TU ELECTRIC

William J. Cahill, Jr.
Executive Vice President

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Ref. # 10CFR50.55(a)

August 31, 1989

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
ADVANCE FSAR SUBMITTAL
DESIGN LIMITS FOR BOLTED PIPING SUPPORT JOINTS
AND BOLTED FLANGE JOINTS

Gentlemen:

This letter provides an advance copy of a change to be included in a future FSAR amendment. This change allows the use of the referenced ASME code edition and addenda documented in Safety Evaluation Report Supplement 14, Section 4.1.2.2 for the design limits of bolted piping support joints and bolted flange joints.

In order to facilitate NRC staff review of this change, the attachment is organized as follows:

1. Draft revised FSAR pages, with changed portions indicated by a bar in the margin, as they are to appear in a future amendment.

2. A detailed description/justification for the change.

3. A copy of the related SER section.

4. A page containing the title of a "bullet" which consolidates and categorizes similar individual changes by subject and related SER section.

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5. The bold/overstrike version of the revised FSAR pages referenced by the detailed description/justification for the changes identified above. The bold/overstrike version facilitates review of the revision by highlighting each addition of new text in bold type font and overstriking with a slash (/) the portion of the text that is deleted.

Sincerely,

William J. Cahill, Jr.

William J. Cahill, Jr.

By: Roger D. Walker

R. D. Walker
Manager, Nuclear Licensing

HAM/smr
Attachment

c - Mr. R. D. Martin, Region IV
Resident Inspectors, CPSES (3)

Attachment to TXX-89597
August 31, 1989

Advance FSAR Submittal Concerning
Design Limits For Bolted Piping Support Joints And
Bolted Flange Joints

Item 1	Draft Revised FSAR Pages	2,3
Item 2	Detailed Description/Justification for Changes	4
Item 3	Related SER Sect	5,6,7
Item 4	Bullet Title	8
Item 5	Bold/Overstrike Version of Revised FSAR Pages	9,10

a. Elastic analysis for the design of Class 2 and 3 components in accordance with subparagraph NB 3227.6 of ASME B&PV Code, Section III.

b. Limit analysis is done at a specific location when the limits on local membrane stress intensity and primary bending stress intensity do not satisfy the limits of ASME B&PV Code, Section III, subparagraph NB 3228.2.

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2. Bolts

For the Code Class 2 and 3 components not in Westinghouse's scope, the following are the criteria for the design of bolting:

DRAFT

a. Bolts for Component Supports (Other than Pipe Supports)

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Normal and Upset Conditions - The design limits are as per ASME B&PV Code, Section III, Article XVII-2460 and NRC approved ASME Code Cases as indicated in the specification.

Q112.13
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Emergency Condition - The bolt allowables are 1.33 times the allowable used in the normal and upset conditions.

Q112.13
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Faulted Condition - The bolt allowables for normal and upset conditions are increased by a factor which is the lower of 1.2 (Sy/Ft) or 0.7 (Su/Ft). However, the total allowable stress shall not exceed 0.9 Sy in any case.

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Sy = Yield stress

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Ft = Allowable tensile stress

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Su = Ultimate tensile stress

Q112.13

b. Bolts for Pipe Support Joints DRAFT

The design limits for bolted pipe support joints are in accordance with the ASME B&PV Code, Section III, 1983 Edition including the Summer 1983 Addenda, paragraphs NF 3225 and NF 3324.6. DRAFT

c. Bolts for Flange Joints DRAFT

The design limits for bolted flange joints connecting pipe to pipe and/or pipe to equipment are in accordance with the ASME B&PV Code, Section III, 1983 Edition, subparagraphs NC/ND 3658.2 and NC/ND 3658.3. DRAFT

d. Bolts and Components DRAFT

Q112.13

Bolts for components do not exceed the Code allowable stress limits. DRAFT

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3. Non-ASME Code Class Components

The supplier of the mechanical components not covered by the ASME B&PV Code must demonstrate by experimental testing or calculation that the design stress limits (with use of applicable codes and standards) are sufficiently below the elastic limits to ensure operability.

3.9B.2 DYNAMIC TESTING AND ANALYSIS

3.9B.2.1 Preoperational Vibration and Dynamic Effects Testing on Piping

Q112.12

The purpose of preoperational vibration and dynamic effects tests of

FSAR Page (as amended)	Group	Description
3.9B-14, 15	2	Allows the use of design limits for bolted pipe support joints in accordance with ASME III, subsection NF, paragraphs NF-3225 and NF-3324.6 of the 1983 Edition-Summer 1983 Addenda. Correction: Incorporates the design limits provided by ASME III, paragraphs NF-3225 and NF-3324.6 of the 1983 Edition-Summer 1983 Addenda. This correction replaces the criteria with design limits presnted to the NRC by TU Electric report entitled, "Documentation of ASME III NA-1140 Review for PIping and Supports," revision 2, dated September 30, 1987 and subsequently reviewed and approved y the NRC as documented in NUREG-0797, Supplement 14 to the Safety Evaluation Report, section 4.1.2.2, pages 4-6 thru 4-8. FSAR Change Request Number: 88-569.1 Related SER Section: 3.9.3; SSER14 4.1.2.2 SER/SSER Impact: No
3.9B-14, 15	2	Allows the usage of Design limits for the design of bolted flange joints connecting pipe and/or pipe to equipment in accordance with ASME III, subparagraphs NC/ND 3658.2 and 3658.3 of the 1983 Edition-Summer 1983 Addenda. Correction: Incorporates the design limits provided by ASME III, subparagraphs NC/ND 3658.2 and 3658.3 of the 1983 Ed.-Summer 1983 Addenda. This correction replaces the criteria with design limits presented to the NRC by TU Electric report entitled, "Documentation of ASME III NA-1140 Review for Piping and Supports," revision 2, dated September 30, 1987 and subsequently reviewed and approved by the NRC as documented in NUREG-0797, Supplement 14 to the Safety Evaluation Report, section 4.1.2.2, pages 4-6 thru 4-8. FSAR Change Request Number: 88-569.2 Related SER Section: 3.9.3; SSER14 4.1.2.2 SER/SSER Impact: No

4.1.2.2 Design Criteria and Methodology

The CPSES pipe stress and pipe support design criteria in CPPP-7 (Reference 30) have been developed by SWEC for the design validation of ASME Code Class 1, 2 and 3 pipe supports and ASME Code Class 2 and 3 piping systems. The controlling documents for the SWEC design validation effort are contained in Comanche Peak Project Procedures CPPP-1 through CPPP-35 (Appendix E of this supplement). The piping stress analyses and pipe support calculations will become the CPSES analyses of record and provide assurance that the structural qualification of the piping and pipe supports within the CAP scope are in accordance with CPSES licensing commitments and the applicable requirements of the ASME Boiler and Pressure Vessel Code (References 27 and 28). The following sections discuss the staff review and evaluation of the CPSES design criteria and analytical methodologies used in the piping and pipe support design validation.

Review of Final Safety Analysis Report Amendment 61

In Amendment 61 (Reference 31) to the CPSES Final Safety Analysis Report (FSAR) (Reference 32), the applicant provided the changes made to the FSAR piping design criteria as a result of the CAP design validation effort. As a result of its review of the FSAR Amendment 61 changes, the staff concludes that the changes do not significantly alter the staff findings in the previous CPSES SEP and supplements (Reference 11) except in the areas related to (1) the combination of loss-of-coolant accident (LOCA) and safe-shutdown earthquake (SSE) loads (Section 3.9.2.3 of the SER) and (2) the piping system damping values (Section 3.7.1 of the SER).

The staff evaluated the combination of LOCA and SSE loads for reactor coolant system heavy component supports in its safety evaluation provided in a letter from C. I. Grimes (NRC) to W. Counsil (TU Electric) dated June 8, 1987 (Reference 33), in conjunction with the implementation of the final rule on the modification of 10 CFR 50, Appendix A, General Design Criterion 4 requirements for protection against the dynamic effects of postulated pipe ruptures (51 Federal Register 12505, dated April 11, 1986). Similarly, the staff found that the use of revised damping values per ASME Code Case N-411 (Reference 34) was acceptable for CPSES as discussed in a letter from V. Noonan (NRC) to W. Counsil (TU Electric) dated March 13, 1986 (Reference 35).

The staff also reviewed the technical acceptability of the FSAR Amendment 61 changes and the use of later ASME Code provisions as permitted in paragraph NA-1140(f) of the ASME Code, Section III (Reference 27). The staff's review of the use of later ASME Code provisions focused primarily on the technical justifications provided in the applicant's report entitled, "Documentation of ASME III NA-1140 Review for Piping and Supports," Revision 2, dated September 30, 1987 (NA-1140 report). This report documented the applicant's review performed to ensure that the use of design criteria in CPPP-7 is in conformance with paragraph NA-1140(f) of the ASME Code and, in particular, that all related ASME Code requirements are met. The code of record for CPSES piping is ASME Code, Section III, 1974 Edition, including Summer 1974 Addenda Subsections NC/ND (Reference 27). The code of record for CPSES pipe supports is the 1974 Edition including Winter 1974 Addenda Subsection NF (Reference 28). On the basis of its review of the NA-1140 report, the staff finds that all related

requirements associated with the use of specific provisions of a Code edition or addenda were met and thus, the use of later Code provisions as specified in the NA-1140 report is acceptable. The specific provisions from later Code editions and addenda reviewed and approved by the staff for CPSES are listed below:

(1) 1977 EDITION - WINTER 1978 ADDENDA

Appendix O - Rules for Design of Safety Valve Installations

(2) 1983 EDITION

NC-3658.2 - Standard Flange Joints at Moderate Pressures and Temperatures

NC-3658.3 - ANSI B16.5, Flanged Joints with High-Strength Bolting

ND-3658.2 - Standard Flange Joints at Moderate Pressures and Temperatures

ND-3658.3 - ANSI B16.5, Flanged Joints with High-Strength Bolting

(3) 1983 EDITION - WINTER 1984 ADDENDA

Figure NC-3673.2(b)-1 - Flexibility and Stress Intensification Factors (Do/tm less than or equal to 100) (Branch Connections, Buttwelds, and Fillet Welds)

Figure NC-3673.2(b)-2 - Branch Dimensions

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(4) 1977 EDITION - WINTER 1978 ADDENDA

XVII-2211 - Stress in Tension

Figure XVII-2111(c)-1 - Illustrations of Maximum Design Stress in Through Thickness Direction of Plates and Elements of Rolled Shapes (Figure Deleted)

NF-3226 - Through Plate Thickness Tensile Limit

Figure NF-3226.5-1 - Illustrations of Maximum Design Stress in Through Thickness Direction of Plates and Elements of Rolled Shapes (Figure Deleted)

NF-3321.1 - Design Conditions

(5) 1977 EDITION - WINTER 1979 ADDENDA

NF-3391.1 - Allowable Stress Limits (Class 2 and MC Plate/Shell)

NF-3392.1 - Allowable Stress Limits (Class 2 and MC Linear)

(6) 1980 EDITION

NF-1133 - Intervening Elements in Relation to Jurisdictional Boundaries

NF-1131.6 - Portion F

(7) 1980 EDITION

XVII-2462 - Minimum Edge Distance

(8) 1983 EDITION - SUMMER 1983 ADDENDA

NF-3225 - Design of Bolting

NF-3324.6 - Design Requirements for Bolted Joints

(9) 1983 EDITION - SUMMER 1985 ADDENDA

NF-4721 - Bolt Holes

(10) 1974 EDITION - WINTER 1975 ADDENDA

NC-6221 - Minimum Required Hydrostatic Test Pressure

(11) 1974 EDITION - WINTER 1975 ADDENDA

XVII-2410 - General Requirements (for the Design of Connections and Joints

(12) 1980 EDITION - WINTER 1982 ADDENDA

NF-3324.5 - Design Requirements for Welds

(13) 1974 EDITION - SUMMER 1975 ADDENDA

NB-3630(d) - Exemptions for Class 1 Piping

It should be noted that 10 CFR 50.55a "Codes and Standards," currently references the ASME Code, Section III, Division 1 up to the 1983 Edition including the Summer 1984 Addenda. Although the portion of 10 CFR 50.55a pertaining to ASME Code Class 2 and 3 piping is not directly applicable to CPSES, it does provide the staff position regarding the latest Code edition and addenda found suitable for use. Several provisions listed above from later Code addenda (i.e., Winter 1984 Addenda and Summer 1985 Addenda) are not referenced currently in 10 CFR 50.55a. A final rule has been developed to update 10 CFR 50.55a to incorporate by reference the Winter 1984 Addenda, Summer 1985 Addenda, Winter 1985 Addenda, and 1986 Edition of Section III,

3.9.3 ASME Code Class 1, 2 and 3 Components, Component Supports and Core Support Structures

EMEB 20. The FSAR has extended the code usage for Class 2 and 3 bolting for flange joints and piping support joints.

a. Elastic analysis for the design of Class 2 and 3 components in accordance with subparagraph NB 3227.6 of ASME B&PV Code, Section III.

b. Limit analysis is done at a specific location when the limits on local membrane stress intensity and primary bending stress intensity do not satisfy the limits of ASME B&PV Code, Section III, subparagraph NB 3228.2.

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2. Bolts

For the Code Class 2 and 3 components not in Westinghouse's scope, the following are the criteria for the design of bolting:

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Sy = Yield stress

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b. **Bolts for Pipe Support Joints**

The design limits for bolted pipe support joints are in accordance with the ASME B&PV Code, Section III, 1983 Edition including the Summer 1983 Addenda, paragraphs NF 3225 and NF 3324.6.

c. **Bolts for Flange Joints**

The design limits for bolted flange joints connecting pipe to pipe and/or pipe to equipment are in accordance with the ASME B&PV Code, Section III, 1983 Edition, subparagraphs NC/ND 3658.2 and NC/ND 3658.3.

d. **Bolts and Components**

b/ Studs & nuts for pipe flanges larger than 24 inches/ where the design pressure and temperature do not exceed 100 Psi or 200°F conform to the requirements of Code case 1744/

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c/ Bolts for components do not exceed the Code allowable stress limits.

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3. Non-ASME Code Class Components

The supplier of the mechanical components not covered by the ASME B&PV Code must demonstrate by experimental testing or calculation that the design stress limits (with use of applicable codes and standards) are sufficiently below the elastic limits to ensure operability.

3.9B.2 DYNAMIC TESTING AND ANALYSIS

3.9B.2.1 Preoperational Vibration and Dynamic Effects Testing on Piping

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