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GNRO-2017/00068

October 12, 2017

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

SUBJECT: Grand Gulf Nuclear Station response to Official Requests for Additional Information (RAI) for RR GG-ISI-020 to Use BWRVIP guidelines (CAC No. MF9460)
Grand Gulf Nuclear Station Unit 1
Docket No. 50-416
License No. NPF-29

REFERENCES: Official Requests for Additional Information (RAI) for RR GG-ISI-020 to Use BWRVIP guidelines (CAC No. MF9460), September 14, 2017.

Dear Sir or Madam:

The purpose of this letter is to provide the Grand Gulf Nuclear Station (GGNS) response to the subject Requests for Additional Information (RAI).

This letter contains no new commitments. If you have any questions concerning the content of this letter, please contact Mr. Douglas A. Neve at 601-437-2103.

Sincerely,

A handwritten signature in black ink that reads "Douglas A. Neve". The signature is written in a cursive style and is positioned to the right of the word "Sincerely,".

Douglas A. Neve
Regulatory Assurance Manager
DAV/rfp

Attachments: 1. GGNS Response to Requests for Additional Information (RAIs) for RR-GG-ISI-020

WITHOUT ATTACHMENTS

cc: NRC Senior Resident Inspector
Grand Gulf Nuclear Station
Port Gibson, MS 39150

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

U.S. Nuclear Regulatory Commission, Region IV
ATIN: Acting- Mr. Scott Morris, Regional Administrator
1600 East Lamar Boulevard
Arlington, TX 76011-4511

**Attachment 1
To
GNRO-2017/00068**

GGNS Response to Requests for Additional Information (RAIs) for RR-GG-ISI-020

RAI-1

Enclosure 3, "Grand Gulf Reactor Vessel Internal Inspection History" of the proposed alternative request by letter dated March 15, 2017, documents the finding of indications on the steam dryer seismic support blocks. However, the proposed alternative request does not discuss how these indications were dispositioned or if they were repaired. Therefore, the NRC staff requests that the licensee discuss how these indications were repaired or dispositioned.

GGNS Response to RAI-1

The steam dryer visual inspection results for the two scheduled refueling outages following the installation of the Grand Gulf replacement steam dryer is documented in a previously submitted letter dated June 30, 2017. (ADAMS Accession No. ML 17186A023)

RAI-2

Enclosure 3 of the proposed alternative request documents the finding of four indications with characteristics associated with intergranular stress-corrosion cracking/irradiation-assisted stress-corrosion cracking [IGSCC/IASCC] during inspections of the core shroud welds H3 and H4. However, the proposed alternative request does not discuss how these indications were dispositioned or if they were repaired. Therefore, the NRC staff requests that the licensee discuss how these indications were repaired or dispositioned.

GGNS Response to RAI-2

Core shroud inspections were performed at Grand Gulf Nuclear Station (GGNS) during the Spring 2016 refueling outage using UT examination techniques. A total of three indications were reported in the circumferential welds H3 and H4. These indications were evaluated by Structural Integrity Associates, Inc. to determine the necessary re-inspection interval for the GGNS core shroud welds H3 and H4. The evaluation was performed using the applicable Boiling Water Reactor Vessel and Internals Project (BWRVIP) inspection and evaluation guidelines. Grand Gulf is considered a Category B shroud per BWRVIP-76, Rev 1-A, and no repairs on the Grand Gulf shroud have been performed.

The H3 weld inspection covered 81.3% of the upper side and 80.0% of the lower side of the weld. Two indications were detected on the lower side of the H3 weld. These indications were a total of 4.33" in length. Based on these indications and previous inspections of the H3 weld, 0.6% of the total H3 weld length is considered flawed. These indications were entered into the corrective action process for dispositioning. The H3 weld met all requirements for re-inspection frequency screening via Table 2-1 of BWRVIP-76, Rev 1-A. The table concluded that the appropriate re-inspection interval for the H3 weld was 10 years.

The H4 weld inspection covered 73.4% of the upper side and 73.4% of the lower side of the weld. One indication was detected on the upper side of the H4 weld. This indication was a total of 1.19" in length. Based on this indication and previous inspections of the H4 weld, 0.2% of the total weld length is considered flawed. This indication was entered into the corrective action process for dispositioning. Due to the fluence at the H4 weld, Table 2-1 of BWRVIP-76, Rev 1-A, was not applicable. Therefore, a site specific analysis was performed by Structural Integrity Associates, Inc. Guidance for plant specific evaluations found in BWRVIP-76, Rev 1-A, were followed. A 360 degree uniform flaw was assumed to exist in the core shroud H4 weld. This flaw is

assumed to have a depth equal to the reported indication depth plus the applicable BWRVIP-03 depth evaluation factor. The K-dependent through-wall crack growth methodology documented in BWRVIP-99-A was used to calculate the final flaw depth after a 10 year evaluation interval. The K-distribution given in BWRVIP-99-A was used with the postulated 30% irradiation induced stress relaxation. The Boiling Water Reactor (BWR) Core Shroud Distributed Ligament Length (DDL) Computer Program was utilized to perform the flaw stability calculation. The site specific evaluation concluded that the re-inspection interval for the H4 weld remained 10 years.

RAI-3

Enclosure 1, Table 2 "Vessel Attachment Welds – Fabricated Either from E-308/E-309 (Furnace Sensitized) Austenitic Stainless Steel or Inconel 182 Material" of the proposed alternative request states that since shroud support welds H8 and H9 are structurally adequate, inspection of shroud support leg (weld H12) is not required. However, regardless of the structural adequacy of shroud support welds H8 and H9, the ASME Code requires inspection of accessible B-N-2 welds, and the proposed alternative does not address whether weld H12 is considered an accessible B-N-2 weld. The NRC also notes that the final safety evaluation of "BWR Vessel and Internals Project, BWR Shroud Support Inspection and Flaw Evaluation Guidelines (BWRVIP-38)" (ADAMS Accession No. ML003735498), requires the inspection of welds in the lower plenum (including weld H12) when inspection tooling and methodologies are developed to allow the welds in the lower plenum to be accessible. Therefore, the NRC staff requests that the licensee discuss the following:

- a) Any operating history that discovered unacceptable indications for weld H12 at GGNS.
- b) A discussion on whether the licensee considers weld H12 to be a B-N-2 weld.
- c) A discussion of the accessibility of weld H12 at GGNS.

GGNS Response to RAI-3

While the H12 weld would be considered a B-N-2 weld, access to the H12 weld is severely limited because of its location in the Reactor Pressure Vessel (RPV) bottom head region beneath the shroud support structure. Reactor component disassembly/removal (jet pump disassembly or fuel support casting removal) beyond that normally performed during a refueling outage is required to access the H12 weld. Due to these accessibility limitations this weld is considered inaccessible. BWRVIP-47-A, BWR Vessel and Internals Project BWR Lower Plenum Inspection and Flaw Evaluation Guidelines, section 3.2.5 states the following,

"The BWRVIP has determined that removing or dismantling of internal components for the purpose of performing inspections is not warranted to assure safe operation. However, on occasion, utilities may have access to the lower plenum due to maintenance activities not part of normal refueling outage activities. In such cases, utilities will perform a visual inspection to the extent practical."

Grand Gulf does not have a history of activities allowing access to the H12 weld during refueling outages. Therefore, Grand Gulf does not have any operating history on H12 weld inspections. The H8 and H9 welds, which are structurally adequate, have no history of indications.