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

Docket No. 50-471

DEC 0 4 1979

MEMORANDUM FOR: Thomas A. Ippolito, Chief
Operating Reactors Branch No. 3, DOR

THRU: L. G. Hulman, Chief
Hydrology-Meteorology Branch, DSE

FROM: William S. Bivins, Leader
Hydrologic Engineering Section, HMB, DSE

SUBJECT: ADDITIONAL QUESTIONS - PILGRIM 1 BREAKWATER

Enclosed are additional hydrologic engineering questions needed to complete our review of the subject breakwater. The questions are necessitated by inadequate responses to our previous requests. This review was performed by T. L. Johnson.

William S. Bivins

William S. Bivins, Leader
Hydrologic Engineering Section
Hydrology-Meteorology Branch
Division of Site Safety and
Environmental Analysis

Enclosure:
As Stated

cc: w/enclosure
D. Muller
W. Gammill
W. Kreger
L. Hulman
W. Bivins
T. Johnson
R. Jachowski (CERC)
ACRS (18)
NRC PDR
LPDR

1633 169

HYDROLOGIC ENGINEERING COMMENTS AND QUESTIONS
PILGRIM UNIT 1 BREAKWATER

You have not documented that the breakwater experienced design water levels and design wave conditions. Based on a review of your responses to our previous questions, the integrity of the breakwater remains questionable.

In your response to Question (f), you state that a study showed that it was possible to redesign the breakwater to provide adequate shore protection. You further state that Mr. R. O. Eaton provided considerable judgment and experience in the redesign. It is not clear what design bases were used to modify the breakwater configuration.

The model studies showed (p. 16) that flatter lee slopes were more stable, yet the breakwater was actually constructed with lee slopes of 1 on 1½ - practically the steepest slope used in breakwater construction. Additionally, you state (p. 23) that stone placement would be better in the prototype than in the model. In all probability, the exact opposite is true.

It appears that, from your responses to Question (e), the necessary quality control on the armor stone (weight, slope, and placement - interlocking with long axis normal to slope) may have been lacking.

Accordingly, provide the following documentation to substantiate the capability of the breakwater to protect safety related facilities.

1633 170

a. Provide additional information on the wave and water level conditions experienced at the site during the February 1978 and February 1979 storms. Compare these conditions to those for which the breakwater was designed. We note that limited information is presented in papers by Fitzgerald and Giese in "The Blizzard of 1979 - Its Effects on the Coastal Environments of Southeastern New England," Boston State College. Portions of this information may be useful in confirming your computed wave data. If

not available in published reports, wave information at the plant site should be obtained from available wave hindcasting mathematical models.

b. Provide your design bases for changing the configuration of the breakwater after the model tests. How did you determine that the redesigned section was as stable as those tested? Describe the engineering judgment that went into the redesign.

c. How do you justify the use of lee slopes of 1 and 1½ with some portions of the slope even steeper, knowing that the models tests indicated correlation between stability and flatness of the slopes.

d. Discuss how repairs were made to the damaged areas of the breakwater to insure that they are structurally equal or superior to the adjacent undamaged structure. Discuss the quality control used insofar as placement and size of the stones are concerned.