SARGENT & LUNDY
ENGINEERS
FOUNDED BY FREDERICK SARGENT-1891
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603
TELEPHONE - 312-269-2000
CABLE ADDRESS - SARLUN-CHICAGO

G. C. KUHLMAN
PARTNER
312-269-3751

February 4, 1980

The Cincinnati Gas & Electric Company
Wm. H. Zimmer Station - Unit 1

Commonwealth Edison Company
La Salle County Station - Units 1 and 2

NUPIPE

1940 302

Mr. Mark Hartzman
Seismic Review Group
Division of Operating Reactors
Nuclear Regulatory Commission (NRC)
Washington, D. C. 20555

Dear Mr. Hartzman:

It is my understanding that you recently contacted our Mr. C. F. Beck by telephone, and asked whether Sargent & Lundy has used the NUPIPE Computer Program in the analysis of any piping systems on our projects. It is my understanding that Mr. Beck explained to you that we had hired Nuclear Services Corporation to perform some pipe analysis work on both the Zimmer - Unit 1 and La Salle - Units 1 and 2 generating stations. It is also my understanding that we explained to you that to the best of our understanding, all of the work on Zimmer and La Salle was on non-safety-related systems.

The reason for your asking the question was, to the best of my understanding, related to the recent problems brought forth in the NRC IE Information Notice No. 79-36, which was distributed on January 2, 1980.

I am enclosing a copy of a letter dated January 28, 1980 from Mr. R. H. Dempsey of Nuclear Services Corporation in response to a letter that I sent to Mr. Naymark of Quadrex Corporation dated January 24, 1980 on this subject. I am also enclosing a copy of my letter to Mr. Naymark and the attachments which were enclosed with that letter, for your information.

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SARGENT & LUNDY
ENGINEERS
CHICAGO

Based upon a review of the Nuclear Services Corporation letter dated January 28, 1980, Sargent & Lundy has concluded that the problem that was brought forth in NRC IE Information Notice No. 79-36 did not exist on any of the work performed by Nuclear Services Corporation in either of the Zimmer or La Salle projects.

I will assume the information provided you with this letter will satisfactorily alleviate the concerns that you raised in your conversation with Mr. Beck.

Yours very truly,

G. C. Kuhlman
Project Director

GCK:clm
In duplicate
Enclosure
Copies:
W. A. Chittenden (1/1)
W. G. Hegener (1/1)
R. J. Mazza (1/1)
R. F. Scheibel (1/1)
C. F. Beck (1/1)
E. B. Branch (1/1)

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NUCLEAR SERVICES CORPORATION
A DIVISION OF QUADREX CORPORATION
1700 DELL AVENUE CAMPBELL, CALIFORNIA 95008 TELEPHONE (408) 446-2500 TWX 910-590-2438

January 28, 1980

Mr. G. C. Kuhlman
Sargent & Lundy
55 East Monroe Street
Chicago, Ill 60603

Subject: Zimmer and LaSalle Projects - NUPIPE ELASTOJOINT Problem

Reference: 1) Letter from G. C. Kuhlman (Sargent & Lundy) to S. N. Naymark (Quadrex) dated January 24, 1980

2) Letter from M. D. Barentsen (CDC) to C. Beck (Sargent & Lundy) dated January 16, 1980

3) Letter from S. N. Naymark (Quadrex) to R. Petersen (CDC) dated December 19, 1979

Dear Mr. Kuhlman:

Per your request, Reference 1, we have reviewed our records of the pipe stress analyses performed by Nuclear Services Corporation for the Wm. H. Zimmer Station - Unit 1 and LaSalle County Station - Units 1 and 2 (P.O. #CD-3021).

The results of this review indicate that the four conditions, which are necessary in order for the problem to arise, do not exist. Hence, the flaw described in References 1 through 3 does not exist in any of the analyses which we have performed for Sargent & Lundy.

I hope that this response satisfies your concerns in this matter. If you have any questions, please feel free to contact me.

Yours truly,

R. H. Dempsey

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R. H. Dempsey
Senior Vice President
Operations and Projects

RHD/bd

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G. C. KUHLMAN
PARTNER
312-269-3751

January 24, 1980

The Cincinnati Gas & Electric Company
Wm. H. Zimmer Station - Unit 1

Commonwealth Edison Company
La Salle County Station - Units 1 and 2

NUPIPE

Mr. Sherman Naymark
President
Quadrex Corporation
1700 Dell Avenue
Campbell, California 95008

Dear Mr. Naymark:

Quadrex Corporation has in the past, and is presently performing piping weight, thermal and seismic analysis under contract to Sargent & Lundy on the Zimmer project for The Cincinnati Gas & Electric Company and the La Salle project for Commonwealth Edison Company. Since this activity has, and presently is being performed by your organization, it is necessary to have you provide us an assessment of the recent occurrences that have been brought forth in various documents regarding the use of the NUPIPE computer program that it is our understanding you have used in these activities.

Sargent & Lundy has received a letter from Control Data Corporation dated January 16, 1980, appended to which is a letter from you to Control Data Corporation dated December 19, 1979, pertaining to the fact that an NRC 10CFR21 has been filed relating to some technical problems relating to the NUPIPE computer program. These letters are, likewise, directly related to a recent NRC IE Information Notice No. 79-36 that was distributed on January 2, 1980.

We, therefore, require that Quadrex provide Sargent & Lundy with written information to verify the following:

1. Determine if any safety-related systems were analyzed by Quadrex on the Zimmer and La Salle projects where the problem, as outlined with the NUPIPE system, could have caused possible flaws in the output data from the analysis. If this has occurred on any of the analysis

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work performed on these projects, it will be necessary for Quadrex to verify to Sargent & Lundy that they have taken the appropriate corrective action on such analysis to verify acceptability or the need for any changes to the design output information that you have developed.

2. Determine whether any analysis was performed on any non-safety-related systems. We will require confirmation from you that either will state that the problem with the NUPIPE computer code does not apply to systems analyzed, or that you have taken the necessary corrective action to verify that the design must be either corrective or is acceptable.

If you have any questions on the above, please contact me. We will be looking forward to a response to this letter at your earliest convenience.

Yours very truly,

G. C. Kuhlman
Project Director

GCK:clm
In duplicate
Attachments
Copies:
W. A. Chittenden (1/0)
W. G. Hegener (1/1)
R. J. Mazza (1/1)
R. F. Scheibel (1/1)
C. F. Beck (1/0)
E. B. Branch (1/1)

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Mailing Address/Box O
Minneapolis, Minnesota 55440

CONTROL DATA CORPORATION

January 16, 1980

Mr. Charles Beck
Sargent and Lundy Engineers
55 East Monroe Street
Chicago, IL 60603

Dear Mr. Beck:

In accordance with the provisions of the NRC's 10CFR21, Control Data Corporation would like to inform you that an error has been detected in the current version of NUPIPE available on the CYBERNET network.

The error affects the calculation of stresses in piping systems. Specifically, the error would affect safety related piping designed to the ANSI B31.1.0 - 1976 code and where an ELBOW-ELASTOJT connection exists. A complete description of the problem can be found in the attached letter from the Quadrex Corporation.

As mentioned in the letter, the error should be corrected in mid-January at which time Control Data Corporation will re-install NUPIPE on the CYBERNET network. Should you have any questions or comments concerning this matter, please contact me at 612/853-6327.

Sincerely,

CONTROL DATA CORPORATION

M. D. Barentsen

M. D. Barentsen, Manager
Applications Quality Control
COMSOURCE

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Enclosure

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QUADREX CORPORATION 1700 DELL ..NUE CAMPBELL, CALIFORNIA 95008 TELEPH (408) 446-2500 TWX 910-590-2438
TELEX 35-2031

December 19, 1979

Mr. Ron Petersen
Manager, Western Region PS-SES
Control Data Corporation
215 Moffett Park Drive SVAFAC
Sunnyvale, CA 94086

Dear Mr. Petersen:

As of Monday, December 17, 1979, Quadrex Corporation has informed the Director, Office of Inspection and Enforcement, Nuclear Regulatory Commission, of a defect in a computer code used to calculate stresses in piping systems. This action is in compliance with the Code of Federal Regulations, Title 10-Part 21. The defect would only occur for those power plants where safety-related piping was designed to the ANSI B31.1.0 - 1976 Code and where an ELBOW-ELASTOJT* connection exists.

NUPIPE is a proprietary computer program which is used to calculate stresses in piping systems to determine the location and type of pipe hanger necessary to support and restrain piping. The conditions for which NUPIPE is used include ASME service level A, B, C and D loadings, including the design base seismic event. Although all piping moments, forces, deflecting and pipe restraint reaction loads calculated by NUPIPE are correct, the stress calculation of an ELBOW to ELASTOJT boundary element is incorrect. The NUPIPE program can calculate an incorrect stress only when all the following conditions exist:

- An ANSI B31.1.0 - 1967 Code version analysis is being conducted, and
- an ELBOW-ELASTOJT connection exists, and
- an absolute sum (MODFLEX combination) of two load cases is being formed, and
- the elbow torsional moment axis does not align with the ELASTOJT local x-axis.

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* An ELASTOJT element is an infrequently used element in the NUPIPE Code used to connect two piping node points with user supplied stiffness values.

QUADREX CORPORATION

The only incorrect values in the NUPIPE output, due to this defect, are the stresses at the ELBOW-ELASTOJT connecting node. Depending on the exact case, the correct stress may be lower or higher than the computed stress. It is unlikely, however, that a highly stressed location in which the correct stress would be significantly higher than the calculated stress, would have escaped attention since the stresses at the opposite (non-ELASTOJT) end of the elbow are computed correctly by NUPIPE.

NUPIPE has been issued since mid-1972. You should carefully review the work performed that has included NUPIPE analysis. The review should first determine if the four conditions described above do actually exist. If all four conditions do exist, the stresses at the ELBOW-ELASTOJT connecting node must be hand recalculated. Depending on the magnitude between the correct stress and the previously calculated stress, and the reanalysis of piping system:

- The differences may be negligible and no further action is required.
- Additional pipe hangers may be required at piping in the vicinity of the ELBOW-ELASTOJT boundary.
- The present pipe hangers in the vicinity of the ELBOW-ELASTOJT boundary may require modification to lower the pipe stresses so that Code allowables are not exceeded.
- For power plants that have been operating and the difference in the correct and calculated values are large, the effect on the design fatigue life will have to be considered.

The NUPIPE program is presently being modified to eliminate the defect and will be reissued as Version 1.4 in mid-January 1980.

Quadrex Corporation will continue to communicate to you any events which have a direct bearing on the defect NUPIPE or the ramifications of that defect.

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Very truly yours,

Sherman Naymark

Sherman Naymark, President
Quadrex Corporation

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