

NRR-DMPSPeM Resource

From: Klett, Audrey
Sent: Thursday, January 24, 2019 5:38 PM
To: Zaremba, Arthur H.
Cc: Wasik, Christopher J
Subject: NRC Request for Additional Information for Oconee LAR 2017-05 (L-2018-LLA-0149)
Attachments: RAIs for Oconee LAR 2017-05.docx

Hi Art,

Attached are the RAIs for Oconee LAR 2017-05. NRC is requesting a due date of 30 days from today. Please call me if you have any questions.

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Recipients:
"Wasik, Christopher J" <Christopher.Wasik@duke-energy.com>
Tracking Status: None
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REQUEST FOR ADDITIONAL INFORMATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

LICENSE AMENDMENT REQUEST 2017-05

DUKE ENERGY CAROLINAS, LLC

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

DOCKET NOS. 50-269, 50-270, and 50-287

By letter RA-18-0023 dated May 17, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18144A788), Duke Energy Carolinas, LLC (the licensee) applied for license amendments to Renewed Facility Operating Licenses DPR-38, DPR-47, and DPR 55, for the Oconee Nuclear Station, Units 1, 2, and 3 (Oconee), respectively. In order to complete its review, the staff developed draft requests for additional information (RAIs). On January 22, 2018, licensee and NRC staff held a clarification call to discuss the draft RAIs. As a result of the call, the staff made clarifying and editorial changes to the RAIs. Per electronic mail dated January 23, 2018 from Mr. Chris Wasik of the licensee's staff, the NRC staff requests the licensee to respond to the RAI below within 30 calendar days from the date of this request.

RAI 1

Section 6 of the Enclosure to the licensee's application listed several references. Reference 3 is a letter from the licensee to the NRC dated May 17, 1993, titled, "Alignment of Keowee Hydro Station Auxiliary Power." Page 2 of the Enclosure to Reference 3 states:

The one minute delay will ensure that, without a failure, the load center will remain powered from its normal power source, and also ensure power is restored to the auxiliaries in a timely manner if a failure removes the normal power source (the Keowee Units can operate for approximately **1 hour** *[emphasis added]* without auxiliary power).

Reference 4 is a letter from the licensee to the NRC dated December 6, 1993, titled, "Response to NRC Question #10 on Technical Specification 3.7 Revision." Reference 4 states:

Since the Keowee Units are designed to start and run for greater than 30 minutes without AC power to the auxiliaries, credit is taken for operator action to ensure that power is restored to the Keowee auxiliaries after a Design Basis Accident [DBA].

Section 2.3 of the Enclosure to the licensee's application dated May 17, 2018, states:

A recent review initiated by Duke Energy determined that for events where a KHU is initially in commercial generation mode, following an emergency start signal, the governor oil accumulators would be exhausted and governor oil pumps would be required to start within **a few minutes** *[emphasis added]*. More time is available if the KHU is initially in standby, as less wicket gate movement is

required to bring a KHU to rated speed from standby compared with recovering from load rejection that occurs on receipt of an emergency start if operating for commercial generation.

Duke Energy, as a result of recent analysis reviews, determined that existing procedures and staffing requirements could challenge the ability to manually realign auxiliary power in the short timeframe necessary to support accident mitigation (i.e., within a few minutes of receipt of emergency start signal). The issue was entered into the Duke Energy corrective action program. TS 3.8.1 does not contain requirements to ensure the automatic auxiliary power transfer logic is operable to support Keowee operability. As such, this is considered a non-conservative Technical Specification. Immediate action taken was to restrict the underground assigned KHU from commercial generation to meet the guidance in NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant safety," dated December 29, 1988.

Based on the above, it appears that the time within which power needs to be restored to the auxiliaries has evolved since 1993 from a maximum of 1 hour to a minimum of "a few minutes." Section 50.36(b) of 10 CFR requires that the TSs be derived from the analyses and evaluation included in the safety analysis report. The staff requests the licensee to explain how the licensee determined the current available time of "a few minutes" for completion of necessary operator action with emphasis on the governor oil accumulator exhaustion rate, including its relation with the KHU power generation (with and without commercial generation) at the time of a design basis accident (i.e., a loss-of-coolant accident with a loss of offsite power).

RAI-2

Oconee Updated Final safety Analysis Report (UFSAR), Section 6.3.3.3, "Loss of Normal Power Source," states:

Following a loss-of-coolant accident assuming a simultaneous loss of normal power sources to the LOCA unit, the emergency power source and the Low Pressure Injection Systems will be in full operation within 74 seconds after actuation, even assuming a single failure, and the High Pressure Injection System will be in full operation within 48 seconds after actuation. The electrical power system design is based on the assumption that engineered safeguards actuation in one unit occurs simultaneously with a loss of offsite power to all three units. However, accident scenarios in FSAR Section Chapter 15 assume loss of offsite power to the LOCA unit only. Except for large break LOCA (as described in UFSAR Section 15.14.3.3.6), all calculations for Oconee Units have assumed a 48 second delay from receipt of the actuation signal to start flow for the HPI system and a 7 second delay for the LPI system. Upon loss of normal power sources including the startup source and initiation of an engineered safeguards signal, the 4160 volt engineered safeguards powerline is connected to the underground feeder from Keowee hydro (Section 8.3.1). The Keowee hydro unit will start up and accelerate to full speed in 23 seconds or less. An analysis has shown that by energizing the HPI and LPI valves (which have opening times of 14 seconds to deliver required flow, and 36 seconds respectively at normal bus voltage) and pumps after a 10 second swapper time (required by the single failure), the design injection flow rate at (HPI - 450

gal/min, LPI - 3000 gal/min) will be obtained within 48 and 74 seconds, respectively.

Oconee UFSAR, Section 15.14.4.3.6, "ECCS Performance and Single Failure Assumption," states in part:

The Keowee hydro unit will start up and accelerate to full speed in 23 seconds or less (Section 6.3.3.3). The failure of transformer CT-4 results in an additional 10 second delay before power is available to the ECCS pumps. The time delay between breaker closure and valve/pump motors operating at rated voltage/speed is 5 seconds. Thus, for the large break LOCA analyses performed with the RELAP5-based evaluation model (Reference 40), the LPI valves will begin to open at 38 seconds with a stroke time of 36 seconds or less. Credit is taken in the analysis for flow through the LPI valves while the valves are traveling to their full open position. Full LPI flow will be obtained within 74 seconds. Two ECCS trains are available with the single failure of transformer CT-4. However, only one train of LPI flow is credited in the actual large break LOCA analyses (Reference 42).

Section 50.36(b) of 10 CFR requires that the TSs be derived from the analyses and evaluation included in the safety analysis report. The staff requests the licensee to confirm whether it considered the potential loss of power to the KHU auxiliaries and the subsequent restoration of power, either by manual switchover or the automatic switchover, generally in the accident analysis and in UFSAR Sections 6.3.3.3 and 15.14.4.3.6. If the licensee made any changes to the analyses, the staff requests the licensee to provide a summary those changes.

RAI-3

In Section 2.1 of the application's enclosure, the licensee states:

[T]he current licensing basis (CLB) includes allowances for using [KHUs] for commercial generation in addition to their TS 3.8.1 required function of onsite emergency power sources. TS 3.8.1 and SLC [Selected License Commitment] 16.8.4, Keowee Operational Restrictions, include requirements for certain features and operational restrictions to ensure that KHUs can transition from commercial operation mode to onsite emergency power mode and meet all accident analysis assumptions. One such feature is the Zone Overlap Protection Circuitry (TS LCO 3.8.1.c)."

In Section 2.3, the licensee states:

A recent review initiated by Duke Energy determined that for events where a KHU is initially in commercial generation mode, following an emergency start signal, the governor oil accumulators would be exhausted and governor oil pumps would be required to start within a few minutes. More time is available if the KHU is initially in standby, as less wicket gate movement is required to bring a KHU to rated speed from standby compared with recovering from load rejection that occurs on receipt of an emergency start signal if operating for commercial generation.

...

Duke Energy as a result of recent analysis reviews, determined that existing procedures and staffing requirements could challenge the ability to manually realign auxiliary power in the short time which is necessary to support accident mitigation (i.e., within a few minutes of receipt of emergency start signal). This issue was entered into the licensee corrective action program. TS 3.8.1 does not contain requirements to ensure the automatic auxiliary power transfer logic is operable to support Keowee operability. As such, this is considered a non-Conservative TS. *Immediate action was taken to restrict the underground assigned KHU from commercial generation to meet the guidance in NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," date December 29, 1998 [emphasis added].*

Section 50.36(b) of 10 CFR requires that the TSs be derived from the analyses and evaluation included in the safety analysis report.

- a. The staff requests the licensee to:
 - i. Describe if or when both KHUs can be in commercial generation mode and under what conditions one KHU can be in standby while the other is in commercial mode.
 - ii. Confirm whether these modes have been analyzed for design basis event (DBE) mitigation, including clarification of how long it takes to manually align the KHU auxiliary power sources to mitigate a DBE and how long it takes for auxiliary power alignment using the auto transfer logic to mitigate a DBE.
 - iii. Specify the allowable time to start powering the safety loads to mitigate an accident or plant transient from the time the emergency start signal is received.
 - iv. Please confirm whether the licensing basis allows both KHUs to be operated in commercial generation mode.
- b. The staff requests the licensee to confirm whether it intends to use both KHUs to generate to the grid after the licensing action is approved and whether the auto position of the auto/manual switch for power transfer would become the design basis position whenever one or more of the Oconee 1, 2, and 3 units are in power operation.

RAI 4

In Section 2.3 of the application enclosure, the licensee states, "[T]he automatic logic was defense in depth, was installed QA-1, would be maintained QA-1, and would be periodically tested. The NRC accepted this position in a September 4, 1998, Safety Evaluation (Reference 5)." In Section 3.1.1.1.6, "Second Category, Oconee QA-1 SSCs" of the UFSAR, Item 13 states, "[T]he maintenance and test procedures for certain 6.9 kV and 4 kV switchgear breakers are QA-1. Components that are used in future maintenance on these breakers that may impact the ability to shed non-safety loads are also QA-1." In order to confirm the reliability of the zone protection circuitry, the staff requests the licensee to identify any breakers involved in the auto transfer logic and confirm whether they are covered by QA-1 maintenance procedures, and to describe any operating experience regarding automatic transfer logic failures caused by a circuitry malfunction.

RAI-5

Section 50.36(b) of 10 CFR requires that the TSs be derived from the analyses and evaluation included in the safety analysis report. The staff requests the licensee to provide the following information:

- a. Logic and/or electrical diagrams showing breaker alignment for normal and alternate auxiliary power sources, including associated breakers and buses fed from these auxiliary power sources, and a comparison of these diagrams to Figure 1 of the application with respect to Zone Overlap Circuitry.
- b. The staff requests the licensee to provide high-level system descriptions of: (1) the governor oil system, including the breaker alignment for normal and alternate power sources that feed the accumulators; and (2) the normal and auxiliary power swaps to the load centers.
- c. Legible versions of UFSAR figures 8.1, 8.3 (page 1 of 2), and 8.4 (all three pages).