

The Light company

Houston Lighting & Power P.O. Box 1700 Houston, Texas 77001 (713) 228-9211

June 10, 1981
ST-HL-AE-682
SFN: V-0530

50-498
50-499

81-459-000
Bart 21

Mr. Karl Seyfrit
Director, Region IV
Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76012

Dear Mr. Seyfrit:

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Third Interim Report Concerning
HILTI Kwik - Bolt
Expansion Anchors



On December 12, 1980, pursuant to 10CFR50.55(e), Houston Lighting & Power Company (HL&P), notified your office of an item involving a 10CFR21 notification by HILTI Inc. concerning the average ultimate tensile loads of their 1 inch concrete expansion anchors. Subsequently, on May 12, 1981, HL&P notified your office of preliminary results for an on-site testing program to confirm the average ultimate tensile load capacities, for concrete expansion anchors. The preliminary results identified potential concerns with respect to several diameters of concrete expansion anchors manufactured by HILTI Inc. Please find attached our third interim report regarding this item. The next interim report will be submitted to your office by September 4, 1981.

If you have any questions concerning this matter, please contact Mr. Michael E. Powell at (713) 676-8592.

Very truly yours,

G. W. Oprea, Jr.

G. W. Oprea, Jr.
Executive Vice President

MEP/flj
Attachment

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Third Interim Report
Concerning HILTI Kwik-Bolt
Concrete Expansion
Anchors

As previously identified in the Second Interim Report concerning this item, Houston Lighting & Power has conducted an on-site testing program to confirm the average ultimate tensile load capacity values for HILTI Kwik-Bolts. The results of the test are being evaluated by Engineering, however, preliminary findings are:

- a. Generally, expansion anchors installed in concrete supplied to STP develop the capacity to carry loads equal to or greater than the capacities as published in the supplier's design manual.
- b. Expansion anchors tested at less than 28 days concrete age show a lower load carrying capacity than those tested at 28 days or more.
- c. In grout, a significant number of test results fell below the vendor's published values of the ultimate capacity of expansion anchors in concrete. There are, however, no ultimate load values for expansion anchors used specifically in grout.
- d. Non-perpendicularity of the expansion anchor in concrete or grout does not appear to affect the ultimate capacities when held within 6 degrees of normal.
- e. Torque relaxation amounts to about 25 percent of installation torque within 24 hours with 50 percent of that amount occurring in the first hour.
- f. Expansion anchors installed at the minimum embedment of 4.5 times the diameter and tested in tension generally caused a concrete shear cone type failure while embedments of 6 times the diameter and greater caused wedge slippage type failure.
- g. The 1/4 and 1/2 inch sizes of expansion anchors had the greatest number of failures in tension, while the 1/4, 3/8, and 1/2 inch sizes had the largest number of shear failures.

Although a relatively large number of bolts have been used at STP, only a small percentage have been permanently installed in safety-related applications. These safety-related applications include pipe supports and restraints, cable tray supports, and HVAC hanger supports.

As an immediate response to this concern the supplier has been informally advised of the preliminary test results which indicate ultimate values. Final test results as presented in the testing agency's report are being evaluated for safety significance and need for corrective action. Recurrence control will be provided through revisions, as necessary, to design criteria documents and appropriate construction procedures. The testing agency's report will provide the

bases for revisions to these documents. Designs will then be reviewed and revised as required relative to any revision of the design criteria documents.

A determination of the safety significance of this concern is pending review and evaluation of the data and information presented in the testing agency's report.