

April 29, 2005

Mr. M. R. Blevins
Senior Vice President &
Chief Nuclear Officer
TXU Power
Attn: Regulatory Affairs Department
P. O. Box 1002
Glen Rose, TX 76043

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION, UNITS 1 AND 2 - RELIEF
FROM CERTAIN REQUIREMENTS OF THE AMERICAN SOCIETY OF
MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE
(TAC NOS. MC1958 AND MC1959)

Dear Mr. Blevins:

By letter dated September 15, 2004, TXU Generation Company LP (the licensee) requested relief from certain requirements associated with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) for the second 10-year inservice inspection (ISI) interval for Comanche Peak Steam Electric Station (CPSES), Units 1 and 2. Relief Requests (RRs) B-4 and B-1 would apply to CPSES, Units 1 and 2, respectively. The subject RRs address the ASME Code 1998 Edition through the 2000 Addenda, Section XI, IWA-5250(a)(2), which states that if leakage occurs at a bolted connection, all the bolts shall be removed, VT-3 examined for corrosion, and evaluated in accordance with IWA-3100. In lieu of the requirements of sub-paragraph IWA-5250(a)(2), the licensee proposes to perform an evaluation in accordance with the alternative requirements of ASME Code Case N-566-2, "Corrective Action for Leakage at Bolted Connections, Section XI, Division 1," in the event that leakage is found in a Class 1, 2, or 3 bolted connection.

The U.S. Nuclear Regulatory Commission staff has completed its review of RRs B-4 and B-1, as documented in the enclosed Safety Evaluation, and concludes that the licensee's proposed alternative provides an acceptable level of quality and safety. Therefore, the licensee's proposed alternative is authorized pursuant to 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations* for the second 10-year ISI interval for CPSES, Units 1 and 2 or until such time as

ASME Code Case N-566-2 is referenced in Regulatory Guide (RG) 1.147. At that time, if the licensee intends to continue to implement this Code case, the licensee should follow all provisions referenced in ASME Code Case N-566-2 and any NRC limitations or conditions imposed in RG 1.147.

Sincerely,

/RA/

Allen G. Howe, 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: See next page

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Docket Nos. 50-445 and 50-446

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cc: See next page

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*No major change to SE input dated February 28, 2005

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SECOND 10-YEAR INTERVAL INSERVICE INSPECTION

REQUEST FOR RELIEF NOS. B-4 AND B-1

COMANCHE PEAK STEAM ELECTRIC STATION, UNITS 1 AND 2

TXU GENERATION COMPANY, LLC

DOCKET NOS. 50-445 AND 50-446

1.0 INTRODUCTION

By letter dated September 15, 2004 (ML042660411), TXU Generation Company LP (the licensee or TXU Power) requested relief from certain requirements associated with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) for the second 10-year inservice inspection (ISI) interval for Comanche Peak Steam Electric Station (CPSES), Units 1 and 2. Relief Requests No. B-4 and B-1 would apply to CPSES, Units 1 and 2, respectively.

2.0 REGULATORY REQUIREMENTS

ISI of ASME Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Code and applicable addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The regulations in 10 CFR 50.55a(a)(3) state that alternatives to the requirements of paragraph (g) may be used, when authorized by the U.S. Nuclear Regulatory Commission (NRC), if: (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

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 pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 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 incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable ASME Code of record

for the second 10-year ISI for CPSES, Units 1 and 2 is the 1998 Edition through the 2000 Addenda of the ASME Boiler and Pressure Vessel Code, Section XI. The second 10-year ISI interval for CPSES, Unit 1 began on August 13, 2000, and ends on August 12, 2010, and the second 10-year ISI interval for CPSES, Unit 2 began on August 4, 2004, and ends on August 2, 2014.

3.0 TECHNICAL EVALUATION

Component Identification

ASME Code, Section XI, Class 1, 2, and 3 bolted connections

Code Requirements

The ASME Code 1998 Edition through the 2000 Addenda, Section XI, IWA-5250(a)(2) states that if leakage occurs at a bolted connection, all the bolts shall be removed, VT-3 examined for corrosion, and evaluated in accordance with IWA-3100.

Licensee's Proposed Alternative Examination

In lieu of the requirements of sub-paragraph IWA-5250(a)(2), TXU Power proposes to perform an evaluation in accordance with the alternative requirements of ASME Code Case N-566-2 [*Corrective Action for Leakage at Bolted Connections, Section XI, Division 1*] in the event that leakage is found in a Class 1, 2, or 3 bolted connections. These alternative requirements specify that if leakage is detected at a bolted connection, one of the following requirements shall be met:

- (a) The leakage shall be stopped, and the bolting and component material shall be evaluated for joint integrity as described in (c) below.
- (b) If the leakage is not stopped, the licensee shall evaluate the structural integrity and consequences of continuing operation, and the effect on the system operability of continued leakage. This engineering evaluation shall include the considerations listed in (c) below.
- (c) The evaluation of (a) and (b) above is to determine the susceptibility of the bolting to corrosion and failure. This evaluation shall include the following:
 - (1) the number and service age of the bolts;
 - (2) bolt and component material;
 - (3) corrosiveness of process fluid;
 - (4) leakage location and system function;
 - (5) leakage history at the connection or other system components; [and]
 - (6) visual evidence of corrosion at the assembled connection.

Licensee's Basis and Reason for Relief Request

In an attachment to its letter dated September 15, 2004, the licensee provided the following basis for the proposed use of Code Case N-566-2:

Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested on the basis that the proposed alternative provides an acceptable level of quality and safety.

TXU Power requests the use of Code Case N-566-2 ... for the CPSES Unit 1 Second Inspection Interval, and for the CPSES Unit 2 Second [ISI] Interval.

If the engineering evaluation that is performed in accordance with paragraphs (a) or (b) of Code Case N-566-2 determines that structural integrity can be assured, given the current conditions, TXU Power will periodically conduct visual inspections of the leaking connection to verify operating conditions have not changed, such that the engineering evaluation is affected. Subsequent inspections of the bolted connection will be scheduled based on the leakage rate, the effect on systems or components in the vicinity of the leak, the potential degradation rate of the materials involved, and when the component is scheduled to be out of service for maintenance or testing. At any time in this process, if it is determined that structural integrity cannot be shown to exist, the appropriate actions would be taken in accordance with the plant's Technical Specifications.

Additionally, in the event that the relevant condition cannot be accepted for continuing operation using Code Case N-566-2 paragraphs (a) or (b), TXU Power would correct the condition in accordance with its ASME Section XI Article IWA-4000 Repair/Replacement Activities and its ASME Section XI Repair Program Requirements.

Furthermore, if the equipment that is leaking can be isolated, the equipment will be isolated and Code Case N-566-2 would not be invoked. If the leakage cannot be isolated and the system affected causes entry into a Technical Specification (TS) Action Statement, Code Case N-566-2 would be invoked and a work plan would be developed for removal and inspection of one bolt at a time. At any time in this process if it is determined that structural integrity cannot be shown to exist, the appropriate actions would be taken in accordance with the CPSES Unit 1 and Unit 2 Technical Specifications.

The 1998 Edition of the ASME Code, 1999 and 2000 Addenda, sub-paragraph IWA-5250(a)(2), requires that if leakage occurs at a bolted connection, all bolts shall be removed from the leaking bolted connection, a VT-3 visual examination must be performed to inspect for corrosion, and the results evaluated in accordance with IWA-3100. The Code requirements provide assurance that bolting corroded by system leakage will be detected and that corrective actions will be taken. However, the Code requirements may be overly conservative since the removal and examination of all bolting may not be necessary to assure continued integrity of a bolted connection. Moreover, corrosion in the joint region may depend on other factors beyond leakage. Thus, in the instances where leakage has been identified at bolted connections, the

requirements of Section XI of the ASME Code do not always provide for the most reasonable course of action. Hence, the request to selectively implement alternatives to Code requirements contained in Code Case N-566-2, in lieu of the requirements of IWA-250(a)(2), the proposed alternative will continue to assure the structural integrity of ASME Class 1, 2, and 3 bolted connections, and that selective implementation of this Code Case will continue to provide an acceptable level of quality and safety.

In addition, the licensee provided the following reasons for its requests for relief:

Removal of bolts for VT-3 visual examination is not always the most prudent action when leakage is discovered at a bolted connection. Leakage at bolted connections is typically identified during system leakage tests. For Class 1 systems, this leakage test is conducted prior to plant startup following each refueling outage. This test is performed at full operating pressure and temperature. When leakage is discovered during this test, the corrective action (i.e., removal of bolts) must be performed with the system at full temperature and pressure, or the plant must be cooled down. The removal of a bolt at full temperature and pressure conditions can be extremely physically demanding due to the adverse heat environment. Cooling down the plant subjects the plant to additional heat up and cool down cycles, and can add 3-4 days to the duration of the refueling outage.

In addition, bolted connections associated with pumps and valves are typically studs threaded into the body of the component. Removal of these studs is typically very difficult and time consuming due to the length of time they have been installed and are often damaged during the removal process. This difficulty is compounded when the removal must be performed under heat stress conditions.

The requirements of IWA-5250(a)(2) must be applied to ASME Code, Section XI, Class 1, 2, and 3 bolted connections regardless of the significance of the leakage or the corrosion resistance of the materials used in the bolted connection. Implementation of Code Case N-566-2 permits factors such as the number and service age of the bolts, the bolting materials, the corrosiveness of the system fluid, the leakage location and system function, leakage history at the connection or at other system components, and visual evidence of corrosion at the bolted connection [to] be used to evaluate the need for corrective measures.

Staff's Evaluation:

The 1998 Edition of the ASME Code through the 2000 Addenda, Section XI, IWA-5250(a)(2) requires that if leakage occurs at a bolted connection, all of the bolts shall be removed, VT-3 examined for corrosion, and evaluated in accordance with IWA-3100. The ASME Code requirements provide assurance that bolting corroded by system leakage will be detected and that corrective actions will be taken. However, the ASME Code requirements are often unnecessarily conservative since corrosion is dependent on other factors beyond system leakage. Additionally, removal and examination of all bolts may not be necessary to assure continued integrity of the bolted connection.

In lieu of these requirements, the licensee has proposed to implement an alternative that requires, in part, an engineering evaluation to determine the need for additional examinations of the bolts considering the elements listed in the licensee's proposed alternative.

The licensee noted that when an evaluation of the proposed elements is concluded and the evaluation determines that the leaking condition has not degraded the fasteners, then no further action is necessary. In addition, if the leakage is not stopped, the licensee will evaluate the structural integrity, consequences of continuing operation, and the effect on the system operability of continued leakage. The engineering evaluation will include six attributes as noted in the licensee's proposed alternative, which are as follows:

- (1) the number and service age of the bolts;
- (2) bolt and component material;
- (3) corrosiveness of process fluid;
- (4) leak location and system function;
- (5) leakage history at the connection or other system components; and
- (6) visual evidence of corrosion at the assembled connection.

The licensee proposed that in the event of a relevant condition that cannot be accepted for continuing operation using Code Case N-566-2 paragraphs (a) or (b), they would correct the condition in accordance with its ASME Code Section XI, Article IWA-4000 Repair/Replacement Activities and its ASME Code Section XI Repair Program Requirements or, if the bolted connection that is leaking can be isolated, it will be isolated and Code Case N-566-2 would not be invoked or, if the leakage cannot be isolated and the system affected causes entry into a TS Action Statement, Code Case N-566-2 would be invoked and a work plan would be developed for removal and inspection of one bolt at a time. At any time in this process, if it is determined that structural integrity cannot be shown to exist, the appropriate actions would be taken in accordance with the CPSES, Unit 1 and Unit 2 TS.

The NRC staff determined that the licensee's proposed alternative to determine the structural integrity of the bolted connection provides an acceptable level of quality and safety. Based on the items included in the evaluation process, the NRC staff concludes that the evaluation proposed by the licensee presents a sound engineering approach.

4.0 CONCLUSIONS

For Request for Relief No. B-4 and Request for Relief No. B-1, the NRC staff concludes that the licensee's proposed alternative provides an acceptable level of quality and safety. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the second 10-year ISI interval for the respective CPSES, Units 1 and 2, or until such time as ASME Code Case N-566-2 is referenced in RG 1.147. At that time, if the licensee intends to continue to implement this Code case, the licensee should follow all provisions referenced in ASME Code Case N-566-2 and any NRC limitations or conditions imposed in RG 1.147.

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

Principal Contributor: T. McLellan

Date: April 29, 2005

Comanche Peak Steam Electric Station

cc:

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P. O. Box 2159
Glen Rose, TX 76403-2159

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

Mr. Fred W. Madden, Director
Regulatory Affairs
TXU Generation Company LP
P. O. Box 1002
Glen Rose, TX 76043

George L. Edgar, Esq.
Morgan Lewis
1111 Pennsylvania Avenue, NW
Washington, DC 20004

County Judge
P. O. Box 851
Glen Rose, TX 76043

Environmental and Natural
Resources Policy Director
Office of the Governor
P. O. Box 12428
Austin, TX 78711-3189

Mr. Richard A. Ratliff, Chief
Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, TX 78756-3189

Mr. Brian Almon
Public Utility Commission
William B. Travis Building
P. O. Box 13326
1701 North Congress Avenue
Austin, TX 78701-3326

Ms. Susan M. Jablonski
Office of Permitting, Remediation
and Registration
Texas Commission on Environmental
Quality
MC-122
P. O. Box 13087
Austin, TX 78711-3087

Terry Parks, Chief Inspector
Texas Department of Licensing
and Regulation
Boiler Program
P. O. Box 12157
Austin, TX 78711