10 CFR 50.55a(g)(5)(iii)

APS A subsidiary of Pinnacle West Capital Corporation

Palo Verde Nuclear Generating Station

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102-06035-DCM/RJR
July 17, 2009

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

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 1
Docket No. STN 50-528
Request for Relief from the American Society of Mechanical Engineers (ASME) Code, Section XI – Relief Request No. 46

Pursuant to 10 CFR 50.55a(g)(5)(iii), Arizona Public Service Company (APS) is submitting this request for relief from the ASME Code requirements which have been determined by APS to be impractical for the Unit 1 second Inservice Inspection (ISI) interval.

No commitments are being made to the NRC by this letter. Should you need further information regarding this relief request, please contact Russell A. Stroud, Licensing Section Leader, at (623) 393-5111.

Sincerely,

DCM/TNW/RAS/RJR/gat

Enclosure

cc: E. E. Collins, Jr. NRC Region IV Regional Administrator
J. R. Hall NRC NRR Project Manager
R. I. Treadway NRC Senior Resident Inspector for PVNGS

A047
NRR

ENCLOSURE

Relief Request No. 46

Relief Request in Accordance with 10 CFR 50.55a(g)(5)(iii)
Inservice Inspection Impracticality

Relief Request No. 46

ASME Code Components Affected

PVNGS Unit: 1, Second Interval

Code Class: 1

Exam Category	Item No.	System or Component	Request Section
B-D	B3.90	Reactor Vessel nozzle-to-vessel welds	A
B-H	B8.20	Pressurizer integrally welded attachments	B
B-J	B9.11	Piping NPS 4 or Larger circumferential welds	C

Code Class 2

Exam Category	Item No.	System or Component	Request Section
C-C	C3.20	Piping integrally welded attachments	D
C-C	C3.30	Pumps integrally welded attachments	E
C-F-1	C5.11 C5.21	Piping Welds ≥3/8 in. Nominal Wall Thickness for Piping > NPS 4 circumferential weld Piping Welds > 1/5 in. Nominal Wall Thickness for Piping ≥NPS 2 and ≤NPS 4 circumferential weld	F
C-H	C7.30 C7.70	Piping pressure retaining components Valves pressure retaining components	G

Applicable Code Edition and Addenda

The second 10-year Interval Inservice Inspection (ISI) Program Plan for Unit 1 was prepared to comply with the American Society of Mechanical Engineers (ASME) Code, Section XI, 1992 Edition, 1992 Addenda.

Applicable Code Requirement

ASME Section XI, 1992 Edition, 1992 Addenda, subsections IWB and IWC defines the requirements for selected welds and components to be examined. These requirements specify the examination area, volume, or boundary as essentially 100%. It should be noted that Code cases, alternatives, and specific details are discussed in part of this request.

Part A: B-D, B3.90 Reactor Vessel - Nozzle to Vessel Welds

Specific ASME Code Requirement

Subsection IWB of ASME Section XI, 1992 Edition, 1992 Addenda defines the ASME Class 1 welds and components that are required to be examined. For volumetric examinations it further specifies the associated examination volume. These examination volume requirements were modified using Code Case N-613-1, which provides alternative figures and volumes and Code Case N-460, which provides alternative rules that allow the examination volume to be reduced by 10% under certain conditions.

Impracticality of Compliance

ASME Code requires a minimum of 90 percent coverage of the weld volume, but because of the configuration of the reactor vessel outlet nozzles and the geometric shape that causes the examination limitations, APS is seeking relief from the Code requirement.

Burden Caused by Compliance

Due to component geometry several scans are performed on these nozzles to maximize coverage. To comply with the Code, the reactor vessel nozzle attachment would have to be redesigned and modified to increase the coverage to 90 percent or better.

Alternative

The design of the reactor vessel outlet nozzle protrusion (illustrated in Figure 2) provides a geometric limitation to the scanning area. The examination robot and transducer sled are physically limited by this protrusion. Figure 1 illustrates the ISI drawing for Zone 1 and the welds 1-15 and 1-18. Figure 2 illustrates where the limitations were documented and a typical transducer sled scanning from the vessel inside diameter. The limitation is the nozzle protrusion as seen in this figure. All accessible reactor vessel surfaces were examined, with the exception of scanning from the radius and protrusion. Examination scanning was performed on these nozzles to obtain the highest examination volume practical. The examination volume coverage was 98% for perpendicular to the weld centerline scans from the nozzle bore. The

tangential scans that are parallel to the weld centerline are limited to 67%. The overall combined examination volume was 82.5%.

Based on the above evaluation, the proposed alternative is to examine these welds to the extent practical.

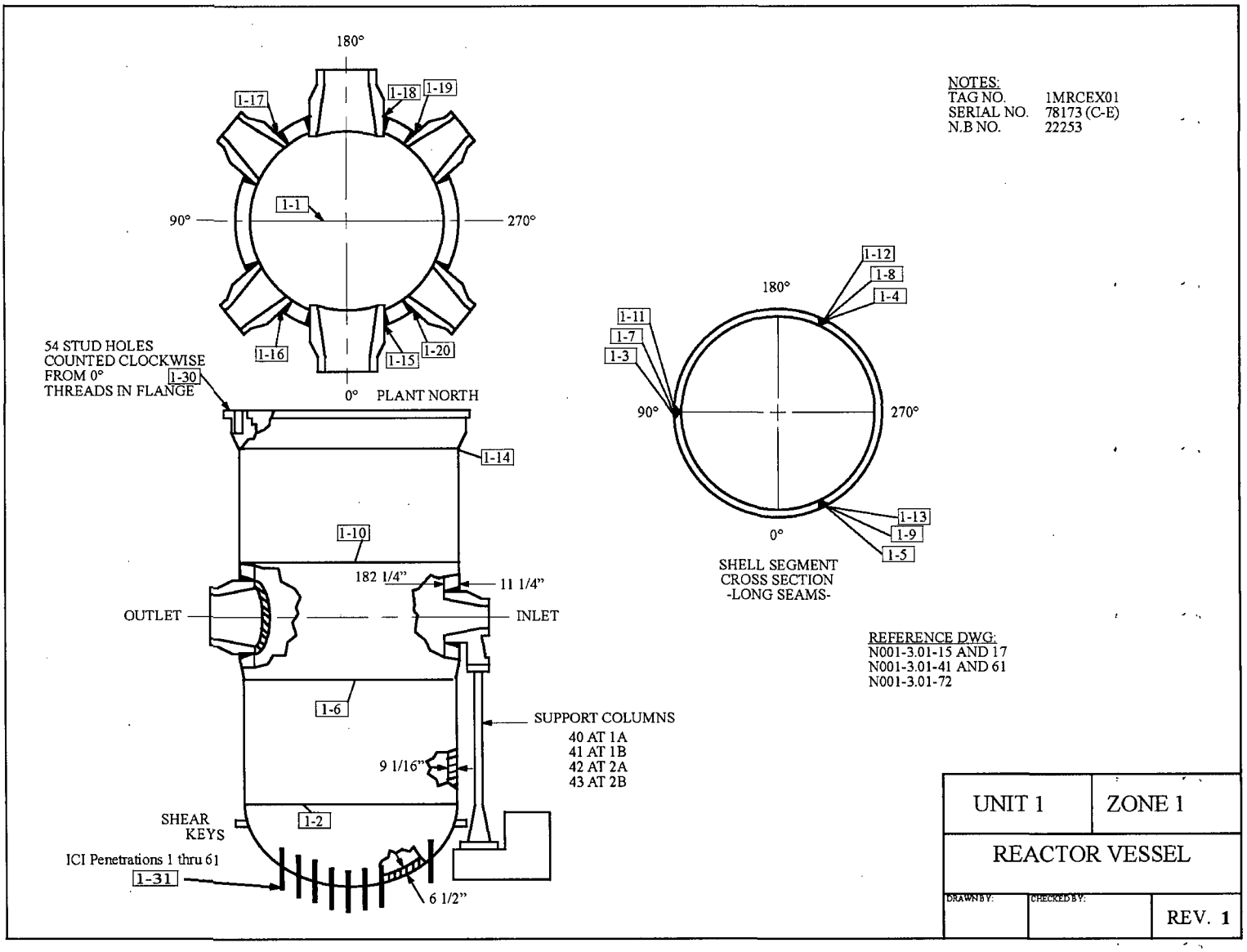

FIGURE 1, ISI ZONE DRAWING 1

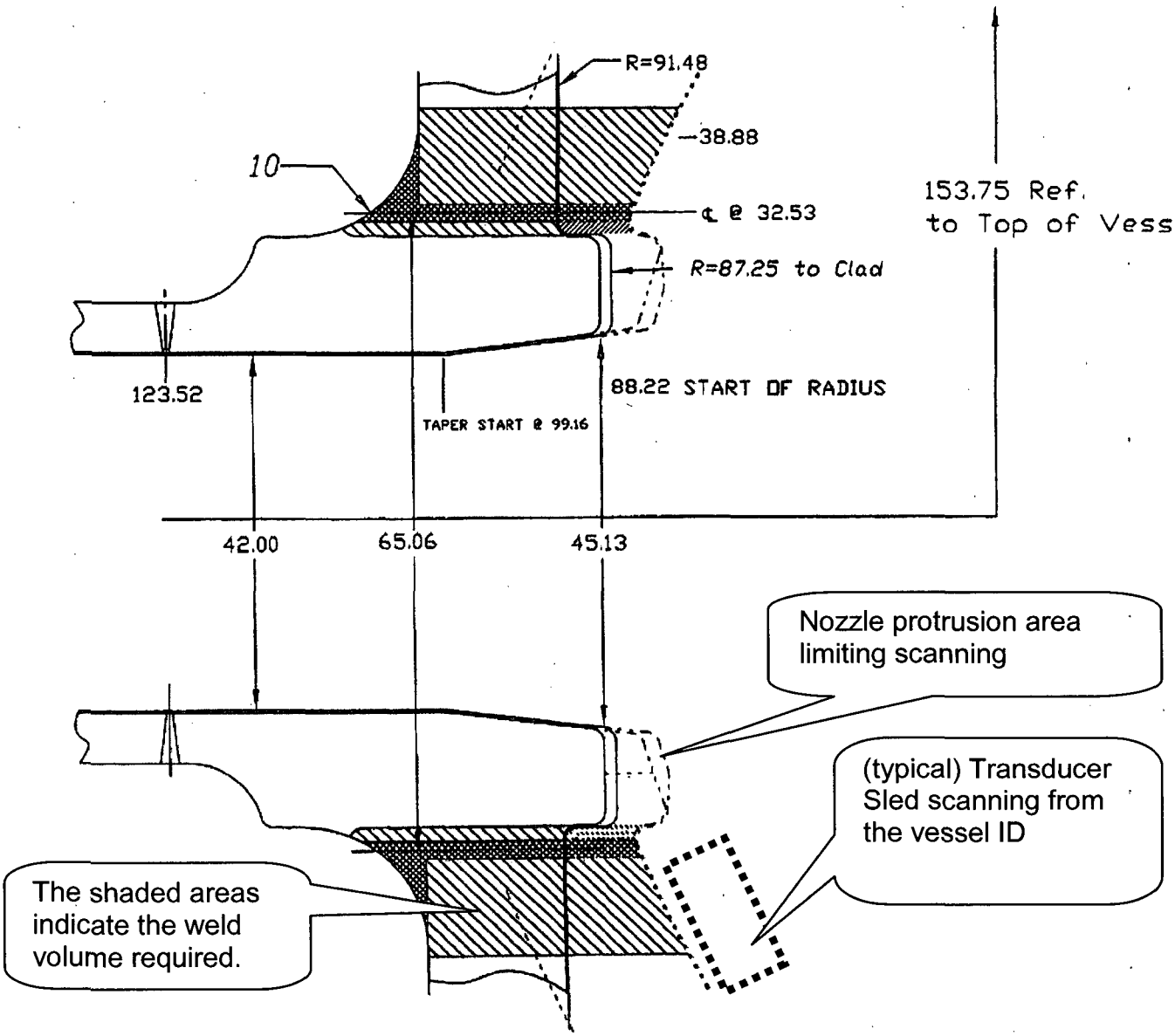

FIGURE 2, NOZZLE TO VESSEL PROTRUSION (typical sketch)

Part B: B-H, B8.20 Pressurizer - Integrally Welded Attachments

Specific ASME Code Requirement

ASME Section XI, 1992 Edition, 1992 Addenda, Category B-H, Item B8.20 requires 100% surface examination, as defined by Figure IWB-2500-13, of both the outside and inside surface of the attachment weld.

Impracticality of Compliance

The Pressurizer attachment weld (Skirt weld number 5-1) is inaccessible from the inside due to radiation, insulation, heaters, and drain lines. Only the outside surface of the skirt weld is accessible for examination. A surface examination using magnetic particle testing (MT) was performed for 100% coverage from the outside diameter of the weld. Where the outside portion is readily accessible, an ultrasonic examination was also performed to augment the surface examination. The ultrasonic examination was limited to 85% coverage. The following sketches (Figure 3 and 4) illustrate the geometric conditions that limit the examination of this weld to the outside diameter.

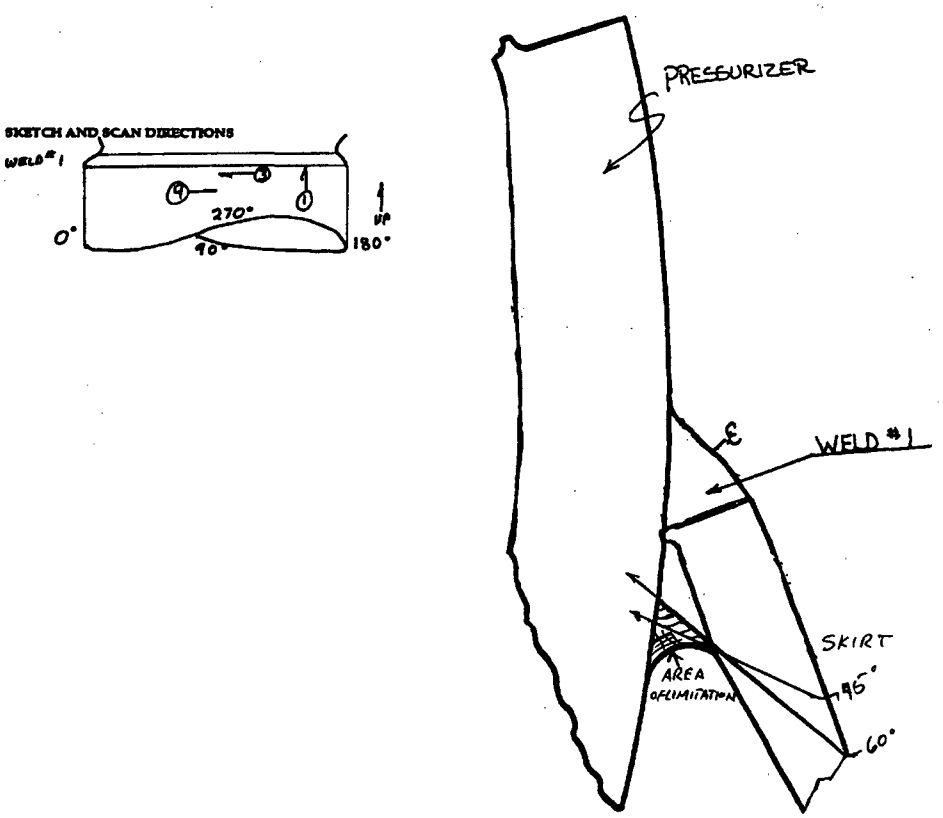

FIGURE 3, PRESSURIZER ATTACHMENT WELD

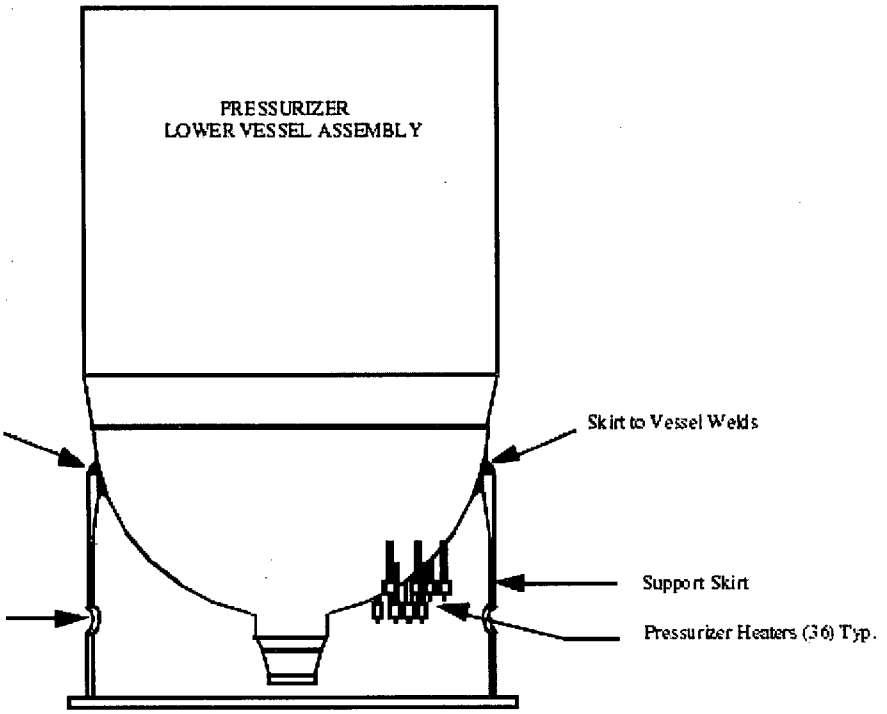

FIGURE 4, PRESSURIZER LIMITATIONS

Burden Caused by Compliance

Relief is being requested because of limited access due to component configuration. In order to meet the examination coverage requirements, the affected component would have to be re-designed and modified. Re-design and modification of components to obtain the required examination coverage is contrary to the intent of the Code. Therefore, this option is considered impractical.

Alternative

Based on the above evaluation, the proposed alternative is to examine this weld using ultrasonic techniques to the extent practical.

Part C: B-J, B9.11 Piping NPS 4 in. or Larger - Circumferential Welds

Specific ASME Code Requirement

ASME Section XI, 1992 Edition, 1992 Addenda, Category B-J, Item B9.11 requires 100% volumetric and surface examination, as defined by Figure IWB-2500-8.

Impracticality of Compliance

The following piping butt welds with single sided access were credited to only a 50% Code volume coverage based on Appendix VIII Performance Demonstration Initiative (PDI) demonstration.

ASME Code, Section XI Examination Category B-J				
Weld ID	Weld Configuration	Material	Ultrasonic Technique	Nominal Pipe Size (NPS) Thickness (inch)
23-4	Pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	14" x 1.406"
23-6	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	14" x 1.406"
24-14	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	14" x 1.406"
24-16	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	14" x 1.406"
24-19	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	14" x 1.406"
24-6	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	14" x 1.406"
25-4	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	14" x 1.406"
25-6	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	14" x 1.406"
26-17	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	14" x 1.406"
26-6	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	14" x 1.406"
29-2	pipe-to-tee	stainless steel	45 degree shear 60 degree refracted longitudinal	4" x 0.532"

All of the B-J piping welds were examined in accordance with the PDI generic procedure PDI-UT-2. A review of the ultrasonic examination reports for the single sided B-J piping welds indicates that no limitations or comments were made addressing weld crown, diametrical weld shrinkage, surface roughness, or other conditions that would cause additional limited volumetric coverage.

Figure 5 below is a typical weld profile (pipe-to-fitting, pipe-to-valve, pipe-to-pump, etc.) configuration. As seen in Figure 5, these types of welds contain a taper as the connection transitions into the attached item. As a result of the slope of this taper and limited distance from the weld to the attached item, no meaningful axial scans can be performed from the tapered side of the weld.

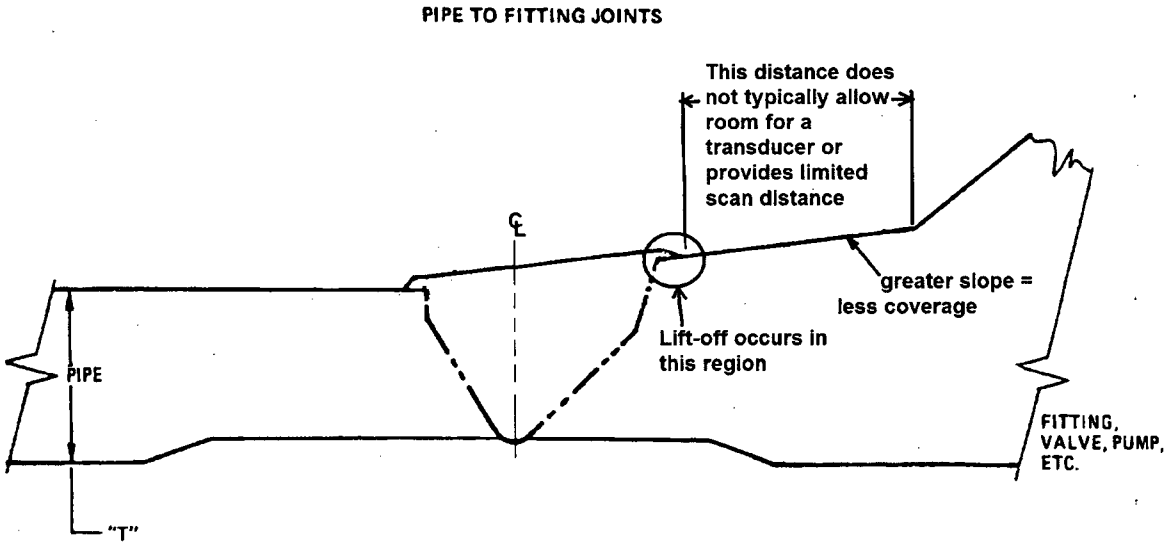

FIGURE 5, TYPICAL PIPE TO VALVE OR FITTING CONFIGURATION

10 CFR 50.55a (b)(2)(xv)(A)(2) allows for full coverage credit to be claimed from a single side examination if a successful single-sided Appendix VIII demonstration using flaws on the opposite side of the weld is successfully completed. However, the PDI procedure used by APS has not been qualified to detect flaws on the far side of single side access configurations as shown above. Therefore, APS considers the B-J weld to be limited coverage.

Burden Caused by Compliance

Relief is being requested because of component geometry. In order to meet the volumetric or surface coverage requirements, the affected welds would have to be re-designed and modified. Re-design and modification of components to obtain the required examination volume is contrary to the intent of the Code. Therefore, this option is considered impractical.

Alternative

Based on the above evaluation, the proposed alternative is to examine the above referenced welds to the extent practical.

Part D: C-C, C3.20 Piping - Integrally Welded Attachments

Specific ASME Code Requirement

ASME Section XI, 1992 Edition, 1992 Addenda, Category C-C, Item C3.20 requires 100% surface examination, as defined by Figure IWC-2500-5.

Impracticality of Compliance

Support SI-107-H-22 is located on the 4" diameter HPSI discharge line in the East Wrap of the auxiliary building. Figure 6 below illustrates the location and zone drawing for this support. This support is fabricated with 2 stainless steel shear lugs, each being ¾" x ¾" x 2" long. One of the lugs is inside the wall penetration and the other is accessible on only 3 sides. The remaining side is very close to the structural member and is not accessible for surface examination.

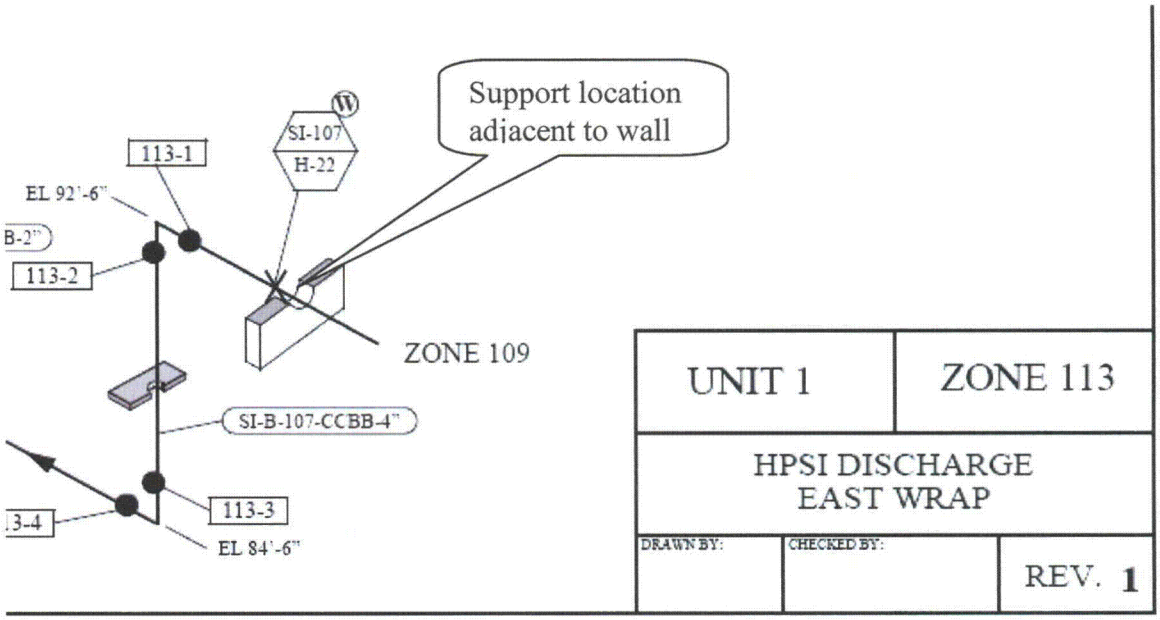

FIGURE 6, ZONE 113

Burden Caused by Compliance

Relief is being requested because of physical interference due to plant configuration. The examination is limited by the building wall and component support members. It would cause undue burden on the plant to disassemble the support to make the inaccessible portion accessible when there have been no abnormal conditions noted at this location. The support components are welded so the disassembly mentioned would be to cut and remove welds and support components. In order to meet the volumetric or surface coverage requirements, the affected component configuration would have to be re-designed and modified. Re-design and modification of

components to obtain the required examination volume is contrary to the intent of the Code. Therefore, this option is considered impractical.

Alternative

Based on the above evaluation, the proposed alternative is to examine the above referenced support attachment welds to the extent practical.

Part E: C-C, C3.30 Pumps - Integrally Welded Attachments

Specific ASME Code Requirement

ASME Section XI, 1992 Edition, 1992 Addenda, Category C-C, Item C3.30 requires 100% surface examination, as defined by Figure IWC-2500-5.

Impracticality of Compliance

Each High Pressure Safety Injection pump (A and B) have four integrally attached support lugs. The enclosed ISI zone drawing (Figure 7) for pump B illustrates the support designation. Note that two lugs are on the front of the pump and two lugs are on the rear of the pump. The limited lug to pump welds are the front lugs, weld numbers 116-1A (117 1A) and 116-1D (117-1D).

Enclosed are pictures of the rear and front support lugs, Figures 8 and 9 respectively. For the rear location access to the bottom side of the lug to pressure boundary weld is provided when the insulation is removed. For the front lug locations, no access to the bottom side of the lug to pressure boundary weld is allowed when insulation is removed. Access was limited by the structural steel member that supports the lug.

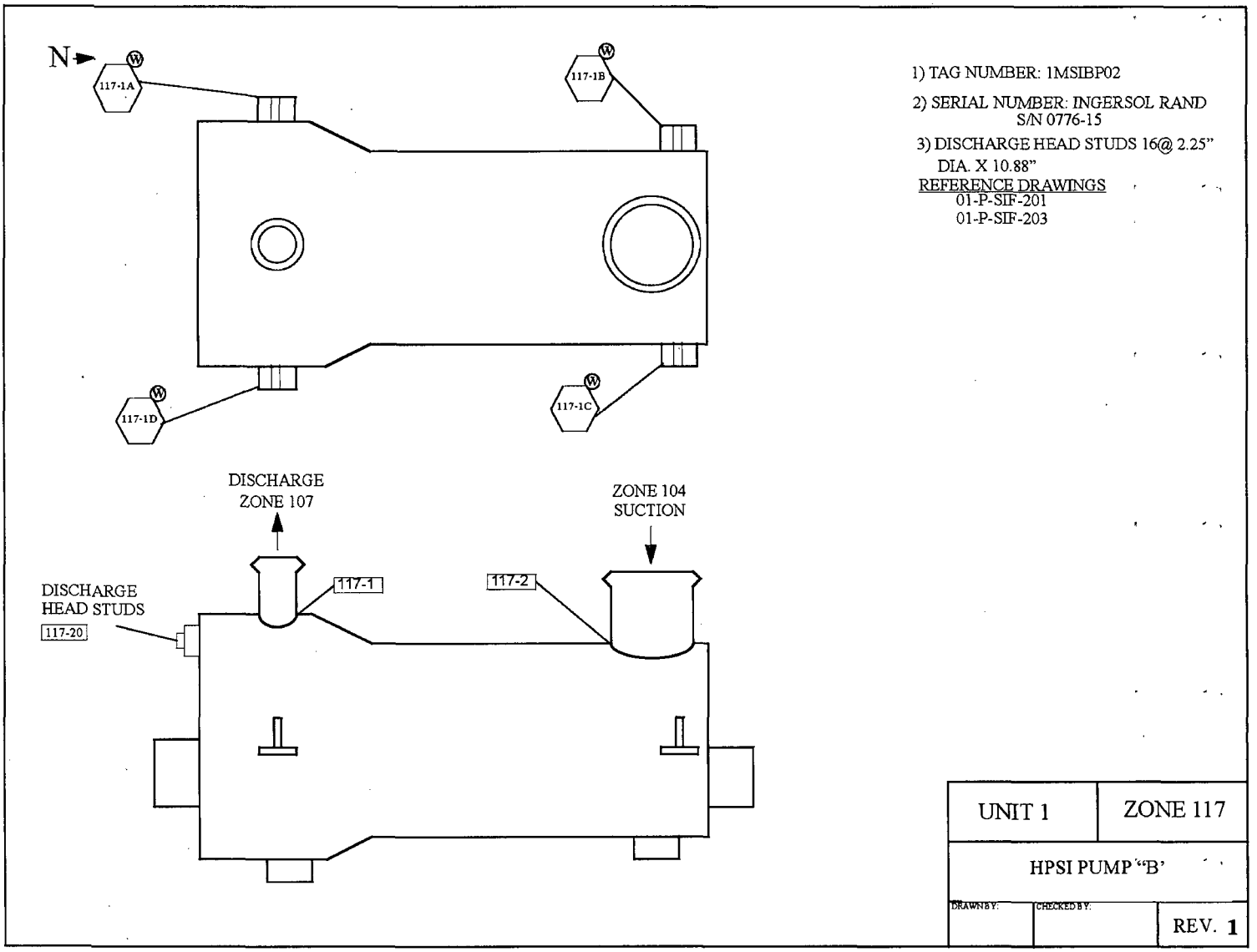

FIGURE 7, ZONE 117 (typical for A and B pump)

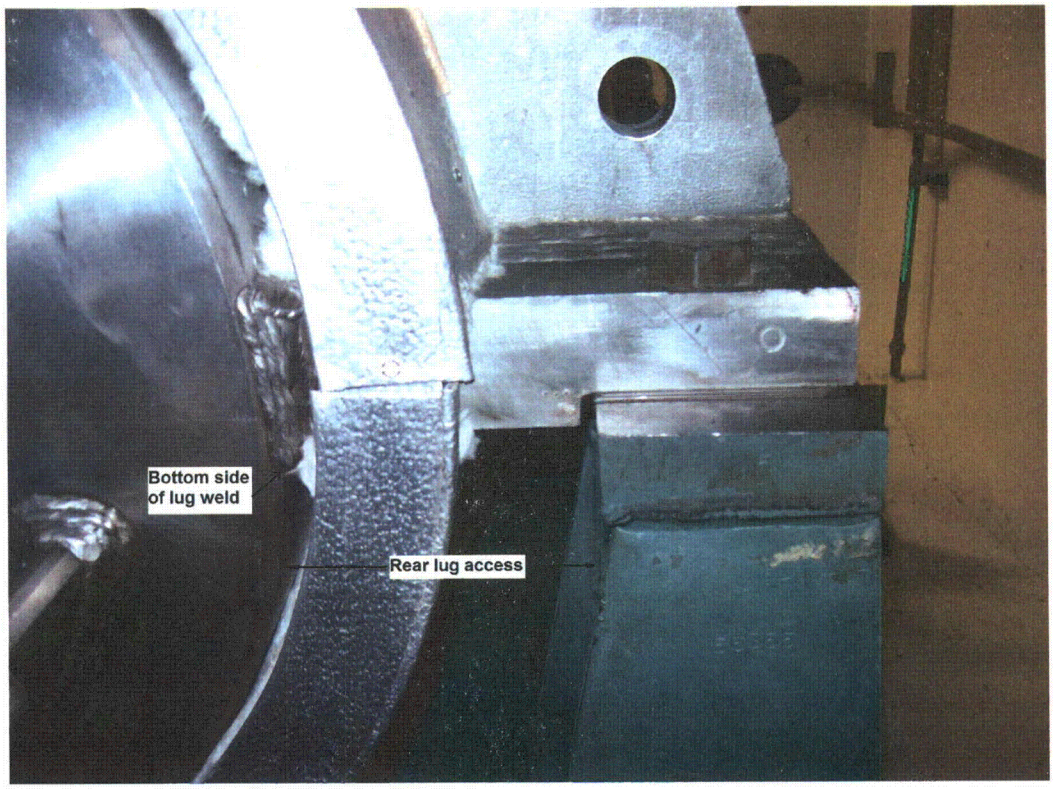

FIGURE 8, HPSI PUMP REAR LUG (NOT limited)

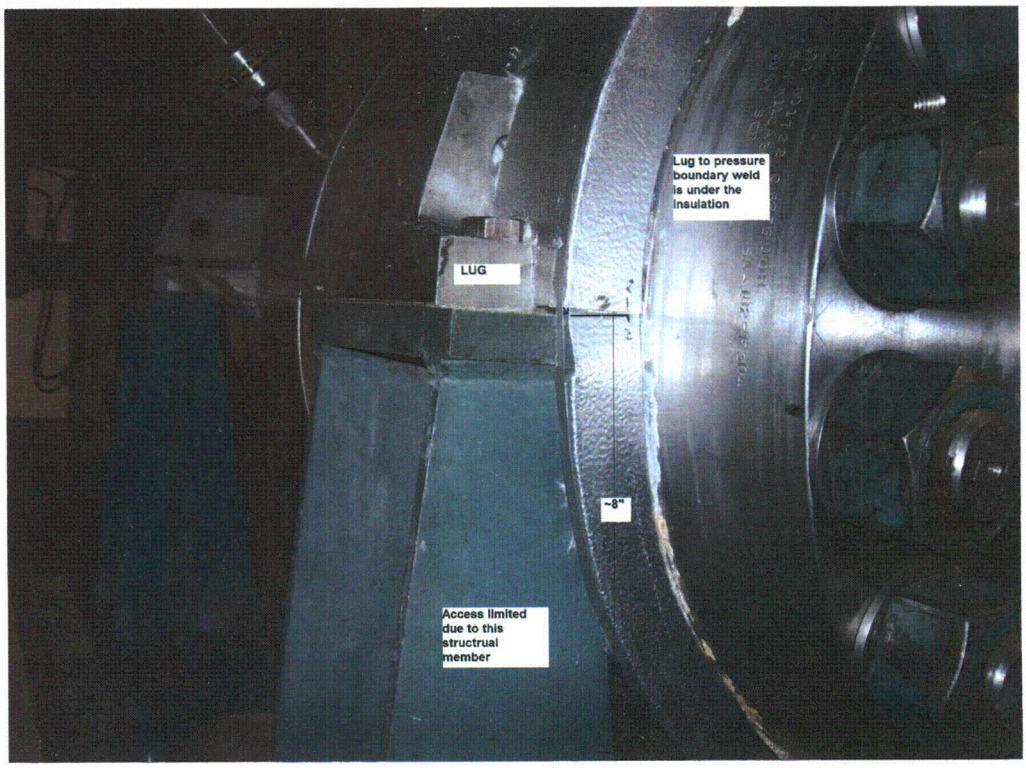

FIGURE 9, HPSI PUMP FRONT LUG (Limited)

Burden Caused by Compliance

Relief is being requested because of physical interference due to plant configuration and component geometry. Based on the physical restriction APS considers the bottom surface of the front lug to pressure boundary weld to be impractical for examination. It would cause undue burden to disassemble the pump supporting elements to allow accessibility. In order to meet the volumetric or surface coverage requirements, the affected welds would have to be re-designed and modified. Re-design and modification of components to obtain the required examination volume is contrary to the intent of the Code. Therefore, this option is considered impractical.

Alternative

All four lugs were liquid penetrant examined to the maximum extent practical. The rear lugs were not limited and 100% coverage was obtained. The front lugs were limited at the bottom side of the lug to pressure boundary weld. It was estimated the coverage for all four lugs to be an average of 78%.

Based on the above evaluation, the proposed alternative is to examine the above referenced welds to the extent practical.

Part F: C-F-1, C5.11 Piping Welds ≥ 3/8 in. Nominal Wall Thickness for Piping > NPS 4 - Circumferential Weld
C5.21 Piping Welds > 1/5 in. Nominal Wall Thickness for Piping ≥ NPS 2 and ≤ NPS 4 - Circumferential Weld

Specific ASME Code Requirement

ASME Section XI, 1992 Edition, 1992 Addenda, Category C-F-1, Items C5.11 and C5.21 require 100% volumetric and surface examination, as defined by Figure IWC-2500-7.

Impracticality of Compliance

The following piping butt welds with single sided access were credited to only a 50% code volume coverage based on Appendix VIII PDI demonstration.

ASME Code, Section XI Examination Category C-F-1					
Weld ID	Weld Configuration	Material	Ultrasonic Technique	Code-Required Surface Examinations Completed	Nominal Pipe Size (NPS) Thickness (inch)
76-7	pipe-to-flange	stainless steel	45 degree shear 70 degree shear	dye penetrant	12" x 0.375"
77-16	pipe-to-valve	stainless steel	45 degree shear 53gree shear 45 degree refracted longitudinal 60 degree refracted longitudinal	dye penetrant	12" x 1.125"
79-14	pipe-to-valve	stainless steel	52 degree shear 60 degree refracted longitudinal	dye penetrant	12" x 1.125"
77-7	pipe-to-flange	stainless steel	45 degree shear 70 degree shear	dye penetrant	12" x 0.375"
77-14	pipe-to-valve	stainless steel	45 degree shear 60 degree shear 45 degree refracted longitudinal	dye penetrant	12" x 1.125"
77-27	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	dye penetrant	12" x 1.312"
70-121	pipe-to-valve	stainless steel	45 degree shear 60 degree refracted longitudinal	dye penetrant	16" x 1.594"
84-3	pipe-to-penetration	stainless steel	45 degree shear 60 degree shear	dye penetrant	24" x 0.375"
84-26	pipe-to-elbow	stainless steel	45 degree shear 70 degree shear 60 degree refracted longitudinal	dye penetrant	24" x 0.375"
86-1	pipe-to-pump	stainless steel	45 degree shear 70 degree shear	dye penetrant	20" x 0.375"
85-46	pipe-to-valve	stainless steel	45 degree shear 70 degree shear	dye penetrant	20" x 0.375"
106-1	pipe-to-pump	stainless steel	45 degree shear 70 degree shear	dye penetrant	4" x 0.337"
106-21	pipe-to-valve	stainless steel	45 degree shear 70 degree shear	dye penetrant	4" x 0.438"
106-64	pipe-to-valve	stainless steel	45 degree shear 70 degree shear	dye penetrant	2" x 0.344"
107-1	pipe-to-pump	stainless steel	45 degree shear 70 degree shear	dye penetrant	4" x 0.337"
107-11	pipe-to-valve	stainless steel	45 degree shear 70 degree shear	dye penetrant	4" x 0.337"
107-42	pipe-to-tee	stainless steel	45 degree shear 70 degree shear	dye penetrant	2" x 0.344"
110-39	pipe-to-penetration	stainless steel	45 degree shear 70 degree shear	dye penetrant	3" x 0.438"
112-45	pipe-to-reducer	stainless steel	45 degree shear 70 degree shear	dye penetrant	3" x 0.438"
113-21	pipe-to-tee	stainless steel	45 degree shear 70 degree shear	dye penetrant	2" x 0.344"
113-28	pipe-to-valve	stainless steel	45 degree shear 70 degree shear	dye penetrant	2" x 0.344"
115-13	pipe-to-penetration	stainless steel	45 degree shear 70 degree shear	dye penetrant	3" x 0.438"

ASME Code, Section XI Examination Category C-F-1					
Weld ID	Weld Configuration	Material	Ultrasonic Technique	Code-Required Surface Examinations Completed	Nominal Pipe Size (NPS) Thickness (inch)
115-20	pipe-to-valve	stainless steel	45 degree shear 70 degree shear	dye penetrant	3" x 0.438"
118-49	pipe-to-valve	stainless steel	45 degree shear 70 degree shear	dye penetrant	3" x 0.438"
119-52	pipe-to-valve	stainless steel	45 degree shear 70 degree shear	dye penetrant	3" x 0.438"
119-53	pipe-to-valve	stainless steel	45 degree shear 70 degree shear	dye penetrant	2" x 0.344"

All of the C-F-1 piping welds were examined in accordance with the PDI generic procedure PDI-UT-2. No limitations to the procedural requirements were encountered. Part C (Figure 5) of this Relief Request illustrates a typical weld profile sketch (pipe-to-fitting, pipe-to-valve, pipe-to-pump, etc.) for these weld configurations. As shown in the sketch, these types of welds contain a taper as the connection transitions into the attached item. As a result of the slope of this taper and limited distance from the weld to the attached item, no meaningful axial scans can be performed from the tapered side of the weld.

10 CFR 50.55a (b)(2)(xv)(A)(2) allows for full coverage credit to be claimed from a single side examination if a successful single-sided Appendix VIII demonstration using flaws on the opposite side of the weld is successfully completed. However, the PDI procedure used by APS has not been qualified to detect flaws on the far side of single side access configurations in stainless steel materials. Therefore, APS considers the C-F-1 welds to be limited coverage.

A review of the ultrasonic examination reports for the single sided C-F-1 piping welds indicates that no limitations or comments were made addressing weld crown, diametrical weld shrinkage, surface roughness, or other conditions that would cause additional limited volumetric coverage.

Burden Caused by Compliance

Relief is being requested because of component geometry. In order to meet the volumetric or surface coverage requirements, the affected welds would have to be re-designed and modified. Re-design and modification of components to obtain the required examination volume is contrary to the intent of the Code. Therefore, this option is considered impractical.

Alternative

Based on the above evaluation, the proposed alternative is to examine the above referenced welds to the extent practical.

Part G: C-H, Pressure Retaining Components, Items C7.30 and C7.70

Specific ASME Code Requirement

ASME Section XI, 1992 Edition, 1992 Addenda, Category C-H requires a system leakage test for item numbers C7.30 and C7.70. These requirements include essentially 100% of the pressure-retaining boundary.

Impracticality of Compliance

There are 2 systems discussed in this section. The first is the charging system and the second is the hydrogen purge system.

Charging System:

The three chemical and volume control system (CVCS) charging pumps each have a suction stabilizer and pulsation dampener for system stability purposes. These components have a bladder and nitrogen system to moderate the fluid shock in the CVCS to maintain consistent operating characteristics. The nitrogen tubing lines up to and including the first isolation valve from the stabilizer and dampener are ASME Class 2. Line numbers for this tubing are A-938-HCBA-3/8", A-937-CCBA-3/8", B-940-HCBA-3/8", B-939-CCBA-3/8", E-942-HCBA-3/8", E-941-CCBA-3/8 " for the A, B and E charging pumps respectively. A visual test level II (VT-2) qualified examiner employs a "snoop" method to detect escaping gas in the form of bubbles on this tubing. This tubing has installation clips and other attachments that prevent 100% snooping of the tubing. Therefore, APS considers this examination to be limited. Figure 10 depicts a typical installation clip and associated VT-2 limitation.

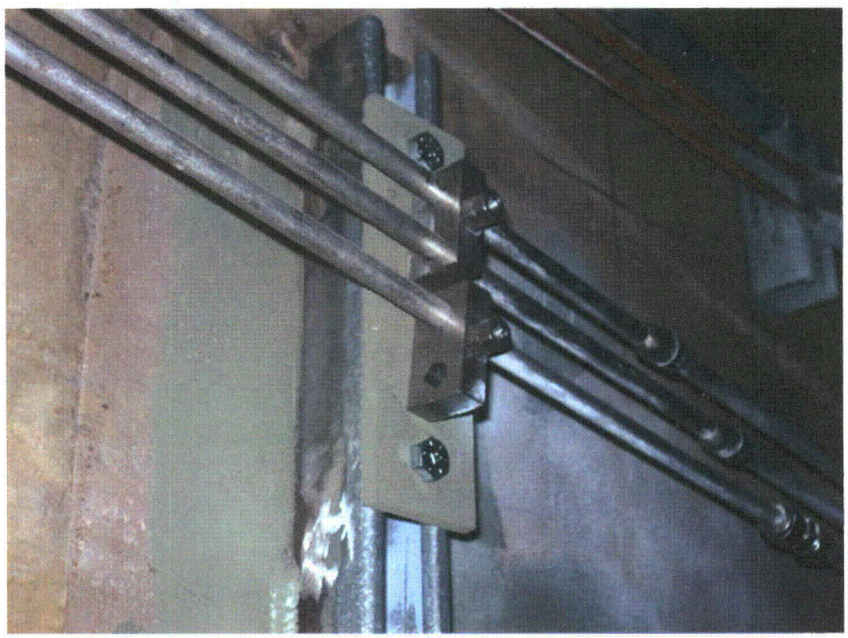

FIGURE 10, TYPICAL INSTALLATION FOR CLAMP BRACKETS FOR THE N2 LINES

The nitrogen supply lines in question are approximately forty (40) feet in length. Each supply line has thirty (30) clips installed. Each clip is approximately one half (.5) inch wide. Thirty (30) clips are approximately equal to 1.25 linear feet of nitrogen supply lines. This number represents approximately 3% of the linear footage that was inaccessible for examination, or conversely, approximately 97% of the lines were accessible for examination. All accessible portions of these lines have been examined.

Hydrogen Purge System:

The two hydrogen purge system penetrations, numbers 36 and 38 (Figures 11 and 12), are pressurized using Local Leak Rate Testing (LLRT) equipment. If the pressure drops over the examination time frame of 10 minutes then the accessible portions of the piping are examined using the "snoop" method. This method applies a liquid that forms bubbles should a gaseous substance leak from the pressure boundary. Portions of the hydrogen purge system piping in the penetrations are inaccessible for the application of the snoop and the examination is limited to the accessible portions of the piping.

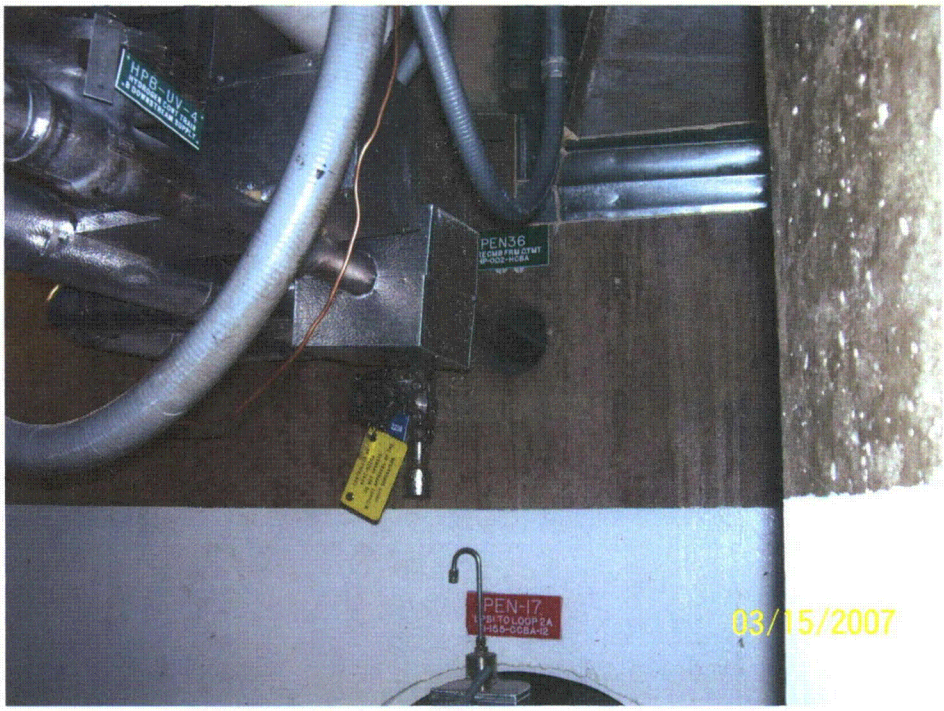

Figure 11, HP PENETRATION 36

Figure 12, HP PENETRATION 38

Burden Caused by Compliance

Relief is being requested because of physical interference due to plant configuration. To meet the testing coverage requirements, wall penetrations would need to be modified to provide additional access. Re-design and modification of components to obtain the required examination volume is contrary to the intent of the Code. Therefore, this option is considered impractical.

Alternative

Based on the above evaluations, the proposed alternative is to examine the above referenced piping to the extent practical.

Duration of Proposed Alternatives

In conclusion, all the items which APS is requesting relief were examined to the fullest extent practical. In accordance with 10 CFR 50.55a(g)(5)(iii) PVNGS is requesting relief from conformance with the above code requirements which have been determined to be impractical for the second inspection interval for Palo Verde Unit 1.