

Commonwealth Edison Company
Braidwood Generating Station
Route #1, Box 84
Braceville, IL 60407-9619
Tel 815-458-2801

ComEd

May 19, 1997

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

Subject: Braidwood Nuclear Power Station, Units 1 and 2
Additional Information Pertaining to Submittal of Relief Requests
NR-27, 28, 31, and 34
NRC Docket Nos. 50-456 and 50-457

- References:
1. H. G. Stanley (ComEd) letter to Document Control Desk (USNRC) Revision 4 of the Inservice Inspection Plan for Braidwood Station Units 1 and 2, dated October 8, 1996.
 2. George F. Dick (USNRC) letter to Irene M. Johnson (ComEd), Request for Additional Information Regarding First 10-Year Inservice Inspection Program - Braidwood Station (TAC Nos. M97134 and M97135), dated March 19, 1997.
 3. H. G. Stanley (ComEd) letter to Document Control Desk (USNRC) Braidwood Nuclear Power Station, Units 1 and 2 Response to Request for Additional Information, dated March 28, 1997.

With Reference 1 Commonwealth Edison (ComEd) transmitted Revision 4 of Braidwood's ISI Plan. Included in that submittal was relief request NR-27, NR-28, and NR-31. Subsequent to that submittal the Staff issued a request for additional information via Reference 2, which ComEd responded to in Reference 3. As stated in Reference 3, Relief Request NR-27, NR-28 and NR-31 would be revised to include a discussion of the limitations of performing the exam, subsequent to the vessel inspection. Additionally, a new relief request, NR-34, would be submitted to address the limitations encountered during the 10CFR50.55a augmented reactor vessel examination. These relief requests were to be provided to the Staff by April 30, 1997. As discussed with the Staff, due to a delay in data analysis, Braidwood would be submitting the revised relief requests prior to the end of May. Finally, based on conversations with the Staff, Relief Requests NR-27,

9706060208 970519
PDR ADOCK 05000456
G PDR

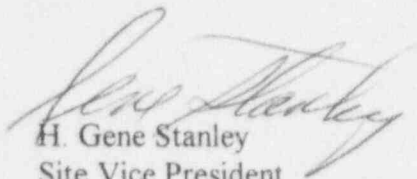


NR-28 and NR-31 have been revised to reflect only the Unit 1 results. Relief requests for Unit 2 will be submitted after performance of the Unit 2 reactor vessel inspection.

Attached are the revised Relief Requests for NR-27, NR-28, NR-31, and the new Relief Request NR-34.

Please address any comments or questions regarding this matter to T. W. Simpkin, at (815) 458-2801 extension 2980.

Very truly yours,



H. Gene Stanley
Site Vice President
Braidwood Nuclear Generating Station

HGS/fb/97044.doc

Attachments

cc: A. B. Beach, Regional Administrator - RIII
G. F. Dick, Braidwood Project Manager - NRR
C. J. Phillips, Senior Resident Inspector - Braidwood
Office of Nuclear Facility Safety - IDNS
Michael T. Anderson, INEL Research Center

RELIEF REQUEST NR-27COMPONENT IDENTIFICATION

Code Class(es): 1
Reference: IWB-2500-1
Examination Categories: B-D
Item Numbers: B3.90
Description: Volumetric Examination of Reactor Pressure Vessel
Nozzle to Vessel Welds
Component Number(s): Unit 1 Welds:
1RV-01-006, 1RV-01-009, 1RV-01-010, 1RV-01-013

CODE REQUIREMENT

Subsection IWB, Table IWB-2500-1, Examination Category B-D, Item B3.90 requires essentially 100% volumetric examination of the region described in Figure IWB-2500-7 for Reactor Pressure Vessel (RPV) nozzle-to-vessel welds.

BASIS FOR RELIEF

ComEd's Braidwood Nuclear Power Station Units 1 conducts ISI activities in accordance with the 1983 Section XI Edition, 1983 Summer Addenda as required by Title 10, Code of Federal Regulations, Part 50, Section 55a, Paragraph (g), Subparagraph (4) [10 CFR 50.55a(g)(4)]. Pursuant to 10 CFR 50.55a(g)(6)(i), relief is requested on the basis that the code requirement to examine essentially 100% of the welds' volume is impractical due to geometric interference.

All RPV welds are examined using remotely operated underwater volumetric inspection techniques. Underwater volumetric inspection techniques are utilized to meet ALARA concerns due to the high radiation levels in these areas. The outlet (Hot Leg) nozzles are constructed with an integral extension on the I.D. surface which mates with the internal core barrel. The extension provides a flow path for reactor coolant from the core into the hot leg nozzles. The integral extensions partially obstructs the circumferential scan for reflectors transverse to the weld (Reference Attachment 1). The integral extension, that confines the movement of the transducer package, along with the curvature of the RPV shell combine to limit full Code volume coverage when scanning in the direction parallel to the weld (Reference Attachment 2). This configuration limits the examination aggregate volume coverage obtained for each weld and adjacent base metal to approximately 84% instead of the Code required essentially 100% examination coverage.

Compliance with the applicable Code requirements may be accomplished by redesigning and modifying the ID of the Hot Leg nozzles and/or the building structure surrounding the RPV at the nozzles' elevation. Braidwood Unit 1 RPV was designed with a RPV shield wall (Reference Attachment 3 and 4). This wall impedes access to the OD of the RPV shell for insulation removal, surface preparation and ultrasonic inspection. Modifying the nozzle ID surface would incur extensive radiation exposure to station personnel and could be detrimental to the component. When designing, fabricating and installing these welds, strict ASME Section III quality controls and procedures were used that minimized the introduction of fabrication defects. Additionally, the periodic VT-2 examinations in accordance with the

RELIEF REQUEST NR-27 (cont.)

requirements of ASME Section XI, Table IWB-2500-1, Examination Category B-P and applicable Reactor Coolant system monitoring requirements specified in the Technical Specifications will provide reasonable assurance of continued structural integrity of the Reactor Vessel. ComEd has recently performed these volumetric examinations to the fullest extent practical, i.e. 84%, during the AlR06 refuel outage and no recordable indications (NRI) were detected. The NRI results of the examination provide further assurance that unacceptable inservice flaws have not developed in the subject welds. Thus, the modification of the nozzles and/or the building structure to increase examination volume coverage from 84% to essentially 100% would incur unnecessary radiological exposure and significant engineering costs without a compensating increase in the level of quality and safety.

PROPOSED ALTERNATE PROVISIONS

The Reactor Vessel outlet (Hot Leg) nozzle welds will be examined to the fullest extent practical using the available underwater volumetric inspection techniques.

APPLICABLE TIME PERIOD

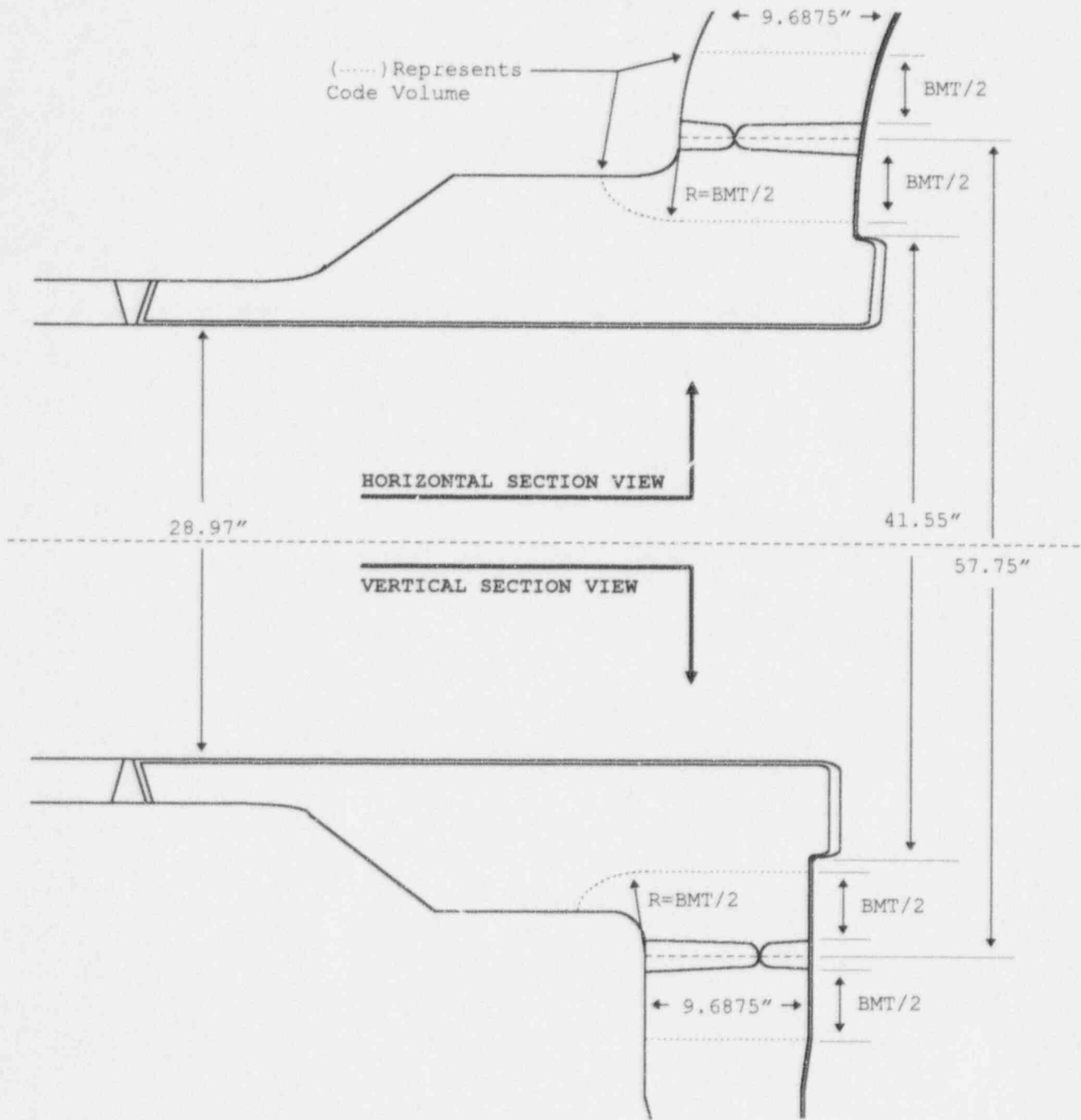
This relief request will be required for the First Ten Year Inspection Interval.

APPROVAL STATUS

Pending NRC review.

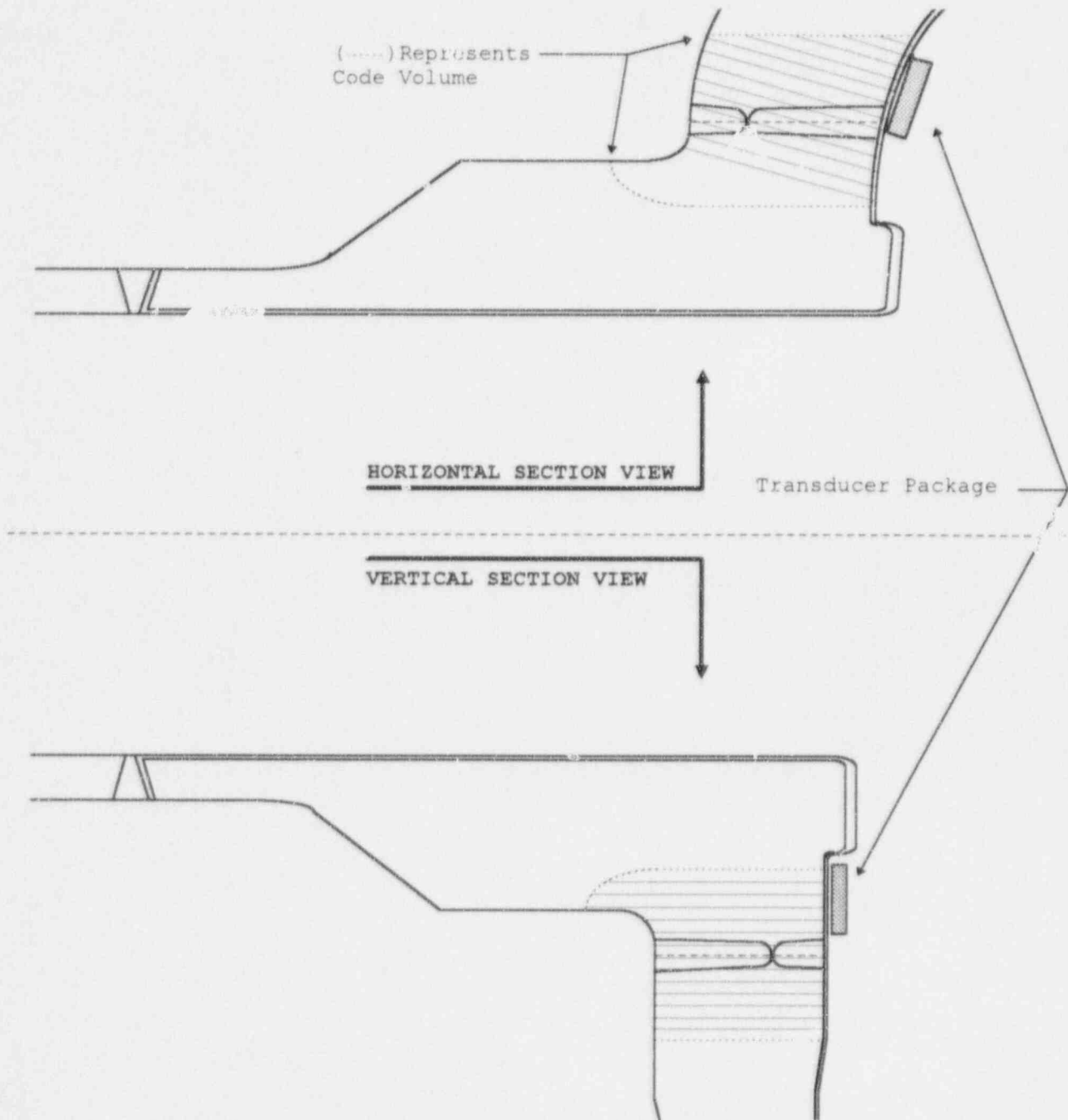
ATTACHMENT 1

(Drawing not to scale)

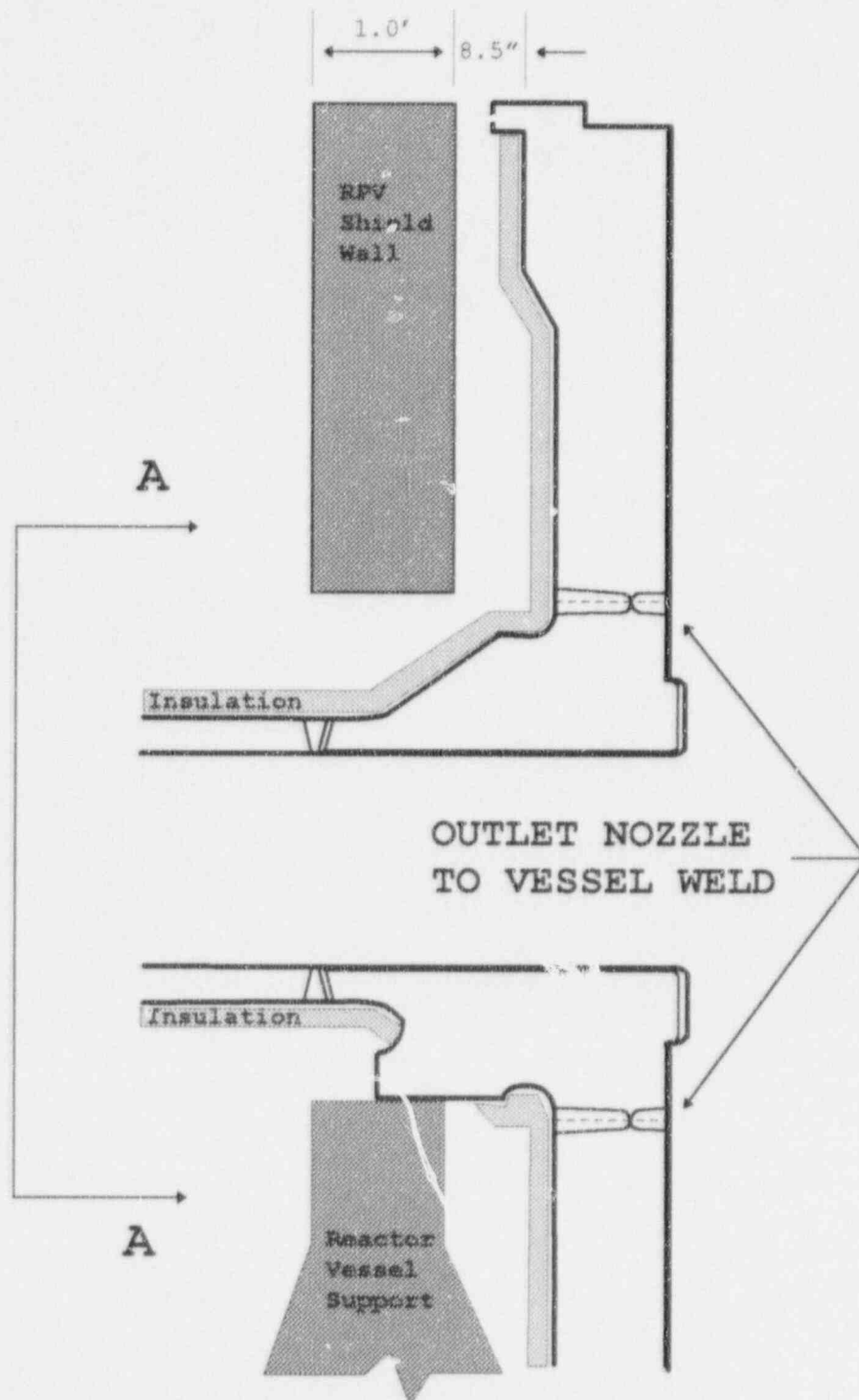


Reactor Vessel Outlet Nozzle

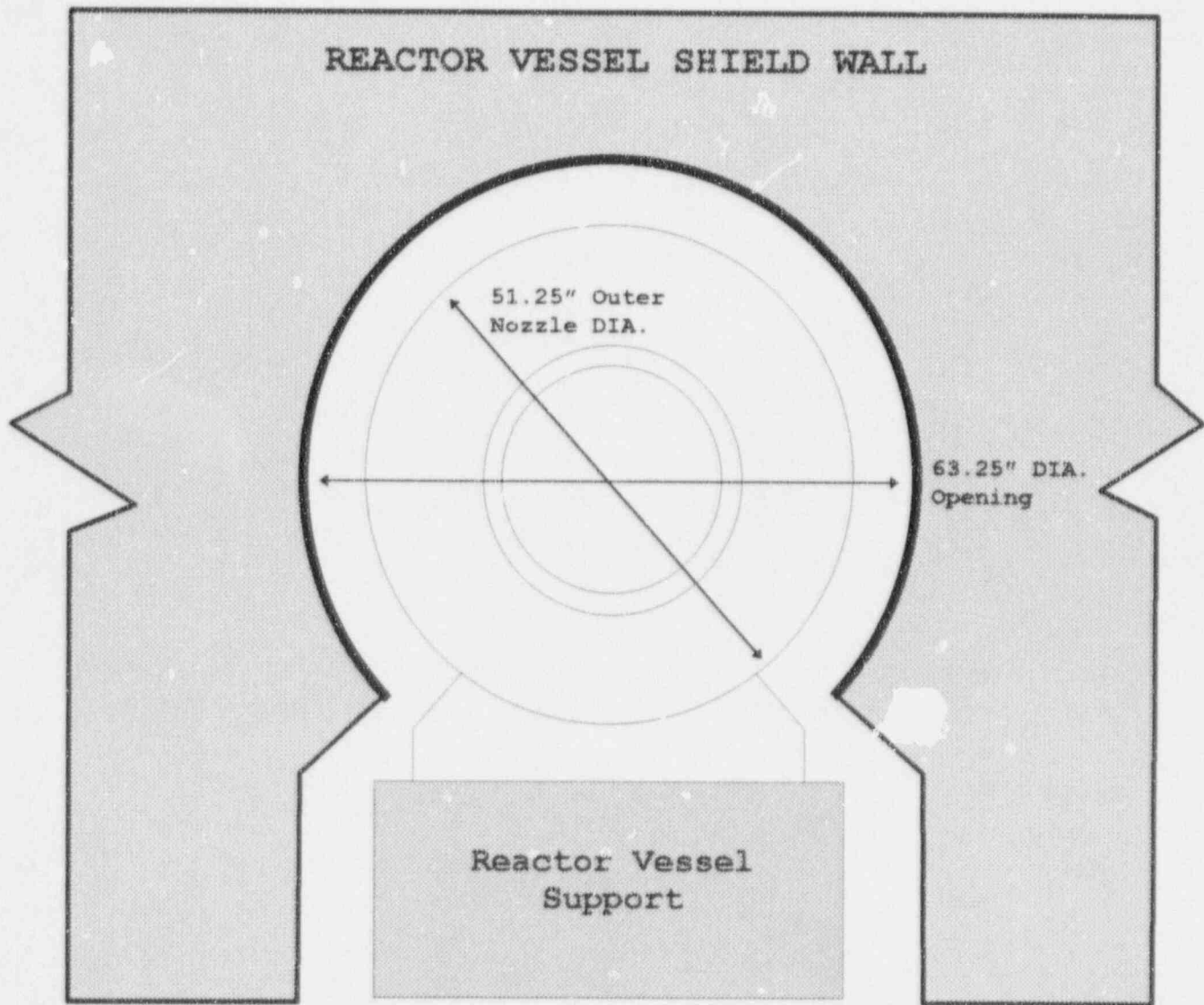
Note: BMT is abbreviation for Base Metal Thickness



RPV Outlet Nozzle Coverage Plots for Scans for Reflectors Oriented Transverse to the Weld
(0°, 45° and 60° Exams)



Reactor Vessel Outlet Nozzle (with support)
Interference Detail



Reactor Vessel Outlet Nozzle (with support)
Section A-A Interference Detail

RELIEF REQUEST NR-28COMPONENT IDENTIFICATION

Code Class(es): 1

Reference: IWB-2500-1

Examination Categories: B-D

Item Numbers: B3.100

Description: Alternative rules for the Inservice Inspection of Reactor Pressure Vessel Nozzle Inner Radius Sections (IRS)

Component Number(s): Unit 1 Welds:
1RV-01-015, 1RV-01-016, 1RV-01-019, 1RV-01-020

CODE REQUIREMENT

Subsection IWB, Table IWB-2500-1, Examination Category B-D, Item B3.100 requires essentially 100% volumetric examination of the inner radius region described in Figure IWB-2500-7 for Reactor Pressure Vessel (RPV) nozzle inner radius sections.

BASIS FOR RELIEF

ComEd's Braidwood Nuclear Power Station Unit 1 conducts ISI activities in accordance with the 1983 Section XI Edition, 1983 Summer Addenda as required by Title 10, Code of Federal Regulations, Part 50, Section 55a, Paragraph g, Subparagraph 4 [10 CFR 50.55a(g)(4)]. Pursuant to 10 CFR 50.55a(g)(6)(i), relief is requested on the basis that the code requirement to examine essentially 100% of the each inner radius section is impractical due to the geometry.

All of the inner radius sections of the RPV nozzles are examined using remotely operated underwater volumetric inspection techniques. Underwater volumetric inspection techniques are utilized to meet ALARA concerns due to the high radiation levels in these areas. Examination of the inner radius sections of the inlet (Cold Leg) nozzles is limited by the nozzle geometry (Reference Attachment 1 and 2). The design of the underwater volumetric inspection equipment was unable to scan the radius area where it transitions from the shell into the nozzle bore. This geometry limits the volumetric examination aggregate volume coverage obtained for the nozzle inner radius section to about 82% instead of the essentially 100% Code required exam volume.

Compliance with the applicable Code requirements may be accomplished by redesigning and modifying the nozzles' inner radius section and/or the building structure surrounding the RPV at the nozzles' elevation. Braidwood Unit 1 was designed with a RPV shield wall (Reference Attachment 3 and 4). This wall impedes access to the OD of the RPV shell for insulation removal, surface preparation and ultrasonic inspection. Modifying the nozzle ID surfaces surface would incur extensive radiation exposure to station personnel.

Based on industry experience, no operating issues to date have been identified in PWR nozzle inner radius sections. If an inservice flaw were to develop in this region, a flaw would be expected to initiate at the ID surface. A visual inspection of the entire ID IRS surface provides reasonable assurance

RELIEF REQUEST NR-28 (cont.)

that unallowable inservice flaws have not developed in the subject area. Additionally, the periodic VT-2 examinations in accordance with the requirements of ASME Section XI, Table IWB-2500-1, Examination Category B-P and applicable Reactor Coolant system monitoring requirements specified in the Technical Specifications will provide reasonable assurance of continued structural integrity of the Reactor Vessel. ComEd has recently performed these volumetric examinations to the fullest extent practical, i.e. 82%, during the AlR06 refuel outage and no recordable indications (NRI) were detected. The NRI results of the examination provide further assurance that unacceptable inservice flaws have not developed in the subject areas. Thus, the modification of the nozzles and/or the building structure to increase examination coverage from 82% to essentially 100% would incur unnecessary radiological exposure and significant engineering costs without a compensating increase in the level of quality and safety.

PROPOSED ALTERNATE PROVISIONS

The Reactor Vessel inlet (Cold Leg) nozzle inner radius sections were examined to the fullest extent practical using the available underwater volumetric inspection technique. In conjunction with the partial volumetric examination, a supplemental VT-1 of the nozzle inner radius area was conducted from the interior of the Reactor Vessel using underwater camera equipment.

APPLICABLE TIME PERIOD

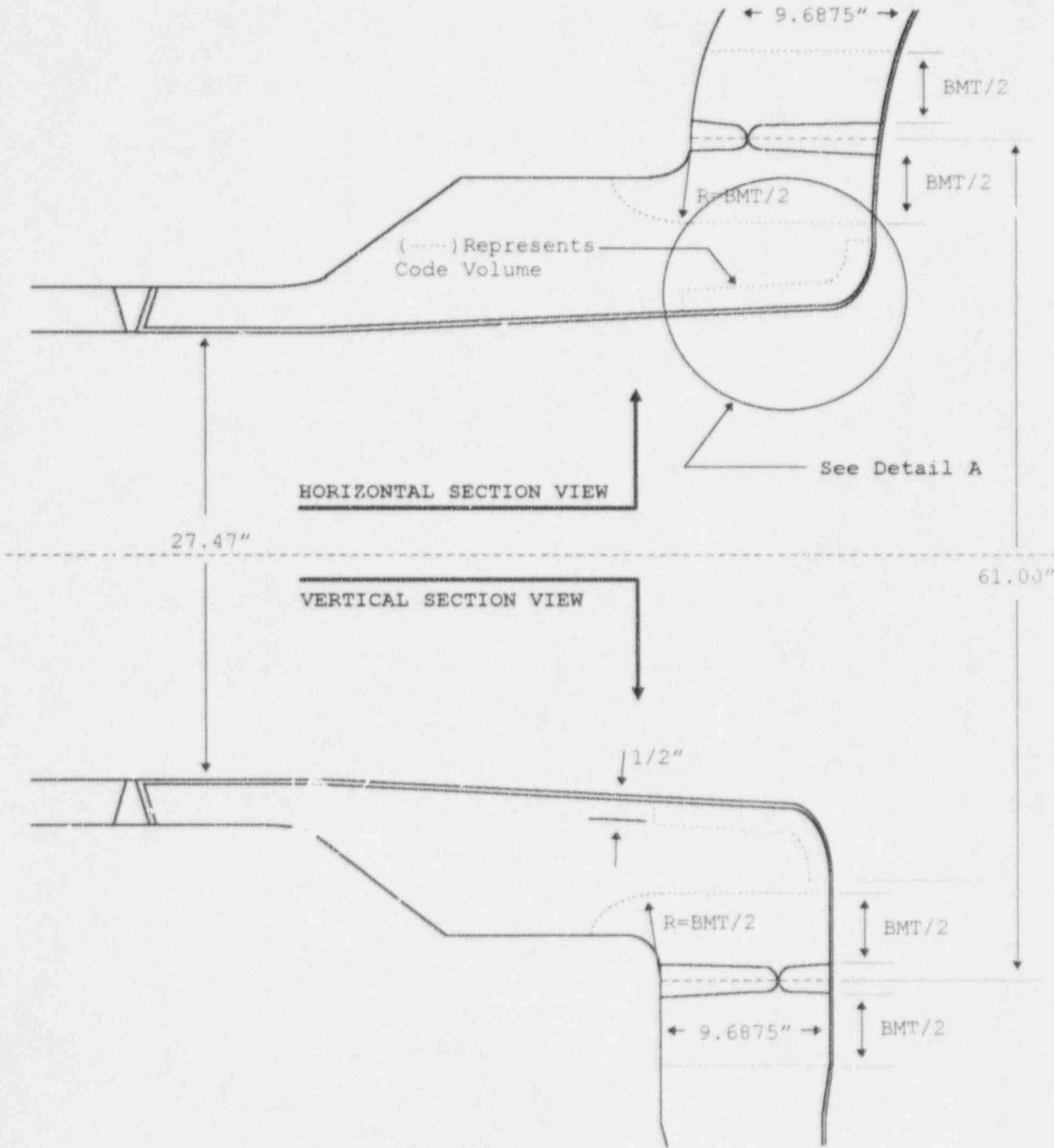
This relief request will be required for the First Ten Year Inspection Interval.

APPROVAL STATUS

Pending NRC review.

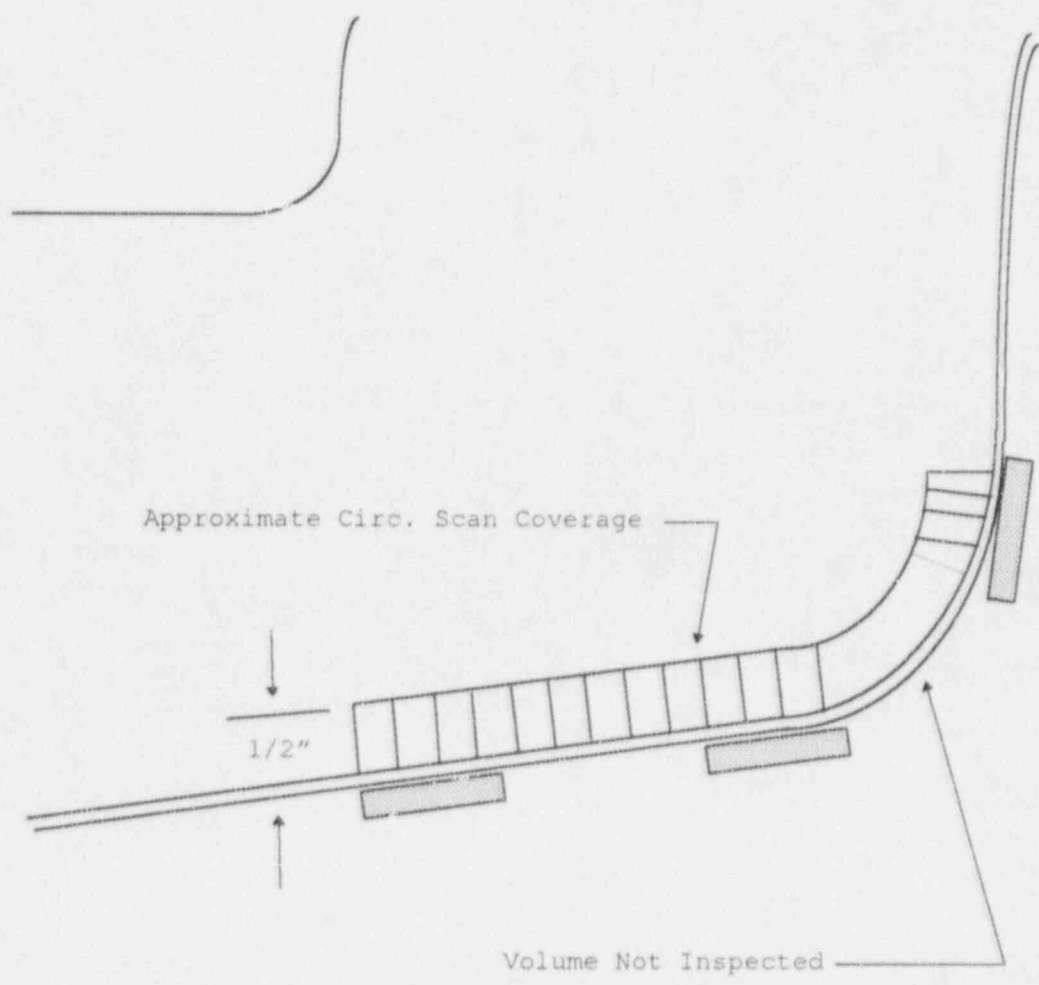
ATTACHMENT 1

(Drawing not to scale)

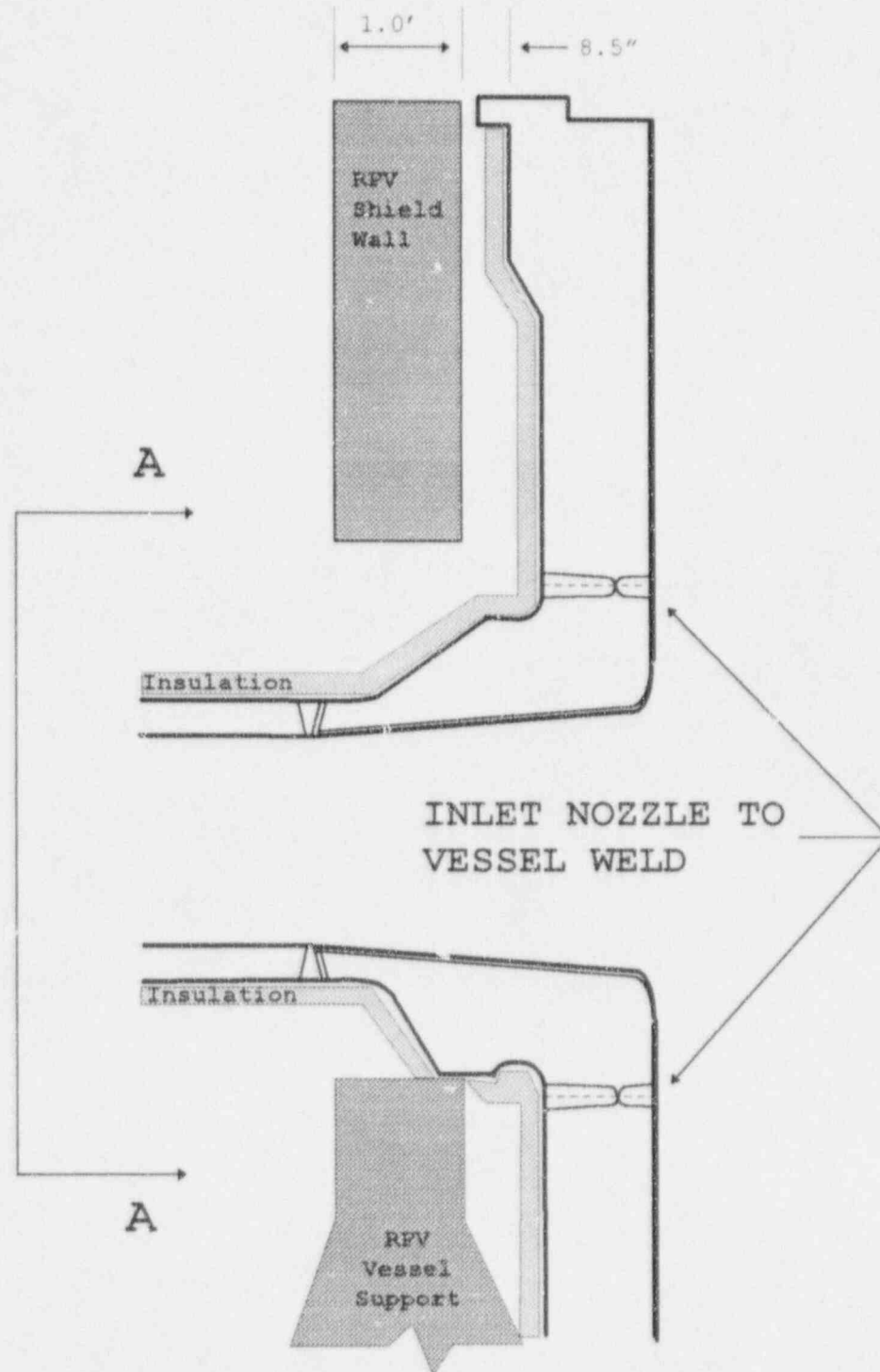


Reactor Vessel Inlet Nozzle

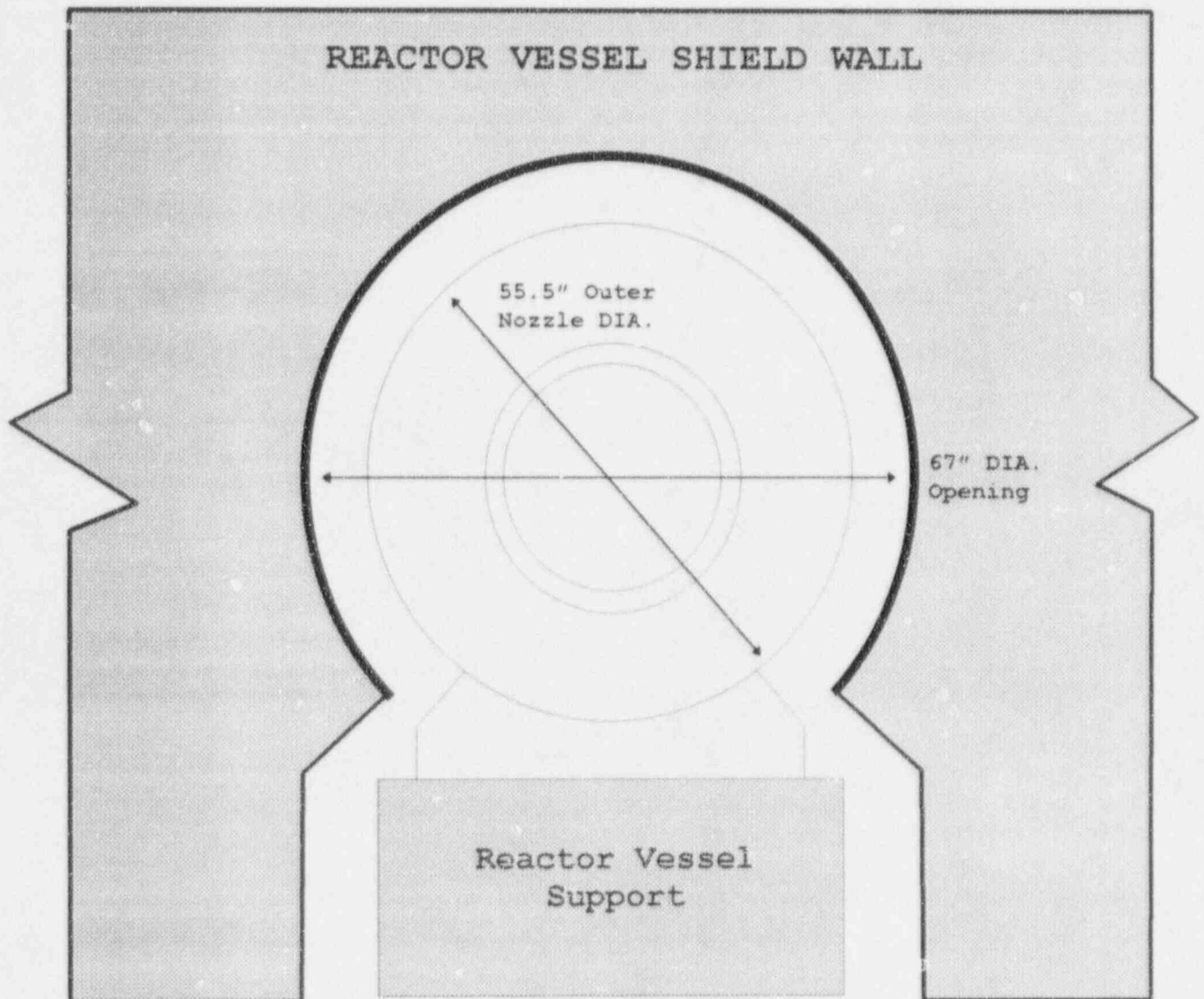
Note: BMT is abbreviation for Base Metal Thickness



Detail A



Reactor Vessel Inlet Nozzle (with support)
Interference Detail



Reactor Vessel Inlet Nozzle (with support)
Section A-A Interference Detail

RELIEF REQUEST NR-31COMPONENT IDENTIFICATION

Code Class(es): 1

Reference: IWB-2500-1, Table IWB-2500-1

Examination Categories: B-A

Item Number(s): B1.11

Description: Volumetric Examination of Reactor Pressure Vessel (RPV) Circumferential Shell Weld.

Component Number(s): Unit 1 Weld: 1RV-02-002

CODE REQUIREMENT

Subsection IWB, Table IWB-2500-1, Examination Category B-A, Item Number B1.11 requires essentially 100% volumetric examination of the RPV Circumferential Shell welds as detailed in Figure IWB-2500-1.

BASIS FOR RELIEF

ComEd's Braidwood Nuclear Power Station Units 1 conducts ISI activities in accordance with the 1983 Section XI Edition, 1983 Summer Addenda as required by Title 10, Code of Federal Regulations, Part 50, Section 55a, Paragraph (g), Subparagraph (4) [10 CFR 50.55a(g)(4)]. Pursuant to 10 CFR 50.55a(g)(6)(ii), relief is requested on the basis that the code requirement to examine essentially 100% of the weld volume is impractical due to geometric interference.

10CFR 50.55 a(g)(6)(ii)(A)(1) revokes all relief requests with respect to volumetric examination coverage for welds specified in Item B1.10. Portions of a previously granted relief request, NR-9, addressed limited exam coverage on the Braidwood RPV shell welds.

Examination of the subject RPV shell weld was conducted on Braidwood Unit 1 during A1R06 refuel outage (Spring 1997). During this exam at Braidwood Unit 1, physical obstructions and geometry prevented ultrasonic (UT) coverage in excess of 90% of the required volume. The examination of the Lower Shell Course-to-Dutchman weld, 1RV-02-002, is restricted by six (6) core barrel locating lugs welded to the inner surface of the vessel approximately 2.5 inches above the weld centerline (See Attachment 1). These lugs obstruct the automated UT examination tool from examining the Code required volume of the weld and base material under and below each lug in both the circumferential and perpendicular scan directions (156° total for all 6 lugs, See Attachment 2, 3 and 4). All weld metal and base material can be examined between the lugs (204° total length between all 6 lugs). The 6 lug interferences limit the examination aggregate volume coverage obtained for the weld and adjacent base metal to approximately 81% of the Code required volume.

Compliance with the applicable Code requirements may be accomplished by redesigning and modifying the RPV and/or the building structure surrounding the vessel(s). Access for manual inspections from the OD of the RPV is limited because of the close proximity of the building structure to the RPV shell (See Attachment 1).

Examination of the Code required examination volume was completed to the maximum extent practical using alternate UT techniques qualified to the highest standard

RELIEF REQUEST NR-31 (cont.)

available. RPV examinations were conducted from the I.D. of the vessel. Access to allow examination from the O.D. (shell side) of these welds is restricted due to the structural concrete surrounding the vessel. The examination techniques employed have been demonstrated and qualified to the Performance Demonstration Initiative (PDI) Program which meets the intent of the rules of Appendix VIII of the ASME Code, Section XI, 1992 Edition with 1993 Addenda. These techniques were used in place of the currently required Section XI, 1983 Edition with Summer 1983 Addenda, techniques (Reference Relief Request NR-29). Although the techniques have been qualified at PDI for single direction scanning, examinations were performed from two directions, when required (i.e., performed from both sides of the weld on the same surface, where feasible).

Strict ASME Section III quality controls were used when designing, fabricating, and installing these RPV welds. Preservice (PSI) examinations to the fullest extent practical were performed on these welds. PSI relief request INR-9 was submitted to the Staff and approved for these lug interferences. ComEd has recently performed these ultrasonic examinations to the fullest extent practical, i.e. 81%, during the A1R06 refuel outage and no unacceptable indications to applicable Section XI standards were detected. The results of the examination provide further assurance that unallowable inservice flaws have not developed in the subject weld. In addition to UT, visual examinations (VT-1 and VT-2) of the weld also verifies its integrity. Thus, the modification of the RPV and/or the building structures to increase examination volume coverage from 81% to essentially 100% would incur unnecessary radiological exposure and significant engineering expenses. Braidwood Station believes this course of action is a hardship without a compensating increase in the level of quality and safety.

PROPOSED ALTERNATE PROVISIONS

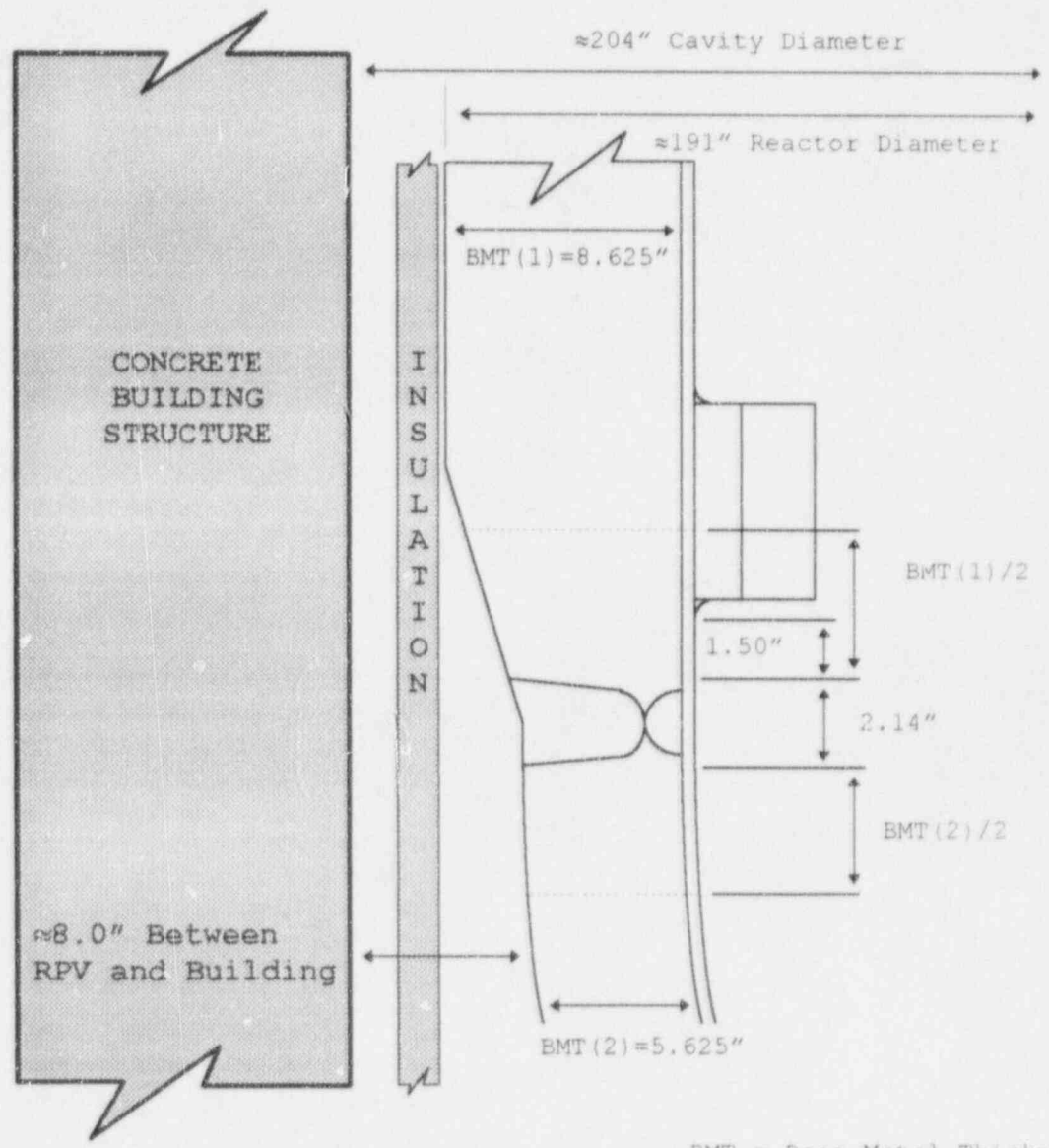
The ultrasonic examination of the Braidwood Unit 1 RPV shell weld, IRV-02-002, was performed to the maximum extent practical. In conjunction with the partial ultrasonic examination, a supplemental VT-1 of the RPV shell weld was conducted from the interior of the RPV using underwater camera equipment.

APPLICABLE TIME PERIOD

This relief request will be required for the First Ten Year Inspection Interval.

APPROVAL STATUS

Pending NRC review.

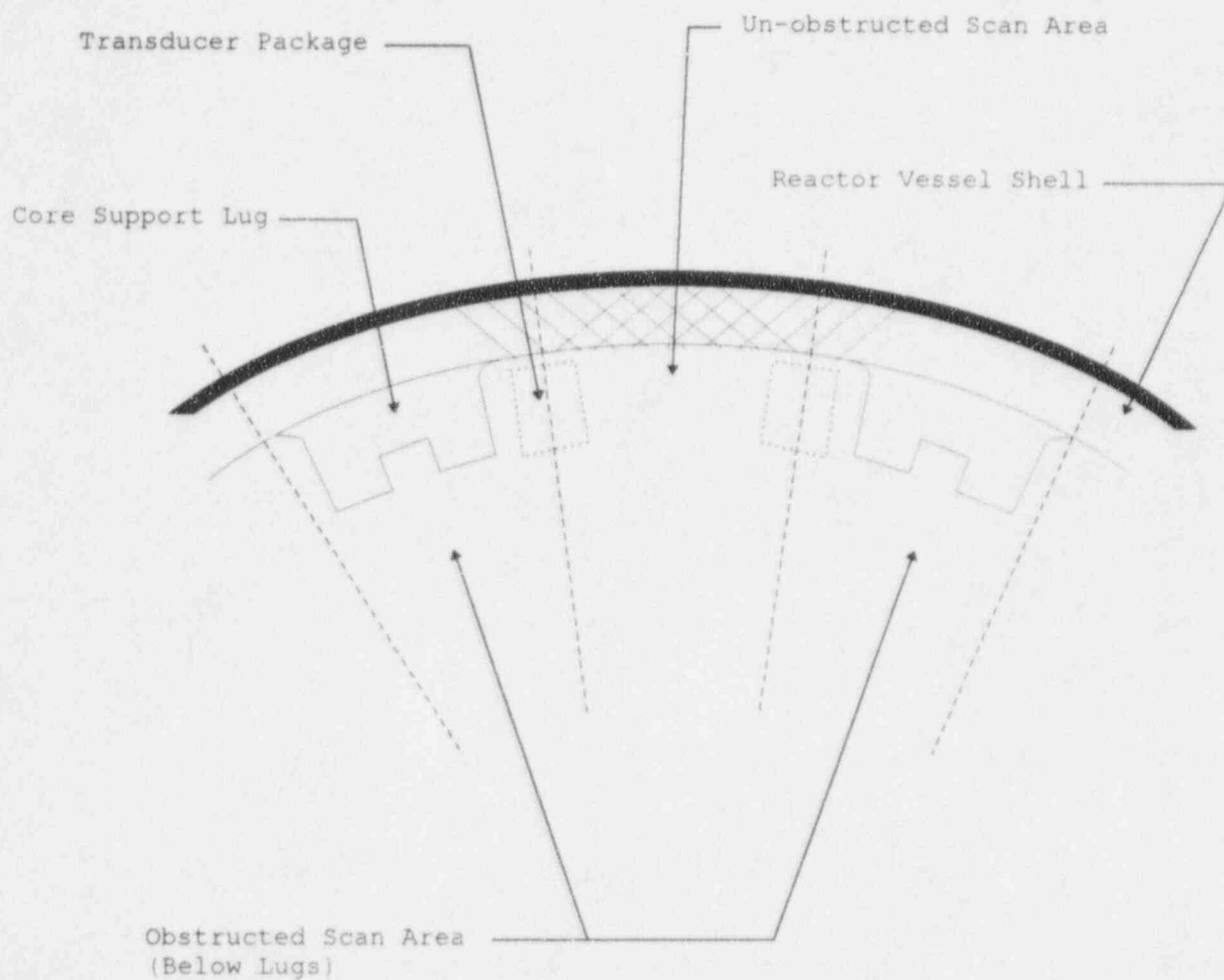


BMT = Base Metal Thickness
(.....) = Code Volume

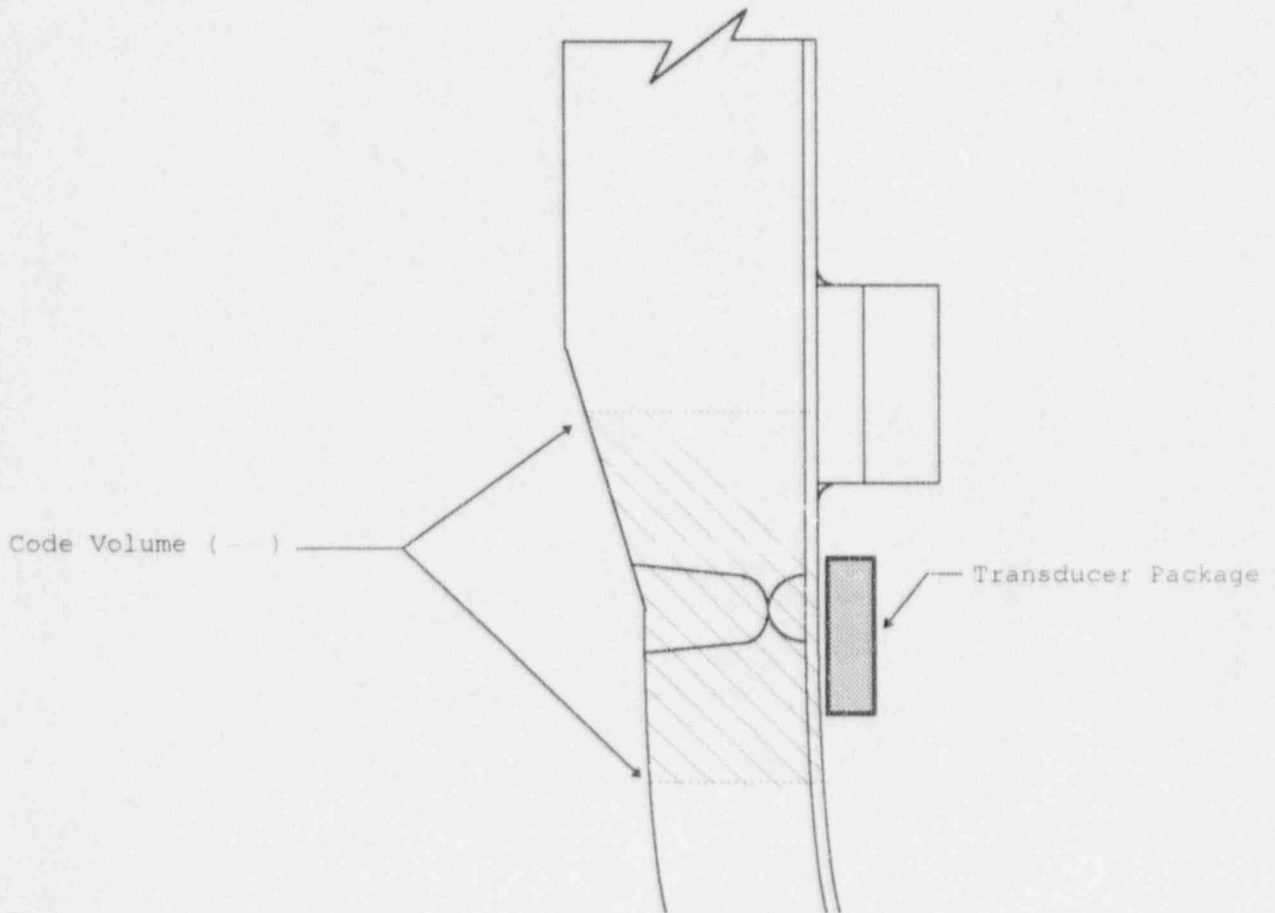
Core Support Lug Detail

Attachment 2

(Drawing not to scale)



Exam Coverage Between Core Support Lugs for Reflectors Oriented Transverse to the Weld



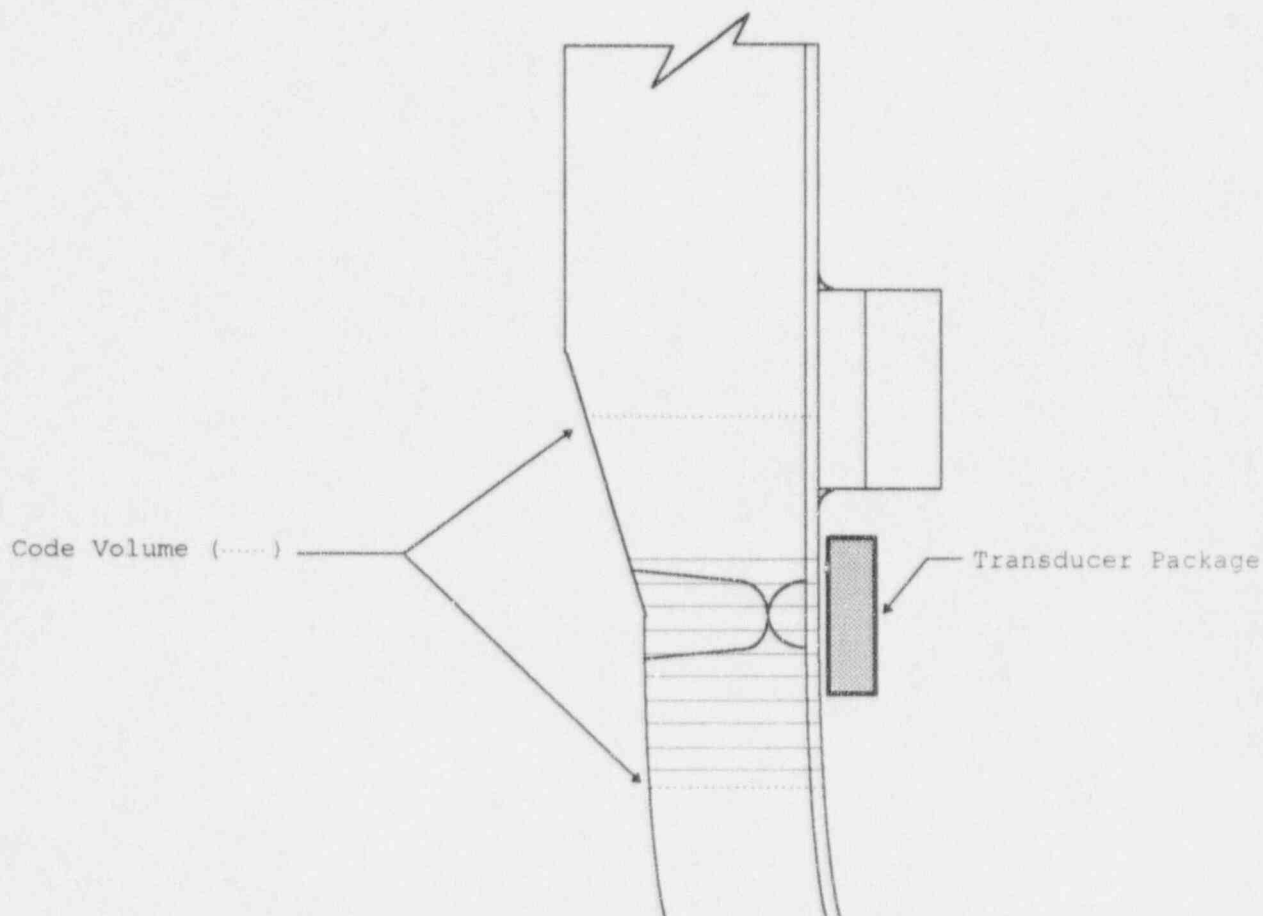
Exam Coverage Under Core Support Lugs for Reflectors Oriented Parallel to the Weld

Revision 1

NR-31

Attachment 4

(Drawing not to scale)



Exam Coverage Under Core Support Lugs for Reflectors Oriented Transverse to the Weld

RELIEF REQUEST NR-34COMPONENT IDENTIFICATION

Code Class(es): 1

Reference: 10CFR50.55a(g)(ii)(A)(2)
IWB-2500-1, Table IWB-2500-1

Examination Categories: B-A

Item Number(s): B1.11

Description: Volumetric Examination of Reactor Pressure Vessel (RPV) Circumferential Shell Welds.

Component Number(s): Unit 1 Weld: 1RV-02-002

CODE REQUIREMENT

10CFR50.55a(g)(ii)(A)(2) requires that all licenses shall augment their Reactor Pressure Vessel (RPV) examination by implementing once, as part of the inservice inspection interval in effect on September 8, 1992, the examination requirements for the RPV shell welds specified in Item B1.10 of Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel", in Table IWB-2500-1 of Subsection IWB of the 1989 Edition of Section XI, Division 1, of the ASME Boiler and Pressure Vessel Code. For the purpose of this augmented examination, "essentially 100%" as used in Table IWB-2500-1 means more than 90% of the examination volume of each weld, where the reduction in coverage is due to interference by another component, or part geometry.

BASIS FOR RELIEF

Pursuant to 10 CFR 50.55a(g)(ii)(A)(5), relief is requested from the requirement to examine more than 90% of the examination volume of the RPV circumferential shell weld, 1RV-02-002, on the basis that the alternative to the examination requirements would provide an acceptable level of quality and safety.

10CFR 50.55 a(g)(6)(ii)(A)(1) revokes all relief requests with respect to volumetric examination coverage for RPV shell welds specified in Item B1.10. Portions of a previously granted First Interval relief request, NR-9, addressed limited exam coverage on the Braidwood RPV shell welds.

Augmented examination of the subject RPV shell weld was conducted on Braidwood Unit 1 during AlR06 refuel outage (Spring 1997). During this exam at Braidwood Unit 1, physical obstructions and geometry prevented ultrasonic (UT) coverage in excess of 90% of the required volume. The examination of the Lower Shell Course-to-Dutchman weld, 1RV-02-002, is restricted by six (6) core barrel locating lugs welded to the inner surface of the vessel approximately 2.5 inches above the weld centerline (See Attachment 1). These lugs obstruct the automated UT examination tool from examining the Code required volume of weld and base material under and below each lug in both the circumferential and perpendicular scan directions (156° total for all 6 lugs, See Attachment 2, 3, and 4). All weld metal and base material can be examined between the lugs (204° total length between all 6 lugs). The 6 lug interferences limit the examination aggregate volume coverage for the weld and adjacent base metal to approximately 81% of the Code required volume.

RELIEF REQUEST NR-34 (cont.)

Compliance with the applicable Code requirements may be accomplished by redesigning and modifying the RPV and/or the building structure surrounding the vessel(s). Access for manual inspections from the OD of the RPV is limited because of the close proximity of the building structure to the RPV shell (See Attachment 1).

Examination of the Code required examination volume was completed to the maximum extent practical using alternate UT techniques qualified to the highest standard available. RPV examinations were conducted from the I.D. of the vessel. Access to allow examination from the O.D. (shell side) of these welds is restricted due to the structural concrete surrounding the vessel. The examination techniques employed have been demonstrated and qualified to the Performance Demonstration Initiative (PDI) Program which meets the intent of the rules of Appendix VIII of the ASME Code, Section XI, 1992 Edition with 1993 Addenda. These techniques were used in place of the currently required Section XI, 1983 Edition with Summer 1983 Addenda, techniques (Reference Relief Request NR-29). Although the techniques have been qualified at PDI for single direction scanning, examinations were performed from two directions, when required (i.e., performed from both sides of the weld on the same surface, where feasible).

Strict ASME Section III quality controls were used when designing, fabricating, and installing these RPV welds. Preservice examinations to the fullest extent practical were performed on these welds. Preservice Inspection (PSI) relief request LNR-9 was submitted to the Staff and approved for these lug interferences. ComEd has recently performed these ultrasonic examinations to the fullest extent practical, i.e. 81%, during the Alk06 refuel outage and no unacceptable indications to applicable Section XI standards were detected. The results of the examination provide further assurance that unallowable inservice flaws have not developed in the subject weld. In addition to UT, visual examinations (VT-1 and VT-2) of the weld also verifies its integrity. Thus, the modification of the RPV and/or the building structures to increase examination volume coverage from 81% to more than 90% would incur unnecessary radiological exposure and significant engineering expenses. Braidwood Station believes this course of action is a hardship without a compensating increase in the level of quality and safety.

PROPOSED ALTERNATE PROVISIONS

The ultrasonic examination of the Braidwood Unit 1 RPV shell weld, 1RV-02-002, was performed to the maximum extent practical. In conjunction with the partial ultrasonic examination, a supplemental VT-1 of the RPV shell weld was conducted from the interior of the RPV using underwater camera equipment.

APPLICABLE TIME PERIOD

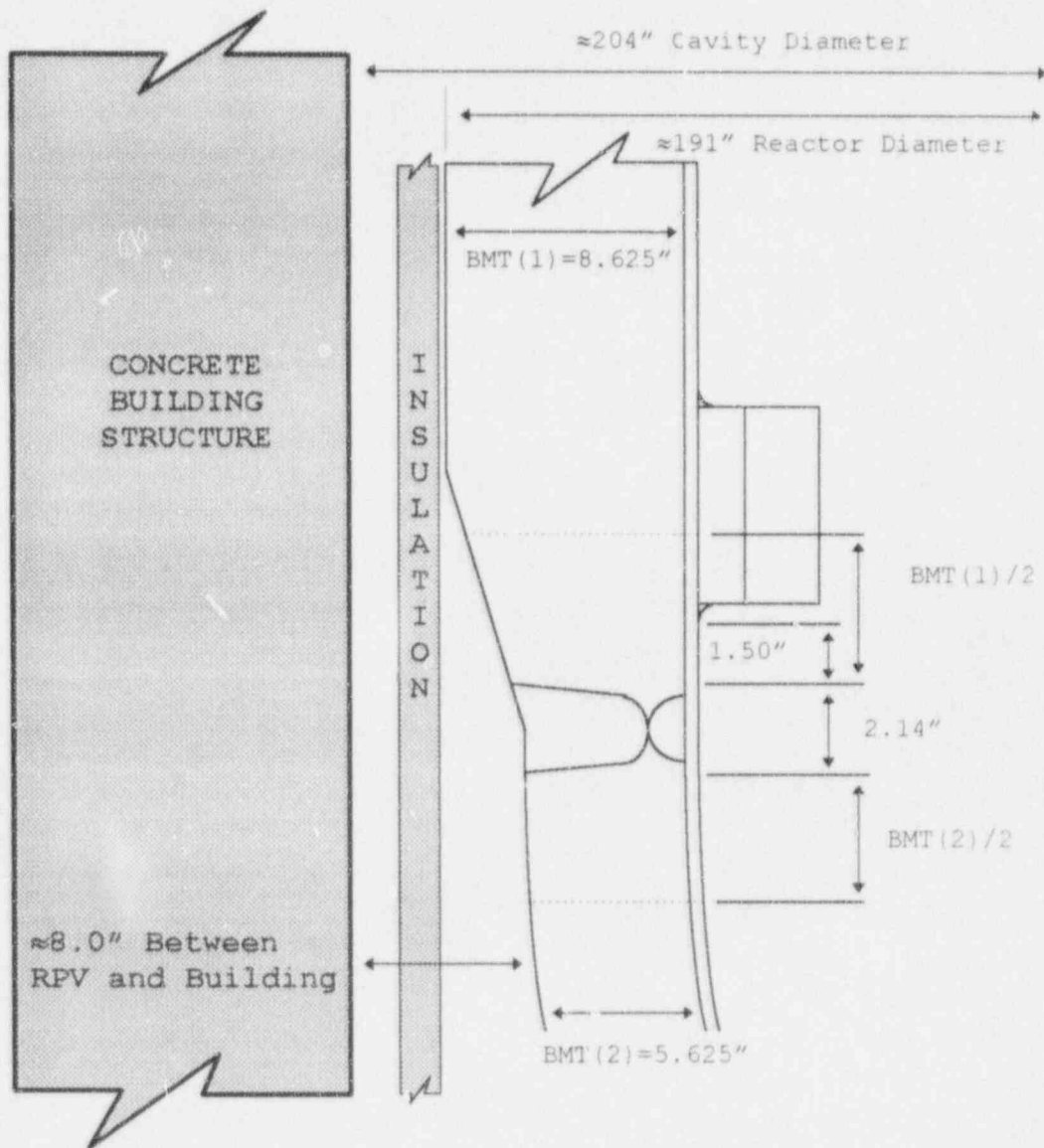
This relief request will be required for the First Ten Year Inspection Interval.

APPROVAL STATUS

Pending NRC review.

Attachment 1

(Drawing not to scale)

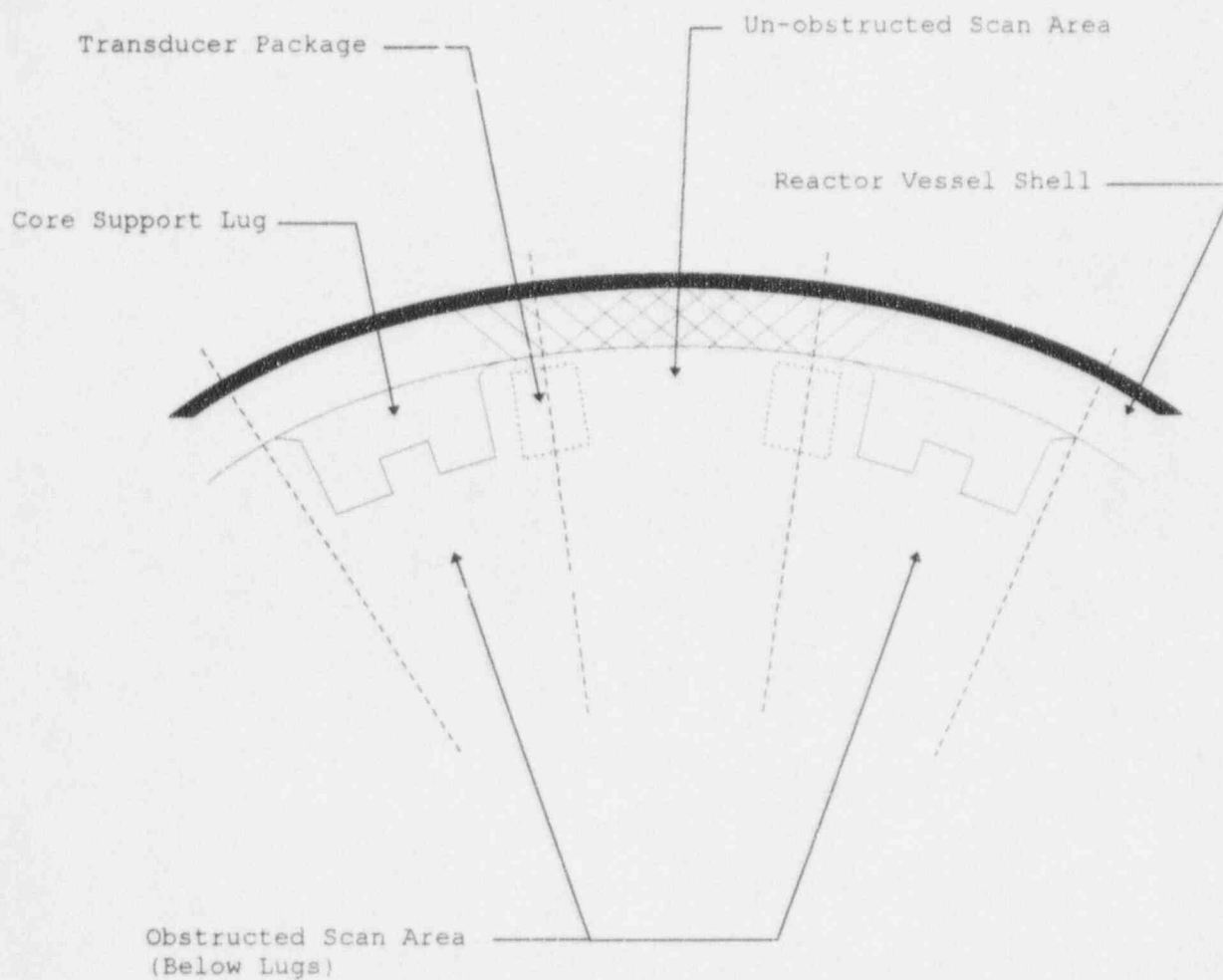


BMT = Base Metal Thickness
(.....) = Code Volume

Core Support Lug Detail

Attachment 2

(Drawing not to scale)



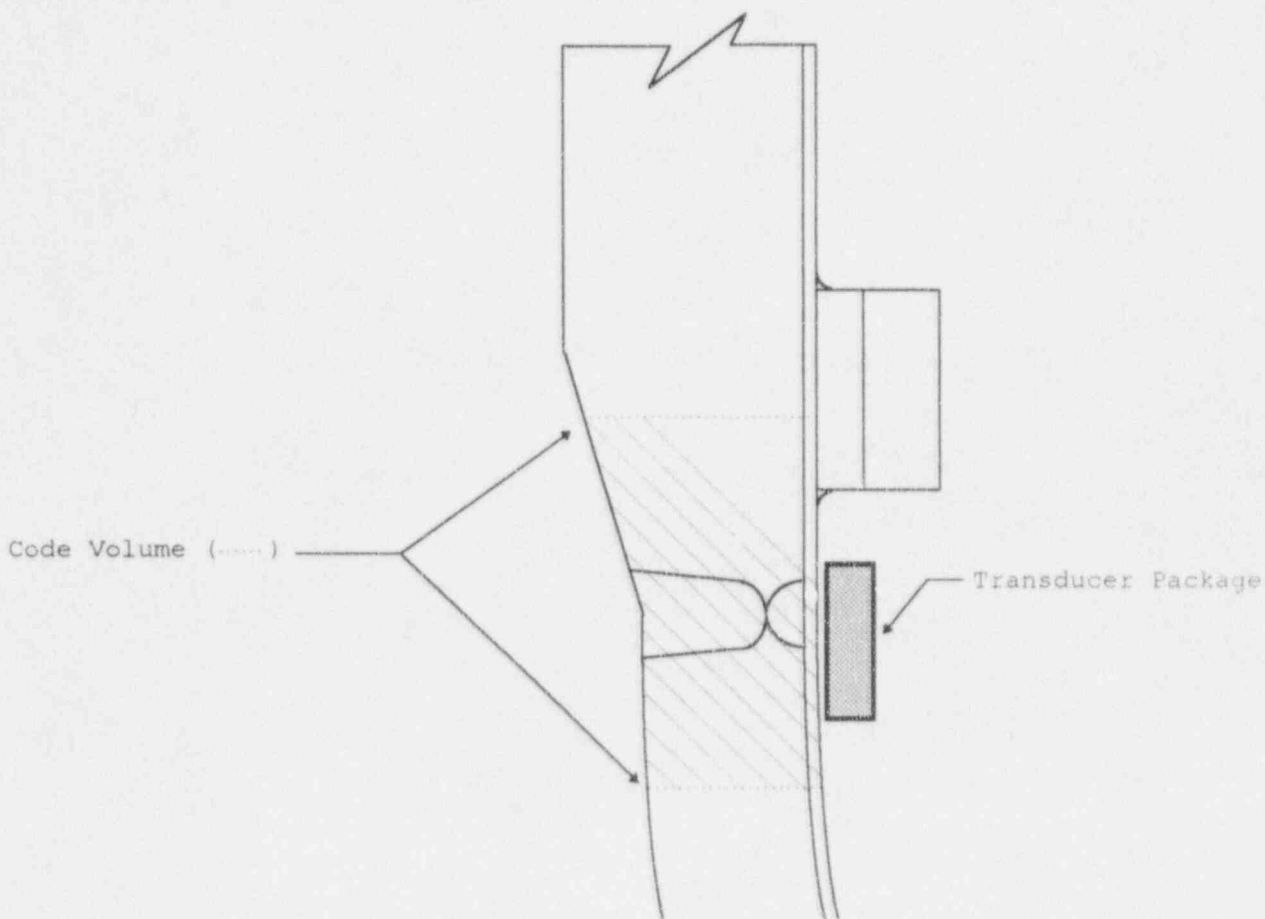
Exam Coverage Between Core Support Lugs for Reflectors Oriented Transverse to the Weld

Revision 0

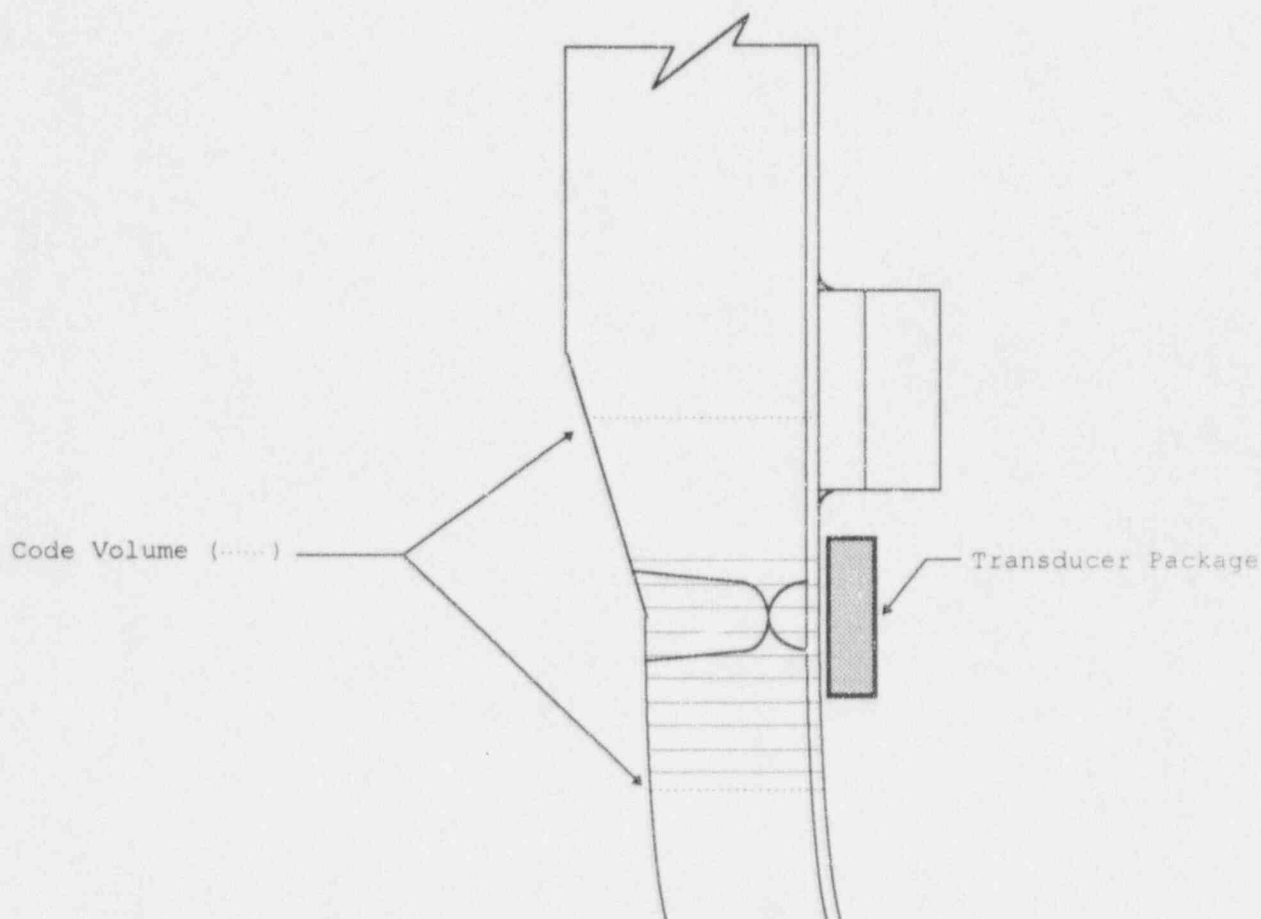
NR-34

Attachment 3

(Drawing not to scale)



**Exam Coverage Under Core Support Lugs for
Reflectors Oriented Parallel to the Weld**



Exam Coverage Under Core Support Lugs for Reflectors Oriented Transverse to the Weld