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

September 28, 1989

Docket No. 50-302

Mr. W. S. Wilgus
Vice President, Nuclear Operations
Florida Power Corporation
ATTN: Manager, Nuclear Operations
Licensing
P. O. Box 219-NA-2I
Crystal River, Florida 32629

Dear Mr. Wilgus:

SUBJECT: CRYSTAL RIVER UNIT 3 - HIGH ENERGY LINE BREAK (HELB) CRITERIA FOR ANALYSIS OF PIPING OUTSIDE CONTAINMENT

The NRC staff has stated its position that the postulation of HELBs outside containment is based on the AEC letter from A. Giambusso to applicants and licensees dated in December, 1972. This remains the licensing basis for CR-3.

By letter dated March 31, 1989, Florida Power Corporation (FPC) submitted Impell Report 03-0920-1186, Rev. 0, entitled Pipe Rupture Analysis Criteria Outside the Reactor Building (Impell report). In that submittal, FPC stated that it intends to use ANSI B31.1, 1967, for determining the high stress locations while adopting the stress criteria for postulating breaks and cracks stated in Standard Review Plan (SRP) 3.6.2, Branch Technical Position (BTP) 3-1, Rev. 0 (1975), and the elimination of arbitrary intermediate breaks, as permitted by SRP 3.6.2, BTP 3-1, Rev. 2 (1987). We had indicated that this was not acceptable for the following reasons:

1. The basis for the calculation of the highest stresses due to occasional and sustained loading prescribed in the Giambusso letter is the Winter 1972 Addendum to the 1971 Edition of ASME Section III, Subsection NC.

2. The basis for the calculation of the stresses in SRP 3.6.2 BTP 3-1, Rev. 0 was the 1974 Edition of ASME Section III which incorporated the Winter 1972 Addendum. The equation for calculating the expansion stresses in this edition is different from the 1971 Edition and yields equal or higher stresses than those calculated using the equation in the 1971 Edition (which is also the same as that in ANSI B31.1, 1967). Therefore, using the expansion stress formulation of ANSI B31.1, 1967, and the stress criteria of SRP 3.6.2, BTP 3-1, Rev 0 is less conservative than using the expansion stress formulation required by the BTP.

3. There are no specific provisions in ANSI B31.1, 1967 for the calculation of the moments and stresses due to sustained and occasional loads. The actual method by which these stresses were determined at CR-3 is therefore unknown. In addition, the intensification factors which were specified for fittings other than those listed in ANSI B31.1, 1967 are also unknown.

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In view of these considerations and uncertainties we performed an assessment of the conditions under which stress calculations based on ANSI B31.1, 1967 would be acceptable for HELB calculations. These conditions are summarized as follows.

a. Occasional loads include seismic and safety relief valve loads.

b. The moment components due to occasional and sustained loads are combined by absolute sum (if they are combined directly), prior to the calculation of the resultant bending moment.

c. The calculated bending stresses due to sustained plus occasional loads are amplified directly by the corresponding stress intensification factor for the fitting or location being evaluated.

d. Stress intensification factors for fittings not listed in ANSI B31.1, 1967 are included and justified, as appropriate.

e. The corresponding stress criteria for HELB postulation are those listed in the Giambusso letter.

If these conditions cannot be met, then the postulation of breaks and cracks should be based on SRP 3.6.2, BTP 3-1 Rev. 0 (1975).

FPC has provided information in its letter of July 19, 1989 which states that its calculation of stresses based on ANSI B31.1, 1967 conforms essentially with the conditions listed above. We find this acceptable, but we will require that the appropriate sections of the Impell report be revised and modified accordingly to include these conditions and state that they have been satisfied at CR-3.

We also find acceptable the proposed elimination of arbitrary intermediate breaks per SRP 3.6.2, BTP 3-1, Rev. 2 (1987).

Sincerely,

Original signed by

Harley Silver, Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

cc:
See next page

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