



**TXU**

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Senior Vice President & Principal Nuclear Officer

Ref: 10 CFR 50.55(a)(3)

CPSES-200200025  
Log # TXX-02004  
File # 10010

March 4, 2002

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

**SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)  
DOCKET NO. 50-446  
UNIT 2 INSERVICE INSPECTION (ISI) A-4 THROUGH A-8 RELIEF  
REQUESTS FROM 1986 EDITION OF ASME CODE, SECTION XI,  
NO ADDENDA**

**REF:** 1) TXU Energy letter from C. L. Terry to the NRC dated September 28, 2001 logged TXX-01163  
2) Federal Register dated September 22, 1999 (Volume 64, Number 183) 10 CFR Part 50 Industry Codes and Standards; Amended Requirements: Final Rule [Page 51370]

Gentlemen:

This letter revises 3 relief requests to the ASME Code requirements for the reactor pressure vessel (RPV) examinations for use at Comanche Peak Steam Electric Station Unit 2. These revised relief requests provide clarifying information requested by the NRC staff, and replaces relief requests A-4 through A-6, submitted via reference 1. Additionally, relief request A-7 and A-8 are added as discussed with your staff.

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Page 2 of 2

Attachment 1 to this letter lists the information requested by the NRC staff, and provides a roadmap as to where the information can be found in the enclosures to this letter.

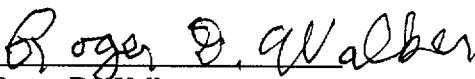
This communication contains no new licensing basis commitments regarding CPSES Units 1 and 2. If you have any questions or need additional information regarding this matter, please feel free to contact Obaid Bhatti at (254) 897-5839 or Douglas W. Snow at (254) 897-8448.

Sincerely,

TXU Generation Company LP

By: TXU Generation Management Company LLC  
Its General Partner

C. L. Terry  
Senior Vice President and Principal Nuclear Officer

By:   
Roger D. Walker  
Regulatory Affairs Manager

OAB/dws

Enclosures/Table/Figures

c - E. W. Merschoff, Region IV  
D. E. Graves, Region IV  
D. H. Jaffe, NRR  
Resident Inspectors, CPSES  
G. Bynog, TDLR

**ADDITIONAL INFORMATION REQUESTED FOR UNIT 2  
INSERVICE INSPECTION (ISI) A-4 THROUGH A-7  
RELIEF REQUESTS FROM 1986 EDITION OF ASME  
CODE, SECTION XI, NO ADDENDA**

The information requested by the NRC staff, and the responses provided by TXU Generating Company LP are as follows:

**Relief Request A-4**

**Requested Information:**

- A. How will these examinations be performed? How will the coverage requirements and examination requirements of 10 CFR 50.55a(b)(xv)(K)(2) and (3) be met. These coverage requirements emphasize ultrasonic examination of the weld volume at the weld root for circumferential and radial flaws.

**Response:**

Refer to Enclosure 2, Section IV, paragraph 3, 4, and 5.

**Requested Information:**

- B. Have any of the four subject welds received any inservice examinations?

**Response:**

Refer to Enclosure 2, Section VI, paragraph 1. Please note that, TXU have revised the population of the subject welds from four to eight.

**Relief Request A-5**

**Requested Information:**

- A. Will the components listed receive direct visual exams or remote visual examination?  
List for each nozzle.

**Response:**

Refer to Enclosure 3, Section V, paragraph 1.

**ADDITIONAL INFORMATION REQUESTED FOR UNIT 2  
INSERVICE INSPECTION (ISI) A-4 THROUGH A-7  
RELIEF REQUESTS FROM 1986 EDITION OF ASME  
CODE, SECTION XI, NO ADDENDA (cont.)**

**Requested Information:**

- B. What is the resolution sensitivity? Describe the resolution capabilities of the equipment (i.e. video camera) used to perform the inspection. What enhancements if any will be used?

**Response:**

Refer to Enclosure 3, Section V, paragraph 2.

**Relief Request A-6**

**Requested Information:**

- A. What is the time period for the third period of the first 10-year ISI interval. When are the examinations scheduled. (Cannot write this relief request to exceed the November 22, 2002 date)

**Response:**

Refer to Enclosure 4, Section VII.

**Requested Information:**

- B. The Code also requires a surface exam. How will the surface exam be reconciled. (Licensee did not address surface exam requirement)(did licensee receive or request relief at an earlier date? Please provide dates.)

**Response:**

Refer to Enclosure 4, Section VI.

**ADDITIONAL INFORMATION REQUESTED FOR UNIT 2  
INSERVICE INSPECTION (ISI) A-4 THROUGH A-7  
RELIEF REQUESTS FROM 1986 EDITION OF ASME  
CODE, SECTION XI, NO ADDENDA (cont.)**

**Relief Request A-7**

**Requested Information:**

- A. Provide a comparison between the ASME Section V based ultrasonic methods and procedures and Appendix VIII, Supplements 4 and 6 based ultrasonic methods and procedures (examination angles, calibrations, scan directions, scan sensitivity, scan index, flaw sizing, scan speed, procedure qualification, data analyst).

**Response:**

Refer to Table 1.

**Requested Information:**

- B. Is the weld accessible to examination from all scan directions? Provide drawing(s) showing access from all scan directions? Is the licensee able to examine the weld on both sides?

**Response:**

Yes, refer to Figures 1 through 3.

**Requested Information:**

- C. Does the PDI qualification block accurately represent the subject shell-to-flange weld configuration? Please provide justification.

**Response:**

The PDI qualification specimens are curved vessel shell plate sections and do not have taper transition geometry however the procedure is used to examine reactor vessel shell welds which have taper transitions at weld joints of dissimilar thickness. The PDI qualification for Supplements 4 and 6 allow for examination of material thickness up to 12.3 inches or a metal path distance of 17.5 inches in the case of the 45 degree transducer. This qualified test range bounds a significant percentage of the flange to shell weld examination volume even in the thicker portion above the weld centerline.

**ADDITIONAL INFORMATION REQUESTED FOR UNIT 2  
INSERVICE INSPECTION (ISI) A-4 THROUGH A-7  
RELIEF REQUESTS FROM 1986 EDITION OF ASME  
CODE, SECTION XI, NO ADDENDA (cont.)**

**Requested Information:**

- D. Has any of the subject welds been examined yet? What portions and directions have already been examined? Using what procedures?

**Response:**

The weld was examined during pre-service by remote automated inspection in accordance with Section XI and Regulatory Guide (RG) 1.150 Revision 1. In the pre-service examinations performed from the vessel ID surface, the flange to shell weld was examined from both sides of the weld using Section XI techniques ( 45 and 60 degree beam angles ) augmented with 70 degree Longitudinal wave near surface examinations. For inservice examinations performed to date, the weld has been examined manually from the flange seal surface using beam angles providing near-normal incidence to the plane of the weld. Procedures for manual examinations were written in accordance with Section XI and RG 1.150 Rev. 1. No matters of concern were identified during the aforementioned examinations.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-4 Rev. 1**

**I. System/Component for Which Relief is Requested:**

Four Class I Reactor Pressure Vessel (RPV) Nozzle-to-Vessel welds Examined at Comanche Peak Steam Electric Station Unit 2.

RPV Nozzle-to-Vessel Weld (Weld TCX—1-1100A-19)  
RPV Nozzle-to-Vessel Weld (Weld TCX—1-1100A-22)  
RPV Nozzle-to-Vessel Weld (Weld TCX—1-1100A-23)  
RPV Nozzle-to-Vessel Weld (Weld TCX—1-1100A-26)  
RPV Nozzle-to-Vessel Weld (Weld TCX—1-1100A-20)  
RPV Nozzle-to-Vessel Weld (Weld TCX—1-1100A-21)  
RPV Nozzle-to-Vessel Weld (Weld TCX—1-1100A-24)  
RPV Nozzle-to-Vessel Weld (Weld TCX—1-1100A-25)

**II. Code Requirement:**

ASME Section XI Class 1, ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1986 Edition with no Addenda; Table IWB-2500-1, Examination Category B-D, Full Penetration Welds of Nozzles in Vessels, Code Item B3.90, Figures IWB-2500-7 (a), (b) and (c), and Article 4 of Section V for the Ultrasonic (UT) examination.

**III. Code Requirement from Which Relief is Requested:**

Pursuant to 10 CFR 50.55a(a)(3)(i), TXU Generation Company LP [herein after referred to as TXU] requests to implement an alternative to the Volumetric (Ultrasonic (UT)) requirements of ASME Section XI Table IWB-2500-1. The Code invokes the (t/2) examination volume requirements of Figures IWB-2500-7 (a), (b), and (c). In lieu of the requirements of ASME Section XI, Figures IWB-2500-7 (a), (b), and (c), TXU proposes to reduce the examination volume next to the widest part of the weld from half of the vessel wall thickness to one-half (1/2) inch from the weld; as indicated in proposed revision to Code Case N-613 (Reference 3).

Additionally, TXU requests relief from ASME Section V, Article 4 for the performance of the required volumetric examinations as specified in Table IWB-2500-1 Category B-D, Code Item B3.90, of the 1986 Edition with no Addenda of ASME Section XI.

This relief is requested for the Comanche Peak Steam Electric Station Unit 2, first 10-year interval vessel examination.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-4 Rev. 1(cont.)**

**IV. Basis for Relief:**

Comanche Peak Unit 2 is currently required to perform inservice examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, and the 1986 Edition with no Addenda of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. The Code invokes the (t/2) examination volume requirements of Figures IWB-2500-7 (a), (b), and (c).

The examination volume for the RPV pressure retaining nozzle-to-vessel welds extend far beyond the weld into the base metal, and is unnecessarily large. This extends the examination time significantly, and results in no net increase in safety, as the area being examined is a base metal region which is not prone to inservice cracking and has been extensively examined during construction, pre-service examination, and during the first inservice examinations with acceptable results.

The implementation of this request for relief would reduce the examination volume next to the widest part of the weld from half of the vessel wall thickness to one-half (1/2) inch from the weld. This reduction is applicable to base metal examination volume that was extensively interrogated during the construction and pre-service inspections and is not located in the high stressed areas of the nozzle-to-vessel weld. The high stressed areas are included in the examination volume as defined above and are subject to examination.

The UT examination of the RPV vessel-to-nozzle weld will be performed both from the vessel shell and from the nozzle bore to ensure full code required through volume examination coverage. The portion of the examination from the vessel shell will be conducted utilizing Appendix VIII Supplements 4 and 6 as amended by the Final Rule in Federal Register Notice 64FR 51370 dated September 22, 1999 in lieu of Article 4 of Section V, which will allow TXU to use a Performance Demonstration Initiative (PDI) qualified procedure, personnel, and equipment for the examination.

In addition to the examination from the vessel wall, a UT examination from the nozzle bore will be performed per the requirements of Article 4 of Section V and the subsequent guideline requirements of Regulatory Guide 1.150 Rev. 1. Currently there are no PDI qualified procedures for the bore examination of the nozzle to vessel weld. The Final Rule requires implementation of Appendix VIII Supplement 7 "Qualification Requirements for Nozzle-To-Vessel Weld" by November 22, 2002. In Supplement 7 and as amended in the Final Rule, both Supplements 4 and 6 will be required at that time.



**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-4 Rev. 1(cont.)**

The use of a qualified UT procedure implementing Supplements 4 and 6 for the portion of the examinations conducted from the vessel shell will save time on the RPV inspection since this would be the same procedure and set up as used for the adjacent welds.

Recently, the NRC granted similar relief to Salem Generating Station, Unit 1, and San Onofre Generating Station Units 2 and 3. (Reference 2 and 4).

**V. Alternate Examinations:**

For CPSES Unit 2 TXU proposes to use the reduced volume of one-half (1/2) inch from the widest part of the weld, in lieu of the requirements of ASME Section XI Figures IWB-2500-7 (a) and (b). This proposed inspection volume is consistent with the weld volume as indicated in Figures 1, 2, and 3 of the Committee Correspondence letter dated October 23, 2000 from W. Norris to the ASME Subgroup Water-Cooled Systems (Reference 3). It is required that this relief be in effect until the end of the first ten-year interval.

TXU proposes to use the alternative requirements defined above in lieu of ASME Section V, Article 4 for the performance of the required volumetric examinations as specified in Table IWB-2500-1 Category B-D, Code Item B3.90, of the 1986 Edition with no Addenda of ASME Section XI. This relief is requested only for CPSES Unit 2 first ten-year interval, reactor pressure vessel examinations, which are scheduled to occur in March of 2002.

TXU will perform examinations in accordance with ASME Code, Section XI, Div. 1, 1995 Edition, 1996 Addenda, Appendix VIII Supplement 4 and 6 as amended by the Federal Register Notice 64 FR 51370 dated September 22, 1999, for the portion of the examination conducted from the vessel shell. For the examination conducted from inside the vessel, the inner volume will be examined to a minimum depth of 15% in four orthogonal directions with personnel and procedures qualified in accordance with Supplement 4, as modified by the rule, and the volume not examined according to Supplement 4 will be examined from the nozzle bore.

The extent of examination coverage proposed, along with the demonstrated ultrasonic technique and periodic system pressure tests will provide added assurance that the Reactor Vessel welds have remained free of service related flaws, therefore providing an acceptable level of quality and safety.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-4 Rev. 1(cont.)**

**VI. Justification for the Granting of Relief:**

TXU proposes reducing the examination volume to 1/2-inch from the widest part of the weld, consistent with Figures 1, 2, and 3 of Committee Correspondence dated October 23, 2000, in lieu of one-half the through-wall thickness from each side of the weld required by Figures IWB-2500-7(a) and (b). The acceptability of this reduced volume examination is based on prior examinations of the base metal and internal stress distribution near the weld. The base metal was extensively examined during construction, pre-service inspection, and prior inservice inspections. These examinations showed the ASME Code volume to be free of unacceptable flaws. The creation of flaws, during plant service in the volume excluded from the proposed reduced examination is unlikely because of the low stress in the base metal away from the weld. The stresses caused by welding are concentrated at and near the weld. Cracks, should they initiate, occur in the highly stressed areas of the weld. The highly stressed areas are within the volume included in the reduced examination volume proposed by the TXU. The prior thorough examination of the base metal and the examination of the highly stressed areas of the weld provide an acceptable level of quality and safety.

TXU also proposes to perform the UT examination of the specified nozzle-to-vessel welds from inside the vessel with personnel and procedures qualified according to Supplements 4 and 6 of Appendix VIII of Section XI in lieu of the requirements of their ISI Code of record, and from the nozzle bore with personnel and procedures qualified according to their ISI Code of record. The ISI Code of record invokes examination requirements of Appendix I, Article 1-2000, which in turn references Section V, Article 4. Article 4 requires the use of prescriptive criteria for qualifying UT techniques (nominal scanning angles of 0, 45, 60, and 70 degrees). The NRC staff has determined that the use of prescriptive criteria for qualifying UT techniques may be less effective than the use of performance-based criteria for detecting and sizing flaws in reactor vessels. This determination was made in a September 22, 1999, rulemaking (64 FR 51370) that revised 10 CFR 50.55a and mandated accelerated implementation of Appendix VIII to Section XI of the ASME Code. The rule requires that the examination of nozzle-to-vessel welds utilize performance-based UT techniques that are qualified according to the criteria in Section XI, Appendix VIII, Supplement 7 by November 22, 2002. The nuclear utilities are participating in the Electric Power Research Institute's PDI program that was created to develop a generic qualification process that would allow utilities to meet the implementation date established in the rule.

In the spirit of meeting Supplement 7 but absent a developed qualification process for Supplement 7, TXU proposes an alternative to perform the nozzle-to-vessel weld examinations from the vessel shell with Appendix VIII qualified personnel and procedures, where possible. For examinations conducted from inside the vessel, the rule

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-4 Rev. 1(cont.)**

would require that the inner volume be examined to a minimum depth of 15 percent in 4 orthogonal directions with personnel and procedures qualified in accordance with Supplement 4, as modified by the rule.

TXU believes that the proposed alternative will satisfy these criteria. The rule would also require that when the volume cannot be effectively examined in all four directions, the examination must be augmented by examination from the nozzle bore using personnel and procedures qualified in accordance with Supplements 4 and 6. The proposed alternative is to continue using the prescriptive criteria from their ISI Code of record for examinations conducted from the bore because there is no PDI qualified procedure for bore examinations of nozzle-to-vessel welds. This methodology is comparable or better than the prescriptive UT, and approaches the methodology for Supplement 7 examinations that will be required after November 22, 2002.

Recently, the NRC granted similar reliefs submitted by Salem Generating Station, Unit 1, Florida Power and Light St. Lucie Plant, Unit 2 and San Onofre Generating Station Units 2 and 3 (Reference 1, 2, and 4).

**VII. Implementation Schedule:**

This relief is requested for the Comanche Peak Steam Electric Station Unit 2, third period of the first 10-year interval vessel examination.

**VIII. REFERENCES**

- 1) Letter from J. Clifford (NRC) to H. W. Keiser (PSEG Nuclear) dated April 26, 2001; Subject; Salem Nuclear Generating Station, Unit No. 1 – Relief from ASME Code Requirements Related to the Inservice Inspection Program, Second 10-Year Interval, Relief Request RR-B8 (TAC No. MB1228)
- 2) Letter from Sheri R. Peterson (NRC) to T. F. Plunkett (FP&L) dated October 4, 1999; Subject; Relief from ASME Code Requirements Related to the Inservice Inspection Program, Second 10-Year Interval for St. Lucie Plant Unit 2 (TAC No. MA5311)
- 3) Committee Correspondence from W. E. Norris (NRC) to K.B. Thomas (Subgroup Water Cooled Systems) dated October 23, 2000; Subject: Proposed Revision to Code Case N-613, "Ultrasonic Examination of Full Penetration Nozzles, Examination Category B-D, Item No's. B3.10 and B3.90, Reactor Vessel-to-Nozzle Welds, Fig. IWB-2500-7 (a), (b), and (c), Section XI, Division 1"

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-4 Rev. 1(cont.)**

- 4) Letter from A. Edward Scherer (SCE) to NRC dated October 22, 2001 requesting reliefs for SONGS 2 & 3

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-5 Rev. 1  
INVOKE CODE CASE N-648**

**I. System/Component for Which Relief is Requested:**

Eight Class I Reactor Pressure Vessel (RPV) Nozzle-to-Shell welds. ASME Section XI, Class 1, Examination Category B-D, Item No. B3.100 Nozzle Inside Radius Section in Reactor Pressure Vessels (RPV) welds Examined at Comanche Peak Steam Electric Station Unit 2.

a) RPV Outlet Nozzle-to-Shell Welds

RPV Nozzle-to-Shell Weld (Weld TCX—1-1100A-19IR)  
RPV Nozzle-to-Shell Weld (Weld TCX—1-1100A-22IR)  
RPV Nozzle-to-Shell Weld (Weld TCX—1-1100A-23IR)  
RPV Nozzle-to-Shell Weld (Weld TCX—1-1100A-26IR)

b) RPV Inlet Nozzle-to Shell Welds

RPV Nozzle-to-Shell Weld (Weld TCX—1-1100A-20IR)  
RPV Nozzle-to-Shell Weld (Weld TCX—1-1100A-21IR)  
RPV Nozzle-to-Shell Weld (Weld TCX—1-1100A-24IR)  
RPV Nozzle-to-Shell Weld (Weld TCX—1-1100A-25IR)

**II. Code Requirement:**

ASME Section XI Class 1, ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1986 Edition with no Addenda; Table IWB-2500-1, Examination Category B-D, Full Penetration Welds of Nozzles in Vessels, Code Item B3.100, Figures IWB-2500-7 (a) through (d).

**III. Code Requirement from Which Relief is Requested:**

Pursuant to 10 CFR 50.55a(a)(3)(i), TXU requests to implement an alternative to the Volumetric (Ultrasonic (UT)) requirements of ASME Code Section XI Table IWB-2500-1, Examination Category B-D, Item B3.100. TXU proposes to perform a VT-1, Visual Examination, as Specified in the Code Case N-648 "Alternative Requirements for the Inner Radius Examinations of Class 1 Reactor Vessel Nozzles, Section XI, Division 1."

This relief is requested for the Comanche Peak Steam Electric Station Unit 2, first 10-year interval vessel examination.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-5 Rev. 1  
INVOKE CODE CASE N-648 (cont.)**

**IV. Basis for Relief:**

Comanche Peak Unit 2 is currently required to perform inservice examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, and the 1986 Edition with no Addenda of the ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. According to a NRC memorandum (Reference 1), the NRC staff indicated that an ultrasonic examination could be replaced by VT-1 visual examination for the proposed RPV nozzle inspections on the basis surveillance is maintained and VT-1 visual examination is performed.

The implementation of this relief is also expected to reduce vessel examination time by approximately 20 hours, which translates to significant reduced personnel radiation exposure and cost savings.

**V. Alternate Examinations:**

TXU proposes to perform a remote visual examination of the accessible surface as shown in Figures IWB-2500-7(a) through (d) in lieu of the volumetric examination requirements of ASME Section XI, Table IWB-2500-1, Examination Category B-D, Item No. B3.100, a VT-1 visual examination will be performed as specified in Code Case N-648<sup>1</sup>.

In addition to the Code Case N-648, TXU proposes to perform an enhanced VT-1 (EVT) visual examination with essentially 100-percent coverage in lieu of the UT. The enhanced aspect of the examination is to use 8x magnification video equipment to examine the inner radii. The resolution sensitivity for this remote, in-vessel exam will be established using a 1-mil diameter wire.

**VI. Justification for the Granting of Relief:**

In a NRC memorandum (Reference 1), the NRC staff indicated that an ultrasonic examination could be replaced by VT-1 visual examination for the proposed RPV nozzle inspections on the basis surveillance is maintained and VT-1 visual examination is performed. The proposed alternative examinations (as specified in Code Case N-648) will not have an impact upon the overall plant quality and safety, and the granting of relief should not jeopardize the health and safety of the public.

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<sup>1</sup> Code Case N-648 contains a typographical error. Paragraph IWB-3513-3 is incorrectly referenced for the nozzle acceptance criteria. The correct reference is IWB-3512-1.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-5 Rev. 1  
INVOKE CODE CASE N-648 (cont.)**

Moreover, in NUREG-0619, the NRC staff concluded that UT of the vessel nozzle inner radius section involves complex geometries, long examination metal paths, and inherent UT beam spread, scatter, and attenuation. During the intervening years, improvements in UT technologies were introduced (e.g., computer modeling, tip diffraction, and phased array scanning), which improved the quality of the examination for this component. However, the area remains difficult to examine completely.

TXU believes that even with vessel examinations using improved NDE technology from the outside surface, the complex geometry of the RPV nozzle inner radius sections prevents complete UT coverage. Hence, TXU proposes to perform an enhanced VT-1 (EVT) visual examination with essentially 100-percent coverage in lieu of the UT. The enhanced aspect of the examination is to use 8x magnification video equipment to examine the inner radii. The resolution sensitivity for this remote, in-vessel exam will be established using a 1-mil diameter wire.

The primary degradation mode in RPV nozzles is fatigue, which produces hairline surface indications along the circumference of the nozzle at the inner radius section. Given the 1-mil resolution capability of the EVT, it is highly unlikely that the TXU would not detect such flaws using high magnification cameras that can examine 100 percent of the nozzle inner radius section surface area. TXU believes that the high resolution image from the camera in lieu of UT of the inner nozzle radius that is difficult to perform, provides adequate assurance of structural integrity. TXU will also adhere to the allowable flaw length criteria in Table IWB-3512-1 of the ASME Code, Section XI, 1986 edition, for the disposition of any linear flaws. Therefore, there is reasonable assurance that the proposed alternative will result in an acceptable level of quality and safety.

**VII. Implementation Schedule:**

This relief is requested for the Comanche Peak Steam Electric Station Unit 2, third period of the first 10-year interval vessel examination.

**VIII Reference:**

NRC Internal memorandum from K.R. Wichman (NRC) to W.H. Bateman (NRC) dated May 25, 2000; Subject The Third Meeting with the Industry to discuss the elimination of RPV Inner Radius Inspection (ML003718630)

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-6**

**I. System/Component for Which Relief is Requested:**

Comanche Peak Steam Electric Station Unit 2, Class 1, Sixteen Category B-J Pressure Retaining Piping welds attaching the Reactor Pressure Vessel (RPV) Nozzle to safe end and safe end elbow [here after referred to as the subject welds].

Weld Numbers:

TCX-1-4100-1	TCX-1-4300-1
TCX-1-4100-2	TCX-1-4300-2
TCX-1-4100-13	TCX-1-4300-13
TCX-1-4100-14	TCX-1-4300-14
TCX-1-4200-1	TCX-1-4400-1
TCX-1-4200-2	TCX-1-4400-2
TCX-1-4200-13	TCX-1-4400-13
TCX-1-4200-14	TCX-1-4400-14

**II. Code Requirement:**

The 1999 Edition of 10 CFR 50.55(a) Codes and Standards was revised by Federal Register Notice 64 FR 51400, September 22, 1999. This revision requires that ASME Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1995 Edition with 1996 Addenda 1 Appendix VIII, Supplement 2 and 3 for austenitic piping welds be implemented by May 22, 2000.

**III. Code Requirement from Which Relief is Requested:**

Pursuant to 10 CFR 50.55a (a)(3)(ii), TXU requests relief from ASME Section XI, Appendix VIII Supplement 2 and 3 for piping welds. TXU is requesting approval to use alternative requirements by performing ultrasonic (UT) examination of the subject welds from the inside surface in accordance with the 1986 Edition, no addenda, of the ASME Code, Section XI, Paragraph IWA-2232 and Appendix III. This relief request would be for the Comanche Peak Steam Electric Station (CPSES) Unit 2 first 10-year interval reactor pressure vessel examination scheduled for the spring of 2002.



**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-6 (cont.)**

**IV. Basis for Relief:**

The subject welds are located inside the primary shield and reactor cavity. There are currently no Appendix VIII qualified personnel or procedures for performing piping welds from the inside surface. In lieu of doing the Appendix VIII, Supplements 2, and 3 UT examinations from the pipe OD, TXU requests relief to continue the past practice of performing the UT examination from the inside diameter (ID) using the 1986 Edition of the ASME Code, Section XI, Paragraph IWA-2232 (b), and Appendix III.

This will be done in conjunction with our 10-year vessel examination, utilizing current industry technology. This will reduce the examination limitations by employing the UT from the ID. The ID examination would reduce the radiation dose and be a cost savings by eliminating the need for the removal of the sand plugs.

To perform the UT examination from the outside surface personnel performing the manual examinations (and supports such as builders of scaffolding, removal of insulation, preparing and cleaning the welds, fire watch, health physics among others) maybe exposed to a dose rate of 2500 to 8000 mRem/Hr.

The estimated number of hours required of these examinations, are as follows:

- Build scaffolding: 84 hours,
- Remove insulation: 32 hours,
- Weld preparation: 48 hours,
- Nondestructive examinations for 24 welds: 96 hours,
- Reinstall insulation: 32 hours and
- Remove scaffolding: 32 hours.

The total man-hours are 324. Using an effective dose rate of 0.25 R/Hr for work directly on the welds and 0.040 R/Hr for work away from the welds, the estimated dose is 27 Person-Rem.

TXU's vendor would be required to perform an additional qualification exercise if they have to implement Appendix VIII examinations on the subject welds during the upcoming refueling outage. It is estimated that the total cost to our inspection vendor could exceed \$150,000.

**V. Alternate Examinations:**

Perform RPV ultrasonic examination of the subject welds from the inside surface in accordance with the 1986 Edition, no Addenda of the ASME Boiler and Pressure Vessel Code Section XI, Paragraph IWA-2232(b), and Appendix III.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-6 (cont.)**

**VI. Justification for the Granting of Relief:**

In 1991, licensees created the Performance Demonstration Initiative (PDI) to implement the performance demonstration requirements of Appendix VIII to Section XI of the Code for UT examination systems. PDI began qualifying personnel and procedures to Appendix VIII, Supplements 2 and 3 in 1994. These qualifications were applicable for UT examinations conducted from the outside surface of the pipe-to-pipe weld. By the time the proposed rule was published for comment in the Federal Register (62 FR 63892) on December 3, 1997, the staff and PDI believed that a sufficient number of UT personnel were qualified to Supplement 2 requirements to satisfy the licensees' needs. The staff established the accelerated implementation schedule for Supplement 2 based on this availability of qualified personnel. The final rule was published in the Federal Register (64 FR 51370) on September 22, 1999, which has since been reflected in the regulations.

Shortly after publishing the final rule, PDI realized that their program could not support Supplement 2 performance demonstrations conducted from the inside surface. For example, the existing test specimens were designed for performance demonstrations performed on the outside surface; the specimens contained flaws which were visible from the inside surface; and, the specimens did not model geometric limitations or scanning conditions which would be encountered during inside surface examinations. To support performance demonstrations conducted from the inside pipe surface, PDI has had to: design, fabricate, and acquire new test specimens; develop the appropriate protocol and test implementation procedures; "fingerprint" the specimens; develop inspection procedures; and train personnel.

PDI has submitted a proposed Code change to Supplement 2 that provides criteria for examinations that are to be performed from the inside diameter of piping. PDI projected that they will be able to support performance demonstrations from the pipe inside surface by November 22, 2002.

TXU has determined that Supplement 2 examinations performed on the outside surface of the safe-end-to-pipe welds would not satisfy Code coverage requirements. Examinations from the outside surface would also require that the sand plugs be removed from the floor of the refueling cavity, and would result in additional costs and occupational radiation dose to plant workers as opposed to performing the examinations from the inside surface (see discussion in section V, Basis for Relief, above).

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-6 (cont.)**

In addition, in order to satisfy the required accelerated implementation of Supplement 2 for inspection from the inside surface, TXU would be required to fabricate additional qualification specimens that are not currently available, which would result in a significant burden in order to perform the necessary qualifications to implement Appendix VIII examinations on subject welds during this outage. TXU proposes to perform RPV UT examination of the safe-end to pipe welds from the inside surface in accordance with the 1986 Edition, of the ASME Code, Section XI, Paragraph IWA-2232 (b), and Appendix III. Appendix III requires a minimum UT examination volume of the inner 1/3 of the weld area (1/3t), and will provide reasonable assurance of the structural integrity of these welds. Thus an acceptable level of quality and safety will have been achieved and allowing the proposed alternative examination in lieu of the Code requirement will not endanger public health and safety.

TXU believes that requiring CPSES Unit 2 to conduct UT examination from the outside surface of the pipe in accordance with the qualification requirements of Supplement 2 would result in a hardship without a compensating increase in the level of safety.

The NRC has granted similar relief to Salem Generating Station, Unit 1 (Reference 1).

**VII. Implementation Schedule:**

This relief is requested for the Comanche Peak Steam Electric Station Unit 2, third period of the first 10-year interval vessel examination. The third period ends August 2003, however, the relief is being requested for the upcoming refueling outage in March 2002.

**VIII. Reference:**

- 1) Letter from J. Clifford (NRC) to H. W. Keiser (PSEG Nuclear) dated April 26, 2001; Subject: Salem Nuclear Generating Station, Unit No.1-Relief from ASME Code Requirements Related to the Inservice Inspection Program, Second 10-Year Interval, Relief Request RR-B12 (TAC No. MB1236)

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-7**

**I. System/Component for Which Relief is Requested:**

ASME Category B-A Pressure Retaining Welds In Reactor Pressure Vessel (RPV), Item No. B1.30 shell-to-flange weld

**II. Code Requirement:**

ASME Section XI, Rules for Inservice Inspection of Nuclear Power plant Components 1986 Edition, No addenda, Subsection IWA-2232, requires UT examination of the RPV-to-flange weld to be in accordance with ASME Code, Section V, Article 4.

In addition, the NRC has issued Regulatory Guide (RG) 1.150, Revision 1, "Ultrasonic Testing Of Reactor Vessel Welds During Preservice and Inservice Examinations", serves as regulatory guidance for the UT examination of RPV welds.

**III. Code Requirement from Which Relief is Requested:**

ASME Code Examination Requirement for which Relief is Requested ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1986 Edition, No Addenda, Subsection IWA-2232, requires UT examination of the RPV-to-flange weld to be in accordance with ASME Code, Section V, Article 4. In addition, Regulatory Guide (RG) 1.150, Revision 1, "Ultrasonic Testing Of Reactor Vessel Welds During Preservice and Inservice Examinations", serves as regulatory guidance for the UT examination of RPV welds.

Relief is requested Comanche Peak Steam Electric Station (CPSES) Unit No. 2, for the first 10-year interval ISI scheduled for the March 2002 refueling outage.

**IV. Basis for Relief:**

CPSES Unit 2 is required to perform inservice examination of the RPV flange weld in accordance with the requirements of ASME Section V Article 4 and the subsequent guideline requirements of Regulatory Guide 1.150 Rev 1.

Federal Register Notice 64 FR 51370 through 51400, dated September 22, 1999, revised the 1999 Edition of 10 CFR 50.55(a) Codes and Standards. This revision requires that ASME Section XI, Appendix VIII, Supplements 4, Qualification Requirements For The Clad/Base Metal Interface of Reactor Vessel, and Supplement 6, Qualification Requirements For Reactor Vessel Welds Other Than Clad/Base Metal Interface, be implemented for most of the RPV welds by Nov 22, 2000. The RPV vessel-to-flange weld is the only RPV circumferential weld not included in Appendix VIII.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-7 (cont.)**

This relief is requested to allow the use of a PDI qualified procedure to complete the UT examination of the RPV vessel-to-flange weld from the vessel side of the weld in accordance with ASME Section XI, Div. 1, 1995 Edition, 1996 Addenda, Appendix VIII Supplement 4 and 6 as amended by the Federal Register Notice 64 FR 51370 through 51400, dated September 22, 1999 in lieu of ASME Section V Article 4.

During the upcoming ten (10) year RPV weld examinations, we will be employing personnel, procedures and equipment, demonstrated and qualified by a Performance Demonstration Initiative (PDI) and in accordance with ASME Section XI, Div. 1, 1995 Edition, 1996 Addenda, Appendix VIII Supplements 4 and 6 as amended by the Federal Register Notice 64 FR 51370 through 51400, dated September 22, 1999 for the adjacent welds.

The remote examinations will be performed using the Westinghouse SUPREEM Robot and the Paragon UT data acquisition system in accordance with a PDI qualified procedure. The Westinghouse procedure PDI-ISI-254, "Remote Inservice Examination of Reactor Vessel Shell Welds", in accordance with ASME Section XI, Appendix VIII, Supplements 4 and 6, was demonstrated at the PDI qualification session in 2001 (Performance Demonstration Qualification Sheet (PDQS) No. 407). The procedure complies with ASME Section XI, Appendix VIII, 1995 edition, 1996 Addenda as modified by the final rule.

Appendix VIII was developed to ensure the effectiveness of UT examinations within the nuclear industry by means of a rigorous, item specific performance demonstration. The performance demonstration was conducted on a RPV mockup containing flaws of various sizes and locations. The demonstration established the capability of equipment, procedures, and personnel to find flaws that could be detrimental to the integrity of the RPV.

Although Appendix VIII is not a requirement for this weld, the qualification process to Appendix VIII criteria demonstrates that the examination and evaluation techniques are equal or surpass the requirements of paragraph IWA-2232, "Ultrasonic Examination" of Section XI of the ASME Code and the guidance in RG 1.150.

A comparison between the ASME Section V Article 4 based UT methods and the procedures developed to satisfy the PDI/Appendix VIII can be best described as a comparison between a compliance-based procedure (ASME Section V Article 4) and a results-based procedure (PDI/Appendix VIII), see attached Table 1. ASME Section V procedures use an amplitude-based technique and a known reflector. The proposed alternate UT method was established independently from the acceptance standards for flaw size found in ASME Section XI.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-7 (cont.)**

The PDI qualified sizing method is considered more accurate than the method used in ASME Section V Article 4. The proposed alternate UT examination technique provides an acceptable level of quality and examination repeatability as compared to the Article 4 requirements

The PDI Program's PDQS No. 407 attests that Westinghouse procedure PDI-ISI-254 is in compliance with the detection and sizing tolerance requirements of Appendix VIII. The PDI qualification method is based on [a] group of samples, which validate the acceptable flaw sizes in ASME Section XI. The sensitivity to detect these flaws is considered to be equal to or greater than the sensitivity obtained through ASME Section V Article 4 because the Westinghouse procedure PDI-ISI-254 procedure relies on a smaller scan index and a higher scan sensitivity for the detection of the UT signals.

The examination and sizing procedure use echo-dynamic motion and tip diffraction characteristics of the flaw instead of the amplitude characteristics required by ASME Section V Article 4. The search units interrogate the same examination volume as depicted by ASME Section XI, Figure IWB 2500-4, Shell-to-Flange Weld Joint.

The use of procedures for satisfying the requirements of ASME Section V Article 4 for the UT examination of the RPV to flange weld from the vessel shell has not received the same qualifications as PDI qualified procedure.

The use of Appendix VIII Supplements 4 and 6 for the completion of the RPV vessel-to-flange weld from the shell side (which PDI has qualified) is expected to reduce examination time, which translates to reduce personnel radiation exposure.

Additionally, this relief would allow a smooth transition to the welds adjacent to the RPV circumferential and longitudinal welds (welds B1.11 and B1.12) which do require an examination in accordance with Appendix VIII Supplement 4 and 6. This would eliminate the need to switch to the different calibration; procedure and technique required by ASME Section V Article 4 and the Regulatory Guide 1.150 Rev 1. This would result in a reduction in transition time to the different calibration, procedure, and technique required which translates to reduce personnel radiation exposure and is more cost effective.

**V. Alternate Examinations:**

The remaining automated shell to flange weld examinations shall be performed using a qualified procedure in accordance with ASME Code, Section XI, Div. 1, 1995 Edition, 1996 Addenda, Appendix VIII Supplement 4 and 6 as amended by the Federal Register Notice 64FR 51370 through 51400, dated September 22, 1999.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. A-7 (cont.)**

**VI. Justification for the Granting of Relief:**

The Appendix VIII criteria was developed to ensure the effectiveness of UT examinations within the nuclear industry by means of a rigorous, item specific performance demonstration. The performance demonstration was conducted on RPV mockups containing flaws of various sizes and locations. The demonstration established the capability of equipment, procedures, and personnel to find flaws that could be detrimental to the integrity of the RPV. The performance demonstration showed that the proposed UT technique is equal to or surpasses the requirements of the Code and the recommendations of RG 1.150. Therefore, there is reasonable assurance that the proposed alternative provides an acceptable level of quality and safety.

The NRC has granted similar relief to Salem Generating Station, Unit 1 (Reference 1).

**VII. Implementation Schedule:**

This relief is requested for the Comanche Peak Steam Electric Station Unit 2, third period of the first 10-year interval vessel examination.

**VIII. Reference:**

- 1) Letter from J. Clifford (NRC) to H. W. Keiser (PSEG Nuclear) dated May 3, 2001; Subject: Salem Nuclear Generating Station, Unit No.1-Relief from ASME Code Requirements Related to the Inservice Inspection Program, Second 10-Year Interval, Relief Request RR-B11 (TAC No. MB1236)

**Table 1 to TXX-02004**  
**Page 1 of 3**  
**TXU GENERATION COMPANY LP**  
**COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2**  
**ISI RELIEF REQUEST A-7**  
**TABLE 1**

**Comparison Of Reactor Pressure Vessel Shell Examination Techniques**

<b>Description (Code Reference)</b>	<b>ASME Section V, Article 4, 1986 ASME Section XI, 1986 NRC Regulatory Guide 1.150, Revision 1</b>	<b>Westinghouse Examination Procedure PDI-ISI-254</b>
Examination Angle	Section V, Article 4, T-441 requires the volume of weld and adjacent base material to be scanned by straight and angle beam techniques. Two angle beams, having nominal angles of 45 and 60 degrees with respect to a perpendicular to the examination surface, shall generally be used. Other pairs of angle beams are permitted provided the measured difference between the angles is at least 10 degrees.	Examinations are conducted with three transducer types applied four directionally. Each transducer type has responsibility for interrogation of a specific depth range. The base material directly underneath the cladding to a depth of 2 inches is examined by the 45 degree dual element transducer at 4 MHz. From 2 inches deep to a depth of 60% of the component thickness, the qualified transducer is the 45 degree L wave, single element at 4 MHz. For examination of vessel shell material from 60% thickness to the OD surface, a 45 degree single element transducer at 2 MHz is used.  These examination angles/ transducer types were successfully qualified under PDI protocol using the PDI program test blocks.
Instrument Calibrations	Section V, Article 4, T-431 requires that instrument screen height and amplitude linearity be evaluated at least every three months.  Section XI, IWA-2232 requires that these screen height and linearity checks be performed at the beginning and end of the weld examination performed on a vessel during one outage.	Instrument screen height and amplitude linearity are checked prior to and following completion of the examinations of the Comanche Peak Steam Electric Station Unit 2 reactor vessel.
System Calibrations	Section V, Article 4, T-432 requires that the original system calibration be performed on the Code basic calibration block.  T-432 allows the use of different types of reference blocks and electronic simulators to perform system calibration verifications.	Calibrations are established on a clad calibration block made from reactor vessel material. The block has side drilled hole reflectors at depths throughout the examination volume which are used for range adjustment and calibration sensitivity.



**Table 1 to TXX-02004**  
**Page 2 of 3**  
**TXU GENERATION COMPANY LP**  
**COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2**  
**ISI RELIEF REQUEST A-7**  
**TABLE 1**

**Comparison Of Reactor Pressure Vessel Shell Examination Techniques**

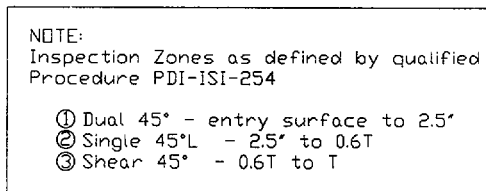
Description (Code Reference)	ASME Section V, Article 4, 1986 ASME Section XI, 1986 NRC Regulatory Guide 1.150, Revision 1	Westinghouse Examination Procedure PDI-ISI-254
Scanning Sensitivity	Section V, Article 4, T-425 permits scanning to be performed at the reference level when electronic distance-amplitude correction (DAC) is used with automated recording.	Scanning is performed at the reference level.
Recording Level	Section V, Article 4, T-441 requires recording and evaluation of reflectors that produce a response equal to or greater than 50% DAC.  Regulatory Guide 1.150 requires recording and evaluation at 20% DAC for the inner 25% of material thickness	Per PDI-ISI-254, any indication suspicious of being a flaw, regardless of amplitude, shall be measured for through-wall and length and assessed in accordance with the acceptance criteria set forth in Section XI, IWB-3000. The procedure sensitivity level compares to an ASME Code level of 5-10% DAC.
Scan Index and Pulse Repetition Rate	Section V, Article 4, T-425 requires each pass of the search unit overlap a minimum of 10% of the transducer piezoelectric element dimension perpendicular to the direction of the scan.  Section XI, IWA-2232 requires each pass of the search unit overlap at least 50% of the transducer piezoelectric element dimension perpendicular to the direction of the scan.  NRC Regulatory Guide 1.150 requires a 25% maximum overlap for detection and 0.25-inch maximum increments for sizing.	A scan index of 0.50" is used for flaw detection and measurement. This index size was satisfactorily demonstrated in the Westinghouse Appendix VIII procedure demonstration.


**Table 1 to TXX-02004**  
**Page 3 of 3**  
**TXU GENERATION COMPANY LP**  
**COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2**  
**ISI RELIEF REQUEST A-7**  
**TABLE 1**

**Comparison Of Reactor Pressure Vessel Shell Examination Techniques**

<p>Flaw Sizing and Evaluation</p>	<p>Section V, article 4, T-441 requires amplitude based sizing at 50% DAC.  Section V, Article 4, T-451 permits evaluation to alternative standards.</p>	<p>The through-wall size of flaws is determined by the recognition and measurement of diffracted signals from the upper and lower extremes of the flaw. The length is determined by adding the number of scan sweeps exhibiting similar features. This measurement technique was successfully demonstrated in accordance with the rules of Section XI, Appendix VIII, Supplements 4 and 6 as modified by the Final Rule.</p>
<p>Procedure qualification and data analyst</p>	<p>N/A</p>	<p>The remote examinations will be performed using the Westinghouse SUPREEM Robot and the Paragon UT data acquisition system in accordance with a PDI qualified procedure. The Westinghouse procedure PDI-ISI-254, "Remote Inservice Examination of Reactor Vessel Shell Welds", in accordance with ASME Section XI, Appendix VIII, Supplements 4 and 6, was demonstrated at the PDI qualification session in 2001 (Performance Demonstration Qualification Sheet (PDQS) No. 407). The procedure complies with ASME Section XI, Appendix VIII, 1995 edition, 1996 Addenda as modified by the final rule.</p> <p>According to procedure, the person performing these tasks must possess individual PDI certification attachments indicating qualification to requirements of Appendix VIII, Supplements 4 and 6 for detection, length, and depth sizing. Examiners are allowed to work only within the scope of their qualifications.</p>

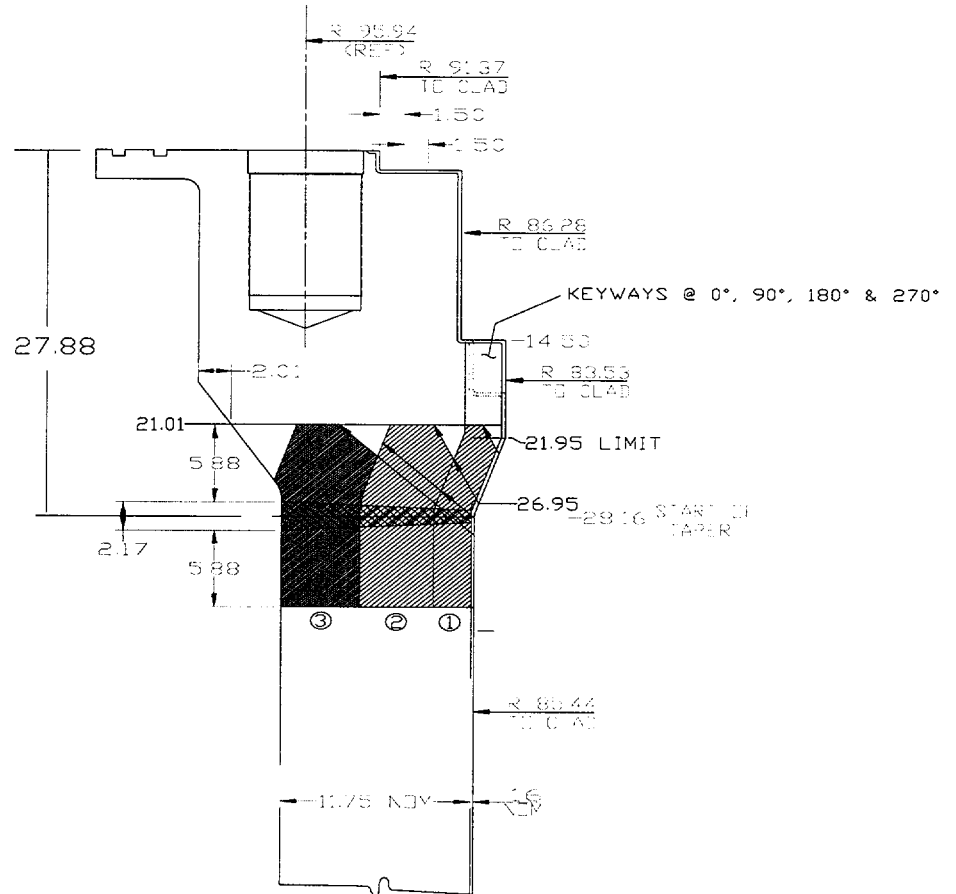
**Figure 1**  
**Downward facing scans**



 Area Examined


**Figures to TXX-02004**  
**Page 2 of 3**  
**TXU GENERATION COMPANY LP**  
**COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2**  
**ISI RELIEF REQUEST A-7**  
**TABLE 1**

**Figure 2**  
**Upward Facing Scans**



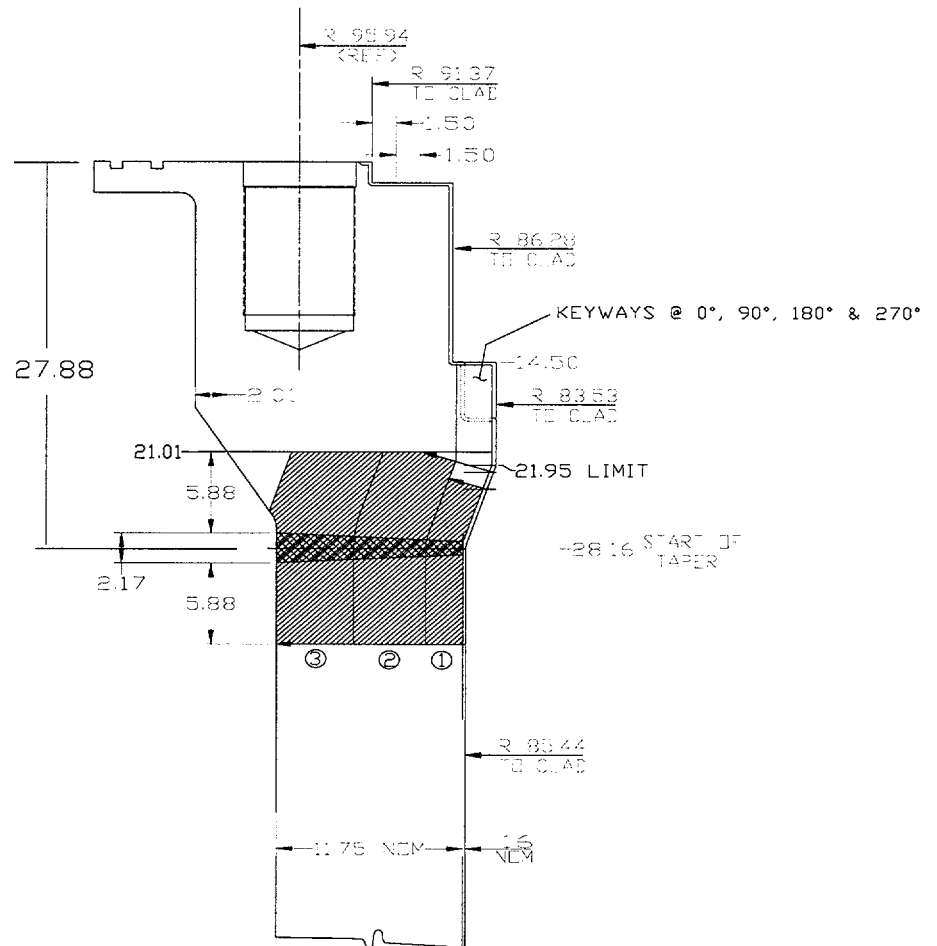
NOTE:  
 Inspection Zones as defined by qualified  
 Procedure PDI-ISI-254

- ① Dual 45° - entry surface to 2.5"
- ② Single 45°L - 2.5" to 0.6T
- ③ Shear 45° - 0.6T to T

 Area Examined


**Figures to TXX-02004**  
**Page 3 of 3**  
**TXU GENERATION COMPANY LP**  
**COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2**  
**ISI RELIEF REQUEST A-7**  
**TABLE 1**

**Figure 3**  
**CW/CCW Scans**



NOTE:  
 Inspection Zones as defined by qualified  
 Procedure PDI-ISI-254

- ① Dual 45° - entry surface to 2.5"
- ② Single 45°L - 2.5" to 0.6T
- ③ Shear 45° - 0.6T to T

 Area Examined

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN YEAR INTERVAL ISI RELIEF REQUEST A-8**

**I. System/Component for Which Relief is Requested:**

Comanche Peak Steam Electric Station (CPSES) Unit 2, Class 1, Sixteen Category B-J and B-F Pressure Retaining Piping welds attaching the Reactor Pressure Vessel (RPV) Nozzle to safe end and safe end elbow [here after referred to as the subject welds].

Weld Numbers:

TCX-1-4100-1	TCX-1-4300-1
TCX-1-4100-2	TCX-1-4300-2
TCX-1-4100-13	TCX-1-4300-13
TCX-1-4100-14	TCX-1-4300-14
TCX-1-4200-1	TCX-1-4400-1
TCX-1-4200-2	TCX-1-4400-2
TCX-1-4200-13	TCX-1-4400-13
TCX-1-4200-14	TCX-1-4400-14

**II. Code Requirement:**

The 1999 Edition of 10 CFR 50.55(a) Codes and Standards was revised by Federal Register Notice 64 FR 51400, September 22, 1999. This revision requires that ASME Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1995 Edition with 1996 Addenda Appendix VIII, Supplement 2 and 3 for austenitic piping welds be implemented by May 22, 2000.

**III. Code Requirement from Which Relief is Requested:**

Pursuant to 10 CFR 50.55a (a)(3)(ii), TXU requests relief from ASME Section XI, Appendix VIII Supplement 2 and 3 for piping welds. TXU is requesting approval to use alternative requirements by performing ultrasonic (UT) examination of the subject welds from the inside surface in accordance with the 1986 Edition, no addenda, of the ASME Code, Section XI, Paragraph IWA-2232 and Appendix III.

Relief is requested from the ASME Section XI Code, Table IWB-2500-1, Examination Category B-F, Item No. B5.10 (nozzle-to-safe end) and Examination Category B-J, Item No. B9.11 (safe end-to-piping) requirements to perform a surface examination on the subject welds and adjacent base material.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN YEAR INTERVAL ISI RELIEF REQUEST A-8 (cont)**

This relief request would be for the Comanche Peak Steam Electric Station (CPSES) Unit 2 first 10-year interval reactor pressure vessel examination scheduled for the spring of 2002.

**IV. Basis for Relief:**

Pursuant to 10CFR50.55a(a)(3)(i), relief is requested from the 1986 Edition, No Addenda, of ASME Section XI requirements for surface examination of the specified nozzle-to-safe end and safe end-to-piping welds. In lieu of performing these surface examinations, CPSES will perform an alternative ultrasonic examination from the nozzle bore that will cover the full through-wall volume of these welds and adjacent base material. The ultrasonic examinations performed in lieu of surface examinations will be performed with automated equipment in conjunction with the ten year ISI examinations of reactor shell and nozzle welds. The ultrasonic examination technique to be applied in lieu of surface examination has previously been qualified and successfully demonstrated to Nuclear Regulatory Commission (NRC) personnel by our RPV inspection vendor (Wesdyne) on an Indian Point Unit 2 welded mockup containing implanted cracks.

To perform the UT examination from the outside surface personnel performing the manual examinations (and supports such as builders of scaffolding, removal of insulation, preparing and cleaning the welds, fire watch, health physics among others) maybe exposed to a dose rate of 2500 to 8000 mRem/Hr.

The estimated number of hours required of these examinations, are as follows:

- Build scaffolding: 84 hours,
- Remove insulation: 32 hours,
- Weld preparation: 48 hours,
- Nondestructive examinations for 24 welds: 96 hours,
- Reinstall insulation: 32 hours and
- Remove scaffolding: 32 hours.

The total man-hours are 324. Using an effective dose rate of 0.25 R/Hr for work directly on the welds and 0.040 R/Hr for work away from the welds, the estimated dose is 27 Person-Rem.

**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN YEAR INTERVAL ISI RELIEF REQUEST A-8 (cont)**

**V. Alternate Examinations:**

A full volume ultrasonic examination will be conducted from the nozzle bore using automated inspection equipment in lieu of performing a surface examination on the outside of the specified welds. The ultrasonic technique to be applied in lieu of the surface examination has been previously qualified by our NDE vendor to reliably detect and size outside surface-connected cracks implanted in a full size mockup of these welds and associated base materials. The Wesdyne procedure and equipment was qualified and successfully demonstrated for Indian Point Unit 2 and NRC personnel at the vendor's facilities. CPSES considers the Wesdyne ultrasonic technique to be applied in lieu of surface examination to be qualified for CPSES because the Indian Point qualification mockup contains identical materials and has a configuration similar to the specified CPSES welds and base materials. Where configuration differences exist, the Indian Point design is considered to be more challenging than CPSES for ultrasonic inspection. Since CPSES considers the Wesdyne ultrasonic technique in lieu of surface examination to have been previously qualified, we are planning no further demonstration of it on CPSES calibration blocks or flawed specimens. However, Wesdyne will optimize their ultrasonic technique and equipment for application on CPSES RPV welds by testing flawed specimens representative of CPSES materials and configurations for the specified welds.

In addition to the alternative ultrasonic inspection described above, the specified welds are subjected to VT-2 visual examination for leakage during system pressure testing in accordance with ASME Section XI requirements each refueling outage which also serves to assure continued structural reliability.

**VI. Justification for the Granting of Relief:**

Requiring that CPSES perform the surface examinations on the outside of the reactor vessel nozzle-to-safe end and safe end-to-pipe welds as required by ASME Section XI, Table IWB-2500-1, Examination Category B-F, Item No. B5.10 and Examination B-J, Item No. B9.11, respectively, would impose a hardship on CPSES due to the restricted access to these welds and the high radiation exposure to NDE and support personnel.



**TXU GENERATION COMPANY LP  
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 2  
FIRST TEN YEAR INTERVAL ISI RELIEF REQUEST A-8 (cont)**

The Code requires volumetric examination of the inner 1/3T of the weld and an outside diameter surface examination of the subject nozzle to safe end and safe end to piping welds. TXU proposes not to perform the Code required surface examination but will perform a full volume ultrasonic examination. This full volume examination will use a qualified procedure which has been demonstrated on a full scale mock-up of its capability to detect surface cracks on the outside diameter when examination conducted from the nozzle bore. Additionally, this procedure has been successfully used at other sites for examination of these welds.

The NRC has granted similar relief requests to Salem Generating Station, Unit 1 (Reference 1) and South Texas Project, Unit 1 and 2 (Reference 2).

**VII. Implementation Schedule:**

This relief is requested for the Comanche Peak Steam Electric Station Unit 2, third period of the first 10-year interval vessel examination. The third period ends August 2003; however, the relief is being requested for the upcoming refueling outage in March 2002.

**IX. Reference:**

- 1) Letter from J. Clifford (NRC) to H. W. Keiser (PSEG Nuclear) dated April 26, 2001; Subject: Salem Nuclear Generating Station, Unit No.1-Relief from ASME Code Requirements Related to the Inservice Inspection Program, Second 10-Year Interval, Relief Request RR-B12 (TAC No. MB1236)
- 2) Letter from John N. Hannon (NRC) to William T. Cottle (STP NOC) dated March 2, 1999; Subject: Inservice Inspection Program (TAC No. MA4245 and MA 4246)