

POLING



Public Service Company of Colorado

July 3, 1979
Fort St. Vrain
Unit No. 1
P-79143

Mr. Karl V. Seyfrit
Director, Region IV, I&E
Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Docket: #50-267

Subject: IE Bulletin 79-02, Base Plate
Designs Using Concrete Expansion
Anchor Bolts

Gentlemen:

The following is in response to the items in IE Bulletin 79-02 dated March, 1979 and Revision 1 dated June 21, 1979:

Item 1. Determine If Base Plate Flexibility Was Accounted For In The Calculation Of Anchor Bolt Loads.

The majority of the base plates attached to concrete at Fort St. Vrain fall into the flexible range based on the criteria set forth in IE Bulletin 79-02. This is based on an analysis of ninety (90) Class I hangers picked at random which represent approximately 10% of all hangers attached to concrete. This sample of 90 hangers was reanalyzed to calculate the bolt loads and adequacy of the expansion anchors. The design base seismic loads and the appropriate shear-tension interaction formula was used to evaluate the expansion anchors. The base plate was assumed to act as a rigid body and a linear distribution of compressive stress upon the concrete was assumed. The analysis took into account the actual bolt spacing and edge distance.

One hanger out of the sample size was determined to not have a four (4) to one (1) factor of safety against pullout. The calculated factor of safety was 2.8 to 1 against pullout for this hanger. Based on PSC results the design is determined to be conservative, therefore, we consider this item closed and no further action is required.

Item 2. Anchor Bolt Factor Of Safety

Of the 90 hangers and corresponding bolts evaluated all but one had the required minimum safety factor of four (4) against pullout. See the response to Item 1.

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Item 3. Cyclic Loads

During the investigation it was found that the bolts in some hangers, were not torqued down to their proper value. However, in all cases the concrete expansion anchor itself was not loose and we were able to properly tighten the bolts. To protect against possible cyclic problems of bolts working loose we have instigated a program to check all Class I concrete expansion anchor bolts for proper bolt torque and that they be retorqued if necessary. This program shall be evaluated after one year using a sampling technique to determine how often torquing is required to maintain proper torque values on bolts. We will consider this item closed upon completion of the torque checking program.

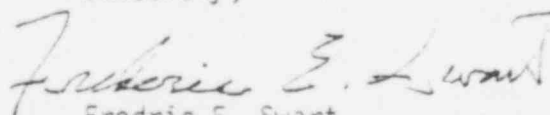
Item 4. Field Verification, a. Cyclic Conditions
b. Bolt Configuration

a. Of the 90 hangers checked in the field several were found that were not torqued down to their proper value. As mentioned in Item 3, this problem will be resolved once the field torque program is completed. The concrete expansion bolts shall be pretensioned to the values specified by the manufacture.

b. Ten of the 90 hangers audited had discrepancies such as improper bolt size, missing bolt, or bolt spacing, when compared to the design hanger drawing. However, upon reanalysis of these hangers as installed, all but one (1) met the design requirements. The one in particular had one bolt missing. No discrepancies were encountered with such items as adequate thread engagement, edge distance, and plate bolt hole size.

To summarize, in our opinion, no problem exists with the concrete expansion anchors, in either the design or installation.

Sincerely,



Fredric E. Swart
Nuclear Project Manager

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