

Raymond A. Lieb
Vice President, Nuclear419-321-7676
Fax: 419-321-7582July 24, 2013
L-13-197

10 CFR 50.55a

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

SUBJECT:

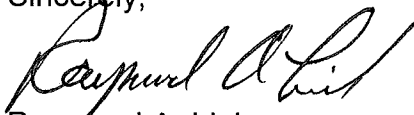
Davis-Besse Nuclear Power Station
Docket No. 50-346, License No. NPF-3
Response to Request for Additional Information on 10 CFR 50.55a Request RR-A37
(TAC No. MF0752)

By correspondence dated February 27, 2013 (Accession No. ML13059A315), FirstEnergy Nuclear Operating Company (FENOC) submitted 10 CFR 50.55a Request RR-A37 for the Davis-Besse Nuclear Power Station.

By electronic mail dated June 27, 2013 (Accession No. ML13179A095), the Nuclear Regulatory Commission (NRC) requested additional information to complete its review of Request RR-A37. FENOC's response to this request is attached. Additionally, the performance demonstration qualification summary, as requested in item 6 of the request for additional information, is provided as an enclosure.

There are no regulatory commitments contained in this submittal. If there are any questions or additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at (330) 315-6810.

Sincerely,



Raymond A. Lieb

Attachment: Response to June 27, 2013 Request for Additional Information

Enclosure: Performance Demonstration Qualification Summary (PDQS) No. 651

cc: NRC Region III Administrator
NRC Resident Inspector
NRC Project Manager
Utility Radiological Safety Board

Response to June 27, 2013 Request for Additional Information
Page 1 of 9

By correspondence dated February 27, 2013, FirstEnergy Nuclear Operating Company (FENOC) submitted a 10 CFR 50.55a Request for Nuclear Regulatory Commission (NRC) review and approval. By electronic mail dated June 27, 2013, NRC staff requested additional information to complete its review. The requested information is presented in bold type, followed by the FENOC response.

1. The licensee states in *Proposed Alternative and Basis for Use*: “Based on radiological survey results from the spring 2012 refueling outage, this work would occur within radiation fields with dose rates up to 500 milli-Rem per hour, resulting in a significant increase in occupational radiation exposure [dose] to personnel.” The Examination Data Sheet for the examination performed on May 15, 2012, indicated that the examination required nearly one hour, but the UT Examination Summary documented a total dose of 32 milli-Rem for the examination.

a. Explain the apparent discrepancy in the dose rate and the total radiological dose.

Response:

The total radiological dose of 32 milli-Rem (mR), as cited on the May 15, 2012 weld examination summary document, was the result of performing the ultrasonic (UT) examination with shielded piping adjacent to the weld. The 32 mR is for the weld examination itself; it does not include any ancillary activities, such as installing and subsequently removing access scaffolding or radiological shielding.

A spring 2012 refueling outage radiological survey used during development of Request RR-A37 revealed a maximum dose rate of 500 mR/hour on contact with the cold leg drain pipe. Therefore, should the piping require a modification, this work would occur within radiation fields with dose rates up to 500 mR/hour.

b. Justify why the dose incurred would present a hardship.

Response:

Radiological dose does not present a hardship; however, unnecessary dose to personnel should be avoided. As discussed during a FENOC-NRC teleconference on June 26, 2013, implementing a modification to reroute the American Society of Mechanical Engineers (ASME) Class 1 piping would require offloading the reactor core, flushing and draining the system, installing (and subsequently removing) scaffolding and rigging, cutting out the existing piping, removing associated pipe supports, installing new pipe supports, installing a new section of piping, and performing any requisite examinations.

Though detailed planning and man-hour estimates for the modification do not exist, it is roughly estimated that several hundred man-hours of work would occur within radiation fields with dose rates up to 500 mR/hour, resulting in a significant increase in occupational radiation exposure [dose] to personnel involved with implementing the modification.

- 2. The NRC staff is unable to determine the exact volumes that were examined and the part of the required volume that was not examined from the drawings provided in the proposed alternative.**

Provide clear scale drawings (with scale indicated) of the subject DMBW [dissimilar metal butt weld], including weld butter and FSWOL [full structural weld overlay] indicated. Clearly show the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Case N-770-1 required examination volume and the volume of material interrogated by the examination in the axial and circumferential scan directions.

Response:

The requested information is provided in Figures 1 and 2.

- 3. Provide a table detailing the scan coverage achieved for each of the following:**
- a. carbon steel nozzle;**
 - b. stainless steel elbow;**
 - c. susceptible weld metal; and**
 - d. full structural weld overlay.**

Provide values for scans in the circumferential and axial directions.

Response:

The requested information is provided in Figures 3 and 4 with coverage values expressed as percentages.

- 4. The licensee states that “limitations imposed by the weld geometry” resulted in incomplete scan coverage. Describe these limitations and their effects on scan coverage.**

Response:

The whole footprint of the search unit must be on the examination surface during scanning. At the point where the search unit loses contact with the surface or hits an obstruction is where the exit point of the sound beam is measured. Examples of this limitation, which results in reduced or incomplete scan coverage values, would be the FSWOL tapers or elbow intrados. Figure 5 provides an example.

- 5. The technical report detailing the preservice examination of Cold Leg Drain Nozzle 1-2 (ISI Component ID RC-40-CCA-18-3-FW9) FSWOL in 2010, “Summary of Weld Overlay Ultrasonic Examinations for Reactor Coolant Pump Suction and Discharge Welds, Core Flood Nozzle Welds, and Cold Leg Drain Line Welds at Davis-Besse Nuclear Power Station, Unit 1” (ADAMS Accession No. ML101230641), states “100 percent axial scan coverage and 80.1 percent circumferential scan coverage of the ASME Code Case N-740 [8] required volume, as documented in the Relief Request [5], was achieved during the examinations.”**

- a. Why does the current examination not achieve 100 percent coverage for scans in the axial direction and at least 80 percent coverage for scans in the circumferential direction?**

Response:

The winter 2010 refueling outage (1R16) preservice inspection examination limited examination calculations were not correct. The spring 2012 refueling outage (1R17) inservice inspection examination limitation calculation is correct. The noted discrepancies have been entered and addressed within FENOC’s corrective action program. The 1R17 calculated coverage values have subsequently been verified with field measurements and detailed coverage drawings. The 1R17 coverage calculations are more conservative than those documented in the 1R16 examination and will be used for all future examinations. The 1R17 calculated coverage values were used in Request RR-A37. For alignment and consistency, the 1R16 datasheet has been updated to reflect the 1R17 calculated coverage values.

- b. Provide a detailed explanation for the differences in examination coverage between the preservice and the current inservice examination.**

Response:

Response to RAI 5a contains the requested information.

- 6. Provide a copy of the Performance Demonstration Qualification Summary (PDQS) for the UT examination procedure used. Describe any limitations of the ASME Code, Section XI, Appendix VIII qualified examination procedure.**

Response:

A copy of the PDQS is provided as an enclosure to this letter. Limitations on its use are specifically described in the PDQS.

- 7. Was the subject inservice examination performed by team scanning?**

Response:

No. The inservice examination was performed by one individual.

Note: Acronyms or symbols used on the following figures:

Dissimilar Metal Weld: DMW

Square Inch: sq. in.

Ultrasonic: UT

Percent: %

Carbon Steel: CS

Stainless Steel: SS

Full Structural Weld Overlay: FSWOL

Figure 1
1-2 RCS COLD LEG DRAIN NOZZLE
RC-40-CCA-18-3-FW9 OVERLAY
CIRCUMFERENTIAL COVERAGE

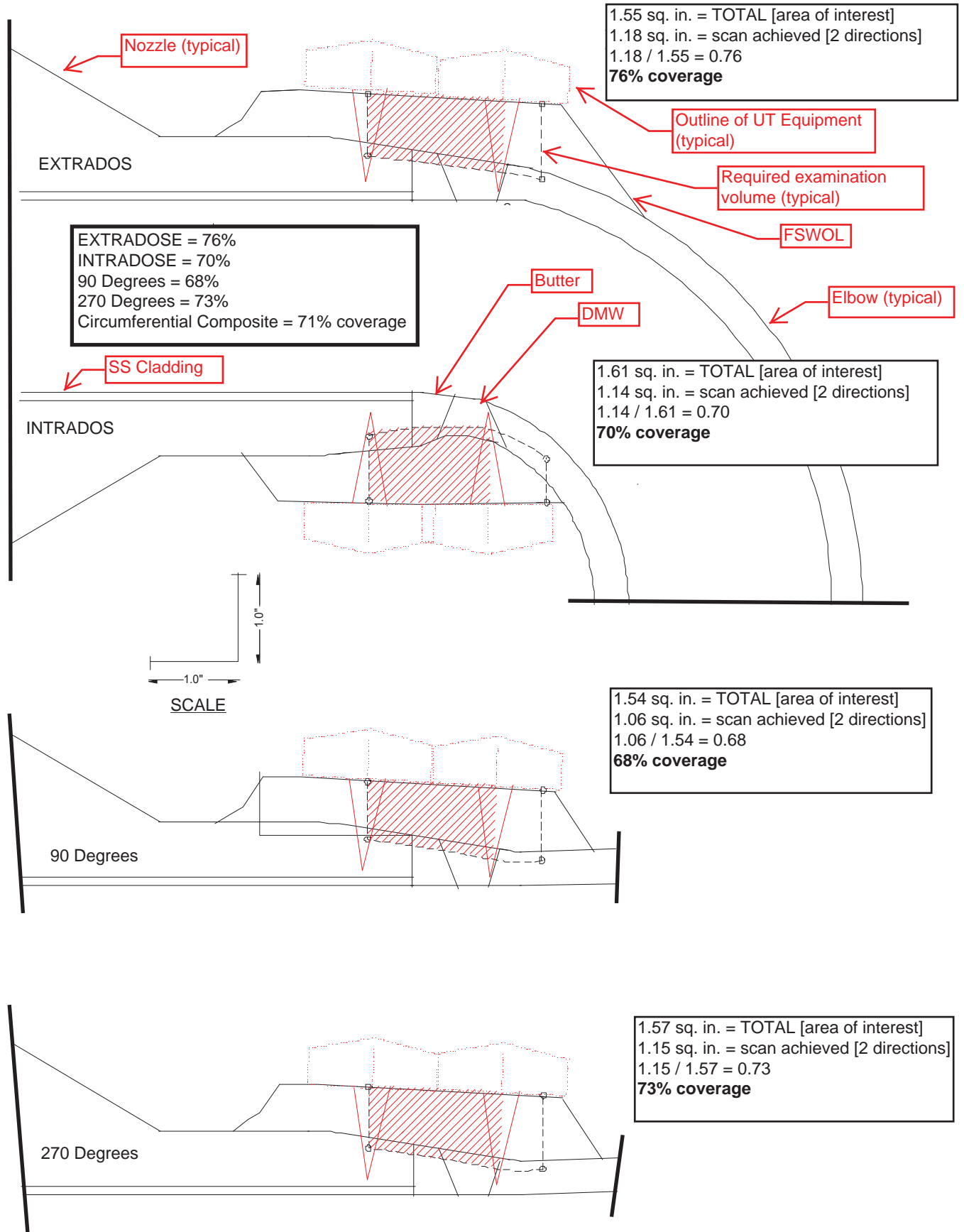


Figure 2
1-2 RCS COLD LEG DRAIN NOZZLE
RC-40-CCA-18-3-FW9 OVERLAY
AXIAL COVERAGE

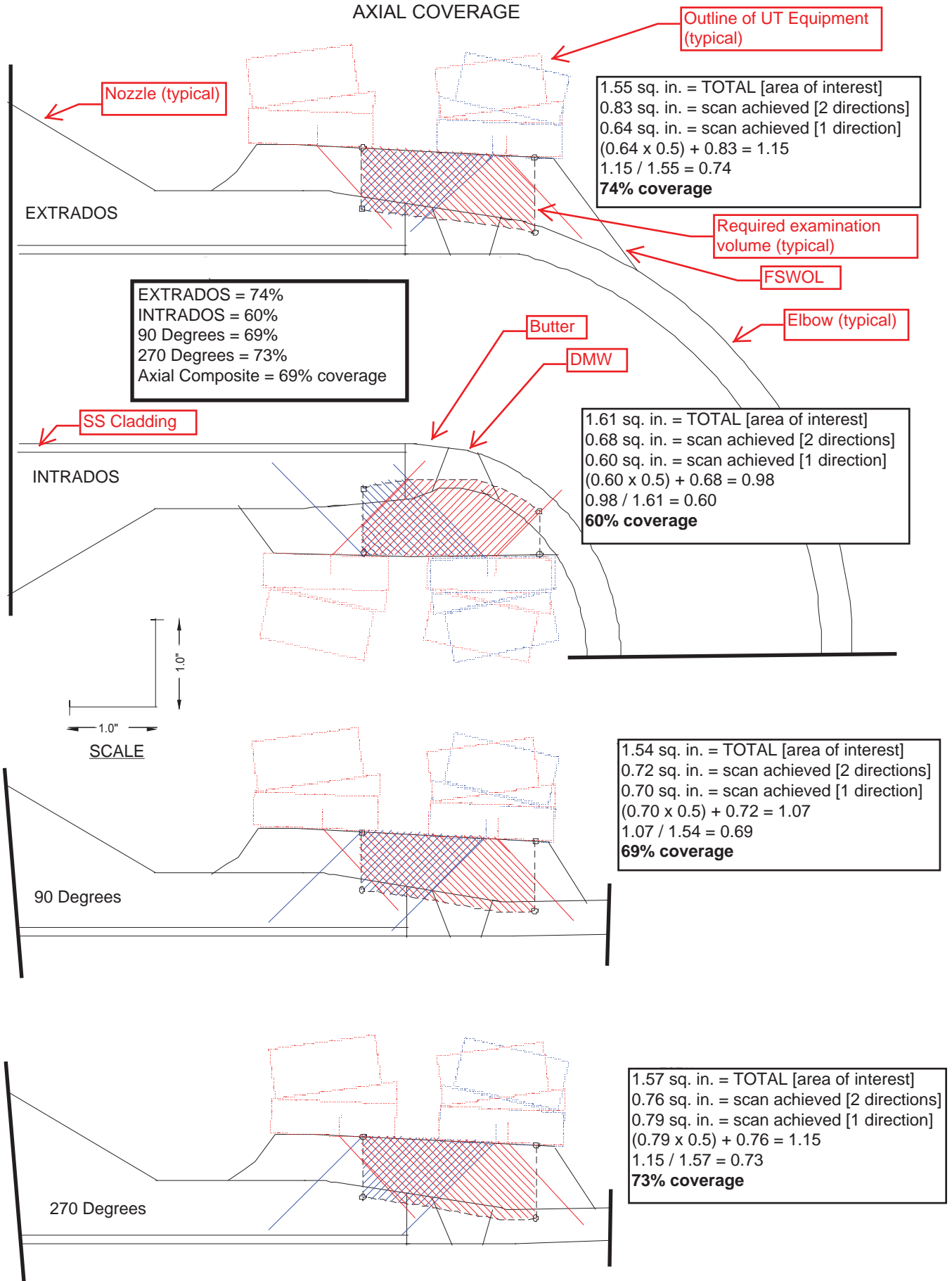


Figure 3
1-2 RCS COLD LEG DRAIN NOZZLE
RC-40-CCA-18-3-FW9 OVERLAY
CIRCUMFERENTIAL COVERAGE

Outline of UT Equipment (typical)

FSWOL

Nozzle (typical)

EXTRADOS

Section	Total Area (sq. in.)	Coverage (sq. in.)		Scan Coverage (ACTUAL / TOTAL)
		50%	100%	
CS Nozzle Base Material	0.08	N/A	0.08	100%
Susceptible Weld Metal	0.13	N/A	0.12	92%
SS Elbow Base Material	0.04	N/A	0.0	0%
FSWOL Material	1.31	N/A	0.98	74%

EXTRADOS

Required examination volume (typical)

Butter

DMW

Elbow (typical)

SS Cladding

INTRADOS

INTRADOS

Section	Total Area (sq. in.)	Coverage (sq. in.)		Scan Coverage (ACTUAL / TOTAL)
		50%	100%	
CS Nozzle Base Material	0.09	N/A	0.09	100%
Susceptible Weld Metal	0.14	N/A	0.11	78%
SS Elbow Base Material	0.11	N/A	N/A	0%
FSWOL Material	1.27	N/A	0.92	72%

90 Degrees

90 Degrees

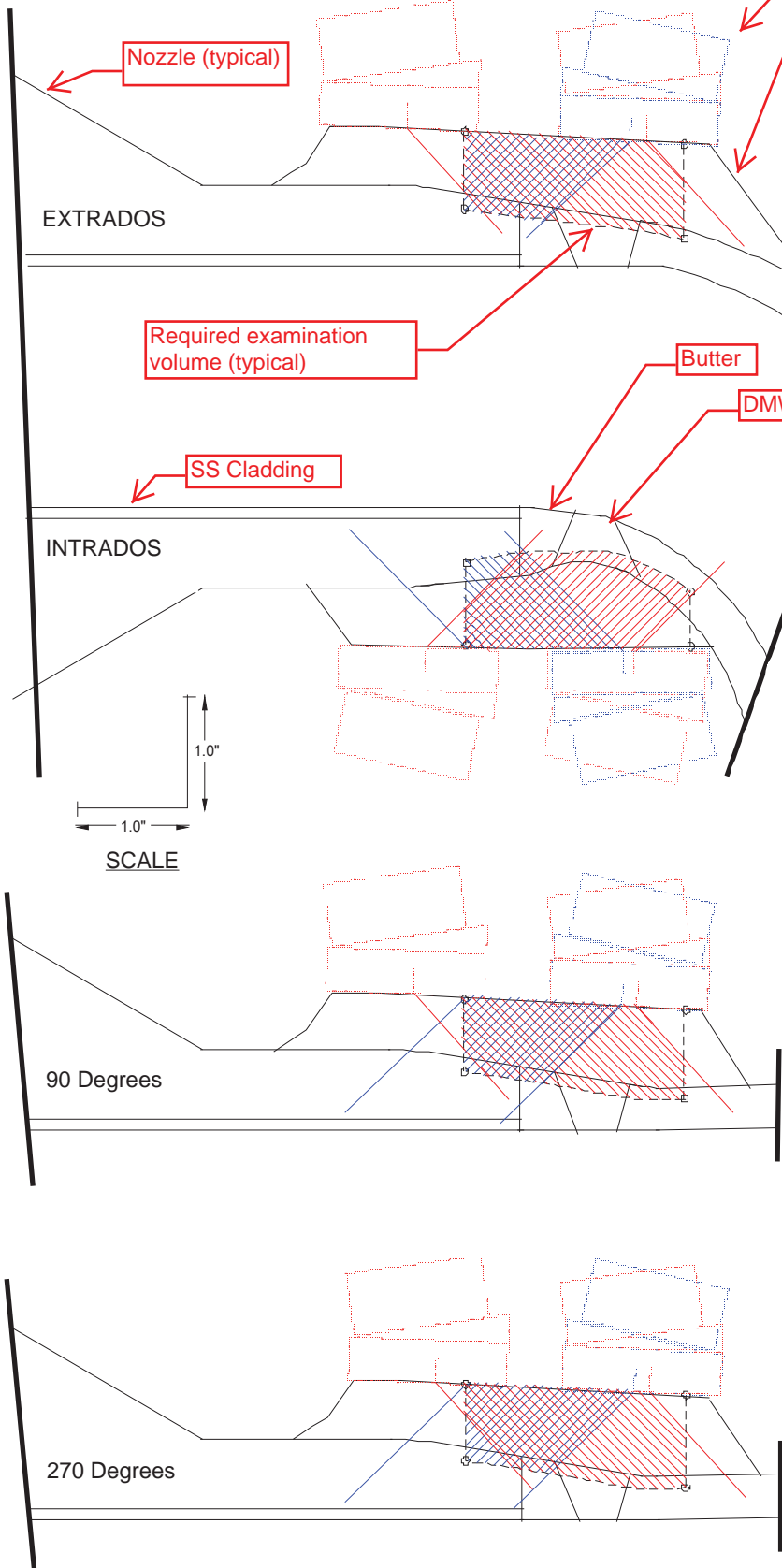
Section	Total Area (sq. in.)	Coverage (sq. in.)		Scan Coverage (ACTUAL / TOTAL)
		50%	100%	
CS Nozzle Base Material	0.07	N/A	0.07	100%
Susceptible Weld Metal	0.12	N/A	0.11	91%
SS Elbow Base Material	0.06	N/A	0.00	0%
FSWOL Material	1.27	N/A	0.89	70%

270 Degrees

270 Degrees

Section	Total Area (sq. in.)	Coverage (sq. in.)		Scan Coverage (ACTUAL / TOTAL)
		50%	100%	
CS Nozzle Base Material	0.06	N/A	0.06	100%
Susceptible Weld Metal	0.13	N/A	0.13	100%
SS Elbow Base Material	0.06	N/A	0.00	0%
FSWOL Material	1.32	N/A	0.97	73%

Figure 4
1-2 RCS COLD LEG DRAIN NOZZLE
RC-40-CCA-18-3-FW9 OVERLAY
AXIAL COVERAGE



EXTRADOS

Section	Total Area (sq. in.)	Coverage (sq. in.)		Scan Coverage (ACTUAL / TOTAL)
		50%	100%	
CS Nozzle Base Material	0.08	N/A	0.08	100%
Susceptible Weld Metal	0.13	0.09	0.04	65%
SS Elbow Base Material	0.04	0.04	N/A	50%
FSWOL Material	1.31	0.53	0.7	73%

INTRADOS

Section	Total Area (sq. in.)	Coverage (sq. in.)		Scan Coverage (ACTUAL / TOTAL)
		50%	100%	
CS Nozzle Base Material	0.09	0.07	0.03	72%
Susceptible Weld Metal	0.14	0.11	0.05	75%
SS Elbow Base Material	0.11	0.09	N/A	40%
FSWOL Material	1.27	.54	0.64	71%

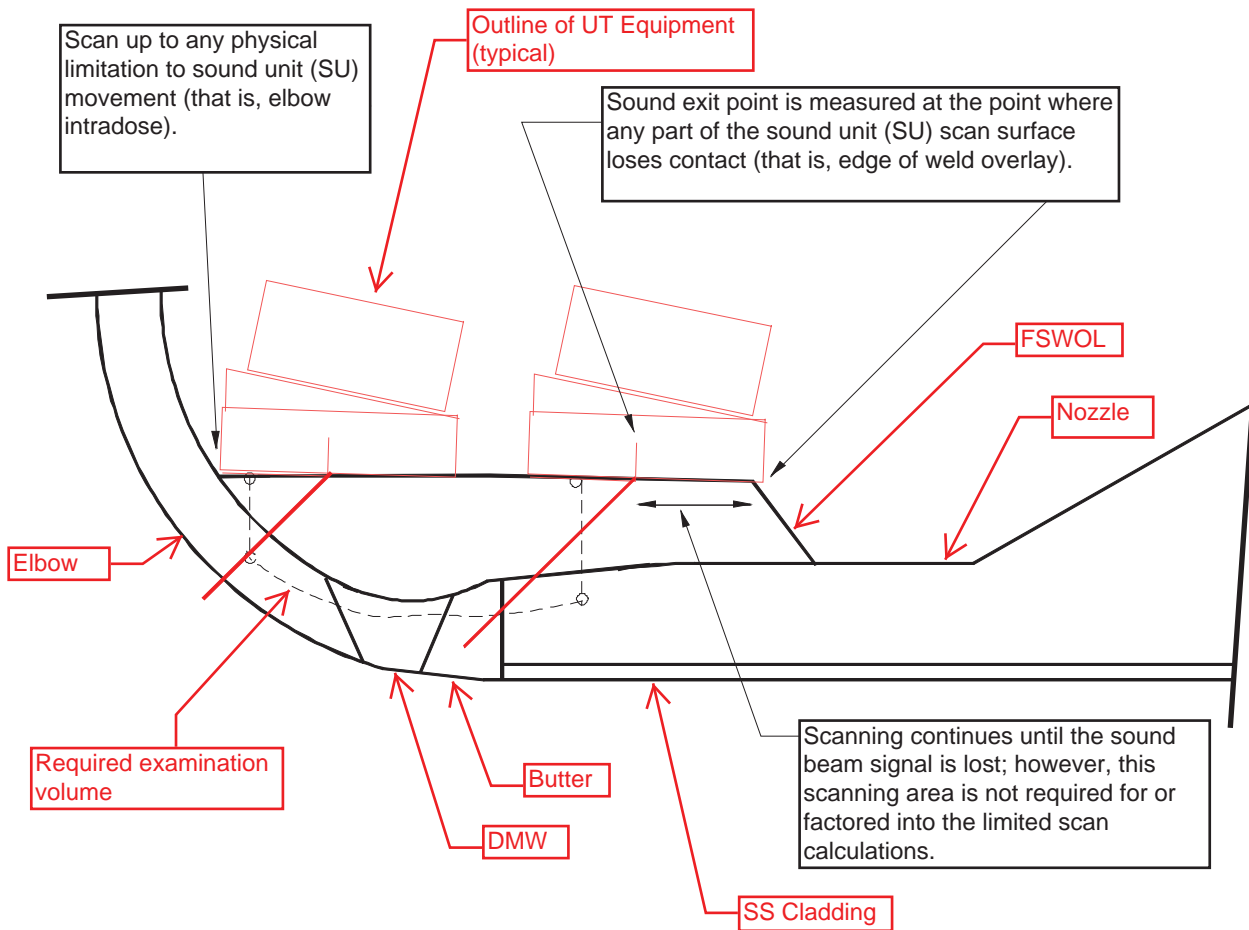
90 Degrees

Section	Total Area (sq. in.)	Coverage (sq. in.)		Scan Coverage (ACTUAL / TOTAL)
		50%	100%	
CS Nozzle Base Material	0.07	N/A	0.07	100%
Susceptible Weld Metal	0.12	0.09	0.03	62%
SS Elbow Base Material	0.06	0.06	N/A	50%
FSWOL Material	1.27	0.52	0.65	71%

270 Degrees

Section	Total Area (sq. in.)	Coverage (sq. in.)		Scan Coverage (ACTUAL / TOTAL)
		50%	100%	
CS Nozzle Base Material	0.06	0.04	0.02	66%
Susceptible Weld Metal	0.13	0.09	0.04	65%
SS Elbow Base Material	0.06	0.06	N/A	50%
FSWOL Material	1.32	0.58	0.70	75%

Figure 5 - Example of Methodology for Limited Scanning Measurements



Enclosure
L-13-197

Performance Demonstration Initiative Program
Performance Demonstration Qualification Summary (PDQS) No. 651

(3 pages total)

Performance Demonstration Initiative Program

In Accordance with the PDI Implementation of Section XI, Appendix VIII

Printed: 31-Jan-13

PDQS No: 651

Specific Details of Qualifications

Owner: EPRI NDE CENTER

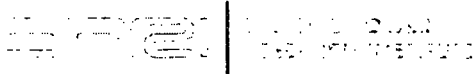
Procedure: EPRI-WOL-PA-1; Revision: 2; Addenda: 0

Procedure for Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds

PDQS Rev:	3	Hardware:	N/A
Date of Issue:	30-Jan-13	Acquisition SW Type/Rev:	N/A
Category:	Overlay	Analysis SW Type/Rev:	N/A
Scan Application:	Manual		

Ranges Demonstrated:

Date:	08-Feb-10
MinDiam:	2.00
MinThick:	0.15
MaxDiam:	28.00
MaxThick:	1.10
Material: Austenitic	
Examination: Overlay	
Access: Dual	
Weld Crown Condition:	
Short Range Roughness: ≥ 250 RMS	
Long Range Roughness: $\leq 1/32$ Gap	
Under Search Unit For Entire Length of Scan	



Performance Demonstration Initiative Program

Printed: 31-Jan-13

PERFORMANCE DEMONSTRATION PROGRAM

In Accordance with the PDI Implementation of Section XI, Appendix VIII

PDQS No: 651

Specific Details of Qualifications

Owner: EPRI NDE CENTER

Procedure: EPRI-WOL-PA-1; Revision: 2; Addenda: 0

Procedure for Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds

PDQS Rev:	3	Hardware:	N/A
Date of Issue:	30-Jan-13	Acquisition SW Type/Rev:	N/A
Category:	Overlay	Analysis SW Type/Rev:	N/A
Scan Application:	Manual		

Tolerances for field applications as follows:

Diameter:

Pipe diameters within a range of 0.9 to 1.5 times the nominal diameter demonstrated shall be considered equivalent.

Diameters greater than 24" need not be demonstrated.

Thickness:

Lower: 0.100" can be subtracted from the minimum overlay thickness demonstrated.

Upper: 0.250" can be added to the maximum overlay thickness demonstrated.

- Comments:**
- 1 Candidates qualified to earlier revisions of this procedure are qualified to use this revision.
 - 2 See procedure Table 1 and Table 2 for qualified search unit / instrument combinations and essential variable settings.
 - 3 For PSI axial examinations of the overlay material, 100% coverage can be claimed if the entire examination volume is covered from at least one direction.
 - 4 For PSI circumferential examinations of the overlay material, 100% coverage can be claimed if the entire examination volume is covered from two directions.
 - 5 For ISI examinations, 100% percent coverage may be claimed when the required volume is examined from 2 directions in both the circ. and axial scan directions.
 - 6 For ISI examinations of component diameters $\geq 4"$ (pre-overlay), examination coverage may be claimed when the required volume is examined with angles $\geq 25^\circ$.
 - 7 For ISI examinations of component diameters $< 4"$ (pre-overlay), examination coverage may be claimed when the required volume is examined with angles $\geq 45^\circ$.
 - 8 The Appendix VIII demonstration requirements applicable to this procedure do not contain provisions to demonstrate sizing of axial flaws. When required, the techniques described for circumferential flaw sizing shall be used for axial flaw sizing.
- Limitations:**
- 1 This procedure/candidate is not qualified for establishing the through wall dimension of flaws contained within the weld overlay material. However, establishing the remaining ligament above a flaw tip is qualified.
 - 2 This procedure/candidate is not qualified for detection, length or depth sizing of flaws contained within the base material of cast stainless steel components.

Performance Demonstration Initiative Program

In Accordance with the PDI Implementation of Section XI, Appendix VIII

Printed: 31-Jan-13

PDQS No: 651

Specific Details of Qualifications


Owner: EPRI NDE CENTER

Procedure: EPRI-WOL-PA-1; Revision: 2; Addenda: 0

Procedure for Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds

PDQS Rev:	3	Hardware:	N/A
Date of Issue:	30-Jan-13	Acquisition SW Type/Rev:	N/A
Category:	Overlay	Analysis SW Type/Rev:	N/A
Scan Application:	Manual		

The above procedure has met the requirements of The Performance Demonstration Initiative's Implementation of The American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Appendix VIII, as stated in this document.



Date: 2/2/2013

John Langevin
Performance Demonstration Initiative
Piping Supervisor/Level III



Date: 2/4/2013

Ronald V. Swain
Performance Demonstration Initiative
Piping Project Manager