April 14, 2003

Mr. C. Lance Terry
Senior Vice President &
Principal Nuclear Officer
TXU Energy
Attn: Regulatory Affairs Department
P.O. Box 1002
Glen Rose, TX 76043

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION, UNITS 1 AND 2 - RE: RELIEF FROM THE REQUIREMENTS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE, SECTION III, CONCERNING PRESSURIZER UPPER LEVEL INSTRUMENTATION AND OTHER LINES AND ASSOCIATED COMPONENTS (TAC NOS. MB6427 AND MB6428)

Dear Mr. Terry:

By letter to the U. S. Nuclear Regulatory Commission (NRC), dated September 30, 2002, TXU Generation Company, LP (the licensee) requested relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), 1974 Edition with Addenda through Summer 1974, Section III, for Class 1 components at Comanche Peak Steam Electric Station (CPSES), Units 1 and 2. Specifically, the licensee's requests for relief (A-2 for CPSES, Unit 1, and A-9 for CPSES, Unit 2) apply to the classification of valves, instrument lines, and other piping connected to the pressurizer above the normal water level in the Reactor Coolant System, the Chemical and Volume Control System, and the Process Sampling System. The proposed alternative would allow these lines, piping, and valves to remain as designed and constructed.

Based on its evaluation, the NRC staff concludes that the licensee's alternative to the ASME Code classification requirements is authorized pursuant to Section 50.55a(a)(3)(ii) of Title 10 of the *Code of Federal Regulations* on the basis that compliance with the Code requirements would result in hardship without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance that these instrument and other lines and components will perform their intended safety function. This authorization is valid for the life of the plant.

The NRC staff's evaluation and conclusions are contained in the enclosed safety evaluation. Should you have any questions regarding this safety evaluation, please contact Mr. David H. Jaffe, at (301) 415-1439.

Sincerely,

/RA/

Robert A. Gramm, Chief, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-445 and 50-446

Enclosure: Safety Evaluation

cc w/encl: See next page

The NRC staff's evaluation and conclusions are contained in the enclosed safety evaluation. Should you have any questions regarding this safety evaluation, please contact Mr. David H. Jaffe, at (301) 415-1439.

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Docket Nos. 50-445 and 50-446

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PRESSURIZER UPPER LEVEL INSTRUMENTATION

AND OTHER LINES AND ASSOCIATED COMPONENTS

REQUEST FOR RELIEF

TXU GENERATION COMPANY, LP

COMANCHE PEAK STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-445 AND 50-446

1.0 INTRODUCTION

By letter to the U. S. Nuclear Regulatory Commission (the Commission, staff, or NRC), dated September 30, 2002, TXU Generation Company LP, the licensee for Comanche Peak Steam Electric Station (CPSES), Units 1 and 2, submitted a request for relief from requirements for Class 1 components in Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) pertaining to the pressurizer upper level instrument and other lines and associated components for both Units 1 and 2. These lines were designed and constructed to meet the Code requirements for Class 2 components. The regulations in 10 CFR 50.55a(c) require that reactor coolant pressure boundary components meet the ASME Code, Section III, requirements for Class 1 components. (The 1974 Edition of the ASME Code, Section III, with Addenda through Summer 1974, is applicable to the affected lines at CPSES, Units 1 and 2.) Specifically, the licensee's requests for relief (A-2 for CPSES, Unit 1 and A-9 for CPSES, Unit 2) apply to the classification of valves, instrument lines, and other piping connected to the pressurizer above the normal water level in the Reactor Coolant System (RCS), the Chemical and Volume Control System (CVCS), and the Process Sampling System (PSS). The proposed alternative would allow these lines, piping, and valves to remain as designed and constructed. These lines and associated components are shown on the licensee's flow diagrams M1-0251 and M2-0251 (Final Safety Analysis Report (FSAR) Figure 5.1-1 for the RCS), on M1-0253-A and M2-0255 (FSAR Figure 9.3-10 for the CVCS) and on M1-0228 and M2-0228 (FSAR Figure 9.3-4 for the PSS).

2.0 BACKGROUND

The regulations in 10 CFR 50.55a require that components which are part of the reactor coolant pressure boundary meet the requirements for Class 1 components in Section III of the ASME Code, except where alternatives have been authorized by the Commission pursuant to paragraphs (a)(3)(i) or (a)(3)(ii) of 10 CFR 50.55a. In proposing alternatives, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety, or (2) compliance would result in hardship or unusual difficulty without a compensating

increase in the level of quality and safety. Section 50.55a authorizes the Commission to approve alternatives upon making the necessary findings.

In addition, 10 CFR 50.55a(c) states, in part:

> (1) Components which are part of the reactor coolant pressure boundary must meet the requirements for Class 1 components in Section III of the ASME Boiler and Pressure Vessel Code, except as provided in paragraphs (c)(2), (c)(3), and (c)(4) of this section.
>
> (2) Components which are connected to the reactor coolant system and are part of the reactor coolant pressure boundary as defined in § 50.2 need not meet the requirements of paragraph (c)(1) of this section, Provided:
>
> (i) In the event of postulated failure of the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system...

In a letter dated May 2, 2000, Westinghouse Electric Company (Westinghouse) issued its Nuclear Safety Advisory Letter "NSAL-00-006: Pressurizer Upper Level Instrument Safety Classification." This letter identified an issue where a break in the instrument lines for the upper (steam side) pressurizer level instruments may result in a rapid depressurization of the RCS sufficient to cause an emergency core cooling system (ECCS) actuation. Westinghouse indicated in its letter that these instrument lines must, therefore, be ASME Code Class 1. The licensee determined that the sequence of events involved for a break in these lines would result in the pressurizer level increasing to greater than allowed by the plant Technical Specifications Limiting Condition for Operation 3.4.9, and would result in a small break loss-of-coolant accident (SBLOCA). Because such a break would not result in a shutdown and cooldown "in an orderly manner," the licensee determined that the existing affected ASME Code Class 2 instruments and other lines and associated components connected to the pressurizer steam space should be classified as ASME Code Class 1, in accordance with 10 CFR 50.55a(c). The licensee has determined that these existing affected Class 2 lines are not in compliance with 10 CFR 50.55a(c). Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee proposes to allow these lines and valves to remain as designed and constructed.

3.0 EVALUATION OF RELIEF REQUEST

Request for Relief No. A-2 for Unit 1 and A-9 for Unit 2

The Items for which Relief is Requested:

The affected lines for both units include: (1) over 500 feet of small bore piping and more than 130 piping supports, (2) over 900 feet of instrument tubing and more than 300 tubing supports, and (3) more than 70 valves. Instrument lines include the piping from the pressurizer upper tap to the root valve and tubing downstream to the instrument boundary valves. This issue is limited to the instrument piping, tubing, and valves because, in accordance with ASME Code, Section III, Article NA-1130(c), the Code does not apply to the instruments themselves. Other piping lines include the pressurizer safety valve loop seal drain lines up to the boundary valve.

Piping lines also include the piping from a tap in the pressurizer relief line to the boundary valves in the pressurizer high point vent line and to a branch from this line to the PSS. This branch line extends to and includes the containment isolation valves for the pressurizer steam space sample line. Piping lines also include the drains on the auxiliary spray line and the bypass lines around the pressurizer spray valves.

The affected lines and associated components discussed above are described in the attached table. Relief is requested only for the listed lines and valves, but not for instruments. (Note that various instrument identification numbers contain the letters “PT” and “LT”, and the boundary valves associated with these instruments have the same identification numbers as their associated instruments.)

Code Requirement:

The regulations in 10 CFR 50.55a(c) require that components which are part of the reactor coolant pressure boundary must meet the requirements for Class 1 components in Section III of the ASME Code.

Proposed Alternative:

The licensee states that the piping and valves described in the attached table were designed and constructed using the rules of the ASME Code, Section III, Subsection NC (Class 2). The instrumentation tubing and flexhoses connected to this piping were also designed using the Class 2 rules of the ASME Code, Section III, and were purchased to ASME Code Class 2 requirements, but were not installed with third party inspection, code stamping, and code data reports. The supports for the tubing are designated as Seismic Category I, and are not ASME Code, Section III, Subsection NF Code supports. The licensee’s design of the tubing supports considers gravity, seismic, and thermal loading combinations and meets the design requirements of the American Institute for Steel Construction (AISC). Any welding of the tubing supports meets American Welding Society specifications consistent with that performed on other safety-related, but non-ASME Code Class supports (e.g., cable tray and conduit supports).

The proposed alternative would allow these lines, piping, and valves to remain as designed and constructed. These lines and associated components are shown on the licensee’s flow diagrams M1-0251 and M2-0251 (FSAR Figure 5.1-1 for the RCS), on M1-0253-A and M2-0255 (FSAR Figure 9.3-10 for the CVCS) and on M1-0228 and M2-0228 (FSAR Figure 9.3-4 for the PSS).

Basis for Relief:

The licensee states that upgrading the affected piping, tubing, and valves to ASME Code, Section III, Subsection NB (Class 1), would be a hardship or unusual difficulty without a compensating increase in the level of quality and safety because the scope of the change would require substantial time and resources to upgrade both documentation and tubing supports, and that upgrading documentation for tubing and piping would provide no safety benefit. The licensee’s estimated time for the potential removal and re-installation of support materials for over 300 tubing supports would be approximately 15,000 man-hours. This time estimate does not include engineering man-hours nor does it consider the additional radiation

exposure that would be experienced during this process. The licensee's estimate of engineering man-hours for upgrading documentation and supports is approximately 4,000 man-hours. The licensee stated that the cost of upgrading components would also include material costs associated with replacing some existing American Society for Testing Materials (ASTM) tubing support materials with ASME materials. Further, the licensee states that, because of the location of the supports, the work could only be done during outages.

Evaluation:

In addition to the licensee's submittal dated September 30, 2002, the NRC staff reviewed information relevant to the design and construction of the affected lines in the CPSES FSAR and in a letter dated December 21, 1992, containing ASME Code "Form N-5 Data Report for Field Installation of Nuclear Power Plant Components and Appurtenances" packages. In the December 21, 1992, N-5 data packages, the NRC staff found that the applicable Code edition and addenda for the affected lines is the 1974 Edition of the ASME Code, Section III through the Summer 1974 Addenda. Unlike later versions of the Code, this edition and addenda do not have a specific provision allowing Class 2 rules to be used for Class 1 design for piping less than or equal to 1 inch in size. This provision was added in the Summer 1975 Addendum to the 1974 Edition in subparagraph NB-3630(d). This provision would not be directly applicable to components designed and constructed to requirements through the Summer 1974 Addenda. However, the fact that the provision was incorporated into the later addendum indicates that the Class 2 installation would meet Class 1 requirements, if the design and construction had simply taken place at a later point in time and the later addendum referenced. In addition, the NRC incorporated by reference the Summer 1975 Addenda (43 FR 17337) in 10 CFR 50.55a(b) without any modifications or limitation in the use of this particular provision. Therefore, the NRC staff finds that the affected Class 2 piping is acceptable, as installed. Further, hardship or unusual difficulty would exist in upgrading documentation for the Class 2 piping to meet Class 1 requirements, with no increase in the level of quality or safety of the installed piping. This piping includes the piping and valves described in the attached Table, but excludes tubing and flexhoses, which are discussed below.

While the affected tubing and flexhoses are constructed of ASME materials, there is a potential difference between ASME Class 1 requirements and the currently installed tubing and flexhoses regarding the quality of fabrication and installation, since there are no third party inspections, code stamping, and code data reports. This would represent a significant hardship for the licensee to either perform necessary testing and inspection of the installed tubing and flexhoses, or replace them to fully meet Class 1 requirements.

Regarding the tubing supports, the NRC staff finds that 10 CFR 50.55a(c) only addresses components which compose the reactor coolant pressure boundary, which would not include piping supports or tubing supports. However, as a practical matter, in order to fully comply with the plant licensing basis, there would also be a significant hardship involved in upgrading or replacing supports, since Class 1 piping or tubing would require supports which meet Article NF. There is a potential difference in quality between the installed tubing supports and those which would meet Article NF. The materials for the tubing supports are ASTM materials, which have the same material specifications as ASME materials, but there is a potential difference in the quality of the materials, since ASME materials are required to have either a Certified Materials Test Report or Certification from the Material Manufacturer, in accordance with ASME Code, Section III, Article NA-1220. There is also a potential difference between

Class 1 tubing supports designed to meet ASME Code, Section III, Article NF, and the existing supports designed to meet AISC requirements. The AISC requirements have conservative allowable loading criteria relative to ASME Code, Section III, Article NF; however, there is a potential difference regarding the fabrication and examination of the supports, particularly in welds, which could also possibly affect quality.

The bounding effect that the above differences in fabrication, installation, examination, and material quality would be to increase the number of break failures that the affected lines may possibly experience during the plant life. There have not been any break type failures in these lines after several years of operational service, including several startup and shutdown thermal cycles and normally-occurring operational vibration. However, because there is potentially less quality in these lines and associated components, compared to those constructed to meet ASME Code Class 1 requirements, there may be a reduced margin in some of them which could result in an increased number of break failures in the future, especially due to more limiting licensing-basis loading conditions. If a break failure should occur, the consequences of such an event would be bounded by the licensing-basis SBLOCA event, which would be mitigated by the plant ECCS. Therefore, granting this relief to continue to operate with the current design configuration would not adversely impact the health and safety of the public. Further, the licensee has demonstrated that upgrading the affected piping and valves to ASME Code, Section III, Class 1 requirements would be a hardship or unusual difficulty because the scope of the change would require substantial time and resources to upgrade both documentation and tubing supports.

Therefore, the NRC staff finds that compliance with ASME Code, Section III, Class 1 requirements for the lines and associated components described in the attached Table would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

The NRC staff concludes that the proposed alternative to the requirements of 10 CFR 50.55a(c) is authorized for CPSES, Units 1 and 2, on the basis that compliance with the ASME Code design requirements for Class 1 components would result in hardship without a compensating increase in the level of quality and safety pursuant to 10 CFR 50.55a(a)(3)(ii). The licensee's proposed alternative provides reasonable assurance that the pressurizer upper level instrument and other lines and associated components, as designed and constructed, will perform their intended safety function. This authorization is valid for the life of the plant.

Principal Contributor: G. Hammer

Date: April 14, 2003

Attachment: Table

TABLE

AFFECTED LINES AND ASSOCIATED COMPONENTS

Unit 1 RCS Drawing M1-0251:			
Drawing Location	**Line(s)**	**Root Valve**	**Instrument(s) & Boundary Valves**
B-5	¾-2501R-2 (piping) ½-2505-2 (tubing) Condensing Pot	1RC-8053A	1-PT-0455 1-PT-0455F 1-LT-0459 1-LT-0459F 1RC-0037 1RC-0038
B-5	¾-2501R-2 ½-2505-2 Condensing Pot	1RC-8053B	1-PT-0456 1-PT-0458 1-LT-0460 1RC-0039 1RC-0040
B-5	¾-2501R-2 ½-2505-2 Condensing Pot	1RC-8053C	1-PT-0457 1-LT-0461 1-LT-0462 1RC-0042 1RC-0043
A-2	¾-RC-1-102-2501R-2	1RC-8064A	N/A
B-2	¾-RC-1-104-2501R-2	1RC-8064B	N/A
C-2	¾-RC-1-106-2501R-2	1RC-8064C	N/A
A-4	¾-RC-1-109-2501R-2 1-RC-1-901-2501R-2 ¾-2501R-2 ¾-RC-1-931-2501R-2 ¾-PS-1-001-2501R-2 (continued on M1-0228)	1 RC-8095 - - 1RC-8078	1RC-8098 1-HV-3609 1-HV-3610
D-5	¾-RC-1-143-2501R-2 ¾-RC-1-133-2501R-2	1RC-8052	N/A
D-6	¾-RC-1-144-2501R-2 ¾-RC-1-134-2501R-2	1RC-8051	N/A
E-5	¾-2501R-2	1RC-0023	N/A

Attachment

Unit 1 PSS Drawing M1-0228:			
Drawing Location	**Line(s)**	**Root Valve**	**Instrument(s) & Boundary Valves**
A-2 B-2 C-2	¾-PS-1-001-2501R-2 ¾-2501R-2 ¾-PS-1-030-2501R-2 3/8-PS-1-921-2501R-2	1PS-0004	1PS-0015 1-HV-4165 1-HV-4176 1PS-0031 1PS-0502
Unit 1 CVCS Drawing M1-0253-A:			
B-6	¾-2501R-2	1RC-0038	N/A

Unit 2 RCS Drawing M2-0251:			
B-5	¾-2501R-2 ½-2505-2 CP2-RCCNPR-01	2RC-8053A	2-PT-0455 2-PT-0455F 2-LT-0459 2-LT-0459F 2RC-0037 2RC-0038
B-5	¾-2501R-2 ½-2505-2 CP2-RCCNPR-02	2RC-8053B	2-PT-0456 2-PT-0458 2-LT-0460 2RC-0039 2RC-0040 2RC-0041
B-5	¾-2501R-2 ½-2505-2 CP2-RCCNPR-03	2RC-8053C	2-PT-0457 2-LT-0461 2-LT-0462 2RC-0042 2RC-0043
A-2	¾-RC-2-102-2501R-2	2RC-8064A	N/A
B-2	¾-RC-2-104-2501R-2	2RC-8064B	N/A
C-2	¾-RC-2-106-2501R-2	2RC-8064C	N/A
A-4	¾-RC-2-109-2501R-2 1-RC-2-906-2501R-2 ¾-2501R-2 ¾-RC-2-905-2501R-2 (continued on M2-0228)	2RC-8095 - - 2RC-8078	2RC-8098 1-HV-3609 1-HV-3610

Unit 2 RCS Drawing M2-0251:			
Drawing Location	**Line(s)**	**Root Valve**	**Instrument(s) & Boundary Valves**
D-5	¾-RC-2-143-2501R-2 ¾-RC-2-133-2501R-2	2RC-8052	N/A
D-6	¾-RC-2-144-2501R-2 ¾-RC-2-134-2501R-2	2RC-8051	N/A
E-5	¾-2501R-2	2RC-0023	N/A

Unit 2 PSS Drawing M2-0228:			
A-2 B-2 C-2	¾-PS-2-00l-2501R-2 ¾-2501R-2 ¾-PS-2-030-2501R-2 3/8-PS-2-922-2501R-2	2PS-0004	2PS-0015 2-HV-4165 2-HV-4176 2PS-0511 2PS-0502

Unit 2 CVCS Drawing M2-0255:			
F-4	¾-2501R-2	2RC-0038	N/A