

**OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 (ONS)
SUBSEQUENT LICENSE RENEWAL APPLICATION (SLRA)
REQUESTS FOR ADDITIONAL INFORMATION (RAIs)**

SECOND ROUND RAI B2.1.9-2a

SAFETY REVIEW

RAI B2.1.9-2a

Regulatory Basis:

Title 10 of the *Code of Federal Regulations* (CFR) Section 54.21(a)(3) requires an applicant to demonstrate that the effects of aging for each structure and component identified in 10 CFR 54.21(a)(1) will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. One of the findings that the U.S. Nuclear Regulatory Commission (NRC) staff must make to issue a renewed license (10 CFR 54.29(a)) is that actions have been identified and have been or will be taken with respect to managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under 10 CFR 54.21, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis.

In order to complete its review and enable making a finding under 10 CFR 54.29(a), the staff requires additional information in regard to the matters described below.

Background:

SLRA Section B2.1.9, "Bolting Integrity," states that the Oconee Bolting Integrity AMP, with the enhancements provided in the SLRA, will be consistent with the ten program elements of GALL-SLR Report AMP XI.M18, "Bolting Integrity." To ensure consistency with the "detection of aging effects" program element, the SLRA included enhancement no. 4 to demonstrate that the program will perform inspections of closure bolting in locations that preclude detection of joint leakage or for which leakage is difficult to detect.

The "detection of aging effects" program element of the GALL-SLR Report AMP states, in part, that the Bolting Integrity program seeks to detect degradation of pressure boundary closure bolting due to crack initiation, loss of preload, or loss of material that may result in leakage from the mating surfaces or joint connections of pressure boundary components. Since these aging effects may be difficult to detect for submerged closure bolting, the GALL-SLR Report AMP recommends the use of visual inspection in bolt heads and threads to detect loss of material during opportunistic maintenance activities (e.g., when made accessible, and when joints are disassembled) for a representative sample population as applicable to the site. When opportunistic maintenance activities will not provide access to the minimum required sample of the population over a 10 year period, the GALL-SLR Report AMP recommends the use of alternate means of inspections or testing to adequately manage the aging of submerged closure bolting for pressure retaining components. Examples of acceptable alternative inspections for submerged bolting recommended in the GALL-SLR Report AMP include: (a) periodic pump vibration measurements are taken and trended; or (b) sump pump operator walkdowns are performed demonstrating that the pumps are appropriately maintaining sump levels.

By letter dated March 31, 2022 (ADAMS Accession No. ML22090A046), Duke Energy provided a revised response to RAI B2.1.9-2. In its response to request no. 2, Duke Energy described

the proposed alternative means of inspections and the acceptance criteria that will be used for submerged bolting by the Bolting Integrity program. Specifically, Duke Energy stated that, “alternative inspections for submerged bolting include diver inspections and remote video/photo inspections. Submerged bolted connections where diver inspections are performed will include visual inspections for degraded bolts, missing or broken bolts and, where possible, the torque of bolts verified to be hand tight. Remote video and photo inspections may be performed to inspect for degraded, loose, or missing bolts.”

Issue:

Additional justification is necessary to demonstrate that the proposed alternative means of inspections can effectively detect the aging effects associated with the degradation of pressure boundary submerged closure bolting before there is a loss of system or component intended function(s). Specifically, the staff identified the following issues as requiring additional clarification:

- It is not clear how the use of remote video and photo inspection will be sufficient to provide clear indications to detect degradations in submerged closure bolting of a pressure retaining boundary. It is noted that the GALL-SLR Report recommends detecting degradation due to crack initiation, loss of preload, or loss of material that may result in leakage from the mating surfaces or joint connections of pressure boundary components, and the use of remote video and photo inspections appear to be limited in their capability to detect some of these aging effects.
- It is not clear how the use of hand tight check will be adequate to detect loss of preload in systems requiring a specific torque value (e.g., 30 lb-ft) at their connections. It is noted that bolts and nuts that can be verified to be hand tight may still leak if the connection is not set to the specified torque value necessary to maintain the pressure boundary of the components.

Request:

Considering the issues identified above, clarify how the proposed alternative means of inspections for submerged bolting, as described in the revised response to RAI B2.1.9-2, can effectively detect the aging effects associated with the degradation of pressure boundary closure bolting (i.e., loss of preload, crack initiation, loss of material) before there is a loss of system or component intended function(s).

If the currently proposed alternative inspection methods cannot be justified to be sufficiently capable of detecting the referenced aging effects, provide revised alternative means of inspections of submerged bolting that are effective in detecting and managing these aging effects. Update the SLRA as necessary.