

**From:** [Rogers, Bill](#)  
**To:** [Tony Banks](#)  
**Cc:** [Wu, Angela](#); [Bloom, Steven](#); [Oesterle, Eric](#); [Gavula, James](#)  
**Subject:** NRC Surry Draft RAI-Open Cycle Cooling Water (NRC TRP-20 James Gavula)  
**Date:** Friday, September 20, 2019 1:21:46 PM  
**Attachments:** [TRP 020 Surry OCCW System follow-up RAI Gavula .docx](#)

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Tony,

As we discussed, I've attached the Surry OCCW draft RAI for your review and in support of next week's clarification call.

Thank you,  
Bill

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NRC Surry SLRA Draft RAI – Open Cycle Cooling Water (NRC TRP-20 James Gavula)

Regulatory Basis

10 CFR 54.21(a)(3) requires an applicant to demonstrate that the effects of aging for structures and components 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 staff must make to issue a renewed license (§54.29(a)) is that actions have been identified, which either have been or will be taken, with respect to managing the effects of aging during the period of extended operation. In order to complete its review and enable the formulation of a finding under §54.29(a), the staff requires additional information in regard to the matters described below.

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RAI B2.1.11-3

Background:

As amended by letter dated July 17, 2019, SLRA Section B2.1.11, "Open-Cycle Cooling Water System," program description states that the carbon fiber reinforced polymer (CFRP) lined components in the circulating water system and service water system piping will be inspected consistent with ASME Code Case N-871, "Repair of Buried Class 2 and 3 Piping Using Carbon Fiber Reinforced Polymer Composite." This amendment added several enhancements. The enhancements subject to this request for information are as follows as follows:

- Procedures will be revised to require personnel who perform visual inspections and evaluation of carbon fiber reinforced polymer piping to be VT-1 qualified consistent with IWA-2300 of ASME Section XI and Mandatory Appendix II of ASME Code Case N-871. Personnel who perform acoustic examinations of CFRP lined piping will be qualified consistent with mandatory Appendix VI of ASME Code Case N-871.
- Procedures will be revised to require accessible surfaces of the CFRP linings at each terminal end to be acoustically impact tap examined in accordance with ASME Code Case N-871 section 5250(a) and 5250(c). The expansion rings need not be removed for this examination provided examinations of adjacent surfaces do not indicate the presence of new unacceptable indications that could extend beneath the rings.

ASME Code Case N-871, Mandatory Appendix V, "Inservice Examination," Section V-2500, "Acoustic Tap Examination of Terminal Ends," states:

Accessible surfaces of the CFRP/GFRP laminate at each terminal end shall be acoustic tap examined in accordance with -5250(a) and -5250(c) between 4 yr and 6 yr following return of the repaired area to service; and a minimum of once per 10-yr inservice inspection interval thereafter in the same inspection period of each succeeding inspection interval. The expansion rings need not be removed for this examination provided examinations of adjacent surfaces do not indicate the presence of new unacceptable indications that could extend beneath the rings.

Issue:

The enhancements to the program do not cite ASME Code Case N-871 Section V-2500 and as a result, there are no inservice inspection requirements for acoustic tap testing. The response did not provide a basis for why inservice acoustic tap testing would not be required to detect potential degradation of the CFRP.

Although one of the enhancements states that individuals conducting the acoustic tap testing will be qualified consistent with mandatory Appendix VI of ASME Code Case N-871; there is no consideration for noise level differences between the personnel qualification test site and the in-situ test site. The staff noted that this is not addressed in the current revision of ASME Code Case N-871; however, a current action proceeding through the Code committees is addressing this issue. Unless the qualification testing is conducted in an area where the ambient noise level is equal to or higher than the noise level where the in-situ testing is performed, it is not clear that the acoustic tap examination will reasonably detect and size voids, internal delamination, or debonding from the substrate at the terminal ends.

One of the enhancements states, "acoustically impact tap examined in accordance with ASME Code Case N-871 section 5250(a) and 5250(c). However, 5250(c) states the following:

Where exposed substrate pipe is accessible the substrate beneath the CFRP/GFRP laminate at terminal ends shall be ultrasonically [e.g., electromagnetic acoustic transducer (EMAT) technique] or electromagnetically measured to document steel substrate thickness. The procedure shall be demonstrated to the ANII as capable of detecting variation in thickness of the steel substrate wall thickness within 0.040 in. (1 mm) accuracy.

Section 5250(c) is not related to acoustic tap testing. The staff acknowledges this ambiguity exists in the current version of ASME Code Case N-871. This topic will also be addressed in a current action proceeding through the Code committees. The response is not clear on what actions will be taken in accordance with 5250(c).

Request:

1. If inservice inspection acoustic tap testing will not be conducted consistent with ASME Code Case N-871 Section V-2500, state how the effects of aging for the carbon fiber reinforce polymer, including voids, internal delamination, or debonding from the substrate, will be adequately managed.
2. If the acoustic tap examination qualification testing will not be performed where the ambient noise level is higher than the noise level where the in-situ testing is performed, provide the information to show that the acoustic tap examination will reasonably detect and size voids, internal delaminations, or debonding from the substrate.
3. Discuss what examinations will be conducted based on citing 5250(c). If no examinations will be conducted, state the basis for how potential aging effects of exposed substrate pipe will be managed.