



DUKE POWER

February 18, 1997

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

Subject: Duke Power Company
Catawba Nuclear Station, Unit 1 and Unit 2
Docket Nos. 50-413 and 50-414

Request for Alternative to Examination
Requirements of 10 CFR 50.55a (g)(6)(ii)(A),
Augmented Examination of Reactor Vessel
Unit 1. No. 97-01, Unit 2, No. 97-02

Pursuant to 10 CFR 50.55a (g)(6)(ii)(A)(5), Duke Power Company requests approval for alternatives to examinations required by the subject Code paragraph.

The attached Enclosure 1, Request For Alternative, Unit 1, No. 97-01, provides a detailed description and justification for Reactor Vessel Welds on Unit 1.

The attached Enclosure 2, Request For Alternative, Unit 2, No. 97-02, provides a detailed description and justification for Reactor Vessel Welds on Unit 2.

Complete coverage of welds described in these Enclosures were not obtained. Complete coverage was not possible due to part geometry and actual physical barriers. Duke Power Company believes that with the limited coverage obtained, an acceptable level of quality and safety has been achieved and public health and safety will not be endangered by approval of the alternative.

This request is being submitted in response to NRC Information Notice 96-32, Implementation of 10 CFR 50.55a (g)(6)(ii)(A), Augmented Examination of Reactor Vessel. It should be noted that Catawba has previously submitted ASME Code Relief Requests (Unit 1, 94-01 and Unit 2, 96-02). The Unit 1 request was approved February 29, 1996. The Unit 2 request remains outstanding, pending approval.

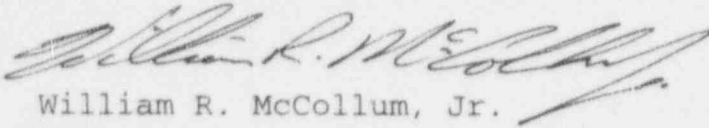
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Document Control Desk
Page 2
February 18, 1997

Should there be any questions concerning this request, please
call D. Tower at (803) 831-3419.

Very truly yours,


William R. McCollum, Jr.

Attachments

XC:

L.A. Reyes, Regional Administrator
Region II

R.J. Freudenberger, Senior Resident Inspector
Catawba Nuclear Station

P.S. Tam, Senior Project Manager
ONRR

ENCLOSURE 1
REQUEST FOR ALTERNATIVE, UNIT 1
97-01

**Duke Power Company
Catawba Nuclear Station Unit 1
10-YEAR INTERVAL REQUEST FOR ALTERNATIVE, NO. 97-01**

BACKGROUND:

In response to NRC Information Notice 96-32, "Implementation of 10 CFR 50.55a(g)(6)(ii)(A) Augmented Examination of Reactor Vessel", Duke Power Company has reviewed the information contained in this notice for applicability to its' facilities and has taken action to avoid or mitigate the effects of limited inspections. These actions are taken to eliminate and/or reduce the concerns expressed in this Information Notice.

Because of concerns regarding the scope of inspection of reactor vessels, the NRC issued, in 1992, 10 CFR 50.55a(g)(6)(ii)(A) [herein referred to as paragraph (A)] "Augmented Examination of Reactor Vessel", which contains new requirements for an augmented examination reactor vessels. The rule requires implementation by the licensee, before the time required by normal updating of the inservice inspection (ISI) program, provisions in the 1989 Edition of the ASME, Boiler and Pressure Vessel Code, Section XI, to examine "essentially 100%" of the length of all reactor vessel shell welds. "Essentially 100% examination as used in Table IWB-2500-1 means more than 90% (reference American Society of Mechanical Engineers (ASME) Section XI Code Case N-460) of the examination volume of each weld, where the reduction in coverage is due to interference by another component, or part geometry".

Many licensees are finding that while the overall average examination coverage for reactor vessel shell welds may be more than 90%, examination coverage for individual welds may be substantially less than 90%. Licensees unable to completely satisfy the requirements for the augmented reactor vessel examination must propose an alternative that would provide an acceptable level of quality and safety.

The licensee must expend all efforts using the latest methods and techniques to achieve acceptably adequate examinations during weld inspections. When examinations cannot be completed with 100% coverage then relief must be requested from ASME Code requirements and a request for alternatives from the Code of Federal Regulations must be submitted.

SYSTEMS/COMPONENTS FOR WHICH RELIEF IS REQUESTED:

Reactor Vessel shell welds are specified in Item B1.10 of Examination Category B-A of the 1989 Code. These systems/components are ASME Section XI Code Class 1. The Construction Code of record is ASME Section III, 1974 Edition through Summer 1974 Addenda, Class 1.

a. **Name and Identification Number**

ASME Section XI Code Class 1

Reactor Vessel

Examination Category B-A

Head-to-Shell Circumferential Weld

<u>ID Number</u>	<u>Item Number</u>
1RPV-W03	B01.011.001

Shell-to-Nozzle Belt Circumferential Weld

<u>ID Number</u>	<u>Item Number</u>
1RPV-W06	B01.011.004

Note

Attachment 1 provides complete description of the listed welds that did not receive "essentially 100%" examination. This information was included in the Request for Relief (Serial No. 94-01, CNS Docket 50-413) for which approval has been received.

Attachment 2 provides detailed calculations for examination coverage for the listed welds that did not receive "essentially 100%" coverage. It is provided here to illustrate method of calculation. This information was included in the Request for Relief (Serial No. 94-01, CNS Docket 50-413) for which approval has been received.

b. **Function:**

Reactor Vessel - Houses the fuel assemblies, control rods, and vessel internals, also directs the flow of reactor coolant.

CODE OF FEDERAL REGULATIONS REQUIREMENT FROM WHICH ALTERNATIVE IS REQUESTED:

Code of Federal Regulations, Part 10, 50.55a(g)(6)(ii)(A).

ASME CODE REQUIREMENT THAT HAS BEEN DETERMINED TO BE IMPRACTICAL:

Examination Category B-A, Pressure Retaining Welds in Reactor Vessel, Table IWB-2500-1, Figure No. IWB-2500-1 "Note 2: Includes essentially 100% of the weld length."

BASIS FOR REQUESTING ALTERNATIVE:

Licensees that make a determination that they are unable to completely satisfy the requirements for the augmented reactor vessel shell weld examination specified in Section 50.55a(g)(6)(ii)(A) shall submit information to the Commission to support the determination and shall propose an alternative to the examination requirements that would provide an acceptable level of quality and safety. The licensee may use the proposed alternative when authorized by the Director of the Office of NRR.

During the ultrasonic examination of the welds shown in Attachment 1, the minimum 90% coverage requirement of ASME Section XI, 1980 Edition through Winter 1981 Addenda, clarified by Code Case N-460, could not be obtained due to part geometry and actual physical barriers. A combination of multiple angles and UT techniques was used to obtain maximum coverage possible. The attached examination reports document the actual amount of examination coverage obtained.

Although the coverage requirements of ASME Section XI could not be met, the amount of coverage obtained for these examinations provides an acceptable level of quality and integrity. Based on these evaluations, the limited coverage will in no way endanger the health and safety of the general public.

These welds were examined to the maximum extent practical in accordance with ASME Section V, Article 4 1980 Edition, Winter '81 Addenda, and the additional requirements of Regulatory Guide 1.150.

No additional examinations will be required.

ALTERNATE EXAMINATIONS:

In accordance with ASME IWA-2000, the licensee is required to perform the necessary examinations and shall expend all methods and techniques possible to achieve acceptably adequate examinations during weld inspections. When examinations cannot be completed with 100% coverage then relief must be requested from Code requirements and a request for alternatives from CFR must be made. The alternative granted by the request, when all methods and techniques had been exhausted, will essentially explain that the limited examination is the best available.

The use of radiography as an alternate volumetric examination method is not practical due to component thickness and geometric configurations. Other restrictions making radiography impractical are physical barriers prohibiting access for placement of source, film, number bands, etc.

Duke will continue to use the most of current ultrasonic techniques available for future examination of the Item Numbers shown in Attachment 1. It is the belief of Duke that the limited examination is the best available.

The application of Code Case N-460 will be utilized in all cases where <100% but >90% weld coverage is obtained. In cases where weld coverage of <90% is obtained, a request for relief from Code requirements will be submitted.

Duke Power Company will continue to perform an ultrasonic examination of all Reactor Vessel welds to the maximum extent practical in accordance with the requirements of ASME Section V, Article 4, 1989 Edition and Regulatory Guide 1.150, Revision 1, Appendix A.

JUSTIFICATION FOR GRANTING ALTERNATIVE:

Technical Specifications for Catawba Nuclear Station, Unit 1, state that the inservice inspection of the ASME Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a(g) except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(I). Section 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used when authorized by the NRC. These proposed alternatives would provide an acceptable level of quality and safety, or compliance with the specified

requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

Full utilization of IWA-2000 of the 1989 ASME Code assures examinations that are in compliance with the Code and will provide for weld coverage possible with the methods and techniques utilized for the examinations. (A)(5) states that licensees that make a determination that they are unable to completely satisfy the requirements for the augmented reactor vessel shell weld examinations specified in Section 50.55a(g)(6)(ii)(A) shall submit information to the Commission to support the determination and shall propose an alternative to the examination requirements that would provide an acceptable level of quality and safety.

Duke Power Company will continue to ultrasonically examine the welds to the extent practical within the limits of original design and construction. This will provide reasonable assurance of weld/component integrity. Thus, an acceptable level of quality and safety will have been achieved and public health and safety will not be endangered by allowing relief from the aforementioned Code requirements.

The licensee, pursuant to 10 CFR 50.55a(g)(5), has determined that conformance with the examination requirement of Section XI of the ASME Code is not practical for its facility. It is not possible to obtain 100% weld coverage for the welds described herein. The alternative granted by the request will essentially explain that the limited examination is the best available.

Request for Relief Serial No. 94-01, CNS Docket 50-413, has been previously approved.

IMPLEMENTATION SCHEDULE:

The alternative described will be in effect for the second 10 year interval for Catawba Nuclear Station, Unit 1.

APPROVALS:

Evaluated By: A. J. Hogge Jr. Date: 9/19/96

NDE Level III Review: James J. McPherson Date: 9/24/96

Reviewed By: J. Sartore Date: 9/26/96

ATTACHMENT 1

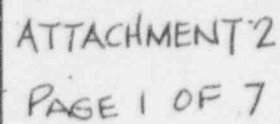
Duke Power Company
Catawba Nuclear Station Unit 1
10-YEAR INTERVAL REQUEST FOR ALTERNATIVE, NO. 97-01

ATTACHMENT 1

Item No.	Exam Category / Figure No.	System Or Component	Function	Area To Be Examined	Reason For Request	Licenses Proposed Alternate Examination
B01.011.001	B-A IWB-2500-1	Reactor Vessel	Houses the fuel assemblies, control rods, and vessel internals, also directs the flow of reactor coolant	Lower Head to Shell Weld	Limited scan due to geometric configuration. Actual coverage obtained =43.60%	None
B01.011.004	B-A IWB-2500-1	Reactor Vessel	Houses the fuel assemblies, control rods, and vessel internals, also directs the flow of reactor coolant	Shell to Nozzle Belt Weld	Limited scan due to geometric configuration. Actual coverage obtained =48.20%	None

ATTACHMENT 2

Duke Power Company
Catawba Nuclear Station Unit 1
10-YEAR INTERVAL REQUEST FOR ALTERNATIVE, NO. 97-C1



W-03

Total Exam Area = 53.32 in² (Near Surface + Weld + T/2)
Near Surface Area = 8.37 in² (Cross-Section)
Weld Area = 6.37 in² (Cross-Section)
T/2 Area = 38.58 in² (Cross-Section)

BETWEEN LUGS

CIRC 70° Gets 6.24 in² of Near Surface Area (74.6 %)
0° Gets 9.07 in² of Total Exam Area (17.0 %)
45° & 60° Get 31.79 in² of T/2 Area, .44 in² of Weld Area
Total Coverage = $\frac{31.79 + 0.44 + 0.44}{38.58 + 6.37 + 6.37} = 63.7 \%$

AXIAL 70° Gets 8.24 in² of Near Surface Area; however due to the Full-Node Exam, 100 % Coverage of the Near Surface Area is obtained by the 45° & 60°.
45° Gets 100 % of Weld and T/2 Area
60° Gets 100 % of Weld and T/2 Area

BELOW LUGS

AXIAL Due to the Full-Node Exam, 7.58 in² of the Near Surface Area is obtained by the 60° (90.6 %).
45° Gets 3.79 in² of T/2 Area (0 % Weld Area)
Total Coverage = $\frac{3.79 + 0.00 + 0.00}{38.58 + 6.37 + 6.37} = 7.4 \%$
60° Gets 9.11 in² of T/2 Area and 1.23 in² of Weld Area
Total Coverage = $\frac{9.11 + 1.23 + 0.00}{38.58 + 6.37 + 6.37} = 20.1 \%$

ATTACHMENT 2
B01.011.001
IRPV-W03

There are six (6) Segments Between Lugs, each 31.60° covered by the center of the head (0° and 60° Circ). The outside transducers each cover an additional 2.06° which results in 35.72° covered by 70°, 60° & 45° Axial and 70° & 45° Circ. There are also six (6) Segments Below Lugs, each covering the remaining 24.28° for Axial Scans.

$$0^\circ \text{ \& \; } 60^\circ \text{ Circ Coverage} = \frac{189.60 \times \% \text{ Between}}{100 \times 360}$$

$$70^\circ \text{ \& \; } 45^\circ \text{ Circ Coverage} = \frac{214.32 \times \% \text{ Between}}{100 \times 360}$$

$$\text{Axial Coverage} = \frac{214.32 \times \% \text{ Between} + 145.68 \times \% \text{ Below}}{100 \times 360}$$

W-03

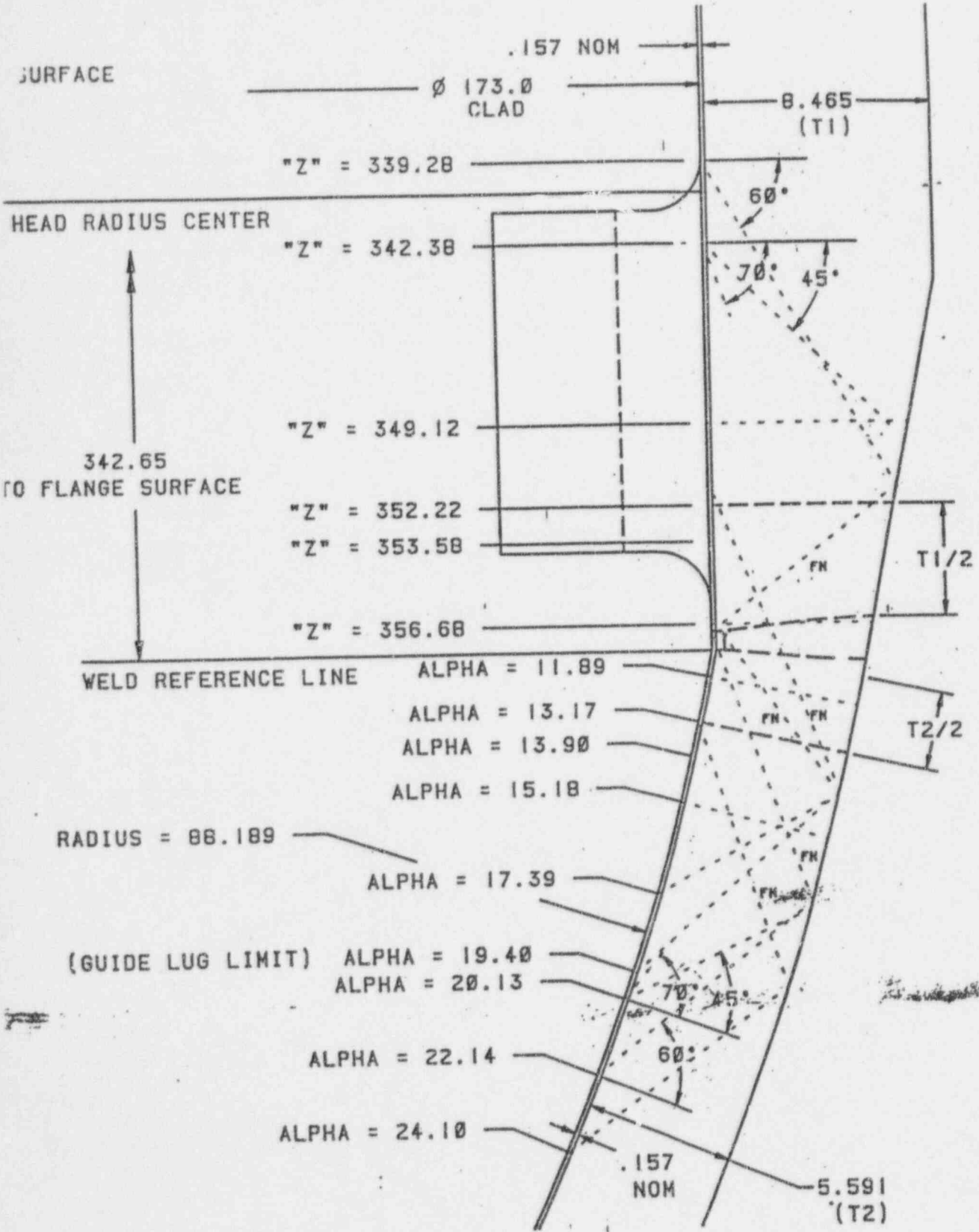
<u>AXIAL</u>			<u>CIRC</u>			
<u>NS</u>	<u>60</u>	<u>45</u>	<u>70</u>	<u>60</u>	<u>45</u>	<u>0</u>
96.2	67.7	62.5	44.4	33.5	37.9	9.0

Aggregate Coverage =

$$\begin{aligned}
 & [96.2 \times 8.37 + (67.7 + 62.5) \times (38.58 + 6.37 + 6.37) \\
 & + 44.4 \times 8.37 + (33.5 + 37.9) \times (38.58 + 6.37 + 6.37) \\
 & + 9.0 \times 53.32] / \\
 & [8.37 \times 2 + (38.58 + 6.37 + 6.37) \times 4 + 53.32] =
 \end{aligned}$$

Aggregate Coverage = 43.6 %

ATTACHMENT 2
 BOL011.001
 IRPV-W03
 PAGE 3 OF 7



ATTACHMENT 2
 B01.011.001
 IRPV-W03
 MIN CLEARANCE =

W-03

PAGE 4 OF 7

W-06

Total Exam Area = 93.65 in² (Near Surface + Weld + T/2)
Near Surface Area = 10.47 in² (Cross-Section)
Weld Area = 11.38 in² (Cross-Section)
T/2 Area = 71.80 in² (Cross-Section)

CIRC 70° Gets 3.82 in² of Near Surface Area (36.5 %)
0° Gets 6.08 in² of Total Exam Area (6.5 %)
45° & 60° Get 28.50 in² of T/2 Area (0 % Weld)
Total Coverage = $\frac{28.50 + 0.00 + 0.00}{71.80 + 11.38 + 11.38} = 30.1 \%$

AXIAL 70° Gets 5.40 in² of Near Surface Area (51.6 %)

45° Gets 63.34 in² of T/2 Area
45°-UP Gets 11.10 in² of Weld Area
45°-DOWN Gets 4.74 in² of Weld Area
Total Coverage = $\frac{63.34 + 11.10 + 4.74}{71.80 + 11.38 + 11.38} = 93.7 \%$

60° Gets 67.39 in² of T/2 Area
60°-UP Gets 9.87 in² of Weld Area
60°-DOWN Gets 9.34 in² of Weld Area
Total Coverage = $\frac{67.39 + 9.87 + 9.34}{71.80 + 11.38 + 11.38} = 91.6 \%$

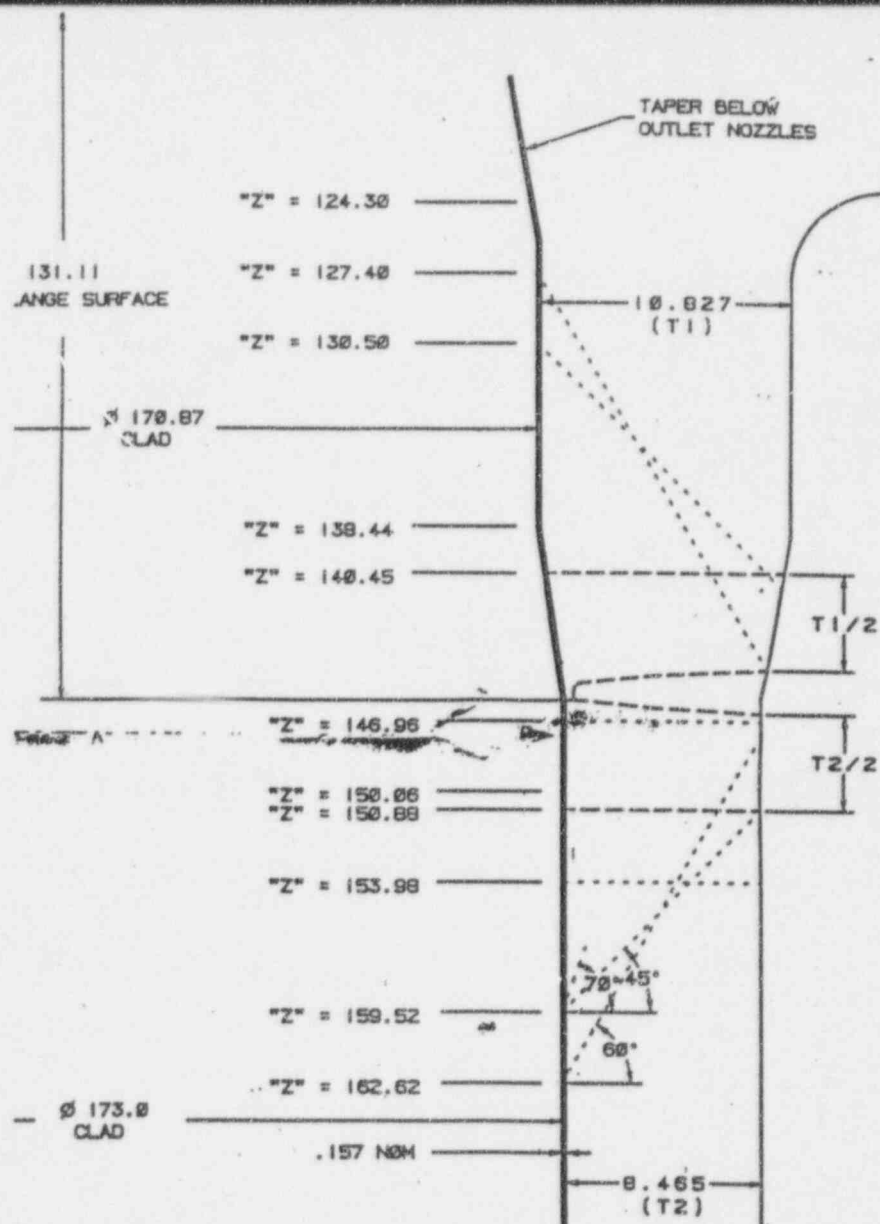
W-06

<u>AXIAL</u>			<u>CIRC</u>			
<u>70</u>	<u>60</u>	<u>45</u>	<u>70</u>	<u>60</u>	<u>45</u>	<u>0</u>
51.6	91.6	83.7	36.5	30.1	30.1	6.5

Aggregate Coverage =

$$\begin{aligned} & [51.6 \times 10.47 + (91.6 + 83.7) \times (71.80 + 11.38 + 11.38) \\ & + 36.5 \times 10.47 + (30.1 + 30.1) \times (71.80 + 11.38 + 11.38) \\ & + 6.5 \times 93.65] / \\ & [10.47 \times 2 + (71.80 + 11.38 + 11.38) \times 4 + 94.65] = \end{aligned}$$

Aggregate Coverage = 48.2 %



GENERAL NOTES:

1. ALL "Z" DIMENSIONS REFERENCE THE DISTANCE BETWEEN THE MATING SURFACE AND THE BOTTOM THE CENTER OF

ATTACHMENT 2
 B01.011.004
 I.RPV-W06
 PAGE 7 OF 7

ENCLOSURE 2
REQUEST FOR ALTERNATIVE, UNIT 2
97-02

Duke Power Company
Catawba Nuclear Station: Unit 2
10-YEAR INTERVAL REQUEST FOR ALTERNATIVE NO. 97-02

BACKGROUND:

In response to NRC Information Notice 96-32, "Implementation of 10 CFR 50.55a(g)(6)(ii)(A) Augmented Examination of Reactor Vessel", Duke Power Company has reviewed the information contained in this notice for applicability to its' facilities and has taken action to avoid or mitigate the effects of limited inspections. These actions are taken to eliminate and/or reduce the concerns expressed in this Information Notice.

Because of concerns regarding the scope of inspection of reactor vessels, the NRC issued, in 1992, 10 CFR 50.55a(g)(6)(ii)(A) [herein referred to as paragraph (A)], "Augmented Examination of Reactor Vessel", which contains new requirements for an augmented examination of welds reactor vessels. The rule requires the licensee to implement, before the time required by normal updating of the inservice inspection (ISI) program, provisions in the 1989 Edition of the ASME, Boiler and Pressure Vessel Code, Section XI, to examine "essentially 100%" of the length of all reactor vessel shell welds. "Essentially 100% examination as used in Table IWB-2500-1 means more than 90% (reference American Society of Mechanical Engineers (ASME) Section XI Code Case N-460) of the examination volume of each weld, where the reduction in coverage is due to interference by another component, or part geometry".

Many licensees are finding that while the overall average examination for reactor vessel shell welds may be more than 90%, examination coverage for individual welds may be substantially less than 90%. Licensees unable to completely satisfy the requirements for the augmented reactor vessel examination must propose an alternative that would provide an acceptable level of quality and safety.

The licensee must expend all efforts using the latest methods and techniques to achieve acceptably adequate examinations during weld inspections. When examinations cannot be completed with 100% coverage then relief must be requested from ASME Code requirements and a request for alternatives from the Code of Federal Regulations must be submitted.

SYSTEMS/COMPONENTS FOR WHICH RELIEF IS REQUESTED:

Reactor Vessel shell welds are specified in Item B1.10 of Examination Category B-A of the 1989 Code. These systems/components are ASME Section XI Code Class 1 and Class 2. The Construction Code of record is ASME Section III, 1974 Edition through Summer 1974 Addenda, Class 1.

a. **Name and Identification Number:**

ASME Section XI Code Class 1

Reactor Vessel

Examination Category B-A

Lower Head-to-Shell Circumferential Weld

<u>ID Number</u>	<u>Item Number</u>
2RPV-101-141	B01.011.001

Lower Shell Longitudinal Seams

<u>ID Number</u>	<u>Item Number</u>
2RPV-101-142A	B01.012.007
2RPV-101.142B	B01.012.008
2RPV-101-142C	B01.012.009

Note

See the Attachment for weld identification and detailed examination results. coverage This information was included in the Request for Relief (Serial No. 96-02) which has been submitted to the NRC for approval.

b. **Function:**

Reactor Vessel - Houses the fuel assemblies, control rods, and vessel internals, also directs the flow of reactor coolant.

CODE OF FEDERAL REGULATIONS REQUIREMENT FROM WHICH ALTERNATIVE IS REQUESTED:

Code of Federal Regulations, Part 10, 50.55a(g)(6)(ii)(A).

ASME CODE REQUIREMENT THAT HAS BEEN DETERMINED TO BE IMPRACTICAL:

Examination Category B-A

Pressure Retaining in
Reactor Vessel - Figure No. IWB-
2500-1 and IWB-2500-2.

"Note 2: Includes essentially 100% of the weld length."

BASIS FOR REQUESTING ALTERNATIVE:

Licensees that make a determination that they are unable to completely satisfy the requirements for the augmented reactor vessel shell weld examination specified in Section 50.55a(g)(6)(ii)(A) shall submit information to the Commission to support the determination and shall propose an alternative to the examination requirements that would provide an acceptable level of quality and safety. The licensee may use the proposed alternative when authorized by the Director of the Office of NRR.

During the ultrasonic examination of the welds shown in the attachment to this alternative, the minimum 90% coverage requirement of ASME Section XI, 1980 Edition through Winter 1981 Addenda, clarified by Code Case N-460, could not be obtained due to part geometry and actual physical barriers. A combination of multiple angles and UT techniques was used to obtain maximum coverage possible. The attached geometric examination reports document the actual amount of examination coverage obtained.

Although the coverage requirements of ASME Section XI could not be met, methods the amount of coverage obtained for these examinations provides an acceptable level of quality and integrity. Based on these evaluations, the limited coverage will in no way endanger the health and safety of the general public.

These welds were examined to the maximum extent practical in accordance with ASME Section V, Article 4 1980 Edition with Winter 1981 Addenda and the additional requirements of Regulatory Guide 1.150.

No additional examinations will be required.

ALTERNATE EXAMINATIONS:

In accordance with ASME IWA-2000, the licensee is required to perform the necessary examinations and shall expend all and techniques possible to achieve acceptably adequate examinations during weld inspections. When examinations cannot be completed with 100% coverage then relief must be requested from Code requirements and a request for alternatives from CFR must be made. The alternative granted by the request, when all methods and techniques had been exhausted, will essentially explain that the limited examination is the best available.

The use of radiography as an alternate volumetric examination method is not practical due to component thickness and configurations. Other restrictions making radiography impractical are physical barriers prohibiting access for placement of source, film, number bands, etc.

Duke will continue to use the most current ultrasonic techniques available for future examination of the Item Numbers shown in the attachment to this alternative. It is the belief of Duke that the limited examination is the best available.

The application of Code Case N-460 will be utilized in all cases where <100% but >90% weld coverage is obtained. In cases where weld coverage of <90% is obtained, a request for relief from Code requirements will be submitted.

Duke Power Company will continue to perform an ultrasonic examination of all Reactor Vessel Welds to the maximum extent practical in accordance with the requirements of ASME Section V, Article 4, 1989 Edition and Regulatory Guide 1.150, Revision 1, Appendix A.

JUSTIFICATION FOR GRANTING ALTERNATIVE:

Technical Specifications for Catawba Nuclear Station, Unit 2, state that the inservice inspection of the ASME Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a(g) except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(I). Section 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used when authorized by the NRC. These proposed alternatives would provide an acceptable level of

quality and safety, or compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

Full utilization of IWA-2000 of the 1989 ASME Code assures examinations that are in compliance with the Code and will provide for weld coverage possible with the methods and techniques utilized for the examinations. (A)(5) states that licensees that make a determination that they are unable to completely satisfy the requirements for the augmented reactor vessel shell weld examinations specified in Section 50.55a(g)(6)(ii)(A) shall submit information to the Commission to support the determination and shall propose an alternative to the examination requirements that would provide an acceptable level of quality and safety.

Duke Power Company will continue to ultrasonically examine the welds to the extent practical within the limits of original design and construction. This will provide reasonable assurance of weld/component integrity. Thus, an acceptable level of quality and safety will have been achieved and public health and safety will not be endangered by allowing relief for the aforementioned Code requirements.

The licensee, pursuant to 10 CFR 50.55a(g)(5), has determined that conformance with the examination requirement of Section XI of the ASME Code is not practical for its facility. It is not possible to obtain 100% weld coverage for the welds described herein. The alternative granted by the request will essentially explain that the limited examination is the best available.

Request for Relief Serial No. 96-02, CNS Docket 50-414 has been submitted to the NRC for approval.

IMPLEMENTATION SCHEDULE:

The alternative described will be in effect for the second 10 year interval for Catawba Nuclear Station, Unit 2.

Approvals:

Evaluated By: A. J. Hogge, Jr. Date: 9-19-96

NDE Level III Review: James J. McQuillen Date: 9/24/96

Reviewed By: J. A. Barlow Date: 9/26/96

ATTACHMENT

Duke Power Company
Catawba Nuclear Station Unit 2
10-YEAR INTERVAL REQUEST FOR ALTERNATIVE NO. 97-02

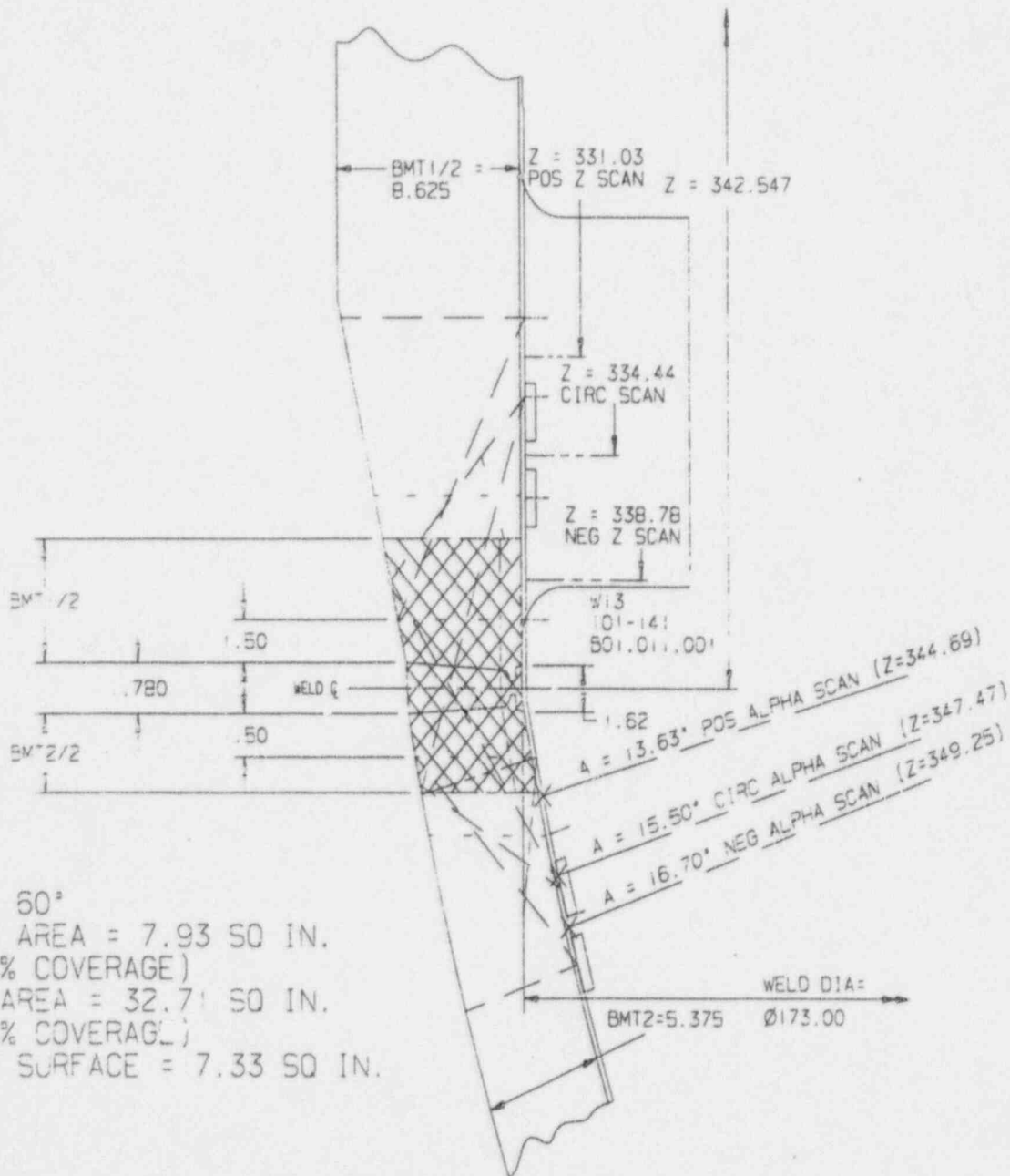
Item No.	Exam Category /Figure No.	System Or Component	Area To Be Examined	Reason For Request	Licensee Proposed Alternate Examination
B01.011.001	B-A IWB-2500-1	Reactor Vessel	Lower Head to Shell Weld	Core Guide Lugs Actual Coverage Obtained = 57%	None
B01.012.007	B-A IWB-2500-2	Reactor Vessel	Lower Shell Long. Seam	Core Guide Lugs Actual Coverage Obtained = 81%	None
B01.012.008	B-A IWB-2500-2	Reactor Vessel	Lower Shell Long. Seam	Core Guide Lugs Actual Coverage Obtained = 81%	None
B01.012.009	B-A IWB-2500-2	Reactor Vessel	Lower Shell Long. Seam	Core Guide Lugs Actual Coverage Obtained = 81%	None

EXAMINATION COVERAGE FOR WELD: W13

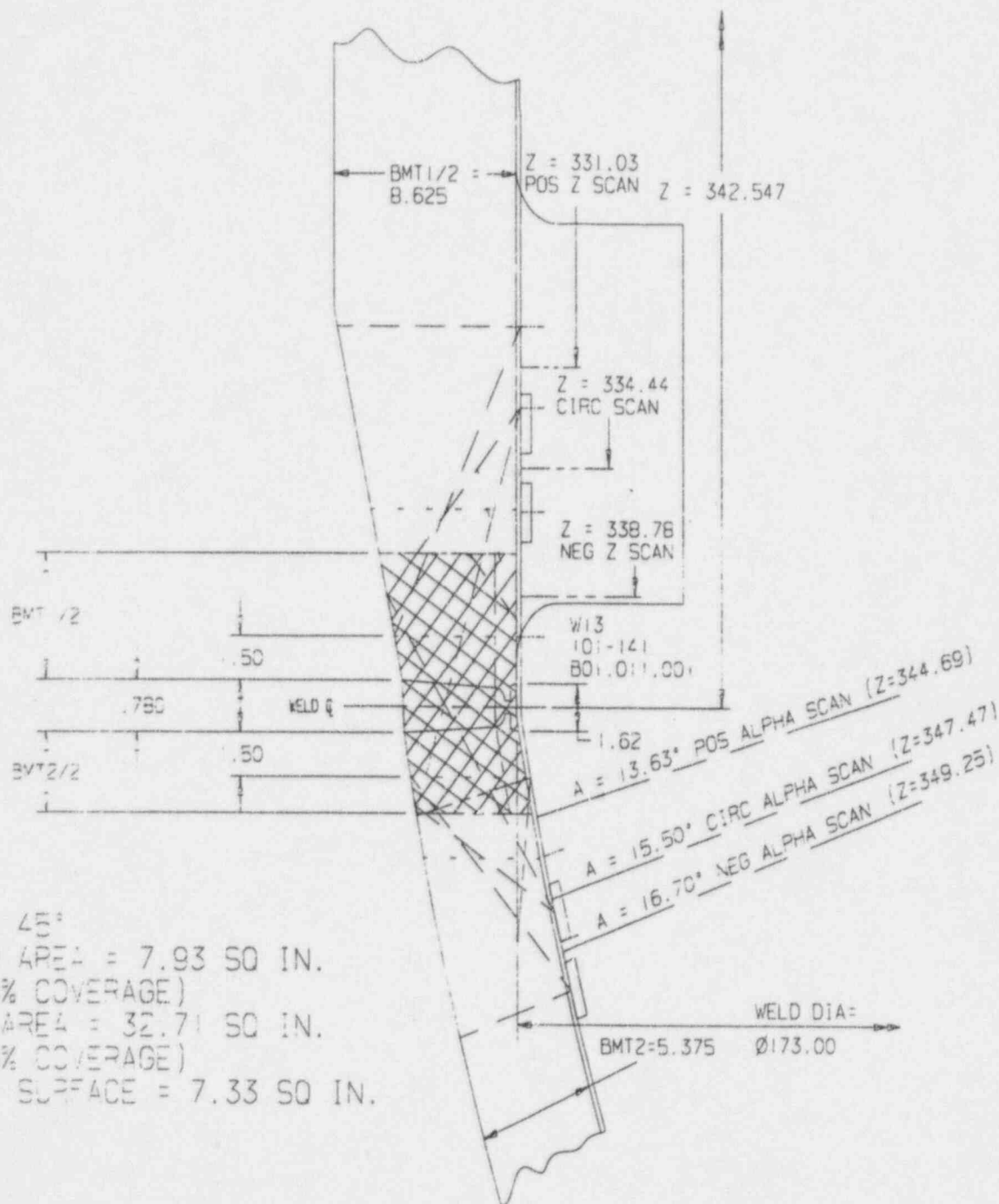
AGGREGATE COVERAGE OBTAINED: 57%

Zone Coverage Obtained							
Weld: 57%		Adjacent Base Metal 57%			Near (ID) Surface: 57%		
Examination Volume Definition							
Weld Length: 543.5 in.							
Area Measurement				Volume Calculation			
Weld	7.93 sq. in.			Weld	4309.955 cu. in.		
Adjacent Base Metal	32.71 sq. in.			Adjacent Base Metal	17777.89 cu. in.		
Near Surface	7.33 sq. in.			Near Surface	3983.855 cu. in.		
Examination Coverage Calculations							
Weld							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	0	n/a	7.9	308.0	2442.4	2442.4	100%
2	0	n/a	0.0	235.5	0.0	1867.5	0%
3	45	1	7.9	308.0	2442.4	2442.4	100%
4	45	2	7.9	308.0	2442.4	2442.4	100%
5	45	1	0.0	235.5	0.0	1867.5	0%
6	45	2	0.0	235.5	0.0	1867.5	0%
7	45	3	7.9	308.0	2442.4	2442.4	100%
8	45	4	7.9	308.0	2442.4	2442.4	100%
9	45	3	0.0	235.5	0.0	1867.5	0%
10	45	4	0.0	235.5	0.0	1867.5	0%
11	60	1	7.9	308.0	2442.4	2442.4	100%
12	60	2	7.9	308.0	2442.4	2442.4	100%
13	60	1	1.0	235.5	242.0	1867.5	13%
14	60	2	0.0	235.5	0.0	1867.5	0%
15	60	3	7.9	308.0	2442.4	2442.4	100%
16	60	4	7.9	308.0	2442.4	2442.4	100%
17	60	3	0.0	235.5	0.0	1867.5	0%
18	60	4	0.0	235.5	0.0	1867.5	0%
Totals:					22223.9	38789.6	57%
Adjacent Base Metal							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	0	n/a	32.7	308.0	10074.7	10074.7	100%
2	0	n/a	0.0	235.5	0.0	7703.2	0%
3	45	1&2	32.7	308.0	10074.7	10074.7	100%
4	45	1&2	0.0	235.5	0.0	7703.2	0%
5	45	3	32.7	308.0	10074.7	10074.7	100%
6	45	4	32.7	308.0	10074.7	10074.7	100%
7	45	3	0.0	235.5	0.0	7703.2	0%
8	45	4	0.0	235.5	0.0	7703.2	0%
9	60	1&2	32.7	308.0	10074.7	10074.7	100%
10	60	1&2	0.0	235.5	0.0	7703.2	0%
11	60	3	32.7	308.0	10074.7	10074.7	100%
12	60	4	32.7	308.0	10074.7	10074.7	100%
13	60	3	0.0	235.5	0.0	7703.2	0%
14	60	4	0.0	235.5	0.0	7703.2	0%
Totals:					70522.8	124445.2	57%
Near Surface							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	70	axial	7.3	308.0	2257.6	2257.6	100%
2	70	axial	0.0	235.5	0.0	1726.2	0%
3	70	circ	7.3	308.0	2257.6	2257.6	100%
4	70	circ	0.0	235.5	0.0	1726.2	0%
Totals:					4515.3	7967.7	57%

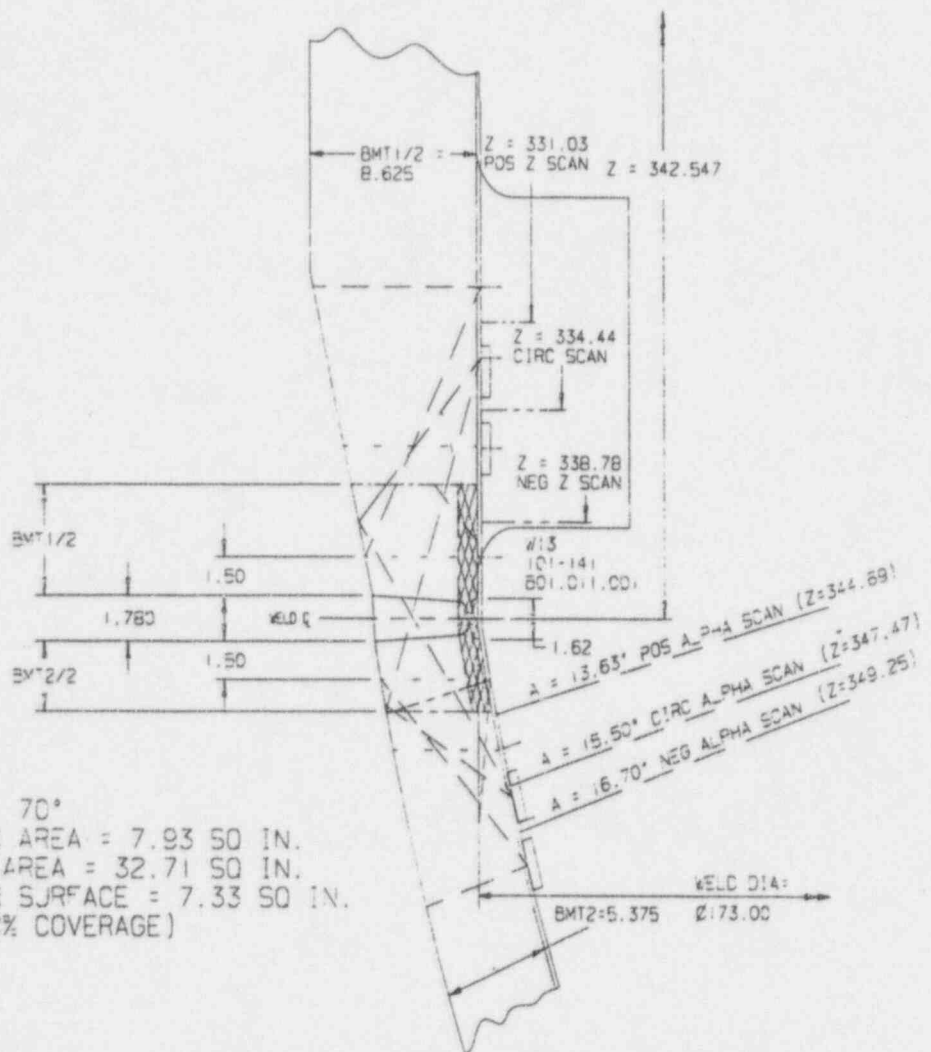
ITEM NO.
B01.011.001



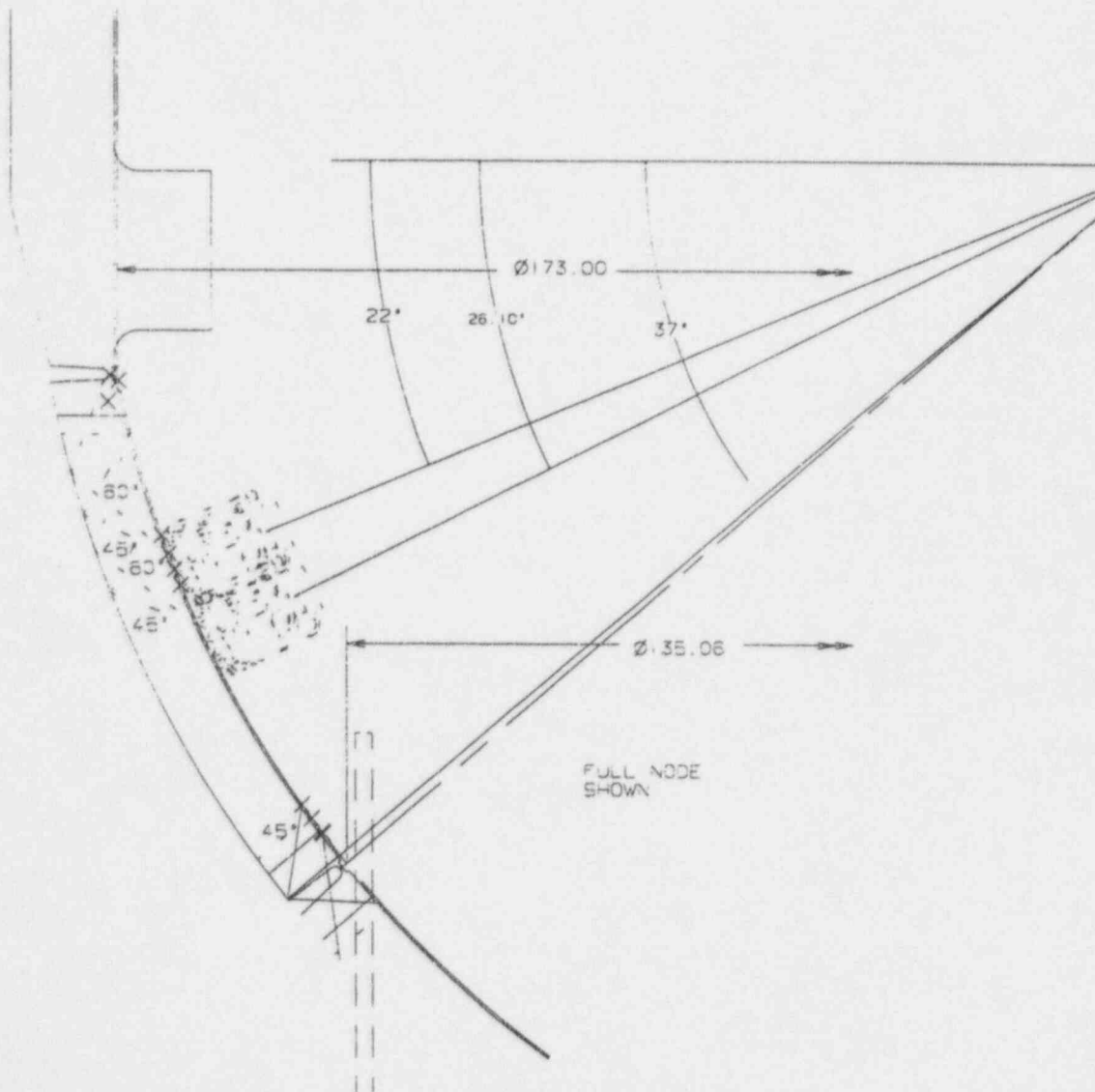
ITEM NO.
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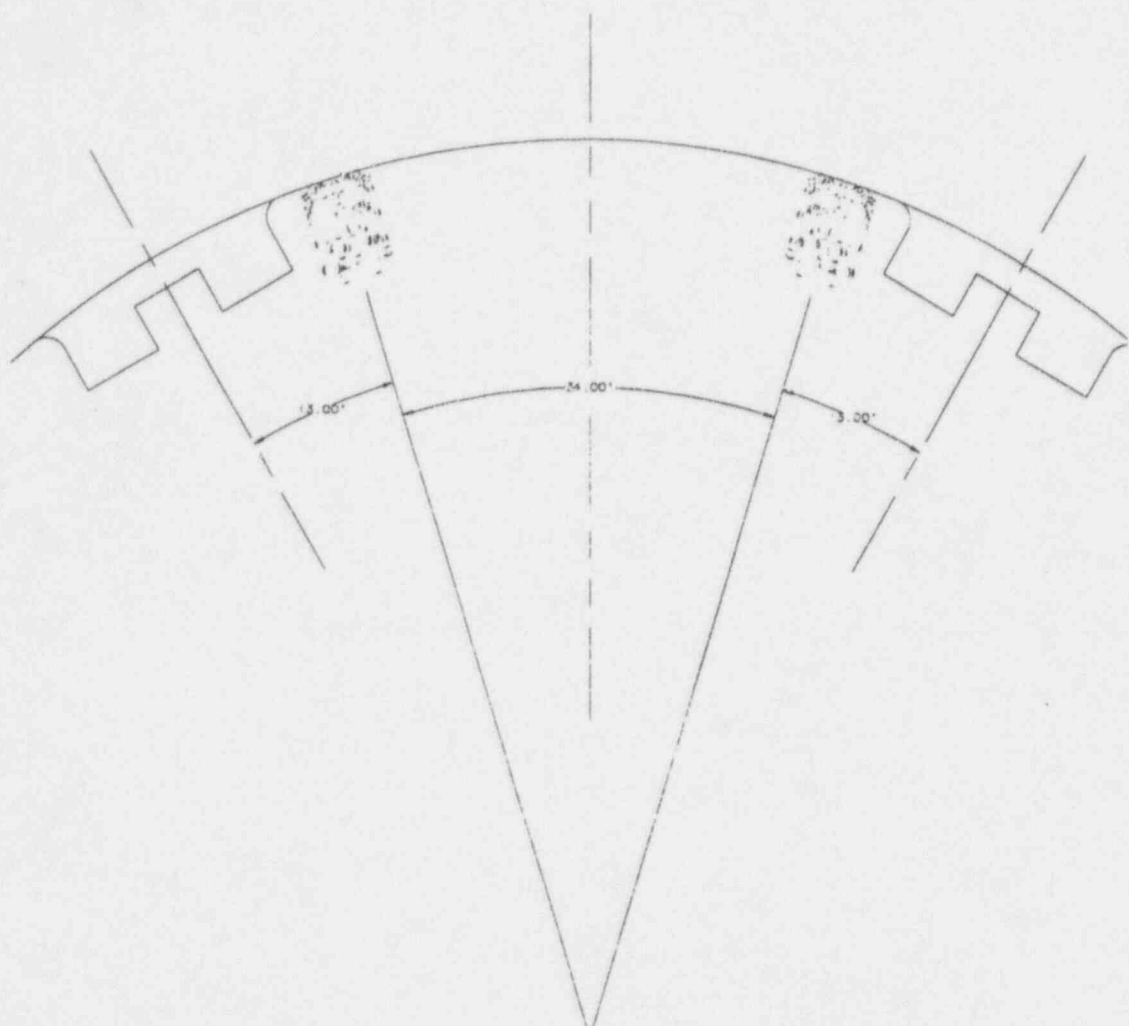
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EXAMINATION COVERAGE FOR WELD: W09

AGGREGATE COVERAGE OBTAINED: 81%

Zone Coverage Obtained							
Weld: 81%		Adjacent Base Metal 81%			Near (ID) Surface: 81%		
Examination Volume Definition							
Weld Length: 97.47 in.							
Area Measurement				Volume Calculation			
Weld		11.86 sq. in.		Weld		1155.994 cu. in.	
Adjacent Base Metal		74.44 sq. in.		Adjacent Base Metal		7255.667 cu. in.	
Near Surface		10.01 sq. in.		Near Surface		975.6747 cu. in.	
Examination Coverage Calculations							
Weld							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	0	n/a	11.9	79.0	936.3	936.3	100%
2	0	n/a	0.0	18.5	0.0	219.6	0%
3	45	1	11.9	79.0	936.3	936.3	100%
4	45	2	11.9	79.0	936.3	936.3	100%
5	45	1	0.0	18.5	0.0	219.6	0%
6	45	2	0.0	18.5	0.0	219.6	0%
7	45	3	11.9	79.0	936.3	936.3	100%
8	45	4	11.9	79.0	936.3	936.3	100%
9	45	3	0.0	18.5	0.0	219.6	0%
10	45	4	0.0	18.5	0.0	219.6	0%
11	60	1	11.9	79.0	936.3	936.3	100%
12	60	2	11.9	79.0	936.3	936.3	100%
13	60	1	0.0	18.5	0.0	219.6	0%
14	60	2	0.0	18.5	0.0	219.6	0%
15	60	3	11.9	79.0	936.3	936.3	100%
16	60	4	11.9	79.0	936.3	936.3	100%
17	60	3	0.0	18.5	0.0	219.6	0%
18	60	4	0.0	18.5	0.0	219.6	0%
Totals:					8427.1	10403.9	81%
Adjacent Base Metal							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	0	n/a	74.4	79.0	5877.0	5877.0	100%
2	0	n/a	0.0	18.5	0.0	1378.6	0%
3	45	1&2	74.4	79.0	5877.0	5877.0	100%
4	45	1&2	0.0	18.5	0.0	1378.6	0%
5	45	3	74.4	79.0	5877.0	5877.0	100%
6	45	4	74.4	79.0	5877.0	5877.0	100%
7	45	3	0.0	18.5	0.0	1378.6	0%
8	45	4	0.0	18.5	0.0	1378.6	0%
9	60	1&2	74.4	79.0	5877.0	5877.0	100%
10	60	1&2	0.0	18.5	0.0	1378.6	0%
11	60	3	74.4	79.0	5877.0	5877.0	100%
12	60	4	74.4	79.0	5877.0	5877.0	100%
13	60	3	0.0	18.5	0.0	1378.6	0%
14	60	4	0.0	18.5	0.0	1378.6	0%
Totals:					41139.3	50789.7	81%
Near Surface							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	70	axial	10.0	79.0	790.3	790.3	100%
2	70	axial	0.0	18.5	0.0	185.4	0%
3	70	circ	10.0	79.0	790.3	790.3	100%
4	70	circ	0.0	18.5	0.0	185.4	0%
Totals:					1580.6	1551.3	81%

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EXAMINATION COVERAGE FOR WELD: W10

AGGREGATE COVERAGE OBTAINED: 81%

Zone Coverage Obtained							
Weld: 81%		Adjacent Base Metal 81%			Near (ID) Surface: 81%		
Examination Volume Definitions							
Weld Length: 97.47							
Area Measurement				Volume Calculation			
Weld		11.86 sq. in.		Weld		1155.994 cu. in.	
Adjacent Base Metal		74.44 sq. in.		Adjacent Base Metal		7255.667 cu. in.	
Near Surface		10.01 sq. in.		Near Surface		975.6747 cu. in.	
Examination Coverage Calculations							
Weld							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	0	n/a	11.9	79.0	936.3	936.3	100%
2	0	n/a	0.0	18.5	0.0	219.6	0%
3	45	1	11.9	79.0	936.3	936.3	100%
4	45	2	11.9	79.0	936.3	936.3	100%
5	45	1	0.0	18.5	0.0	219.6	0%
6	45	2	0.0	18.5	0.0	219.6	0%
7	45	3	11.9	79.0	936.3	936.3	100%
8	45	4	11.9	79.0	936.3	936.3	100%
9	45	3	0.0	18.5	0.0	219.6	0%
10	45	4	0.0	18.5	0.0	219.6	0%
11	60	1	11.9	79.0	936.3	936.3	100%
12	60	2	11.9	79.0	936.3	936.3	100%
13	60	1	0.0	18.5	0.0	219.6	0%
14	60	2	0.0	18.5	0.0	219.6	0%
15	60	3	11.9	79.0	936.3	936.3	100%
16	60	4	11.9	79.0	936.3	936.3	100%
17	60	3	0.0	18.5	0.0	219.6	0%
18	60	4	0.0	18.5	0.0	219.6	0%
Totals:					8427.1	10403.9	81%
Adjacent Base Metal							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	0	n/a	74.4	79.0	5877.0	5877.0	100%
2	0	n/a	0.0	18.5	0.0	1378.6	0%
3	45	1&2	74.4	79.0	5877.0	5877.0	100%
4	45	1&2	0.0	18.5	0.0	1378.6	0%
5	45	3	74.4	79.0	5877.0	5877.0	100%
6	45	4	74.4	79.0	5877.0	5877.0	100%
7	45	3	0.0	18.5	0.0	1378.6	0%
8	45	4	0.0	18.5	0.0	1378.6	0%
9	60	1&2	74.4	79.0	5877.0	5877.0	100%
10	60	1&2	0.0	18.5	0.0	1378.6	0%
11	60	3	74.4	79.0	5877.0	5877.0	100%
12	60	4	74.4	79.0	5877.0	5877.0	100%
13	60	3	0.0	18.5	0.0	1378.6	0%
14	60	4	0.0	18.5	0.0	1378.6	0%
Totals:					41139.3	50789.7	81%
Near Surface							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	70	axial	10.0	79.0	790.3	790.3	100%
2	70	axial	0.0	18.5	0.0	185.4	0%
3	70	circ	10.0	79.0	790.3	790.3	100%
4	70	circ.	0.0	18.5	0.0	185.4	0%
Totals:					1580.6	1951.3	81%

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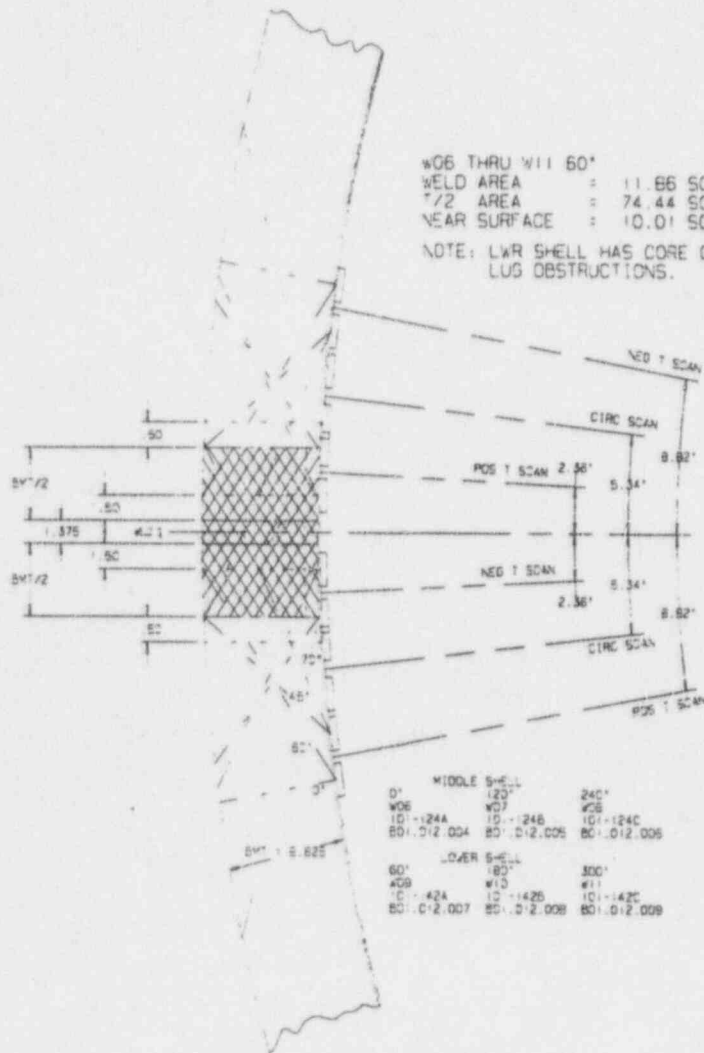
EXAMINATION COVERAGE FOR WELD: W11

AGGREGATE COVERAGE OBTAINED: 81%

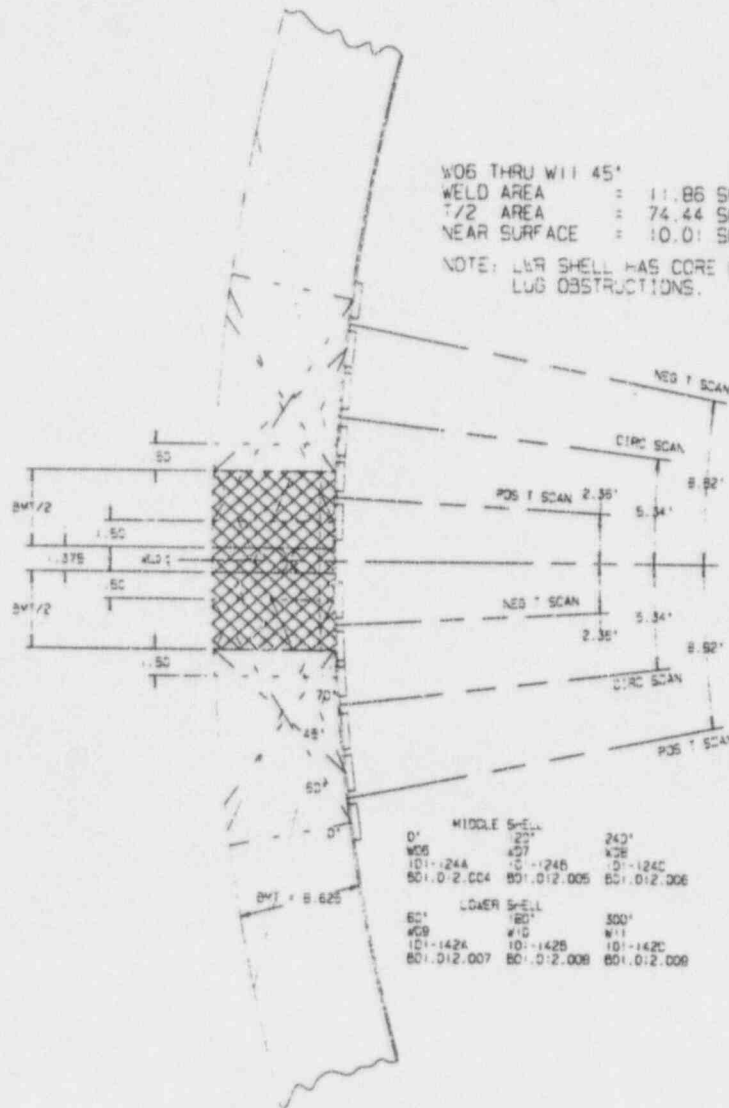
Zone Coverage Obtained							
Weld: 81%		Adjacent Base Metal 81%			Near (ID) Surface: 81%		
Examination Volume Definition							
Weld Length: 97.47 in.							
Area Measurement				Volume Calculation			
Weld	11.86 sq. in.			Weld	1155.994 cu. in.		
Adjacent Base Metal	74.44 sq. in.			Adjacent Base Metal	7255.667 cu. in.		
Near Surface	10.01 sq. in.			Near Surface	975.6747 cu. in.		
Examination Coverage Calculations							
Weld							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	0	n/a	11.9	79.0	936.3	936.3	100%
2	0	n/a	0.0	18.5	0.0	219.6	0%
3	45	1	11.9	79.0	936.3	936.3	100%
4	45	2	11.9	79.0	936.3	936.3	100%
5	45	1	0.0	18.5	0.0	219.6	0%
6	45	2	0.0	18.5	0.0	219.6	0%
7	45	3	11.9	79.0	936.3	936.3	100%
8	45	4	11.9	79.0	936.3	936.3	100%
9	45	3	0.0	18.5	0.0	219.6	0%
10	45	4	0.0	18.5	0.0	219.6	0%
11	60	1	11.9	79.0	936.3	936.3	100%
12	60	2	11.9	79.0	936.3	936.3	100%
13	60	1	0.0	18.5	0.0	219.6	0%
14	60	2	0.0	18.5	0.0	219.6	0%
15	60	3	11.9	79.0	936.3	936.3	100%
16	60	4	11.9	79.0	936.3	936.3	100%
17	60	3	0.0	18.5	0.0	219.6	0%
18	60	4	0.0	18.5	0.0	219.6	0%
Totals:					8427.1	10403.9	81%
Adjacent Base Metal							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	0	n/a	74.4	79.0	5877.0	5877.0	100%
2	0	n/a	0.0	18.5	0.0	1378.6	0%
3	45	1&2	74.4	79.0	5877.0	5877.0	100%
4	45	1&2	0.0	18.5	0.0	1378.6	0%
5	45	3	74.4	79.0	5877.0	5877.0	100%
6	45	4	74.4	79.0	5877.0	5877.0	100%
7	45	3	0.0	18.5	0.0	1378.6	0%
8	45	4	0.0	18.5	0.0	1378.6	0%
9	60	1&2	74.4	79.0	5877.0	5877.0	100%
10	60	1&2	0.0	18.5	0.0	1378.6	0%
11	60	3	74.4	79.0	5877.0	5877.0	100%
12	60	4	74.4	79.0	5877.0	5877.0	100%
13	60	3	0.0	18.5	0.0	1378.6	0%
14	60	4	0.0	18.5	0.0	1378.6	0%
Totals:					41139.3	50789.7	81%
Near Surface							
Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined
1	70	axial	10.0	79.0	790.3	790.3	100%
2	70	axial	0.0	18.5	0.0	185.4	0%
3	70	circ	10.0	79.0	790.3	790.3	100%
4	70	circ	0.0	18.5	0.0	185.4	0%
Totals:					1580.6	1951.3	81%

ITEM NO.
B01.012.009

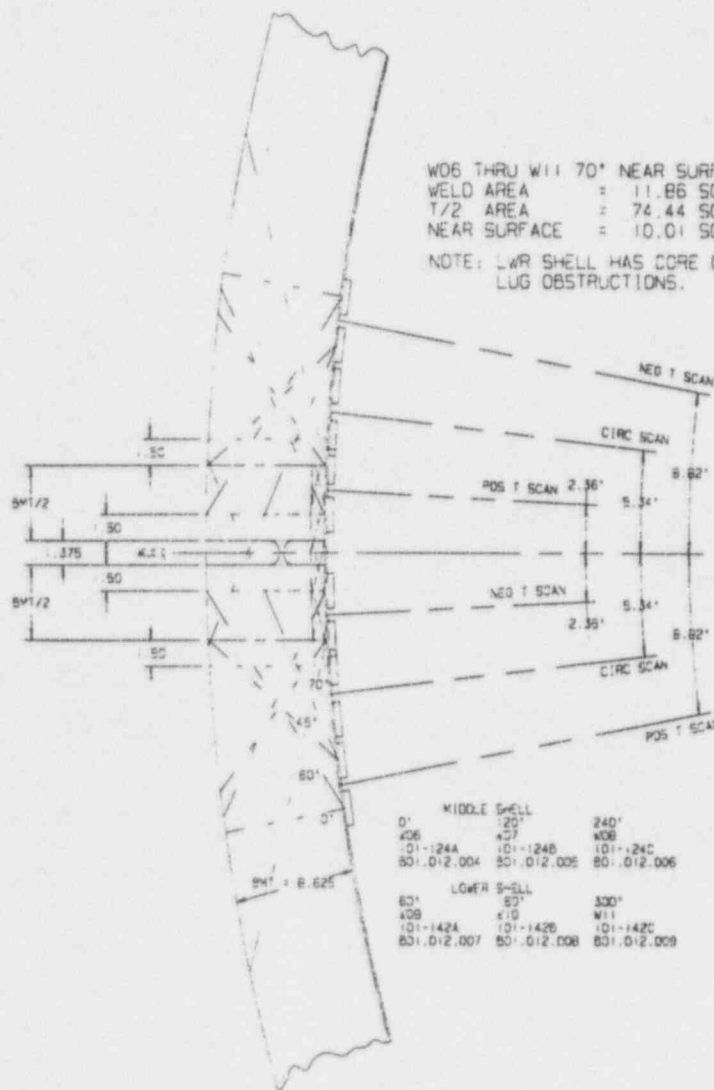
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WOB THRU W11 70" NEAR SURFACE
 WELD AREA = 11.86 SQ IN.
 T/2 AREA = 74.44 SQ IN.
 NEAR SURFACE = 10.01 SQ IN. (100% COVERAGE)

NOTE: LWR SHELL HAS CORE GUIDE
 LUG OBSTRUCTIONS.

MIDDLE SHELL		
01	20"	240"
406	427	408
01-124A	101-124B	101-124C
801.D12.004	801.D12.005	801.D12.006
LOWER SHELL		
60"	50"	330"
409	410	411
101-142A	101-142B	101-142C
801.D12.007	801.D12.008	801.D12.009

ITEM NO.
 B01.012.009