

## NRR-PMDAPem Resource

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**From:** Frehafer, Ken <Ken.Frehafer@fpl.com>  
**Sent:** Friday, February 03, 2017 1:22 AM  
**To:** Buckberg, Perry  
**Cc:** Snyder, Mike; Boggs, Scott; Gil, Rudy; Catron, Steve; Katzman, Eric; Webb, Shane; Hansen, Peter  
**Subject:** [External\_Sender] St. Lucie email responses to clarification call questions

Perry,

The responses are provided as follows:

The staff has the following questions as a result of reviewing the subject Relief Request:

- 1. Provide the identification number for the existing weld were the flaw originates at the toe. If no number currently exist, will a number be assigned? If the licensee does not assign a weld number, how will the repair be tracked?**

Response: The unique repair weld number is identified in the traveler and work order as RCP Seal FW-2001. Unique weld numbers are maintained and assigned in the weld control log.

- 2. Explain what precautions will be taken to ensure that the purge gas will not pickup moisture prior to reaching the weld area and explain how this is verified. The staff notes that an inadequate purge could cause defects on ID surface of the root pass which may not be identified during the surface examination from the outside?**

Response: The purge will be performed for a significant period until the joint is dry. The Oxygen Content will be measured at the crack location with a handheld digital oxygen monitor. A maximum Oxygen content of 2% is specified by the FPL Weld Control Manual. To address moisture content, the material in the area of repair will be heated up after the Oxygen criteria is met. If moisture is present, the Oxygen content is expected to increase. If the oxygen level is maintained with acceptable limits the moisture will be considered removed in the weld area. Welding will not begin until this requirement is verified with the oxygen monitor.

- 3. Given that excessive back pressure during purging can cause welding defects, such as concavity, and blowout of the weld pool during welding, explain how back pressure is controlled and verified.**

Response: The flow rate of the back purge will be maintained as specified in the Welding Procedure Specification (WPS) of 4 to 10 CFH and monitored with a purge flow meter. This is a standard flow rate that is commonly used for successful welds and is supported by the Procedure Qualification Tests that support the WPS to be used for the repair.

- 4. On page 4 of the relief request, the licensee mentioned a radiological dose of 10 Rem for the recent RCP motor and pump assembly replacement. Would this dose be applicable to the ASME Code repair?**

Response: The only feasible option other than the localized repair proposed would be the disassembly of the RCP and replacement of the RCP cover which contains the shop fabricated assembly. Based on past experience for replacement that included this assembly, the dose was 10.03 Rem.

- 5. The top of page 1 states "Proposed Alternative in Accordance with 10 CFR 50.55a(z)(2)" There is no number associated with this Relief Request. Licensees usually assign a number to their relief request, e.g., Relief Request RR-17-01. Without a specific number or identifier for the relief request, how does the licensee track this relief request if there are other "Proposed Alternative" in the future?**

Response: Please note that although the RR # is not on the attachment to L-2107-017 FPL has assigned this RR as UNIT 1 4<sup>th</sup> Interval Relief Request 14 and is noted in the cover letter L-2017-017

- 6. What is the flaw size (length and depth)? Because there is a leakage, the flaw depth is 100% through wall. What is the flaw length?**

Response: The flaw size will be documented as to size, orientation and location on the pipe prior to excavation. Since the system has not yet been completely drained this exam has not yet been performed. However these instructions are in the work package.

**7. Section 5, page 4 discusses a 2:1 fillet weld configuration. Discuss the exact size of the new weld.**

Response: The exact measurement is specified to be similar to a 2:1 fillet since the configuration does not lend itself to measurement. The reinforcement may be 360 degrees however as a minimum it must extend beyond the repair area. There shall be a smooth transition to the pipe similar to a 2:1 fillet.

**8. What is the NDE on the excavation after flaw removal and prior to welding?**

Response: As stated in Section 3 of the relief request the repair is being performed in accordance with the 2001 Edition, through 2003 Edition of ASME Section XI, IWA-4000. The following is the code logic

- IWA-4400 Welding Brazing, Metal Removal, Fabrication and Installation
- IWA-4410 General Requirements: This section identifies that metal removal shall be performed in accordance with the requirements of this Subarticle.
- IWA-4412 Defect Removal: Defect removal shall be accomplished in accordance with the requirements of IWA-4420 Defect Removal Requirements.
- IWA-4421 General Requirements: This section says defect removal by mechanical means per IWA-4462 which gives details to make the cavity suitable for welding.
- IWA-4422 Defect Evaluation and Examination provides details on what defect removal means.
- IWA-4422.2 NDE has several options for defect removal and we are using IWA-4422.2.2
- IWA-4422.2.2, Defect Removal Followed by Welding or Brazing
- (a) Surface examination of the defect removal area is required prior to welding, except as provided below.
- (1) A surface examination is not required when the defect is eliminated by removing the full cross-section of the weld or base material.
- IWA-4422.2.2(e) identifies that final NDE (after the weld is complete) is in accordance with IWA-4520.
- IWA-4520, Examination States (a) Welding or brazing areas and welded joints made for fabrication or installation of items by a Repair/Replacement Organization shall be examined in accordance with the Construction Code identified in the repair and replacement plan.....
- Since this is an ASME III NB-2550 base metal repair send you to NB-2559 which sends you to NB-2539 and NB-2539.4 for examination.
- NB-2539.4 provides the NDE criteria of dye penetrant and radiography (The radiography is the subject of Relief Request 14)

As the code logic above shows the repair is performed in accordance with ASME Section XI which directs the excavation, repair and then sends you to the ASME Section III Construction Code after the weld is complete for the final acceptance NDE. The excavation NDE is addressed in ASME Section XI, IWA-4422.2.2 (a) with the exception in IWA-4422.2.2 (a)(1) for through wall excavations. Although dye penetrant examination will be performed to identify the defect location as part of the excavation, a final dye penetrant examination will not be performed after the excavation goes through wall so as not to introduce dye penetrant materials into the ID of the tube.

**9. Section 5 of the relief request identified that additional layer(s) will be applied to the reinforcing fillet weld in the repair area to provide a smooth transition. If the reinforcement layers are not applied 360 degrees around the tube, have you considered the effect of the asymmetrical residual stresses cause by applying a buildup for only part of the circumference?**

Response: The tube material is 0.125" thick. The reinforcing fillet weld would provide additional weld deposit resulting in approximately an 1/8" of weld material. Due to the limited amount of added weld material for the additional weld passes when compared to the entire weld volume, any overturning bending stress induced in the joint would be minimal. This is because residual stresses are secondary and would be self-limited by the geometry of the configuration.

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