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2CAN061402

June 5, 2014

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

SUBJECT: Results of Dissimilar Metal Weld Examinations
Arkansas Nuclear One, Unit 2
Docket No. 50-368
License No. NPF-6

REFERENCES:

1. Entergy letter dated June 25, 2013, "ASME Code Case N-770-1 Successive Examination Request for Relief ANO2-ISI-016" (2CAN061303) (ML13176A403)

2. NRC Memorandum dated February 26, 2013, "Arkansas Nuclear One, Unit No. 2 – Summary of Telephone Conference Call Re: Verbal Authorization for Revised Relief Request ANO2-ISI-007 (TAC No. MF0331)" (ML13052A470)

3. NRC letter dated May 30, 2013, "Arkansas Nuclear One, Unit No. 2 – Request for Alternative AN02-ISI-007, ASME Code Case N-770-1 Baseline Examination (TAC NO. MF0331)" (2CNA051301) (ML13129A298)

4. Entergy letter dated April 15, 2014, "Successive Examination Plans Request for Relief ANO2-ISI-016" (2CAN041402) (ML14122A250)

5. NRC letter dated April 15, 2014, "Arkansas Nuclear One, Unit 2 – Proposed Alternative ANO2-ISI-016, American Society of Mechanical Engineers Code Case N-770-1Successive Examination (TAC No. MF2320) (2CNA041401) (ML14099A452)

Dear Sir or Madam:

Pursuant to 10 CFR 50.55a(a)(3)(ii), Entergy Operations, Inc., (Entergy) requested relief from the requirements of the American Society of Mechanical Engineers (ASME) Code Case N-770-1, as conditioned by 10 CFR 50.55a(g)(6)(ii)(F) pertaining to volumetric examinations of the dissimilar metal welds associated with the Reactor Coolant Pump (RCP) suction and discharge piping at Arkansas Nuclear One, Unit 2 (ANO-2) (Reference 1). The essentially 100% required weld examination coverage could not be obtained on the eight welds in question due to interference or geometry based on the baseline examination.

The relief request was based on the intent to scan the welds with the same technology used in the baseline examination (linear phased array ultrasonic) and acquire at a minimum the same amount of examination coverage reported and approved via References 2 and 3. Entergy committed to scan the welds and obtain as a minimum the same coverage that was approved in References 2 and 3.

A copy of the ultrasonic examination procedure and the performance demonstration qualification summary (PDQS) for the procedure that was used during the current outage were submitted via Reference 4.

The NRC approved the relief request in Reference 5. In the safety evaluation associated with the approval, the NRC stated:

> The NRC staff further notes that the proposed alternative states: "Examination summary and coverage results will be provided to the NRC following completion of these examinations." Submission of this data from the 2014 refueling outage examinations to the NRC staff is therefore a requirement of the authorized alternative.

The purpose of this submittal is to provide the required information.

Prior to the outage, the component geometry of each of the welds listed in the original request was reviewed to determine what activities could be performed to enhance or improve the amount of examination coverage achievable. In addition, scanners were developed or modified to deploy an automated, encoded linear phased array ultrasonic examination (LPAUT).

Recommendations were made to facilitate deploying this examination and increasing the maximum scan coverage. Those recommendations included:

- Develop scan plans that included scanning on the carbon steel side of the weld, on the weld, and on the cast stainless steel side of the weld. Appendix VIII scanning techniques were to be applied to the cast stainless steel components, although cast stainless steel examination is not qualified to Appendix VIII or covered in the procedure PDQS.

- Encode the scan data and perform second party review.

- Remove any obstructions that were both practical and did not require modification of the plant.

- Visually examine the weld surface of each weld to determine if surface conditioning would improve transducer contact surface.

- Surface condition (grind or buff) any weld surface that would improve transducer contact.

- Make note of any limitation encountered to allow for more accurate examination scan coverage calculations.

During the current spring 2014 outage, actions were taken to remove any obstructions to the extent practical. All of the subject welds were assessed for surface condition and were subsequently ground to achieve optimal condition to allow transducer placement on the weld surface.

All the welds listed in the request were scanned with automated, encoded LPAUT procedures. The encoded LPAUT applied to all weld surfaces substantially improved the previous examination coverage of the code required volume (CRV).

The combined scan coverage of the axial scans for circumferential flaw detection and circumferential scans for axial flaw detection achieved an average CRV coverage that was over 90%. The examination coverage achieved would meet the understood definition of essentially 100% of the CRV.

The examination recorded two embedded, weld discontinuity indications in RCP C discharge weld 12-014 at an adjacent longitudinal seam weld in the ferritic pipe. These indications were detected with the circumferential scan looking for the axial flaws. It should be noted that the Appendix VIII procedure is not qualified to detect or size embedded flaws, nor is it qualified to length size axial flaws. The procedure does provide direction for this process. The indications are above the component inside surface and do not appear in the Primary Water Stress Corrosion Cracking (PWSCC) susceptible material. One indication is mid-wall and outside the CRV (lower 1/3 t). One indication is in the upper third of the CRV. The allowable flaw standards of ASME Section XI, Table IWB-3514-1 for ferritic piping were reviewed. When compared to the criteria in IWB-3514-1 for a 3 to 4 inch thick component, the indications in the CRV as well as the indication outside the CRV were found to be acceptable.

In addition, the examination of RCP A discharge weld 11-008, recorded two embedded, weld discontinuity indications in at an adjacent longitudinal seam weld in the ferritic pipe. These indications were also detected with the circumferential scan looking for the axial flaws. The indications are above the component inside surface and do not appear in the PWSCC susceptible material. Both indications are at or near mid-wall and outside the CRV (lower 1/3 t). The allowable flaw standards of ASME Section XI, Table IWB-3514-1 for ferritic piping were reviewed. When compared to the criteria in IWB-3514-1 for a 3 to 4 inch thick component, the indications outside the CRV were found to be acceptable.

Table 1 depicts the summary of all the examinations related to this submittal.

This submittal fulfills one commitment and contains no new commitments.

If you have any questions or require additional information, please contact me.

Sincerely,

Original signed by Stephenie L. Pyle

SLP/rwc

cc: Mr. Marc L. Dapas
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Table 1

ANO2 2R23 - ASME Section XI Code Case N-770-1 Examination Summary and Coverage

Item	Closest Component	Component Type	Location	ISI Number	NPS	Code Case N-770-1 Inspection Item	2009 Baseline MRP Exam Manual LPAUT Axial Scan % Circ Scan % Code Required Coverage % (CRV)	Covered by an Existing Relief Request	2R23 May 2014 UT Process	2R23 Exam Coverage Obtained N-770-1 & 10 CFR 50.55a Appendix VIII Appendix III Axial Circ CRV Average	2R23 Exam Coverage N-770-1 & 10 CFR 50.55a Appendix VIII Susceptible Material Axial Circ Average	2R23 Examination NRI –No Recordable Indications RI-Recordable Indication	Relief Request Required to Support Inspection	Notes or Comments Obstructions
1	2P-32B	30” C/L Elbow - SE	Suction side of 2P-32B	08-014	30	B	Ax -100% Circ - 87.2% CRV 60%	ANO2-ISI-007	Auto Encoded LPAUT	Ax - 100% Circ – 88.2% Ave. – 94.1%	Ax – 100% Circ – 100% Ave – 100%	NRI	ANO2-ISI-016	Support bracket
2	2P-32A	30” C/L Elbow - SE	Suction side of 2P-32A	*10-014	30	B	Ax -100% Circ -84.1% CRV -55%	ANO2-ISI-007	Auto Encoded LPAUT	Ax - 100% Circ – 95.1% Ave. – 97.6%	Ax – 100% Circ – 97.2% Ave – 98.6%	NRI	ANO2-ISI-016	Support bracket
3	2P-32C	30” C/L Elbow - SE	Suction side of 2P-32C	12-014	30	B	Ax - 100% Circ -85.3% CRV -56.3%	ANO2-ISI-007	Auto Encoded LPAUT	Ax - 100% Circ – 88.1% Ave. – 94.1 %	Ax - 100% Circ – 93.2% Ave – 96.6%	2 RI Weld discontinuities	ANO2-ISI-016	Support bracket
4	2P-32D	30” C/L Elbow - SE	Suction side of 2P-32D	14-014	30	B	Ax -100% Circ - 87% CRV- 57.5%	ANO2-ISI-007	Auto Encoded LPAUT	Ax - 100% Circ – 100% Ave. – 100%	Ax - 100% Circ – 100% Ave – 100%	NRI	ANO2-ISI-016	
5	2P-32B	30” C/L SE-Pipe	Discharge side of 2P-32B	09-008	30	B	Ax - 100% Circ - 73.8% CRV -56%	ANO2-ISI-007	Auto Encoded LPAUT	Ax - 92.4% Circ – 100% Ave. – 96.2%	Ax – 92.8% Circ – 100% Ave – 96.4%	NRI	ANO2-ISI-016	Spray Nozzle obstruction
6	2P-32A	30” C/L SE-Pipe	Discharge side of 2P-32A	11-008	30	B	Ax - 100% Circ -76.3% CRV- 56.7%	ANO2-ISI-007	Auto Encoded LPAUT	Ax - 96.0% Circ – 100% Ave. – 98.0%	Ax – 91.6% Circ – 100% Ave – 95.8%	2 RI Weld discontinuities	ANO2-ISI-016	Spray Nozzle obstruction
7	2P-32C	30” C/L SE-Pipe	Discharge side of 2P-32C	13-008	30	B	Ax -100% Circ -89.7% CRV-60.1%	ANO2-ISI-007	Auto Encoded LPAUT	Ax - 100% Circ – 100 % Ave. – 100%	Ax - 100% Circ – 100% Ave – 100%	NRI	ANO2-ISI-016	
8	2P-32D	30” C/L SE-Pipe	Discharge side of 2P-32D	15-008	30	B	Ax -100% Circ -89.7% CRV-62.8%	ANO2-ISI-007	Auto Encoded LPAUT	Ax - 100% Circ – 100% Ave. – 100%	Ax - 100% Circ – 100% Ave – 100%	NRI	ANO2-ISI-016	

Notes:

* Component 10-014 was the most limiting component identified in correspondence related to relief request ANO2-ISI-007.

** Scan coverage listed as the 2009 baseline is as submitted in the original relief request.