UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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TO BE FILED IN Hearing File

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November 7, 1978

James L. Kelley
Acting General Counsel
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

In the Matter of Virginia Electric and Power Company
(North Anna Nuclear Power Station, Units 1 and 2)
Docket Nos. 50-338 OL and 50-339 OL

Dear Mr. Kelley:

Enclosed are recent memoranda discussing certain problems experienced in connection with pipe support base plate design. The NRR Staff has informed us that the problems discussed in Mr. Stello's memorandum dated September 28, 1978 are applicable to the North Anna Units 1 and 2 facility, and that DSS is presently reviewing this aspect of piping design analysis on a case-by-case basis under SRP section 3.9.3 - ASME Codes 1, 2 and 3 Components, Component Supports and Core Support Structures. If the Commission wishes additional information, please let us know.

Sincerely,

Stuart A. Treby

Stuart A. Treby
Assistant Chief Hearing
Counsel for NRC Staff

Enclosure: Memo 9/28/78
Stello to Grossman (w/encls)

cc: See page 2

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cc w/enclosure:

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UNITED STATES
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SEP 28 1978

MEMORANDUM FOR: Milton J. Grossman, Hearing Division Director and Chief Counsel, OELD

FROM: Victor Stello, Jr., Director Division of Operating Reactors, NRR

SUBJECT: BOARD NOTIFICATION - PIPE SUPPORT BASE PLATE DESIGN

The attached memorandum to Roger Mattson, dated June 28, 1978, presents information concerning failures of safety-related pipe supports at Millstone 1 and design deficiencies on similar equipment at Shoreham Unit 1. As indicated in the attachment, two factors appeared to contribute to failure of anchor-bolt connections of pipe supports. These are, 1) the design assumption that base plates perform structurally as rigid load-bearing members when they may be flexible members, and 2) incorrect anchor bolt torquing.

Recent audits of Architectural Engineering firms and assessments of the actions taken at Millstone, as noted in the attachment, provided the following general information:

1. During the last few years, the A/Es have changed their design and installation procedures for concrete embedded pipe supports.

2. Past and current design and installation procedures vary among the A/Es.

3. In the past many of the pipe support designs have been contracted, and were done with methods not known by the principal A/Es.

We have concluded that the more detailed information required must be obtained from each operating facility. We are preparing a generic

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letter to each operating facility requesting detailed design, installation, and testing information of concrete-embedded anchor-bolted pipe supports of safety-related equipment.

We recommend that this information be provided to the following Boards:

1. Monticello (FTL)
2. Indian Point 1,2,3 (Seismic Design)

We will provide an assessment of this issue upon completion of our evaluations.

Victor Stello, Jr., Director
Division of Operating Reactors
Office of Nuclear Reactor
Regulation

Enclosure:
June 28, 1978 memo, Stello to Mattson

cc w/enclosure:
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WASHINGTON, D. C. 20555

JUN 02 1978

MEMORANDUM FOR: B. K. Grimes, Assistant Director
for Engineering and Projects, DOR

D. G. Eisenhut, Assistant Director
for Systems and Projects, DOR

FROM: Acitng Branch Chief,
Engineering Branch, DOR

SUBJECT: PIPE SUPPORT BASE PLATE PROBLEM

The Engineering Branch, Division of Operating Reactors, has contacted Bechtel, Bergen - Paterson, Gilbert, and Stone & Webster in regard to their past and current design procedures for support base plates utilizing drilled anchor bolts. Bechtel and Stone & Webster indicated that they became aware of base plate flexibility effects on anchor bolt pull-out loads within the past couple of years and are now considering this in current designs. Gilbertand Bergen - Paterson indicated they are using rigid plate assumptions for calculating bolt loads.

Review of the support redesigns at Millstone shows a considerable increase in base plate thickness and anchor bolt sizes over the previous design. The original designs by Bergen - Paterson did not meet the current rigidity requirements used by Stone & Webster. Design deficiency reports by Long Island Lighting Company on Shoreham show that consideration of base plate flexibility has increased the pull-out loads on some bolts, and inspection of the supports has shown that approximately 55 percent of the anchor bolts had incorrect embedment lengths.

Currently, I&E is considering whether Stone & Webster should be investigated for a Part 21 deviation and will be further investigating this matter.

The Engineering Branch considers the problem at Millstone where several support plates were pulled out to be a combination of base plate flexibility and anchor bolt design problems. Since the anchor bolts were never tested for cyclic loadings, and the lines at Millstone experienced flow induced vibrations, the capability of the anchor bolts to withstand cyclic loadings should be addressed.

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Based on the above information, the Engineering Branch recommends that this be considered a generic item for all operating plants, and a vendor inspection program be implemented with I&E to review the vendor design procedures used for analyzing support base plates utilizing drilled anchor bolts along with the field installation procedures utilized in installing the anchor bolts. Also, the load rating techniques used by the anchor bolt manufacturers for cyclic loadings should be reviewed. The Engineering Branch has talked with I&E and consider the vendor inspection program to be the most efficient method of completing the necessary review. The Engineering Branch estimates approximately 15 man-weeks will be required to review design procedures used by vendors and A/E firms. The Engineering Branch will set up a meeting with both AD's to determine the interface between the Engineering Branch and I&E required to implement the review.

The Engineering Branch is in the process of preparing a feedback memo to DSS on the base plate problem which is expected to be completed by June 9, 1978.

Original signed by:

V. S. Noonan, Acting Branch Chief
Engineering Branch
Division of Operating Reactors

cc: V. Stello, Jr., DOR
H. Rutherford, IE
U. Potopous, IE
R. Mattson, DSS
J. P. Knight, DSS
R. Bosnak, DSS