

Washington Public Power Supply System

Box 1223 Elma, Washington 98541 (206) 482-4428

Docket Nos. 50-508 and 50-509

Mr. R. H. Engleken
U. S. Nuclear Regulatory Commission
Suite 202, Walnut Creek Plaza
1990 N. California Boulevard
Walnut Creek, California 94596

September 25, 1981
G03-81-2470

Dear Mr. Engleken:

Subject: NUCLEAR PROJECT NOS. 3 AND 5
IE BULLETIN NO. 79-02, REVISION NO. 2
"PIPE SUPPORT BASE PLATE DESIGNS USING
CONCRETE EXPANSION ANCHOR BOLTS"



- Reference:
- 1) Letter, D. L. Renberger to R. H. Engleken, "same subject", dated May 14, 1981, G03-81-1069.
 - 2) Letter, R. S. Leddick to R. H. Engleken, "same subject", dated July 21, 1981, G03-81-2262.

The referenced letters advised the NRC that the Supply System was conducting an assessment of concrete expansion anchor usage on the WNP-3/5 projects to confirm compliance with criteria contained in IE Bulletin 79-02. Attached are the results of that assessment. In summary; all Class I piping supports have been inventoried to identify expansion anchors usage, the designs have been evaluated to confirm compliance with IE Bulletin 79-02, and administrative design practices reviewed and formatted to maintain current the inventory.

Should you have any questions concerning this response, please contact me.

Very truly yours,

R. S. LEDDICK
Program Director

Attachments

- cc: D. Smithpeter (BPA)
J. A. Adams (PP&L)
M. K. Yates (NYO)
Ebasco, Elma
WNP-3/5 Files, Richland

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3. Cyclic Load

Teledyne Engineering Services Technical Report TR-3501-2 "Summary Report, Generic Response to USNRC I & E Bulletin Number 79-02 Base Plate/Concrete Expansion Anchor Bolts", dated August 30, 1979 concludes that:

- a) Cyclic loading does not decay the ultimate capacity of the anchor
- b) Constant shear loading during cycling does not decay the ultimate capacity of the anchor
- c) Preload as high as design load is not required to develop cyclic capacity. All TES tests were run with bolt tightened in accordance with manufacturer's instructions.

Therefore, the factor of safety in the design of anchor bolts as specified in Item 2 above provides enough margin to withstand cyclic loads.

4. QC Documentation

During the installation and inspection of the bolts and plates, installation contractors are required to meet Ebasco Specification 467 which equals or exceeds those requirements in IE-79-02. No drilled-in expansion anchors for Class I piping have been installed to date.

5. Use in Concrete Block Walls

Drilled-in concrete anchors are not used in any piping support designs attaching to concrete block walls.

6. Direct Attachment of Structural Shapes

Drilled-in concrete anchors are not used in any piping support designs for direct attachment of structural shapes to concrete.

7. Testing During Extended Outage

N/A

8. Documentation of Sampling Inspection for Holders of Operating Licenses

N/A

9. Completion of Items 5 and 6 for Installed Pipe Supports

N/A

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
PROJECTS 3 AND 5

Drilled-In Expansion Anchors
WPPSS Quality Class I Piping Supports

The original design of Class I piping supports has used base plates with drilled-in concrete anchors where embedded base plates or "through bolts" could not be specified in time for concrete placement. In the future, as in the past, the design will specify drilled-in concrete anchors only where absolutely necessary.

The first usage of base plates with drilled-in concrete anchors was specified in May 1980 for small bore Safety Injection piping in the RAB between elevations 335' and 362', and in October 1980 for Diesel Generator large bore piping between elevations 390' and 417'.

As of June 30, 1981 utilizing the NRC Bulletin IE 79-02 criteria, fifteen (15) large bore and seventy-one (71) small bore support drawings have specified concrete anchors in the original design. This was due to a design release date later than concrete pour date.

The following summarizes the assessment of expansion anchors utilization on the WNP-3/5 Project.

A. An Inventory of the Current Usage of Expansion Anchors

An inventory of Class I piping supports current to 7/1/81 has been established.

B. Assessment of Each Use to Establish Its Compliance with the Bulletin 79-02

All of the plates and anchors identified in the inventory have been designed to the requirements of the IE Bulletin 79-02. All nine requirements of the Bulletin are in compliance as described below.

1. Pipe Support Base Plate Flexibility

Ebasco utilizes both rigid and flexible plate design analytical methods to verify adequacy per NRC Bulletin 79-02 before the designs for base plates are released. Rigid plate designs are generally used for small bore and standard plate arrangements when justified analytically or by IE-79-02 criteria. "ANSYS" finite element program for base plate and anchorage nonlinear analysis is one of several analytical methods being used by Ebasco to account for baseplate flexibility in the calculation of anchor bolt loads. The program has special features available which can generate spring constants of the concrete, consider the pretension of the anchors, consider the friction between the baseplate and concrete surfaces, and consider the location, number of bolts and the attachments.

2. Minimum Factor of Safety on the Bolt Design Load

The current Ebasco Specifications 3240-467 for use of drilled-in concrete expansion anchors specifies factors of safety of 4 for both shear and tension loads, which is the factor of safety of 4 required by 79-02 for wedge type anchor bolts.