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FPL Energy.
Duane Arnold Energy Center

February 26, 2007

NG-07-0188
10 CFR 50.55a(a)(3)(i)

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

Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49

Response to Requests for Additional Information on Alternative to ASME Section XI Requirements to use Code Cases N-504-2 and N-638-1 for Weld Overlay Repairs at the Duane Arnold Energy Center

Reference: 1) Letter, Gary Van Middlesworth (FPL Energy Duane Arnold) to Document Control Desk (USNRC) - Alternative to ASME Section XI Requirements to use Code Cases N-504-2 and N-638-1 for Weld Overlay Repairs at the Duane Arnold Energy Center, dated February 24, 2006

Reference 1 forwarded the FPL Energy Duane Arnold request for relief to allow use of an alternative to ASME Section XI Requirements to use Code Cases N-504-2 and N-638-1 for weld overlay repairs at the Duane Arnold Energy Center (DAEC). in an email dated February 26, 2007, the NRC provided a request for additional information concerning Reference 1. This submittal provides the responses to the requests.

FPL Energy Duane Arnold requests approval of Reference 1 prior to beginning the weld overlay repair of safe-end-to-nozzle welds RRC-F002 and RRF-F002, currently scheduled for February 27, 2007.

This letter contains no new commitments and no revisions to existing commitments.

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Questions regarding this matter should be directed to Steve Catron, Licensing Manager, at (319) 851-7234.

2/26/07

Gary Van Middlesworth
Site Vice President, Duane Arnold Energy Center
FPL Energy Duane Arnold

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, DAEC, USNRC
Resident Inspector, DAEC, USNRC

Response to Requests for Additional Information on Alternative to ASME Section XI Requirements to use Code Cases N-504-2 and N-638-1 for Weld Overlay Repairs at the Duane Arnold Energy Center

Request #1

How has the licensee addressed the rapid cooling rates which are possible from water-backed welding on the SA-508 Class 2 base metal? Has a mockup or procedure qualification record (PQR) of a water-backed weld overlay been performed? What overlay thickness was used on the mockup or PQR? What is the thickness of the nozzle under the weld overlay? Has any testing (metallurgical, destructive, non-destructive, etc.) been performed on any weld overlays fabricated on water-backed SA-508 Class 2 base metal?

FPL Energy Duane Arnold Response:

The welding procedure was qualified for water-backed welding. The procedure was qualified using PQR 0303T803 Rev. 0 which is a water-backed PQR. The overlay thickness used for the PQR was 1.5 inch deep cavity on a 3 inch coupon. The nozzle thickness in the area of the overlay is 1.06 inch. FPL Energy Duane Arnold has performed pre-service and inservice examinations of the two overlays that were completed using Code Cases N-504-1 and N-606 in 1999.

Request #2

What is the maximum area of the P-3 material that will be welded on? This should be stated in the relief request. The relief request mentions 500 sq. in., but not as the maximum area that is to be welded on during this specific repair.

FPL Energy Duane Arnold Response:

The weld overlay will cover approximately 180 square inches of the low alloy nozzle (ref. page 11 of 14 of the relief request (Reference 1)).

Request #3

How often will contact pyrometers be used to measure weld preheat and interpass temperatures? Every pass? Every layer? Once during welding?

FPL Energy Duane Arnold Response:

The contact pyrometers will be used to verify pre-heat prior to welding and every three to five beads on the first three layers.

Request #4

On page 12 of 14 [of Reference 1], under "Exception to Code Case N-638-1, Paragraph 4.0(b)," how far will the surface examination be continued past the toe of the weld overlay on the SA-508 Class 2 base metal?

FPL Energy Duane Arnold Response:

The surface examination will extend to 1.5" up on the nozzle.

Request #5

On page 12 of 14 [of Reference 1], under "Exception to Code Case N-638-1, Paragraph 4.0(b)," will the ultrasonic examination extend up to the very edge of the overlay?

FPL Energy Duane Arnold Response:

The ultrasonic examination will be performed in accordance with PDI-UT-8 Revision F which states: "Pre-service examinations shall be performed across the entire overlay surface. Inservice examinations shall be performed to the extent necessary to cover the required examination volume." The examination volume is depicted in Figure 4300-1 of Appendix Q.

Request #6

On Page 12 of 14 [of Reference 1], under "Exception to Code Case N-638-1 Paragraph 4.0(b), the licensee states that "...Any laminar flaws in the weld overlay will be evaluated in accordance with ASME Section XI Non-mandatory Appendix Q, Paragraph Q-4100, except, as allowed by IWB-3132.2, any flaws that exceed the acceptance standards of Table IWB-3410-1 are acceptable for continued service, without repair, if an analytical evaluation, performed in accordance with IWB-3600, meets the acceptance criteria of IWB-3600."

The staff does not agree with the licensee's exception to Appendix Q, Paragraph Q-4100. Paragraph Q-4100(1) does not allow laminar flaws to be accepted by IWB-3600. In addition, Code Case N-504-2, Paragraph (i) does not allow flaw acceptance by IWB- 3600 for the preservice examination. The NRC staff's position is that any flaw detected in the weld overlay during the preservice examination that does not satisfy the acceptance standards of Table IWB-3514-2 must to be removed or repaired. Therefore, the licensee should modify its relief request to be consistent with the NRC staff's position or provide a detailed, technical basis to support its exception to paragraph Q-4100 of Appendix Q of the ASME Code, Section XI.

FPL Energy Duane Arnold Response:

The exception as noted in the original relief request will be removed. The DAEC will comply with the requirements contained in Non-mandatory Appendix Q Paragraph Q-4100(1). The exception on page 12 of 14 from Reference 1 is hereby revised as follows:

"Code Case N-638-1 Paragraph 4.0(b) specifies that the final weld surface and band area (1.5T width or 5 inches, whichever is less) shall be examined using surface and ultrasonic methods when the completed weld has been at ambient temperature for at least 48 hours. The UT shall be in accordance with ASME Section XI, Appendix I. Surface exams will be performed. IWA-4634 requires UT of the weld only. ~~Any laminar flaws in the weld overlay will be evaluated in accordance with ASME Section XI Non-mandatory Appendix Q, Paragraph Q-4100, except, as allowed by IWB-3132.3, any flaws that exceed the acceptance standards of Table IWB-3410-1 are acceptable for continued service, without repair, if an analytical evaluation, performed in accordance with IWB-3600, meets the acceptance criteria of IWB-3600~~. Full UT of the 1.5T band will not be performed. The weld overlay will extend into the blend radius of the nozzle beyond the length required by Code case N-504-2 for structural reinforcement. This extension onto the blend radius eliminates a stress riser on the nozzle and provides additional OD surface area for UT examination of the defect area. UT examination on the nozzle beyond the overlay will not provide any information regarding the area of the defect that required repair. Additionally, such UT would likely be unsatisfactory when applied to the nozzle blend radius, where the toe of the weld overlay resides. The UT return signal would be difficult to obtain and to interpret. Alternatively, surface examination will assure that no defects have been created at the toe of the weld overlay. Therefore, this alternative provides an acceptable level of quality and safety."

Request #7

Clarify whether the weld overlay will be applied multiple times to a specific weld.

FPL Energy Duane Arnold Response:

The DAEC will only apply one overlay to each weld RRF-F002 and RRC-F002.

Reference:

1) Letter, Gary Van Middlesworth (FPL Energy Duane Arnold) to Document Control Desk (USNRC) - Alternative to ASME Section XI Requirements to use Code Cases N-504-2 and N-638-1 for Weld Overlay Repairs at the Duane Arnold Energy Center, dated February 24, 2006