment cooling and spent fuel pool cooling will be maintained during this design basis event.

2. In its LAR, Duke Energy indicates that emergency auxiliary feedwater (AFW) water sources (e.g., the condensate storage tank) will be exhausted within the 24-hour period of analysis and that additional water sources (e.g., lake water) will be provided for the remainder of the event. If crediting reliance on water sources that have a potential to include impurities that could impair heat transfer performance, demonstrate that decay heat can be removed via the steam generators and auxiliary feed water pumps until recovery of residual heat removal, including:

    a. Describe the water sources for AFW after the condensate storage tank is depleted and how those sources will be provided to the AFW pumps.

    b. Provide a summary of the results of any analyses performed on the impurities in those water sources and that the impacts of the impurities on the capability to effectively transfer heat from the primary loop, over the duration of the event, are minimal. (Will the impurities deposit on heat transfer sources reducing heat transfer coefficients sufficient to impair the ability to remove heat?)

    c. Provide a summary of the results of any assessments performed that demonstrate that the impacts of the impurities in the water sources on the steam generator tube integrity, including an evaluation of the potential for erosion of the tubes from silica (and similar impurities) in the water are minimal.

3. The NRC's guidance on risk-informed license amendment requests (Regulatory Guide (RG) 1.174, Rev. 2) states that when "risk increases are proposed, the benefits should be described and should be commensurate with the proposed risk increase." Examples of benefits appropriate for permanent or one-time changes to technical specifications (e.g. reduction in personnel exposure, avoidance of plant transient) are described in RG 1.177. The original request dated October 29, 2016, cited increased pump design margin for reliability as a benefit. Duke Energy no longer plans to perform this maintenance during the current cycle. Given this change, please explain whether the benefits associated with the LAR have changed and justify that they are commensurate with the proposed risk increase.

4. In its LAR, Duke Energy's justification for removing a train of ESW from service for maintenance relies, in part, on the availability and capability of the other train to perform its safety function. As such, please describe whether any special actions, beyond confirmation that routine surveillances, testing, and maintenance have been satisfactorily performed on the 'B' ESW pump and EDG, will be taken prior to starting maintenance on the 'A' ESW pump to ensure that the 'B' ESW pump and the 'B' EDG would start and run if necessary.

5. In its LAR, Duke Energy stated the Work Control Program and associated procedures and programs that implement the Maintenance Rule Program under 10 CFR 50.65(a)(4) will provide for controls and assessments to preclude the possibility of simultaneous planned outages of redundant trains and ensure system reliability. Further, Section 3.7 Configuration Risk Management cites plant procedures that the licensee would use to ensure compliance with 50.65(a)(4). During the maintenance of 'A' ESW pump, the licensee is relying on the functionality of the INOPERABLE 'A' EDG and the OPERABILITY of the turbine-driven AFW pump, as well as the other components/systems listed in Section 7.0 of Attachment 6 of the LAR, for defense-in-depth in a LOOP and single failure of the 'B' ESW train.

If any of these protected systems/components listed in Section 7.0 become INOPERABLE or nonfunctional (as in the case of the 'A' EDG that is already INOPERABLE but functional) either before maintenance or during maintenance of the 'A' ESW pump, the defense-in-depth available to remove decay heat would be significantly different. Therefore,

   a. Describe what action you would take to ensure sufficient defense-in-depth if any of the systems/components described in Section 7.0 became INOPERABLE or nonfunctional, respectively, either before or during maintenance on the 'A' ESW pump.

   b. How would the Work Control Program described in Section 3.3 and Configuration Risk Management described in Section 3.7 of the LAR manage defense-in-depth to ensure plant safety in the above described scenarios?

6. In its LAR, Duke Energy stated that the ESW maintenance was anticipated to take approximately 10 days, which is within the 14-day AOT requested. Additional details are requested to enhance the staff's understanding of the planned risk management activities associated with the 'A' ESW pump replacement.

   a. Will all parts needed for the replacement be verified to be on site prior to commencing the maintenance?

   b. Are there any replacement parts that have a long lead time such that if the part is damaged during installation, completing the 'A' ESW pump maintenance during the 14-day AOT would be challenged? If so, describe the specific risk management activity associated with the activity.

   c. What are the critical verification points during the 'A' ESW pump maintenance? Describe the specific risk management activity associated with each activity.

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