

Vogle PEmails

From: Hearn, Peter
Sent: Thursday, January 26, 2017 2:45 PM
To: Vogle PEmails
Subject: FW: RAIs regarding Vogle, Units 3 and 4 LAR-16-027
Attachments: Proposed RAI questions regarding Vogle CS Embed Plate LAR.docx; Public Meeting Topics_LAR-16-027_VogleCS.docx

Attached are the RAIs for LAR 16-027

From: McMurray, Nicholas
Sent: Wednesday, January 04, 2017 4:10 PM
To: Hearn, Peter <Peter.Hearn@nrc.gov>; Patel, Chandu <Chandu.Patel@nrc.gov>
Cc: Mitchell, Matthew <Matthew.Mitchell@nrc.gov>; Dixon-Herrity, Jennifer <Jennifer.Dixon-Herrity@nrc.gov>; Gleaves, Bill <Bill.Gleaves@nrc.gov>; Williams, Shawn <Shawn.Williams@nrc.gov>
Subject: RAIs regarding Vogle, Units 3 and 4 LAR-16-027

Peter and Chandu,

Attached are the RAIs for Vogle LAR-16-027 related to the carbon steel embed plate welds. They have been reviewed by NRO/DEIA management.

During review of the LAR the staff also identified some items that did not rise to the level of an RAI, but wanted to clarify at the public meeting with the licensee. These items are also attached. You can also share those with the licensee in preparation of the meeting.

Thanks,

Nicholas McMurray
General Engineer
Materials and Chemical Engineering Branch
Division of Engineering, Infrastructure, and Advanced Reactors
U.S. NRC Office of New Reactors
T-07G08 | 301-415-6700

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Sent Date: 1/26/2017 2:44:37 PM
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From: Hearn, Peter

Created By: Peter.Hearn@nrc.gov

Recipients:
"Vogtle PEmails" <Vogtle.PEmails@nrc.gov>
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Files	Size	Date & Time	
MESSAGE	1131	1/26/2017 2:44:38 PM	
Proposed RAI questions regarding Vogtle CS Embed Plate LAR.docx			31534
Public Meeting Topics_LAR-16-027_VogtleCS.docx	27136		

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Reply Requested: No
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Staff Request for Addition Information Regarding
Vogtle LAR-16-027

Regulatory Basis:

10 CFR Part 50, GDC 1, "Quality Standards and Records," requires that structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed.

10 CFR Part 50, GDC 2, "Design Bases for Protection Against Natural Phenomena," requires that structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions.

10 CFR Part 50, GDC 4, "Environmental and Dynamic Effects Design Bases," requires that structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing and postulated accidents, including loss-of-coolant accidents.

10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Appendix D, "Design Certification Rule for the AP1000 Design," Section VIII.B.6 requires prior NRC approval for changes to Tier 2* information. The proposed changes affect Tier 2* information and therefore requires NRC approval.

RAI Question 1:

The proposed Tier 2* wording describes the testing methodology and results used to justify that the specific population of inaccessible welds that did not receive the appropriate nondestructive examination (NDE) can meet their design requirements. Currently, the proposed Tier 2* wording describes the impacted welds as:

The non-conforming partial penetration welds associated with reinforcement bar size #9 C3J couplers installed on carbon steel embedment plates under CA20 at Vogtle Unit 3 and Unit 4 and under CA01 at Vogtle Unit 3 that did not undergo non-destructive examination at the time of fabrication...

While the proposed Tier 2* wording describes the impacted welds, it does not clearly state that the testing is only representative of the population of Cives and Joseph Oat couplers that are referenced in the LAR.

- a. Please clarify the proposed Tier 2* wording so that it is clear that it is only applicable to this specific population of Cives and Joseph Oat couplers, and that it is not applicable for future welds that may not receive the appropriate NDE.

RAI Question 2:

The proposed Tier 2* wording states that it is only applicable for #9 sized couplers since there are no impacted and installed #11 sized couplers at VEGP. Page 6 of Enclosure 1 justifies using the #11 couplers in the analysis at VEGP.

The “Phase 2” paragraph of the proposed Tier 2* wording states that a total of thirty #9 sized couplers were tested. While this is accurate, there were also three #11 sized couplers that were tested. The second to last paragraph states, “Safety margin was calculated using the nominal tensile strength and the 90/95% confidence interval test coefficient based on the test samples”. The LAR’s Phase II analysis groups the 33 total couplers into one data set in order to calculate the test coefficient, “c”. The value of “c” is based on the single data set using both coupler sizes, and is a direct input for calculating both factors of safety for the #9 sized couplers. Therefore, it is inaccurate to state that only thirty #9 sized couplers were tested for Phase II as the safety margins are also influenced by the three #11 sized couplers. Both of these safety margins are referenced in the conclusion of the LAR, and referenced in the proposed Tier 2* wording.

- a. For the “Phase 2” paragraphs in the proposed Tier 2* wording, please clarify that #11 sized couplers were also tested since their results were used as part of the inputs for the calculated safety margins in your evaluation.

The staff notes that the reference to only the #9 sized couplers in the “Phase 1” paragraph is accurate as the Phase I test results did not combine both coupler sizes. Furthermore, the staff notes that referencing only the #9 sized couplers in the second to last paragraph is accurate as only #9 couplers are installed at VEGP.

RAI Question 3:

The LAR states that there are 1214 inaccessible Cives carbon steel couplers, and 872 inaccessible Joseph Oat carbon steel couplers at VEGP. These couplers are currently installed within specific modules.

- a. Provide the percentage of Cives carbon steel couplers in each specific module as compared to the total percentage of couplers installed in each specific module.
- b. Provide the percentage of Joseph Oat carbon steel couplers in each specific module as compared to the total percentage of couplers installed in each specific module.

RAI Question 4:

The design of the Phase II test assembly was to aid in the fit-up for the tensile testing machine, and to attempt to isolate the failure point at the test weld. The test assembly design ground out the threads of the test coupler, filled in the test coupler with weld material, and welded an oversized coupler to the test coupler with a fixture weld. During a previous public meeting, the staff requested justification to show that this design would not have any impact on the mechanical properties of the test weld. The LAR states that hardness testing was performed. From the description in the LAR, the hardness testing only shows the potential changes to the mechanical properties at the fillet weld surface. Based on the test assembly design, it is likely that the majority of the heat input would impact the partial joint penetration (PJP) weld and the heat affected zone (HAZ).

- a. Please provide additional detail related to the hardness testing that demonstrates that the test assembly design had no impact on the test weld mechanical properties (particularly at the PJP and HAZ).

In the stainless steel embed plate LAR (ADAMS ML16242A399), it was stated that several Phase II test welds were “influenced by the fixture weld” during tensile testing and therefore they

were not considered as part of the test results. In the CS embed plate LAR, there is no discussion related to this concept.

- b. Please confirm that no CS coupler weld tests were influenced by the fixture weld.

RAI Question 5:

The Joseph Oat supplemental couplers were produced three years after the Joseph Oat production couplers. Therefore, while the supplemental coupler testing shows the strength of the weld, the staff requests additional justification to provide reasonable assurance that the supplemental couplers are representative of the production couplers already installed in the modules.

- a. Confirm that the welders' qualifications were reviewed to meet the applicable code.
- b. Confirm that the weld procedures and PQRs were reviewed to meet the applicable code.
- c. Provide the weld procedure (including name, welding process, revision and date) that was used for both the supplemental couplers and the production couplers.
- d. Provide an evaluation that the production and supplemental couplers' welding records were verified to ensure that essential variables were within the allowable limits, and the values were similar between the production and supplemental coupler populations.

RAI Question 6:

ACI 349-01, Section 12.14.3.4.1 requires six static test samples. However, the Phase 1 testing described in the LAR only used test data for two #9 couplers from Joseph Oat, two #9 couplers from Cives, and two #11 sized couplers from Cives.

- a. In the stainless steel embed plate LAR, Phase 1 test data was collected from different vendor loads. For the CS couplers, was the qualification process different for the CS embed plates compared to the SS embed plates?
- b. Provide justification on why the six static test qualification test couplers for each of the #9 Joseph Oat, #9 Cives, and #11 Cives couplers (total of 18 couplers) was not used in the evaluation provided in this LAR.

Items to discuss at a public meeting

1. The LAR states that 218 Joseph Oat plates were shipped, and 202 plates were installed. Table 3-2 states the VT results for the Joseph Oat plates. However, the table only describes the 202 installed plates, not the scrapped plates.
 - a. What were the VT results of the 16 Joseph Oat scrapped plates?

The LAR states that 24 Cives couplers failed receipt inspection, and 2/24 are available and tested. The LAR states that 4 of the Joseph Oat supplementary couplers did not pass receipt inspection, and they are also included in the testing. However, the LAR does not state if any of the Joseph Oat installed couplers failed receipt inspection.

- b. Did any of the Joseph Oat installed couplers fail receipt inspection? If so, how were these couplers dispositioned?