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SUBJECT: Proposes to eliminate dynamic effects associated w/high energy pipe rupture in RCS piping from licensing & design bases by application of leak-before-break technology, per Topical Rept CEN-367. Supporting info encl. R
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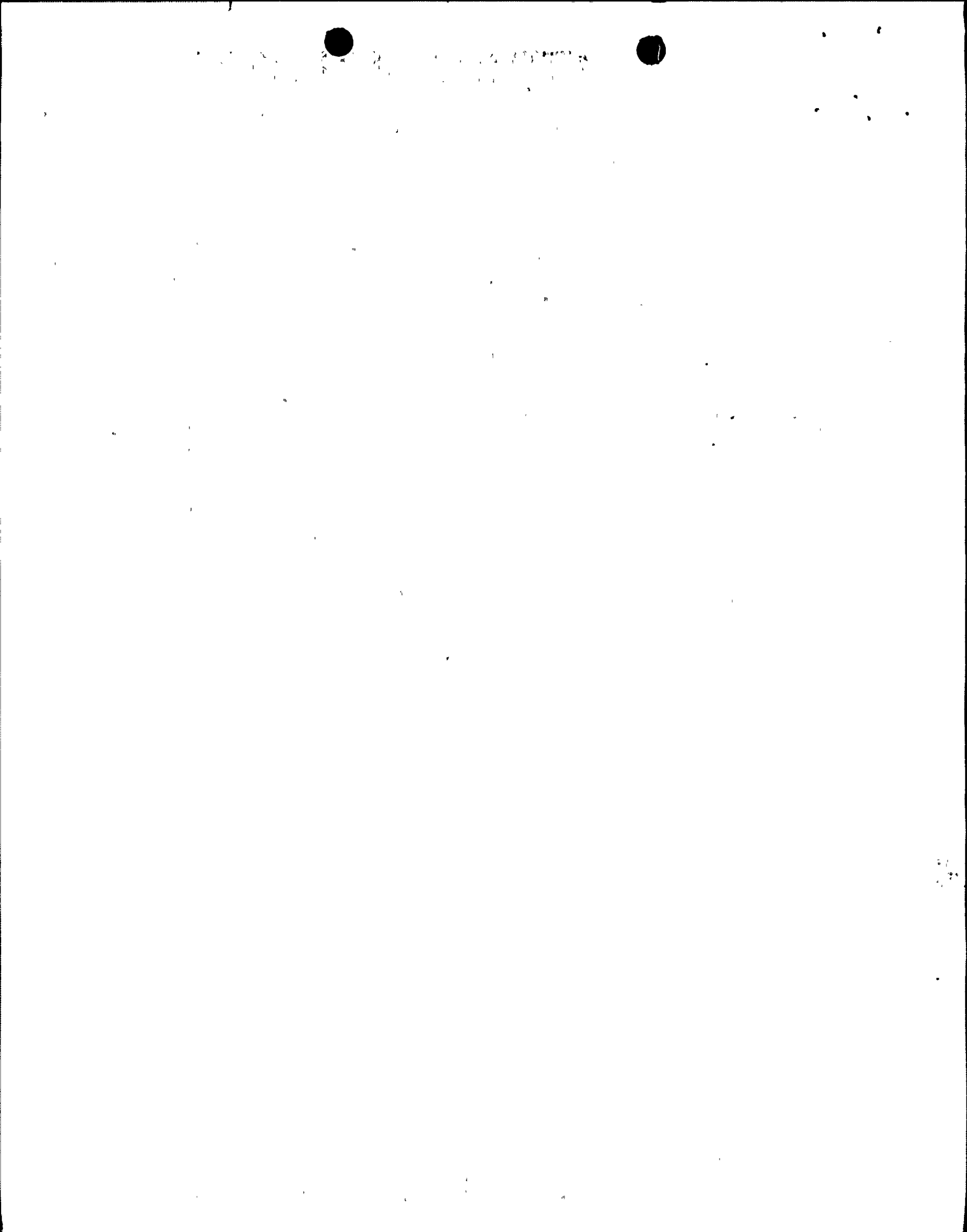
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August 26, 1992

L-92-231
10 CFR 50.4

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

RE: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Application of Leak-Before-Break
Technology to Reactor Coolant System Piping

Florida Power and Light Company (FPL) proposes to eliminate the dynamic effects associated with high energy pipe rupture in the reactor coolant system piping from the licensing and design bases of St. Lucie Units 1 and 2 by the application of leak-before-break (LBB) technology. This change to the licensing and design bases is permitted by revised General Design Criterion 4 (GDC-4) of Appendix A to 10 CFR 50.

Approval is requested by February 26, 1993, to allow use of LBB technology as part of the bases of design engineering scheduled to begin in 1993.

On October 30, 1990, the NRC provided acceptance for referencing of Topical Report CEN-367, *Leak-Before-Break Evaluation of Primary Coolant Piping in Combustion Engineering Designed Nuclear Steam Supply Systems*. CEN-367-A was issued in February 1991. The information requested by the NRC safety evaluation when referencing this topical report is attached.

Please contact us if there are any questions about this submittal.

Very truly yours,

D. A. Sager
Vice President
St. Lucie Plant

DAS/GRM/kw

cc: Stewart D. Ebnetter, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

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St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Application of Leak-Before-Break
Technology to Reactor Coolant system Piping

APPLICATION OF LEAK-BEFORE-BREAK TECHNOLOGY
TO ST. LUCIE UNITS 1 AND 2

I. BACKGROUND

This change to the licensing and design bases is permitted by revised General Design Criterion 4 (GDC-4) of Appendix A to 10 CFR 50. The revised GDC-4 is based on the development of advanced fracture mechanics technology using the LBB concept. On October 27, 1987, a final rule was published (52 FR 41288), effective November 27, 1987, amending GDC-4 of Appendix A to 10 CFR 50. The revised GDC-4 allows the use of analyses to eliminate from the design basis the dynamic effects of postulated pipe ruptures in high energy piping in nuclear power plants. Implementation permits the removal of pipe whip restraints and jet impingement barriers as well as other related changes in operating plants. Although the functional and performance requirements for containments, emergency core cooling systems, and environmental qualification of equipment remain unchanged, local dynamic effects uniquely associated with postulated ruptures in piping which qualify for LBB may be excluded from the design basis (53 FR 11311).

On October 30, 1990, the NRC accepted Topical Report CEN-367, *Leak-Before-Break Evaluation of Primary Loop Piping in Combustion Engineering Designed Nuclear Steam Supply Systems*, which was submitted for staff review by Combustion Engineering Owners Group (CEOG) letter dated November 20, 1987. FPL was a participating CEOG member and St. Lucie Units 1 and 2 were included in the bounding analyses submitted.

The NRC Safety Evaluation dated October 30, 1990, approving CEN-367, concluded that the subject CEOG primary loop piping complied with the revised GDC-4 when reviewed according to the NRC staff criteria. Thus, the probability or likelihood of large pipe breaks occurring in the primary coolant system loops of the applicable CEOG plants is sufficiently low such that dynamic effects associated with postulated pipe breaks need not be a design basis. Licensees referencing the CEOG topical report, CEN-367-A, as a technical basis for applying LBB to primary loop piping, must submit information to demonstrate that leakage detection systems installed at the specific facility are consistent with Regulatory Guide 1.45.

II. UNIT 1 CONSISTENCY WITH REGULATORY GUIDE 1.45

The plant Technical Specifications provide part of the technical basis for the St. Lucie Unit 1 operating license. Section 3/4.4.6.1 of the Unit 1 Technical Specification bases states:

"The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary [RCPB]. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, Reactor Coolant Pressure Boundary Leakage Detection Systems, May 1973."

The RCS leakage detection systems are described in the Unit 1 FUSAR section 5.2.4. The design was evaluated by the NRC and acceptance is documented in the Unit 1 original Safety Evaluation Report, *Safety Evaluation of the St. Lucie Plant Unit 1, dated November 8, 1974*, section 5.3 which states in part:

"... The airborne particulate radioactivity monitoring system was designed prior to Regulatory Guide 1.45 and has not been specifically designed to remain functional when subjected to the SSE. Otherwise, the leakage detection system proposed to detect leakage from components and piping of the reactor coolant pressure boundary is in accordance with the recommendations of AEC Regulatory Guide 1.45. The systems will provide reasonable assurance ... and are therefore acceptable with respect to the requirements of AEC General Design Criterion 30 and Appendix A of 10 CFR Part 50."

In preparation of this submittal, FPL has reviewed the design of the RCS leakage detection systems and reaffirmed the original NRC staff conclusion.

III. UNIT 2 CONSISTENCY WITH REGULATORY GUIDE 1.45

The plant Technical Specifications provide part of the technical basis for the St. Lucie Unit 2 operating license. Section 3/4.4.6.1 of the Unit 2 Technical Specification bases states:

"The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary [RCPB]. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, Reactor Coolant Pressure Boundary Leakage Detection Systems, May 1973."

The RCS leakage detection systems are described in the Unit 2 FUSAR section 5.2.5. The design was evaluated and acceptance is documented in the Unit 2 original Safety Evaluation Report, *Safety Evaluation Report related to the operation of the St. Lucie Plant Unit 2, dated October 1981*, section 5.2.5 which states in part:

"... Based on the above, we conclude that the RCPB leakage detection systems are diverse and provide reasonable assurance that primary system leakage (both identified and unidentified) will be detected and meet the requirements of General Design Criterion 30 with respect to provisions for RCPB leakage detection and identification, and the guidelines of Regulatory Guide 1.45 with respect to RCPB leakage detection system design and are, therefore, acceptable."

In preparation of this submittal, FPL has reviewed the design of the RCS leakage detection systems and reaffirmed the original NRC staff conclusion.

IV CONCLUSIONS:

The requirements for the leakage detection systems are included in the Technical Specifications for St. Lucie Unit 1 and Unit 2. The leakage detection systems were evaluated by the NRC during original plant licensing and determined to meet the guidelines of Regulatory Guide 1.45. In addition, the NRC has reviewed the leakage detection capability at St. Lucie as part of the FPL response to NRC Generic Letter 88-05, *Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in FWR plants*, which required that licensees address among other things, procedures for locating small coolant leaks (i.e., leakrates at less than Technical Specification limits).

Since the St. Lucie Units are bounded by the CEOG analyses and the leakage detection systems are capable of detecting the specified leakage rate, the dynamic effects associated with postulated pipe breaks in the primary coolant system piping can be excluded from the licensing and design bases of the St. Lucie Units.

