

Dominion Nuclear Connecticut, Inc.  
Millstone Power Station  
Rope Ferry Road, Waterford, CT 06385



JUL 13 2007

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Attention: Mr. J. E. Dyer  
Washington, D.C. 20555-0001

Serial No. 07-0494  
NSSL/RWM R0  
Docket No. 50-423  
License No. NPF-49

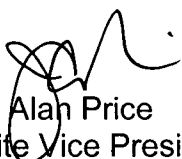
**DOMINION NUCLEAR CONNECTICUT, INC.**  
**MILLSTONE POWER STATION UNIT 3**  
**INSPECTION AND MITIGATION OF ALLOY 82/182 PRESSURIZER BUTT**  
**WELDS, RESULTS OF INSPECTIONS AND RESPONSE TO REQUEST FOR**  
**ADDITIONAL INFORMATION REGARDING COMPLETION OF THE FULL**  
**STRUCTURAL WELD OVERLAYS**

Dominion Nuclear Connecticut, Inc. (DNC) hereby provides the notification of completed commitments associated with inspection and mitigation of Alloy 82/182 pressurizer butt welds, as required by the NRC's Confirmatory Action Letter (CAL No. NRR-07-020) dated March 27, 2007. DNC has completed the application of full structural weld overlays (WOLs) on the pressurizer surge, spray, safety, and relief nozzle-to-safe end welds containing Alloy 82/182 material. The spray nozzle was WOL repaired in the fall of 2005 and the remaining nozzles were completed during refueling outage 11 (3R11).

Enclosure 1 to this letter submits information related to the WOLs installed during 3R11 as described in Section 3.3.4 of the NRC approval for DNC Alternative Request IR-2-47, Revision 1. As discussed during a teleconference on April 17, 2007, the enclosure to this letter also contains additional information requested by the NRC regarding the initial inspection results for the WOLs that were performed in 3R11. Appendix A to the enclosure consists of excerpts from the inspection vendor's final report summarizing the examination results for the weld overlays installed during 3R11.

If you have any questions regarding this submittal, please contact Mr. David W. Dodson at (860) 447-1791, 2346.

Very truly yours,

  
J. Alan Price  
Site Vice President – Millstone

Commitments in this letter: None

Enclosure(s): (1)

A110

NRR

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**ENCLOSURE 1**

**INSPECTION AND MITIGATION OF ALLOY 82/182 PRESSURIZER BUTT  
WELDS, RESULTS OF INSPECTIONS AND RESPONSE TO REQUEST FOR  
ADDITIONAL INFORMATION REGARDING COMPLETION OF THE  
FULL STRUCTURAL WELD OVERLAYS**

**DOMINION NUCLEAR CONNECTICUT, INC.  
MILLSTONE POWER STATION UNIT 3**

**INSPECTION AND MITIGATION OF ALLOY 82/182 PRESSURIZER BUTT WELDS, RESULTS OF INSPECTIONS AND RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING COMPLETION OF THE FULL STRUCTURAL WELD OVERLAYS**

**1.0 PURPOSE AND SUMMARY:**

Dominion Nuclear Connecticut, Inc. (DNC) hereby provides information regarding the installation and examination of structural weld overlays (WOLs) on pressurizer nozzle dissimilar and similar metal welds at Millstone Power Station Unit 3 (MPS3).

The information provided herein addresses WOLs that were installed during refueling outage 11 (3R11) as required by Section 3.3.4 of the NRC approval letter related to DNC's 10 CFR 50.55a Alternative Request IR-2-47, Revision 1. The submittal of this information is required within 60 days of restart from the most recent refueling outage. MPS3 returned to operation following 3R11 on May 17, 2007.

The results of the examinations of the WOLs installed in 3R11 indicate the WOLs are acceptable. The effects of changes in applied loads as a result of weld shrinkage are also acceptable based on the measured shrinkage being significantly less than acceptance criteria of requirements in Alternative Request IR-2-47, Revision 1.

Additional information related to initial examinations of the 3R11 WOLs is provided in Section 4.0. Required discussion of the repairs to overlay and base materials performed during 3R11 is provided in Section 5.0. Excerpted final report documentation related to the structural evaluation of the 3R11 WOLs is provided in Appendix A of this enclosure.

**2.0 BACKGROUND:**

DNC requested NRC staff approval of 10 CFR 50.55a Request IR-2-47 to allow the application of WOLs on the pressurizer nozzle dissimilar and similar metal welds at MPS3 in a letter dated October 17, 2006.<sup>(1)</sup> By letter dated March 28, 2007<sup>(2)</sup> DNC responded to NRC staff's request for additional information and provided an update to the request, 10 CFR 50.55a Request IR-2-47, Revision 1.

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<sup>(1)</sup> DNC Letter, Alternative Request IR-2-47, Use of Weld Overlays as an Alternative Repair Technique, October 17, 2006, (ADAMS Accession No. ML062910122)

<sup>(2)</sup> DNC Letter, Response to Request for Additional Information Regarding an Alternative for the Weld Overlay of Pressurizer Nozzle Welds (TAC No. MC3379), March 28, 2007, (ADAMS Accession No. ML070880565)

DNC subsequently submitted a Westinghouse report containing the WOL design information on March 30, 2007<sup>(3)</sup> and on April 23, 2007<sup>(4)</sup> DNC provided additional information on the technical basis for the weld overlay design and its associated analyses. The NRC approved the proposed alternative in correspondence dated May 3, 2007.<sup>(5)</sup>

### 3.0 SCOPE OF THE MITIGATED PRESSURIZER NOZZLE DISSIMILAR AND SIMILAR METAL WELDS:

#### 3.1 Spring 2007, Structural Weld Overlays Implemented in 3R11:

Structural weld overlays were installed on the following pressurizer nozzles during 3R11;

- Surge Weld 03-X-5551-X-T: 14-inch RCS Safe End to Surge Nozzle and adjacent Safe End-to-Pipe (Weld RCS-SL-FW-4)
- Safety (A) Weld 03-X-5644-A-T: 6-inch Safety Nozzle-To Safe End Weld and adjacent Safe End-to-Pipe (Weld RCS-516-FW-1)
- Safety (B) Weld 03-X-5648-B-T: 6-inch Safety Nozzle-To Safe End Weld and adjacent Safe End-to-Pipe (Weld RCS-516-FW-3)
- Safety (C) Weld 03-X-5649-C-T: 6-inch Safety Nozzle-To Safe End Weld and adjacent Safe End-to-Pipe (Weld RCS-516-FW-5)
- Relief Weld 03-X-5650-D-T: 6-inch Relief Nozzle-To Safe End Weld and adjacent Safe End-to-Pipe (Weld RCS-413-FW-1)

The structural weld overlays (WOLs) installed during 3R11 meet the following requirements:

- ASME Section XI 1998 Edition, no Addenda, as modified by the MPS3 10 CFR 50.55a Request IR-2-47, Revision 1

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<sup>(3)</sup> DNC Letter, Supplemental Information Regarding Request IR-2-47 for use of Weld Overlays as an Alternative Repair Technique, March 30, 2007, (ADAMS Accession No. ML070960355)

<sup>(4)</sup> DNC Letter, Response to Request for Additional Information Regarding an Alternative for the Weld Overlay of Pressurizer Nozzle Welds (TAC No. MC3379), April 23, 2007, (ADAMS Accession No. ML071160239)

<sup>(5)</sup> NRC Letter, Request for Approval to use IR-2-47 for Dissimilar Metal Weld Overlays as an Alternative Repair Technique (TAC NO. MD3379), May 3, 2007, (ADAMS Accession No. ML071210024)

- Code Case N-740 as modified by the MPS3 10 CFR 50.55a Request IR-2-47, Revision 1
- Code Case N-638 as modified by the MPS3 10 CFR 50.55a Request IR-2-47, Revision 1
- Ultrasonic examination in accordance with ASME Section XI 1995 Edition, 1996 Addenda, Appendix VIII, Supplement 11, as modified by the MPS3 10 CFR 50.55a Request IR-2-47, Revision 1

The WOLs meet the maximum and minimum requirements (lengths and thickness) as determined by the overlay designs and as specified in their design drawings:

A design value of 0.31 inches of shrinkage was used for the piping evaluation. The measured shrinkages are significantly less than this value and are therefore acceptable.

The required pressure tests and VT3 examinations were performed on the affected nozzles and supports with satisfactory results achieved in all cases.

The installed WOLs were inspected and found to be acceptable, consistent with the requirements of the MPS3 10 CFR 50.55a Request IR-2-47, Revision 1, and applicable Codes.

#### 4.0 RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION:

In an April 17, 2007 teleconference, the NRC requested additional information relative to the preliminary weld overlay examination results obtained during 3R11. This section provides DNC responses to the two NRC questions discussed during the teleconference.

NRC Question 1      *[Regarding the Appendix A]:*

In Table 1 of the Summary, the licensee reported a laminar indication in the Safety B nozzle. However, the Flaw Indication Evaluation Summary Table (Evaluation number safety B-01) indicates a laminar indication and a "spot" planar indication. Clarify why the planar indication was not listed in Table 1 of the Summary or included in the weld overlay sketch.

DNC Response:

In response to NRC Question 1, Wesdyne revised the final report documentation to accurately depict the two indications in Table 1 and on the weld overlay map. The revised information is reflected in Appendix A of this enclosure.

There were two indications reported during the final performance demonstration initiative (PDI) ultrasonic test (UT) examination performed by WesDyne. The first indication was a laminar type flaw detected with the 0 degree search unit, which measured 1.0 inch in length, located at a distance of -1.0 to -2.0 inches from the zero degree datum point and is indicative of a small mass of impurities in a flattened or laminar configuration. The indication is located at a depth of 0.27 inches from the overlay surface. This indication was also recorded during the informational UT performed after application of the sacrificial layer.

The second indication is an angle beam indication and is from the same flaw that was detected by the 0 degree search unit. This indication was detected by the 45 degree search unit which measured the indication as 0.50 inches in length located at a distance of -0.9 to -1.4 inches from the zero degree datum point with no measurable through wall dimension. The remaining angle beam examinations (60 degree, 70 degree and OD Creeping Wave) did not detect this indication, which confirms that there is no through wall depth to the indication.

The DNC Level III has conservatively assigned a total length of the indication based upon the two data points (0 degree and 45 degree) to be 1.1 inches in length, which meets the acceptance criteria of IR-2-47, Revision 1, Section 3(a)(3) for laminar flaws.

NRC Question 2      *[Regarding the Appendix A]:*

The Flaw Indication Evaluation Summary Table indicates a "spot" planar indication. Explain the "spot" planar indication because this is not a terminology used in the ASME Code, Sections III or XI.

DNC Response:

The Commission is correct that the terminology of a "spot" planar indication is not a term used in the ASME Codes. This term is commonly used by UT examiners in performing examinations and is used when an indication has no measurable length or through wall dimension.

For the two indications in question on the B safety nozzle, this term would be inappropriate as the angle beam indication did have a measurable length of 0.50 inches with no measurable through wall dimension.

Wesdyne has revised the final report documentation, consistent with the discussion in the NRC teleconference on April 17, 2007. The revisions are reflected in the excerpted final report documentation provided in Appendix A to this enclosure. The revised report depicts the recorded indication, as an angle beam indication of 0.50 inches in length with no measurable through wall dimension.

#### 5.0 REPAIRS TO THE OVERLAY MATERIAL AND BASE MATERIAL:

Other than minor surface blemishes that were buffed out, the examination of the weld overlays identified only one location that required repair on the B safety nozzle sacrificial layer / base metal.

Following initial machine Gas Tungsten Arc Weld (GTAW) deposit of the sacrificial weld layer on the B safety nozzle, liquid penetrant (LP) indications were found in the last inch of the weld deposit on the stainless steel pipe. These indications were located beyond the underlying welds and were greater than 2 inches beyond the stainless steel safe end-to-pipe weld (RCS-516-FW-3). These indications were reworked as in-process weld metal rework per the provisions of the work traveler.

One of the indications re-occurred and required excavation approximately 1/16 inch into the stainless steel pipe base metal. The resulting depression, approximately 1/32 inch below design nominal wall thickness, remained well above the required minimum wall for the pipe.

The excavation area was approximately 2 inches circumferential by 3/4 inch axial, and was located at the extreme end of the overlay beyond the stainless steel safe end to pipe weld near the 0 degree top centerline. While this configuration was acceptable to the Code of construction the resulting localized depression was not suitable for the machine deposition of the structural weld overlay (WOL). In order to optimize the WOL, the depression was filled as a base metal weld repair. This base metal weld repair was performed in accordance with the original Construction Code, ASME Section III, for the pipe and passed all of the Code required NDE (i.e., VT and LP).



The WOL was then installed over this base metal weld repair. The Performance Demonstration Initiative (PDI) ultrasonic test (UT) examination performed on the final WOL identified a laminar discontinuity 1.0 inch long and 0.1 inch wide in the area of the above base metal repair. The discontinuity was evaluated and found to be acceptable in accordance with the MPS3 Alternative Request IR-2-47, Revision 1, Enclosure 1, paragraph 3(a)(3).

**APPENDIX A  
OF ENCLOSURE 1**

**PRESSURIZER STRUCTURAL WELD OVERLAY PROJECT,**  
**FINAL REPORT – REV 1**

**(Excerpted)**

**DOMINION NUCLEAR CONNECTICUT, INC.  
MILLSTONE POWER STATION UNIT 3**



Millstone Unit 3  
Pressurizer Structural Weld Overlay Project  
Final Report – Rev 1

Spring 2007 PDI / NDE Inspections

Prepared by / Date:

A handwritten signature in black ink that reads "R. P. Vestovich". The signature is written in a cursive style with a long horizontal stroke extending to the right.

R. P. Vestovich

5/11/07

**Millstone Unit 3  
Pressurizer Structural Weld Overlay Project  
Final Report – Rev 1**

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**Millstone Unit 3  
Pressurizer Structural Weld Overlay Project  
Final Report – Rev 1**

**Summary**

In support of the Structural Weld Overlay project during RFO 3R11 at Millstone Unit 3, WesDyne performed PDI examinations of five structural weld overlaid pressurizer nozzles. This Final Report documents the results of the NDE inspections performed by WesDyne in support of that project.

Table 1, "Indications for Pressurizer Weld Overlays", provides detailed results of the final PDI UT inspections performed on the five pressurizer nozzles.

**Table 1 - Indications for Pressurizer Weld Overlays**

Nozzle	Weld Identifications (DM/SS)	Number of Indications Initial PDI Inspection	Indication Assessment Summary
Safety A	03-X-5644-A-T RCS-516-FW-1	No recordable indications	N/A
Safety B	03-X-5648-B-T RCS-516-FW-3	1 (0°) laminar Indication 1 (45°) angle beam indication	The 0° laminar and 45° angle beam indications were acceptable. No repairs performed.
Safety C	03-X-5649-C-T RCS-516-FW-5	No Recordable Indications	N/A
PORV	03-X-5650-D-T RCS-513-FW-1	No Recordable Indications	N/A
Surge	03-X-5551-X-T RCS-SL-FW-4	No Recordable Indications	N/A

**Coverage**

A summary of the exam coverage is as follows:

	SURGE	PORV	SAFETY A	SAFETY B	SAFETY C
Weld Overlay Volume					
0 degree Beam	99.6%	99.5%	99.50%	99.9%	99.7%
Circ Beams	90.7%	93.0%	92.60%	97.6%	93.9%
Axial Beams	100%	100%	100%	100%	100%
DM Weld Volume					
Axial Beams	100%	100%	100%	100%	100%
Circ Beams	100%	100%	100%	100%	100%
SS Weld Volume					
Axial Beams	100%	100%	100%	100%	100%
Circ Beams	100%	100%	100%	100%	100%

Specific coverage analysis for each nozzle is included in this report in the section labeled "Tab-II COVERAGE".

**Millstone Unit 3  
Pressurizer Structural Weld Overlay Project  
Final Report – Rev 1**

## **Examination Procedures**

The procedures used for the inspection of the pressurizer nozzles at Millstone Unit 3 were as follows:

- WDI-STD-1005, “Manual or Multi-Channel Automated Ultrasonic Instrument Linearity Procedure”, Revision 2.
- WDI-STD-1007, “Generic Procedure for the Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds Using PDI-UT-8”, Revision 1. Field Change Notices 01 & 02
- PDI-UT-8, “PDI Generic Procedure for the Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds”, Rev F.
- WDI-STD-1014, “Generic Procedure for Acquiring Material Thickness for Dissimilar Metal Weld Overlays”, Revision 3.
- WDI-STD-1016, “Generic Procedure for the Ultrasonic Information Only Examinations of Weld Overlay Material Using Straight Beam (0°) Probes, Revision 0. Field Change Notice 01

Copies of specific procedures used during inspection of the pressurizer nozzle are included in this report in the section labeled “Tab-III PROCEDURES”.

## **Examination Program Plan**

The Examination Program Plan utilized to perform the inspections and implement the examination procedures was:

- WDI-PJF-1303606-EPP-001, “Examination Program Plan for the Pre-service Inspection of Pressurizer Nozzle Structural Weld Overlays at Millstone Unit 3”, Revision 0
- WDI-PJF-1303606-EPP-001, “Examination Program Plan for the Pre-service Inspection of Pressurizer Nozzle Structural Weld Overlays at Millstone Unit 3”, Revision 1 Amendment 1
- WDI-PJF-1303692-EPP-001, “Examination Program Plan for the Inprocess UT of Pressurizer Nozzle Structural Weld Overlays, Revision 0
- WDI-PJF-1303692-EPP-001, “Examination Program Plan for the Inprocess UT of Pressurizer Nozzle Structural Weld Overlays, Revision 0, Amendment 1

Copies of the Exam Program Plans are included in this report in the section labeled “Tab-IV Exam Program Plan”.

**Millstone Unit 3  
Pressurizer Structural Weld Overlay Project  
Final Report – Rev 1**

## **Personnel and Certifications**

Included in this report are the NDE Certifications, Certificates of Eye Examinations, and applicable PDI-issued Performance Demonstration Qualification Summaries (PDQS's) for the following personnel:

- Shaw, Clayton
- Orihuela, Miguel
- Johnson, Jimmy
- Martinez, Jaime
- Michael, Dickey
- Fish, Edward
- Peters, Tammy

Copies of the Personnel Certifications are included in this report in the section labeled "Tab-V PERSONNEL CERTS".

## **Equipment Used and Certifications**

Report section "Tab-VI EQUIPMENT CERTS" contains the UT Scope Linearities, and the certifications for the couplant, thermometers and calibration blocks. Report section "Tab-VII TRANSDUCERS" contains the certifications for all the transducers used for the inspection.

## **NDE Reports**

Specific NDE reports for each nozzle are included in this report in the section labeled "Tab-VIII NDE REPORTS". This section contains; weld coverage, final contours, calibration sheets, indication sheets and indication evaluations.

<b>FLAW INDICATION EVALUATION SUMMARY FOR:</b>		
<b>MILLSTONE UNIT 3 SAFETY NOZZLE 'B'</b>		
<b>FINAL ACCEPTANCE UT</b>		
	<b>Applicable ASME Code</b>	
	<b>Section XI:</b>	1998 Edition with no Addenda
<b>Dominion Nuclear Connecticut Relief Request (IR-2-47) Criteria</b>	<b>Acceptance Standard</b>	<b>Summary of Results</b>
<b>Evaluation: Laminar Flaw Indications [Ref. 1.1 of Evaluation Worksheet]</b>	ASME Section XI, Table IWB-3514-3	ACCEPTABLE CONDITION: Measured area of laminar flow indication is 0.1 sq. in. versus allowable of 7.5 sq. in.
<b>Evaluation: Laminar Flaw Indications [Ref. 1.2 of Evaluation Worksheet]</b>	≤10% of Weld Overlay Surface Area	ACCEPTABLE CONDITION: Measured area of laminar flow indication is 0.1% of weld overlay surface area.
<b>Evaluation: Laminar Flaw Indications [Ref. 1.3 of Evaluation Worksheet]</b>	≤ 3-inch (76mm) or 10% of Nominal Pipe Circumference Whichever is Greater, Linear Dimension	ACCEPTABLE CONDITION: Laminar flow indication length is 0.92" versus an allowable of 3".
<b>Evaluation: Reduction in Coverage in the Weld Overlay Examination Volume Due to Laminar Flaw Indications [Ref. 2.0 of Evaluation Worksheet]</b>	<10% Reduction in Coverage in Weld Overlay Examination Volume	ACCEPTABLE CONDITION: Laminar flow indication lies at or below weld overlay/base material interface thus there is no reduction in coverage in weld overlay examination volume. There also is no reduction in coverage in PSI/ISI base material examination volumes.
<b>Evaluation: Consideration of the Largest Radial Planar Flaw (Axial and Circumferential) That Could Exist in Any Uninspectable Volume Within the Weld Overlay Examination Volume [Ref. 3.0 of Evaluation Worksheet]</b>	ASME Section XI, Table IWB-3514-2 Preservice Examination Standards	ACCEPTABLE CONDITION: There is no uninspectable volume within weld overlay examination volume.
<b>Evaluation: Planar Flaw Indications in Weld Overlay Examination Volume [Ref. 4.0 of Evaluation Worksheet]</b>	ASME Section XI, Table IWB-3514-2 Preservice Examination Standards	ACCEPTABLE CONDITION: Only one angle beam flaw indication with no measurable through-wall extent detected.



<b>Evaluation: Flaw indications in PSI/ISI Base Material Examination Volume and Within Outer 25% of Underlying Weld and Base Metal Must Satisfy Design Requirements of the Weld Overlay [Ref. 5.0 of Evaluation Worksheet]</b>	Design Requirements of the Weld Overlay	ACCEPTABLE CONDITION: No flaw indications detected in PSI/ISI base material examination volumes.
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Preparer:



Date:

11-May-2007

WesDyne Level III Review:



Date:

11-May-2007

**ATTACHED FLAW INDICATION EVALUATION SHEETS:**

Evaluation	Yes
Indication Plots	Yes
Reduction in Coverage Plots	No
Assumed Planar Flaw Plots	No
Layout of Indications	Yes

THE FLAW INDICATION PLOT DESCRIBING THE LOCATION AND MEASURED DIMENSIONS OF THE FLAW INDICATIONS ARE ATTACHED.

Summary of Flaw Indications: (information taken from attached indication plots and referenced UT indication reports)

Indication #	Indication Type	Measured Width at Overlay OD Surface (in)	Measured Length at Overlay OD Surface (in)	Average Radial Position of Indication in Exam Volume (in)	Measured Circumference of Overlay Surface @ Indication (in)	Estimated Outer Radius of Weld Overlay @ Indication (in)	Corrected Length @ Indication (in)	Tswol @ Indication (in) [Note 1]	Measured Through-wall Dimension of Planar Flaw Indications (in)
1 (0)	Laminar	0.10	1.00	3.18	21.80	3.47	0.92	0.14	N/A
1 (45)	Angle Beam	0.00	0.50	3.18	21.80	3.47	0.46	0.14	None

NOTE 1: Tswol is measured from the weld overlay OD surface perpendicular to the pipe axis to the weld overlay/base metal interface using the nearest cross-section profile. For combined indications, the Tswol is an average.

REFERENCES:

1. WesDyne Procedure WDI-STD-1007, Revision 1
2. Dominion Nuclear Connecticut, Millstone Power Station Unit 3, Alternative Request IR-2-47, Revision 1: Use of Weld Overlays as an Alternative Repair Technique

Evaluation of Structural Weld Overlay Inspection Indications in Accordance with Dominion Nuclear Connecticut Relief Request IR-2-47 Requirements:

Acceptance Criteria:

1.1 Laminar flaws in the weld overlay examination volume shall meet the acceptance standards of Table IWB-3514-3. [Ref. IR-2-47, Enclosure 1, 3.0(a)(3)(a)]:

Individual Indication Evaluation per Table IWB-3514-3:

Indication #	Measured Area (Measured Width x Corrected Length) (sq)	Allowable Laminar Flaw per Table IWB-3514-3 (sq. in)	Acceptable or Unacceptable
1 (0)	0.1	7.5	Acceptable

1.2 Laminar flaws in the weld overlay examination volume shall not exceed 10% of the weld surface area. [Ref. IR-2-47, Enclosure 1, 3.0(c)(3)(a)]:

Indication #	Measured Area (Measured Width x Measured Length) (sq)
1 (0)	0.10

Total Laminar Flaw Surface Area: 0.1 sq. in.

Total Weld Overlay Surface Area:

Weld Overlay Examination Volume Surface Length =	7.08	in.	Contour:	0	degrees
5 Measured Circumferences (inches):	30.2	29.00	28.1	27.25	25.25
Average Circumference of Weld Overlay Examination Volume=	27.96 in.				
Total Weld Overlay Surface Area=	197.9568 sq. in.				

Total Laminar Flaw Surface Area/Total Weld Overlay Surface Area (%)= 0.1% ACCEPTABLE

1.3 No linear dimension of a laminar flaw indication area exceeds 3.0 inches or 10% of the nominal pipe circumference, whichever is greater. [Ref. IR-2-47, Enclosure 1, 3.0(a)(3)(a)]:

Nominal Pipe Circumference=	27.96	in.	(Average Circumference of Weld Overlay Examination Volume from above)
Linear Dimension Criteria: ≥	3	in.	(3.0" or 10% of nominal pipe circumference whichever is greater)



FLAW INDICATION EVALUATION

Indication #	Corrected Length @ Indication (in)	Acceptable or Unacceptable
1 (0)	0.92	ACCEPTABLE

2.0 The reduction of coverage to the weld overlay examination volume, as defined in IR-2-47 Enclosure 1 Figure 1(a), due to laminar flaws is to be less than 10%. The dimensions of the uninspectable volume are dependent on the coverage achieved with the angle beam examination of the weld overlay. [Ref. IR-2-47, Enclosure 1, 3.0(a)(3)(b)]

FLAW INDICATION LIES AT OR BELOW WELD OVERLAY/BASE MATERIAL INTERFACE; THEREFORE NO REDUCTION IN COVERAGE IN WELD OVERLAY VOLUME THERE IS ALSO NO REDUCTION IN COVERAGE IN PSI/ISI BASE MATERIAL VOLUMES.

Total Weld Overlay Examination Volumes: (averaged using on 0-degree cross-section):

	Calculated Cross-Sectional Area by Drawing Package (in <sup>2</sup> )	Average Radius of Exam Volume (in)	Average Circumference of Exam Volume (in)	Total Exam Volume (in <sup>3</sup> )
Total Weld Overlay Exam Volume:	4.37	4.10	25.76	112.58

Weld Overlay Examination Volume Reduction in Coverage (RIC) from flaw indications based on Angle Beam (Circ Scan Direction):

Indication #	Calculated Circumferential Cross-Sectional Area of RIC by Drawing Package (in <sup>2</sup> )	UT Measured Width of Laminar Flaw Indication (in)	RIC Volume for Each Indication (in <sup>3</sup> )
1 (0)	0.00	0.10	0.00

Total RIC Volume in Weld Overlay Exam Volume from Flaw Indications based on Angle Beam (Circ Scan Direction): 0.00

Weld Overlay Examination Volume Reduction in Coverage (RIC) from flaw indications based on Angle Beam (Axial Scan Direction):

Indication #:	Calculated Cross-Sectional Area of RIC by Drawing Package (in <sup>2</sup> )	Average Radius of RIC Cross-Section (in)	Weld Overlay OD Surface Radius at Indication (in)	Measured Length of Indication at Weld Overlay OD Surface (in)	Corrected Length of Indication at Average RIC Cross-Section (in)	RIC Volume for Each Indication (in <sup>3</sup> )
1 (0)	0.00	0.00	3.45	1.00	0.00	0.00

Total RIC Volume in Weld Overlay Exam Volume from Flaw Indications based on Angle Beam (Axial Scan Direction): 0.00

COVERAGE ESTIMATE ASSUMPTION: Weld overlay volume must be examined in at least one axial and two circumferential directions to obtain full 100% coverage credit [Ref. PDI-UT-8, Para. 8.8.2]; No averaging applied.

	Total Exam Volume (in <sup>3</sup> )	Total RiC Volume (in <sup>3</sup> )	% RiC	Status
Percentage of Weld Overlay Examination Volume Not Covered (Circ Scan Direction):	112.58	0.00	0.00%	ACCEPTABLE

	Total Exam Volume (in <sup>3</sup> )	RIC Volume	% RiC	Status
Percentage of Weld Overlay Examination Volume Not Covered (Axial Scan Direction):	112.58	0.00	0.00%	ACCEPTABLE

3.0 Any uninspectable volume in the weld overlay is to be assumed to contain the largest radial flaw that could exist in that volume. This assumed flaw is to meet the preservice examination standards of Table IWB-3514-2. Both axial and circumferential planar flaws are to be assumed. [Ref. IR-2-47, Enclosure 1, 3.0(a)(3)(c)]

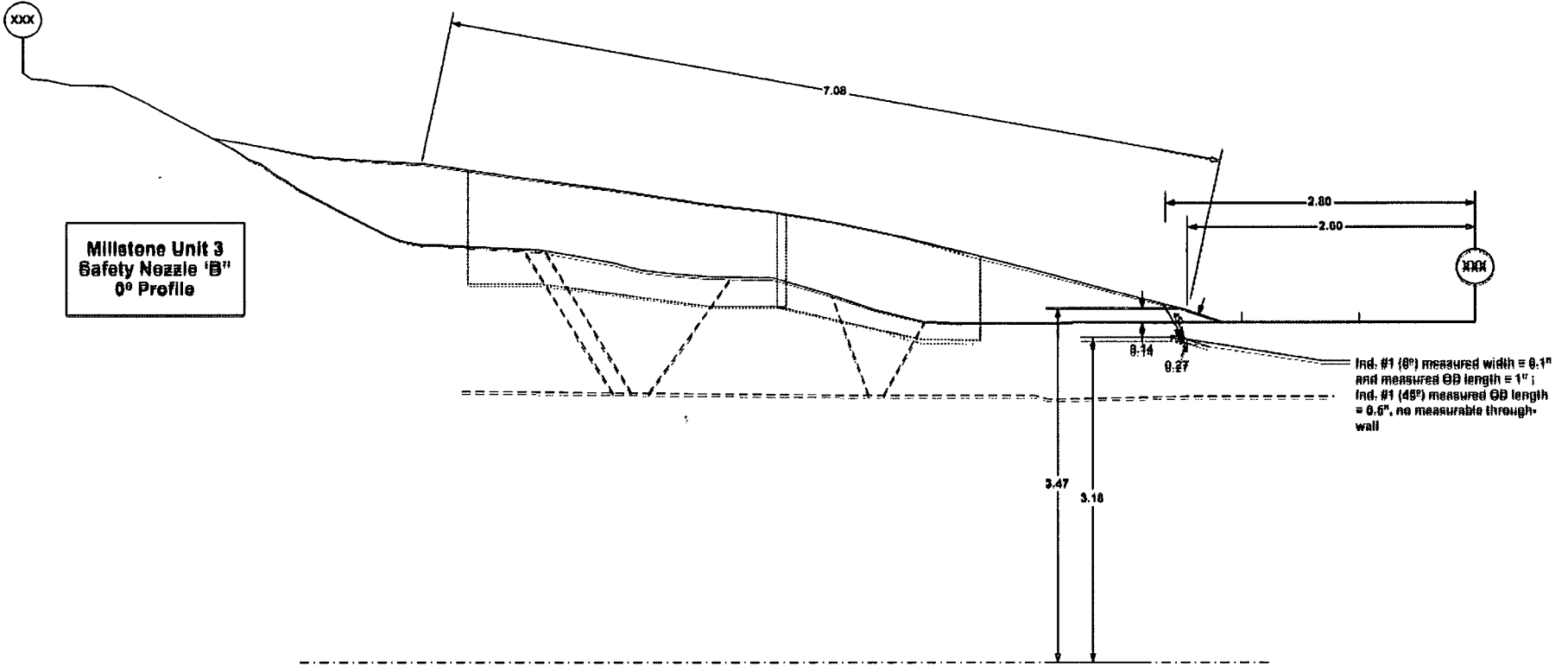
FLAW INDICATION LIES AT OR BELOW WELD OVERLAY/BASE MATERIAL INTERFACE; THEREFORE NO UNINSPECTABLE VOLUME IN WELD OVERLAY

4.0 Planar flaw indications found in the weld overlay examination volume, as defined in IR-2-47 Enclosure 1, Figure 1, are to meet the preservice examination acceptance standards of Table IWB-3514-2. [Ref. IR-2-47, Enclosure 1 3.0(a)(3)]

FLAW INDICATION FOUND WITH ANGLE BEAM TRANSDUCER HAS NO MEASURABLE THROUGH-WALL EXTENT THEREFORE ACCEPTABLE

5.0 Planar flaw indications found in the IR-2-47, Enclosure 1, Figure 2 examination volumes, and within the outer 25% of the underlying weld and base metal are to satisfy the design analysis requirements of the weld overlay. [Ref. IR-2-47, Enclosure 1 3.0(b)(2)]

NO PLANAR FLAWS DETECTED IN PSI/ISI EXAMINATION VOLUMES.





### LAYOUT OF INDICATIONS

Millstone Unit 3  
Safety Nozzle 'B'  
Flaw Indication Layout  
(all dimensions on OD surface)

