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August 6, 1984  
84056.015

Mr. J. B. George  
Project Manager  
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Highway FM 201  
Glen Rose, Texas 76043

Subject: Cable Tray and Conduit Support Review Questions  
Comanche Peak Steam Electric Station  
Independent Assessment Program - Phase 4  
Texas Utilities Generating Company  
Job No. 84056

Dear Mr. George:

Attachments A and B to this letter contain conduit support and cable tray support questions, respectively. Additional questions will follow later this week. If there is any question or uncertainty while preparing responses to these questions, please call.

Very truly yours,

N. H. Williams  
Project Manager

Attachments

cc: Mr. D. Wade (w/attachment)  
Mr. G. Grace (w/attachment)  
Mr. S. Burwell (w/attachment)  
Mr. S. Treby (w/attachment)  
Mrs. J. Ellis (w/attachment)  
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**ATTACHMENT A**

**CONDUIT SUPPORT QUESTIONS**

1. In the calculation of allowable stresses for Unistrut components, Gibbs & Hill employed the AISC code which is for hot-rolled steel members. Unistrut members, which are cold-formed components, are governed by either the Unistrut Manufacturers Catalogue or AISI specifications for cold-formed members. Please provide justification for the use of the AISC code for the analysis and design of cold-formed members?
2. In the design of several conduit supports within the Phase 4 scope, Cygna has discovered instances where the eccentricity of applied loads have not been considered in the design of concrete connections. Two examples of this are:

a) Details CSM-18c and CSM-18d:

Eccentricities between the tube steel centerline and the anchor bolt centerline is not included in the anchor bolt design. The calculations state that the eccentricities have not been included; however, no basis for omitting the effect is provided.

b) Detail CSD-1a

The eccentricity between the P1001 or P1004A sections, and the centerline of the anchor bolt is not considered in the design of the anchor bolts. Cygna believes that the inclusion of this eccentricity will have a significant effect on the bolt loads.

Please provide technical justification for omitting the effects of eccentric loadings in the design of these connections.

3. Support details CA-1a and CA-2a utilize Unistrut sections as "outriggers" to reduce the effect of longitudinal conduit loads on the main support member and Hilti expansion anchors. In the design of Hilti expansion anchors which attach these "outriggers" to the concrete, no reduction in bolt capacity is made even though the bolts have a spacing of less than the required 10 bolt diameters. Please evaluate the effects of bolt spacing on the Hilti bolt capacity.
4. The bolt hole for Unistrut P2558 clamps is 13/32". Therefore, for Hilti bolts, Nelson studs, A307 or A325 high strength bolts of 1/2" diameter or greater, the holes are not large enough. Gibbs & Hill has specified that the holes should be reamed to the appropriate size, thus altering a standard manufacturer supplied component. Please provide documentation for the acceptability of this procedure.

ATTACHMENT B

CABLE TRAY SUPPORT QUESTIONS

1. It is Cygna's understanding the effects of adding Thermolag Fire Barrier weight to cable trays and their supports are evaluated per TUGCO Engineering Instruction CP-EI-4.0-49, Rev. 1. Cygna has reviewed this document and has noted two discrepancies between allowable design load values and the combined weight of unfilled 6" trays covered with fire barrier as noted in Table 1 of the above instruction and as shown below:

Tray Size	Unfilled Tray Weight (lbs/lf)	Fire Barrier Weight (lbs/lf)	Total Weight (lbs/lf)	Design Weight (lbs/lf)
4" x 6"	5.0	13.0	18.0	17.5
6" x 6"	5.0	14.5	19.5	17.5

Converting units to Psf, the total weights of the 4" and 6" trays exceed the design weight (at 100% cable fill) of 35 psf by 1 and 4 psf, respectively. Please provide Cygna with the following items:

- a) The basis for Thermolag weights as listed in column 4, Table 1 of the above instruction, and;
- b) An evaluation of the actual loading conditions for the 6" trays noted above as related to the allowable loads for the design of cable trays and supports.

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2. Bolted connections may be employed to attach the cable trays to tray supports. During the Phase 4 review Cygna noted instances where the reduction in flange area of the supporting beam due to the bolt hole was not considered. Typically such beams were standard and miscellaneous channel sections (e.g., C4 x 7.25, C6 x 8.2 and MC6 x 12). According to Cygna's calculations, the area reduction for a C4 x 7.25 would be 24.9% or .13 square inches. Section properties for the beams in question have not been reduced in accordance with AISC specification 1.10.1. Please provide Gibbs & Hill's rationale for employing properties based on an unreduced cross-section.