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SUBJECT: Forwards addl info re NRC Bulletin 79-14, "Torsional Moment Exclusion When Using USAS B31.1-1967 Power Piping Code."

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March 10, 1989

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Gentlemen:

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Kewaunee Nuclear Power Plant  
Additional Information Related to NRC Bulletin 79-14 Torsional  
Moment Exclusion When Using USAS B31.1-1967 Power Piping Code

Reference: 1) Letter from C. R. Steinhardt (WPSC) to Document Control Desk  
(NRC) dated January 18, 1989

This submittal provides an assessment of Fluor Daniel's interpretation of USAS B31.1.0-1967 regarding torsional moments, and the results of a sampling study which evaluated the effect of adding the torsional moment when calculating stresses due to occasional loads. Wisconsin Public Service Corporation (WPSC) committed to provide this information to the NRC in reference 1.

For your review the following documents accompany this submittal. Attachment 1 is a technical paper prepared by Teledyne Engineering Services entitled "A Discussion of Torsion Effects in Limit Moment Theory and Piping Code Criteria." This paper examines the technical adequacy of the 1967 code, and concludes that excluding torsional moment from the stress evaluation is a correct interpretation of the code. Additionally, the paper points out that using the longitudinal stresses to provide protection against pipe collapse has proven to be a highly successful method.

Attachment 2 is a report prepared for Fluor Daniel by S. Levy Incorporated entitled "Documentation of Methodology Used for Combination of Moments for Piping Constructed to the USAS B31.1-1967 Power Piping Code." This report discusses the technical adequacy of using two bending moments to calculate longitudinal stresses, and provides a historical perspective of the code's evolution. This report demonstrates two key points; first, that the exclusion of torsional moments was an acceptable interpretation of the 1967 code, and second, that piping analyzed to the 1967 Edition of B31.1 code is acceptable due to conservatism incorporated in the code.

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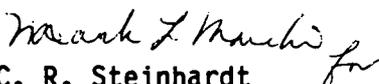
Attachment 3 is the summary of a sampling study performed by Fluor Daniel entitled "Summary Report on Sampling Study to Evaluate the Effect of Torsional Moment on Pipe Stress Qualification." This study included analyses of randomly selected analytical parts. The study concluded, with a 95% confidence level, that stress levels at the Kewaunee Nuclear Power Plant (KNPP) are within USAR allowables for Upset and Faulted stress combinations, including torsional moments.

In our earlier submittal we made reference to a preliminary evaluation performed by Fluor Daniel of selected analyses from Prairie Island Nuclear Generating Plant and KNPP that were used to determine the effect of including torsional moments. From this preliminary evaluation one analysis exceeded the USAR criteria when torsional moment was included. This case was an analytical part at Prairie Island Nuclear Generating Plant. This analysis is unique due to a combination of large eccentric loads, high initial stress, and low allowable stress due to a high design temperature. This line met the operability criteria of the IE Bulletin 79-14 program and the Prairie Island Nuclear Generating Plant had already scheduled the line for modification due to as-built discrepancies.

Based on our review of the attached documents we believe that Fluor Daniel properly interpreted the 1967 code with regard to the treatment of torsional moments when calculating stresses due to occasional loads. Moreover, we believe that there are no safety concerns with continuing to perform stress analyses in piping systems employing our current methodology.

If you have questions or need additional information on this matter please contact Ms. Sherry Bernhoft of my staff.

Sincerely,

  
C. R. Steinhardt  
Manager - Nuclear Power

SLB/jms

Attach.

cc - Mr. Robert Nelson, US NRC  
US NRC, Region III