



Entergy

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2CAN051601

May 24, 2016

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

SUBJECT: Request for Additional Information Related to Requests for Relief from  
American Society of Mechanical Engineers (ASME) Section XI Volumetric  
Examination Requirements – Fourth 10-Year Interval, First Period  
Arkansas Nuclear One, Unit 2  
Docket No. 50-368  
License No. NPF-6

REFERENCES: 1. Entergy letter dated January 14, 2016, *Relief from American  
Society of Mechanical Engineers (ASME) Section XI Volumetric  
Examination Requirements – Fourth 10-Year Interval, First Period*,  
(2CAN011603) (ML16015A276)

2. NRC email dated April 26, 2016, "Request for Additional  
Information – Relief Request Numbers ANO2-ISI-018 and  
ANO2-ISI-019, (2CNA041601) (ML16118A043)

Dear Sir or Madam:

Pursuant to 10 CFR 50.55a(g)(6)(i), Entergy Operations, Inc. (Entergy) requested relief from the requirements of ASME, Boiler and Pressure Vessel Code, Section XI pertaining to volumetric examinations at Arkansas Nuclear One, Unit 2 (ANO-2) in letter dated January 14, 2016 (Reference 1). In several locations, the required coverage cannot be obtained to fully meet code requirements due to interference or geometry. Individual relief requests were provided in the attachments to the Reference 1 letter, divided by examination category.

10 CFR 50.55a(g)(5)(iv) requires that the basis for the determination of impracticality be submitted to the NRC for review and approval within 12 months after the expiration of the 120-month inspection interval. The subject requests for relief are for the fourth ANO-2 10-year Inservice Inspection interval, first period. The interval and first period commenced on March 26, 2010. The first period ended March 25, 2013.

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The NRC has subsequently determined that additional information is needed to complete the review of the requests for relief. The requested information was forwarded to Entergy via email on April 26, 2016 (Reference 2). The Entergy response to the NRC request is included in attachment to this letter.

As discussed in the attachment to this letter, request for relief ANO2-ISI-019 is being withdrawn from further NRC review.

There are no new regulatory commitments made in this submittal.

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

Sincerely,

**ORIGINAL SIGNED BY STEPHENIE L. PYLE**

SLP/dbb

Attachment: Response to Request for Additional Information (RAI) – Relief Request  
Numbers ANO2-ISI-018 and ANO2-ISI-019

cc: Mr. Marc L. Dapas  
Regional Administrator  
U. S. Nuclear Regulatory Commission, Region IV  
1600 East Lamar Boulevard  
Arlington, TX 76011-4511

NRC Senior Resident Inspector  
Arkansas Nuclear One  
P.O. Box 310  
London, AR 72847

U. S. Nuclear Regulatory Commission  
Attn: Mr. Stephen Koenick  
MS O-8B1A  
One White Flint North  
11555 Rockville Pike  
Rockville, MD 20852

**Attachment to**

**2CAN051601**

**Response to Request for Additional Information (RAI)  
Relief Request Numbers ANO2-ISI-018 and ANO2-ISI-019**

**Response to Request for Additional Information (RAI)**  
**Relief Request Numbers ANO2-ISI-018 and ANO2-ISI-019**

By letter dated January 14, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML16015A276), Entergy Operations, Inc. (Entergy, the licensee), submitted relief request numbers ANO2-ISI-018 and ANO2-ISI-019 to the U.S. Nuclear Regulatory Commission (NRC) for the fourth ten-year inservice inspection interval of Arkansas Nuclear One, Unit 2. In relief requests ANO2-ISI-018 and ANO2-ISI-019, the licensee requested relief from the examination requirements of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) applicable to ASME Code Class 1 nozzle-to-vessel welds in the pressurizer vessel and ASME Code Class 2 circumferential welds in the shutdown cooling heat exchanger shell identified in the licensee's submittal. These welds are ASME Code, Section XI, Examination Category B-D weld, Item No. B3.110 and Examination Category C-A weld, Item Nos. C1.10 and C1.30, respectively. The licensee determined that conformance with the examination requirements of Section XI of the ASME Code for these welds is impractical. Title 10 of the *Code of Federal Regulations*, Part 50, Paragraph 50.55a(g)(5)(iii) requires the licensee to submit information to the NRC to support the determination of impracticality. The NRC staff determined that additional information is required in order to complete the review of relief request numbers ANO2-ISI-018 and ANO2-ISI-019.

**RAI 1**

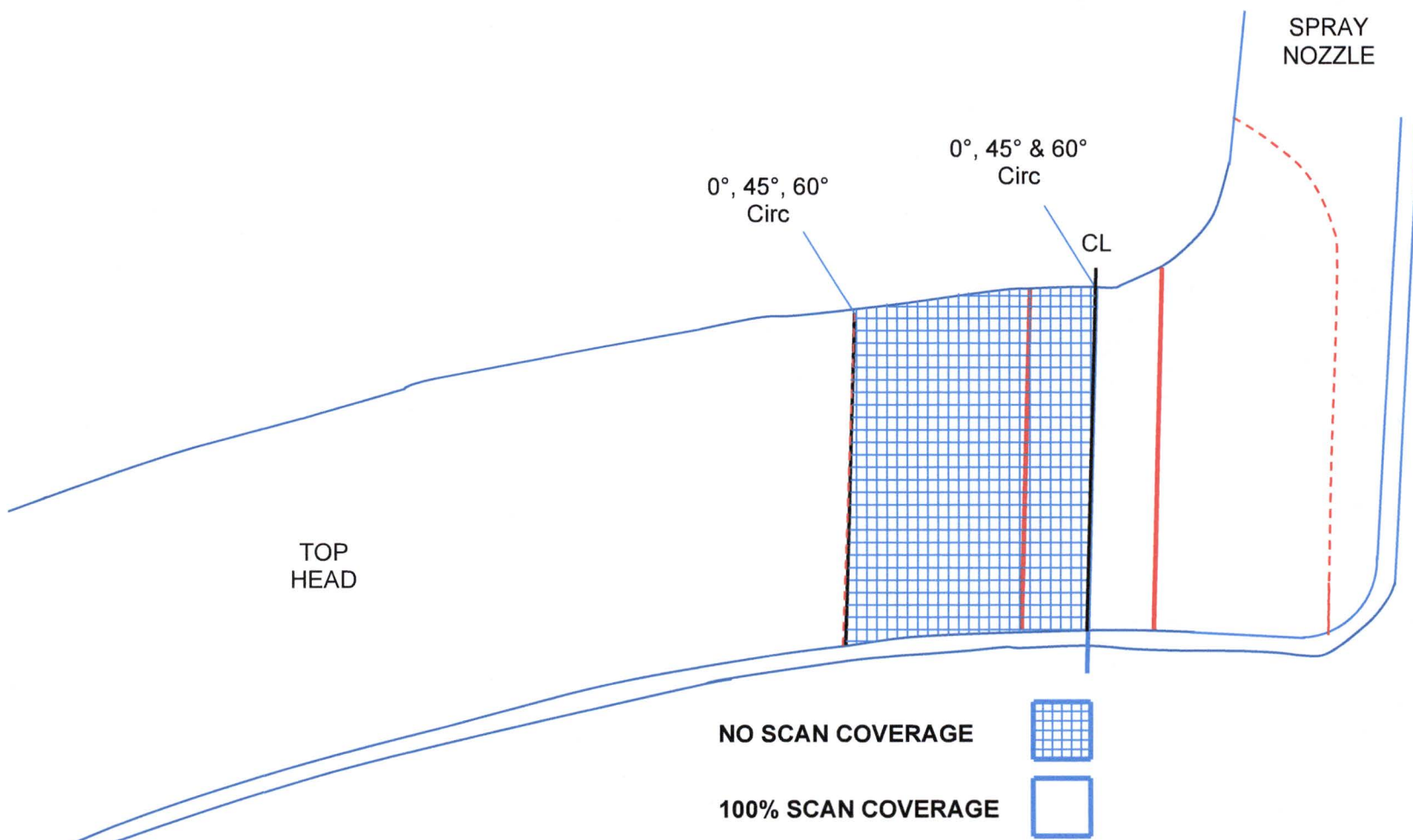
- a) The coverage diagrams in Figures 1 through 4 of relief request number ANO2-ISI-018 and in Figures 1 and 2 of relief request number ANO2-ISI-019 do not provide sufficient detail for the staff to evaluate the examination coverage obtained. For an example of what the staff deems as clear information in a coverage diagram, please refer to slide 12 of the "Coverage Relief Requests" presentation (ADAMS Accession No. ML15013A266) given by the staff during an Industry/NRC Information Exchange Public Meeting held on January 13-15, 2015. Please include separate diagrams for the "Axial Scan" and "Circumferential Scan" coverages as shown in the example.

*Entergy Response*

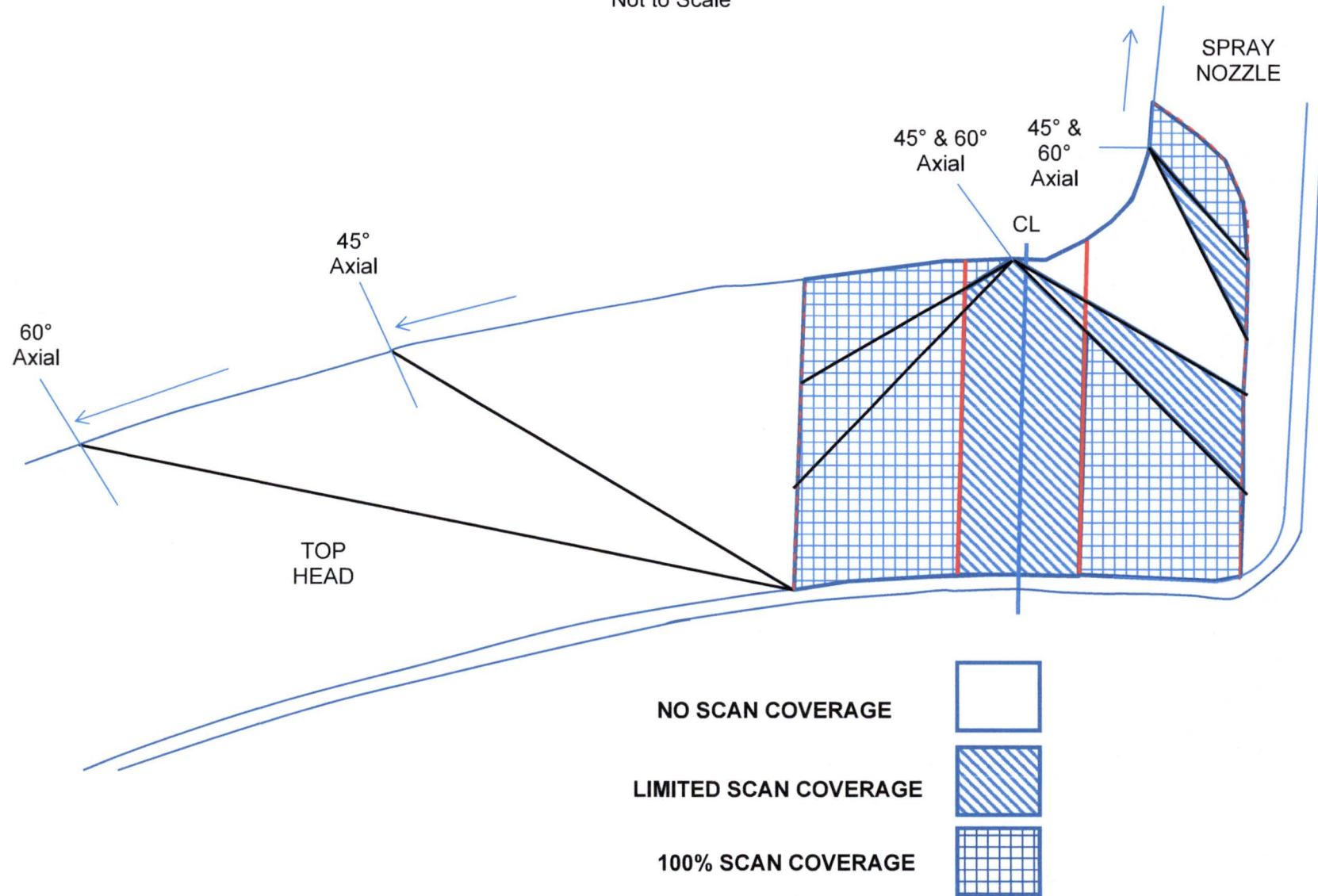
With respect to request for relief ANO2-ISI-018; Figures 1 through 4 of the original Entergy request (Reference 1) have been subdivided such that each of the four figures will now involve one figure illustrating the Axial Scan coverage and one illustrating the Circumferential Scan coverage. These figures are included below.

Request for relief ANO2-ISI-019 was associated with examination of the ANO-2 Shutdown Cooling (SDC) heat exchangers. At the time of the request, Entergy planned to perform permanent repair of the two degraded Arkansas Nuclear One, Unit 2 (ANO-2) SDC heat exchangers. Subsequent to the original request for relief (Reference 1), Entergy has decided to pursue complete replacement of the heat exchangers. Therefore, request for relief ANO2-ISI-019 is no longer required. As a result, Entergy requests to withdraw request for relief ANO2-ISI-019 from further NRC review.

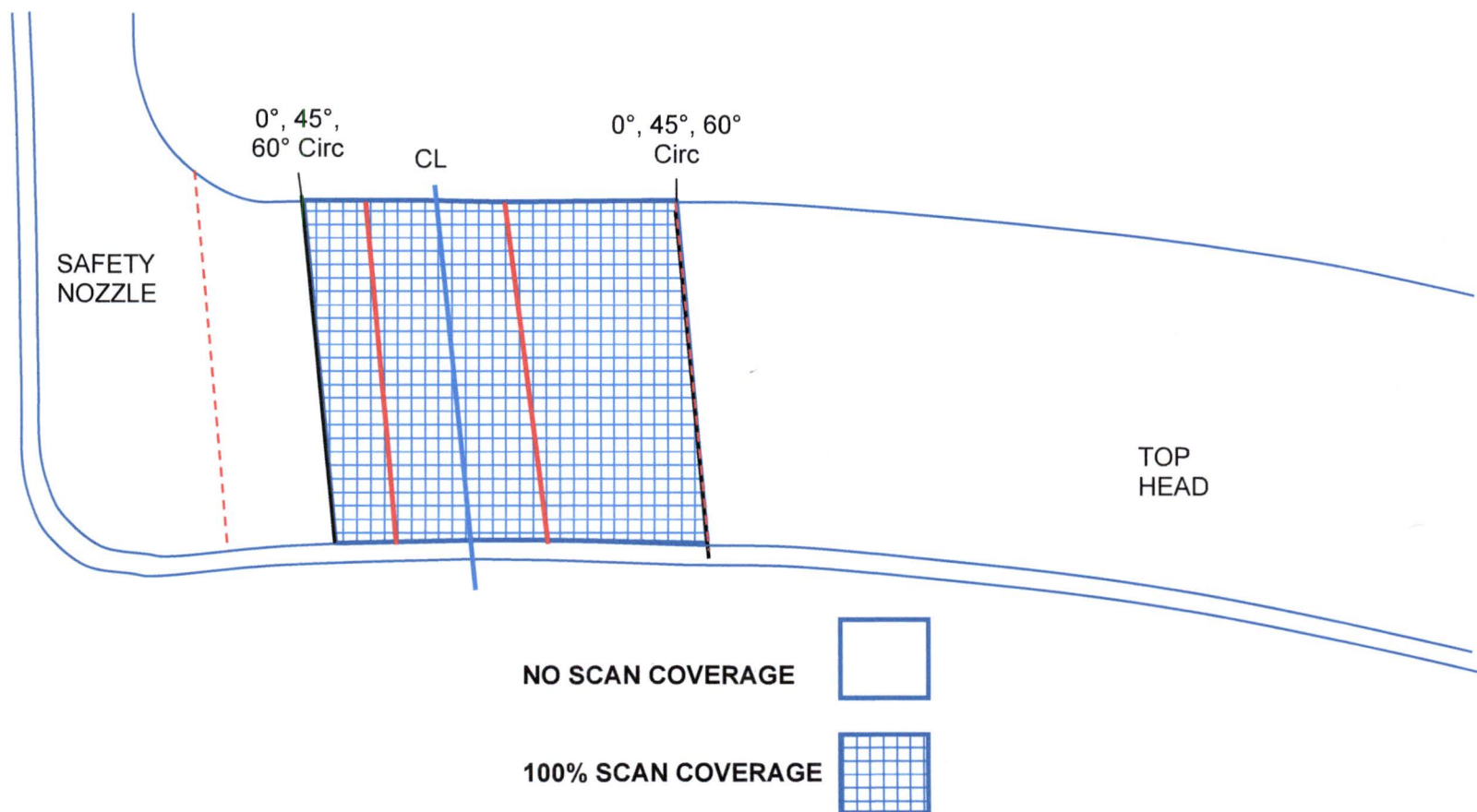
**Circumferential Scan Plan and Coverage for Component 05-010**  
Not to Scale



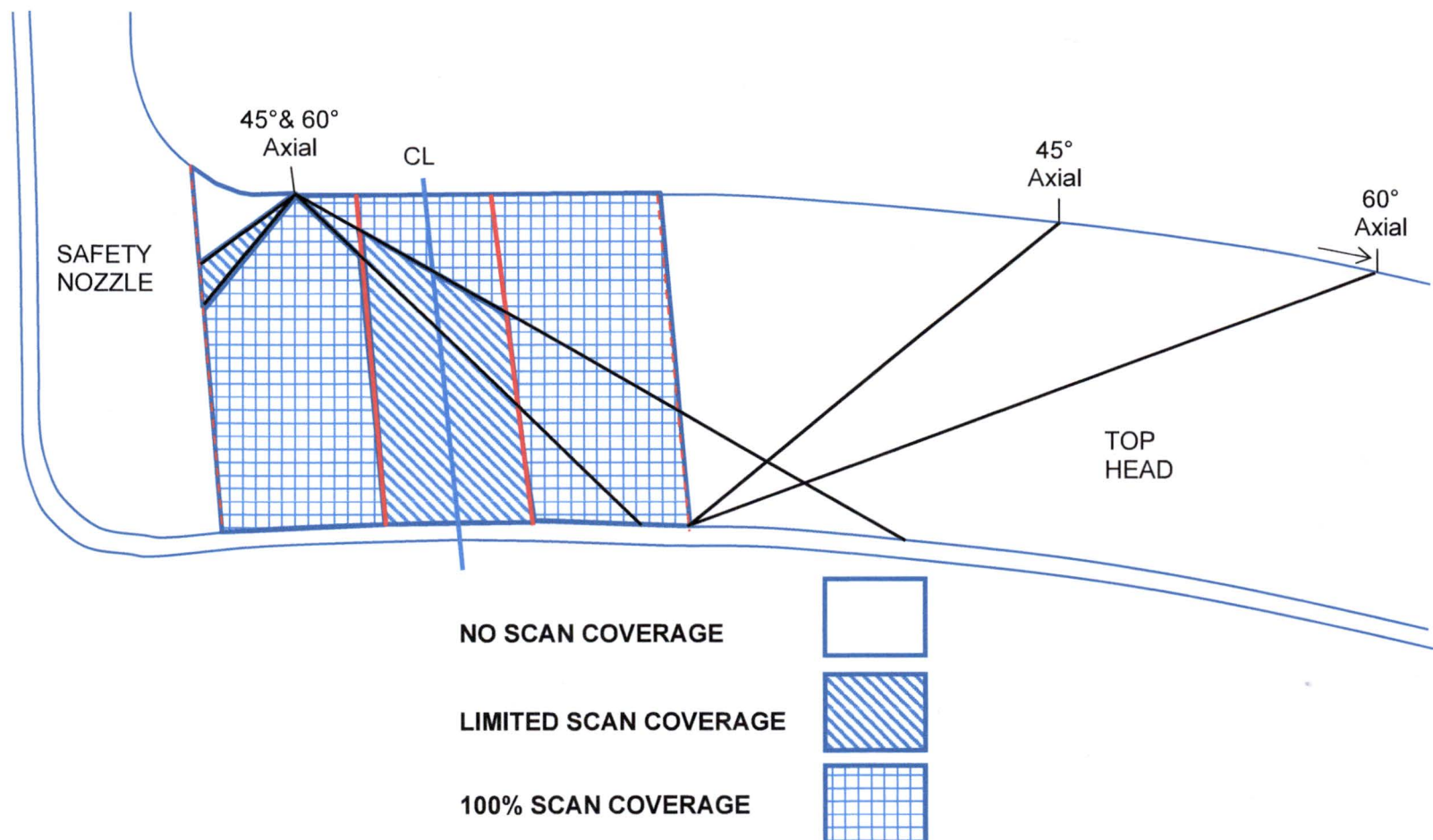
**Axial Scan Plan and Coverage for Component 05-010**  
Not to Scale



**Circumferential Scan Plan and Coverage for Component 05-011**  
Not to Scale

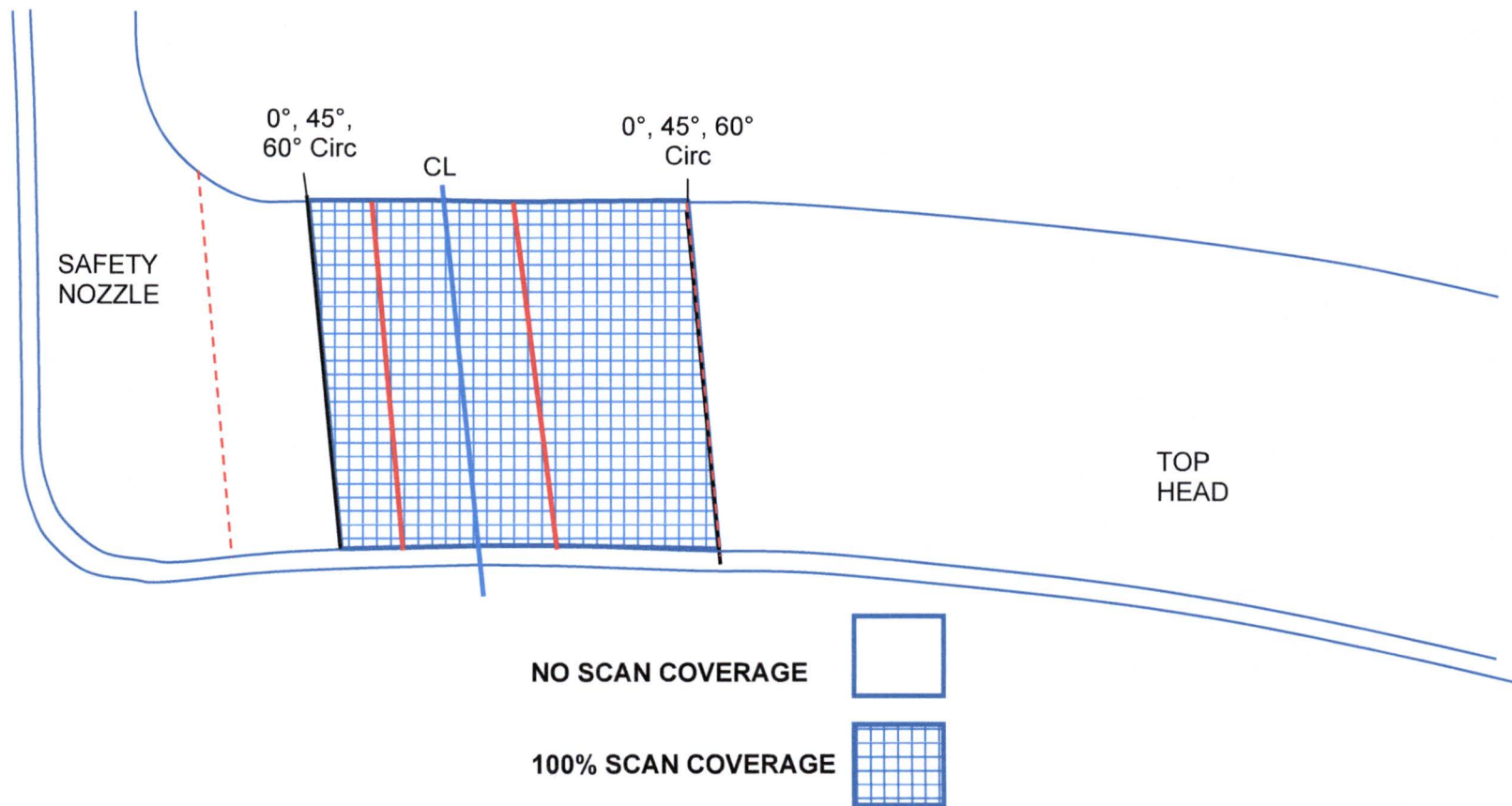


**Axial Scan Plan and Coverage for Component 05-011**  
Not to Scale

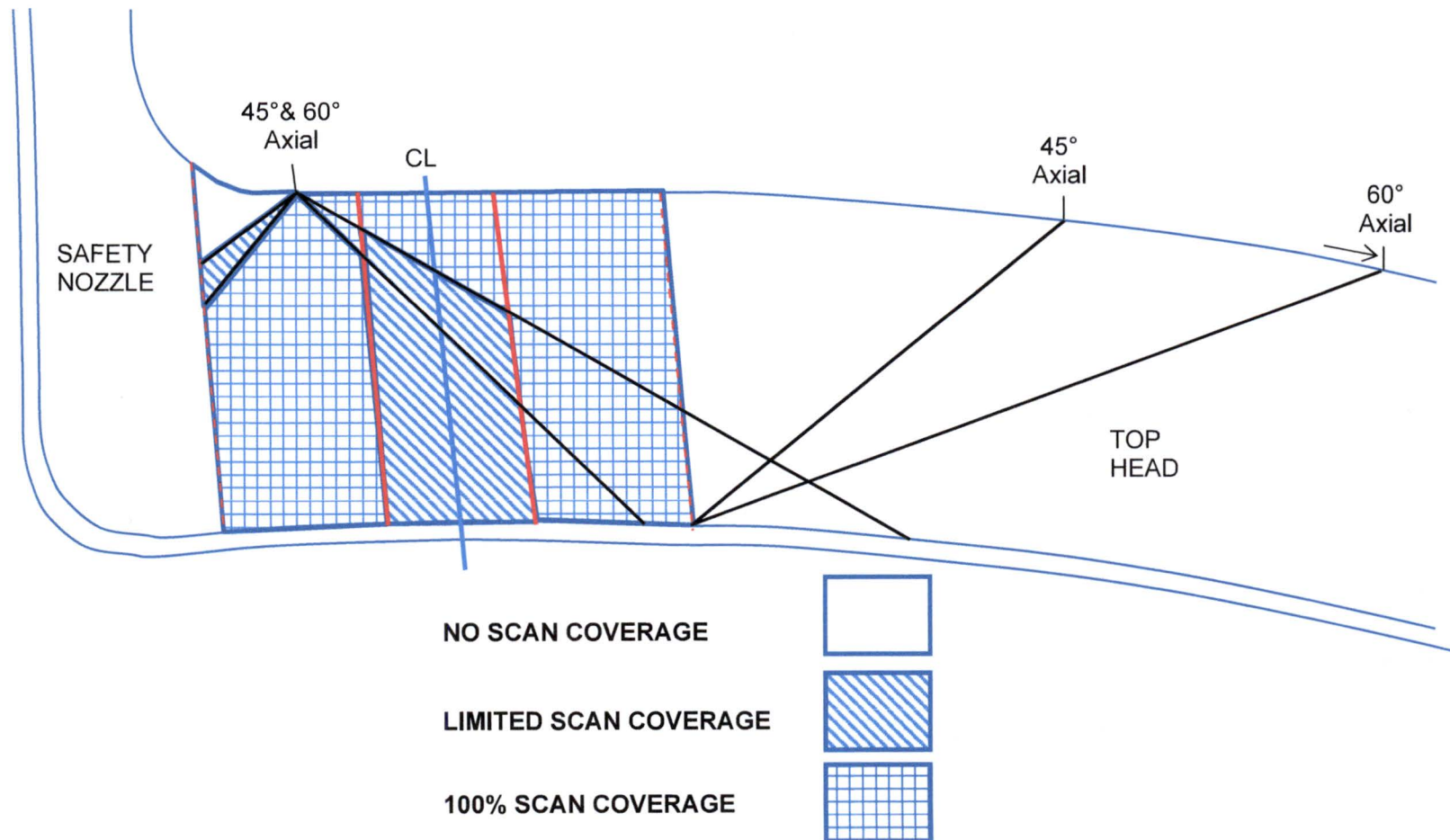




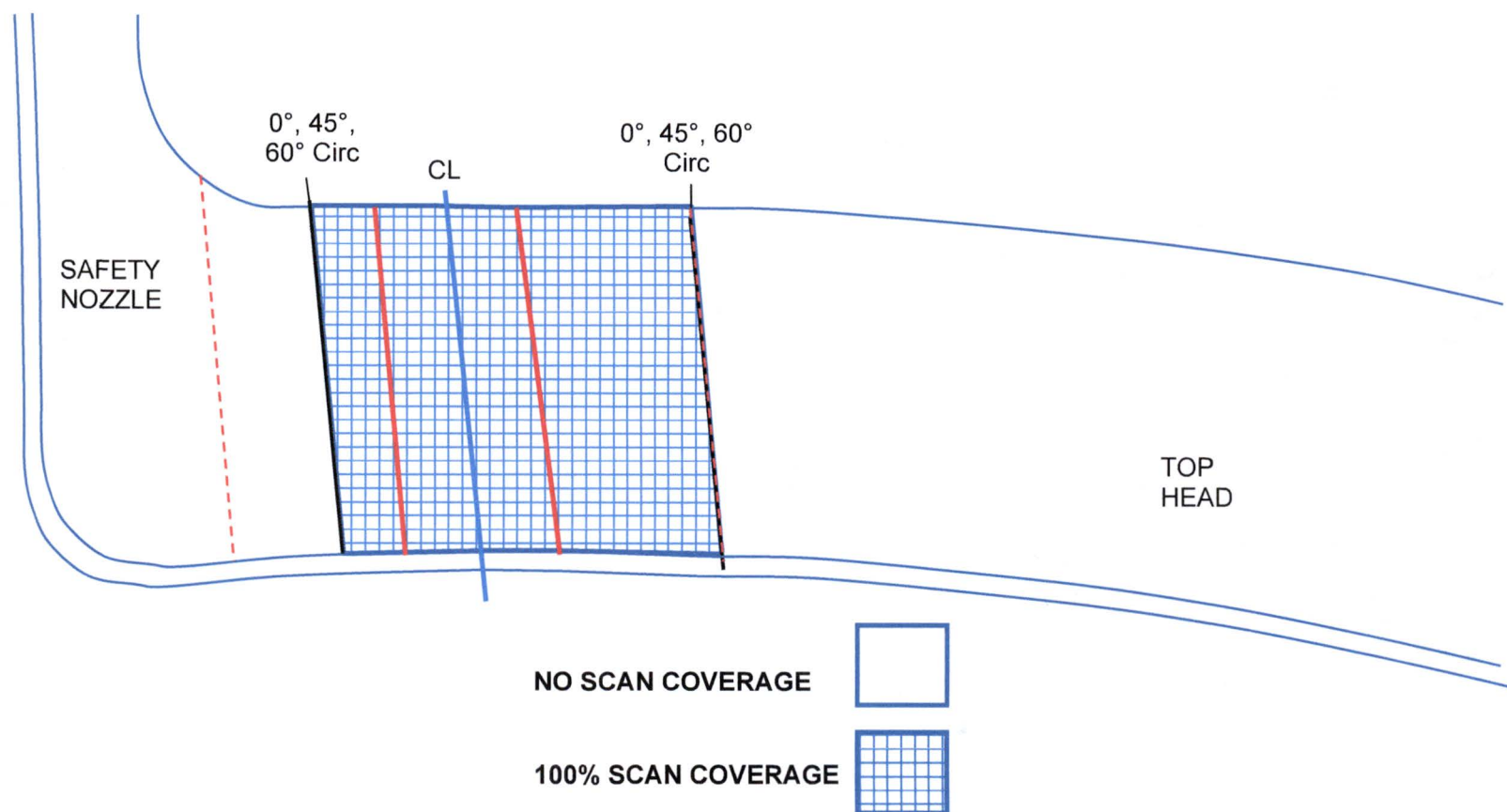
**Circumferential Scan Plan and Coverage for Component 05-012**  
Not to Scale



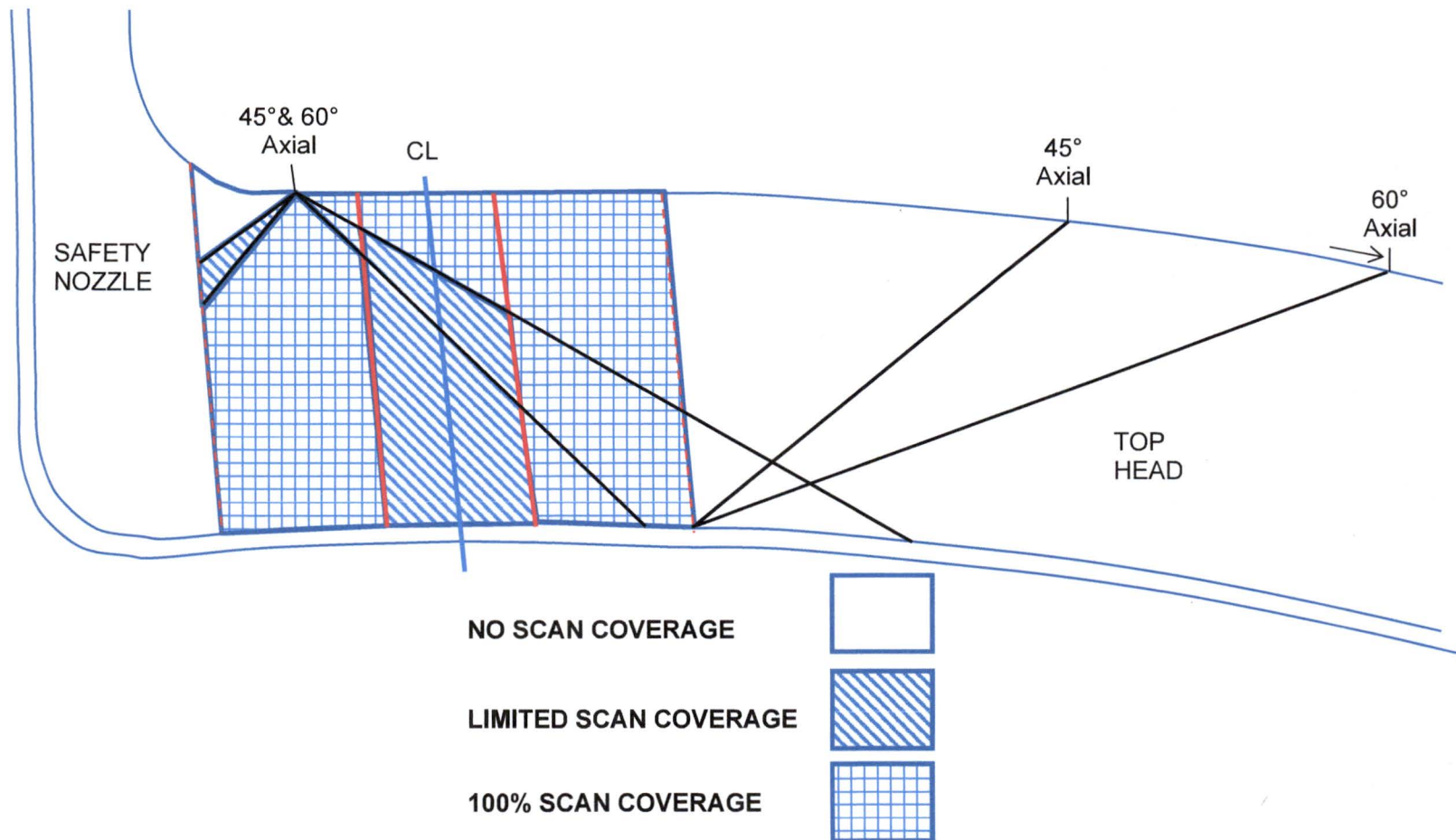
**Axial Scan Plan and Coverage for Component 05-012**  
Not to Scale



**Circumferential Scan Plan and Coverage for Component 05-013**  
Not to Scale



**Axial Scan Plan and Coverage for Component 05-013**  
Not to Scale





- b) With respect to relief request number ANO2-ISI-018, explain how the values for "factor for limitation" in Figures 2 through 4 were determined and why there was no "factor for limitation" applied in Figure 1.

*Entergy Response*

With respect to Attachment 1, Figures 1 through 4 of the Reference 1 request for relief ANO2-ISI-018, the "factors for limitation" values listed in Figures 2 through 4 were taken from previous data considering possible limitations from adjacent nozzles or an upending lug. The technician performing the estimated ultrasonic coverage calculations applied that factor as a measure of conservatism on the safety nozzles (Figures 2 through 4) that are on the slope of the pressurizer vessel head. The spray nozzle is depicted in Figure 1 and is in the center of the pressurizer vessel head. The technician did not apply a factor of limitation to that weld scan coverage estimation as the nozzle weld has uniform geometry. The scans for all 4 nozzle welds depicted in Figures 1 through 4 achieved the maximum scan coverage with the required angles, considering the primary scan direction is from the vessel head. The prominent limitation for all nozzle welds is the limitation to scan the weld area from the nozzle side due to geometric configuration. The weld areas received essentially 100% scan coverage from the vessel head side.

- c) With respect to relief request number ANO2-ISI-018, under the "Axial Scan Coverage" in Figures 1 through 4, where it indicates "Metal", please clarify if this is meant to be "Weld Metal".

*Entergy Response*

Where "metal" was stated in Figures 1 through 4, it was intended to describe "weld metal".

**RAI 2**

With respect to relief request numbers ANO2-ISI-018 and ANO2-ISI-019, please discuss the ASME Code Section XI, Appendix I requirement on which the manual ultrasonic examinations method is based. If supplements apply, please discuss which supplements were used.

*Entergy Response*

As discussed in response to RAI 1.a above, request for relief ANO2-ISI-019 is being withdrawn from further NRC review and is not discussed further in this submittal.

With respect to request for relief ANO2-ISI-018, the ultrasonic examinations were performed to procedure instructions as specified in ASME Code Section XI, Appendix I, Paragraph I-2120 entitled "Other Vessels". The procedures comply with ASME Code Section V, Article 4, and applicable ASME Code Section XI, Appendix I, Supplements 1, 2, 3, 7, 8, 10, and 11, which are described below.

ASME Code Section V, Article 4 – Ultrasonic Examination Methods for Inservice Inspection

ASME Code Section XI, Appendix I

Supplement 1	Calibration Block Material and Thickness
Supplement 2	Calibration Blocks for Clad Welds or Components
Supplement 3	Calibration Blocks for Examination of Parts with Curved Surfaces
Supplement 7	Instrument Calibration
Supplement 8	Scan Overlap and Search Unit Oscillation
Supplement 10	Recording Criteria
Supplement 11	Geometric Indications

**RAI 3**

With respect to relief request numbers ANO2-ISI-018 and ANO2-ISI-019, please discuss any plant-specific operating experience regarding potential degradation (such as stress corrosion cracking, fatigue cracking, flow-accelerated corrosion, and general corrosion) in the subject welds.

*Entergy Response*

As discussed in response to RAI 1.a above, request for relief ANO2-ISI-019 is being withdrawn from further NRC review and is not discussed further in this submittal.

With respect to request for relief ANO2-ISI-018, the welds listed in the relief request are from the ANO-2 pressurizer. The pressurizer is a replaced component which was installed in the fall of 2006 during the 2R18 refueling outage. There is currently no identified degradation in the pressurizer welds.

**RAI 4**

With respect to weld 49-001 in relief request number ANO2-ISI-019, the licensee indicated in Table 1 of Attachment 2 in the submittal that a plate segregate indication was identified outside of the ASME Code required volume and that was “~50” from the shell inside diameter. The staff noted that in the licensee’s submittal of relief request number ANO2-ISI-12 for the previous (third) ten-year ISI interval (ADAMS Accession No. ML12086A293), the licensee identified in the same weld of the SDC heat exchanger (weld 49-001) a plate segregate indication that was also outside the ASME Code required volume and “~0.50” from the shell inside diameter. Please clarify the apparent discrepancy between “~50” in the January 16, 2016 submittal and “~0.50” in the third ten-year ISI submittal.

*Entergy Response*

As discussed in response to RAI 1.a above, request for relief ANO2-ISI-019 is being withdrawn from further NRC review and is not discussed further in this submittal.

References

1. Entergy letter dated January 14, 2016, *Relief from American Society of Mechanical Engineers (ASME) Section XI Volumetric Examination Requirements – Fourth 10-Year Interval, First Period*, (2CAN011603) (ML16015A276)
2. NRC email dated April 26, 2016, "Request for Additional Information – Relief Request Numbers ANO2-ISI-018 and ANO2-ISI-019, (2CNA041601) (ML16118A043)