



Comanche Peak Nuclear Power Plant  
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TXX-24061  
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U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Ref 10CFR50.55(a)(g)(5)(iii)

Subject: Comanche Peak Nuclear Power Plant (CPNPP)  
Docket Nos. 50-446  
Multiple Relief Requests for Unit 2 Third Ten-Year Inservice Inspection Interval from  
10CFR50.55(a) Inspection Requirements due to Impracticality

Dear Sir or Madam:

Pursuant to 10CFR50.55(a)(g)(5)(iii), Vistra Operations Company LLC ("Vistra OpCo") is submitting Relief Requests B-1, B-2, B-3, B-4, C-1, C-2, and C-3 (see attachments) for Comanche Peak Nuclear Power Plant Unit 2, for the third ten-year inservice inspection interval. Vistra OpCo has determined that certain inspection requirements of ASME Section XI are impractical due to physical interferences.

The explanation for each relief request reasoning will be held in the applicable attachment. All of the attached relief requests are authorized by law, will not endanger life or property or the common defense and security, and are in the public interest giving consideration to the burden upon the licensee.

This letter contains no new commitments regarding Comanche Peak Nuclear Power Plant Unit 2.

Should you have any questions, please contact Mr. Ryan Sexton at (979) 292-5064.

Sincerely,

  
Steven K. Sewell

Enclosures:

- Attachment 1 - 10CFR 50.55a Request Number B-1 Relief Requested In Accordance with 10CFR50.55a(g)(5)(iii) - Inservice Inspection Impracticality
- Attachment 2 - 10CFR 50.55a Request Number B-2 Relief Requested In Accordance with 10CFR50.55a(g)(5)(iii) - Inservice Inspection Impracticality
- Attachment 3 - 10CFR 50.55a Request Number B-3 Relief Requested In Accordance with 10CFR50.55a(g)(5)(iii) - Inservice Inspection Impracticality
- Attachment 4 - 10CFR 50.55a Request Number B-4 Relief Requested In Accordance with 10CFR50.55a(g)(5)(iii) - Inservice Inspection Impracticality -
- Attachment 5 - 10CFR 50.55a Request Number C-1 Relief Requested In Accordance with 10CFR50.55a(g)(5)(iii) - Inservice Inspection Impracticality -
- Attachment 6 - 10CFR 50.55a Request Number C-2 Relief Requested In Accordance with 10CFR50.55a(g)(5)(iii) - Inservice Inspection Impracticality -
- Attachment 7 - 10CFR 50.55a Request Number C-3 Relief Requested In Accordance with 10CFR50.55a(g)(5)(iii) - Inservice Inspection Impracticality -

cc: NRC Regional Administrator, Region IV  
NRC Project Manager, CPNPP  
NRC Senior Resident Inspector, CPNPP  
NRC Resident Inspector CPNPP

**10CFR 50.55a Request Number B-1  
Relief Requested  
In Accordance with 10CFR50.55a(g)(5)(iii)  
- Inservice Inspection Impracticality -**

**1. ASME Code Components Affected:**

ASME Code Class: Code Class 1  
References: ASME Section XI, Table IWB-2500-1 and IWB-3510  
Examination Category: B-B  
Item Number: B2.40  
Description: Code required examination coverage for the weld volume is impractical  
Component: Steam Generator 2-01 Head-to-Tubesheet Weld  
Component Number: TCX-1-3100-1-1

**2. Applicable Code Edition and Addenda:**

ASME Section XI, 2007 Edition through 2008 Addenda.

**3. Applicable Code Requirement:**

ASME Section XI 2007 Edition through 2008 Addenda, Figure IWB-2500-6 (Design B) requires a minimum volumetric examination of the weld volume extending  $1/2t$  into the base metal on both the head side and tubesheet side of the head-to-tubesheet weld (Code Item B2.40).

Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 second ten-year interval Inservice Inspection Program Plan also implements Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1," which is endorsed by the NRC in Revision 21 of 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%."

NRC Information Notice (IN) 98-42, "Implementation of 10CFR50.55a(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." This methodology has been applied to all examinations of welds or other areas required by ASME Section XI.

**10CFR 50.55a Request Number B-1**

**4. Impracticality of Compliance:**

The examination of the subject component weld is limited by the presence of four 24"x24" Steam Generator support pads and seventeen 2.5"x2.5" welded pads (See attached sketch). The examinations were conducted in accordance with procedure TX-ISI-210, "Ultrasonic Examination Procedure for Welds in Ferritic Steel Vessels." Angle beam (45° shear and 60° longitudinal) scans were used to achieve the weld volume obtained. As shown on the attached Figures B-1-1 and B-1-2, the 45° exam angles were both limited to 23% not examined, and the 60° exam angle was limited to 29% not examined. Taking the worst-case limitation this corresponds to a coverage of 71% of the required examination volume.

**5. Burden Caused by Compliance:**

The design configuration restrictions of the subject component make the Code required examination coverage requirements for the weld volume impractical. Plant modifications or replacements of components designed to allow for complete coverage would be needed to meet the Code requirements. This would cause considerable burden to CPNPP.

**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 component weld was performed to the maximum extent practical during the third ten-year interval.
2. Pressure test VT-2 visual examinations were performed, as required by Code Category B-P, during the third 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 no indications identified during the examination, there is a high level of confidence in the continued structural integrity of the weld. CPNPP believes that there is no undue risk to the public health and safety presented by this request.

**10CFR 50.55a Request Number B-1**

**6. Duration of Proposed Alternative:**

The third ten-year ISI interval for Unit 2 began on August 3, 2014, and ends on August 2, 2023.

**7. Precedents:**

Comanche Peak Nuclear Power Plant, Unit 2 Relief Request B-7, B-12, B-13 for Steam Generator Heat-to-Tubesheet Welds for Relief from certain ASME Code Inspection Requirements for the Second 10-year Inservice Inspection Interval,” as approved by the NRC in ADAMS Accession No. ML15090A104.

Figure B-1-1  
 [TCX-1-3100-1-1]

Utility: Luminant  
 Site: Comanche Peak

# Ultrasonic Supplemental Report

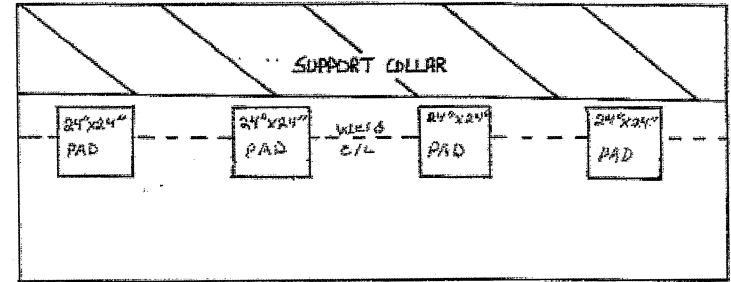
Report No.: 2RF19 (P2)-UT-6  
 Page: 3 of 4

Component ID: TCX-1-3100-1-1

Comments: \_\_\_\_\_

Weld length is 432.9"  
 Four 24" x 24" support pads limit all scans for 96"  
 $96" \div 432.9" = 0.2217$   
 $100 - 22.17 = 77.83\%$

Required scan volume:  
 $6.7" \times 5.6" = 37.52"$



45° DS is missing coverage due to the support collar  
 $1.7" \times 1.7" = 2.89" \div 2 = 1.445"$   
 $1.445" \div 37.52" = 0.0385"$   
 $77.29\% - 3.85\% = 73.44\%$

45°  
 CW 77.83%  
 CCW 77.83%  
 US 77.83%  
 + DS 73.44%  
 306.93  
 ÷ 400.00  
 76.73%

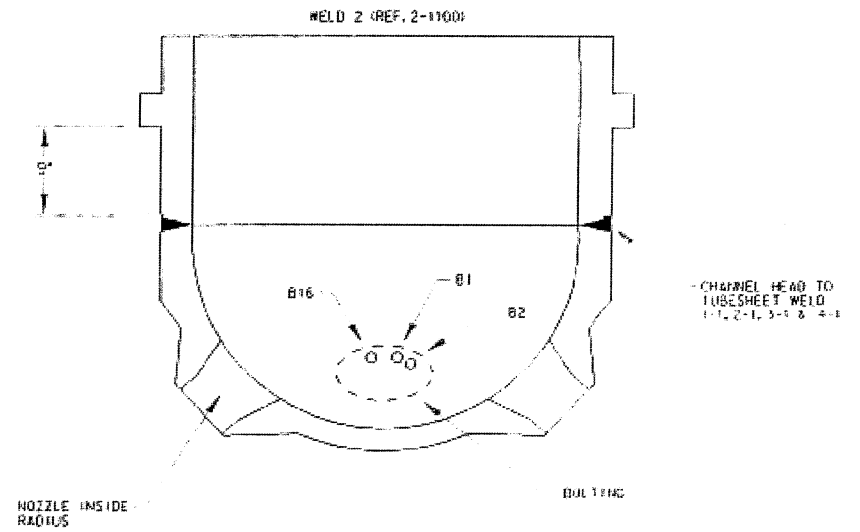
45° 76.73%  
 60° + 71.00%  
 147.73  
 ÷ 200.00  
 73.86%

60° DS is missing coverage due to the support collar  
 $5.8" \times 3.4" = 19.72" \div 2 = 9.86"$   
 $9.86" \div 37.52" = 0.2627"$   
 $77.29\% - 26.77\% = 50.52\%$

60°  
 CW 77.83%  
 CCW 77.83%  
 US 77.83%  
 + DS 50.52%  
 284.01  
 ÷ 400.00  
 71.00%

**Figure B-1-2**  
**[TCX-1-3100-1-1]**

<u>STEAM GENERATOR</u>	<u>WELD</u>	<u>MANWAY</u>	<u>ROLLING</u>	<u>INSIDE RADIUS</u>
1	1-1	HOTSIDE	1-B1 TO 1-B16	1A
		COLD SIDE	1-B17 TO 1-B32	1B
2	2-1	HOTSIDE	2-B1 TO 2-B16	2A
		COLD SIDE	2-B17 TO 2-B32	2B
3	3-1	HOTSIDE	3-B1 TO 3-B16	3A
		COLD SIDE	3-B17 TO 3-B32	3B
4	4-1	HOTSIDE	4-B1 TO 4-B16	4A
		COLD SIDE	4-B17 TO 4-B32	4B



**10CFR 50.55a Request Number B-2  
Relief Requested  
In Accordance with 10CFR50.55a(g)(5)(iii)  
- Inservice Inspection Impracticality -**

**1. ASME Code Components Affected:**

ASME Code Class: Code Class 1  
Examination Category: R-A  
Item Number: R1.11(Elements Subject to Thermal Fatigue)  
Description: Code required examination coverage for the weld volume is impractical  
Component: Pipe to Valve welds  
Component Numbers: TCX-1-4105-6 and TCX-1-4504-11

**2. Applicable Code Edition and Addenda:**

ASME Section XI, 2007 Edition through 2008 Addenda.

**3. Applicable Code Requirement:**

ASME Section XI 2007 Edition through 2008 Addenda, Figure IWB-2500-8(c) requires a volumetric examination of a minimum volume of the inner 1/3 t (one third of the thickness) extending into the piping base metal for a distance of 1/4" past the edge of the weld crown for NPS 4" and larger. The RI-ISI(Risk informed ISI) program extends the Code required volume of the inner 1/3t to 1/3" past the edge of the weld crown is no counterbore is present or a distance of 1/4" on either side of the weld counterbore.

Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 second ten-year interval Inservice Inspection Program Plan also implements Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1," which is endorsed by the NRC in Revision 21 of 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%."

NRC Information Notice (IN) 98-42, "Implementation of 10CFR50.55a(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." This methodology has been applied to all examinations of welds or other areas required by ASME Section XI.



**4. Impracticality of Compliance:**

TCX-1-4105-6 is an austenitic stainless steel 3” schedule 160 pipe to valve weld on the Reactor Coolant alternate charging line. The examination of the subject component limits the examination to one side, due to the valve welded to the pipe. Volumetric examinations were performed with shear wave search units with nominal angles of 45, 60 and 75 degrees. The coverage is limited to 50% due to the valve configuration as shown in Figure B-2-1. The examinations were conducted in accordance with procedure TX-ISI-302, “Ultrasonic Examination of Austenitic Piping Welds.”

TCX-1-4504-11 is an austenitic stainless steel 3” schedule 160 pipe to valve weld on the Pressurizer Relief line. The examination of the subject component limits the examination to one side, due to the valve welded to the pipe. Volumetric examinations were performed with shear wave search units with nominal angles of 45, 60 and 75 degrees. The coverage is limited to 50% due to the valve configuration as shown in Figure B-2-2. The examinations were conducted in accordance with procedure TX-ISI-302, “Ultrasonic Examination of Austenitic Piping Welds.”

**5. Burden Caused by Compliance:**

The design configuration restrictions of the subject component make the Code required examination coverage requirements for the weld volume impractical. Plant modifications or replacements of components designed to allow for complete coverage would be needed to meet the Code requirements. This would cause considerable burden to CPNPP.

**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 component weld was performed to the maximum extent practical during the third ten-year interval.
2. Pressure test VT-2 visual examinations were performed, as required by Code Category B-P, during the third 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 no indications identified during the examination, there is a high level of confidence in the continued structural integrity of the weld. CPNPP believes that there is no undue risk to the public health and safety presented by this request.

**6. Duration of Proposed Alternative:**

The third ten-year ISI interval for Unit 2 began on August 3, 2014, and ends on August 2, 2023.

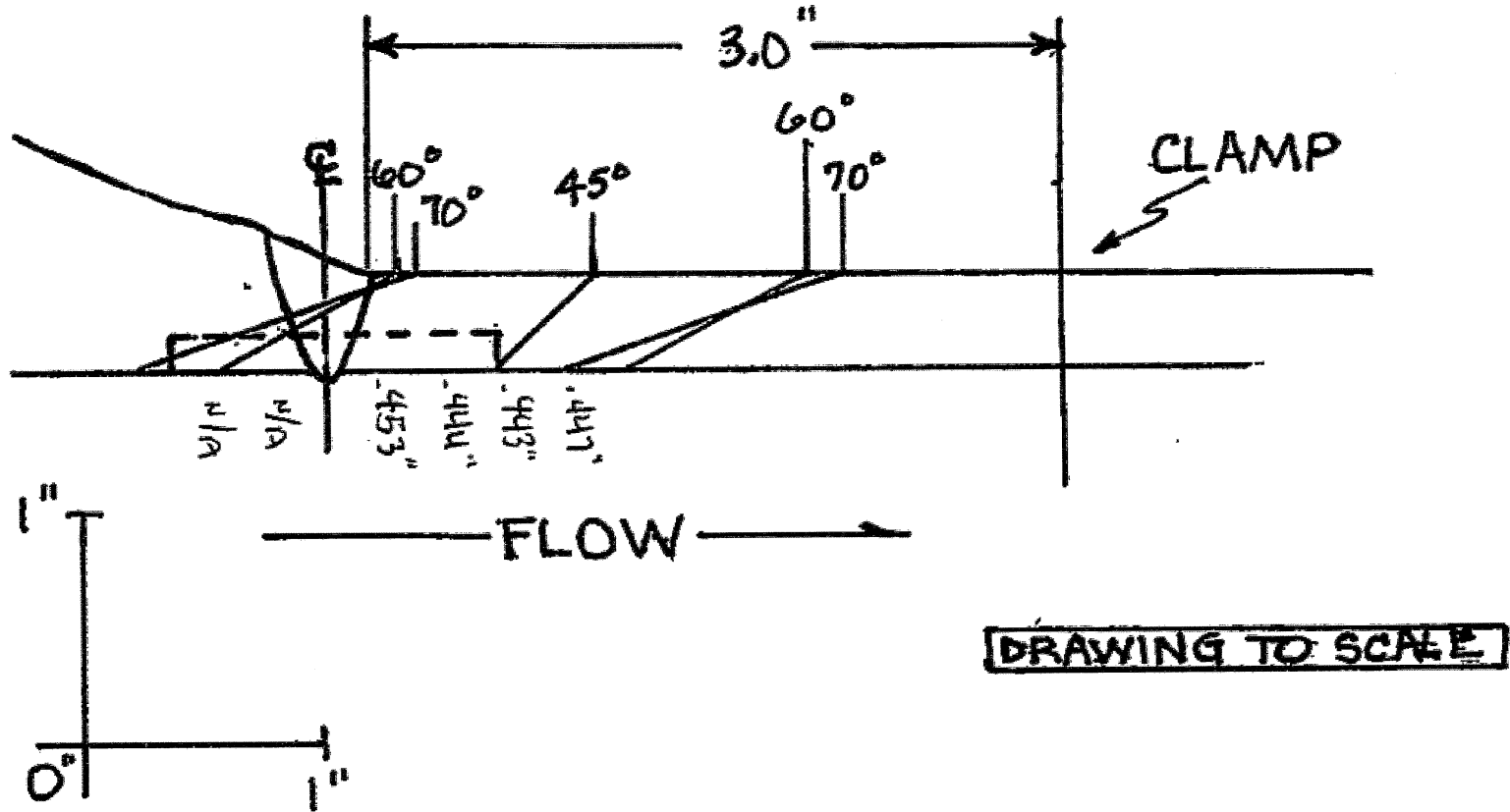
**7. Precedents:**

Comanche Peak Nuclear Power Plant, Unit 2 Relief Request B-3, B-9, B-10, and B-11 for the Second 10-year Inservice Inspection Interval,” as approved by the NRC in ADAMS Accession No. ML1679A405.

Comanche Peak Nuclear Power Plant, Unit 2 Relief Request B-2 for the Second 10-year Inservice Inspection Interval From 10 CFR 50.55a Inspection requirements due to physical interferences,” as approved by the NRC in ADAMS Accession No. ML082130147.



Figure B-2-2  
[TCX-1-4504-11]



**10CFR 50.55a Request Number B-3  
Relief Requested  
In Accordance with 10CFR50.55a(g)(5)(iii)  
- Inservice Inspection Impracticality -**

**1. ASME Code Components Affected:**

ASME Code Class: Code Class 1  
Examination Category: R-A  
Item Number: R1.16 (Elements Subject to Intergranular Stress Corrosion Cracking(IGSCC))  
Description: Code required examination coverage for the weld volume is impractical  
Component: Pipe to Elbow weld  
Component Numbers: TCX-1-4301-10

**2. Applicable Code Edition and Addenda:**

ASME Section XI, 2007 Edition through 2008 Addenda.

**3. Applicable Code Requirement:**

ASME Section XI 2007 Edition through 2008 Addenda, Figure IWB-2500-8(c) requires a volumetric examination of a minimum volume of the inner  $1/3 t$  (one third of the thickness) extending into the piping base metal for a distance of  $1/4$ " past the edge of the weld crown for NPS 4" and larger. The RI-ISI (Risk informed ISI) program extends the Code required volume of the inner  $1/3t$  to  $1/3$ " past the edge of the weld crown is no counterbore is present or a distance of  $1/4$ " on either side of the weld counterbore.

Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 second ten-year interval Inservice Inspection Program Plan also implements Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1," which is endorsed by the NRC in Revision 21 of 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%."

NRC Information Notice (IN) 98-42, "Implementation of 10CFR50.55a(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." This methodology has been applied to all examinations of welds or other areas required by ASME Section XI.

#### **4. Impracticality of Compliance:**

TCX-1-4301-10 is an austenitic stainless steel 10" schedule 140 pipe to elbow weld on the Safety Injection line. The examination of the subject component was limited by the closeness of the piping welds to safety injection structural restraints attached to the steam generator lower beam Figures B-3-2. This configuration limited portions of the weld volume from being examined.

Volumetric examinations were performed with shear search units having a minimal angle of 45° in the two axial and circumferential directions (Figure B-3-1). Minimum coverage obtained was 76.5% for TCX-1-4301-10 (Figure B-3-2). The examinations were conducted in accordance with procedure TX-ISI-302, "Ultrasonic Examination of Austenitic Piping Welds."

Consideration was given to selecting other welds that possibly could have provided full coverage, but it was not feasible. There are only twelve welds in four SI segments, classified as risk category 5a, with a medium consequence and a degradation mechanism is IGSCC. The SI piping, subject welds, and support configurations are identical in each of the Loop Rooms. Four of the welds, one per Loop, are at valve, with the examination single sided. The other eight welds, two per loop, are identical to the ones selected, with structural steel supports limiting the examinations. After looking at the associated piping in the four Loop Rooms, it was determined that the welds in Loop 3, TCX-1-4301-9 and TCX-1-4301-10, would provide the most coverage. A 100% coverage was feasible at weld TCX-1-4301-9; however, 76.5% coverage was obtained for TCX-1-4301-10 (see Figure B-3-2).

#### **5. Burden Caused by Compliance:**

The design configuration restrictions of the subject component make the Code required examination coverage requirements for the weld volume impractical. Plant modifications or replacements of components designed to allow for complete coverage would be needed to meet the Code requirements. This would cause considerable burden to CPNPP.

#### **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 component weld was performed to the maximum extent practical during the third ten-year interval.

2. Pressure test VT-2 visual examinations were performed, as required by Code Category B-P, during the third 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 no indications identified during the examination, there is a high level of confidence in the continued structural integrity of the weld. CPNPP believes that there is no undue risk to the public health and safety presented by this request.

**6. Duration of Proposed Alternative:**

The third ten-year ISI interval for Unit 2 began on August 3, 2014, and ends on August 2, 2023.

**7. Precedents:**

Comanche Peak Nuclear Power Plant, Unit 2 Relief Request B-3, B-9, B-10, and B-11 for the Second 10-year Inservice Inspection Interval,” as approved by the NRC in ADAMS Accession No. ML1679A405.

Figure B-2-1  
[TCX-1-4301-10]

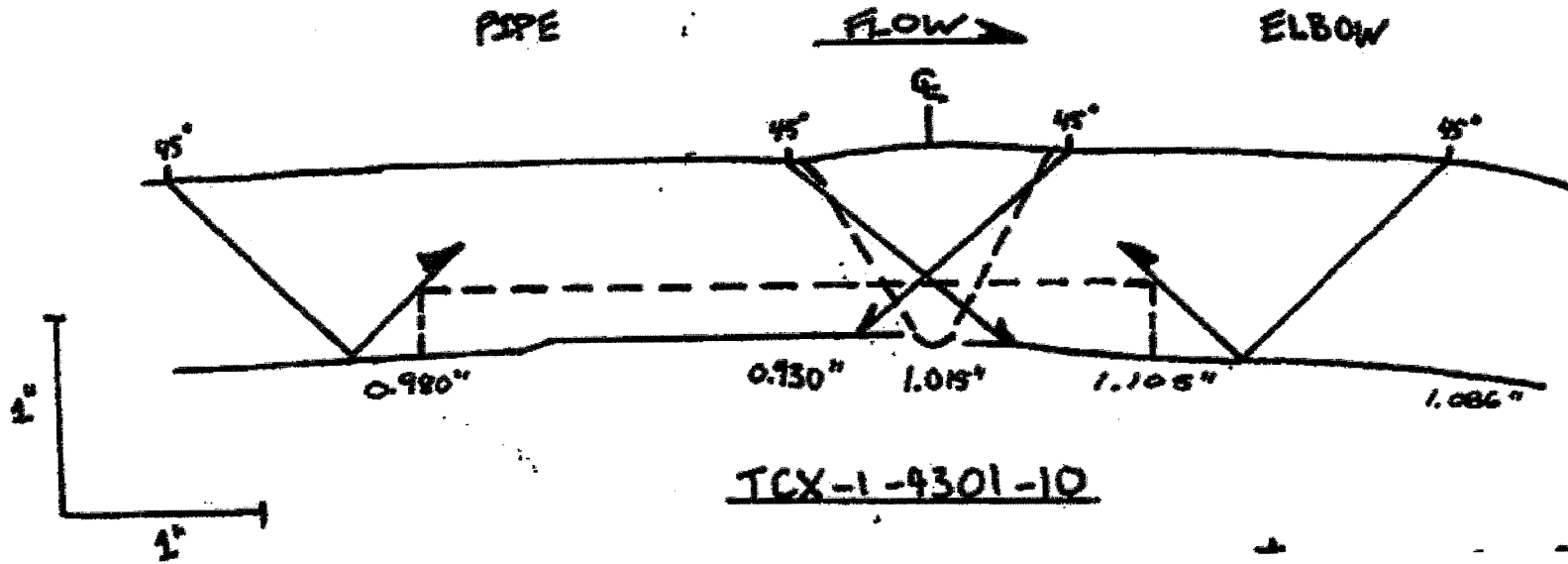
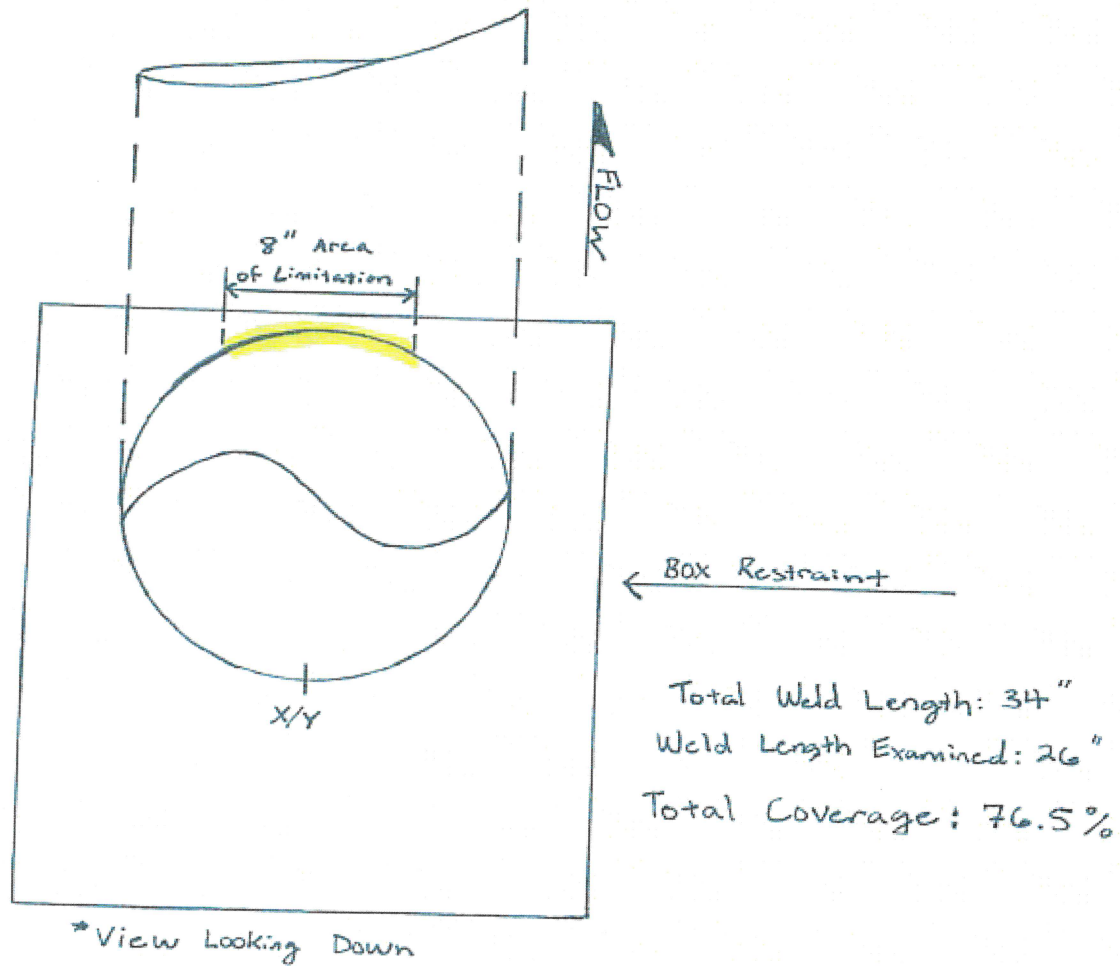




Figure B-3-2  
[TCX-1-4301-10]



**10CFR 50.55a Request Number B-4  
Relief Requested  
In Accordance with 10CFR50.55a(g)(5)(iii)  
- Inservice Inspection Impracticality -**

**1. ASME Code Components Affected:**

ASME Code Class: Code Class 1  
References: ASME Section XI, Table IWB-2500-1 and IWB-3510  
Examination Category: B-A  
Item Number: B1.11  
Description: Code required examination coverage for the weld volume is impractical  
Component: Reactor Vessel Lower Shell to Botton Head Weld  
Component Number: TCX-1-1100-4

**2. Applicable Code Edition and Addenda:**

ASME Section XI, 2007 Edition through 2008 Addenda.

**3. Applicable Code Requirement:**

ASME Section XI 2007 Edition through 2008 Addenda, Figure IWB-2500-1 (Design B) requires a minimum volumetric examination of the weld volume extending  $\frac{1}{2} t$ . The thickness is  $t$  corresponds to the thickness on each side of the weld on the Vessel Shell-Head Joint (Code Item B1.11).

Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 second ten-year interval Inservice Inspection Program Plan also implements Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1," which is endorsed by the NRC in Revision 21 of 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%."

NRC Information Notice (IN) 98-42, "Implementation of 10CFR50.55a(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." This methodology has been applied to all examinations of welds or other areas required by ASME Section XI.

**10CFR 50.55a Request Number B-4**

**4. Impracticality of Compliance:**

The examination of the subject component weld is limited by the proximity of the 6 core support lugs (Figure B-4-1) at 0°, 60°, 120°, 180°, 240°, and 300°. Scanning was conducted between and below the core support lugs with scan boundaries maximized by visually assisted positioning of the exam head. Coverage was achieved to the maximum extent practical by using solid modeling to design the robot scan routines around the limitation. Additional transducers were included in the examination sled to maximize coverage. Final examination coverage is estimated at 79.2% for the weld (Figure B-4-2). The examinations were conducted in accordance with procedure PDI-ISI-254, "Remote Inservice Inspection of Reactor Vessel Shell Welds." This examination was last performed in the first interval due to the B-9 alternative (ML090720583) which approved a ten year exemption for these examinations by a letter from the NRC dated December 22, 2009 (ML092870637). The previous examination in the first interval (2RF06) indicated a 91.7% Combined Coverage rate (Figure B-4-3).

**5. Burden Caused by Compliance:**

The design configuration restrictions of the subject component make the Code required examination coverage requirements for the weld volume impractical. Plant modifications or replacements of components designed to allow for complete coverage would be needed to meet the Code requirements. This would cause considerable burden to CPNPP.

**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 component weld was performed to the maximum extent practical during the third ten-year interval.
2. Pressure test VT-2 visual examinations were performed, as required by Code Category B-P, during the third 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 no indications identified during the examination, there is a high level of confidence in the continued structural integrity of the weld. CPNPP believes that there is no undue risk to the public health and safety presented by this request.

**10CFR 50.55a Request Number B-4**

**6. Duration of Proposed Alternative:**

The third ten-year ISI interval for Unit 2 began on August 3, 2014, and ends on August 2, 2023.

**7. Precedents:**

None

Figure B-4-1  
[TCX-1-1100-4]

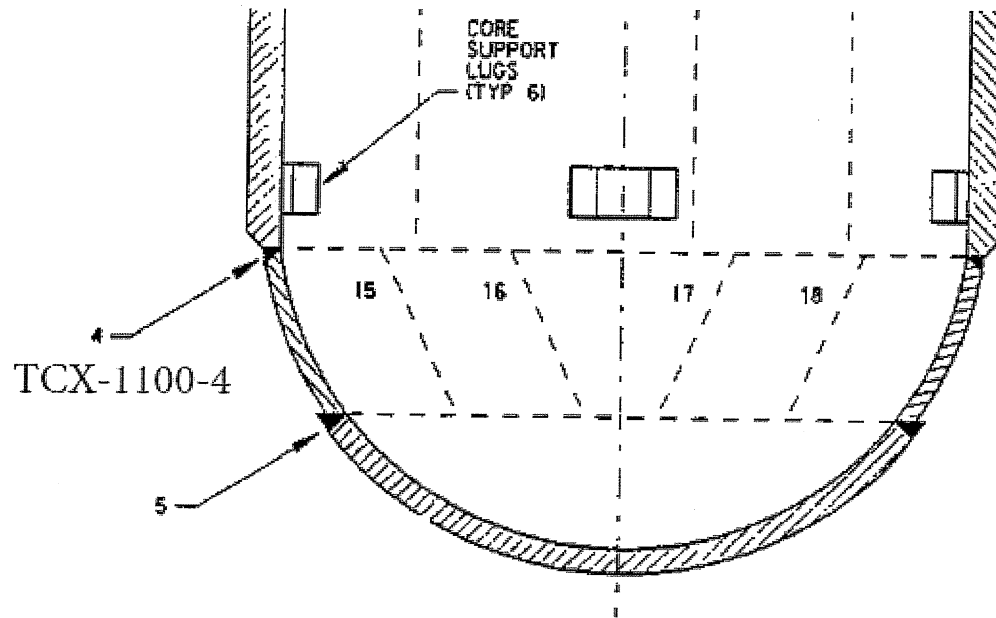


Figure B-4-2  
 [TCX-1-1100-4]

## Comanche Peak Unit 2

### RPV COVERAGE ESTIMATE BREAKDOWNS

### DIRECTION / ORIENTATION

PARALLEL SCANS	CCW / CW
PERP. SCANS	UP / DN

WELD DESCRIPTION Lower Shell to Bottom Head Weld

WELD NO. TCX-1-1100-4 (W4)

### BEAM ANGLES

BEAM DIRECTION	45° Dual	45° Single	45° Shear	-	TOTAL
	EXAM VOLUME	EXAM VOLUME	EXAM VOLUME	-	79.2%
CCW / CW	78.7%	78.7%	78.7%	-	78.7%
UP/DN	79.7%	79.7%	79.7%	-	79.7%
UT COVERAGE = See exam volume EPP sketch sheet 17 of 19	79.2% Limitations: 6 Core support Lugs				


Figure B-4-3  
 [TCX-1-1100-4]

<b>Comanche Peak Unit #2 (TCX)</b>						DIRECTION / ORIENTATION					
RPV COVERAGE ESTIMATE BREAKDOWNS						PARALLEL SCANS		<u>CCW / CW</u>			
						PERP. SCANS		<u>UP / DN</u>			
ITEM / AREA <u>Lower Shell to Bottom Head</u>						WELD NO. <u>TCX-1-1100-4</u>					
<b>BEAM ANGLES</b>											
BEAM DIRECTION	45° L Dual		45° L Single		45° Shear						
	WELD	VOLUME	WELD	VOLUME	WELD	VOLUME	WELD	VOLUME	WELD	VOLUME	
CCW	100	81.5	100	79.1	100	81.2					
CW	100	81.5	100	79.1	100	81.2					
UP (IN)	100	100	67.6	73.4	100	100					
DOWN (OUT)	100	100	(1) 67.6	(1) 73.4	(1) 100	100					
BORE AXIAL											

Weight Factors = 45° L Dual = .3494 (Weight Factors based on % of exam. Region examined by each transducer type)  
 45° L Single = .2376  
 45° Shear = .413

(1) Combination of single & dual sided exams

**Combined Coverage = 91.7%**

ANALYST 

**10CFR 50.55a Request Number C-1  
Relief Requested  
In Accordance with 10CFR50.55a(g)(5)(iii)  
- Inservice Inspection Impracticality –**

**1. ASME Code Components Affected:**

ASME Code Class: Code Class 2  
References: ASME Section XI, Table IWC-2500-1 and IWC-3510  
Examination Category: C-A  
Item Number: C1.10  
Description: Code required examination coverage for the weld volume is impractical  
Component: Containment Spray Heat Exchanger (CP2-CTAHCS-01) Shell  
Component Number: TCX-2-1180-1-2

**2. Applicable Code Edition and Addenda:**

ASME Section XI, 2007 Edition through 2008 Addenda.

**3. Applicable Code Requirement:**

ASME Section XI 2007 Edition through 2008 Addenda, Figure IWC-2500-1(a) requires a minimum volumetric examination of the weld volume extending ½” into the base metal on the vessel and flange sides for the circumferential weld (Code item C1.10).

Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 second ten-year interval Inservice Inspection Program Plan also implements Code Case N-460, “Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1,” which is endorsed by the NRC in Revision 21 of 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%.”

NRC Information Notice (IN) 98-42, “Implementation of 10CFR50.55a(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.” This methodology 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 component weld is limited by the configuration of the flange design and the proximity of two welded support plates on the shell side of the heat exchanger. As shown in Figures C-1-1 and C-1-2, the proximity of the welded supports and the flange configuration limit the parallel scans (circumferential) and perpendicular (axial scans) are limited mainly by the welded supports on the shell side of the weld. This yields a composite coverage of 40.16% of the required examination volume. The examinations were conducted in accordance with procedure TX-ISI-214, "Ultrasonic Examination Procedure for Welds in Piping Systems and Vessels." Angle beams (45° shear and 70° longitudinal) scans were used to achieve the weld volume obtained.

**5. Burden Caused by Compliance:**

The design configuration restrictions of the subject component make the Code required examination coverage requirements for the weld volume impractical. Plant modifications or replacements of components designed to allow for complete coverage would be needed to meet the Code requirements. This would cause considerable burden to CPNPP.

**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 component weld was performed to the maximum extent practical during the third ten-year interval.
2. Pressure test VT-2 visual examinations were performed, as required by Code Category C-H, during the third 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 with no indications identified during the examination, there is a high level of confidence in the continued structural integrity of the weld. CPNPP believes that there is no undue risk to the public health and safety presented by this request.

**6. Duration of Proposed Alternative:**

The third ten-year ISI interval for Unit 2 began on August 3, 2014, and ends on August 2, 2023.

**7. Precedents:**

Comanche Peak Nuclear Power Plant, Unit 2 Relief Request B-15, C-2, and C-4 for Application of an Alternative to the ASME Code, Section XI Weld Examination Requirements for Reactor Vessel Head, Containment Spray HX and RHR HX due to Physical Interferences for the Second 10-Year Inservice Inspection Interval”, as approved by the NRC in ADAMS Accession No. ML16063A001.

Figure C-1-1  
[TCX-1-1180-1-2]



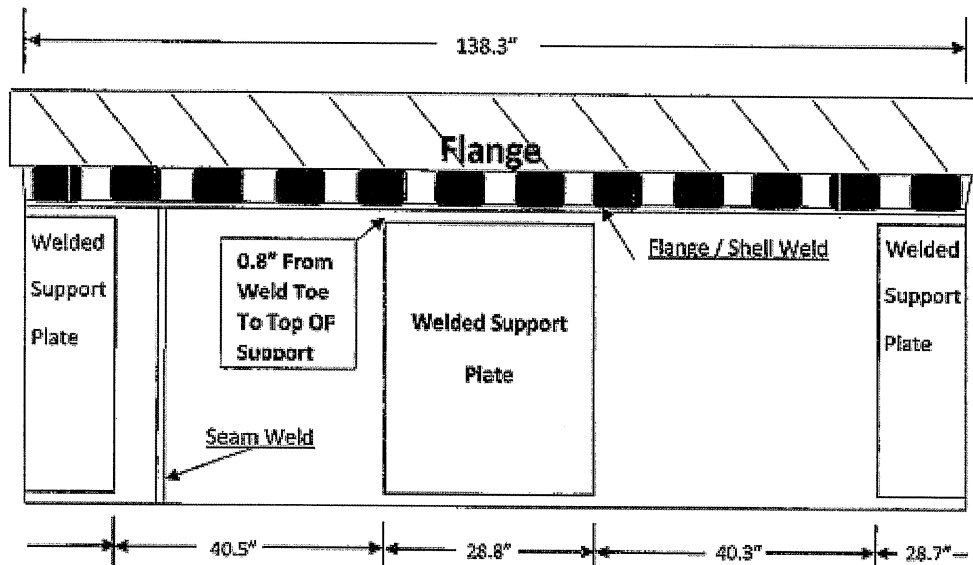
Supplemental Report

Report No.: UT-2017-006

Page: 4 of 4

Summary No.: 097420

Sketch or Photo:



Axial Scans

**Total Area Required**  
0.640" H x 1.6" W x 138.3" L = 141.62 SQIN

**Obtained Areas**  
0.640" H x 0.850" W x 80.8" L = 44 SQIN  
44 ÷ 141.62 SQIN = 0.311"  
0.311 x 100 = 31.1%

**Obtained Areas Vessel Side**  
0.800" H x 0.850" L = 0.68 ÷ 0.34"  
0.34" x 80.8" = 27.47"  
27.47" ÷ 141.62 SQIN = 0.194"  
0.194 x 100 = 19.4%

**70 RL Additional Coverage**  
0.128" H x 80.8" L = 10.34"  
10.34" ÷ 141.62 SQIN = 0.073"  
0.073 x 100 = 7.30%

Circ Scans

0.640" H x 0.800" L x 141.62 SQIN = 72.51"  
72.51" ÷ 141.62 SQIN = 0.512"  
0.512 x 100 = 51.2%

51.6% CW  
51.6% CCW  
31.1% Shell  
26.7% Flange  
161 ÷ 4 = 40.25

**Total Coverage: 40.16%**



**10CFR 50.55a Request Number B  
C-2  
Relief Requested  
In Accordance with 10CFR50.55a(g)(5)(iii)  
- Inservice Inspection Impracticality –**

**1. ASME Code Components Affected:**

ASME Code Class: Code Class 2  
References: ASME Section XI, Table IWC-2500-1 and IWC-3510  
Description: Code required examination coverage for the weld volume is impractical  
Component: Residual Heat Removal (RHR) Heat Exchanger Welds (TCX-2-1120)

Code Cat.	Item No.	Description	Component/Weld No.
C-A	C1.10	RHR Heat Exchanger Head-to-Shell Weld	TCX-2-1120-1-1
C-A	C1.10	RHR Heat Exchanger Shell-to-Flange Weld	TCX-2-1120-1-2
C-B	C2.21	RHR Heat Exchanger Inlet Nozzle-to-Shell Weld	TCX-2-1120-1-3
C-B	C2.21	RHR Heat Exchanger Outlet Nozzle-to-Shell Weld	TCX-2-1120-1-4

Description: Code required examination coverage for the weld volume is impractical  
Component: Containment Spray Heat Exchanger (CP2-CTAHCS-01) Shell  
Component Number: TBX-2-1180-1-2

**2. Applicable Code Edition and Addenda:**

ASME Section XI, 2007 Edition through 2008 Addenda.

**3. Applicable Code Requirement:**

ASME Section XI 2007 Edition through 2008 Addenda, Figure IWC-2500-1(a) requires a minimum volumetric examination of the weld volume extending ½” into the base metal on the vessel and flange sides for the circumferential weld.

Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 second ten-year interval Inservice Inspection Program Plan also implements Code Case N-460, “Alternative Examination

Coverage for Class 1 and Class 2 Welds, Section XI, Division 1,” which is endorsed by the NRC in Revision 21 of 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%.”

NRC Information Notice (IN) 98-42, “Implementation of 10CFR50.55a(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.” This methodology 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 component weld is limited by the configuration of welded supports, bolt flange, and the vessel. As shown on Figures C-2-1, C-2-2, C-2-3 and C-2-4, the proximity of the welded supports, the flange configuration limits the parallel scans (circumferential) and perpendicular (axial). See Table C-2

Table C-2-1 Limitations		
Component/Weld No.	Limitation	Achieved Coverage
TCX-2-1120-1-1	Weld supports	75%
TCX-2-1120-1-2	Bolts flange and weld supports	31.5%
TCX-2-1120-1-3	One sided exam due to vessel	75%
TCX-2-1120-1-4	Once sided exam due to vessel	75%

**5. Burden Caused by Compliance:**

The design configuration restrictions of the subject components make the Code required examination coverage requirements for the weld volume impractical, as shown in Table C-2 above and Figure C-2-1 and C-2-2. Plant modifications or replacements of components designed to allow for complete coverage would be needed to meet the Code requirements. This would cause considerable burden to CPNPP.

**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 component weld was performed to the maximum extent practical during the third ten-year interval.
2. Pressure test VT-2 visual examinations were performed, as required by Code Category C-H, during the third ten-year interval. No evidence of leakage was identified for this component.
3. For Category C-B, Item C2.21 welds, the required Surface exams were performed with required coverage and no indications on welds TCX-2-1120-1-3 and TCX-2-1120-1-4.

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, no indications identified during either examination and the additional weld inspected with similar configuration, there is a high level of confidence in the continued structural integrity of the weld. CPNPP believes that there is no undue risk to the public health and safety presented by this request.

**6. Duration of Proposed Alternative:**

The third ten-year ISI interval for Unit 2 began on August 3, 2014 and ends on August 2, 2023.

**7. Precedents:**

Comanche Peak Nuclear Power Plant, Unit 2 Relief Request B-15, C-2, and C-4 for Application of an Alternative to the ASME Code, Section XI Weld Examination Requirements for Reactor Vessel Head, Containment Spray HX and RHR HX due to Physical Interferences for the Second 10-Year Inservice Inspection Interval”, as approved by the NRC in ADAMS Accession No. ML16063A001.

Figure C-2-1  
[Configuration and Coverage for TCX-2-1120-1-1 and TCX-2-1120-1-2]

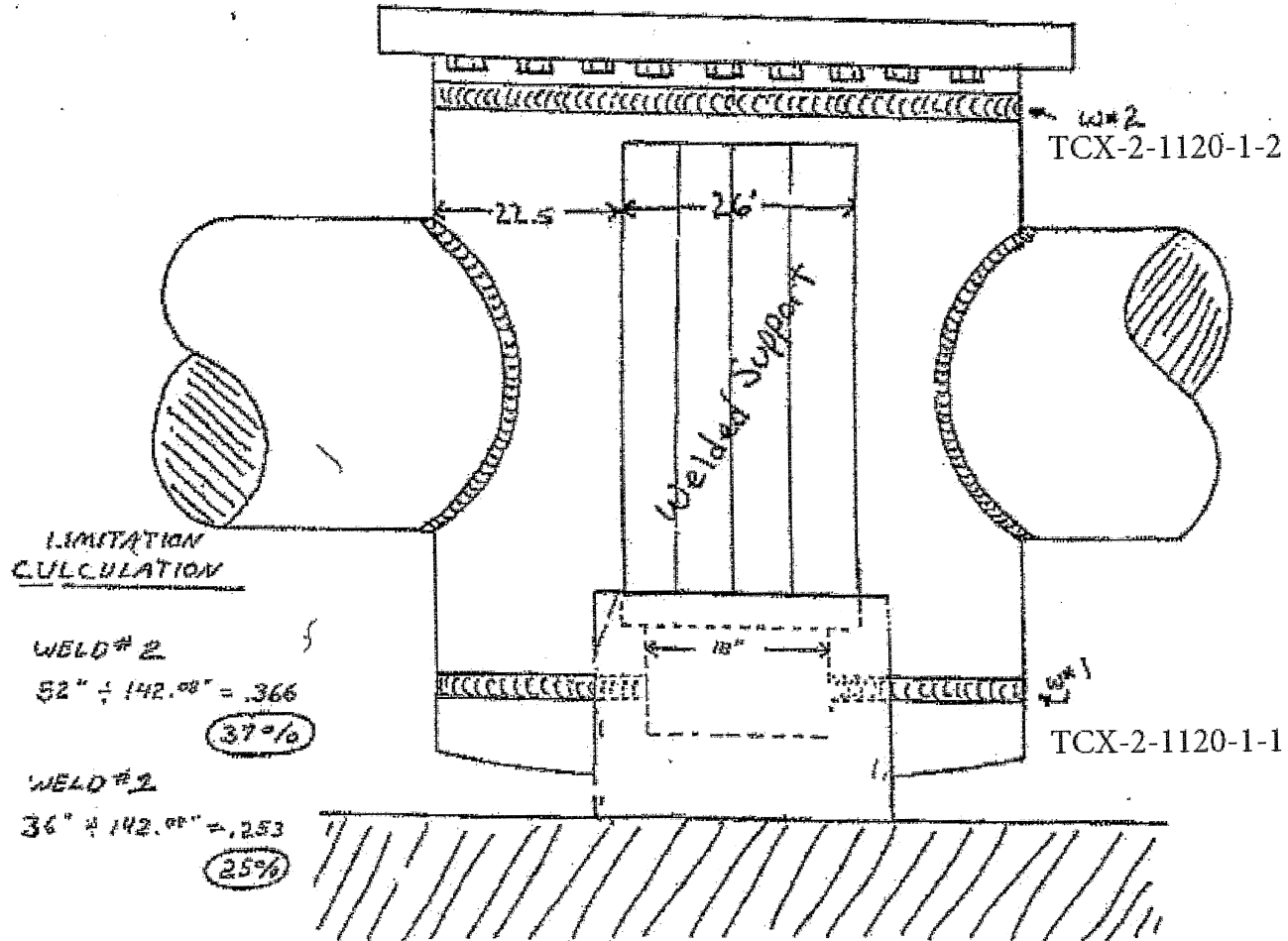
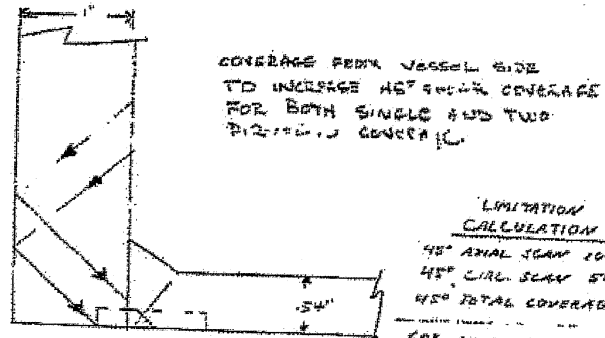
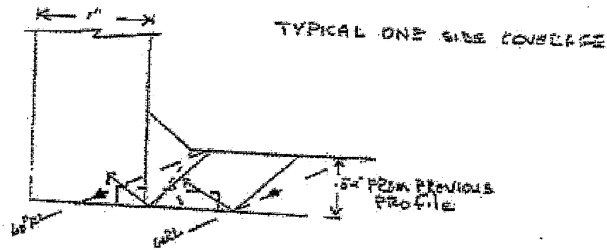




Figure C-2-2  
 [Configuration and Coverage for TCX-2-1120-1-3 and TCX-2-1120-1-4]



LIMITATION  
 CALCULATION

45° AXIAL SCAN 100%

45° CIRC SCAN 50%

45° TOTAL COVERAGE 75%

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60° AXIAL SCAN 100%

60° CIRC SCAN 100%

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45° CIRC SCAN  
 $32.68 \times 2 = 65.36$   
 $65.36 + 32.68 = 98.04$  (100%)

45° AXIAL SCAN (100%)

45° TOTAL SCAN (98%)

**10CFR 50.55a Request Number B**  
**C-3**  
**Relief Requested**  
**In Accordance with 10CFR50.55a(g)(5)(iii)**  
**- Inservice Inspection Impracticality –**

**1. ASME Code Components Affected:**

ASME Code Class: Code Class 2  
References: ASME Section XI, Table IWC-2500-1 and IWC-3510  
Description: Code required examination coverage for the weld volume is impractical  
Component: Residual Heat Removal (RHR) Heat Exchanger Welds (TCX-2-1120)

Code Cat.	Item No.	Description	Component/Weld No.
C-A	C1.10	RHR Heat Exchanger Head-to-Shell Weld	TCX-2-1120-1-1
C-A	C1.10	RHR Heat Exchanger Shell-to-Flange Weld	TCX-2-1120-1-2
C-B	C2.21	RHR Heat Exchanger Inlet Nozzle-to-Shell Weld	TCX-2-1120-1-3
C-B	C2.21	RHR Heat Exchanger Outlet Nozzle-to-Shell Weld	TCX-2-1120-1-4

Description: Code required examination coverage for the weld volume is impractical  
Component: Containment Spray Heat Exchanger (CP2-CTAHCS-01) Shell  
Component Number: TBX-2-1180-1-2

**2. Applicable Code Edition and Addenda:**

ASME Section XI, 2007 Edition through 2008 Addenda.

**3. Applicable Code Requirement:**

ASME Section XI 2007 Edition through 2008 Addenda, Figure IWC-2500-1(a) requires a minimum volumetric examination of the weld volume extending ½” into the base metal on the vessel and flange sides for the circumferential weld.

Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 second ten-year interval Inservice Inspection Program Plan also implements Code Case N-460, “Alternative Examination

Coverage for Class 1 and Class 2 Welds, Section XI, Division 1,” which is endorsed by the NRC in Revision 21 of 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%.”

NRC Information Notice (IN) 98-42, “Implementation of 10CFR50.55a(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.” This methodology 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 component weld is limited by the configuration of welded supports, bolt flange, and the vessel. As shown on Figures C-3-1 and C-3-2, the proximity of the welded supports, the flange configuration limits the parallel scans (circumferential) and perpendicular (axial). See Table C-3-1.

Table C-3-1 Limitations		
Component/Weld No.	Limitation	Achieved Coverage
TCX-2-1120-1-1	Weld supports	75%
TCX-2-1120-1-2	Bolts flange and weld supports	31.5%
TCX-2-1120-1-3	One sided exam due to vessel	75%
TCX-2-1120-1-4	Once sided exam due to vessel	75%

#### 5. Burden Caused by Compliance:

The design configuration restrictions of the subject components make the Code required examination coverage requirements for the weld volume impractical, as shown in Table C-3-1 above and Figure C-3-1 and C-3-2. Plant modifications or replacements of components designed to allow for complete coverage would be needed to meet the Code requirements. This would cause considerable burden to CPNPP.

#### 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 component weld was performed to the maximum extent practical during the third ten-year interval.
2. Pressure test VT-2 visual examinations were performed, as required by Code Category C-H, during the third ten-year interval. No evidence of leakage was identified for this component.
3. For Category C-B, Item C2.21 welds, the required Surface exams were performed with required coverage and no indications on welds TCX-2-1120-1-3 and TCX-2-1120-1-4.

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, no indications identified during either examination and the additional weld inspected with similar configuration, there is a high level of confidence in the continued structural integrity of the weld. CPNPP believes that there is no undue risk to the public health and safety presented by this request.

**6. Duration of Proposed Alternative:**

The third ten-year ISI interval for Unit 2 began on August 3, 2014 and ends on August 2, 2023.

**7. Precedents:**

Comanche Peak Nuclear Power Plant, Unit 2 Relief Request B-15, C-2, and C-4 for Application of an Alternative to the ASME Code, Section XI Weld Examination Requirements for Reactor Vessel Head, Containment Spray HX and RHR HX due to Physical Interferences for the Second 10-Year Inservice Inspection Interval”, as approved by the NRC in ADAMS Accession No. ML16063A001.

Figure C-3-1  
[Configuration and Coverage for TCX-2-1120-1-1 and TCX-2-1120-1-2]

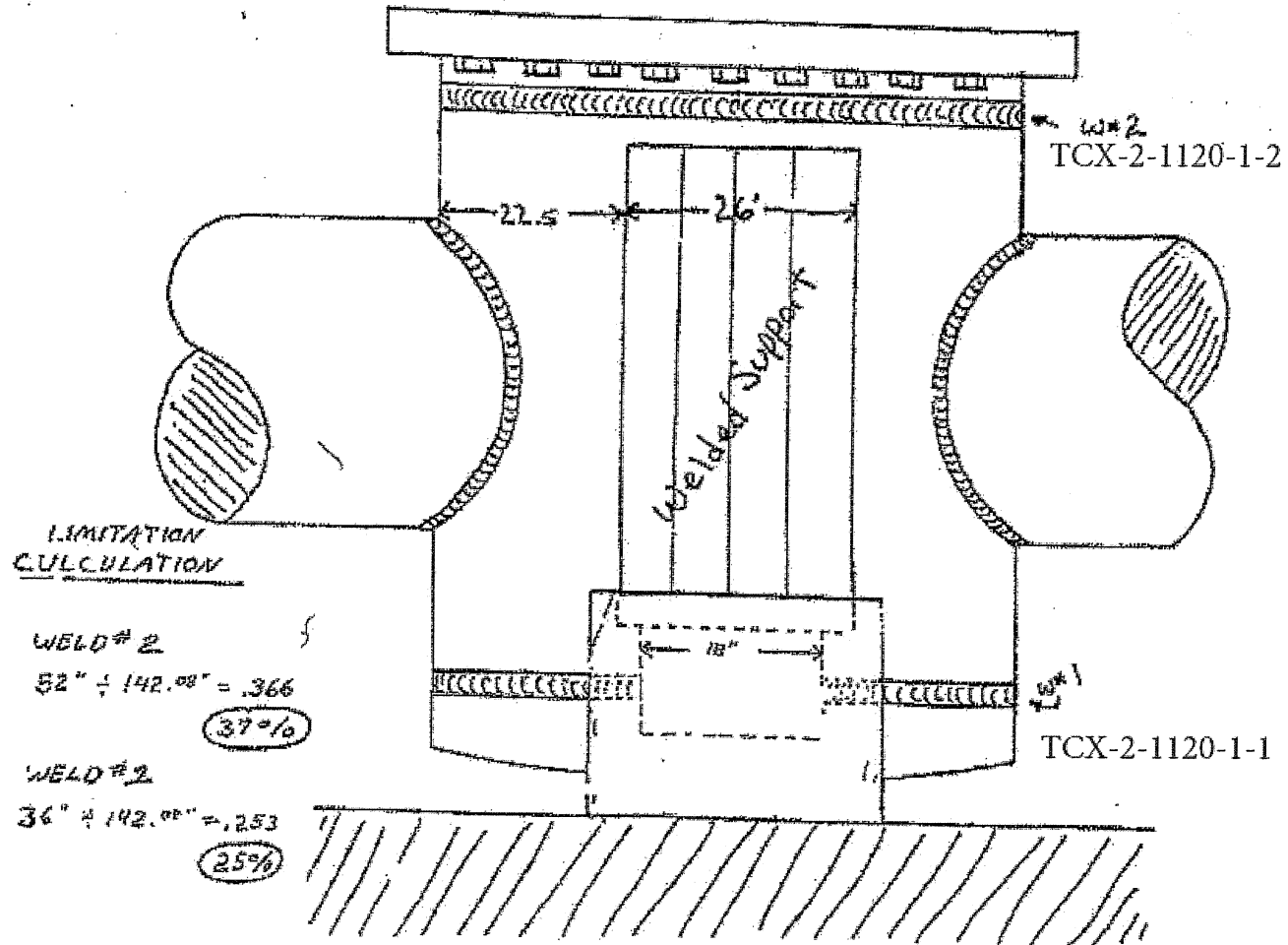


Figure C-3-2  
 [Configuration and Coverage for TCX-2-1120-1-3 and TCX-2-1120-1-4]

