



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

April 3, 2015

Mr. Rafael Flores  
Senior Vice President and  
Chief Nuclear Officer  
Attention: Regulatory Affairs  
Luminant Generation Company LLC  
P.O. Box 1002  
Glen Rose, TX 76043

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNIT 2 – RELIEF REQUESTS  
B-7, B-12, AND B-13 FOR STEAM GENERATOR HEAD-TO-TUBESHEET  
WELDS FOR RELIEF FROM CERTAIN ASME CODE INSPECTION  
REQUIREMENTS FOR THE SECOND 10-YEAR INSERVICE INSPECTION  
INTERVAL (TAC NO. MF4752)

Dear Mr. Flores:

By letter dated August 27, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14253A211), as supplemented by letter dated January 8, 2015 (ADAMS Accession No. ML15022A015), Luminant Generation Company LLC (the licensee) submitted Relief Requests (RRs) B-7, B-12, and B-13 to the U.S. Nuclear Regulatory Commission (NRC) for Comanche Peak Nuclear Power Plant, Unit 2, for the second 10-year inservice inspection interval. In its submittal, the licensee requested relief from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI for Steam Generator Head-to-Tubesheet welds. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.55a(g)(5)(iii), the licensee requested to use alternatives on the basis that complying with the specified requirement is impractical.

The NRC staff has reviewed the request and concludes, as set forth in the enclosed safety evaluation, that the examinations performed to the extent practical provide reasonable assurance of structural integrity of the subject components and that complying with the specified ASME Code, Section XI, requirements, is impractical. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), the NRC staff grants relief for the subject examinations of components described in RRs B-7, B-12, and B-13 for the second 10-year inservice inspection interval, which began on August 3, 2004, and ended on August 2, 2014.

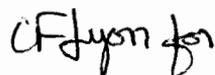
All other ASME Code, Section XI, requirements for which relief has not been specifically requested, remain applicable, including a third-party review by the Authorized Nuclear Inservice Inspector.

R. Flores

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If you have any questions, please contact Balwant K. Singal at 301-415-3016 or via e-mail at [Balwant.Singal@nrc.gov](mailto:Balwant.Singal@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "M. Markley".

Michael T. Markley, Chief  
Plant Licensing Branch IV-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-446

Enclosure:  
Safety Evaluation

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUESTS B-7, B-12, AND B-13 FOR THE  
SECOND 10-YEAR INSERVICE INSPECTION INTERVAL  
LUMINANT GENERATION COMPANY LLC  
COMANCHE PEAK NUCLEAR POWER PLANT, UNIT 2  
DOCKET NO. 50-446

1.0 INTRODUCTION

By letter dated August 27, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14253A211), as supplemented by letter dated January 8, 2015 (ADAMS Accession No. ML15022A015), Luminant Generation Company LLC (the licensee) submitted Relief Requests (RRs) B-7, B-12, and B-13 to the U.S. Nuclear Regulatory Commission (NRC) for Comanche Peak Nuclear Power Plant (CPNPP), Unit 2, for the second 10-year inservice inspection interval. In its submittal, the licensee requested relief from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI for Steam Generator (SG) Head-to-Tubesheet welds. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.55a(g)(5)(iii), the licensee requested to use alternatives on the basis that complying with the specified requirement is impractical.

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code, which was incorporated by reference in 10 CFR 50.55a(b) (retitled paragraph 50.55a(a)(1)(i) by *Federal Register* notice dated November 5, 2014 (79 FR 65776), 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein.

The regulations in 10 CFR 50.55a(g)(5)(iii) state, in part, that licensees may determine that conformance with certain code requirements is impractical and that the licensee shall notify the Commission and submit information in support of the determination. Determination of

Enclosure

impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the code requirements during the inservice inspection interval for which the request is being submitted. Requests for relief made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial 120-month inspection interval or subsequent 120-month inspection interval for which relief is sought.

The regulations in 10 CFR 50.55a(g)(6)(i) state that the Commission will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The licensee has requested relief from ASME Code requirements pursuant to 10 CFR 50.55a(g)(5)(iii). The ASME Code of record for second 10-year interval inservice inspection program is the 1998 Edition through the 2000 Addenda.

### 3.0 TECHNICAL EVALUATION

In its letter dated January 8, 2015, the licensee confirmed that no Nickel Alloy weld metals (182 and 82) were used in the ASME Code, Section XI, Category B-B, Item B2.40 SG Head-to-Tubesheet Welds listed in RRs B-7, B-12, and B-13. The duration of the proposed relief request for CPNPP, Unit 2, is the second 10-year inservice inspection interval which began on August 3, 2004, and ended on August 2, 2014.

#### 3.1 ASME Code Requirement For RRs B-7, B12, and B-13

The ASME Code Section XI, Code Class 1, Table IWB-2500-1, Examination Category B-B, Item B2.40, Figure IWB-2500-6 (Design B) requires a volumetric examination of essentially 100 percent of the required weld volume extending  $1/2t$  (where  $t$  is the thickness of the base metal) into the base metal on both the head side and tubesheet side of the head-to-tubesheet weld. ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1," as an alternative approved for use by the NRC in Regulatory Guide (RG) 1.147, Revision 17, "Inservice Inspection Code Case Acceptability, Section XI, Division 1," August 2014 (ADAMS Accession No. ML13339A689), states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent (i.e., greater than 90 percent examination coverage is obtained).

#### 3.2 Relief Request B-7

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examination of SG 2-02 Head-to-Tubesheet Weld TCX-1-3100-2-1 (Component No. TCX-RCPCSG-02).

### 3.2.1 Licensee's Basis for Relief Request (as stated, in part)

The examination of the subject component weld is limited by the presence of four 24" x 24" Steam Generator support pads and seventeen 2.5" x 2.5" welded pads [see weld profile sketch, pages 3 and 4 of Attachment 1 to the letter dated August 27, 2014]. The examinations were conducted in accordance with procedure TX-ISI-210, "Ultrasonic Examination Procedure for Welds in Ferritic Steel Vessels." Straight beam (0°) and angle beam (45° shear and 60° longitudinal) scans were used to achieve the weld volume obtained.

The licensee further stated:

The design configuration restrictions of the subject component makes 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.

### 3.2.2 Licensee's Proposed Alternative Examination (as stated)

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

### 3.2.3 NRC Staff Evaluation

The ASME Code, Section XI, Table IWB-2500-1, Examination Category B-B, Item B2.40, Figure IWB-2500-6 (Design B) requires a volumetric examination of essentially 100 percent of the required weld volume extending 1/2t into the base metal on both the head side and tubesheet side of the Head-to-Tubesheet Weld TCX-1-3100-2-1. The required volumetric examinations are limited due to the design configuration of the subject welds and by four 24" x 24" SG support pads and 17 2.5" x 2.5" welded pads. In order for the licensee to perform the ASME Code-required examinations, the subject components would have to be redesigned and replaced.

The licensee noted that the examinations were conducted in accordance with the licensee's procedure TX-ISI-210, "Ultrasonic Examination Procedure for Welds in Ferritic Steel Vessels." The examinations were performed with a straight beam (0 degree (°)) and angle beam (45° shear and 60° longitudinal) scans to achieve the weld examination volume of 69 percent. The data sheets (Attachment 1 to the letter dated August 27, 2014) provided by the licensee shows that the 0° and 45° examination angles were both limited to 22 percent not examined, and the 60° examination angle was limited to 31 percent not examined. The licensee examined the

subject weld to the extent practical and obtained an average coverage of 69 percent of the ASME Code-required examination volume of the SG 2-02 Head-to-Tubesheet Weld TCX-1-3100-2-1.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage of the SG 2-02 Head-to-Tubesheet Weld TCX-1-3100-2-1 due to the design configuration of the subject welds and by four 24" x 24" SG support pads and 17 2.5" x 2.5" welded pads near the subject weld. Based on the volumetric coverage obtained of 69 percent for the subject welds, and considering the licensee's performance of UT techniques employed to maximize this coverage, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. In addition, by letter dated January 8, 2015, the licensee confirmed that no Nickel alloy weld metals 182 and 82 were used in the welds that are listed in this relief request. Since low alloy steel welds have better resistance to stress corrosion-cracking (SCC) than Nickel alloy welds, there is no active aging degradation in the welds. Therefore, the proposed request for relief submitted by the licensee for these welds is acceptable.

The licensee is also performing system leakage testing that is performed each refueling outage in accordance with ASME Code, Section XI, Table IWB-2500-1, Examination Category B-P, which requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provides additional assurance of pressure boundary integrity. Therefore, the NRC staff concludes that the results of the ASME Code examinations and the pressure test VT-2 visual examinations provide reasonable assurance of structural integrity of the subject component.

### 3.3 Relief Request B-12

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examination of the SG 2-01 Head-to-Tubesheet Weld TCX-1-3100-1-1 (Component No. TCX-RCPCSG-01).

#### 3.3.1 Licensee's Basis for Relief Request (as stated)

The examination of the subject component weld is limited by the presence of four 24" x 24" Steam Generator support pads and seventeen 2.5" x 2.5" welded pads [see weld profile sketch, page 4 of Attachment 2 to the licensee's letter dated August 27, 2014]. The examinations were conducted in accordance with procedure TX-ISI-210, "Ultrasonic Examination Procedure for Welds in Ferritic Steel Vessels." Straight beam (0°) and angle beam (45° shear and 60° longitudinal) scans were used to achieve the weld volume obtained. As shown on the [examination data sheets, pages 6 through 14 of Attachment 2 to the licensee's letter dated August 27, 2014] the 0° and 45° exam[ination] angles achieved 78% examination coverage, and the 60° exam[ination] angle achieved 69% examination coverage. Taking the worst case limitation this corresponds to coverage of 69% of the required examination volume.

### 3.3.2 Licensee's Proposed Alternative Examination (as stated)

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

### 3.3.3 NRC Staff Evaluation

The ASME Code, Section XI, Table IWB-2500-1, Examination Category B-B, Item B2.40, Figure IWB-2500-6 (Design B) requires a volumetric examination of essentially 100 percent of the required weld volume extending  $1/2t$  into the base metal on both the head side and tubesheet side of the SG 2-01 Head-to-Tubesheet Weld TCX-1-3100-1-1. The required volumetric examinations are limited due to the design configuration of the subject welds and by four 24" x 24" SG support pads and 17 2.5" x 2.5" welded pads. In order for the licensee to perform the ASME Code-required examinations, the subject components would have to be redesigned and replaced.

The licensee noted that the examinations were conducted in accordance with the licensee's procedure TX-ISI-210, "Ultrasonic Examination Procedure for Welds in Ferritic Steel Vessels." The examinations were performed with a straight beam ( $0^\circ$ ) and angle beam ( $45^\circ$  shear and  $60^\circ$  longitudinal) scans to achieve the weld examination volume of 69 percent. The data sheets (Attachment 2 to the letter dated August 27, 2014) provided by the licensee shows that the  $0^\circ$  and  $45^\circ$  examination angles were both limited to 22 percent not examined, and the  $60^\circ$  examination angle was limited to 31 percent not examined. The licensee examined the subject weld to the extent practical and obtained an average coverage of 69 percent of the ASME Code-required examination volume of the SG 2-01 Head-to-Tubesheet Weld TCX-1-3100-1-1.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage of the SG 2-01 Head-to-Tubesheet Weld TCX-1-3100-1-1 due to the design configuration of the subject welds and by four 24" x 24" SG support pads and 17 2.5" x 2.5" welded pads near the subject weld. Based on the volumetric coverage obtained of 69 percent for the subject welds, and considering the licensee's performance of UT techniques employed to maximize this coverage, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. In addition, by letter dated January 8, 2015, the licensee confirmed that no Nickel alloy weld metals 182 and 82 were used in the welds that are listed in this relief request. Since low alloy steel welds have better resistance to SCC than Nickel alloy welds, there is no active aging degradation in the welds. Therefore, the proposed request for relief submitted by the licensee for these welds is acceptable.

The licensee is also performing system leakage testing that is performed each refueling outage in accordance with ASME Code, Section XI, Table IWB-2500-1, Examination Category B-P,

which requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provides additional assurance of pressure boundary integrity. Therefore, the NRC staff concludes that the results of the ASME Code examinations and pressure test VT-2 visual examination provide reasonable assurance of structural integrity of the subject component.

### 3.4 Relief Request No. B-13

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examination of the SG 2-04 Head-to-Tubesheet Weld TCX-1-3100-4-1 (Component No. TCX-RCPCSG-04).

#### 3.4.1 Licensee's Basis for Relief Request (as stated)

The examination of the subject component weld is limited by the presence of four 24" x 24" Steam Generator support pads and nineteen 2.5" x 2.5" welded pads [see weld profile sketch, pages 4 and 5 of Attachment 3 to the licensee's letter dated August 27, 2014]. The examinations were conducted in accordance with procedure TX-ISI-210, "Ultrasonic Examination Procedure for Welds in Ferritic Steel Vessels." Straight beam (0°) and angle beam (45° shear and 60° longitudinal) scans were used to achieve the weld volume obtained. As shown on the [examination data sheets, pages 6 through 14 of Attachment 3 to the licensee's letter dated August 27, 2014] the 0°, 45°, and 60° exam[ination] angles all achieved 77.5% examined. Therefore, this corresponds to a cumulative exam[ination] coverage of 77.5% of the required examination volume.

#### 3.4.2 Licensee's Proposed Alternative Examination (as stated)

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

#### 3.4.3 NRC Staff Evaluation

The ASME Code, Section XI, Table IWB-2500-1, Examination Category B-B, Item B2.40, Figure IWB-2500-6 (Design B) requires a volumetric examination of essentially 100 percent of the required weld volume extending 1/2t into the base metal on both the head side and tubesheet side of the SG 2-04 Head-to-Tubesheet Weld TCX-1-3100-4-1. The required volumetric examinations are limited due to the design configuration of the subject welds and by four 24" x 24" SG support pads and 19 2.5" x 2.5" welded pads. In order for the licensee to perform the ASME Code-required examinations, the subject components would have to be redesigned and replaced.

The licensee noted that the examinations were conducted in accordance with the licensee's procedure TX-ISI-210, "Ultrasonic Examination Procedure for Welds in Ferritic Steel Vessels." The examinations were performed with a straight beam (0°) and angle beam (45° shear and 60° longitudinal) scans to achieve the weld examination volume of 69 percent. The data sheets (Attachment 3 to the letter dated August 27, 2014) provided by the licensee shows that the 0°, 45°, and 60° examination angles all achieved 77.5 percent examined. The licensee examined the subject weld to the extent practical and obtained an average coverage of 77.5 percent of the ASME Code-required examination volume of the SG 2-04 Head-to-Tubesheet Weld TCX-1-3100-4-1.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage of the SG 2-04 Head-to-Tubesheet Weld TCX-1-3100-4-1 due to the design configuration of the subject welds and by four 24" x 24" SG support pads and 19 2.5" x 2.5" welded pads near the subject weld. Based on the volumetric coverage obtained of 77.5 percent for the subject welds, and considering the licensee's performance of UT techniques employed to maximize this coverage, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. In addition, by letter dated January 8, 2015, the licensee confirmed that no Nickel alloy weld metals 182 and 82 were used in the welds that are listed in this relief request. Since low alloy steel welds have better resistance to SCC than Nickel alloy welds, there is no active aging degradation in the welds. Therefore, the proposed request for relief submitted by the licensee for these welds is acceptable.

The licensee is also performing system leakage testing during each refueling outage in accordance with ASME Code, Section XI, Table IWB-2500-1, Examination Category B-P, which requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provides additional assurance of pressure boundary integrity. Therefore, the NRC staff concludes that the results of the ASME Code examinations and the pressure test VT-2 visual examinations provide reasonable assurance of structural integrity of the subject component.

#### 4.0 CONCLUSION

As set forth above, the NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest, given the burden that could be faced by the licensee if the requirements were imposed on the facility. Furthermore, the staff concluded that the examinations performed to the extent practical provide reasonable assurance of structural integrity of the subject components. In addition, the licensee confirmed that no Nickel alloy weld metals 182 and 82 were used in the welds that are listed in the relief request. Since low alloy steel welds have better resistance to SCC than Nickel alloy welds, there is no active aging degradation in the welds. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i). Therefore, the NRC staff grants relief for the subject examinations of the components contained in RRs B-7, B-12, and B-13 for CPNPP, Unit 2, second 10-year inservice inspection Interval, which began on August 3, 2004, and ended on August 2, 2014.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Thomas McLellan, NRR/DE/EVIB

Date: April 3, 2015

R. Flores

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If you have any questions, please contact Balwant K. Singal at 301-415-3016 or via e-mail at [Balwant.Singal@nrc.gov](mailto:Balwant.Singal@nrc.gov).

Sincerely,

*/RA/*

Michael T. Markley, Chief  
Plant Licensing Branch IV-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-446

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**ADAMS Accession No. ML15090A104**

**\* Memo dated March 11, 2015**

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