From: Thomas Alexion
To: BENNETT, STEVE A
Date: 7/14/03 8:20AM
Subject: RAIs on Relaxation Requests

Steve,

See the attached 2 RAIs.

Tom

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Subject:	RAIs on Relaxation Requests
Creation Date:	7/14/03 8:20AM
From:	Thomas Alexion
Created By:	TWA@nrc.gov

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BMVRAI.wpd	8606	07/14/03 08:10AM
NozzleThreadsRAI.wpd	5268	07/14/03 08:14AM
MESSAGE	722	07/14/03 08:20AM

Options

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Request for Additional Information (RAI) and Comments Regarding Entergy Letter 2CAN050301 (May 8, 2003), Public Meeting at NRC Headquarters on June 17, 2003, and Entergy Letter 2CAN060308 (June 26, 2003) In Regard to Reactor Pressure Vessel (RPV) Bare Metal Visual (BMV) Examination Relaxation Request
Arkansas Nuclear One, Unit 2

1. The BMV examination required by Order EA-03-009 has two purposes, to act as diverse and complimentary to the non-visual examination requirements of the Order Section IV.C(1)(b) (ensure that there is no leakage from nozzle) and to ensure that there is no degradation of the low alloy steel head by boric acid corrosion. Please provide the following information directly addressing each item:

   - Complete information that demonstrates that the methods described in the licensees' proposal, public meeting and RAI response that demonstrate that the alternate inspections (i.e., UT into the welds, "Triple Point" and low frequency Eddy Current Testing) will provide a diverse and complimentary examination to that described in Order Section IV.C(1)(b).

   - In particular, describe how the proposed alterative addresses both BMV functions of leakage detection and head corrosion detection.

   - The information should be very specific as to how the demonstrations of these methods give a level of confidence as to the accuracy of the information that will be attained during the inspection process.

   - Information should also include the methodology used to establish the test matrix for the demonstrations that the licensee or vendor used to demonstrate the alternative inspection methods and be very specific as to what level of confidence the test matrix provides.

   - Also explain how demonstrations (mockups) are representative of field occurring anomalies.

2. In the licensee's RAI response letter, 2CAN060308, the licensee states on page four that "Entergy will determine the appropriate means of establishing detection criteria for the low frequency ECT examination prior to the 2R16 refueling outage." The following items must be specifically and thoroughly addressed by the licensee in order for the staff to properly evaluate the licensee's relaxation request.

   - Please explain how an adequate demonstration of the low frequency ECT to detect nozzle bore degradation could have been performed without establishing acceptable detection criteria prior to the demonstration.

   - Given that detection criteria is a critical component to demonstrating the accuracy and sensitivity of a non-destructive testing method, a thorough testing regime that clearly demonstrates the ability of the low frequency ECT process as well as acceptance criteria to detect degradation to the RPV head due to a leaking CEDM nozzle is necessary to allow a thorough evaluation of the adequacy of the relaxation request.

3. Previously, Entergy submitted Westdyne International Report WDI-TJ-007-02-P *Demonstration of Volumetric Ultrasonic Inspection of CRDM Nozzles Using The Open House Scanner for ANO-2,* by letter dated June 17, 2002.

   - The diagram on the bottom of page 14 of 43 is extremely difficult to read. Please provide a legible copy of page 14.

Request for Additional Information (RAI) and Comments Regarding Entergy Letter CNRO-2003-00020 (June 11, 2003) In Regard to Nozzle Threads Relaxation Request Arkansas Nuclear One, Unit 2 and Waterford

Note that the following RAIs and comments address Enclosures 1 and 2 of the subject letter. The NRC staff has not reviewed Enclosures 3 to 5 pending resolution of the issues raised below.

1. The description of the transducers (in Section IV.A "Background" of Enclosures 1 and 2) does not include consideration of penetration into the weld metal, as described in a prior relaxation request. Does the omission of this penetration into the weld metal affect the findings from the analyses?

2. The discussions of the "free-span length" for each unit (Section IV.C) refer to the dimensions coming from the design drawings of each unit. For ANO Unit 2 (which has been inspected using UT), how do these design drawing dimensions compare to the as-built configuration identified during the prior UT examination? Based on the ANO Unit 2 findings, what conclusions can be reached regarding the as-built configuration of Waterford 3? Are they expected to be more than or less than those from the design drawings?

3. What is the minimum free-span length, both from the design drawings and based on UT results for ANO Unit 2, for each row of nozzles at each plant?

4. How does the free-span length compare to the distance from the bottom of the fillet weld to the bottom of the nozzles, for each row of nozzles and at each plant, both from the design drawings and actual UT measurements at ANO Unit 2.

5. The Entergy crack growth analyses ignore the fillet weld reinforcement and instead use the intersection of the J-groove weld face (at the projected cladding interface) as the axial flaw propagation limit. The fillet weld reinforcement should not be ignored in the calculations due to the much higher crack growth rate identified in weld metal (10X or more that of the base metal) and the likelihood that axial cracks propagating in the nozzle base metal will likely continue to grow (at high rate) in the weld. Therefore, the crack growth analysis should use the bottom of the fillet weld as the proper point to terminate the evaluation. With this revised definition for the crack growth analysis, provide the revised flaw evaluation results for each plant.

6. Provide justification for ignoring the fillet weld reinforcement in the evaluation of stress distributions. How do the calculated stress magnitudes compare for the analysis provided in the request and for an evaluation that considers effects of the fillet weld?

7. Clarify how the analysis "compensated" for the longer free-span nozzle lengths used in the finite element analysis models for each unit relative to the design drawings.

8. Since the limiting flaw configurations are for an outside diameter surface flaw (49.6° nozzle location) or a through wall flaw (0° nozzle location), can PT be used to increase the coverage area of "examined material" to locations below the top of the threaded (and hence uninspectable) regions of the limiting nozzles?