WOLF CREEK
NUCLEAR OPERATING CORPORATION

Terry J. Garrett
Vice President Engineering

March 2, 2006

ET 06-0011

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

References: 1) Letter ET 05-0023, dated November 10, 2005, from T.J. Garrett, WCNOC, to USNRC

2) Letter ET 05-0027, dated November 22, 2005, from T.J. Garrett, WCNOC, to USNRC

Subject: Docket 50-482: 10 CFR 50.55a Requests I2R-34, I2R-35, I2R-36, I2R-37, and I2R-38 for the Second Inservice Inspection Program Interval

Gentlemen:

Wolf Creek Nuclear Operating Corporation (WCNOC) Letter ET 05-0023, Reference 1, submitted the Owner's Activity Reports for the Inservice Inspection (ISI) Program Second Interval, Third Period, and also committed to issuing 10 CFR 50.55a requests for seven (7) Category B-D, two (2) Category B-A, one (1) Category C-A, and twelve (12) Risk Informed – Inservice Inspection (RI-ISI) components in which the examinations performed did not achieve greater than 90 percent total coverage of the ASME Code required volume. This submittal, in conjunction with WCNOC Letter ET 05-0027, Reference 2, completes the commitments made in Letter ET 05-0023 to submit 10 CFR 50.55a requests for the identified components, and is also the final submittal of 10 CFR 50.55a requests required for the Second Ten-Year Interval of WCNOC's ISI Program.

Pursuant to 10 CFR 50.55a(g)(5)(iii), Wolf Creek Nuclear Operating Corporation (WCNOC) hereby requests NRC approval of the following five (5) 10 CFR 50.55a Requests (Attachments 1, 2, 3, 4 and 5) for the Second Ten-Year Interval of WCNOC's ISI Program, which ended on September 2, 2005.

A047

Attachment 1 provides 10 CFR 50.55a Request Number I2R-34, which requests relief from the examination requirements of ASME Section XI for Class 1 Pressurizer Pressure-retaining Nozzle-to-Vessel welds and the Nozzle Inside Radius section. The basis for use of these alternatives is that they provide the maximum examination coverage possible within the limitations of the current design configuration. This 10 CFR 50.55a request is similar to a request previously approved by the NRC for the McGuire Nuclear Station Unit 1 in NRC Safety Evaluation Report dated March 28, 2001 (TAC No. MA9034).

Attachment 2 provides 10 CFR 50.55a Request Number I2R-35, which requests relief from the examination requirements of ASME Section XI for the Reactor Vessel Lower Head to Shell Weld and the Reactor Vessel Lower Head to Dollar Plate Weld, respectively. The basis for use of these alternatives is that they provide the maximum examination coverage possible within the limitations of the current design configuration. A similar request was previously submitted by PG&E Letter, dated December 22, 2005, Docket No. 50-275, for Diablo Canyon Unit 1, "ASME Section XI Insevice Inspection Program Relief Request NDE-SLH". It is believed that this request is still undergoing review by the NRC. This precedent is applicable only to the Reactor Vessel Lower Head to Shell Weld.

Attachment 3 provides 10 CFR 50.55a Request Number I2R-36, which requests relief from the examination requirements of ASME Section XI for the Bonnet Flange to Channel Weld of the Residual Heat Removal (RHR) Heat Exchanger. The basis for use of this alternative is that it provides the best examination coverage practical within the limitations of the current configuration. This 10 CFR 50.55a request is similar to a request previously approved by the NRC for the Comanche Peak Steam Electric Station in NRC Safety Evaluation Report dated July 8, 2005 (TAC No. MC6405). (Only the B-12 portion of the safety evaluation is applicable to this document.)

Attachment 4 provides 10 CFR 50.55a Request Number I2R-37, which requests relief from the examination requirements of ASME Section XI for Class 1 pressure-retaining piping (safe-end) welds examined from the inside of the reactor vessel. The basis for use of these alternatives is that they provide the best examination coverage practical within the limitations of the current configuration.

Attachment 5 provides 10 CFR 50.55a Request Number I2R-38, which requests relief from the examination requirements of ASME Section XI for certain Class 1 and 2 Risk-Informed ISI piping welds. The basis for use of these alternatives is that they provide the best examination coverage possible within the limitations of the current configuration.

There are no commitments contained within this letter. If you have any questions, please contact me at (620) 364-4084 or Mr. Kevin Moles at (620) 364-4126.

Sincerely,

Terry J. Garrett

TJG/rlt

Attachment 1: 10 CFR 50.55a Request Number I2R-34
Attachment 2: 10 CFR 50.55a Request Number I2R-35
Attachment 3: 10 CFR 50.55a Request Number I2R-36
Attachment 4: 10 CFR 50.55a Request Number I2R-37
Attachment 5: 10 CFR 50.55a Request Number I2R-38

cc: J. N. Donohew (NRC), w/a
W. B. Jones (NRC), w/a
B. S. Mallett (NRC), w/a
Senior Resident Inspector (NRC), w/a

Attachment 1 – 10 CFR 50.55a Request No. I2R-34

10 CFR 50.55a Request Number I2R-34
Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)
--Inservice Inspection Impracticality--

1. ASME Code Component(s) Affected

Class 1 Pressurizer Pressure-retaining Nozzle-to-Vessel welds and Nozzle Inside Radius section as listed.

NOZZLE WELDS CODE CATEGORY B-D

Code Item	Description	Weld No.
B3.110	Pressurizer Surge Nozzle to Bottom Head Weld	TBB03-10A-W
B3.110	Pressurizer Spray Nozzle to Top Head Weld	TBB03-10C-W
B3.120	Pressurizer Spray Nozzle Inside Radius Section	TBB03-10C-IR

2. Applicable Code Edition and Addenda

The applicable ASME Boiler and Pressure Vessel Code (hereafter referred to as the "Code") edition and addenda is ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1989 Edition, with no Addenda.

3. Applicable Code Requirement

ASME Section XI, Figure IWB-2500-7 (b) 1989 Edition with no addenda requires volumetric examination of a minimum volume of base material on each side of the weld equal to a distance of $t_s/2$ (one half of the Pressurizer shell thickness adjacent to the weld) for the nozzle to shell welds (Code Item B3.110). The same figure requires volumetric examination of a volume ½" thick on the inner radius of the nozzle, extending from a point that is the beginning of the radius of the nozzle on the head side to a point equal to the thickness of the shell up the nozzle towards the piping connection for the nozzle inner radius section (Code Item B3.120).

The Wolf Creek Nuclear Operating Corporation (WCNOC) second ten-year interval inservice inspection program plan also implements Code Case N-460, which is endorsed by the NRC in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability ASME Section XI, Division 1." Code Case N-460 states in part, "when the entire examination volume or area cannot be examined due to interference by another component or part geometry, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent."

NRC Information Notice (IN) 98-42, "Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements," termed a reduction in coverage of less than 10 percent to be "essentially 100 percent." IN 98-42 states in part, 'The NRC has adopted and further refined the definition of "essentially 100 percent" to mean "greater than 90 percent"... has been applied to all examinations of welds or other areas required by ASME Section XI.'

10 CFR 50.55a Request Number I2R-34

4. Impracticality of Compliance

The examination of the Code Item B3.110 components is limited by the geometry of the nozzle design. As shown on the attached figures 1 and 2, the configuration of the nozzle to vessel welds limits the scans from the vessel head. The proximity of the pressurizer heaters to the weld also limits the scan of the surge nozzle to bottom head weld. The examination of the Code Item B3.120 components is also limited by the geometry of the nozzle design. As shown on the attached figure 3, the configuration of the nozzle limits the scan from the vessel head. See Table 1 for a breakdown of the beam angle coverage's for these components.

5. Burden Caused by Compliance

The design configuration restrictions of the subject nozzles at Wolf Creek Generating Station (WCGS) make the Code required examination coverage requirements impractical. Plant modifications or the replacement of components designed to allow for complete coverage would be needed to meet the Code requirements. This would impose a considerable burden to WCNOC.

6. Proposed Alternative and Basis for Use

Proposed Alternative

The following alternatives are proposed in lieu of the required examination coverage of essentially 100 percent:

1. Ultrasonic Testing (UT) of the subject components was performed to the maximum extent practical, as listed in Table 1, due to design configuration restrictions during the second ten-year interval.

2. Pressure test VT-2 visual examinations were performed as required by Code Category B-P during the second ten-year interval. No evidence of leakage was identified for these components.

Basis for Use

The basis for use of these alternatives is that they provide the maximum examination coverage possible within the limitations of the current design configuration.

7. Duration of Proposed Alternative

The second ten year ISI interval which began September 3, 1995 and ended September 2, 2005.

8. Precedents

a) Duke Energy Letter dated May 10, 2000, McGuire Nuclear Station Unit 1 Docket No. 50-369, "Relief Request 99-003", and the associated NRC Safety Evaluation Report dated March 28, 2001 (TAC No. MA9034)

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Table 1

Beam Angle Breakdown for Pressurizer Nozzle-to-Vessel Welds and Nozzle Inside Radius Section

Component ID	0°	45° Perpendicular	45° Parallel	60° Perpendicular	60° Parallel	Composite
TBB03-10A-W	77.9	96.3	77.9	79.7	77.9	81.9%
TBB03-10C-W	70.7	93.1	70.7	96.2	70.7	80.3%
TBB03-10C-IR	NA	NA	NA	NA	52.5%	52.5%

TBB03-10A-W perpendicular scans are limited by the nozzle configuration for the inner portion (getting into the radius of the nozzle) and by the heater sleeves on the outer portion (not allowing the transducer to be backed up far enough). The 0 degree and parallel scans are limited only by the nozzle configuration for the inner portion (getting into the radius of the nozzle). See Figure 1.

TBB03-10C-W scans are limited by the nozzle configuration for the inner portion (getting into the radius of the nozzle). See figure 2.

TBB03-10C-IR scan is limited by the nozzle configuration (getting into the radius of the nozzle). Conducting further examination from the nozzle boss and OD blend is not practical, due to the complex beam angles that must be calculated and then maintained during manual scanning in order to achieve an effective examination. See figure 3.

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Figure 1

TBB03-10A-W

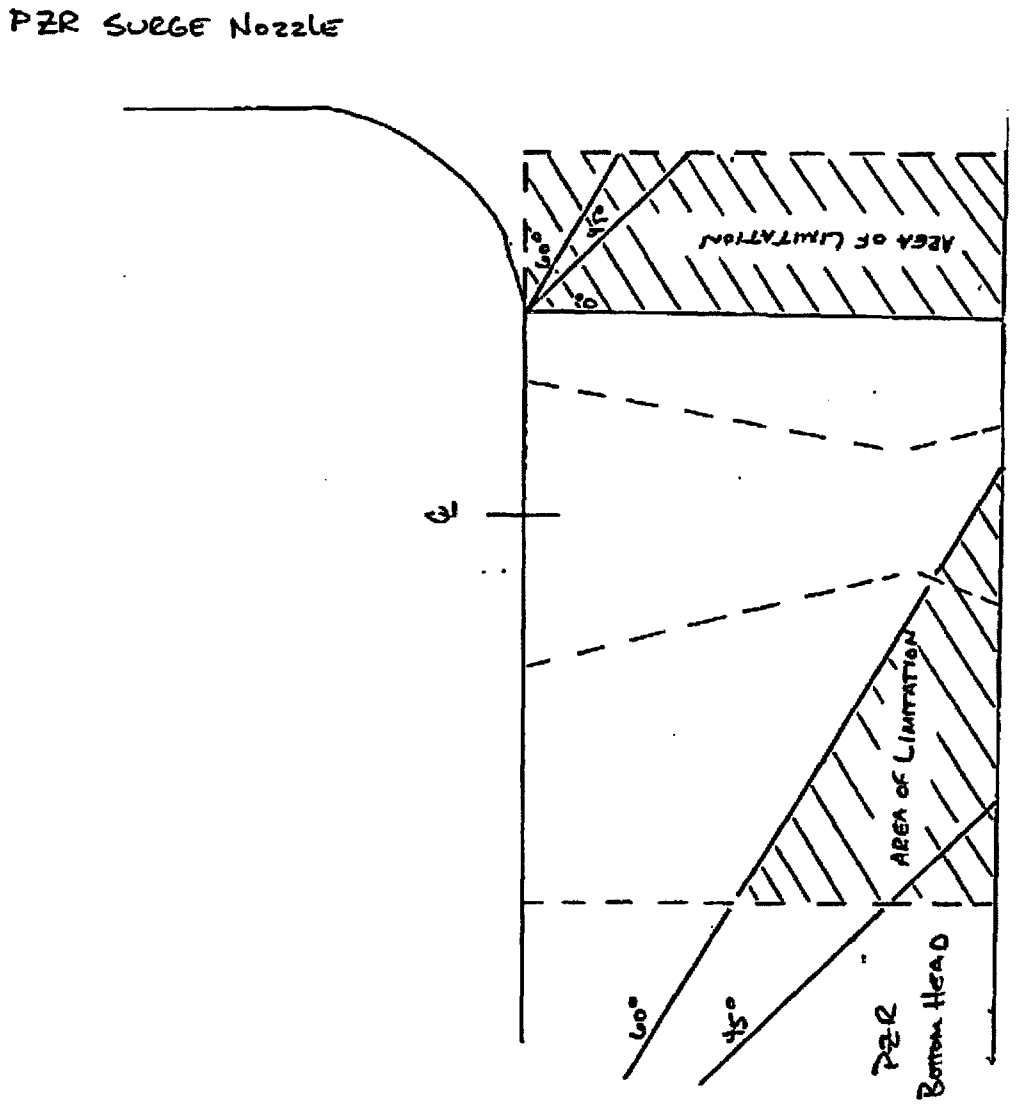

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Figure 2

TBB03-10C-W

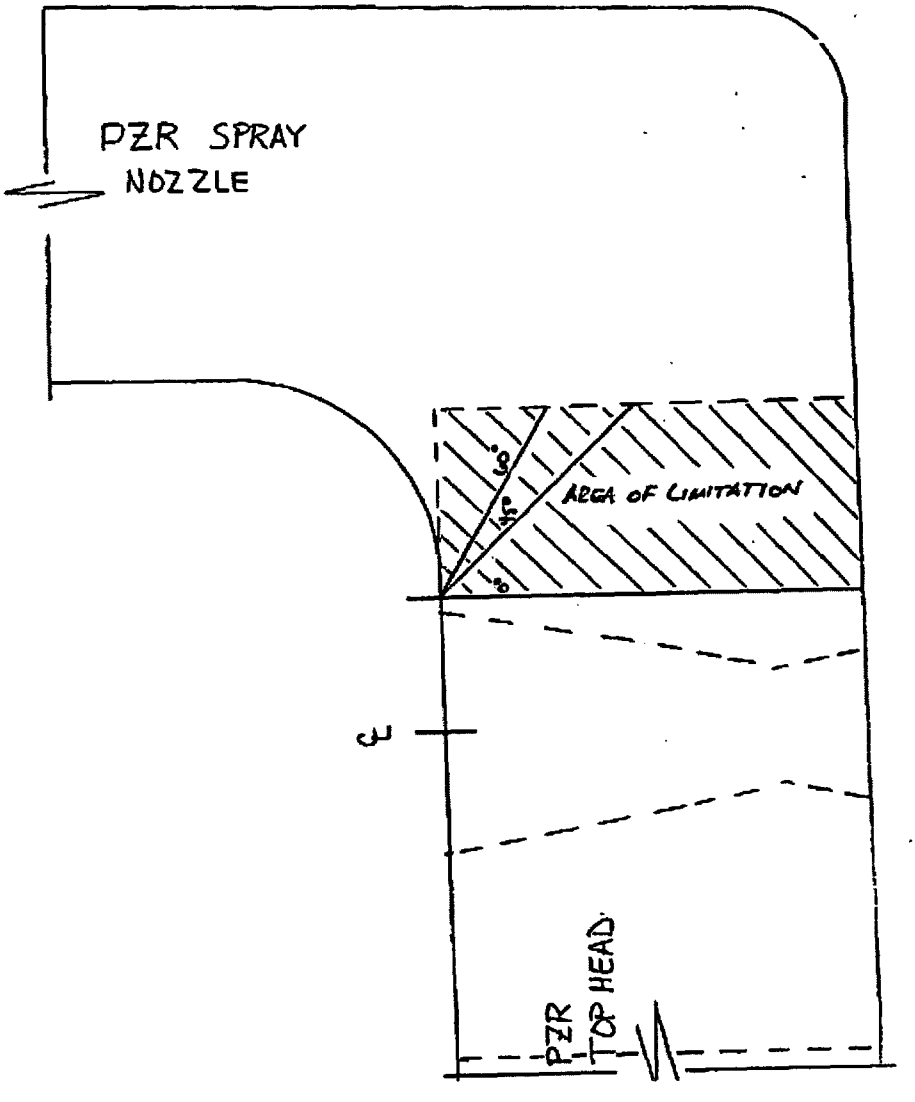

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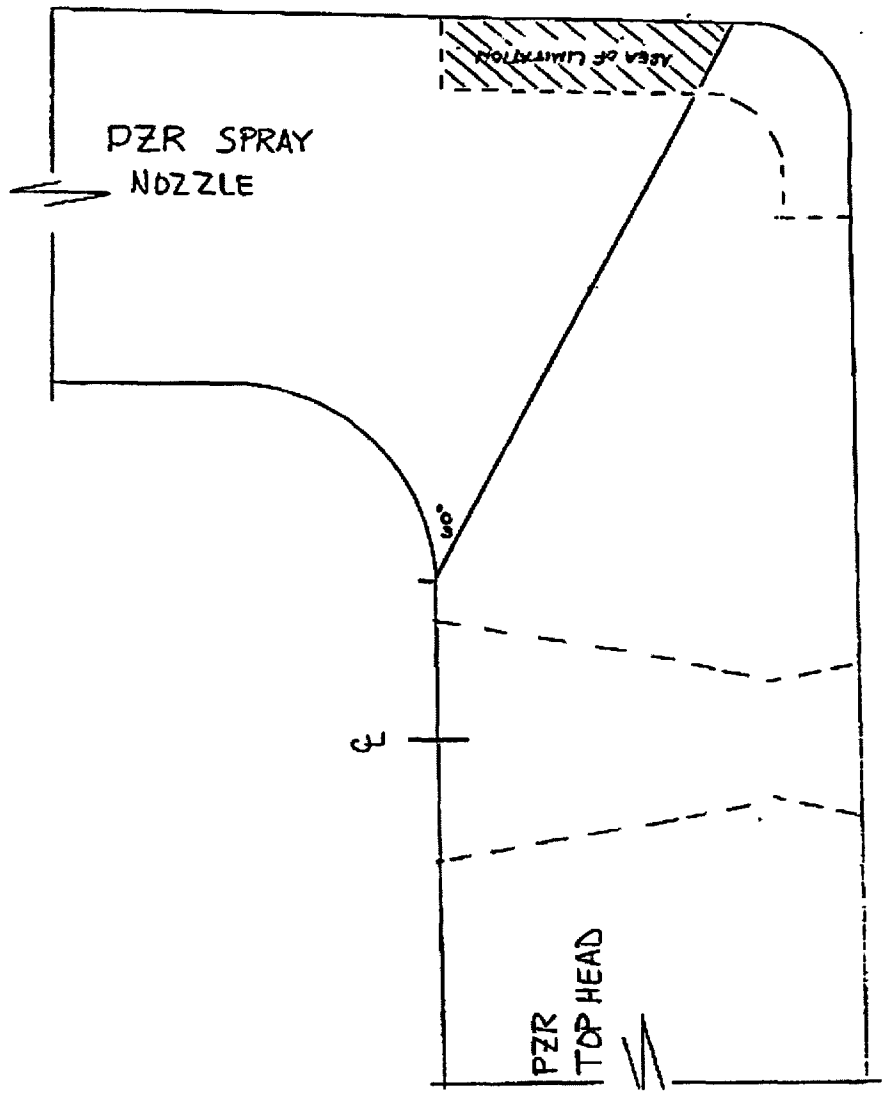
Figure 3

TBB03-10C-IR



Attachment 2 - 10 CFR 50.55a Request No. I2R-35

10 CFR 50.55a Request Number I2R-35
Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)
--Inservice Inspection Impracticality--

1. ASME Code Component(s) Affected

Class 1 Reactor Pressure Vessel Pressure-retaining welds as listed.

REACTOR VESSEL WELDS CODE CATEGORY B-A

Code Item	Description	Weld No.
B1.11	Reactor Vessel Lower Head to Shell Weld	RV-101-141
B1.21	Reactor Vessel Lower Head to Dollar Plate Weld	RV-102-151

2. Applicable Code Edition and Addenda

The applicable ASME Boiler and Pressure Vessel Code (hereafter referred to as the "Code") edition and addenda is ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1989 Edition, with no Addenda. In addition, as required by 10 CFR 50.55a, ASME Section XI, 1995 Edition 1996 Addenda is used for Appendix VIII, Performance Demonstration for Ultrasonic Examination Systems.

3. Applicable Code Requirement

ASME Section XI, Figure IWB-2500-1 1989 Edition with no addenda requires volumetric examination of a minimum volume of base material on each side of the weld equal to a distance of 1/2t (one half of the shell thickness adjacent to the weld for the shell side, one half of the head thickness adjacent to the weld for the head side) for the vessel shell to head welds (Code Item B1.11). Figure IWB-2500-3 requires volumetric examination of a minimum volume of base material on each side of the weld equal to a distance of 1/2t (one half of the head thickness adjacent to the weld) for the vessel head welds (Code Item B1.21).

The Wolf Creek Nuclear Operating Corporation (WCNOC) second ten-year interval inservice inspection program plan also implements Code Case N-460, which is endorsed by the NRC in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability ASME Section XI, Division 1." Code Case N-460 states in part, "when the entire examination volume or area cannot be examined due to interference by another component or part geometry, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent."

NRC Information Notice (IN) 98-42, "Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements," termed a reduction in coverage of less than 10 percent to be "essentially 100 percent." IN 98-42 states in part, 'The NRC has adopted and further refined the definition of "essentially 100 percent" to mean "greater than 90 percent"... has been applied to all examinations of welds or other areas required by ASME Section XI.'

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4. Impracticality of Compliance

The examination of the lower shell to lower head weld is limited by the proximity of the six core support lugs. During the Cycle 14 refueling outage in the spring of 2005 the subject weld was examined by remote tool (automated examination). As shown on the attached figure 1, the proximity of the core support lugs to the lower shell to lower head weld limits the scan path of this component. Scanning was conducted between and below the obstructing lugs with the scan boundaries maximized by visually assisted positioning of the exam head so that scan starts and stops were as close to the support lugs as tool configuration allowed. The combined perpendicular coverage is estimated at 74.44%, the combined parallel coverage is estimated at 77.56% resulting in a combined average of 76.00%. See Table 1 for a breakdown of the beam angle coverages.

The examination of the lower head to dollar plate weld is limited by proximity of the bottom mounted instrument (BMI) tubes. During the Cycle 14 refueling outage in the spring of 2005 the subject weld was examined by remote tool (automated examination). As shown on the attached figures 2 and 3, the lower head to dollar plate weld is positioned at about the same elevation as the peripheral BMI tubes. Scanning was conducted between the obstructing penetrations with the scan boundaries maximized by visually assisted positioning of the exam head so that scan starts and stops were as close to the tubes as tool configuration allowed. The combined perpendicular coverage is estimated at 73.30%, the combined parallel coverage is estimated at 69.49% resulting in a combined average of 71.39%. See Table 2 for a breakdown of the beam angle coverages.

Note: The coverage estimates were calculated by the vendor utilizing conservative values.

5. Burden Caused by Compliance

The design configuration restrictions of the subject welds at Wolf Creek Generating Station (WCGS) make the Code required examination coverage requirements impractical. Plant modifications or the replacement of components designed to allow for complete coverage would be needed to meet the Code requirements. This would impose a considerable burden to WCNOC.

6. Proposed Alternative and Basis for Use

Proposed Alternative

The following alternatives are proposed in lieu of the required examination coverage of essentially 100 percent:

1. Ultrasonic Testing (UT) of the subject welds was performed to the maximum extent practical, as listed in Tables 1 and 2, due to design configuration restrictions during the second ten-year interval.

2. Visual examinations were performed as required by Code Category B-N-1 during the second ten-year interval. No degradation was identified during this examination.

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3. Pressure test VT-2 visual examinations were performed as required by Code Category B-P during the second ten-year interval. No evidence of leakage was identified for these components.

Basis for Use

The basis for use of these alternatives is that they provide the best examination coverage possible within the limitations of the current design configuration. The volumetric examination

was performed using a system (procedures, personnel, and equipment) qualified in accordance with Appendix VIII, Supplements 4 and 6. The partial volumetric examinations, combined with the visual examinations provide continued assurance of weld integrity.

7. Duration of Proposed Alternative

The second ten year ISI interval which began September 3, 1995 and ended September 2, 2005.

8. Precedents

a) PG&E Letter, dated December 22, 2005, Docket No. 50-275, Diablo Canyon Unit 1, "ASME Section XI Insevice Inspection Program Relief Request NDE-SLH". It is believed that this request is still undergoing review by the NRC. This precedent is applicable only to the Reactor Vessel Lower Head to Shell Weld.

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Table 1

Beam Angle Breakdown for the Lower Shell to Lower Head Weld

Beam Direction	45 Shear		45 L Single		45 L Dual			
	Weld	Volume	Weld	Volume	Weld	Volume	Weld	Volume
Perpendicular Scan	74.00	75.93	74.00	74.00	74.00	74.68		
Parallel Scan	81.65	73.50	63.30	71.41	96.72	78.75		
Average	76.27		58.55		81.04			

The scans are limited due to the 6 Core Support Lugs located on the vessel ID.

Combined Perpendicular: 74.44%
Combined Parallel: 77.56%
Combined Average: 76.00%

Table 2

Beam Angle Breakdown for the Lower Torus to Dollar Plate Weld

Beam Direction	45 Shear		45 L Single		45 L Dual			
	Weld	Volume	Weld	Volume	Weld	Volume	Weld	Volume
Perpendicular Scan	73.30	73.30	73.30	73.30	73.30	73.30		
Parallel Scan	69.49	69.49	69.49	69.49	69.49	69.49		
Average	71.39		71.39		71.39			

The scans are limited due to the Bottom Mounted Instrument tubing on the Bottom Head.

Combined Perpendicular: 73.30%
Combined Parallel: 69.49%
Combined Average: 71.39%

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Figure 1

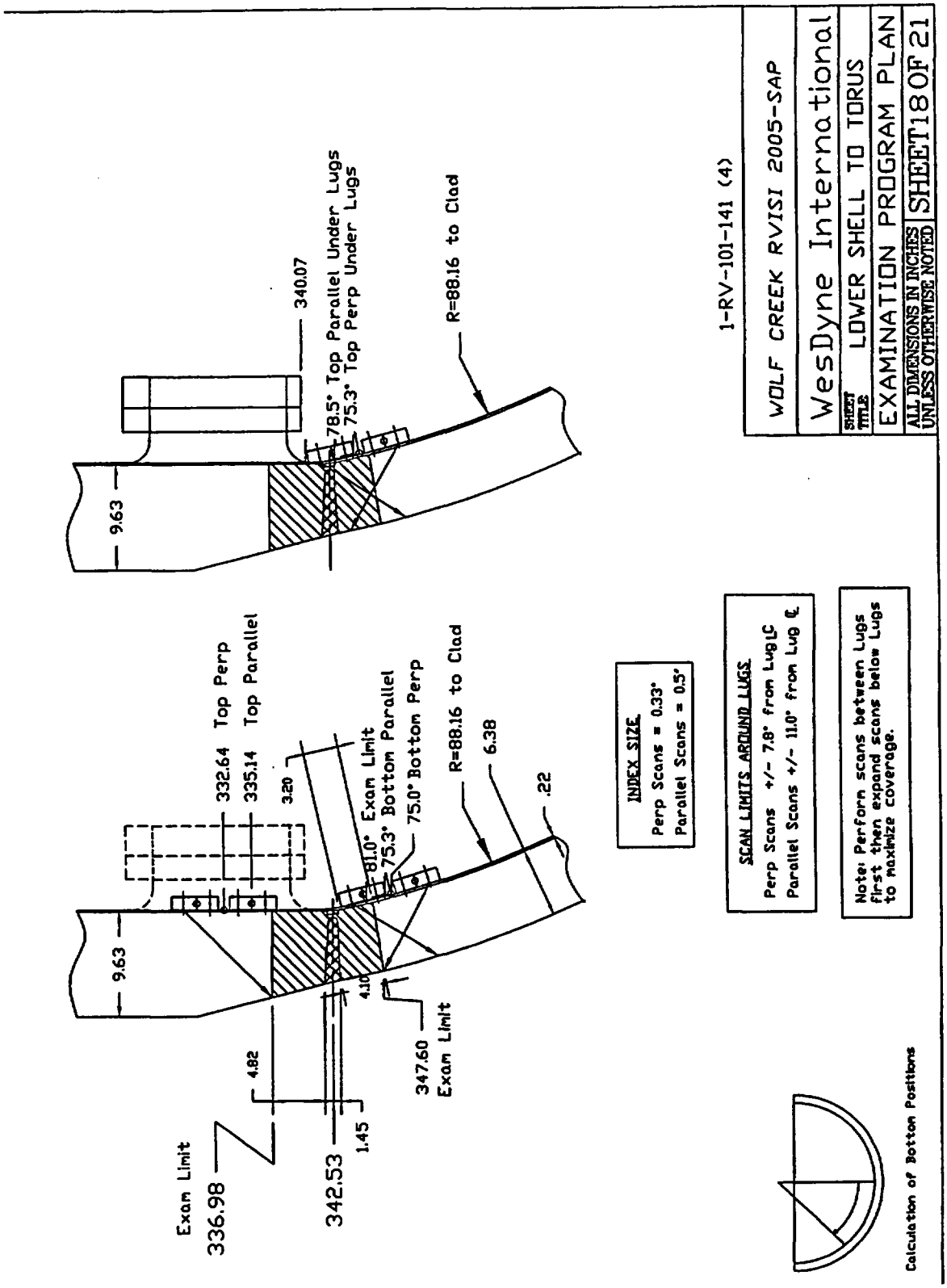

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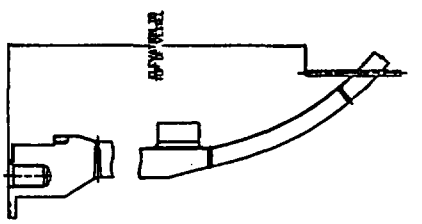
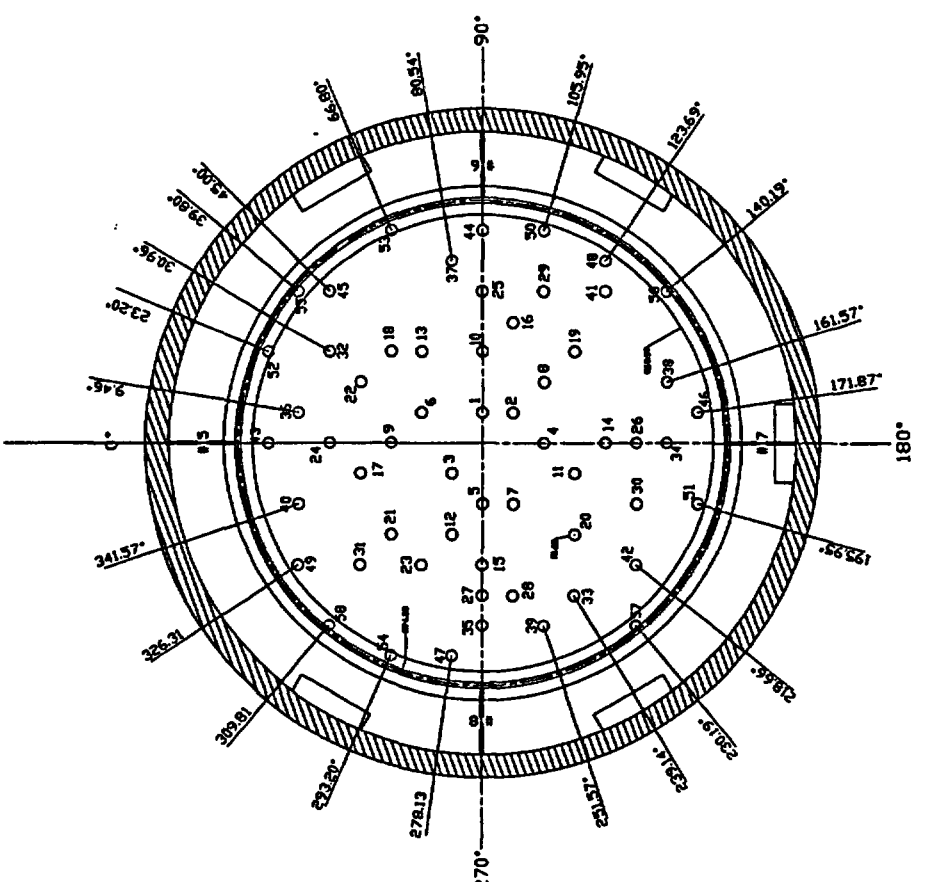
Figure 2

BMI Tube(s) Number	Elevation (Top of Tube)	Scan Start (Vessel)	Scan Start (Tube)	Scan Stop (Vessel)	Scan Stop (Tube)	Scan Length
1	401.25	409.2	7.95	418.17	16.92	8.97
2,3	400.76	408.59	7.83	417.8	17.04	9.21
4,5	400.01	407.82	7.81	417.16	17.15	9.34
6,7	399.6	407.39	7.79	416.83	17.23	9.44
8	398.35	406.05	7.7	415.68	17.33	9.63
9,10	397.92	405.59	7.67	415.29	17.37	9.7
11,12	397.5	405.13	7.63	414.86	17.39	9.76
13	396.19	403.79	7.60	413.61	17.42	9.5
14,15	394.62	402.48	7.58	412.5	17.58	10.02
16,17	394.44	401.99	7.55	412.08	17.64	10.09
18 thru 21	394.0	401.55	7.55	411.68	17.68	10.13
22,23	393.12	400.66	7.54	410.87	17.75	10.21
24 thru 27	390.82	398.36	7.54	408.72	17.9	10.36
28	390.37	397.82	7.45	408.3	17.93	10.48
29,30	388.94	396.32	7.38	406.97	18.03	10.65
31	387.5	394.88	7.38	405.62	18.12	10.74
32,33	386.53	393.67	7.34	404.72	18.17	10.83
34,35	385.57	392.86	7.31	403.74	18.19	10.88
36,37	385.06	392.35	7.29	403.35	18.29	11
38 thru 40	383.53	390.78	7.25	401.92	18.39	11.14
41,42	383.03	390.27	7.24	401.46	18.43	11.19
43,44	378.78	385.9	7.14	397.52	18.76	11.62
45 thru 47	378.22	385.32	7.1	397.01	18.79	11.69
48,49	377.09	384.1	7.01	395.9	18.81	11.8
50,51	376.53	383.53	7.0	395.39	18.86	11.86
52 thru 54	373.62	380.47	6.85	392.66	19.04	12.19
55 thru 58	371.81	378.68	6.87	391.06	19.25	12.38

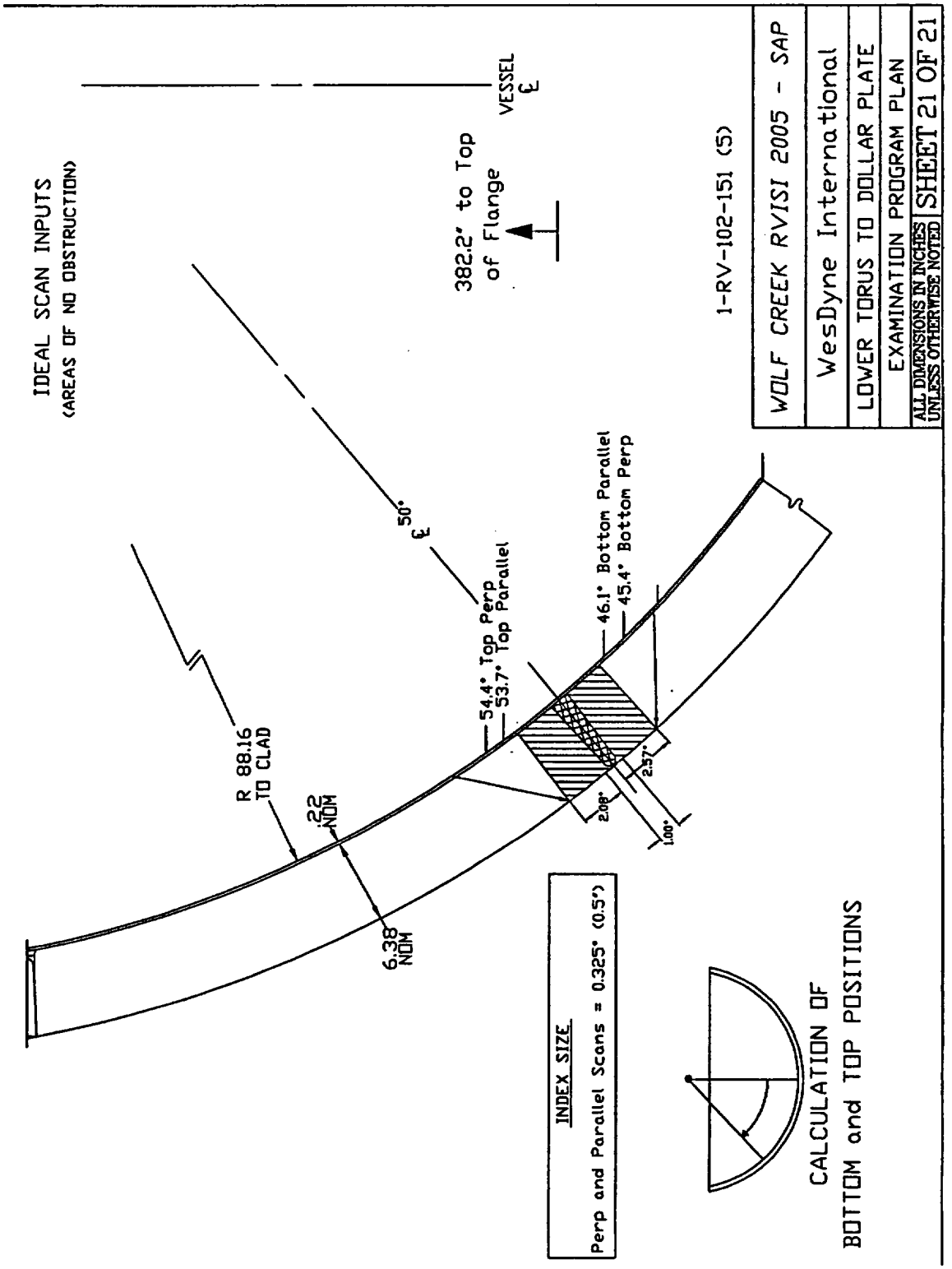




WOLF CREEK RVISI 2005 - SAP
WesDyne International
Bottom Head Dollar/BMI Tube Scans
EXAMINATION PROGRAM PLAN
ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED
SHEET 20 OF 21

10 CFR 50.55a Request Number I2R-35

Figure 3



Attachment 3 - 10 CFR 50.55a Request No. I2R-36

10 CFR 50.55a Request Number I2R-36
Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)
--Inservice Inspection Impracticality--

1. ASME Code Component(s) Affected

Class 2 Pressure Vessel Pressure-retaining weld as listed.

PRESSURE VESSEL WELDS CODE CATEGORY C-A

Code Item	Description	Weld No.
C1.10	Bonnet Flange to Channel Weld of the Residual Heat Removal (RHR) Heat Exchanger	EEJ01A-SEAM-1-W

2. Applicable Code Edition and Addenda

The applicable ASME Boiler and Pressure Vessel Code (hereafter referred to as the "Code") edition and addenda is ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1989 Edition, with no Addenda.

3. Applicable Code Requirement

ASME Section XI, Figure IWC-2500-1 1989 Edition with no addenda requires volumetric examination of a minimum volume of base material on each side of the weld equal to a distance of ½ inch for the shell circumferential weld (Code Item C1.10).

The Wolf Creek Nuclear Operating Corporation (WCNOC) second ten-year interval inservice inspection program plan also implements Code Case N-460, which is endorsed by the NRC in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability ASME Section XI, Division 1." Code Case N-460 states in part, "when the entire examination volume or area cannot be examined due to interference by another component or part geometry, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent."

NRC Information Notice (IN) 98-42, "Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements," termed a reduction in coverage of less than 10 percent to be "essentially 100 percent." IN 98-42 states in part, 'The NRC has adopted and further refined the definition of "essentially 100 percent" to mean "greater than 90 percent"... has been applied to all examinations of welds or other areas required by ASME Section XI.'

4. Impracticality of Compliance

The examination of the subject components is limited by the configuration of the flange design and the location of flange bolting. As shown on the attached figures, the proximity of the bolting to the bonnet flange to channel weld limits the scans from the flange side of the weld. Complete perpendicular coverage was achieved; however, the parallel coverage was limited on the flange side of the weld. Although a small amount of scanning was able to be performed on the flange side, parallel coverage was conservatively credited only to the channel side of the weld. This yields a composite coverage of the required examination volume of 75%.

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Removal of the bolting to allow for complete coverage would be needed to meet the Code requirements. This would result in a considerable increase of radiological exposure to WCNOC personnel as, during refueling outages, this component is located in an area classified as a "high radiation area". The dose rates around this component generally range from 15 to 50 millirem per hour. It is estimated that it would take approximately 40 additional man-hours to remove the bolting, perform the additional examination and replace the bolting. The amount of dose received by personnel during this time would be a considerable burden to WCGS.

5. Burden Caused by Compliance

The design configuration restrictions of the bonnet flange of the RHR heat exchanger at Wolf Creek Generating Station (WCGS) make the Code required examination coverage requirements impractical. The bolting is located so that circumferential scanning for axial flaws is limited on the flange side of the weld. To examine essentially 100% of the Code required volume would require removal and replacement of the bolting, causing Wolf Creek personnel to receive an additional amount of radiological dose, likely well in excess of one man-Rem.

6. Proposed Alternative and Basis for Use

Proposed Alternative

The following alternatives are proposed in lieu of the required examination coverage of essentially 100 percent:

1. Ultrasonic Testing (UT) of the subject weld was performed to the maximum extent practical during the second ten-year interval.

2. Pressure test VT-2 visual examinations were performed as required by Code Category C-H during the second ten-year interval. No evidence of leakage was identified for this component.

Basis for Use

The basis for use of this alternative is that it provides the best examination coverage practical within the limitations of the current configuration. Based on the percentage of the examination volume completed, and the lack of any indications detected, there is a high level of confidence in the continued structural integrity of the weld. WCNOC does not believe that there is an increased level of safety or quality commensurate with the amount of increased dose required to complete this examination.

It should be noted that the Channel-to-Head weld of this RHR heat exchanger was examined with 100% coverage achieved, and no indications were detected.

7. Duration of Proposed Alternative

The second ten year ISI interval which began September 3, 1995 and ended September 2, 2005.

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8. Precedents

a) Comanche Peak Steam Electric Station Letter, dated March 10, 2005, Docket No. 50-446, " Relief Requests B-12, B-13, B-14, and C-8 to the Unit 2 Inservice Inspection (ISI) from 1986 Edition of ASME Code, Section XI, No Addenda" and the associated NRC Safety Evaluation Report dated July 8, 2005 (TAC No. MC6405) [Only the B-12 portion of the request and the safety evaluation related to the B-12 portion is applicable to this document.]

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Figure 1

Bonnet Flange to Channel Weld Configuration
Weld EEJ01A-SEAM-1-W

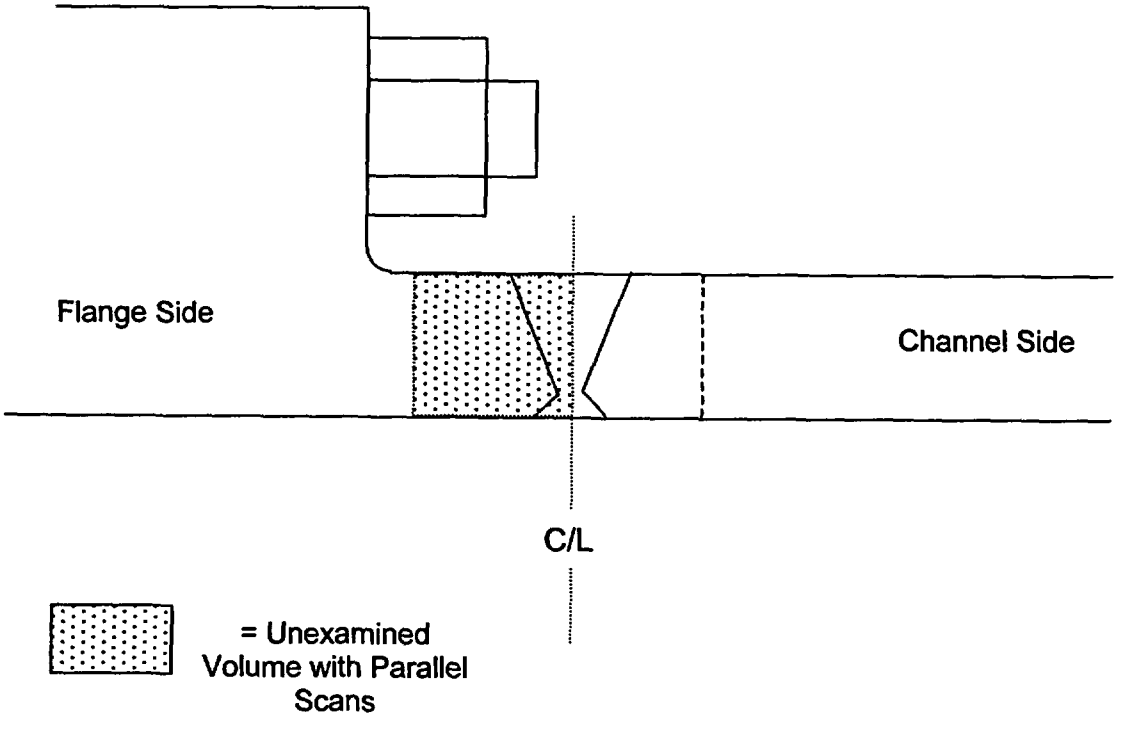

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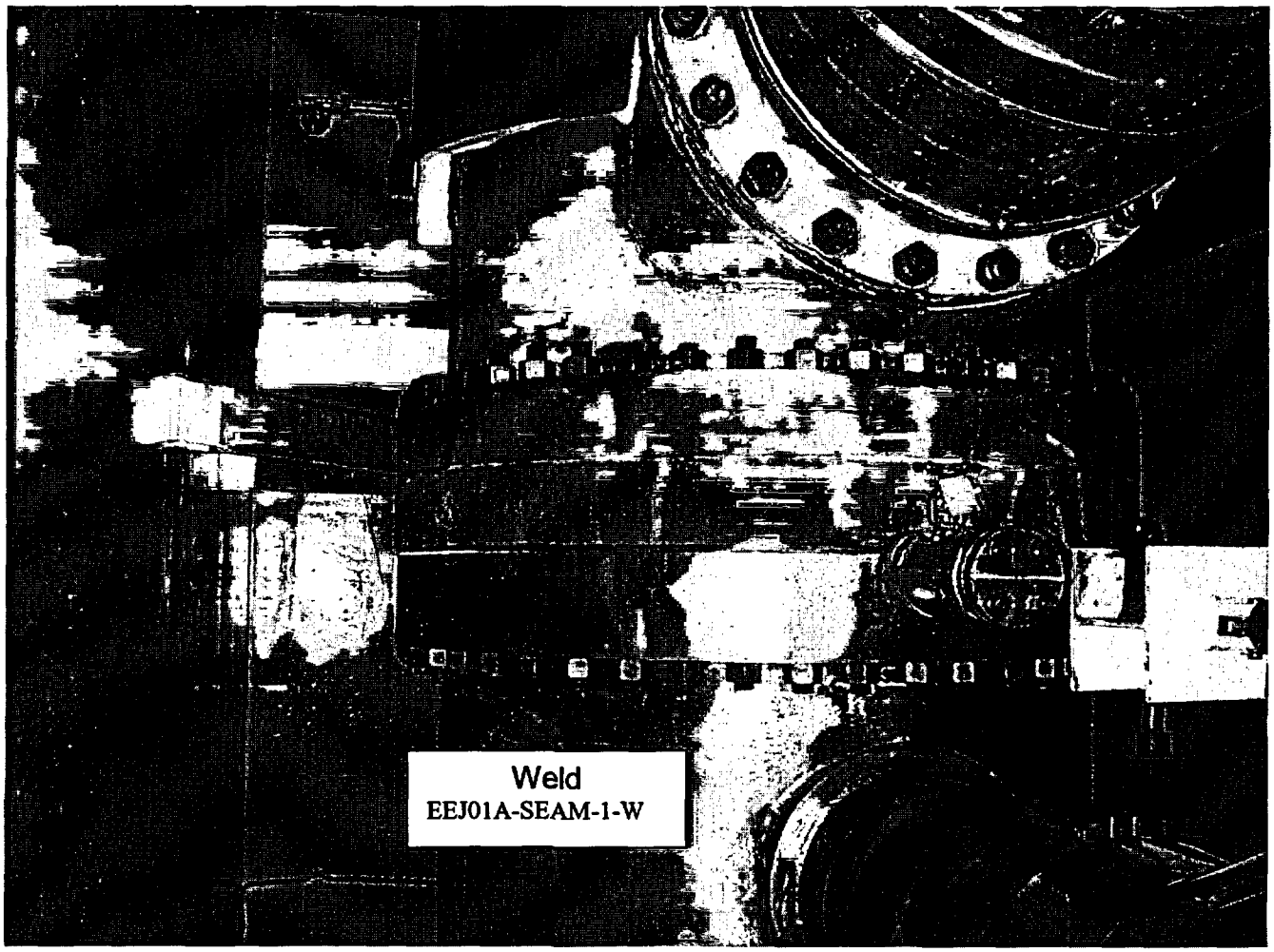
Figure 2

Photograph of Bonnet Flange to Channel Weld



Attachment 4 - 10 CFR 50.55a Request No. I2R-37

10 CFR 50.55a Request Number I2R-37
Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)
--Inservice Inspection Impracticality--

1. ASME Code Component(s) Affected

Risk-Informed Inservice Inspection (RI-ISI) Class 1 Pressure Retaining Piping Welds examined from the inside surface of Pressurized Water Reactors using procedures, personnel, and equipment qualified to ASME Section XI, Appendix VIII, Supplement 2 or 10 criteria. This request is applicable to ISI selected welds identified by Note 2 in the following tables. However, similar conditions were encountered on other examined welds (Wolf Creek Nuclear Operating Corporation (WCNOC) augmented examinations) and those welds are also listed in the tables, as identified by Notes 3 and 4.

RI-ISI SAFE-END DISSIMILAR METAL WELDS
(Formerly CODE CATEGORY B-F)

Code Item (Note 1)	Description	Weld No.
R1.20	Safe-end to Loop A RPV Inlet Nozzle	RV-302-121-A (Note 2)
R1.20	Safe-end to Loop B RPV Inlet Nozzle	RV-302-121-B (Note 3)
R1.20	Safe-end to Loop C RPV Inlet Nozzle	RV-302-121-C (Note 3)
R1.20	Safe-end to Loop D RPV Inlet Nozzle	RV-302-121-D (Note 2)

RI-ISI SAFE-END PIPING WELDS
(Formerly CODE CATEGORY B-J)

Code Item (Note 1)	Description	Weld No.
R1.20	Elbow to Loop A RPV Inlet Safe-End Weld	BB-01-F102 (Note 2)
R1.20	Pipe to Loop A RPV Outlet Safe-End Weld	BB-01-F103 (Note 2)
R1.20	Elbow to Loop B RPV Inlet Safe-End Weld	BB-01-F202 (Note 4)
R1.20	Pipe to Loop B RPV Outlet Safe-End Weld	BB-01-F203 (Note 4)
R1.20	Elbow to Loop C RPV Inlet Safe-End Weld	BB-01-F302 (Note 4)
R1.20	Pipe to Loop C RPV Outlet Safe-End Weld	BB-01-F303 (Note 4)
R1.20	Elbow to Loop D RPV Inlet Safe-End Weld	BB-01-F402 (Note 4)
R1.20	Pipe to Loop D RPV Outlet Safe-End Weld	BB-01-F403 (Note 4)

Note 1: As the methodology in EPRI TR-112657 Rev. B-A does not provide item numbers, the format in ASME Code Case N-578-1 is utilized for the assignment of these numbers.
Note 2: These welds are required to be examined per the ISI Program Plan.
Note 3: Due to V. C. Summer hot leg nozzle cracking, it was decided by WCNOC that all inlet and outlet nozzle-to-safe end dissimilar metal welds (listed above) were to be examined.
Note 4: These stainless steel Cat. B-J welds were examined due to the proximity to the dissimilar metal nozzle-to-safe end Cat. B-F welds being examined for reasons identified in Notes 2 and 3.

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2. Applicable Code Edition and Addenda

The applicable ASME Boiler and Pressure Vessel Code (hereafter referred to as the "Code") edition and addenda is ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1989 Edition, with no Addenda. In addition, as required by 10 CFR 50.55a, ASME Section XI, 1995 Edition 1996 Addenda is used for Appendix VIII, Performance Demonstration for Ultrasonic Examination Systems.

3. Applicable Code Requirement

ASME Section XI, Figure IWB-2500-8(c) 1989 Edition with no addenda requires volumetric examination of a minimum volume of the inner 1/3t (the inner 1/3 thickness of the piping) extending into the base material on each side of the weld equal to a distance of 1/4 inch on each side of the weld crown.

In a letter dated December 13, 2001, from the NRC to WCNOC, the NRC approved a relief request for WCNOC for the application of a risk-informed inservice inspection (RI-ISI) program for ASME Code Class 1 and 2 piping. As approved, the methodology in EPRI TR-112657 Rev. B-A is utilized for the method of examination of the subject welds, as well as the selection of welds to be examined.

The WCNOC second ten-year interval inservice inspection program plan also implements Code Case N-460, which is endorsed by the NRC in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability ASME Section XI, Division 1." Code Case N-460 states in part, "when the entire examination volume or area cannot be examined due to interference by another component or part geometry, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent."

NRC Information Notice (IN) 98-42, "Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements," termed a reduction in coverage of less than 10 percent to be "essentially 100 percent." IN 98-42 states in part, 'The NRC has adopted and further refined the definition of "essentially 100 percent" to mean "greater than 90 percent"... has been applied to all examinations of welds or other areas required by ASME Section XI.'

4. Impracticality of Compliance

The examination of the subject components is limited in examination coverage for the detection of axial flaws (circumferential scans) due to the ID configuration. The vendor who performed the subject weld examinations utilized surface geometry profiling software (profilometry) in conjunction with a focused immersion ultrasonic transducer positioned to permit accurate profile data across the examination volume to help the examiner confirm locations where the raw data indicates lack of transducer contact due to problematic surface geometry. There was roughness detected in the examination of the subject welds to the extent that the circumferential scan is not considered qualified to detect axial flaws. During the Cycle 14 refueling outage (RF14) the subject welds were examined by remote tool (automated examination) from the inside diameter (ID) of the piping. The vendor's procedure is not qualified to detect axial flaws in either austenitic or

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dissimilar metal welds that are not either ground or machined smooth. As shown on the attached figures 1 and 2, the amount of roughness present makes the scan for axial flaws unqualified. The final ultrasonic coverage is credited at 50% due to credit taken for axial scans only.

It should be noted that the four dissimilar metal welds on the outlet nozzles were smooth and thus able to be examined fully with both axial and circumferential scans.

5. Burden Caused by Compliance

The configuration of the ID of the subject welds at Wolf Creek Generating Station (WCGS) make the Code required examination coverage requirements impractical. Plant modifications or the replacement of components designed to allow for complete coverage would be needed to meet the Code requirements. This would impose a considerable burden to WCNOC.

6. Proposed Alternative and Basis for Use

Proposed Alternative

The following alternatives are proposed in lieu of the required examination coverage of essentially 100 percent:

1. Ultrasonic testing (UT) of the subject welds was performed to the maximum extent practical due to configuration restrictions during the second ten-year interval.

2. Supplemental examination by Eddy Current techniques was performed. All areas of limitation were fully examined and no flaws were detected.

3. Pressure test VT-2 visual examinations were performed as required by Code Category B-P during the second ten-year interval. No evidence of leakage was identified for these components.

Basis for Use

The basis for use of these alternatives is that they provide the best examination coverage practical within the limitations of the current configuration. The volumetric examination was performed using a system (procedures, personnel, and equipment) qualified in accordance with Appendix VIII, Supplements 2 and 10. The supplemental Eddy Current examination has been developed and demonstrated as stated below and would have detected any ID connected flaws that might have been present.

Due to the possibility that surface roughness would be detected during the examination of the subject welds, the vendor performed eddy current examination to augment the ultrasonic examination and to provide increased sensitivity at the near surface. This eddy current technique was first used in the VC Summer reactor vessel primary nozzle examinations of 2000. The procedure was refined after its first use in 2000 by applying it to the VC Summer hot leg dissimilar metal weld section removed from service. The

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removed section had a number of primary water stress corrosion cracking flaws along with non-relevant indications resulting from metallurgical interface and surface geometry. Using these actual flaws and geometric conditions in the removed section to refine the technique, the vendor developed a reliable flaw-screening criteria which allowed for the successful use of the procedure in the VC Summer 2002 and 2003 examinations.

Since that time, the technique has been successfully blind tested for the Swedish authority SQC Kvalificeringscentrum AB (SQC NDT Qualification Center) under the program, "Qualification of Equipment, Procedure and Personnel for Detection, Characterization and Sizing of Defects in Areas in Nozzle to Safe End Welds at Ringhals Unit 3 and 4," Hakan Soderstrand 7-10-03.

The technique has also been used to supplement examination of portions of the relevant near-surface volumes during the last several domestic pressurized water reactor nozzle-to-pipe examinations conducted by the vendor.

WCNOC believes that the performance of the partial volumetric examination combined with the supplemental eddy current examination and visual leakage examination provide a level of safety and quality at least equal, if not superior, to the Code required examination.

7. Duration of Proposed Alternative

The second ten year ISI interval which began September 3, 1995 and ended September 2, 2005.

8. Precedents

None

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Figure 1

Inlet Nozzle to Safe-end and Safe-end to Pipe

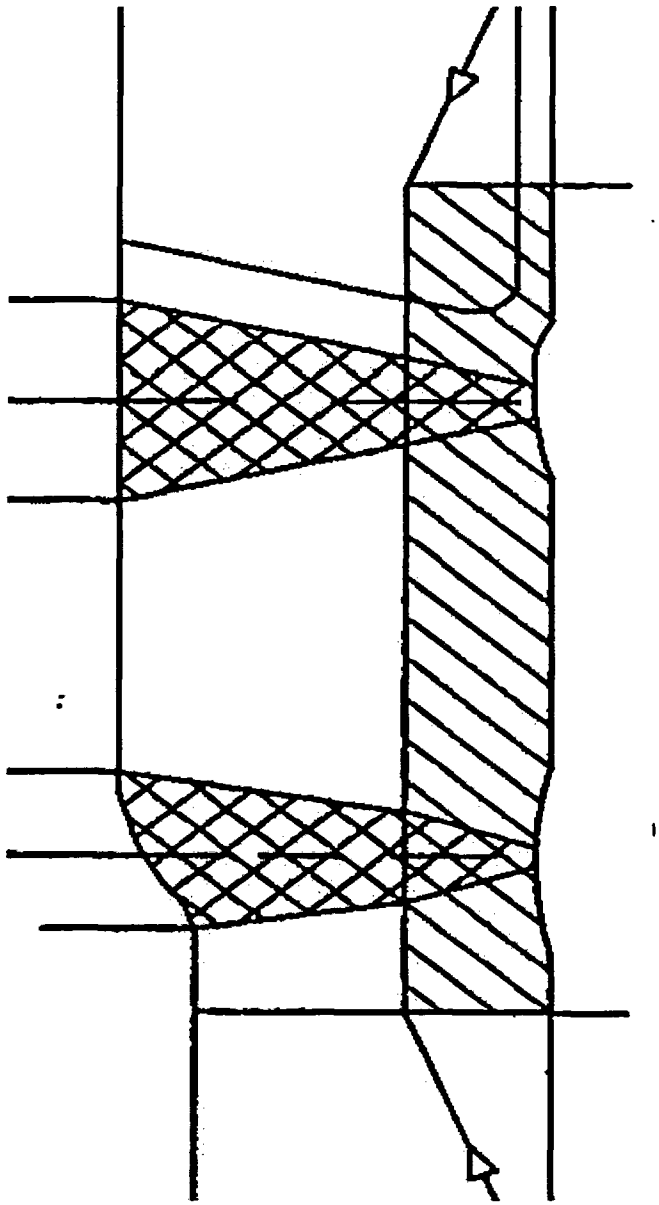

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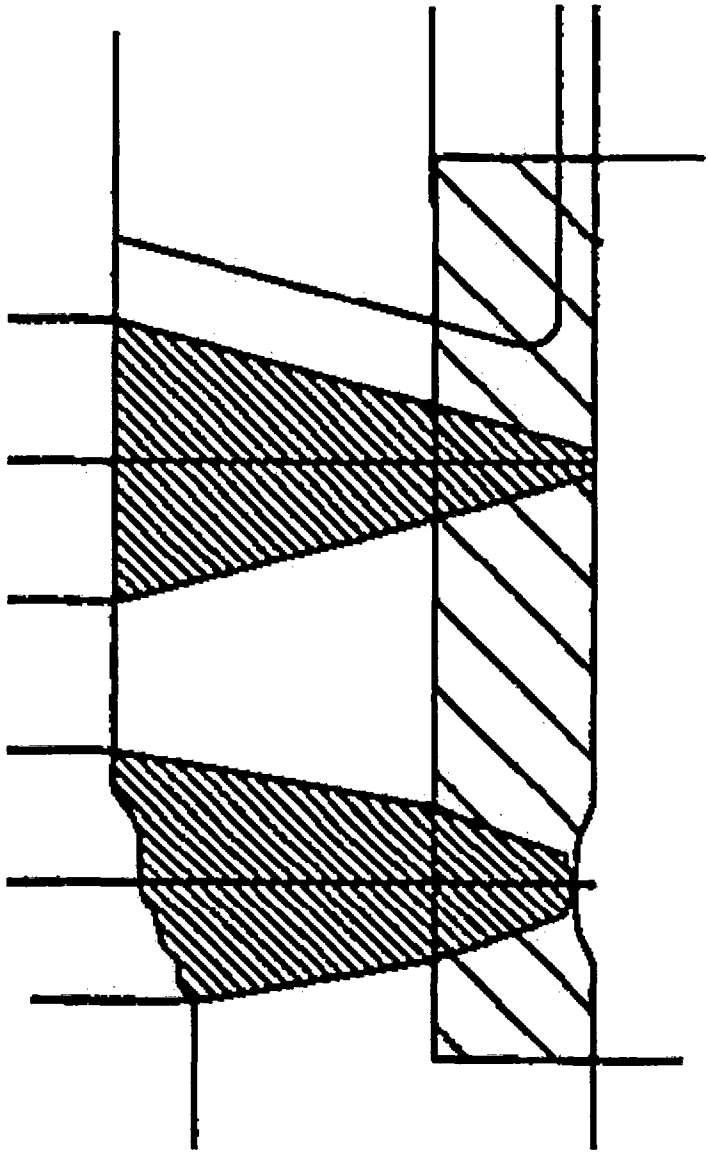
Figure 2

Outlet Nozzle to Safe-end and Safe-end to Pipe



Attachment 5 - 10 CFR 50.55a Request No. I2R-38

10 CFR 50.55a Request Number I2R-38
Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)
--Inservice Inspection Impracticality--

1. ASME Code Component(s) Affected

Class 1 and 2 Risk-Informed Inservice Inspection (RI-ISI) Piping welds as listed.

RI-ISI PIPING WELDS (Formerly CODE CATEGORY B-J, C-F-1)

Code Item (Note)	Description	Weld No.
R1.11	6" 180 Degree Return to 6" Flange (Valve 8010A)	BB-02-FW301
R1.11	3" Pipe to Valve 8378A	BG-21-F013B
R1.11	12" Pipe to Valve HV-8701A	EJ-04-F048A
R1.11	6" Pipe to Valve 8818A	EP-01-F009
R1.11	6" Pipe to Valve 8818D	EP-01-F021
R1.11	6" Pipe to Valve 8818C	EP-02-F022A
R1.20	6" Pipe to Pressurizer Safety Nozzle Safe-End	BB-02-F001A
R1.20	Valve PCV-455C to 4" Pipe	BB-04-F014

Note: As the methodology in EPRI TR-112657 Rev. B-A does not provide item numbers, the format in ASME Code Case N-578-1 is utilized for the assignment of these numbers.

2. Applicable Code Edition and Addenda

The applicable ASME Boiler and Pressure Vessel Code (hereafter referred to as the "Code") edition and addenda is ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1989 Edition, with no Addenda. In addition, as required by 10 CFR 50.55a, ASME Section XI, 1995 Edition 1996 Addenda is used for Appendix VIII, Performance Demonstration for Ultrasonic Examination Systems.

3. Applicable Code Requirement

ASME Section XI, Figure IWB-2500-8(c) 1989 Edition with no addenda requires volumetric examination of a minimum volume of the inner 1/3t (one third of the thickness) extending into the piping base metal for a distance of ¼" past the edge of the weld crown. Figure IWC-2500-7(a) requires an identical examination volume.

In a letter dated December 13, 2001, from the NRC to Wolf Creek Nuclear Operating Corporation (WCNOC), the NRC approved a relief request for WCNOC for the application of a risk-informed inservice inspection (RI-ISI) program for ASME Code Class 1 and 2 piping. As approved, the methodology in EPRI TR-112657 Rev. B-A is utilized for the method of examination of the subject welds, as well as the selection of welds to be examined. The RI-ISI program requires volumetric examination of the subject welds and extends the Code required examination volume of the inner 1/3t to a distance 1/4" on either side of the weld counterbore or ½" past the edge of the weld crown if no counterbore is present.

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The WCNOC second ten-year interval inservice inspection program plan also implements Code Case N-460, which is endorsed by the NRC in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability ASME Section XI, Division 1." Code Case N-460 states in part, "when the entire examination volume or area cannot be examined due to interference by another component or part geometry, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent."

NRC Information Notice (IN) 98-42, "Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements," termed a reduction in coverage of less than 10 percent to be "essentially 100 percent." IN 98-42 states in part, 'The NRC has adopted and further refined the definition of "essentially 100 percent" to mean "greater than 90 percent"... has been applied to all examinations of welds or other areas required by ASME Section XI.'

4. Impracticality of Compliance

The geometry of the subject components limits the examination to one side. Figures 1, 2, and 3 show the geometry of a pipe to nozzle-safe-end, an elbow to flange, and a pipe to valve weld, respectively.

When the examination area is limited to one side of an austenitic weld, the examination coverage does not comply with 10 CFR 50.55a(b)(2)(xv)(A) or the ASME Section XI requirements and proficiency demonstrations do not comply with 10 CFR 50.55a(b)(2)(xvi) and full coverage may not be claimed. For austenitic piping, a procedure must be qualified with flaws on the inaccessible side of the weld. Performance Demonstration Initiative (PDI) has not been able to qualify a single side examination procedure technique that is capable of demonstrating equivalency for a two-sided examination procedure technique on austenitic piping welds. Thus the coverage that may be claimed is limited to 50%.

5. Burden Caused by Compliance

The geometry of the subject components make the Code required examination coverage requirements impractical. PDI has not been able to qualify a single side examination procedure technique that is capable of demonstrating equivalency for a two-sided examination procedure technique on austenitic piping welds.

6. Proposed Alternative and Basis for Use

Proposed Alternative

The following alternatives are proposed in lieu of the required examination coverage of essentially 100 percent:

1. Ultrasonic Testing (UT) of the subject welds was performed to the maximum extent practical due to design configuration restrictions during the second ten-year interval. This includes a best effort examination of the far side of each component to the extent possible utilizing a 60 degree refracted longitudinal

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search unit for components with thickness greater than 0.5 inch and utilizing a 70 degree shear wave search unit for components with thickness equal to or less than 0.5 inch.

2. Pressure test VT-2 visual examinations were performed as required by Code Category B-P during the second ten-year interval. No evidence of leakage was identified for these components.

Basis for Use

The basis for use of these alternatives is that they provide the best examination coverage possible within the limitations of the current design configuration. The volumetric examination was performed using a system (procedures, personnel, and equipment) qualified in accordance with Appendix VIII, Supplement 2.

In addition, the thinner side of each component was fully examined (as shown by the attached figures). When degradation (i.e. cracking) occurs in a component with a configuration similar to these, it typically starts in the thinnest area. This thinnest area where degradation typically begins was fully examined in the subject welds.

7. Duration of Proposed Alternative

The second ten year ISI interval which began September 3, 1995 and ended September 2, 2005.

8. Precedents

None

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Figure 1

Pipe to Safety nozzle safe end configuration

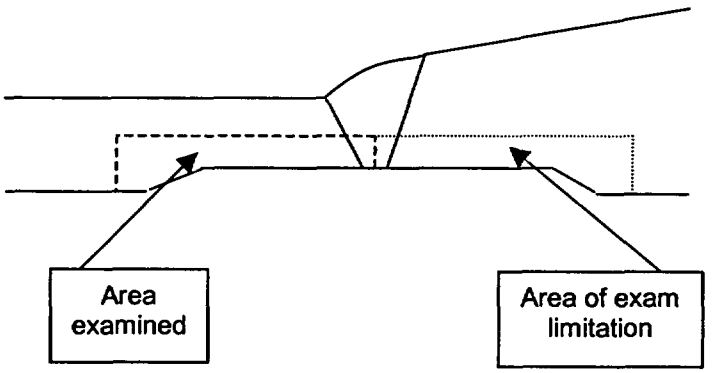

Figure 2

Elbow to Flange configuration

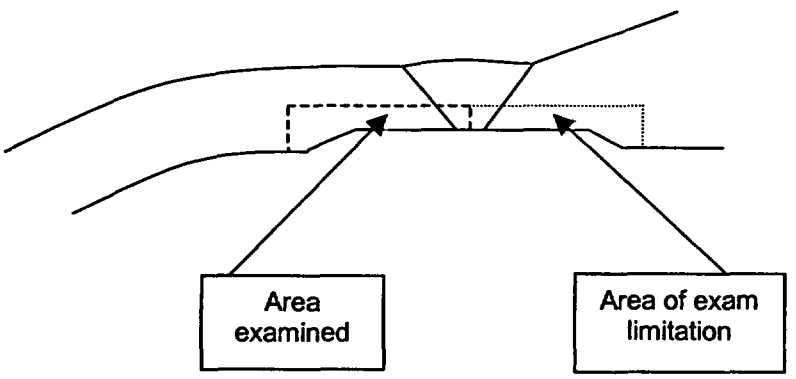

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Figure 3

Pipe to Valve configuration
(Typical)