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Michael R. Kansler
President

April 27, 2004
NL-04-045

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

SUBJECT: Indian Point Nuclear Generating Units No. 2 and No. 3
Docket No. 50-247, and 50-286
**Reply to RAI regarding Relief Requests to Use ASME Code Case N-613-1;
Reactor Vessel Nozzle-to-Vessel Weld Inspections (TAC MC1698 & MC1699)**

- References:
1. USNRC letter from Patrick D. Milano to Michael Kansler; "Request for Additional Information Regarding Relief Requests to Use Code Case N-613-1 For Reactor Vessel Nozzle-to-Vessel Weld Inspections", dated March 15, 2004.
 2. Entergy letter to NRC, NL-03-188, regarding "Alternative to Use Code Case N-613-1 for Reactor Vessel Nozzle to Vessel Weld Inspection", dated December 30, 2003.

Dear Sir or Madam:

This letter provides a reply to the Request for Additional Information (RAI) from the Nuclear Regulatory Commission (Reference 1) regarding the relief requests submitted by Entergy Nuclear Operations, Inc (Entergy) in Reference 2, for use of ASME Code Case N-613-1. During a April 7, 2004 telecon with the NRC Project Manager, it was mutually agreed that the RAI response would be submitted by the end of April 2004.

Entergy's responses to the RAI questions are provided in Attachment I. Entergy also is revising the relief requests based on the RAI responses. Enclosure 1 is the revised relief request, RR-67, for Indian Point 2 (IP2) and Enclosure 2 is the revised relief request, RR 3-36, for Indian Point 3 (IP3).

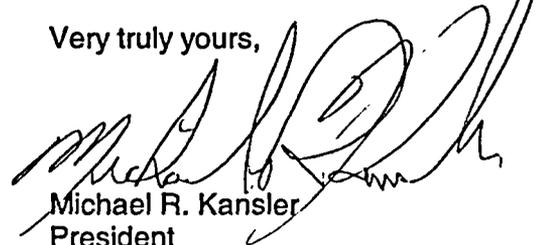
Code Case N-613-1 establishes examination volume requirements for ultrasonic examination of reactor vessel nozzle-to-vessel welds as an alternative to the examination volume requirements specified in the ASME Boiler and Pressure Vessel Code, Section XI, Subsection IWB. Use of the code case in its entirety provides an acceptable level of quality and safety for examination of the affected welds, pursuant to 10 CFR 50.55a(a)(3)(i).

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Approval of RR-67 (Revision 1) for IP2 is requested by August 30, 2004 to support the IP2 Fall 2004 refueling outage. Due to the similarity of these requests for relief, it is also requested that approval of RR 3-36 (Revision 1) for IP3 be granted at the same time.

There are no new commitments made in this letter. If you have any questions, please contact Ms. Charlene Faison at 914-272-3378.

Very truly yours,



Michael R. Kansler
President
Entergy Nuclear Operations, Inc.

Attachment I: Response to RAI Regarding Request for Relief to Use ASME Code Case N-613-1.

Enclosures: 1. Indian Point Generating Station Unit No. 2, RR-67, Revision 1.
2. Indian Point Generating Station Unit No. 3, RR 3-36, Revision 1.

cc:

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ATTACHMENT I TO NL-04-045

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING
REQUEST FOR RELIEF TO USE ASME CODE CASE N-613-1**

**ENTERGY NUCLEAR OPERATIONS, INC
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 AND 3
DOCKETS 50-247 AND 50-286**

Response to RAI Regarding Request for Relief to Use ASME Code Case N-613-1

Question 1:

The licensee states that, "The examination (exam) volumes for the reactor vessel nozzle to vessel welds are unnecessarily large." It further state that, "Entergy shall ensure that the high stressed areas of the [IP2 and 3] reactor vessel nozzle to shell welds shall be included in the examination."

Provide a description of the analyses and results to indicate the extent and magnitude of the stresses associated with the nozzle to vessel welds at IP2 and 3 in support of the contention that highly stressed areas of the reactor vessel nozzle to shell welds will be included in the examination.

Response to Question 1:

The stresses in the nozzle-to-shell weld are derived from two primary sources, operational stresses and weld residual stresses.

The operational stresses are derived from internal pressure in the vessel and temperature changes which occur during operational transients. These stresses are limited by design to ensure that ASME Code stress limits are met. Also, a fatigue analysis is required by Section III to ensure that the component is unlikely to initiate flaws during operation from this source. The fatigue usage in the nozzle-to-shell weld region is less than 0.1, as compared to the code limit of 1.0.

Stresses caused by welding are concentrated at and near the weld. The weld residual stresses are reduced through post-weld stress relief heat treatment. Weld residual stresses that remain after the heat treatment decrease significantly as a function of distance from the weld boundary.

Since operational and weld residual stresses are limited by design requirements and the stress relief heat treatment, creation of flaws during plant service is unlikely due to the low stresses in the base metal away from the weld. In addition, the affected areas were previously examined in the previous two inspection intervals, with acceptable results, using the larger volume examination requirements specified in the ASME Boiler and Pressure Vessel Code.

Since Entergy intends to implement Code Case N-613-1 in its entirety, the statement "Entergy shall ensure that the high stressed areas ... be included in the examination" was changed to say "The weld volume and the adjacent base metal volume will be examined in accordance with the requirements of Code Case N-613-1", in the revised relief requests (Enclosures 1 and 2).

In summary, the stresses in the nozzle-to-shell region of the reactor vessel are all within the code allowable values, and the usage factor is small (less than ten percent of the code limit). Therefore the alternative inspection requirements as proposed in the relief requests are sufficient to ensure that potential indications are found, and that the structural integrity of the reactor vessel is maintained.

Question 2:

The weld sketches shown on the "Wesdyne" sketches (Attachment 2 to the December 30 letter) are idealized drawings, which infer that the welds were square butt welds and welded perfectly. Since the welds to be examined are not ideal, perfect welds, it is unclear how the licensee will be able to precisely locate the extremities (widest sections) of the nozzle-to-vessel welds. It is unclear how repaired areas (fabrication or inservice) extending beyond the ideal weld cross-sectional area are identified, and how these areas will be examined.

- a. Discuss the documentation available of the actual cross-sectional dimensions and precise locations of repaired areas for all RPV Nozzle-to Vessel welds and IP2 and 3. Discuss the process for defining new examination volumes that encompass the repair areas.*
- b. If examination personnel are to identify the extremities (widest sections) of the nozzle-to-vessel welds, what positive means of examination (such as weld etching) will be used to identify the weld extremities? Will the weld extremities be identified on both the inside and outside diameters of the vessel to ensure complete coverage of the welds?*
- c. Describe the process for accurately determining the location of ultrasonic reflectors with respect to the proposed new examination volumes.*

Response to Question 2a:

The examination volume sketches (see WesDyne sketches included with the Relief Requests) duplicate the depiction of the weld nugget as it is shown in the reactor vessel nozzle design detail drawing (CE proprietary drawing E-234-045-1). Indian Point Units 2 and 3 are dimensionally identical in this regard. This is the most reliable source of dimensional data for defining the examination volume.

A records check for the Indian Point Unit 2 and 3 reactor nozzle welds was conducted. There is no evidence of repairs being conducted on the nozzle-to-shell welds for either IP2 or IP3 reactor vessel. Documentation checked included manufacturing deviations, supplier correspondence and supplier certifications.

Response to Question 2b:

The weld volume is defined using dimensional data from design drawings as described in response to question 2(a). To ensure the extremities of the weld are included in the examination volume, a margin of 0.5 inches is conservatively added to the scanning path of all transducers in all directions as allowed by component geometry. This is standard practice for nozzle-to-shell, shell welds, and nozzle-to-pipe welds examinations. The WesDyne sketches included in the relief requests have been revised to reflect this additional conservatism.

Response to Question 2c:

Appendix VIII qualified ultrasonic techniques will be applied from the nozzle bore and from the vessel shell inside diameter surface to accomplish the examination.

Question 3:

In various sections of the relief requests, the licensee has defined the proposed reduced examination volume as: (a) "...examination of the base material volume extending ½ inch from each side of the weld."; (b) "...½ inch of base metal on each side of the thickest portion of the weld," (c) "...½ inch from the weld," and (d) "The weld and surrounding ½ inch volume..." These definitions can possibly be interpreted in different ways, some of which do not capture the requirements shown in Code Case N-613-1.

Revise the relief requests to define the examination volume in terms that are unambiguous and conform with Code Case N-613-1. If not, provide the justification.

Response to Question 3:

The proposed reduced examination volume will conform to Code Case N-613-1. The relief requests have been revised to ensure consistent use of terminology defining the examination volume.

**INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
THIRD TEN-YEAR INTERVAL INSERVICE INSPECTION PROGRAM
RELIEF REQUEST RR-67, Rev. 1**

Proposed Alternative
In Accordance with 10CFR50.55a(a)(3)(i)

--Alternative Provides Acceptable Level of Quality and Safety--

1. ASME Code Component(s) Affected

Component Numbers: ASME Code Class 1 Reactor Vessel Nozzle-to-Vessel Welds

Examination Category: B-D

Item Number: B3.90 – Nozzle-to-Vessel Welds

2. Applicable Code Edition and Addenda

The Code of Record for the Third Inservice Inspection Interval is ASME Section XI Code, 1989 Edition, No Addenda.

3. Applicable Code Requirements

ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1989 Edition with No Addenda: Table IWB-2500-1 Code Item B3.90, Figures IWB-2500-7 (a) thru (d) for defining the examination volume of the reactor vessel nozzle-to-vessel welds. The examination requirements for reactor vessel nozzle-to-vessel welds are defined in the ASME Code, Section XI, Appendix VIII, Supplements 4, 6 and 7, 1995 Edition, 1996 Addenda as modified by 10 CFR 50.55a. Eight (8) RPV nozzle-to-vessel welds, 4 inlet and 4 outlet, are planned for examination in 2004 as follows:

Nozzle-to-Vessel Weld RPVN1 @ 22° Azimuth

Nozzle-to-Vessel Weld RPVN2 @ 67° Azimuth

Nozzle-to-Vessel Weld RPVN3 @ 113° Azimuth

Nozzle-to-Vessel Weld RPVN4 @ 158° Azimuth

Nozzle-to-Vessel Weld RPVN5 @ 202° Azimuth

Nozzle-to-Vessel Weld RPVN6 @ 247° Azimuth

Nozzle-to-Vessel Weld RPVN7 @ 293° Azimuth

Nozzle-to-Vessel Weld RPVN8 @ 338° Azimuth

4. Reason for Request

The Code required examination volume of the nozzle-to-vessel welds is unnecessarily large. The proposed alternative to use Code Case N-613-1 in its entirety will not affect the flaw detection capabilities in the weld and the heat affected zone, and provides an adequate level of quality and safety for examination of the affected welds.

5. Proposed Alternative

In accordance with 10CFR50.55a(a)(3)(i), Entergy Nuclear Operations, Inc. (Entergy) requests relief from the $t_s/2$ (t_s is equal to the vessel wall thickness) examination volume requirement and proposes to use Code Case N-613-1 in its entirety for the inspection of the reactor vessel nozzle-to-vessel welds. The examination volume will be as defined in detail within Code Case N-613-1 (Attachment 1) and as represented in the WesDyne sketches (Attachment 2).

Basis for Use

The examination (exam) volumes for the reactor vessel nozzle-to-vessel welds are unnecessarily large. For the IP2 reactor vessel, the nozzle-to-vessel volume would extend about 5 inches into the nozzle forging and the same distance into the upper shell course forging. This proposed alternative would redefine the examination volume boundary (in accordance with Code Case N-613-1). This reduction in base metal inspection will not affect the flaw detection capabilities in the weld and heat affected zone. Compliance with these requirements will assure the requisite level of quality and safety is maintained.

The proposed reduction in exam volume is for base metal only, which was extensively interrogated by ultrasonic examination during fabrication, preservice examinations and in the last inservice examinations performed in 1995 (at the end of the second interval). In 1995, the data was acquired, archived and analyzed using automated ultrasonic systems. Entergy is confident that reasonable comparisons can be made between the past and present, if necessary. During the 1995 examinations, there were no unacceptable indications found in the eight-reactor vessel nozzle-to-vessel examination volumes, including the base metal areas proposed for exclusion from examination in this request. The 1995 results were based on examinations performed in accordance with the ASME Code, Section XI, Section V and Regulatory Guide 1.150, Rev. 1.

The Section XI examination volume for the pressure retaining nozzle-to-vessel welds extends from the edge of the weld to include a significant portion of the nozzle forging body (inward) and reactor vessel upper shell course (outward) which is a forged ring. The large volume results in a significant increase in examination time with no corresponding increase in safety as the greatest portion of the volume is base material not prone to inservice cracking.

The implementation of this request for relief would reduce the examination volume as outlined in Code Case N-613-1 and the attached WesDyne sketches. This reduction applies only to the base metal and not the weld metal.

The weld volume and the adjacent base metal volume will be examined in accordance with Code Case N-613-1. The examinations shall consist of techniques and procedures qualified in accordance with the ASME Code, Section XI, Appendix VIII, and supplements 4, 6 and 7. The weld and base metal volumes (in accordance with Code Case N-613-1) will be interrogated from the nozzle bore using techniques and procedures specifically qualified to inspect the nozzle-to-vessel weld from the nozzle bore. These procedures were qualified in January 2003 in accordance with Appendix VIII, Supplement 7 as administered by the PDI.

The nozzle-to-vessel examination volume is also accessible from the vessel ID surface and will be examined in four orthogonal directions for the first 15 percent of weld thickness with respect to the vessel ID surface using Appendix VIII, Supplement 4 qualified techniques. The remaining 85 percent of weld volume accessible from the vessel ID surface will be examined in two opposing circumferential scanning directions using Appendix VIII, Supplement 6 qualified techniques to interrogate for transverse defects.

This combination of scans address the requirements set forth by the ASME Code, Section XI, 1995 Edition with 1996 Addenda as modified by 10CFR50.55a and assures that current qualified technology will be applied to the redefined examination volume specified herein to the maximum extent practical. Compliance with these requirements will assure the requisite level of quality and safety is maintained.

6. Duration of Proposed Alternative

Entergy proposes to use the alternative for the remainder of the Third Inservice Inspection Interval for IP2.

7. Precedents

A similar request for relief was approved for Hope Creek (Docket No. 50-354, TAC NO. MB7839, dated August 26, 2003).

8. Attachments

1. Code Case N-613-1 (for information)
2. WesDyne Sketches, Indian Point Units 2 and 3 (TYP.), RPV Inlet and Outlet Nozzles Examination Volume – Code Case N-613-1 (2 pages), Rev. 1, dated 03-16-04

CASE

N-613-1

CASES OF ASME BOILER AND PRESSURE VESSEL CODE

Approval Date: August 20, 2002

See Numeric Index for expiration
and any reaffirmation dates.

Case N-613-1

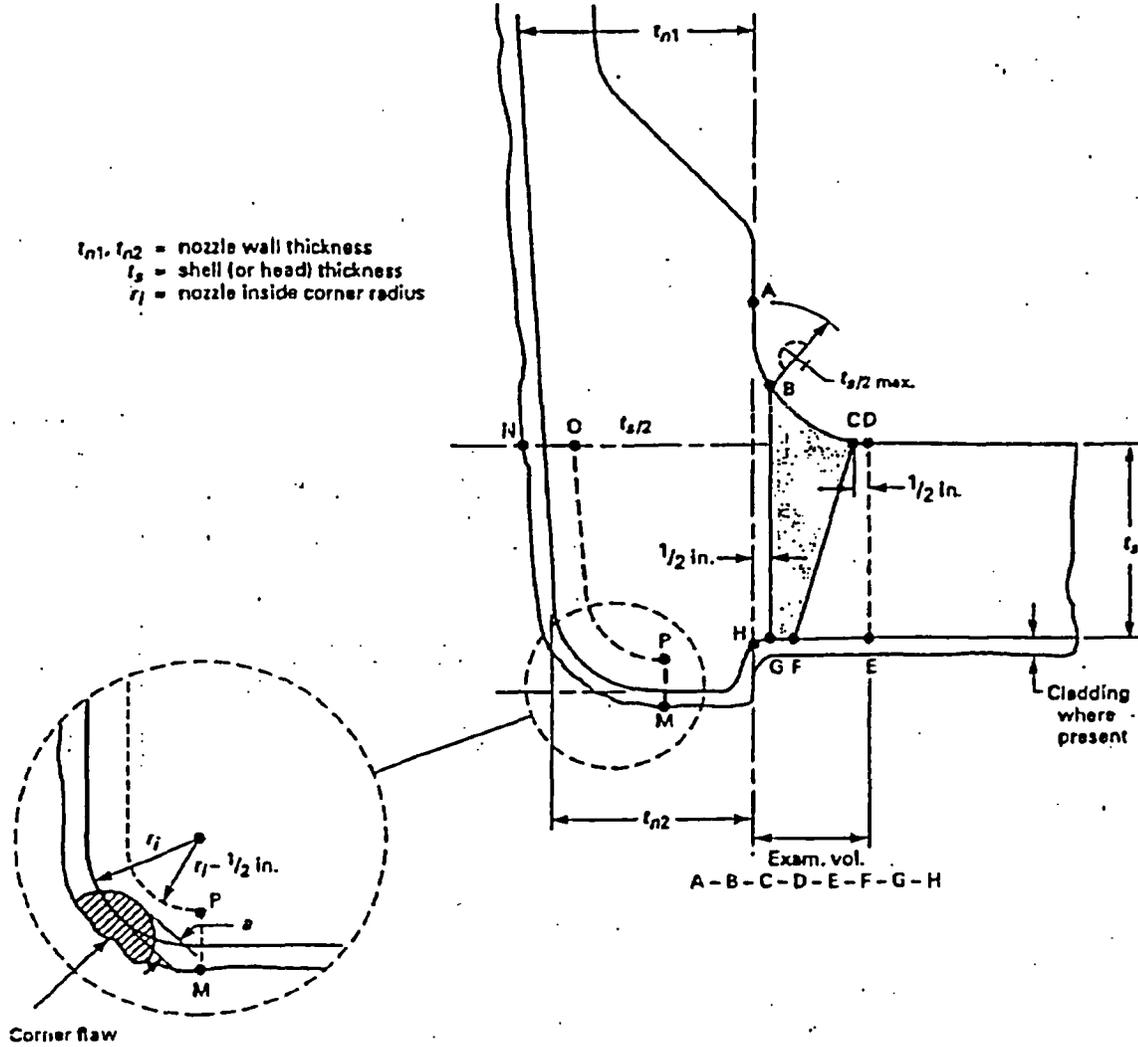
Ultrasonic Examination of Full Penetration
Nozzles in Vessels, Examination Category B-D,
Item No's. B3.10 and B3.90, Reactor Nozzle-To-
Vessel Welds, Figs. IWB-2500-7(a), (b), and (c)
Section XI, Division 1

Inquiry: What alternatives to the examination volume
requirements of Figs. IWB-2500-7(a), (b), and (c) are
permissible for ultrasonic examination of reactor-nozzle-
to-vessel welds?

Reply: It is the opinion of the Committee that Cate-
gory B-D nozzle-to-vessel welds previously ultrasoni-
cally examined using the examination volumes of Figs.
IWB-2500-7(a), (b), and (c) may be examined using
the reduced examination volume (A-B-C-D-E-F-G-H)
of Figs. 1, 2, and 3.

CASE (continued)
 N-613-1

CASES OF ASME BOILER AND PRESSURE VESSEL CODE



EXAMINATION REGION [Note (1)]

- Shell (or head) adjoining region
- Attachment weld region
- Nozzle cylinder region
- Nozzle inside corner region

EXAMINATION VOLUME [Note (2)]

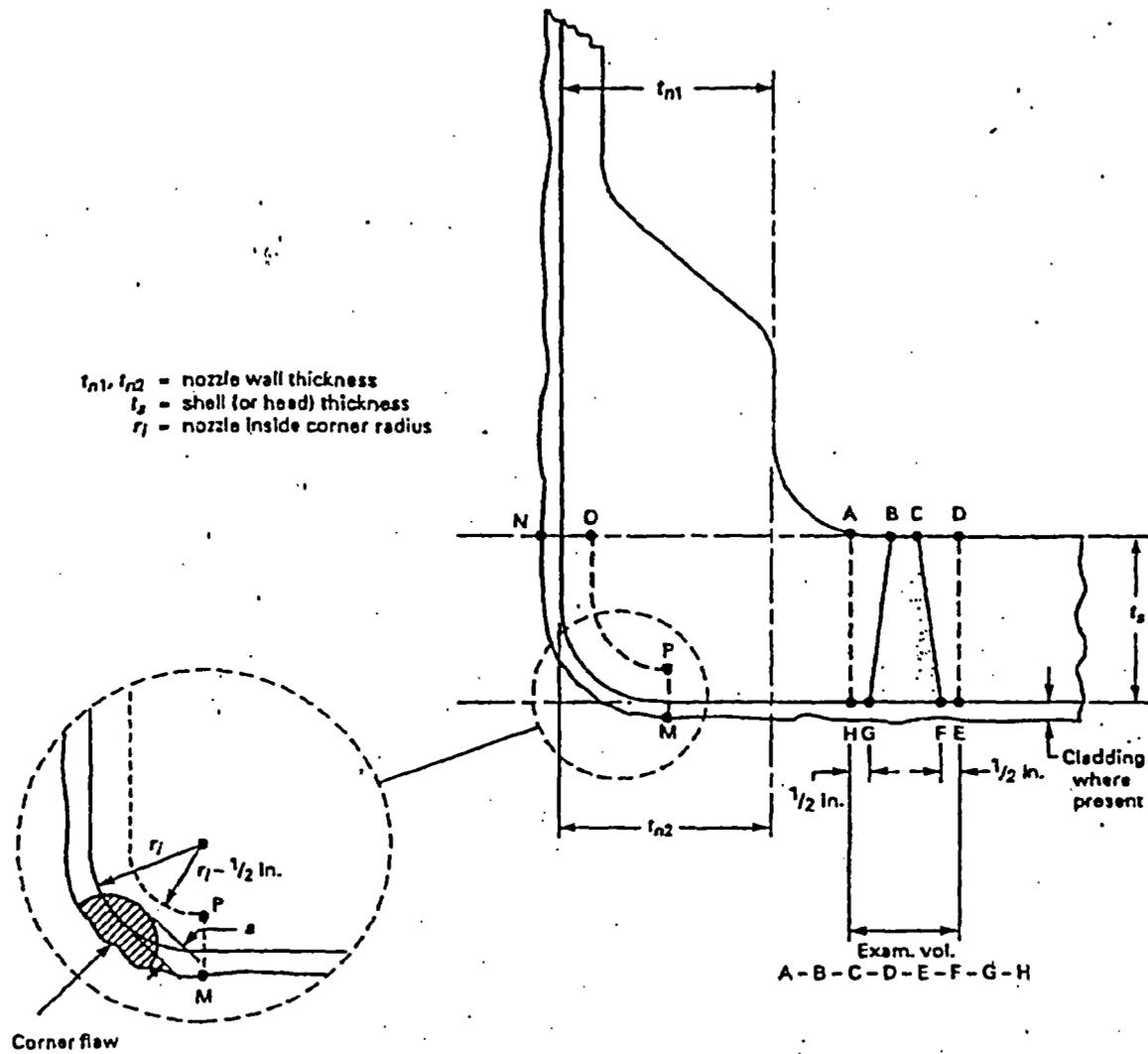
- C-D-E-F
- B-C-F-G
- A-B-G-H
- M-N-O-P

NOTES:

- (1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.
- (2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. 1 NOZZLE IN SHELL OR HEAD
 (Examination Zones In Barrel Type Nozzles Joined by Full Penetration Corner Welds)

CASES OF ASME BOILER AND PRESSURE VESSEL CODE



EXAMINATION REGION [Note (1)]

- Shell (or head) adjoining region
- Attachment weld region
- Nozzle cylinder region
- Nozzle inside corner region

EXAMINATION VOLUME [Note (2)]

- C-D-E-F
- B-C-F-G
- A-B-G-H
- M-N-O-P

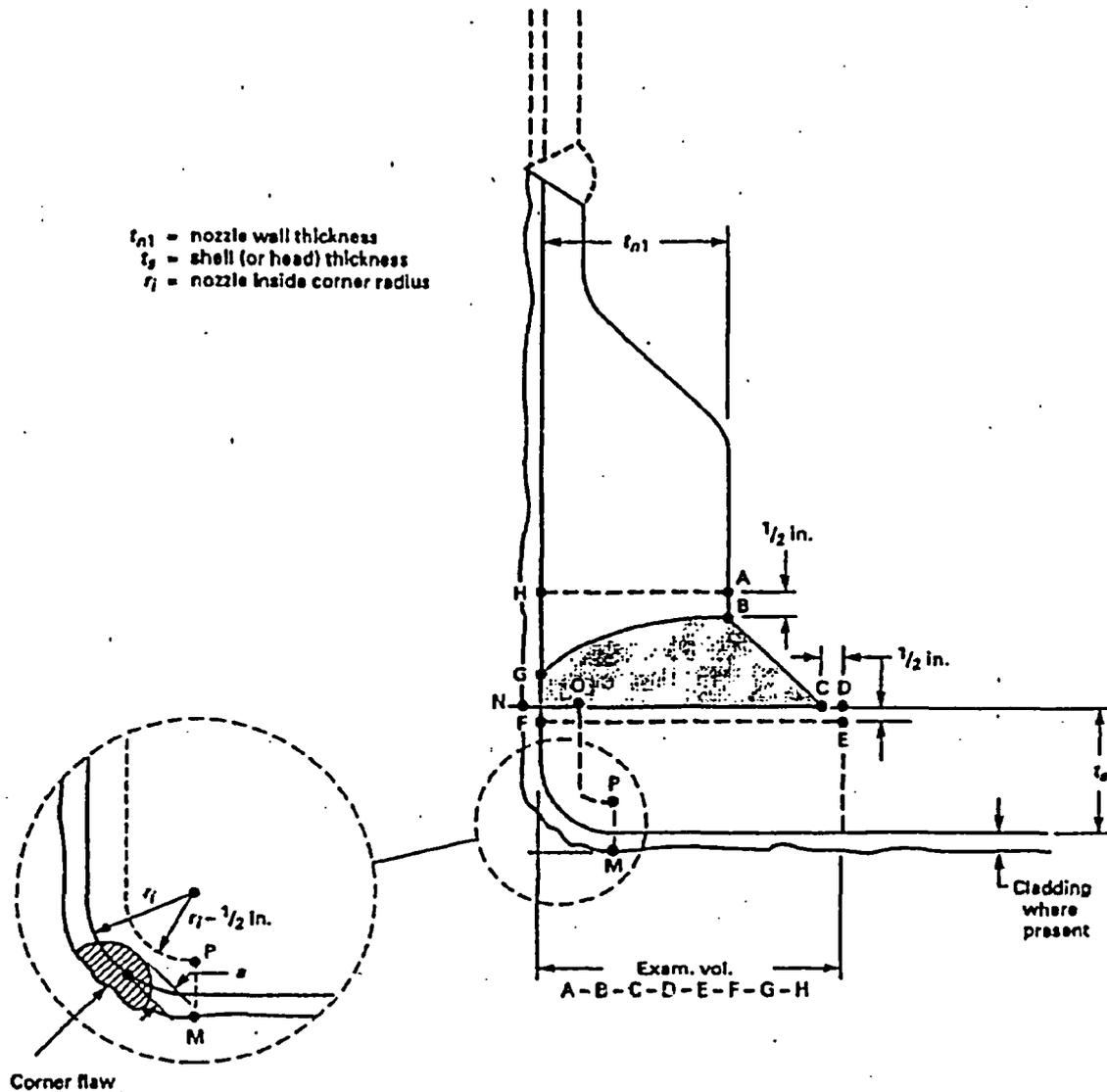
NOTES:

- (1) Examination regions are identified for the purpose of differentiating the acceptance standards in WB-3512.
- (2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. 2 NOZZLE IN SHELL OR HEAD
 (Examination Zones in Flange Type Nozzles Joined by Full Penetration Butt Welds)

CASE (continued)
N-613-1

CASES OF ASME BOILER AND PRESSURE VESSEL CODE



t_{n1} = nozzle wall thickness
 t_s = shell (or head) thickness
 r_1 = nozzle inside corner radius

EXAMINATION REGION [Note (1)]

- Shell (or head) adjoining region
- Attachment weld region
- Nozzle cylinder region
- Nozzle inside corner region

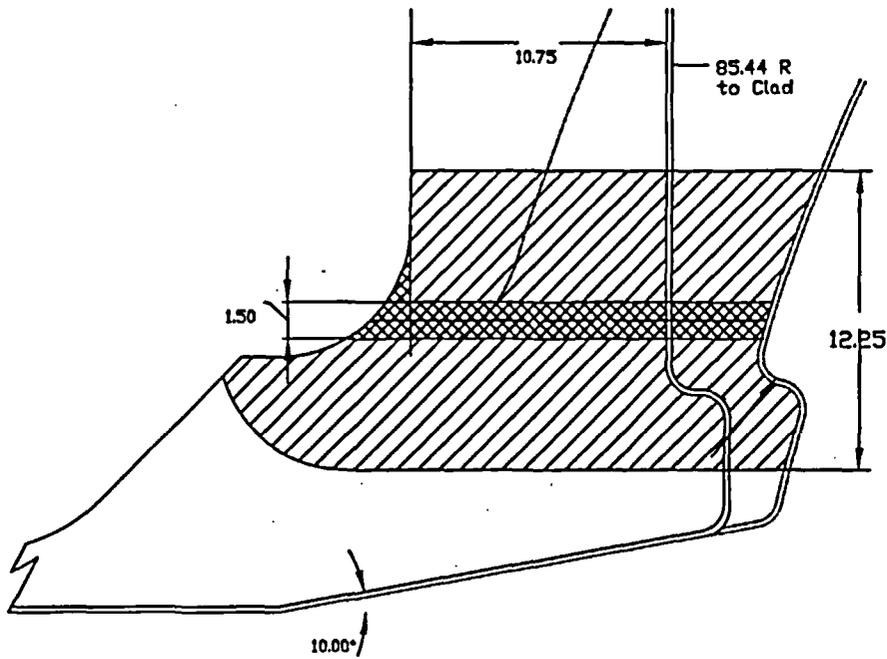
EXAMINATION VOLUME [Note (2)]

- C-D-E-F-G
- B-C-G
- A-B-G-H
- M-N-O-P

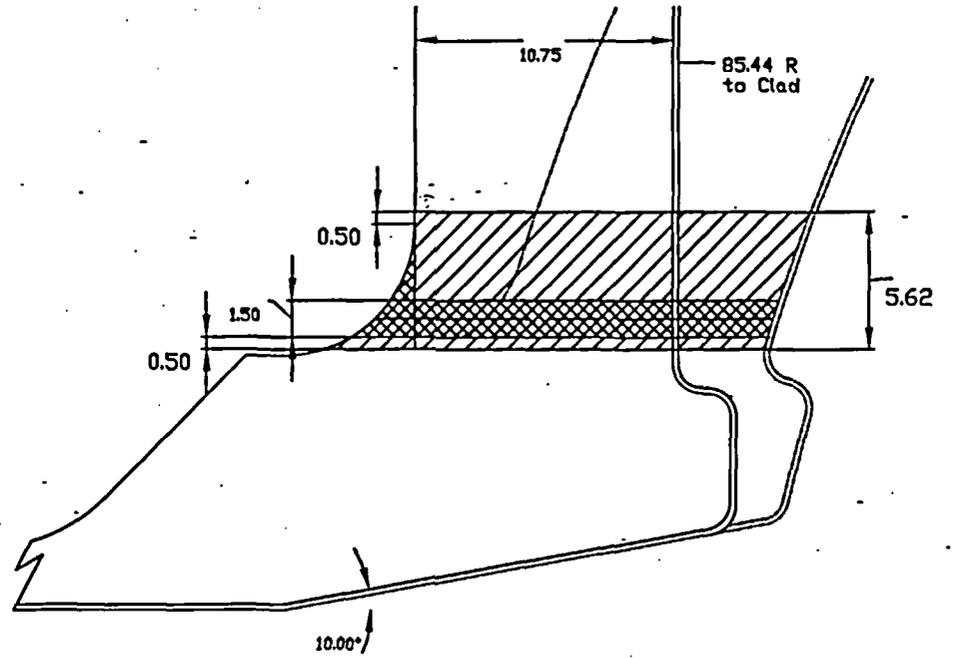
NOTES:

- (1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.
- (2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. 3 NOZZLE IN SHELL OR HEAD
 (Examination Zones in Set-On Type Nozzles Joined by Full Penetration Corner Welds)



EXAMINATION VOLUME - SECTION XI



EXAMINATION VOLUME - CODE CASE N-613-1

NOTE: FOR CONSERVATISM, THE SCAN PATH FOR EACH ULTRASONIC TRANSDUCER IS TYPICALLY EXTENDED 0.5' BEYOND THE LIMITS OF THE EXAM VOLUME AS PERMITTED BY GEOMETRY.

REVISION 1 3-16-04

INDIAN POINT UNITS 2 AND 3 (TYP)

RPV OUTLET NOZZLE

SHEET TITLE CODE CASE NOZZLE VOLUME REFINEMENT

EXAMINATION PROGRAM PLAN 2004

ALL DIMENSIONS IN INCHES
UNLESS OTHERWISE NOTED

VESDYNE 2004

**INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
THIRD TEN-YEAR INTERVAL INSERVICE INSPECTION PROGRAM
RELIEF REQUEST RR 3-36, Rev. 1**

Proposed Alternative
In Accordance with 10CFR50.55a(a)(3)(i)

--Alternative Provides Acceptable Level of Quality and Safety--

1. ASME Code Component(s) Affected

Component Numbers: ASME Code Class 1 Reactor Vessel Nozzle-to-Vessel Welds.

Examination Category: B-D

Item Number: B3.90 – Nozzle-to-Vessel Welds

2. Applicable Code Edition and Addenda

The Code of Record for the Third Inservice Inspection Interval is ASME Section XI Code, 1989 Edition, No Addenda.

3. Applicable Code Requirements

ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1989 Edition with No Addenda: Table IWB-2500-1 Code Item B3.90, Figures IWB-2500-7 (a) thru (d) for defining the examination volume of the reactor vessel nozzle-to-vessel welds. The examination requirements for reactor vessel nozzle-to-shell welds are defined in the ASME Code, Section XI, Appendix VIII, Supplements 4, 6 and 7, 1995 Edition, 1996 Addenda as modified by 10 CFR 50.55a. Eight (8) RPV nozzle to shell welds, 4 inlet and 4 outlet, are planned for examination in 2009 as follows:

Nozzle-to-Vessel Weld 21 @ 113° Azimuth

Nozzle-to-Vessel Weld 22 @ 158° Azimuth

Nozzle-to-Vessel Weld 23 @ 202° Azimuth

Nozzle-to-Vessel Weld 24 @ 247° Azimuth

Nozzle-to-Vessel Weld 25 @ 293° Azimuth

Nozzle-to-Vessel Weld 26 @ 338° Azimuth

Nozzle-to-Vessel Weld 27 @ 22° Azimuth

Nozzle-to-Vessel Weld 28 @ 67° Azimuth

4. Reason for Request

The Code required examination volume of the nozzle-to-vessel welds is unnecessarily large. The proposed alternative to use Code Case N-613-1 in its entirety will not affect the flaw detection capabilities in the weld and the heat affected zone, and provides an adequate level of quality and safety for examination of the affected welds.

5. Proposed Alternative

In accordance with 10CFR50.55a(a)(3)(i), Entergy Nuclear Operations, Inc. (Entergy) requests relief from the $t_s/2$ (t_s is equal to the vessel wall thickness) examination volume requirement and proposes to use Code Case N-613-1 in its entirety for the inspection of the reactor vessel nozzle-to-vessel welds. The examination volume will be as defined in detail within Code Case N-613-1 (Attachment 1) and as represented in the WesDyne sketches (Attachment 2).

Basis for Use

The examination (exam) volumes for the reactor vessel nozzle-to-vessel welds are unnecessarily large. For the IP3 reactor vessel, the nozzle-to-vessel volume would extend about 5 inches into the nozzle forging and the same distance into the upper shell course forging. This proposed alternative would re-define the examination volume boundary (in accordance with Code Case N-613-1). This reduction in base metal inspection will not affect the flaw detection capabilities in the weld and heat affected zone. Compliance with these requirements will assure the requisite level of quality and safety is maintained.

The proposed reduction in exam volume is for base metal only, which was extensively interrogated by ultrasonic examination during fabrication, preservice examinations and in the last inservice examinations performed in 1999 (at the end of the second interval). In 1999, the data was acquired, archived and analyzed using automated ultrasonic systems. Entergy is confident that reasonable comparisons can be made between the past and present if necessary. During the 1999 examinations, there were no unacceptable indications were found in the eight-reactor vessel nozzle-to-vessel examination volumes including the base metal areas proposed for exclusion from examination in this request. The 1999 results were based on examinations performed in accordance with the ASME Code, Section XI, Section V and Regulatory Guide 1.150, Rev. 1.

The Section XI examination volume for the pressure retaining nozzle-to-vessel welds extends from the edge of the weld to include a significant portion of the nozzle forging body (inward) and reactor vessel upper shell course (outward) which is a forged ring. The large volume results in a significant increase in examination time with no corresponding increase in safety as the greatest portion of the volume is base material not prone to inservice cracking.

The implementation of this request for relief would reduce the examination volume as outlined in Code Case N-613-1 and the attached WesDyne sketches. This reduction applies only to the base metal and not the weld metal.

The weld volume and the adjacent base metal volume will be examined in accordance with Code Case N-613-1. The examinations shall consist of techniques and procedures qualified in accordance with the ASME Code, Section XI, Appendix VIII, and supplements 4, 6 and 7. The weld and base metal volumes (in accordance with Code Case N-613-1) will be interrogated from the nozzle bore using techniques and procedures specifically qualified to inspect the nozzle-to-vessel weld from the nozzle bore. These procedures were qualified in January 2003 in accordance with Appendix VIII, Supplement 7 as administered by the PDI.

The nozzle-to-vessel examination volume is also accessible from the vessel ID surface and will be examined in four orthogonal directions for the first 15 percent of weld thickness with respect to the vessel ID surface using Appendix VIII, Supplement 4 qualified techniques. The remaining 85 percent of weld volume accessible from the vessel ID surface will be examined in two opposing circumferential scanning directions using Appendix VIII, Supplement 6 qualified techniques to interrogate for transverse defects.

This combination of scans addresses the requirements set forth by the ASME Code, Section XI, 1995 Edition with 1996 Addenda as modified by 10CFR50.55a and assures that current qualified technology will be applied to the re-defined examination volume specified herein to the maximum extent practical. Compliance with these requirements will assure the requisite level of quality and safety is maintained.

6. Duration of Proposed Alternative

It is proposed to use the alternative for the remainder of the Third Inservice Inspection Interval for IP3.

7. Precedents

A similar request for relief was approved for Hope Creek (Docket No. 50-354, TAC NO. MB7839, dated August 26, 2003).

8. Attachment

1. Code Case N-613-1 (for information)
2. WesDyne Sketches, Indian Point Units 2 and 3 (TYP.), RPV Inlet and Outlet Nozzles Examination Volume – Code Case N-613-1 (2 pages), Rev. 1, dated 03-16-04.

CASES OF ASME BOILER AND PRESSURE VESSEL CODE

Approval Date: August 20, 2002

*See Numeric Index for expiration
and any reaffirmation dates.*

Case N-613-1

**Ultrasonic Examination of Full Penetration
Nozzles in Vessels, Examination Category B-D,
Item No's. B3.10 and B3.90, Reactor Nozzle-To-
Vessel Welds, Figs. IWB-2500-7(a), (b), and (c)
Section XI, Division 1**

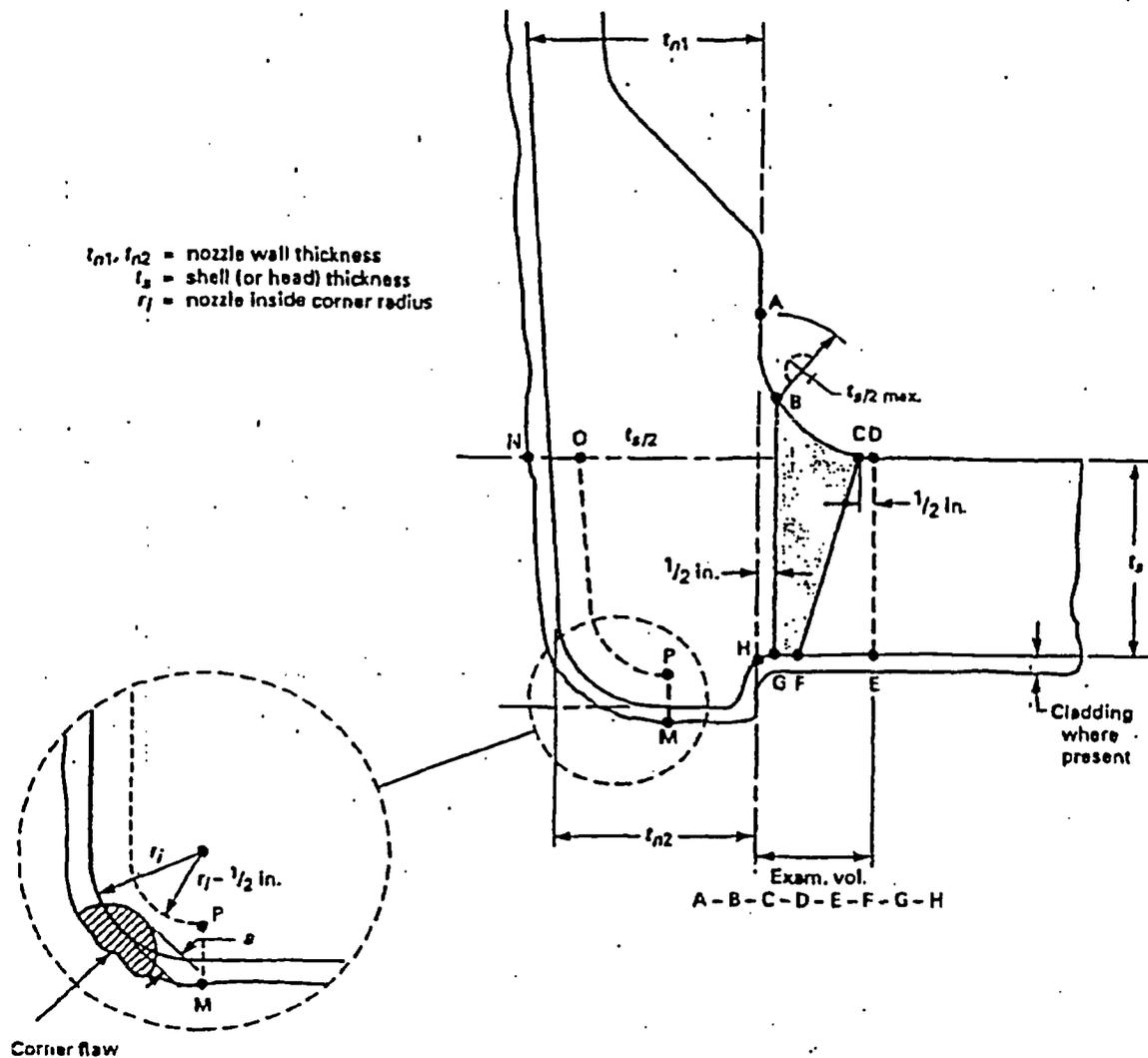
*Inquiry: What alternatives to the examination volume
requirements of Figs. IWB-2500-7(a), (b), and (c) are
permissible for ultrasonic examination of reactor-nozzle-
to-vessel welds?*

*Reply: It is the opinion of the Committee that Cate-
gory B-D nozzle-to-vessel welds previously ultrasoni-
cally examined using the examination volumes of Figs.
IWB-2500-7(a), (b), and (c) may be examined using
the reduced examination volume (A-B-C-D-E-F-G-H)
of Figs. 1, 2, and 3.*

CASE (continued)

N-613-1

CASES OF ASME BOILER AND PRESSURE VESSEL CODE



EXAMINATION REGION [Note (1)]

- Shell (or head) adjoining region
- Attachment weld region
- Nozzle cylinder region
- Nozzle inside corner region

EXAMINATION VOLUME [Note (2)]

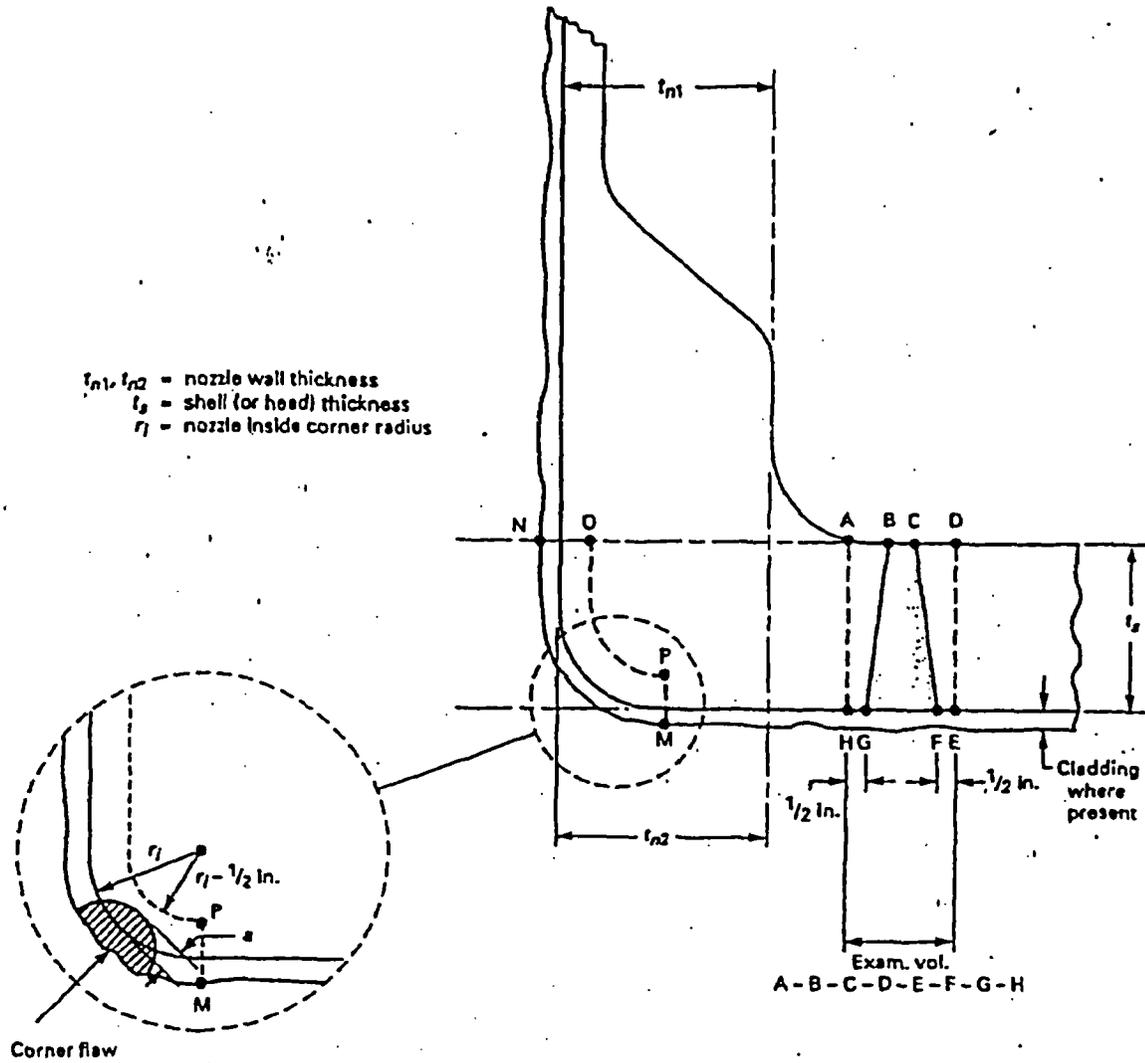
- C-D-E-F
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- M-N-O-P

NOTES:

- (1) Examination regions are identified for the purpose of differentiating the acceptance standards in MWB-3512.
- (2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. 1 NOZZLE IN SHELL OR HEAD
 (Examination Zones In Barrel Type Nozzles Joined by Full Penetration Corner Welds)

CASES OF ASME BOILER AND PRESSURE VESSEL CODE



EXAMINATION REGION [Note (1)]

- Shell (or head) adjoining region
- Attachment weld region
- Nozzle cylinder region
- Nozzle inside corner region

EXAMINATION VOLUME [Note (2)]

- C-D-E-F
- B-C-F-G
- A-B-G-H
- M-N-O-P

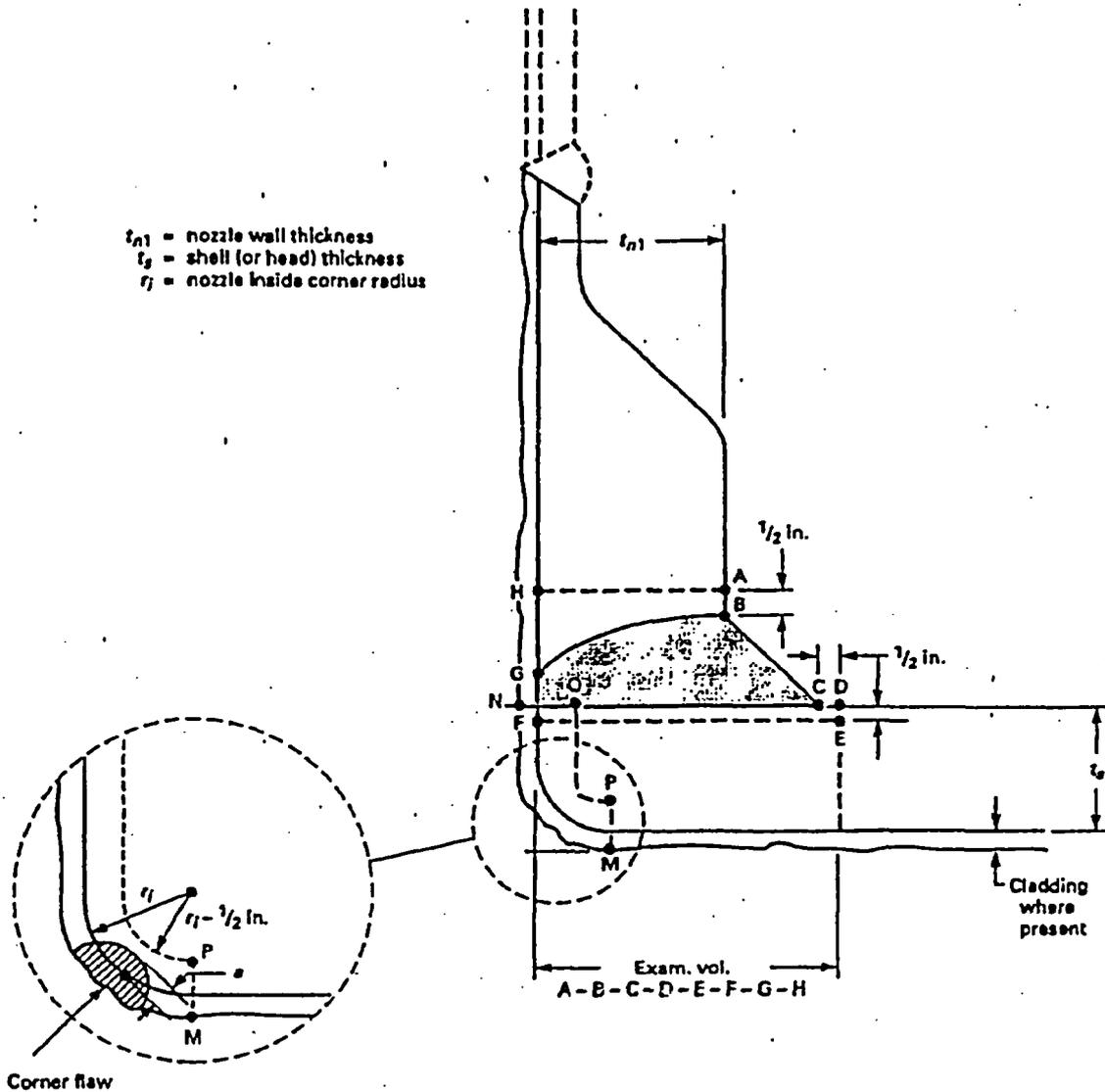
NOTES:

- (1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.
- (2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. 2 NOZZLE IN SHELL OR HEAD
 (Examination Zones in Flange Type Nozzles Joined by Full Penetration Butt Welds)

CASE (continued)
 N-613-1

CASES OF ASME BOILER AND PRESSURE VESSEL CODE



t_{n1} = nozzle wall thickness
 t_s = shell (or head) thickness
 r_f = nozzle inside corner radius

Corner flaw

EXAMINATION REGION [Note (1)]

- Shell (or head) adjoining region
- Attachment weld region
- Nozzle cylinder region
- Nozzle inside corner region

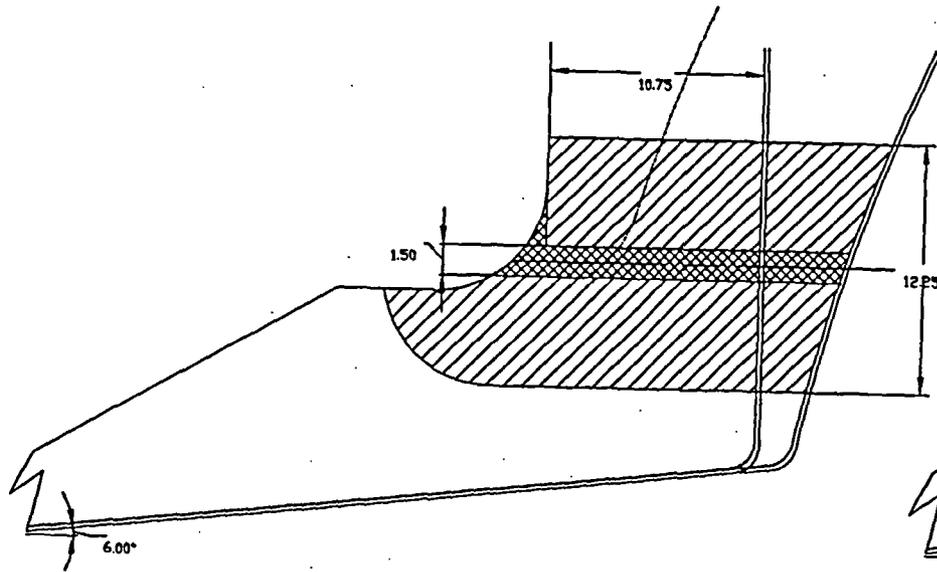
EXAMINATION VOLUME [Note (2)]

- C-D-E-F-G
- B-C-G
- A-B-G-H
- M-N-O-P

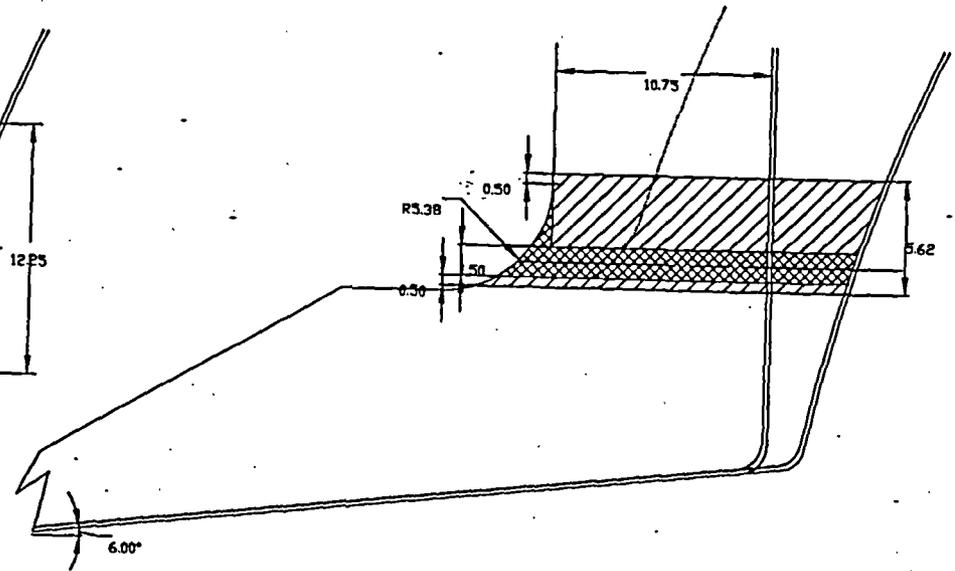
NOTES:

- (1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.
- (2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. 3 NOZZLE IN SHELL OR HEAD
 (Examination Zones in Set-On Type Nozzles Joined by Full Penetration Corner Welds)



EXAMINATION VOLUME - SECTION XI



EXAMINATION VOLUME - CODE CASE N-613-1

NOTE: FOR CONSERVATISM, THE SCAN PATH FOR EACH ULTRASONIC TRANSDUCER IS TYPICALLY EXTENDED 0.5" BEYOND THE LIMITS OF THE EXAM VOLUME AS PERMITTED BY GEOMETRY.

REVISION 1 03-16-04

INDIAN POINT UNITS 2 AND 3 (TYP.)

RPV INLET NOZZLE

SHEET TITLE CODE CASE NOZZLE VOLUME REFINEMENT

EXAMINATION PROGRAM PLAN 2004

ALL DIMENSIONS IN INCHES
UNLESS OTHERWISE NOTED

WESDYNE 2004