INDIANA MICHIGAN POWER
A unit of American Electric Power

Indiana Michigan Power
Cook Nuclear Plant
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Bridgman, MI 49106
AEP.com

June 23, 2006

AEP:NRC:6055-07
10 CFR 50.55a

Docket No: 50-316

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Unit 2
PROPOSED ALTERNATIVE TO THE AMERICAN SOCIETY
OF MECHANICAL ENGINEERS CODE, SECTION XI
SUPPLEMENTAL INFORMATION

Reference: Letter from Joseph N. Jensen, Indiana Michigan Power Company, to Nuclear Regulatory Commission Document Control Desk, "Donald C. Cook Nuclear Plant Unit 2, Proposed Alternative to the American Society of Mechanical Engineers Code, Section XI Repair Requirements, Request for Additional Information," AEP:NRC:6055, Accession Number ML060620063, dated March 1, 2006.

The referenced letter provided Indiana Michigan Power Company's (I&M's) proposed alternative to the repair requirements of the American Society of Mechanical Engineers Code, Section XI repair requirements. I&M's alternative proposed applying preemptive weld overlays over dissimilar metal welds that connect the Donald C. Cook Nuclear Plant Unit 2 pressurizer nozzles to stainless steel safe ends. The alternative proposed the use of Code Case N-638-1 with modifications. One modification was to perform an ultrasonic examination (UT) of the 1.5T band, a region of the nozzle adjacent to the overlay, to the extent practical.

During a March 21, 2006, telephone conversation, I&M informed Nuclear Regulatory Commission (NRC) personnel that I&M was having difficulty locating calibration blocks and fabricating new calibration blocks to meet the requirements of Code Case N-638-1 and SA-388, "Recommended Practice for Ultrasonic Testing and Inspection of Heavy Steel Forgings," a standard required to be met when following Code Case N-638-1. I&M agreed to perform a "best effort" examination, and to provide the NRC with a basis for not meeting the requirements of SA-388, and to provide updated weld schematics showing the actual amount of UT coverage obtained during the examination.

During the telephone conversation, I&M was asked to provide available information about weld-wire chemical testing following the processing of Alloy 52M billets into weld wire (Note: The

A047

weld wire is designated as Alloy 52MS; the "S" denotes the process used to process the billet into weld wire). The justification for the examinations performed is provided in Attachment 1. The summaries of the examinations performed are provided in Attachment 2, and the weld-wire chemical testing data are provided in Attachment 3.

This letter contains no new commitments. Should you have any questions, please contact Ms. Susan D. Simpson, Regulatory Affairs Manager, at (269) 466-2428.

Sincerely,

Joseph N. Jensen
Site Support Services Vice President

RV/rdw

Attachments: 1. Preemptive Weld Overlay, Basis for Examination
2. Examination Summaries
3. Weld Wire 52MS, Certification of Chemical Overcheck Sheet

c: R. Aben – Department of Labor and Economic Growth
J. L. Caldwell – NRC Region III
K. D. Curry – AEP Ft. Wayne
J. T. King – MPSC
MDEQ – WHMD/RPMWS
NRC Resident Inspector
P.S. Tam – NRC Washington, DC

Attachment 1 to AEP:NRC:6055-07

PREEMPTIVE WELD OVERLAY
BASIS FOR EXAMINATION

The referenced letter provided Indiana Michigan Power Company's (I&M's) proposed alternative to the repair requirements of the American Society of Mechanical Engineers Code, (ASME) Section XI repair requirements. I&M's alternative proposed applying preemptive weld overlays (PWOLs) over dissimilar metal welds that connect the Donald C. Cook Nuclear Plant (CNP) Unit 2 pressurizer nozzles to stainless steel safe ends. The alternative proposed the use of Code Case N-638-1 with modifications. One modification was to perform an ultrasonic examination (UT) of the 1.5T band, a region of the nozzle adjacent to the overlay, to the extent practical.

During a March 21, 2006, telephone conversation, I&M informed Nuclear Regulatory Commission (NRC) personnel that I&M was having difficulty locating calibration blocks and fabricating new calibration blocks to meet the requirements of N-638-1 and SA-388, "Recommended Practice for Ultrasonic Testing and Inspection of Heavy Steel Forgings," a standard required to be met when following Code Case N-638-1. I&M agreed to perform a "best effort" examination, and to provide the NRC with a basis for not meeting the requirements of SA-388. The basis for not meeting the requirements of SA-388 is provided below.

Code Case N-638-1 addresses the use of the temper bead welding technique. The weld overlays applied to the CNP Unit 2 pressurizer safe end to nozzle welds used this technique on the ferritic nozzle base material adjacent to the dissimilar metal welds (A-82/182 material).

The 1.5T band on the ferritic nozzle material adjacent to the PWOL is required by Code Case N-638-1 to be examined using the requirements of Appendix I of ASME Section XI, which specifies the use of ASME Section V, T-541.2.2 which states, "The calibration requirements shall be in accordance with the applicable standard listed in T-541.2."

T-541.2 requires examination to SA-388. SA-388, Paragraph 7.3.3 states, "A separate calibration standard may be used; however, it shall have the same nominal composition, heat treatment, and thickness as the forging it represents."

Additionally, SA-388 requires that a 3 percent inside diameter (ID) and outside diameter (OD) notch be placed in the calibration block. The amplitude response from the ID notch is set at 75 percent of Full Screen Height and, with the same instrument setting, the OD notch amplitude response is identified on the screen. This establishes the reference amplitude curve for the examination. However, SA-388 is applicable to the fabrication process of the nozzle forging prior to the application of cladding on the ID of the forging.

In the case of I&M's application, the ID of the forging is clad with stainless steel which prevents the ultrasonic sound from achieving a "skip" off the cladding for examination of the OD surface. Access to the ID is unattainable without significant and complicated disassembly and reassembly

of the pressurizer manway and the development of remote tooling to access the ID of each nozzle forging. Therefore, it is impractical to meet the requirements of SA-388 for a calibration block and the initial calibration and examination from the ID and OD of an installed nozzle forging with stainless steel cladding.

The UT assures that no adverse effects to the ferritic steel base material were created during the temper bead welding process. The most likely adverse effect would be delayed hydrogen cracking, which would be initiated on the surface on which the welding was performed. For the pressurizer welds, the welding was performed on the outside surface of the ferritic nozzle.

The portion of the ferritic nozzle material below the PWOL is part of the weld overlay examination volume and was examined using performance demonstration initiative qualified ultrasonic procedures. Therefore, the presence of delayed hydrogen cracking would have been detected during the pre-service examination of the PWOL. One-hundred percent of the pre-service examination volume was examined with no detection of any type of cracking in the PWOL examination volume.

I&M has performed a "best effort" UT of the 1.5T band from the OD using standard transducers and calibration techniques that are readily available in the industry. The examination coverages are provided in Attachment 2.

Because delayed hydrogen cracking would most likely occur at the surface of a ferritic component directly under or adjacent to the surface on which the weld is deposited, both a "best effort" UT and a liquid penetrant surface examination of the 1.5T band were performed after completion of the 48-hour hold required by Code Case N-638-1. There were no indications observed from either the "best effort" UT or the liquid penetrant examination.

Based on these results, I&M considers the examinations of the 1.5T band to be acceptable for demonstrating that delayed hydrogen cracking did not occur as a result of the application of the temper bead welding performed to the requirements of Code Case N-638-1.

Reference: Letter from Joseph N. Jensen, I&M, to NRC Document Control Desk, "Donald C. Cook Nuclear Plant Unit 2, Proposed Alternative to the American Society of Mechanical Engineers Code, Section XI Repair Requirements, Request for Additional Information," AEP:NRC:6055, Accession Number ML060620063, dated March 1, 2006.

Attachment 2 to AEP:NRC:6055-07

EXAMINATION SUMMARIES

Table 1

Estimated Coverage for the 1.5T Band Adjacent to Preemptive Weld Overlays

Component	0° Longitudinal (Resultant 30° angle)	25° Shear (Circumferential)	30° Longitudinal (Resultant 0° angle)	30° Shear (Circumferential)	40° (Circumferential)	45° Shear (Axial)	60° Shear (Axial)	Estimated Volume examined with angle beams	
2-PRZ-21	56%	55%	64%	N/A	N/A	35%	21%	Axial	75%
								Circumferential	55%
2-PRZ-22	51%	N/A	37%	46%	N/A	0%*	0%*	Axial	51%
								Circumferential	46%
2-PRZ-23	51%	N/A	37%	46%	N/A	0%*	0%*	Axial	51%
								Circumferential	46%
2-PRZ-24	51%	N/A	37%	46%	N/A	0%*	0%*	Axial	51%
								Circumferential	46%
2-PRZ-25	51%	N/A	37%	46%	N/A	0%*	0%*	Axial	75%
								Circumferential	75%
2-PRZ-26	50%	N/A	50%	N/A	50%	59%	61%	Axial	98%
								Circumferential	50%

*The close proximity of the Nozzle Boss to the Preemptive Weld Overlay prevented transducer contact for 45° and 60° axial examinations

AREVA

DC COOK SPRAY 2-PRZ-21 POST OVERLAY

Coverage plot for Scans with 0 degree transducer

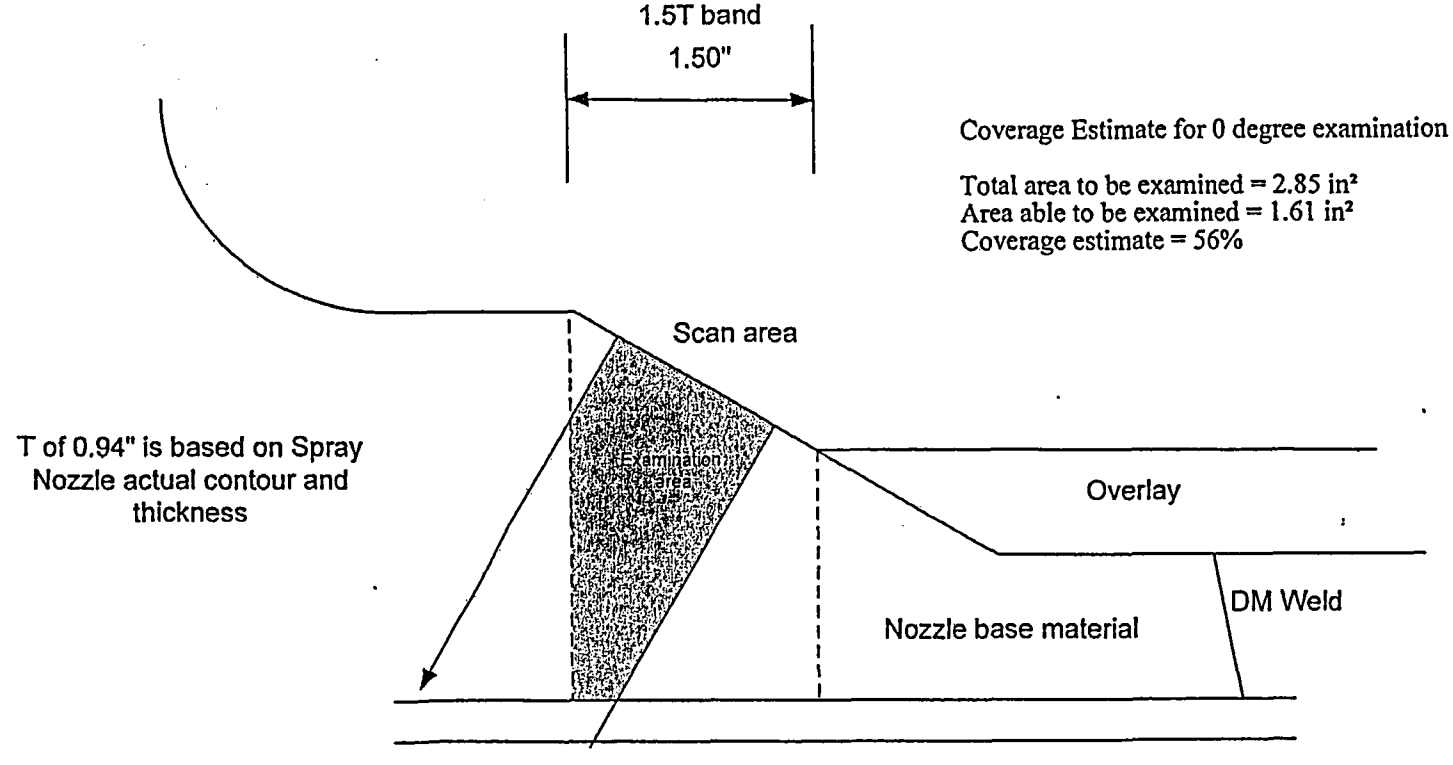

Figure 1

AREVA

DC COOK
SPRAY
2-PRZ-21
POST OVERLAY

Coverage plot for Circ. Scans with 25 degree transducer

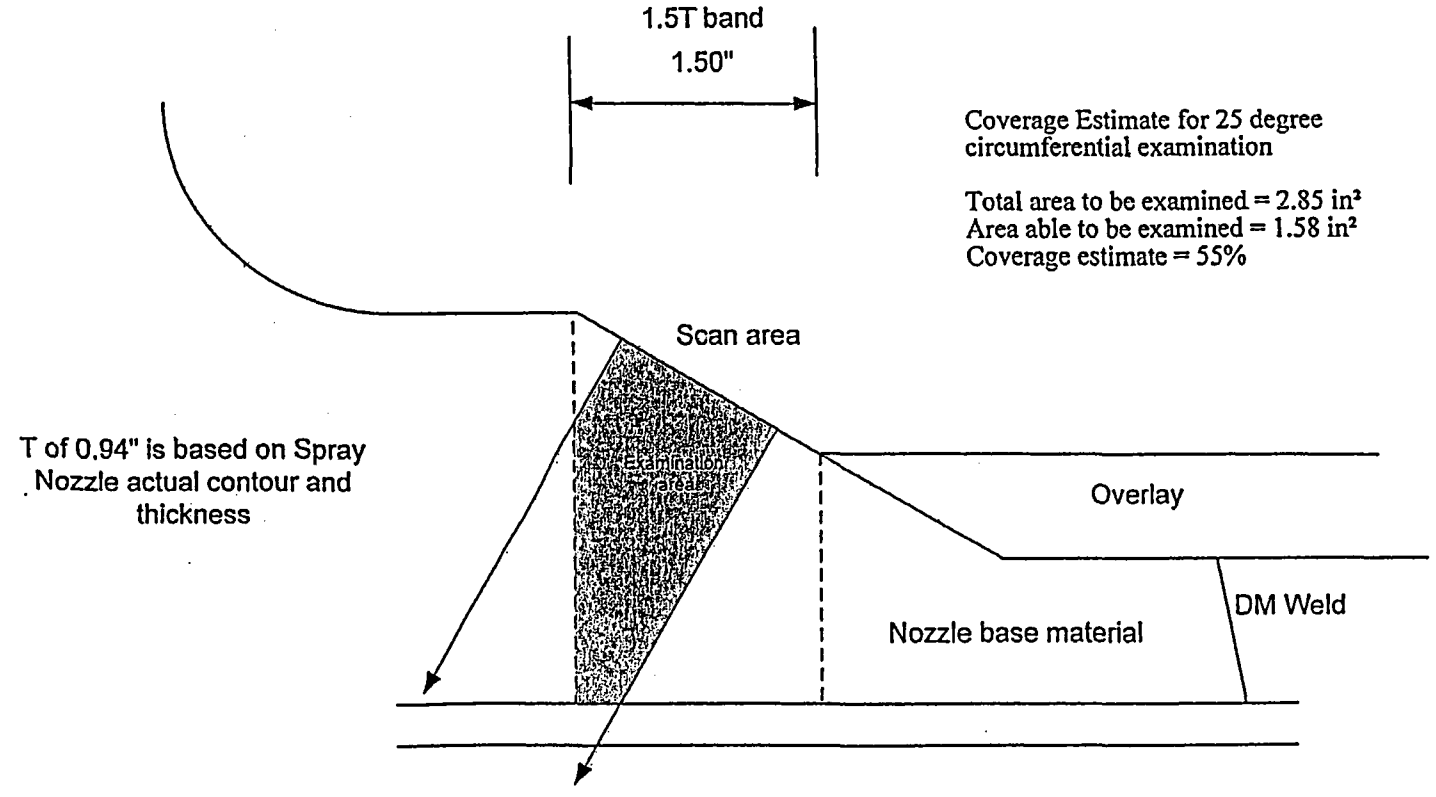

Figure 2

AREVA

DC COOK
SPRAY
2-PRZ-21
POST OVERLAY

Coverage plot for
Scans with 30L degree
transducer

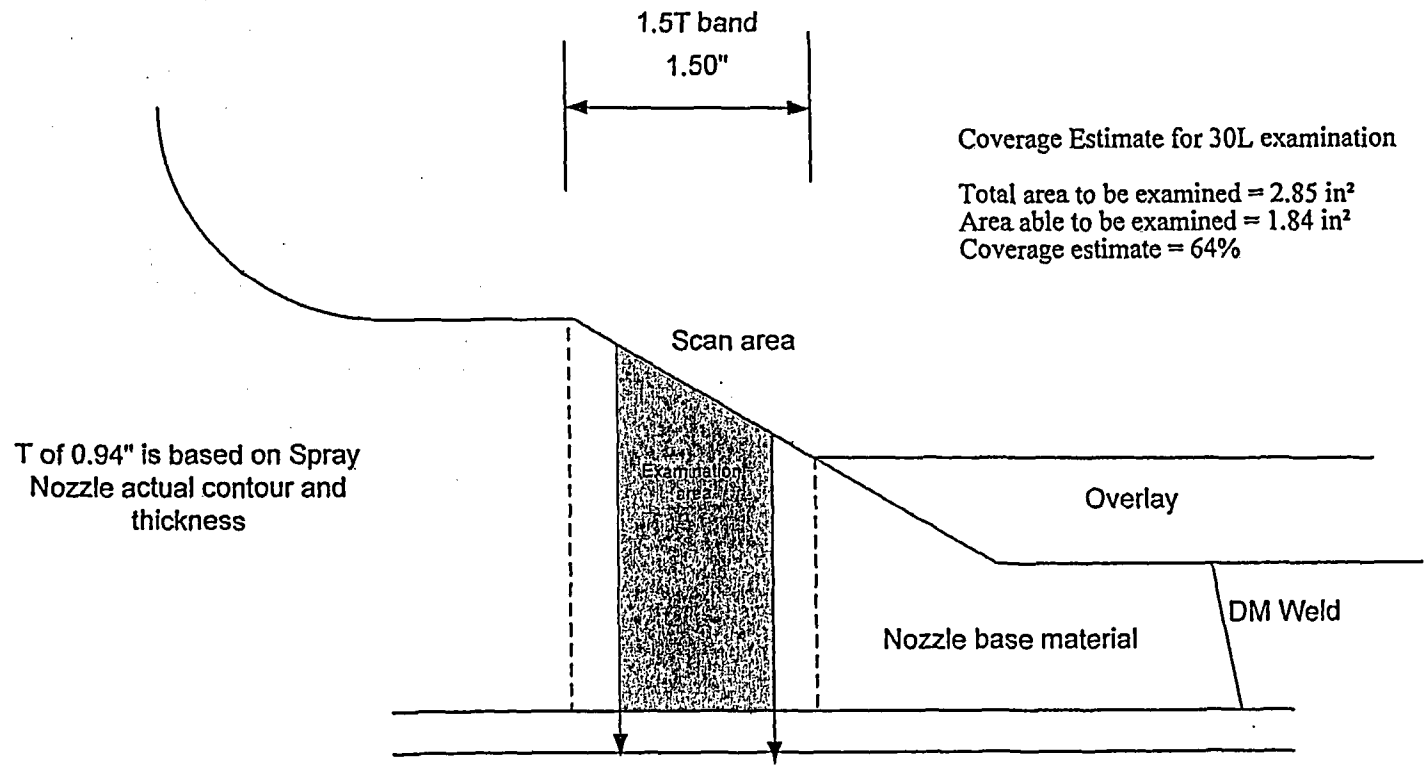

Figure 3

AREVA

DC COOK
SPRAY
2-PRZ-21
POST OVERLAY

Coverage plot for axial scan with 45 degree transducer

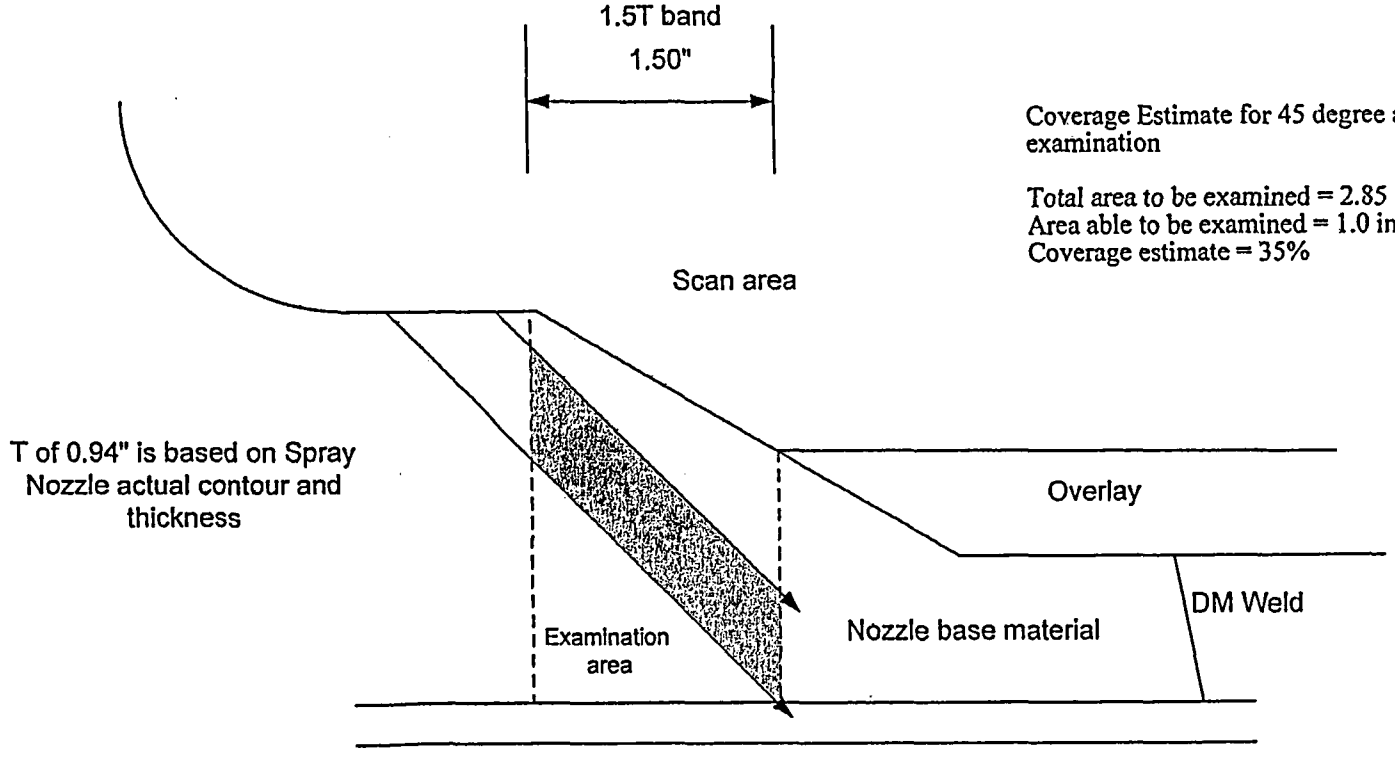

Figure 4

AREVA

DC COOK SPRAY 2-PRZ-21 POST OVERLAY

Coverage plot for axial scan with 60 degree transducer

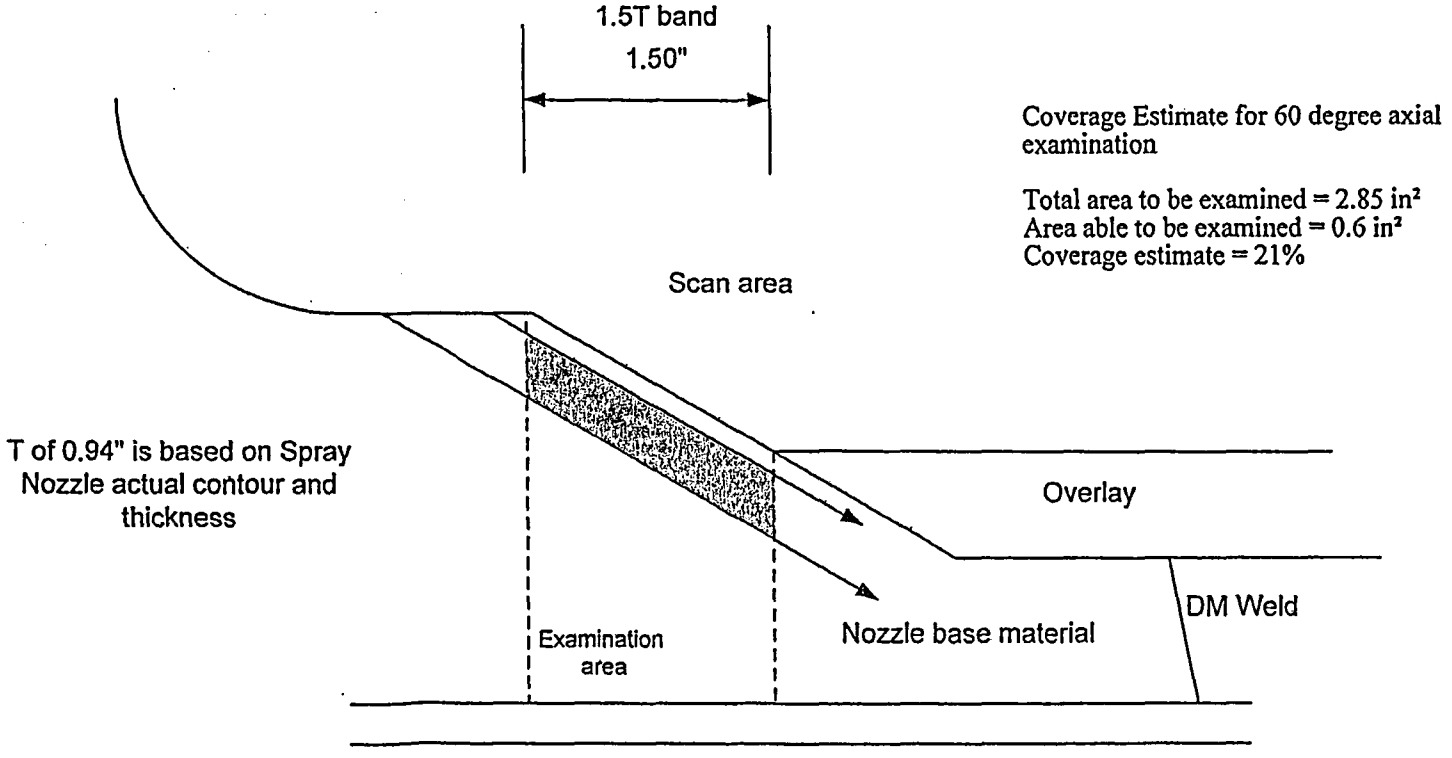

Figure 5

AREVA

DC COOK SAFETY 2-PRZ-22 POST OVERLAY

Coverage plot for 0L degree transducer

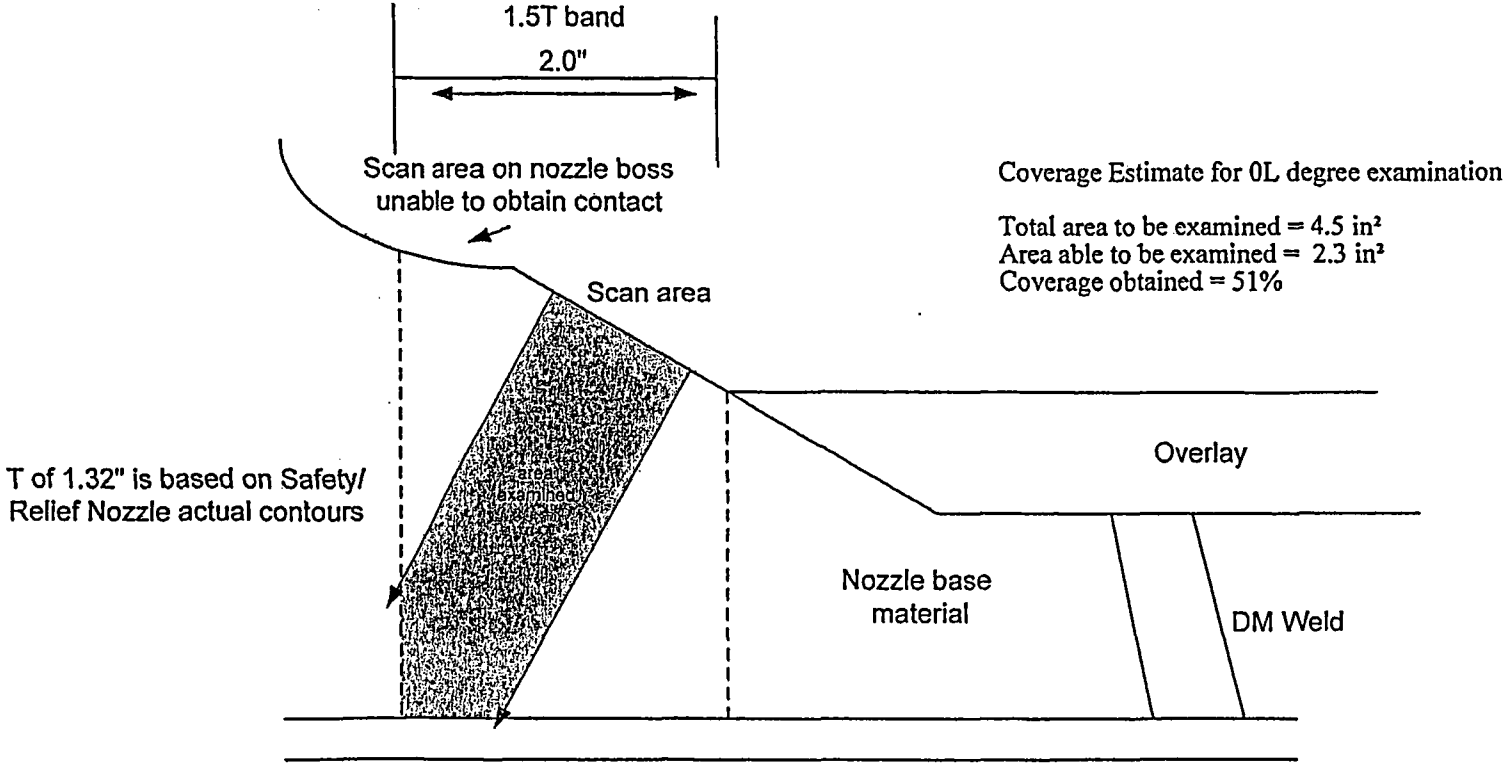

Figure 6

AREVA

DC COOK SAFETY 2-PRZ-22 POST OVERLAY

Coverage plot for 30L degree transducer

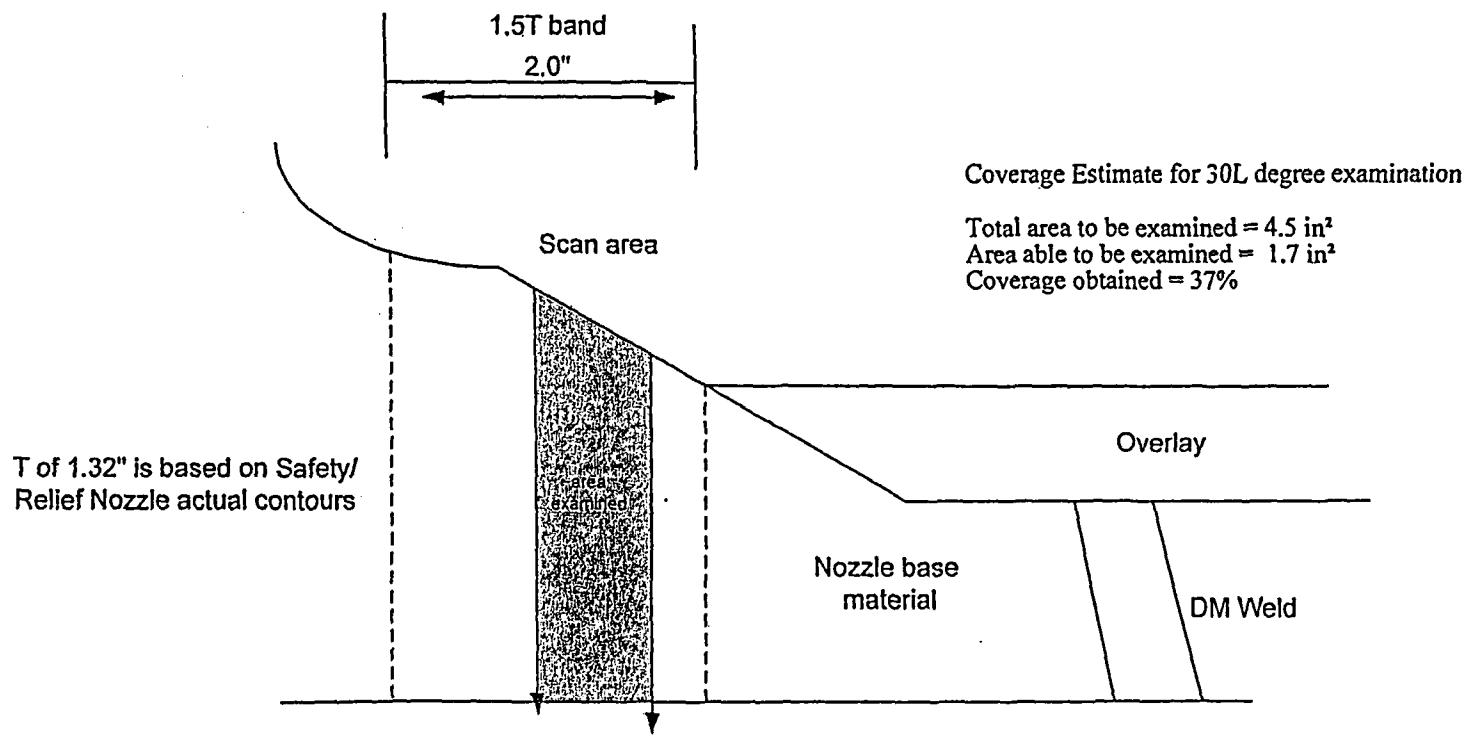

Figure 7

AREVA

DC COOK
SAFETY
2-PRZ-22
POST OVERLAY

Coverage plot for 30s degree transducer for circumferential scans

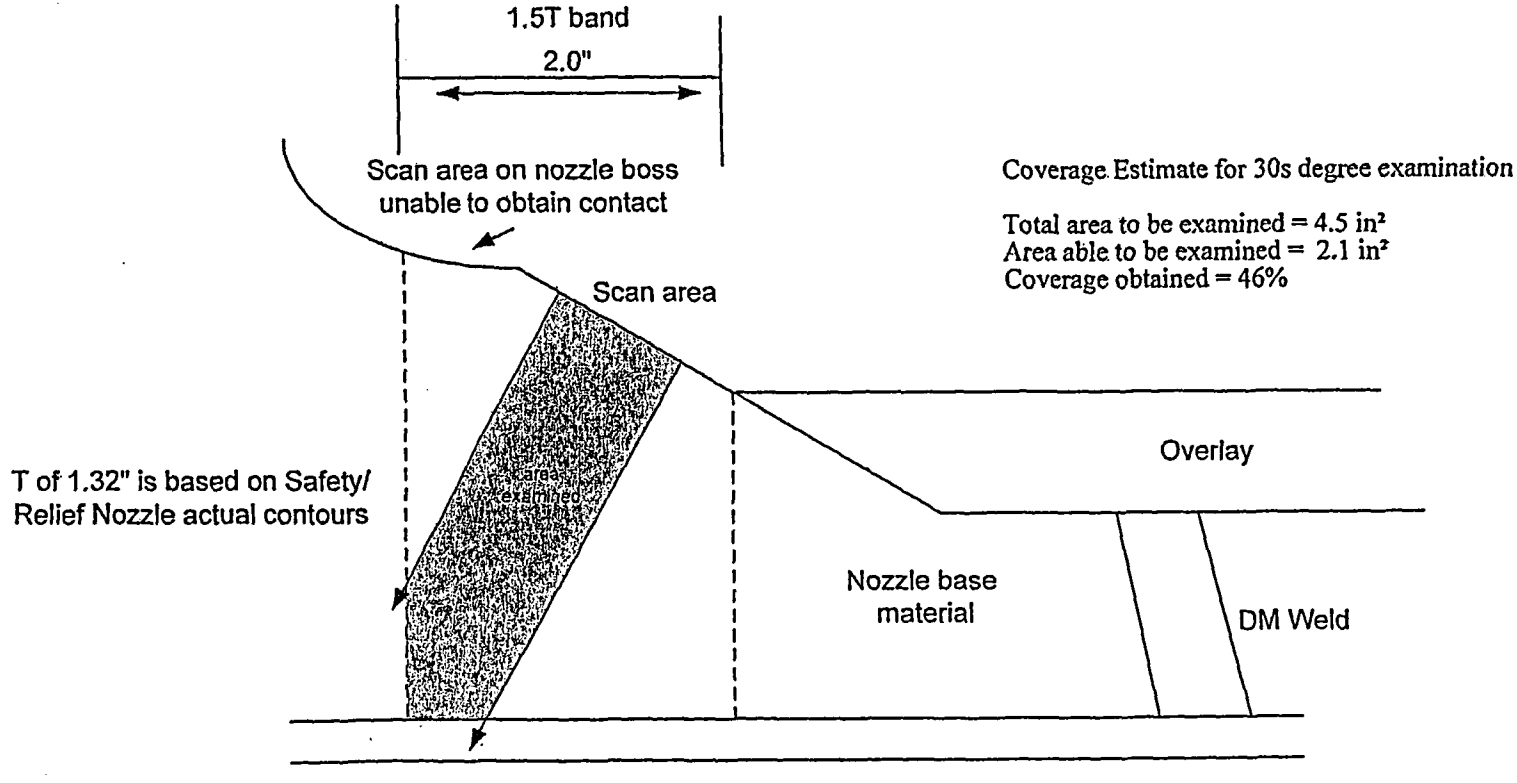

Figure 8

AREVA

DC COOK
SAFETY
2-PRZ-22
POST OVERLAY

Coverage plot for 45 and 60 degree transducers

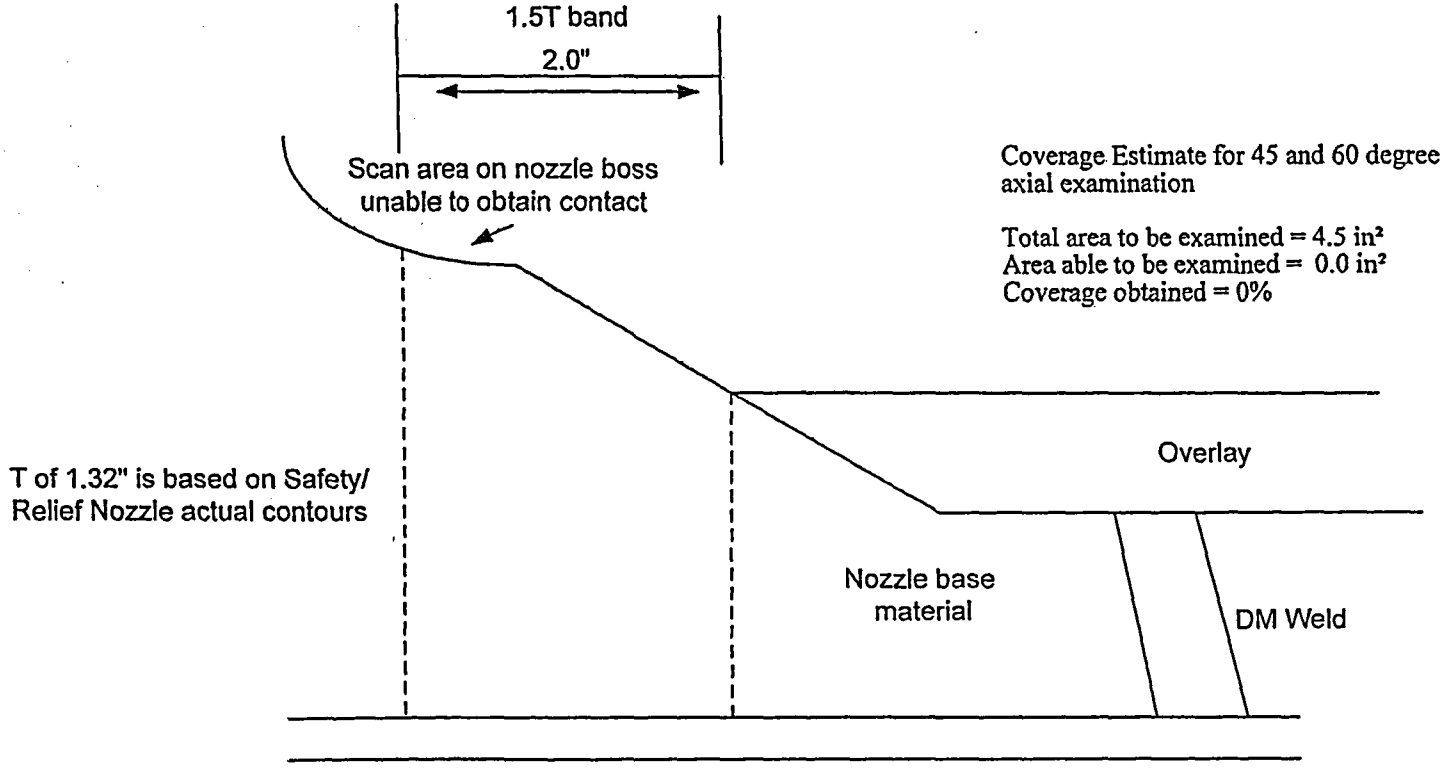

Figure 9

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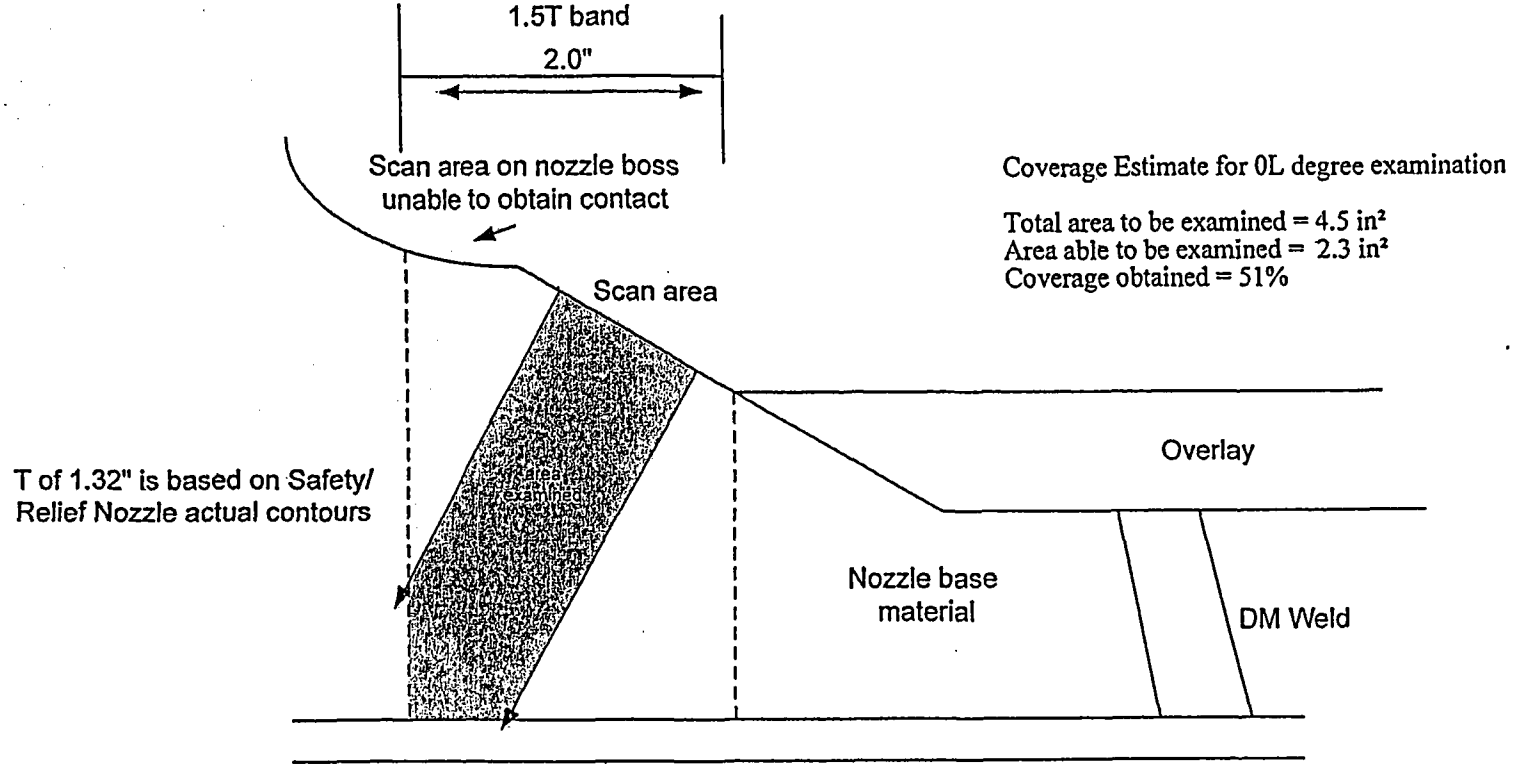
DC COOK
SAFETY
2-PRZ-23
POST OVERLAY

Coverage plot for 0L degree transducer



Coverage Estimate for 0L degree examination

Total area to be examined = 4.5 in²
Area able to be examined = 2.3 in²
Coverage obtained = 51%

Figure 10

AREVA

DC COOK
SAFETY
2-PRZ-23
POST OVERLAY

Coverage plot for 30L degree transducer

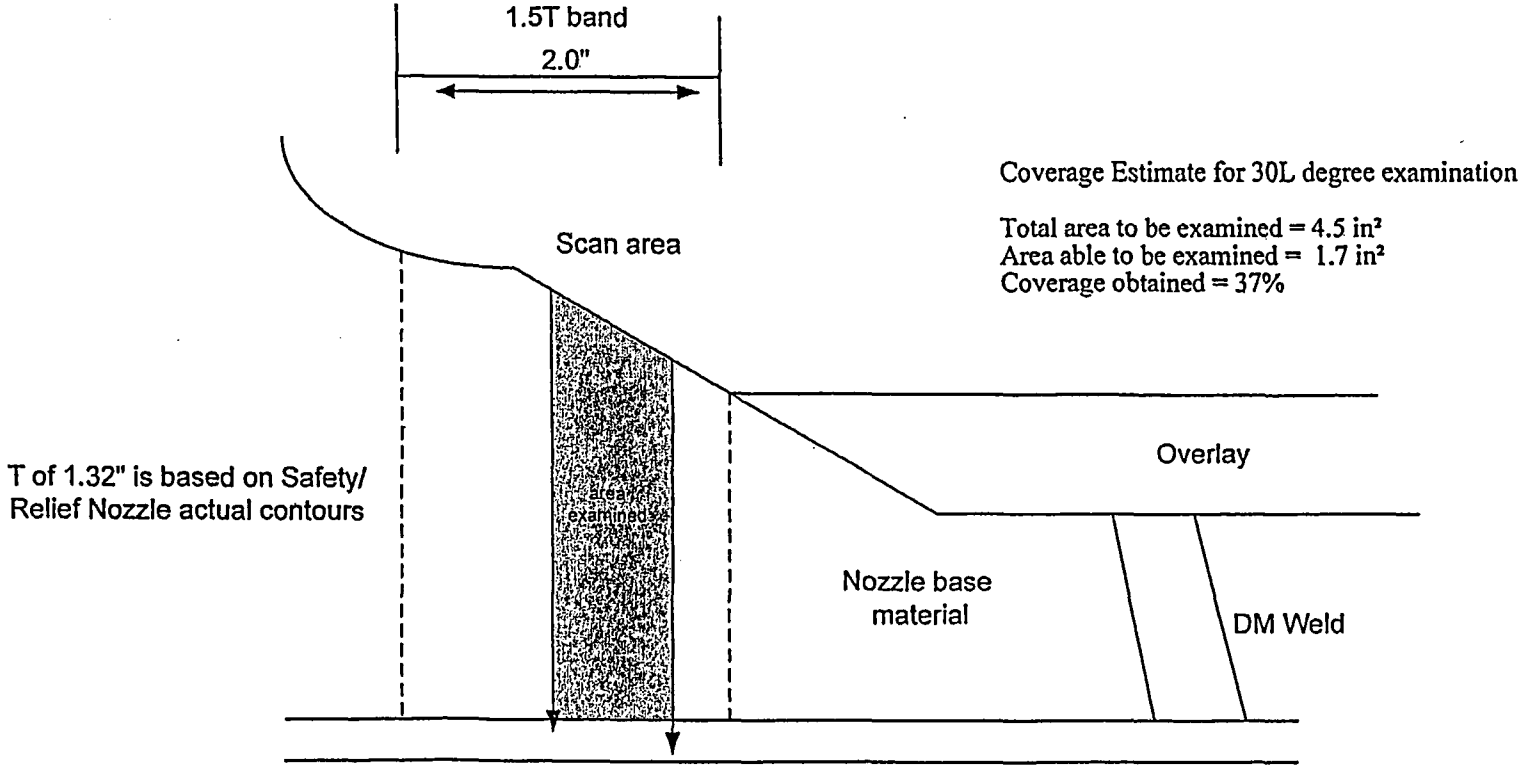


Figure 11

AREVA

DC COOK
SAFETY
2-PRZ-23
POST OVERLAY

Coverage plot for 30s degree transducer for circumferential scans

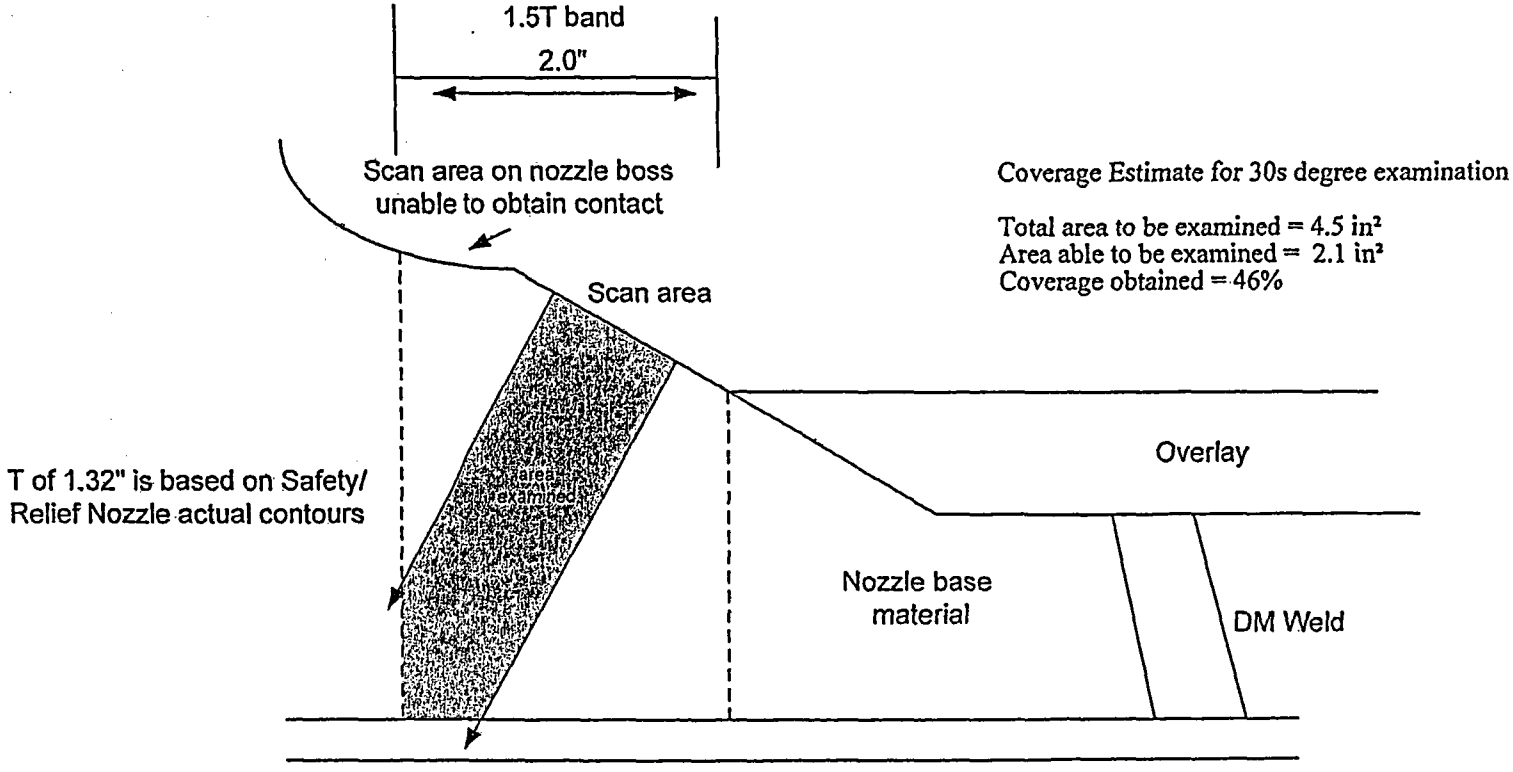


Figure 12

AREVA

DC COOK
SAFETY
2-PRZ-23
POST OVERLAY

Coverage plot for 45 and 60 degree transducers

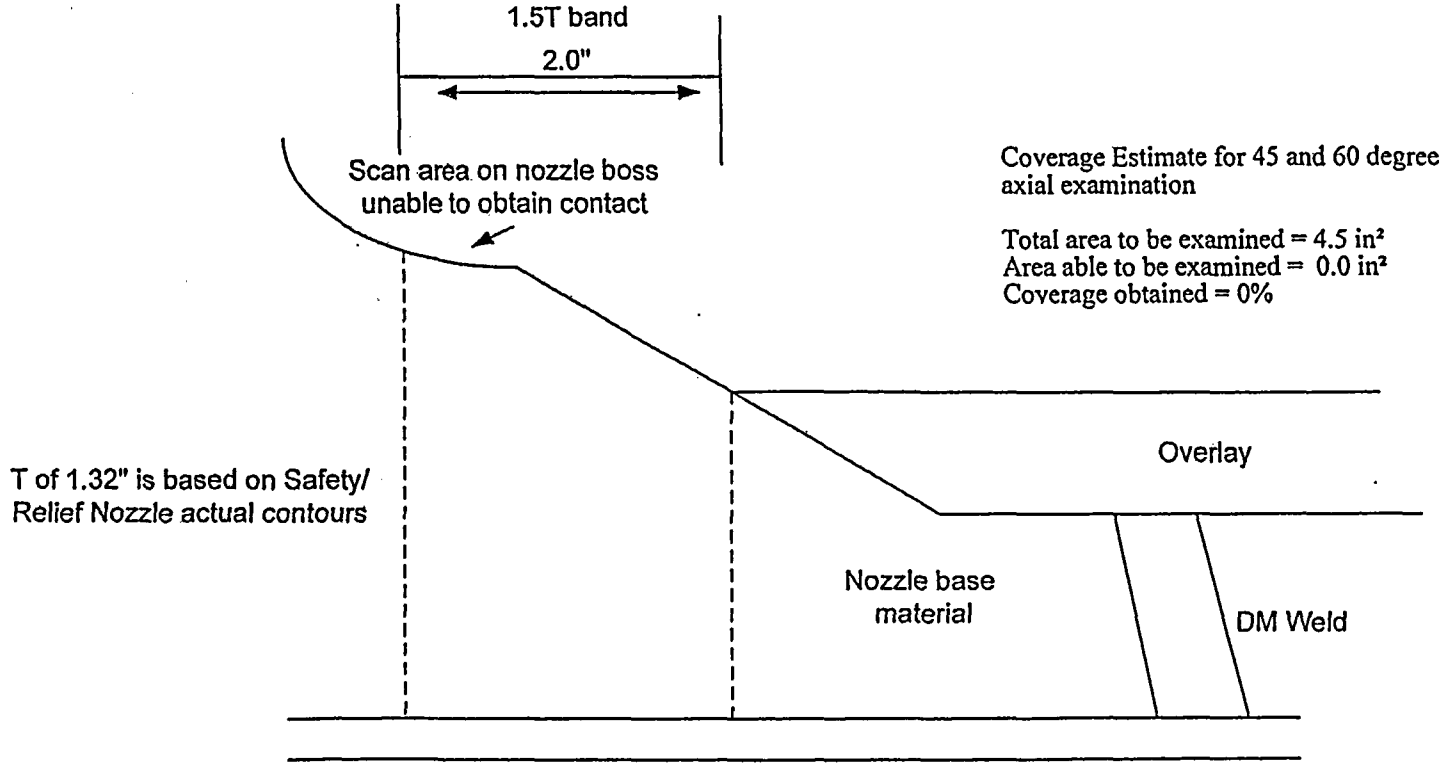


Figure 13

AREVA

DC COOK
SAFETY
2-PRZ-24
POST OVERLAY

Coverage plot for 0L degree transducer

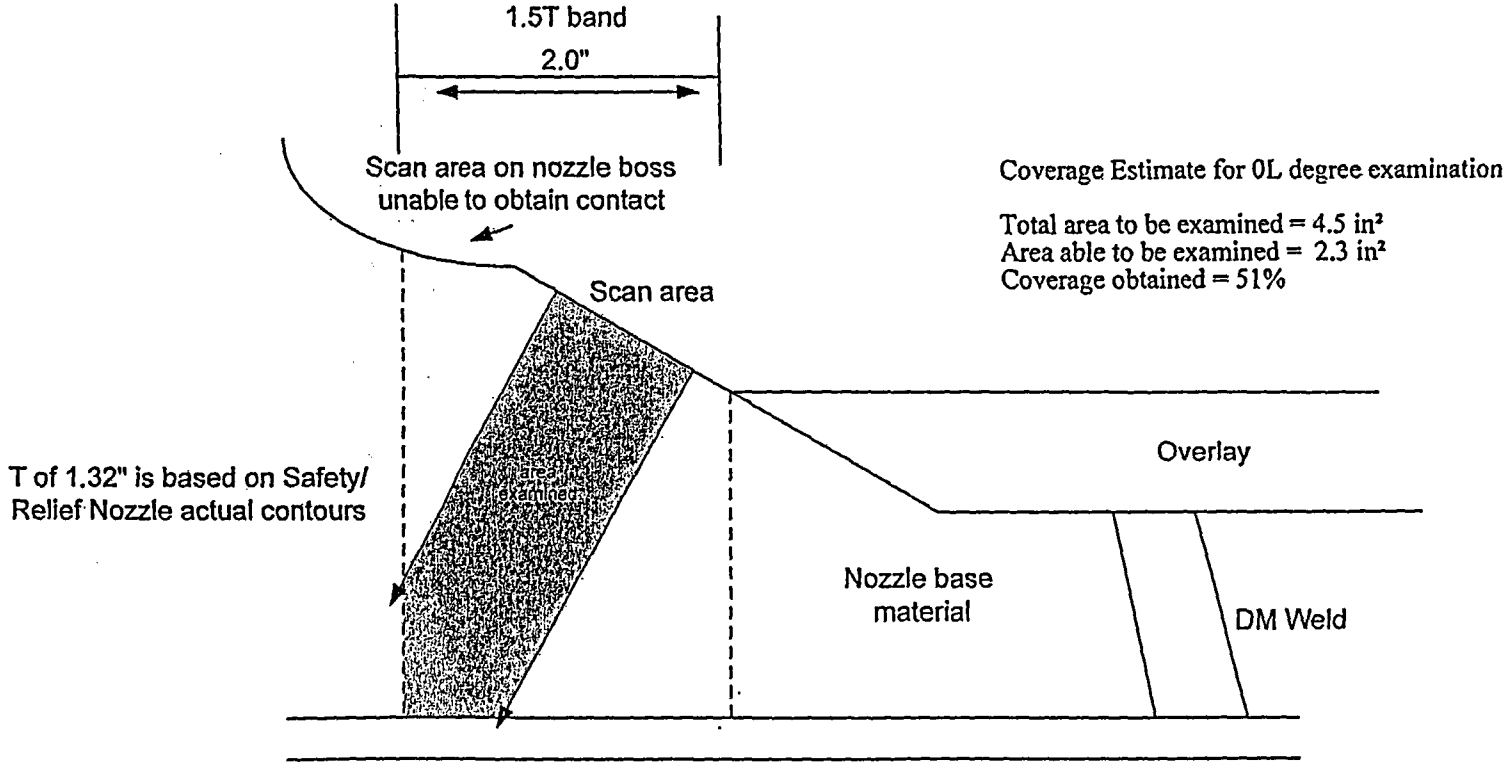


Figure 14

AREVA

DC COOK SAFETY 2-PRZ-24 POST OVERLAY

Coverage plot for 30L degree transducer

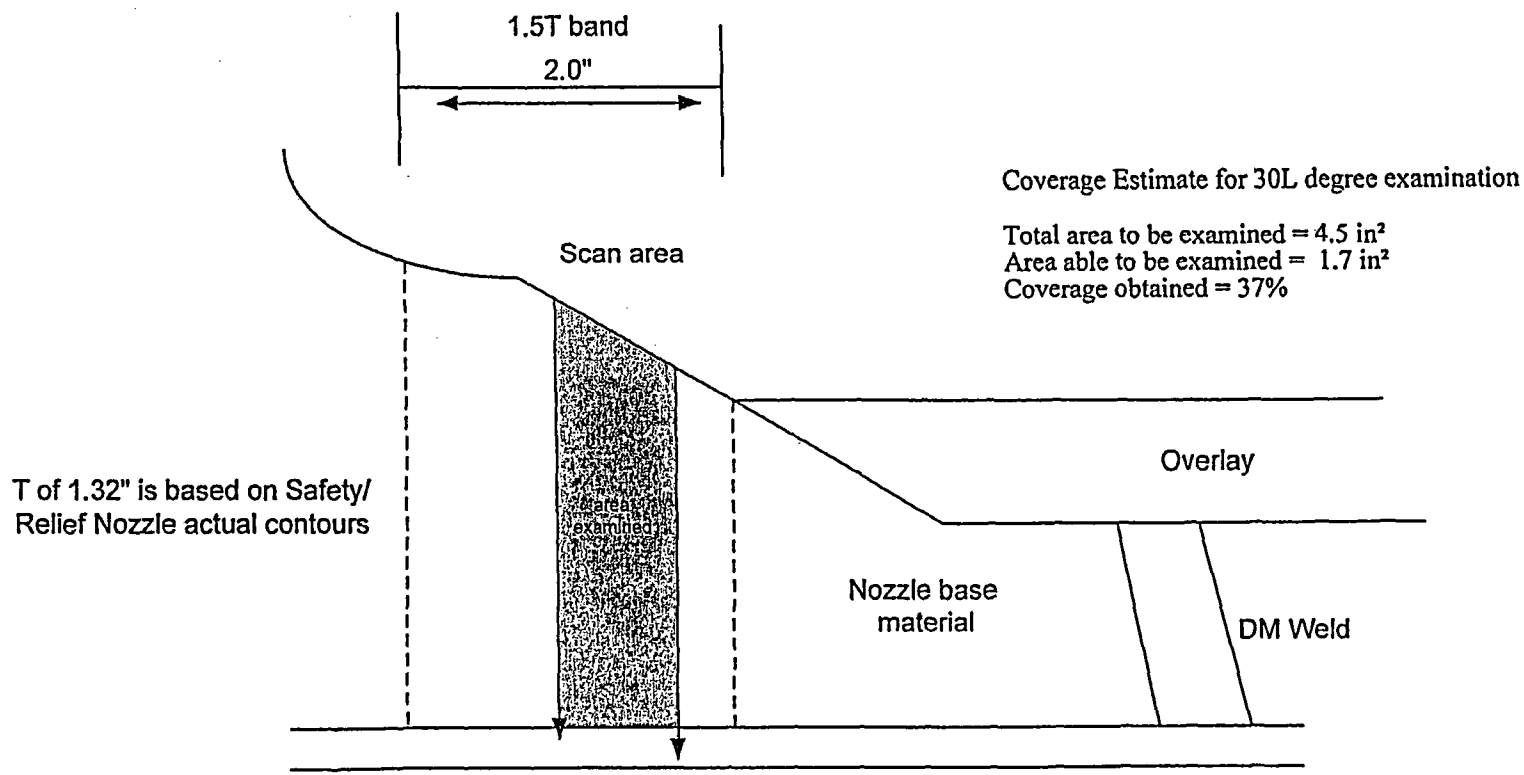


Figure 15

AREVA

DC COOK
SAFETY
2-PRZ-24
POST OVERLAY

Coverage plot for 30s degree transducer for circumferential scans

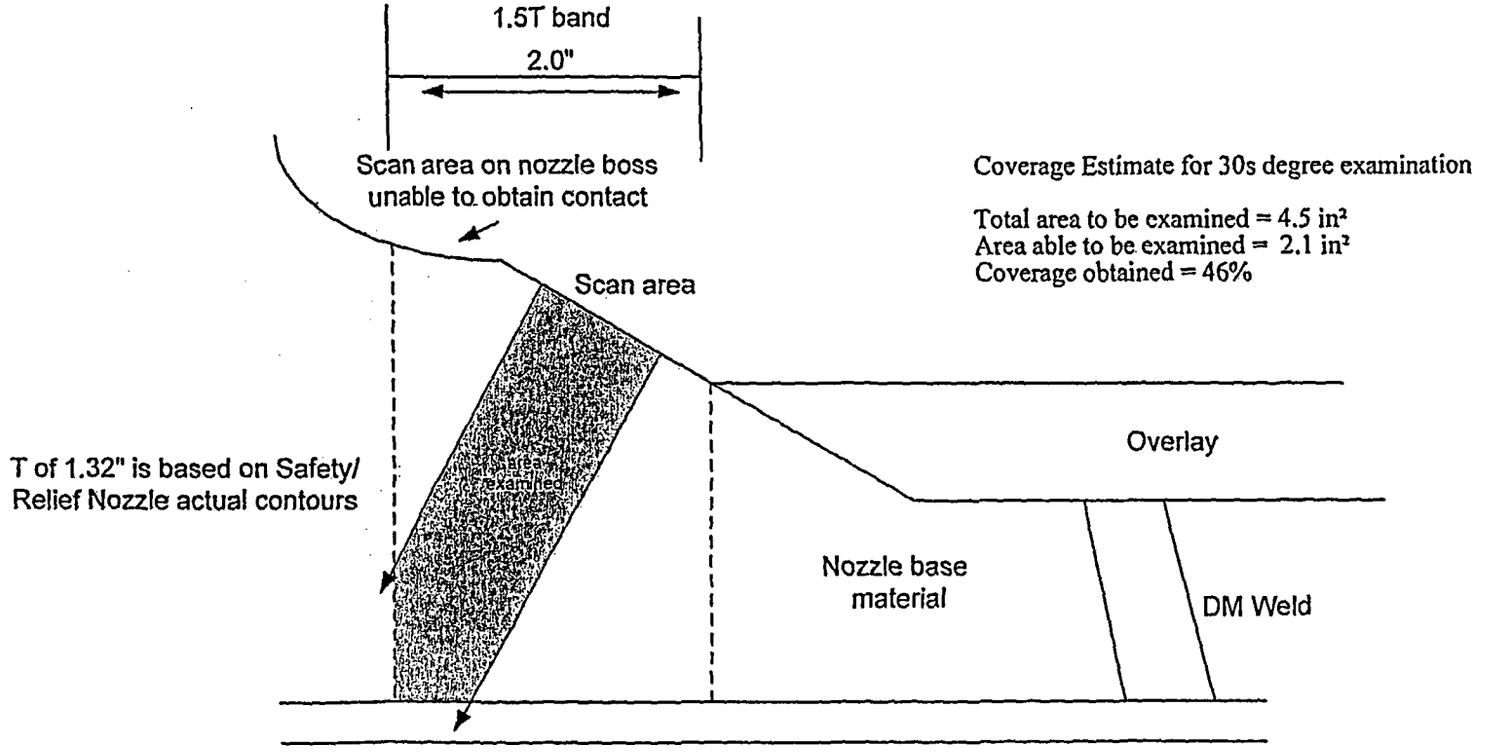


Figure 16

AREVA

DC COOK
SAFETY
2-PRZ-24
POST OVERLAY

Coverage plot for 45 and 60 degree transducers

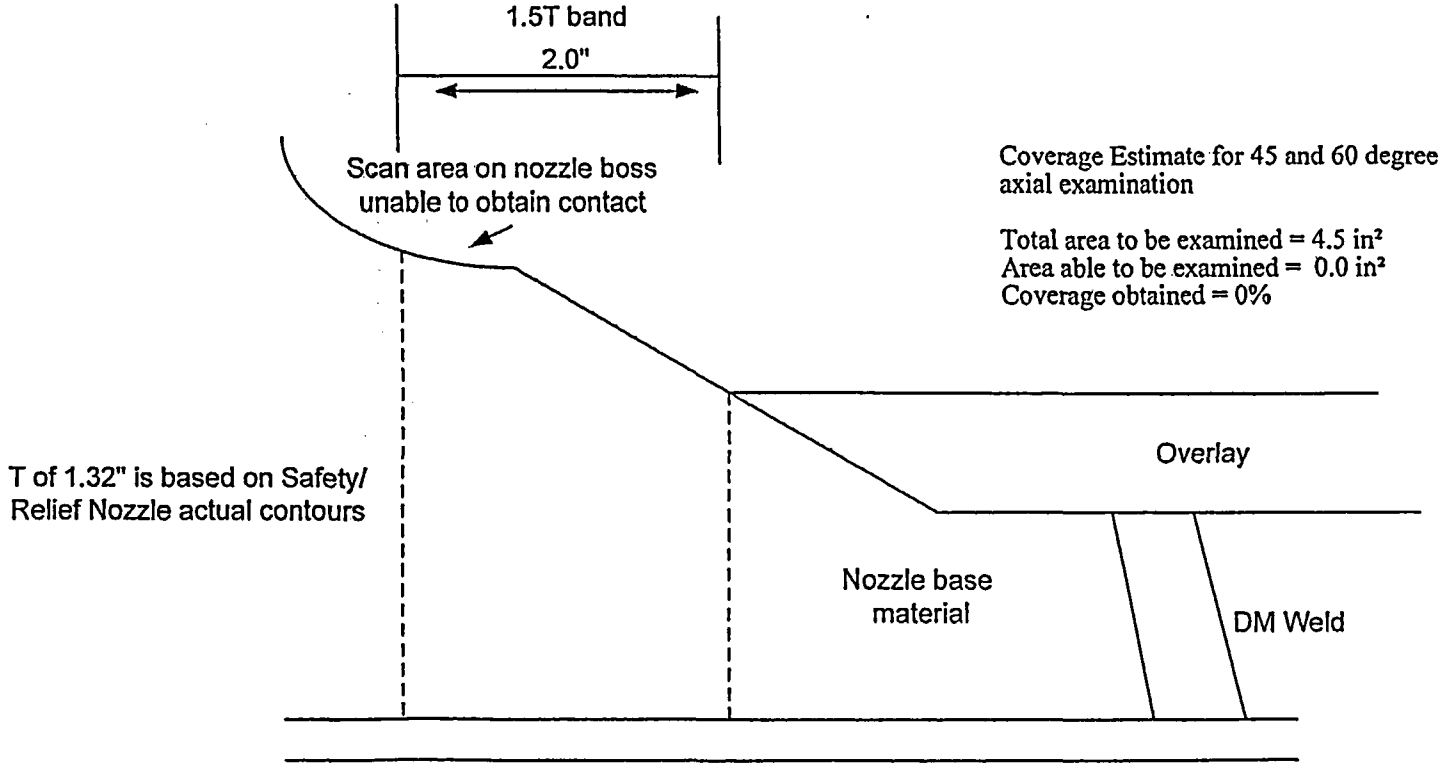


Figure 17

AREVA

DC COOK
RELIEF
2-PRZ-25
POST OVERLAY

Coverage plot for 0L degree transducer

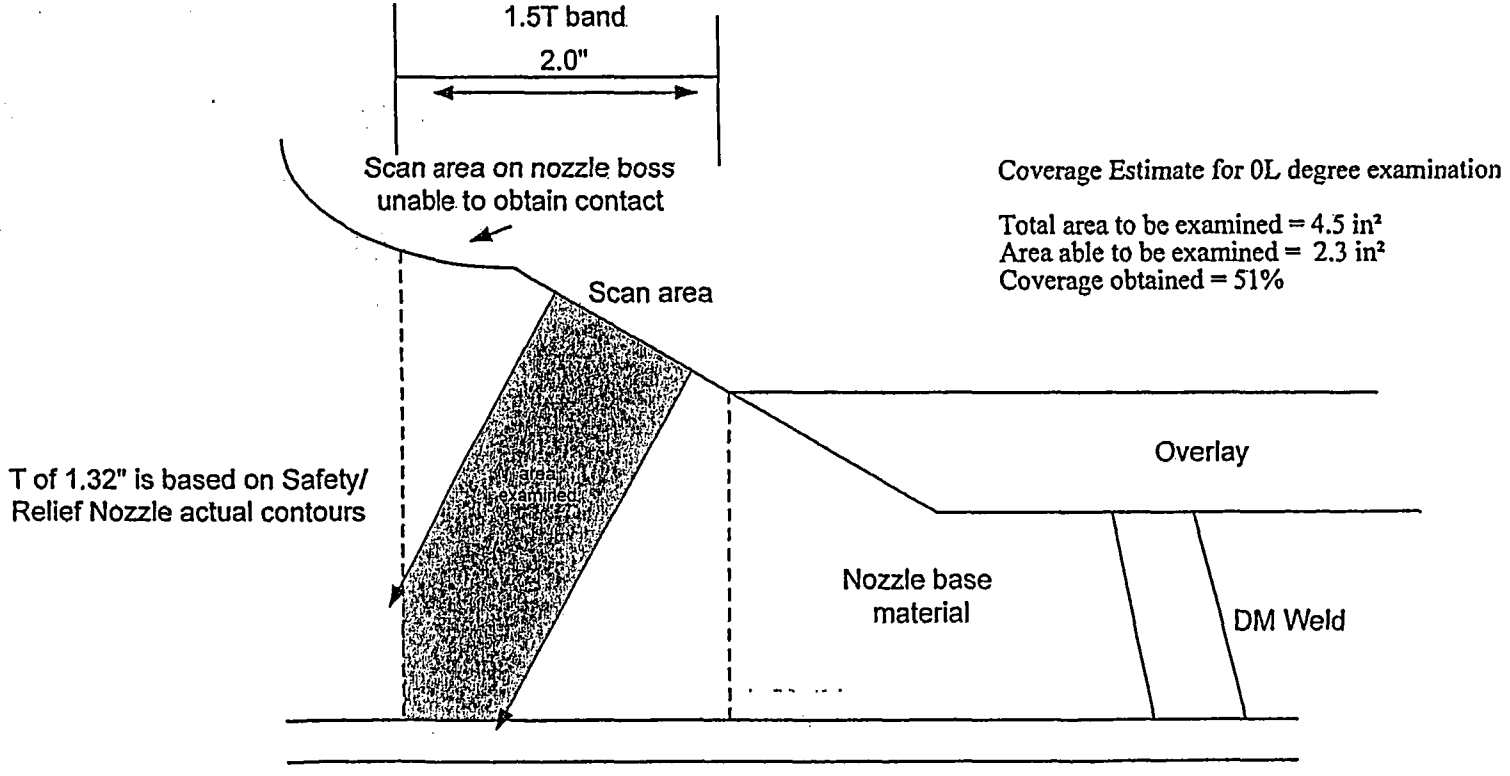


Figure 18

AREVA

DC COOK
RELIEF
2-PRZ-25
POST OVERLAY

Coverage plot for 30L degree transducer

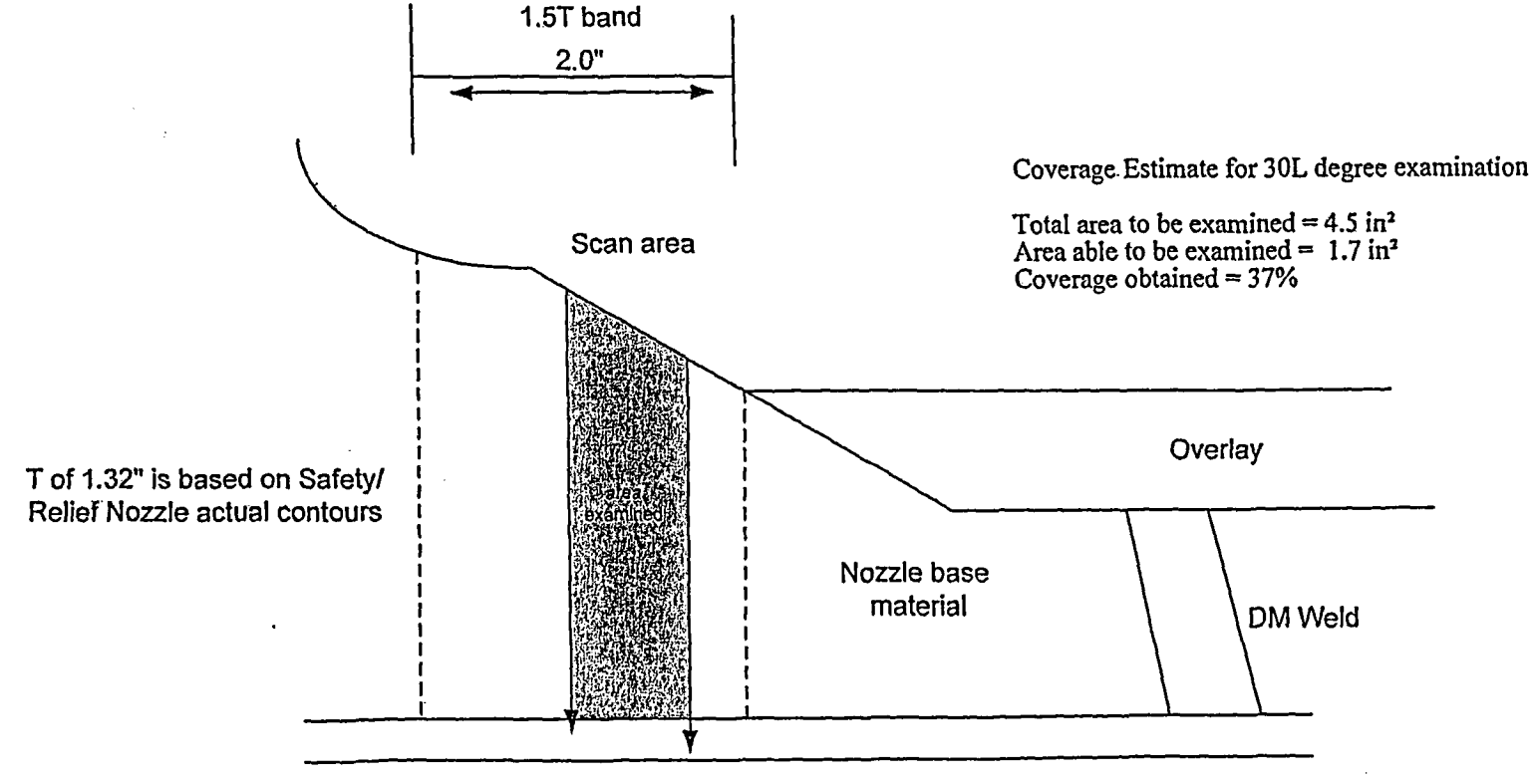
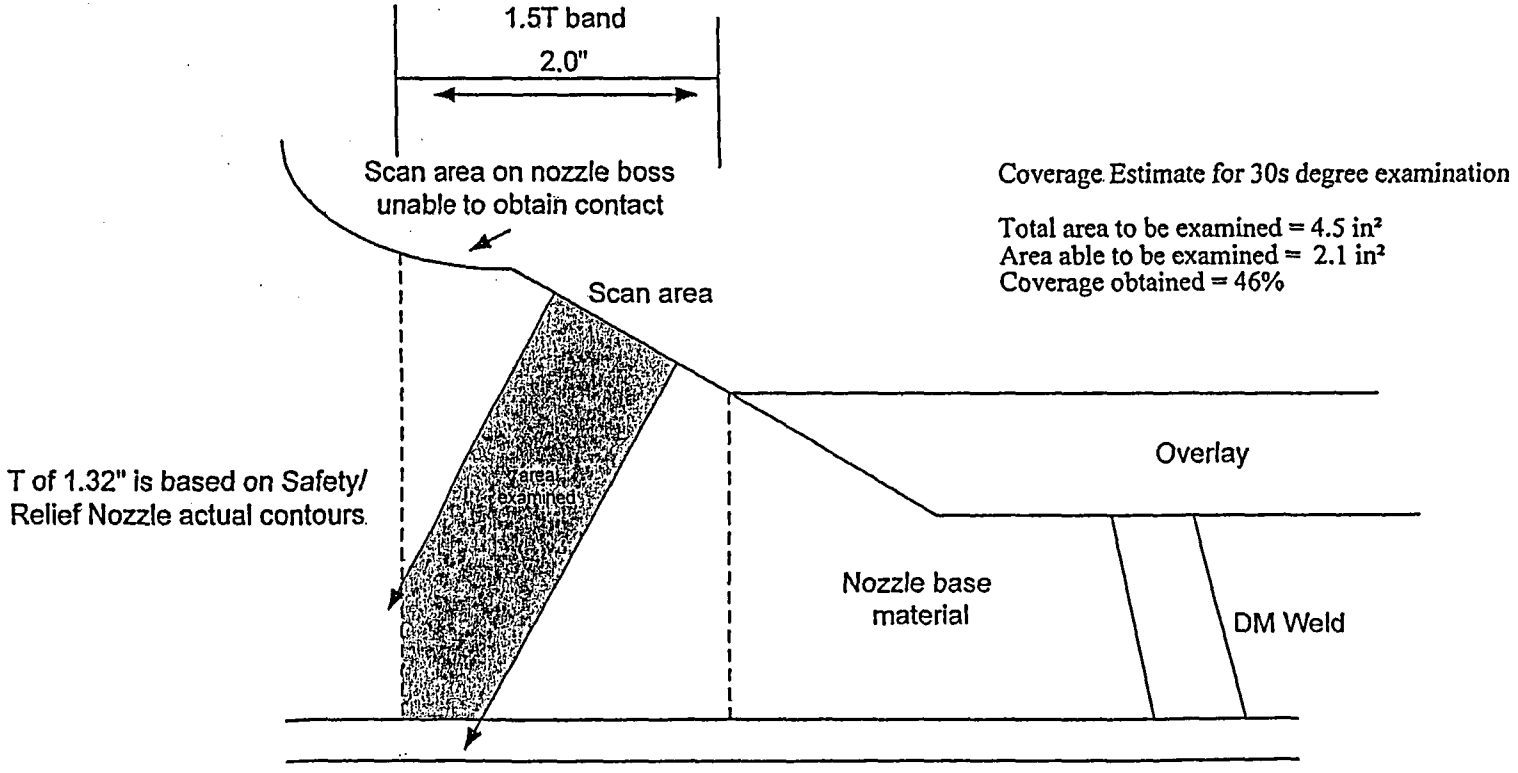


Figure 19

AREVA

DC COOK
RELIEF
2-PRZ-25
POST OVERLAY

Coverage plot for 30s degree transducer for circumferential scans



Coverage Estimate for 30s degree examination

Total area to be examined = 4.5 in²
Area able to be examined = 2.1 in²
Coverage obtained = 46%

Figure 20

AREVA

DC COOK
RELIEF
2-PRZ-25
POST OVERLAY

Coverage plot for 45 and 60 degree transducers

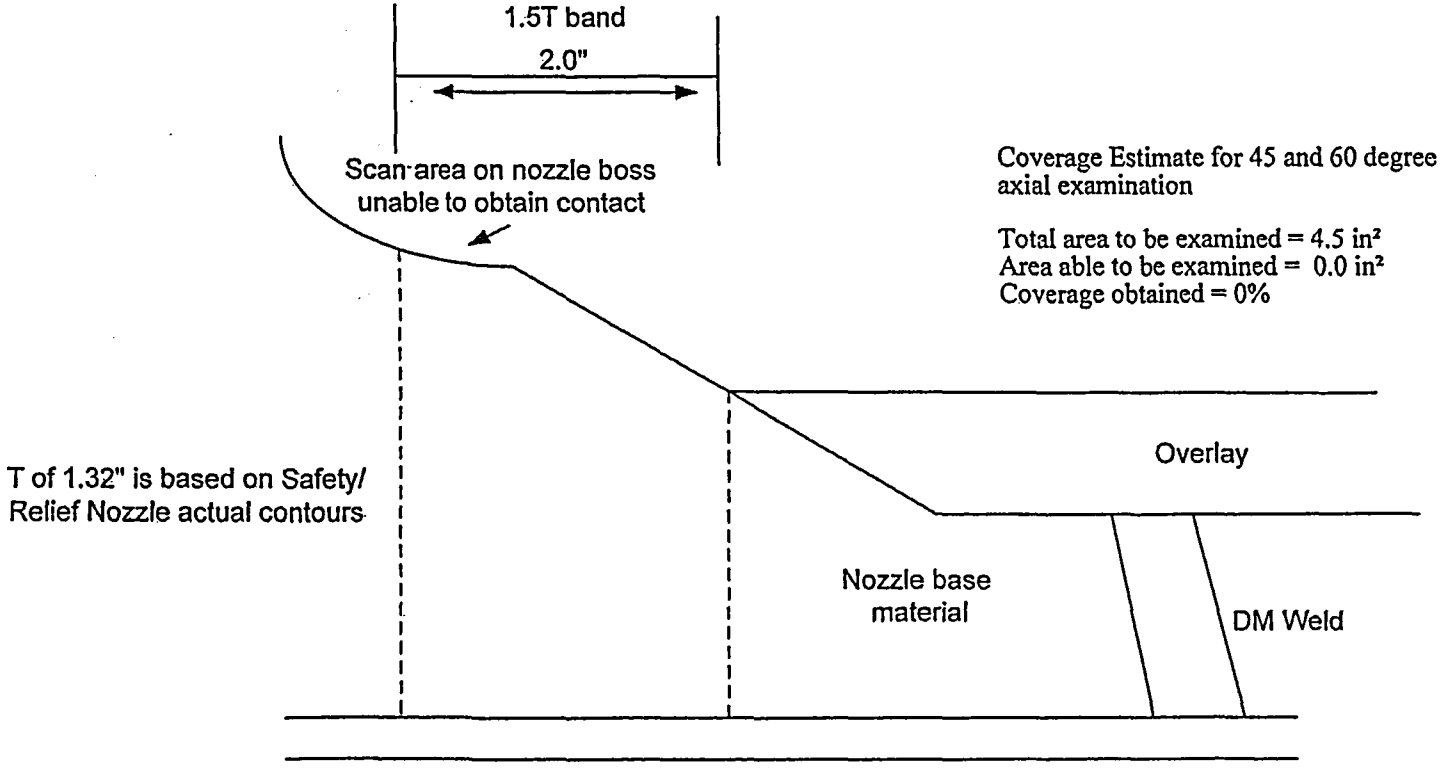


Figure 21

AREVA

DC COOK
SURGE NOZZLE
2-PRZ-26
POST OVERLAY

Coverage plot for Scans with 0 degree transducer

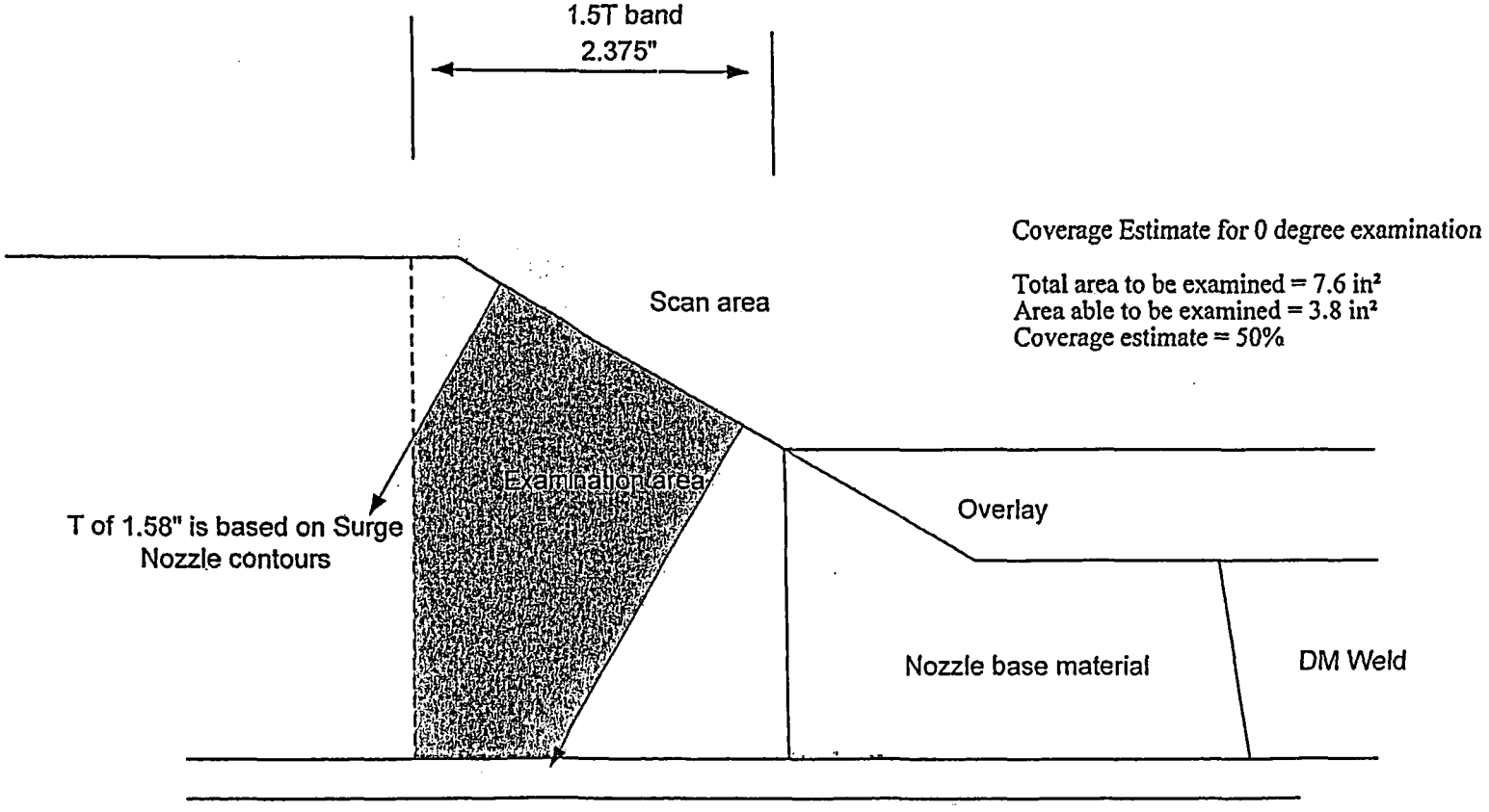


Figure 22

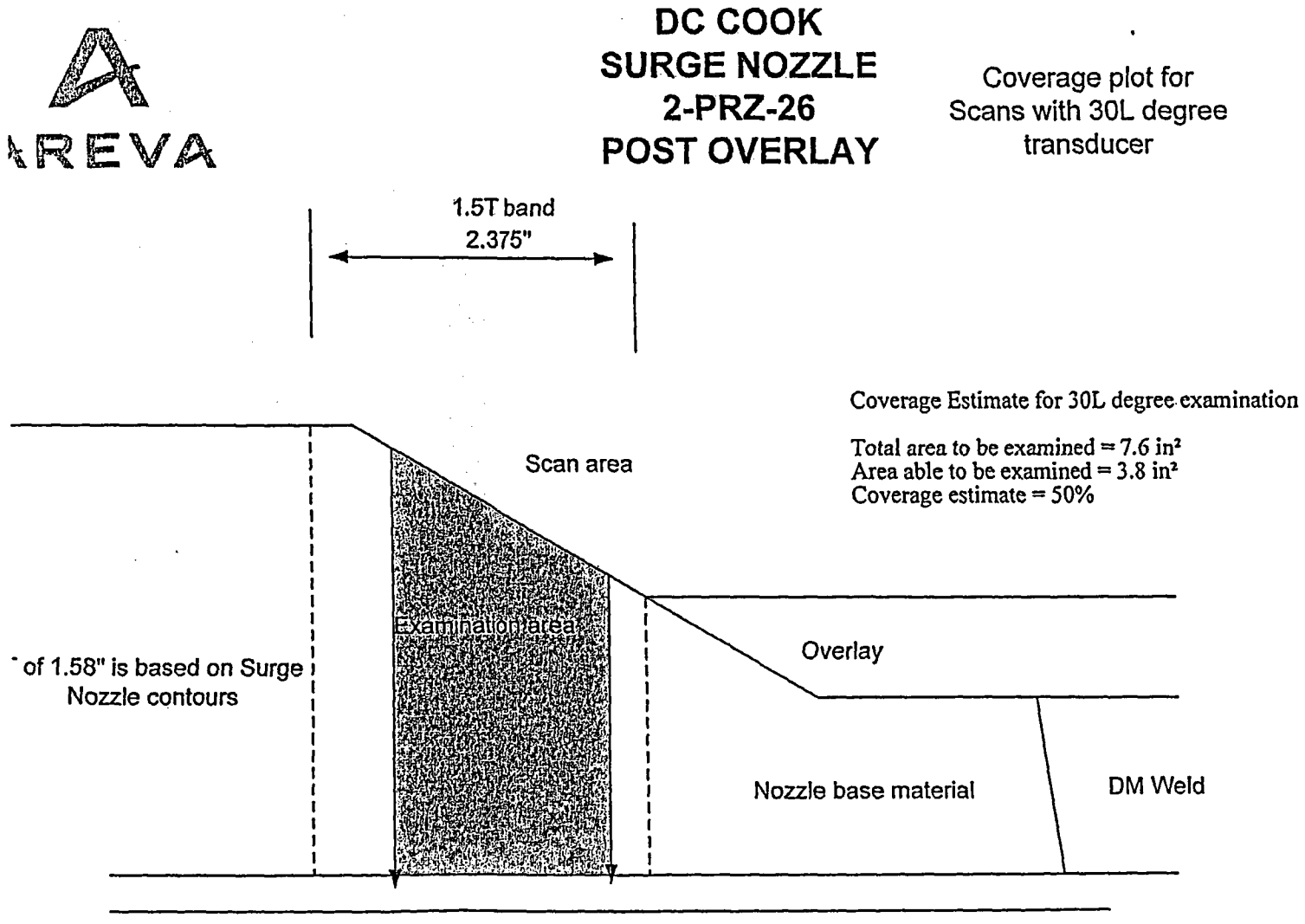

AREVA
DC COOK
SURGE NOZZLE
2-PRZ-26
POST OVERLAY
Coverage plot for
Scans with 30L degree
transducer
1.5T band
2.375"
Coverage Estimate for 30L degree examination
Total area to be examined = 7.6 in²
Area able to be examined = 3.8 in²
Coverage estimate = 50%
Scan area
Examination area
Overlay
of 1.58" is based on Surge
Nozzle contours
Nozzle base material
DM Weld

Figure 23

AREVA

DC COOK
SURGE NOZZLE
2-PRZ-26
POST OVERLAY

Coverage plot for Circ. Scans with 40 degree transducer

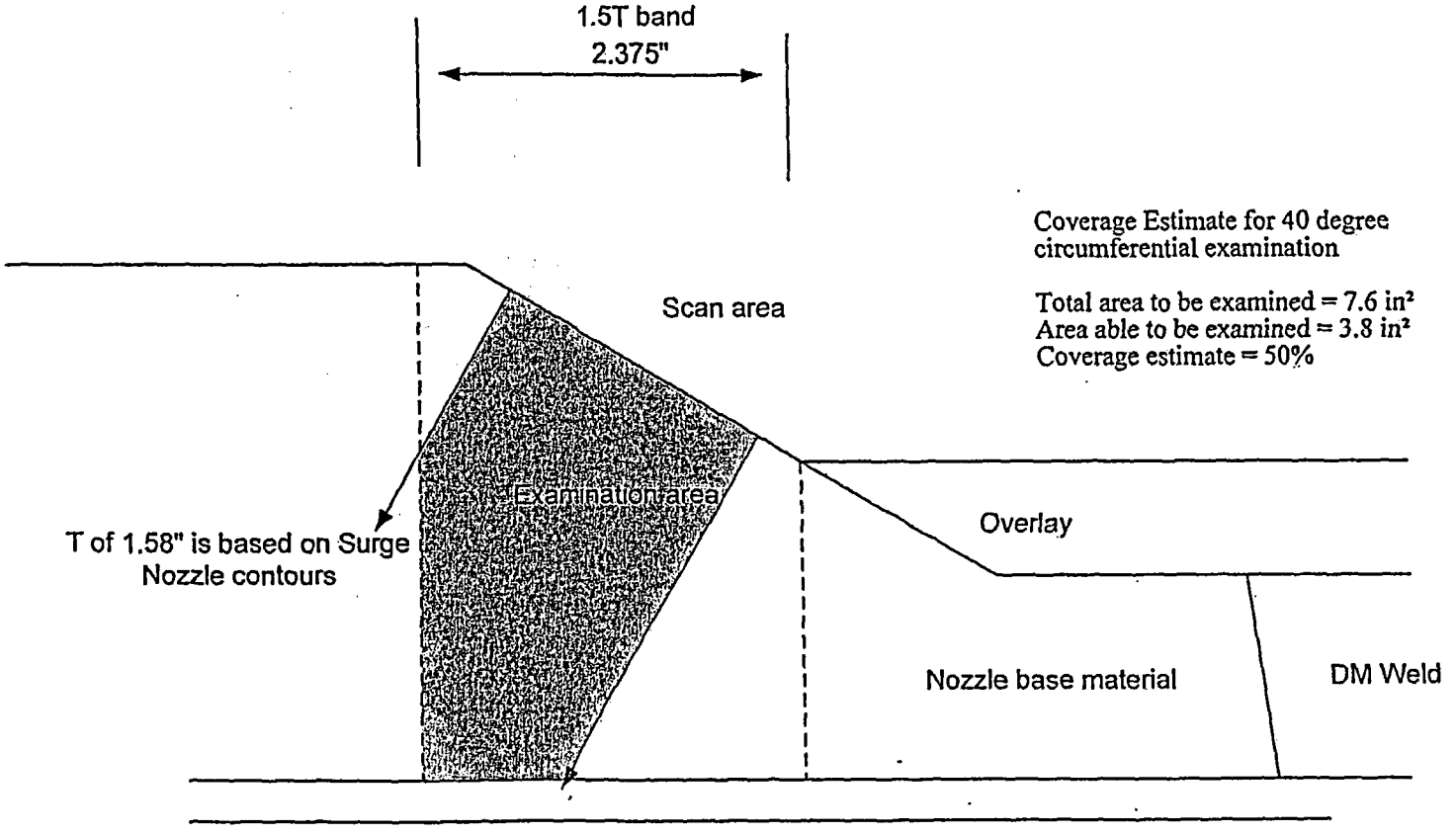


Figure 24

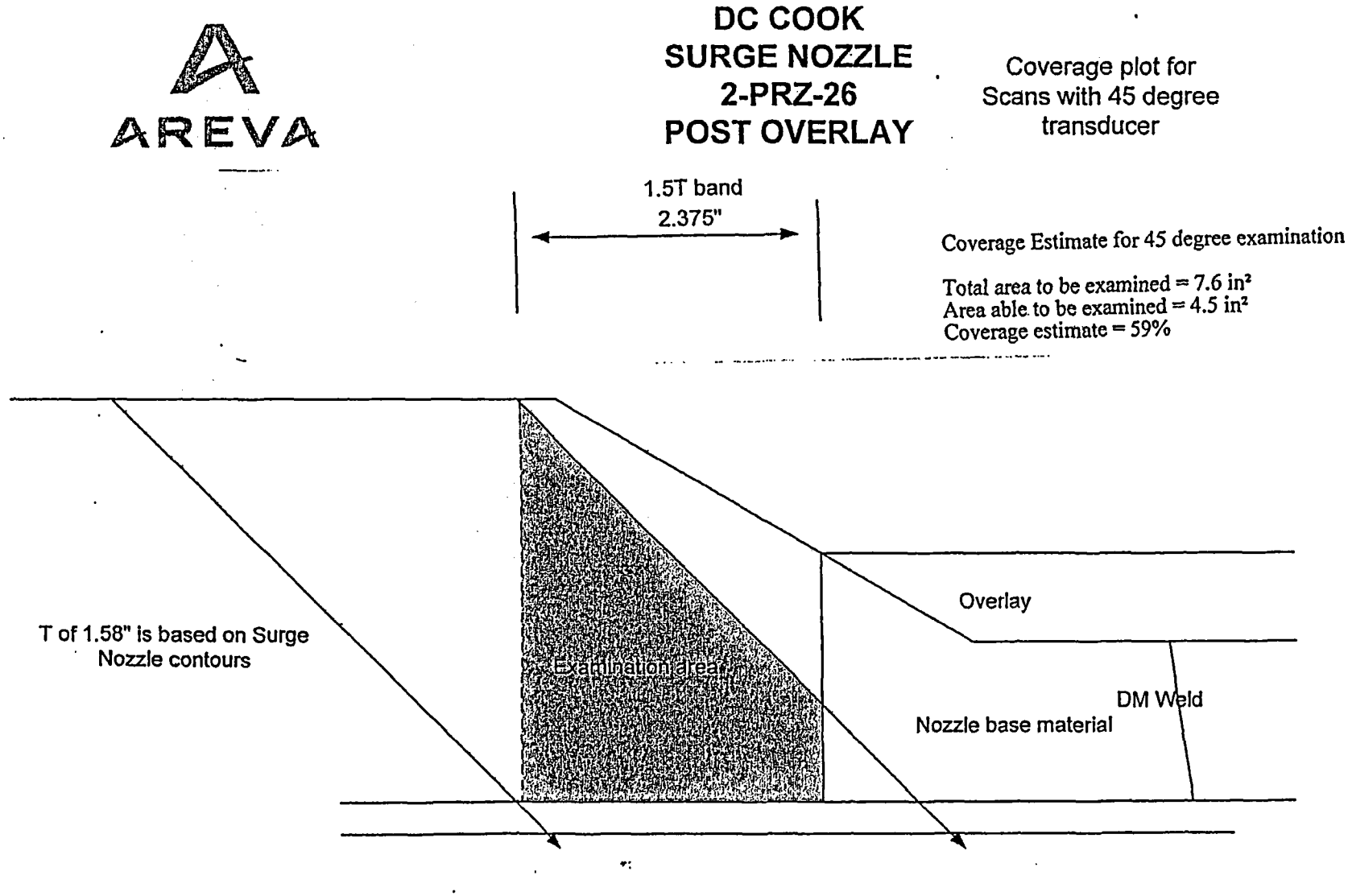

AREVA
DC COOK
SURGE NOZZLE
2-PRZ-26
POST OVERLAY
Coverage plot for
Scans with 45 degree
transducer
1.5T band
2.375"
Coverage Estimate for 45 degree examination
Total area to be examined = 7.6 in²
Area able to be examined = 4.5 in²
Coverage estimate = 59%
T of 1.58" is based on Surge
Nozzle contours
Examination area
Overlay
DM Weld
Nozzle base material

Figure 25

AREVA

DC COOK
SURGE NOZZLE
2-PRZ-26
POST OVERLAY

Coverage plot for Scans with 60 degree transducer

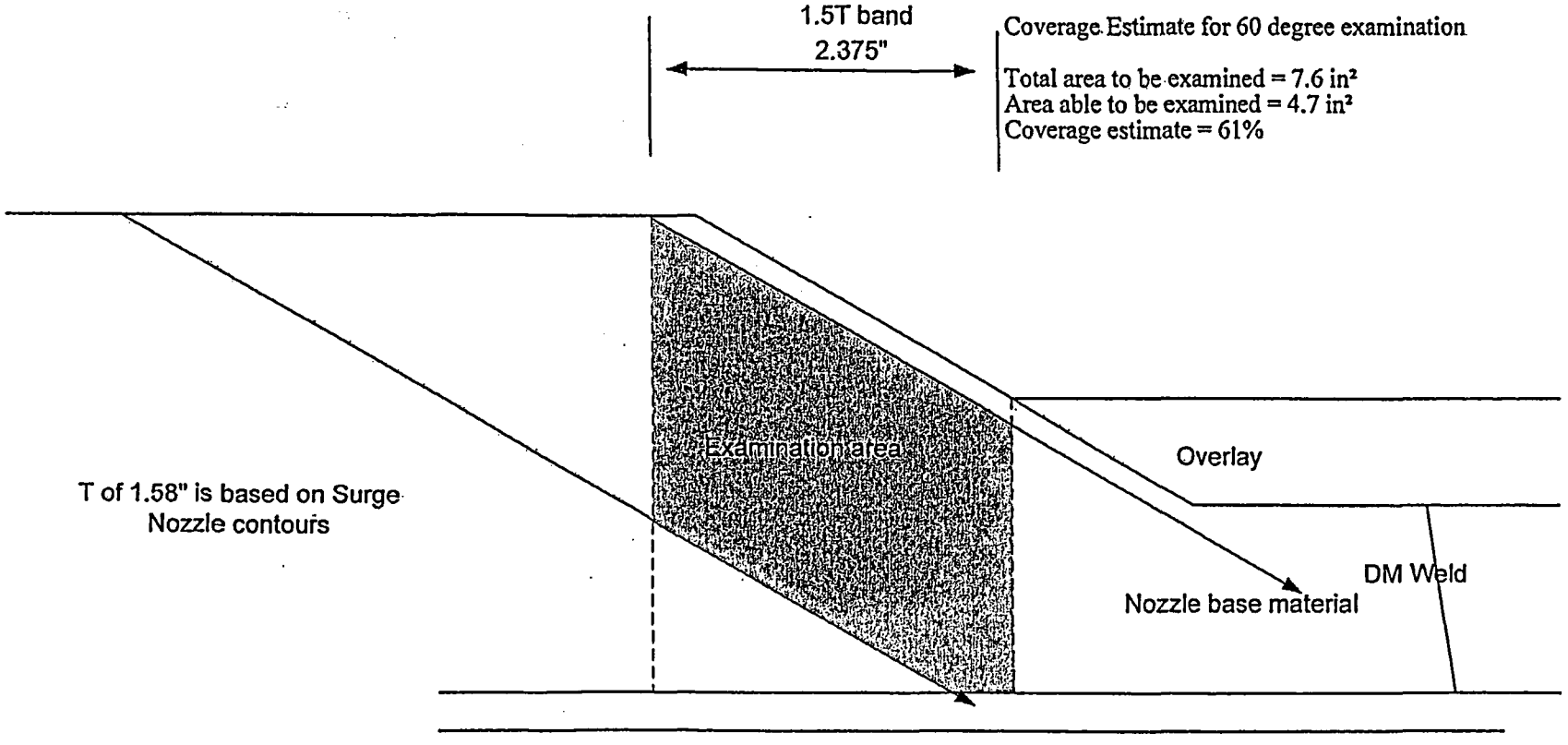


Figure 26

Attachment 3 to AEP:NRC:6055-07

WELD WIRE 52MS
CERTIFICATION OF CHEMICAL OVERCHECK SHEET

Westmoreland Mechanical Testing & Research, Inc.
P.O. Box 388
Westmoreland Drive
Youngstown, Pa. 15696-0388 U.S.A.
Telephone: 724-537-3131 Fax: 724-537-3151
Website: www.wmtr.com
WMT&R is a technical leader in the material testing industry.

Accredited Nadcap Materials Testing Laboratory

GARY STRAW
FRAMATOME ANP
3315 OLD FOREST ROAD
P.O. BOX 10935
LYNCHBURG, VA 24506-0935
USA

Date: 02/08/06
P.O. No.: 172182
WMTR REPORT NO. 6-22544
TestLog No. D10216

CERTIFICATION OF CHEMICAL OVERCHECK

Heat No.: NX4720TK
Specimen ID: 2142-2

Analyzed	Min	Max	Found	Units
Nickel			REM	%
Chromium	28.0	31.5	30.1	%
Manganese		1.00	0.70	%
Silicon		0.50	0.13	%
Carbon (Leco)		0.04	0.020	%
Sulfur (Leco)		0.015	<0.001	%
Iron	7.0	11.0	8.7	%
Aluminum		1.10	0.16	%
Titanium		1.0	0.22	%
Molybdenum		0.50	0.007	%
Copper		0.30	0.021	%
Niobium	0.5	1.0	0.90	%
Phosphorus		0.02	0.005	%

EQUIPMENT USED: Gases: LECO
Plasma: ICP1 - Plasma Emission Spectrographic

SPECIFICATIONS: Acceptable per ASME Case 2142-2 chemical requirements.

COMMENTS: All testing done at WMT&R, Inc.
LECO analysis was performed in accordance with ASTM E1019-03

Reviewed/Approved
By FANP Welding Engineering
Daniel [signature] 3/1/06

Work Inspected and Certified by:
[signature]
Andrew M. Wisniewski
Met./Chemcical Analysis Manager
Date: 2-8-06