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March 29, 1985
84056.060

Mr. J.W. Beck
Manager - Licensing
Texas Utilties Generating Company
Skyway Tower
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Dallas, Texas 75201

Subject: Generic Issues Summary
Comanche Peak Steam Electric Station
Independent Assessment Program - All Phases
Job Nos. 83090, 84042 and 84056

Dear Mr. Beck:

On March 14, 1985, a meeting was held between the Comanche Peak Review Team (CPRT) and Cygna to discuss the findings from all four phases of the Independent Assessment Program (IAP). At this meeting, Cygna supplied a preliminary document which summarizes and provides references for all open and closed issues known at that time. This document will be referred to as the "Review Issues List" henceforth. The attachments to this letter contain seven sets of questions, one for each review discipline, which, if answered properly, could close all issues known at this time. The two currently incomplete areas are cable tray and conduit support reviews (Attachments C and D). The degree of incompleteness is detailed on the respective attachment.

The questions in the attached Generic Issues Summaries provide the necessary focus for assessing the generic implications of interrelated issues and any cumulative effects. We have also attempted to narrow some issues by highlighting Cygna's specific concerns.

The more detailed, Review Issues List will be issued in final form this week. Cygna personnel will continue to review this listing on a weekly basis to identify any necessary revisions as we complete our review documentation and obtain any outstanding documents. We do not anticipate any significant changes to the attached Generic Issues Summaries as a result of revision(s) to the Review Issues List, however.

Use attached distribution

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If you require additional information, please do not hesitate to call.

Very truly yours,

N.H. Williams

N.H. Williams
Project Manager

NHW/ajb

Attachments (7)

cc: Mr. V. Noonan (USNRC) w/attachments
Mr. S. Burwell (USNRC) w/attachments
Mr. S. Treby (USNRC) w/attachments
Mr. J. Redding (TUGCO) w/attachments
Ms. J. van Amerongen (TUGCO/EBASCO) w/attachments
Ms. J. Ellis (CASE) w/attachments

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ATTACHMENT A
Generic Issues Summary

PIPE STRESS

Two major items still remain open in the pipe stress area. They are:

1.0 Mass Participation

2.0 Cumulative Effects of Five Piping Analyses Observations

If TUGCO/CPRT adequately answers the following questions, these issues could be resolved.

1.0 Mass Participation

1.1 Demonstrate how TUGCO will comply with the FSAR commitments relative to mass participation.

1.2 Demonstrate why the 30 percent mass participation cut-off used in the Gibbs & Hill reevaluation is reasonable, considering the fact that higher order modes may contribute more than 10 percent additional response to the piping system.

1.3 Demonstrate how your final design documents will reflect the effects of question 1.1 and 1.2 above.

2.0 Cumulative Effects of Five Piping Analyses Observations

2.1 Considering the cumulative effects of stress intensification factor discrepancies, inclusion of fluid and insulation weights at valves and flanges, mass point spacing discrepancies, inclusion of support mass in the stress analysis, and pipe support stiffness, demonstrate how all systems achieve compliance with the ASME Code and other applicable FSAR requirements such as the evaluation of welded attachments.

ATTACHMENT A
Generic Issues Summary
(continued)

2.2 How are the results of the Component Cooling Water (CCW) study on the effects of fluid and insulation weights at valves and flanges applicable to other systems?

2.3 The mass point spacing discrepancies found in the Gibbs & Hill reanalysis were statistically significant. Therefore, demonstrate how TUGCO/CPRT intends to resolve this issue.

2.4 The ASLB is concerned with the effects of including appropriate fractions of the support mass in the pipe stress analysis. Demonstrate how the effects of including support mass have been evaluated and resolved.

ATTACHMENT B
Generic Issues Summary

PIPE SUPPORTS

The major open items associated with the pipe support reviews may be divided into two categories:

1.0 Design Loads and Displacements

2.0 Design of Support Components

If satisfactory responses are received which properly account for any interaction with decisions made in response to the pipe stress questions, the above open items could be resolved.

1.0 Design Loads and Displacements

1.1 Considering the cumulative effects of all previously stated piping observations which impact support loadings, as well as the effects of self-weight excitation in the unrestrained direction, please demonstrate how all pipe support designs meet applicable code and FSAR requirements.

1.2 For all potentially unstable supports, please demonstrate how either:

a. the support maintains positive connection to the pipe throughout the design life of the plant; or

b. the redistribution of the load due to the potential loss of restraint does not compromise the ability of the piping or other pipe supports to meet design requirements.

1.3 Demonstrate how TUGCO will ensure that dual strut/snubber designs consider the effects of load imbalance due to pipe rotation in the design of support components and welded attachments.

1.4 Demonstrate how TUGCO has ensured that loads on civil structures due to concrete anchors and thru-bolt connections are within the original civil design loading or have been explicitly accommodated.

1.5 Some systems must be designed for dynamic events (i.e., steam and water hammer) which produce displacements much larger than those resulting from earthquakes. How have these larger displacements been accounted for in the design of frame gaps, swing angles and spring travel?

ATTACHMENT B
Generic Issues Summary
(continued)

2.0 Design of Support Components

2.1 How is the design requirement that all attachments to embedded plates be spaced a minimum of 12 inches apart implemented and controlled in the field?

2.2 Demonstrate how all combination welded/bolted connection designs meet the requirements of Paragraph XVII-2442 of the ASME B&PV Code.

2.3 Regarding Richmond Insert designs as discussed in Cygna letter 84042.025, dated January 31, 1985, demonstrate how Richmond Inserts are in compliance with the FSAR and applicable codes.

2.4 Please provide a basis for evaluating punching shear in the tube steel around drilled holes caused by bolted attachments. Describe how supports have been checked for these effects.

2.5 Demonstrate how both cinched U-bolts and box frames with 0-inch gaps maintain positive connection with the pipe without inducing excessive stresses in the support or the pipe.

2.6 Demonstrate how the range of the construction tolerances on bolt holes and base plates are accounted for in the base plate design calculations.

ATTACHMENT C
Generic Issues Summary

CABLE TRAY SUPPORTS

Cygna's summary documentation of the support reviews is approximately 90% complete. Specifically, Cygna has not yet received a response from TUGCO to questions concerning support Detail "5". In addition, as a result of the support reviews, Cygna is also investigating the impact of the design specified support spacing on cable tray stresses. Other than the above incomplete reviews, the major open items associated with Cygna's cable tray support reviews can be summarized into five categories based on the particular aspect of the design affected and the number of supports affected. These categories are:

1.0 Design Loadings

2.0 Response Spectra Analysis

3.0 Generic Studies

4.0 Systems Concept for Design

5.0 Component Design

If satisfactory responses to the following questions are received, the above open items could be resolved.

Many of the cable tray support findings are interrelated and therefore tend to produce effects which are cumulative. Since these relationships are sometimes complex and difficult to analytically quantify, TUGCO may wish to consider a comprehensive in-situ testing program as a means of collectively addressing Cygna's questions. If testing is selected, please provide a detailed description of how these "load rating" type in-situ tests will encompass the concerns highlighted in items one through five above.

In lieu of developing a comprehensive testing program please provide responses to the following questions:

1.0 Design Loadings

1.1 Demonstrate how the OBE load combination is the governing load case for each component in the support designs (i.e., concrete anchors, clamps, structural steel members, plates, welds, etc.).

ATTACHMENT C
Generic Issues Summary
(continued)

1.2 Explain why other FSAR required loads such as pipe whip and jet impingement are not explicitly addressed in the design calculations.

1.3 Demonstrate how the additive effects of support dead load, support self-weight excitation in the unrestrained direction, combining the dead load with the SRSS combination of seismic loads, and the inclusion of a dynamic amplification factor do not impact the integrity of low margin supports.

1.4 Demonstrate the adequacy of the support designs when compared to the original design criteria, i.e., allowable transverse and longitudinal support spacings, allowable supported tray width, accelerations, etc.

2.0 <u>Response Spectra Analysis</u>

2.1 When response spectra analyses are used for evaluations, how is compliance with Regulatory Guide 1.92 ensured?

2.2 Response spectra analysis using only one support type have been used in generic studies or in response to Cygna questions. This does not appear to be representative of the actual installations. Since modeling assumptions greatly influence system response, please demonstrate how the results are applicable to the balance of the designs?

2.3 Demonstrate how the boundary conditions and tray attachment modeling assumptions are reasonable when compared to the hardware (i.e., base angle connections and clamps).

3.0 <u>Generic Studies</u>

3.1 The working point and weld underrun generic studies did not reflect the as-built condition. Please identify these differences and evaluate their effect on the results of these studies.

3.2 Demonstrate how the generic studies envelop all possible as-built configurations.

4.0 <u>Systems Concept for Design</u>

4.1 Considering the fact that bolted clamps are used for connections between the tray and longitudinal trapeze-type supports, please explain why these supports will not carry any transverse or vertical loads.

ATTACHMENT C
Generic Issues Summary
(continued)

4.2 Considering the fact that transverse supports use tray clamps that allow a gap, what is the basis for assuming that the tray provides sufficient support to:

a. minimize the effects of torsion and bending in the beam and hanger members due to eccentrically applied loads?

b. resist buckling in the hanger member due to compressive loads?

c. limit base angle rotations?

4.3 If the additional loading due to self-weight excitation of transverse supports is carried by the longitudinal supports, how have the longitudinal supports been designed to resist this additional loading?

5.0 Component Design

5.1 How are construction tolerances, drawing specified component substitutions, and design specification (i.e., SS-30 requirements on Richmond Insert spacing and embedded plate design) requirements accounted for in the design calculations?

5.2 Demonstrate how all base angle connection designs properly account for the effects of prying and eccentric load application.

5.3 Why is ACI 349-76, Appendix B, an acceptable basis for a 1.8 safety factor in the design of Richmond Inserts and connections at CPSES? And, if ACI 349 is considered acceptable, please address why all other ACI 349, Appendix B requirements need not be met.

5.4 Demonstrate how member and connection designs properly account for the effects of eccentric load application.

5.5 Demonstrate how the design calculations account for all applicable provisions of AISC as required by the FSAR?

When preparing responses, please provide the assessments on a generic basis. In addition, for those items which may have cumulative impact on the overall support system integrity, please address the additive effects of all such responses on a generic basis.

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Mr. J.W. Beck
March 29, 1985

ATTACHMENT D
Generic Issues Summary

CONDUIT SUPPORTS

Cygna's summary documentation of the conduit support reviews is approximately 85% complete. The following areas are still being evaluated for their effects on the support designs. These areas are:

a. changes in span lengths for unprotected and fire protected spans;

b. evaluation of cable tray stresses due to attached conduit;

c. Nelson studs; and,

d. loads on grouted penetrations.

Additionally, since the technical requirements for conduit support designs have changed over time, Cygna is still reviewing the effect of these changes on the support adequacy.

Other than the above incomplete reviews, the major open items associated with the conduit support reviews may be divided into three categories:

1.0 Design Loadings

2.0 Systems Concept for Design

3.0 Component Designs

If TUGCO/CPRT adequately answers the following questions, and properly considers any associated cumulative effects, these items could be resolved.

1.0 Design Loadings

1.1 Demonstrate how the OBE load combination governs for each component used in the support designs, i.e., concrete anchors, clamps, structural steel members, cold-formed members, plates, welds, etc.

1.2 Explain why other FSAR required loads such as pipe whip and jet impingement are not explicitly addressed in the design calculations.

ATTACHMENT D
Generic Issues Summary
(continued)

1.3 Quantify the additive effects of support dead load, support self-weight excitation in the unrestrained direction, combining the dead load with the SRSS combination of seismic loads, and the inclusion of a dynamic amplification factor on conduit support integrity.

1.4 How do amplified accelerations affect the integrity of LA-type conduit supports which are adjacent to flexible spans or are loaded with flexible conduits.

1.5 What is the basis for excluding longitudinal loads on transverse-type supports given that the same clamps are used for all support types.

2.0 Systems Concept for Design

2.1 If the additional loading due to self-weight excitation of transverse supports is carried by longitudinal supports, how have the longitudinal supports been designed to resist this additional loading.

2.2 Gibbs & Hill has assumed that Z-clip rotations are limited by the attachment to the conduit. How does the conduit support testing program validate this assumption?

3.0 Component Designs

3.1 How are construction tolerances, drawing specified component substitutions, and design specifications, e.g., 2323-SS-30, accounted for in the designs?

3.2 Demonstrate how all base connections properly account for the effects of prying and eccentric load application.

3.3 Demonstrate how the design calculations account for all applicable provisions of AISC as required by the FSAR?

3.4 TUGCO has initiated a program which includes reanalysis using the provisions of AISI and testing of conduit supports to document the adequacy of support designs which utilize Unistrut components and Z-clip base connections. Explain how this program will demonstrate the adequacy of all such supports at CPSES.

3.5 Explain how TUGCO will demonstrate the adequacy of support designs which employ catalog components that have been altered from the manufacturer supplied configuration?

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ATTACHMENT E
Generic Issues Summary

MECHANICAL SYSTEMS

Three items remain open in the mechanical systems area. They are:

1.0 Single Failure Criteria

2.0 Changes in Design Parameters

3.0 Control of Appendix R Modifications

If TUGCO/CPRT adequately answers the following questions, these issues could be resolved.

1.0 Single Failure Criteria

1.1 Cygna has identified a potential finding wherein single failure criteria may not have been satisfied for the Component Cooling Water (CCW) system valve which provides isolation in the event of a thermal barrier rupture. Demonstrate that this situation has been resolved and demonstrate that single failure criteria for valves has been satisfied throughout the plant.

2.0 Changes in Design Parameters

2.1 Given the situation with the conflicting design temperature documentation on the CCW system, how does TUGCO ensure that the final design loads are within the design envelopes for the components such as pumps and heat exchangers?

2.2 By definition, Class 5 piping is not intended to fulfill a safety related function. Explain the use of Class 5 piping in areas where functionality is required following design basis events.

3.0 Control of Appendix R Modifications

3.1 How does TUGCO ensure that the as-built Appendix R modifications are in conformance with the Appendix R design requirements and specifications?

ATTACHMENT F
Generic Issues Summary

ELECTRICAL

The only item of potential significance identified during the electrical reviews were two instances where the pressure-temperature ratings for installed Component Cooling Water (CCW) system instruments were lower than the maximum pressure or temperature of the system as indicated by the Gibbs & Hill analysis. When design and operating data is revised, how does TUGCO ensure that all existing system components meet the new operating conditions?

ATTACHMENT G
Generic Issues Summary

DESIGN CONTROL

Given the data available from all four phases of the Cygna technical and design control reviews, a cumulative effects evaluation of all observations and potential findings reports is being performed. This review will also focus on the cumulative effects of individually insiginificant discrepancies. Any trends identified which indicate either strengths or weaknesses in the CPSES design/ design control program will be evaluated. Cygna is also evaluating the adequacy of the overall design process employed on the Comanche Peak Project. As part of this assessment, particular attention is being paid to the control of design organization interfaces, the adequacy of design procedures, the adequacy of the design documentation, and the control of the design inputs.

At this time, there are two open items. These items are:

1.0 Corrective Action

2.0 Document Control

In order for Cygna to complete the design control evaluations described above, please provide responses to the following questions.

1.0 Corrective Action

1.1 In light of the observations identified through the Cygna reviews, demonstrate/quantify the degree of confidence TUGCO has in their corrective action system.

2.0 Document Control

2.1 By early 1984, TUGCO had implemented a functional DCC system. Demonstrate how TUGCO has ensured that change documentation issued prior to the establishment of the present DCC system was incorporated into the final installed designs.