50302-326

Safety Evaluation Report

Supp. No. 3

U. S. Nuclear Regulatory Commission

related to operation of

Crystal River Nuclear Generating Plant, Unit 3

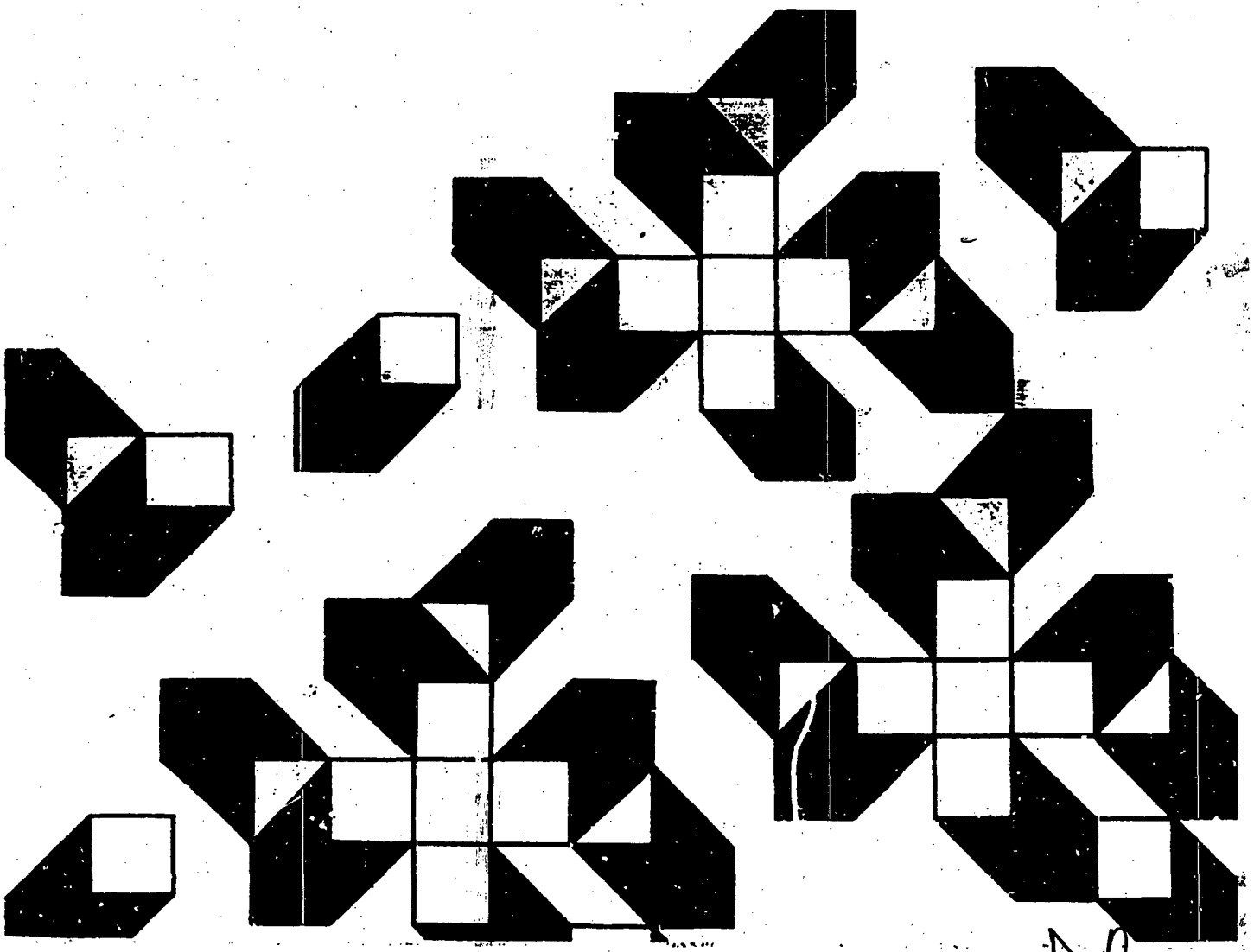
Office of Nuclear Reactor Regulation

Docket No. 50-302

December 1976

Florida Power Corporation, et al.

Supplement No. 3



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December 30, 1976

SUPPLEMENT NO. 3
TO THE
SAFETY EVALUATION REPORT
BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
IN THE MATTER OF
FLORIDA POWER CORPORATION, ET AL
CRYSTAL RIVER UNIT NO. 3
DOCKET NO. 50-302

3.0 DESIGN CRITERIA - STRUCTURES, COMPONENTS, EQUIPMENT AND SYSTEMS

3.8 Design of Category 1 (Seismic) Structures

3.8.1 Containment

We stated in Supplement No. 2 to our Safety Evaluation Report that we would review the final report related to the structural integrity test of the containment to confirm our conclusion that the repaired containment structure meets the original structural design criteria and will withstand the specified design conditions without impairment of structural integrity or safety function. We also stated that since there has not been any experience with the behavior of such a structure, we required Florida Power Corporation to make a detailed analysis of the repaired dome and to instrument the dome so that a correlation between the predicted and measured behavior could be established when the containment structure is subjected to the structural integrity test.

We have reviewed the information submitted by Florida Power Corporation on December 10, 1976 related to the repair of the containment dome and the structural analysis of the repaired structure. This information, when added to the interim report "Reactor Building Dome Delamination" submitted on June 11, 1976, constitutes the final report on this matter. Based on our review of the final report we conclude that the principal contributor to the delamination of the dome was the lack of radial reinforcement. The concrete alone was not able to support the radial stresses imposed by the tensioning of the tendons.

Florida Power Corporation also submitted its final report, "Reactor Containment Building Structural Integrity Test," GAI Report No. 1930, on December 9, 1976 which presents a description of the test of the containment. In its final report Florida Power Corporation states that the overall response of the structure was well substantiated by the test, and that the displacements observed were within predicted values and were typical of displacements measured on other similar structures with recovery observed to be within normally expected limits for a structure of this type. Florida Power Corporation also concludes that the cracking observed on the dome during the test was slightly greater than would normally be expected in a prestressed dome but substantially less and of smaller magnitude that could be expected in a reinforced dome. Further, the fact that these cracks closed indicated that the structure was still within the elastic range. The strains recorded were also well within the elastic range of the material.

In order to provide assurance that the containment structure will continue to behave as predicted during the life of the plant, we will require Florida Power Corporation to propose modifications to the surveillance program specified in the plant Technical Specifications to include displacement and strain measurements and monitoring of crack patterns and crack widths. We will require that this additional surveillance be in effect at the next schedule surveillance for containment integrity that is specified in Section 4.6.1.6.1 of the plant Technical Specifications. Our principal concern in this regard is the strains that may be introduced as a consequence of temperature differentials across the dome.

Based on our review to date the information provided in the final report of the structural integrity test, we conclude that the plant can be operated within the startup mode at power levels less than five percent of rated thermal power without adversely affecting the health and safety of the public. Our evaluation of our concerns regarding thermal strains and additional surveillance of crack patterns will be discussed in a future supplement to the Safety Evaluation Report.