



101 California Street, Suite 1000, San Francisco, CA 94111-5894

415/397-5600

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84056.026

Mr. J. B. George
Project General Manager
Texas Utilities Generating Company
Comanche Peak Steam Electric Station
Highway FM 201
Glen Rose, Texas 76043

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

Dear Mr. George:

Cygn conducted a walkdown of the various cable tray supports to assure that the as-built condition properly reflects the designed support. Several discrepancies were discovered during the course of the walkdown. These discrepancies are listed in Attachment A. Please provide the information requested for each item.

If there are any questions, don't hesitate to call.

Very truly yours,

N. H. Williams
Project Manager

dmm

Enclosure

cc: Mr. S. Burwell (US NRC)
Mr. S. Treby (US NRC)
Mr. D. Wade (TUGCO)
Ms. D. Van Amerongen (EBASCO/TUGCO)
Mrs. J. Ellis (CASE)
Mr. R. Ballard (G&H)

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ATTACHMENT A

CABLE TRAY SUPPORT WALKDOWN QUESTIONS

Cable Tray Supports - Concrete Expansion Anchors

References:

1. Brown & Root, Inc., Instruction CEI-20, revision 9. "Installation of Hilti Drilled in Bolts."
2. Brown & Root, Inc., Drawing FSE-00179, revision 14. "Attachments for Cable Tray Hangers."
3. Gibbs & Hill, Inc. Drawing 2323-S-0901, revision 4.
4. Gibbs & Hill, Inc. Drawing 2323-S-0903, revision 5
5. Gibbs & Hill, Inc. Drawing 2323-S-0905, revision 2.

Cygn conducted field inspections for selected cable tray supports within the project scope. For a number of inspected supports, discrepancies were noted between the installed anchorage configuration and that specified in references 1 through 5. Table 1, attached, provides a listing of these supports and a description of the discrepancies.

The results are discussed below.

1. Incorrect Type of Hilti Anchor Bolt

Many of the typical connection details for cable tray supports (references 2 through 5) require the installation of Hilti Super Kwik Bolts. The method of identification for installed Hilti bolts is defined in reference 1, paragraph 3.1.3.3:

Hilti Super Kwik Bolts shall be additionally marked with a "star" on the end which will remain exposed upon installation. This marking will be performed by the craft in a manner which does not obliterate the length marking. The stamp shall be controlled by the cognizant QC Inspector.

Cygn noted the Hilti bolts for inspected hangers which required Super Kwik Bolts were not stamped with a star (*). These results indicate that the installed bolts may be Hilti Kwik Bolts instead of Super Kwiks or the craft and QC are not following established procedures.

Please determine what type of bolts are actually installed by means of existing documentation and justify any discrepancies between the design and installation if necessary.

ATTACHMENT A

CABLE TRAY SUPPORT WALKDOWN QUESTIONS

2. Incorrect Anchor Bolt Diameter

Cable tray support number 332 is a type Detail "A" as shown on drawing 2323-E1-0700-01-S. Cygna's walkdown results indicate that this support uses three 1" (P) Hilti Kwik Bolts. Reference 2, sheet 19, indicates that connection is to be per Detail "C" shown on reference 4. Reference 3 requires 1-1/4" diameter Hilti Super Kwik Bolts with embedments of 8-1/2", 10-5/8" or 13-1/8" depending on the attachment eccentricity.

Please provide Cygna with justification and documentation for the use of 1" diameter Hilti Kwik Bolts.

3. Insufficient Number of Bolts

Cable tray support number 408 is a type B₄. Cygna's inspection indicates that the north leg of this support is attached to the bottom of a concrete beam with one anchor bolt. Reference 2, sheet 7 indicates that case B₄ requires two 1-1/4" x 10-5/8" Hilti Super Kwik Bolts.

Please provide Cygna with justification and documentation for using a one-bolt connection.

4. Insufficient Embedment Length

Cable tray support number 481 is a type L-A₄. Cygna's walkdown results indicate that the lower brace of this support is attached with two 1-1/4" (T) Hilti Kwik Bolts. Reference 2, sheet 4 "Hanger and Brace Connection for Longitudinal Cable Tray Supports - Using Hilti Bolts" requires that case L-A₄ employ two 1-1/4" x 13-1/8" Hilti Super Kwik Bolts to attach the brace. A bolt of length code "T" (12" - 13") cannot provide 13-1/8" embedment.

Please provide Cygna with justification and documentation for the use of an anchor bolt with a smaller embedment length than specified by the design drawings.

5. Support Number 3026, Type SP-4, Gibbs & Hill Drawing 2323-S-0903

Cygna's walkdown noted that the spacing of a 1-1/4" (U) Hilti Kwik expansion anchor is 8-1/2" from a 1-1/4" bolt on support number 3360. This spacing is less than the 10 bolt diameter requirement. No reduction in bolt capacity has been calculated for either bolt in accordance with Gibbs & Hill specification 2323-SS-30, revision 1.

Please provide Cygna with justification and documentation that the capacities of the anchor bolts for each support are adequate to

ATTACHMENT A

CABLE TRAY SUPPORT WALKDOWN QUESTIONS

resist the applied loads when bolt spacing and the installed configuration (reference Cygna letter 84042.022, question 5) are considered.

6. Cygna's Phase 4 review of the cable tray supports included an assessment of whether or not the design requirements such as: member size, bolt diameter, and weld configuration, were all properly represented on the Gibbs & Hill design drawings as well as the Brown & Root FSE-00159 and FSE-00179 series construction drawings. Cygna's reviewers, who were familiar with the design requirements, were not able to easily determine from the FSE series drawings which concrete connections were required for a given hanger frame configuration. References on the FSE-00179 drawing refer to the Gibbs & Hill design drawings rather than another sheet of the FSE-00179 series.

The FSE-00159 drawing series does not specify the concrete connection to be used for the specific support. Rather, note 1 of all FSE-00159 drawing sheets states that the connection configuration is to be selected by the contractor in accordance with Brown & Root drawing FSE-00179 (reference 1). Brown & Root construction procedure ECP-10, revision 6 also specifies in section 3.1.2.2 that the selection of the concrete connection detail shall be made in the field by the contractor in accordance with construction FSE-00179 (reference 1).

Cygna is concerned that if someone familiar with the design calculations and assumptions has difficulty with identifying the appropriate connection detail, how can one reasonably expect construction personnel to choose the correct connection detail. Please provide Cygna with the following:

- (1) A detailed description of the procedures which specify the process the contractor uses to select the appropriate connection details.
- (2) The process or procedure by which quality control inspectors verify that the appropriate concrete connection detail has been installed.

TABLE 1.
CABLE TRAY SUPPORT ANCHORAGE DISCREPANCIES

Support	Support	Anchor Bolt Configuration Per Field Inspection (See Note 2)	Anchor Bolt Requirements (See Note 3)	Comments
202	Case A ₄	North Leg: One 1-1/4" (T) HKB South Leg: Two 1-1/4" (T) HKB	One 1-1/4" x 10-5/8" HSKB or Two 1-1/4" x 8-1/2" HSKB per FSE-00179 Sheet 6	1. Requires Hilti Super Kwik Bolts
332	Detail "A" 2323-E1- 0700-01-S	Three 1" (P) HKR	Three 1-1/4" x 8-1/2" HSKB per FSE-00179, Sheet 19, use Detail "C" on S-0903 and per 2323-S-0903, Detail "C"	1. Wrong Bolt Diameter 2. Requires Hilti Super Kwik Bolts
408	Case B ₄	North Leg: One bolt (size not determined)	Two 1-1/4" x 10-5/8" HSKR per FSE-00179, Sheet 7	1. Requires minimum of two bolts
455	Case SP-R	Wall Attachments: Two 1-1/4" (T) HKR each South: spacing (h) = 15", attachment below lower bolt North: spacing (b) = 21", e = 0.20h	Two 1" x 7" HKR, e < 0.2h per FSE-00179, Sheet 1, Detail R and 2323-S-0903, Case SP-8	1. Angle must attach between two anchor bolts on wall clip
479	Detail "C" 2323-E1- 0500-01-S	Two 1-1/4" (T) HKB	Two 1-1/4" x 8-1/2" HSKB per FSE-00179, Sheet 19, the support connections are the same as SP-1. Reference 2323-S-0903 for Case SP-1.	1. Requires Hilti Super Kwik Bolts

TABLE 1.
CABLE TRAY SUPPORT ANCHORAGE DISCREPANCIES

Support	Support	Anchor Bolt Configuration Per Field Inspection (See Note 2)	Anchor Bolt Requirements (See Note 3)	Comments
481	Case L-A ₄	Legs: Two 1-1/4" (T) HKB each Upper Brace: Two 1-1/4" (P) HKB Lower Brace: Two 1-1/4" (T) HKB	Legs: Two 1-1/4" x 10-5/8" HSKB Upper Brace: Two 1" x 7" HSKB Lower Brace: Two 1-1/4" x 13-1/8" HSKB per FSE-179, Sheet 4	1. Leg connection requires Hilti Super Kwik Bolts 2. Lower brace requires Hilti Super Kwik Bolts of a greater length
580	Case A ₁	Legs: One 1-1/4" (T) HKB each	Legs: One 1-1/4" x 8-1/2" HSKB per FSE-00179, Sheet 6	1. Requires Hilti Super Kwik Bolts
590	Case A ₁	West Leg: One 1-1/4" (T) HKB East Leg: One 1" R.I. and one 1-1/4" (P) HKB	One 1-1/4" x 8-1/2" HSKB or Two 1" x 7" HKB per FSE-00179, Sheet 6	1. West Leg requires Hilti Super Kwik Bolt
605	Detail A 2323-E1- 0500-04-S	Two 1-1/4" (T) HKB	Two 1-1/4" x 8-1/8" HSKB per FSE-00179, Sheet 19	1. Requires Hilti Super Kwik Bolts
648	Case A ₁	Legs: One 1-1/4" (T) HKB each	Legs: One 1-1/4" x 8-1/2" HSKB per FSE-00179, Sheet 6	1. Requires Hilti Super Kwik Bolts

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Support	Support	Anchor Bolt Configuration Per Field Inspection (See Note 2)	Anchor Bolt Requirements (See Note 3)	Comments
649	Case A ₁	Two 1-1/4" (T) HKB on a common angle shared by both legs.	Two 1-1/4" x 13-1/8" HSKB per 2323-S-0903, Detail 1 Alternate and Note 2 for Detail 1	1. Requires Hilti Super Kwik Bolt of a greater length
722	Detail "N" 2323-E1- 0601-01-S	Brace: Two 1-1/4" (W) HKB spacing (b) = 16" eccentricity (e) = 8" (brace is attached at top bolt)	Brace: Two 1" x 7" HKB 12" < b < 30", e < 0.3b per FSE-00179, Sheet 19	1. Brace attachment eccentricity exceeds allowable
758	Detail "V" 2323-E1- 0601-01-S	Legs: Two 1-1/4" (T) HKB each	Two 1-1/4" x 8-1/2" HSKB per FSE-00179, Sheet 19: "Case B ₃ ," and Case B ₃ , Sheet 7	1. Requires Hilti Super Kwik Bolts
2602	Detail "W" 2323-E1- 0601-01-S	Fast End Attachment to Wall Two 1-1/4" (U) HKB	Two 1-1/4" x 10-1/2" HSKB per CMC 32513, Rev. 1, Sheet 3/4	1. Requires Hilti Super Kwik Bolts
2989	Case A ₄	Legs: One 1-1/4" HKB each (length stamp illegible)	One 1-1/4" x 8-1/2" HSKB per FSE-00179, Sheet 6	1. Requires Hilti Super Kwik Bolts

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Support	Support	Anchor Bolt Configuration Per Field Inspection (See Note 2)	Anchor Bolt Requirements (See Note 3)	Comments
2998	Special Type per CMC 6114	Base Plate: Three 1-1/4" (U) HKB	Three 1-1/4" x 8-1/2" HSKB per CMC 6114, Rev. 6, Sheet 2	1. Requires Hilti Super Kwik Bolts
3026	Case SP-4 (Omit Brace)	Reams: Two 1-1/4" (U) HKB each at wall	Two 1-1/4" x 10-5/8", HSKB per FSE-00179 "Special Case Attachment Chart," Sheet 2 and Detail D, Sheet 1	1. Requires Hilti Super Kwik Bolts
3134	Detail "11" 2323-S-0905	Beam: Four 1-1/4" HKB Braces: Two 1-1/4" HKB	Beam: Four 1-1/4" x 13-1/8" HSKB per 2323-S-0905, Section 11A - 11A Brace: Two 1-1/4" x 10-5/8" HSKB per 2323-S-0903, Detail G	1. Requires Hilti Super Kwik Bolts
5807	Case L-A ₁	Base Angle: Three 1-1/4" (T) HKB each	Three 1-1/4" x 10-5/8" HSKB per FSE-00179, Sheet 4	1. Requires Hilti Super Kwik Bolts
629	Case SP-7 w/Brace	Brace: Two 1-1/4" (U) HKB	Brace: Two 1-1/4 x 8-1/2" HSKB, per DCA 2769, Rev. 4, Page 2	1. Requires Hilti Super Kwik Bolts
720	Case SP-7	Beam: Two 1-1/4" (T) HKB	Beam: Two 1-1/4" x 10-5/8" HSKB, per FSE-00179, Sheet 2, Section A-A	1. Requires Hilti Super Kwik Bolts

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Support	Support	Anchor Bolt Configuration Per Field Inspection (See Note 2)	Anchor Bolt Requirements (See Note 3)	Comments
790	Case (2) SP-7	Beam: Three 1-1/4" (U) HKB	Beam: Three 1-1/4" x 10-5/8" HSKB, per FSE-00179, Sheet 2 "Multiple SP-7 Supports"	1. Requires Hilti Super Kwik Bolts
2920	Case (2) SP-7 w/Brace	Brace: Two 1-1/4" (T) HKB	Brace: Two 1-1/4" x 8-1/2" HSKB per DCA 2769, Rev. 4, Page 2	1. Requires Hilti Super Kwik Bolts
3023	Detail "F" 2323-E1- 0601-01-S .	Three 1-1/4" (T) HKB	Three 1-1/4" x 10-5/8" HSKB per FSE-00179, Sheet 19: "Similar to SP-7" Sheet 2: "Multiple SP-7 Supports"	1. Requires Hilti Super Kwik Bolts

NOTES:

- The following abbreviations are used:

RI = Richmond Inserts
HKB = Hilti Kwik Bolts
HSKB = Hilti Super Kwik Bolts

- The field inspection determined bolt diameter and length code. Length codes shown as (U), (T), (P), etc., per CEI-20, Attachment 4, revision 9, which lists overall bolt length.
- Anchor bolt requirements given are the bolt diameter and minimum embedment length as specified in Note 14(e) on drawing 2323-S-0901, revision 4.