September 15, 1982

Docket No. 50-245
LS05-82-09-046

Mr. W. G. Counsil, Vice President
Nuclear Engineering and Operations
Northeast Nuclear Energy Company
Post Office Box 270
Hartford, Connecticut 06101

Dear Mr. Counsil:

SUBJECT: SEP TOPIC III-3.A, EFFECTS OF HIGH WATER LEVEL ON STRUCTURES
MILLSTONE NUCLEAR POWER STATION, UNIT 1

Enclosed is a copy of our final evaluation of SEP Topic III-3.A. The draft SER on this topic, sent to you on May 11, 1981, has been revised to reflect the results of SEP Topic II-3.B, Flooding Potential and Protection Requirements that was sent to you on June 30, 1982.

The evaluation concludes that some structures at your site may be affected by the increase in flood levels described in SEP Topic II-3.B.

This safety evaluation report will be a basic input to the Integrated Safety Assessment for your facility unless you identify changes needed to reflect as-built conditions at your facility. This assessment may be revised in the future if your facility design is changed or if NRC criteria relating to this subject are modified before the Integrated Assessment is completed.

Sincerely,

SE04
DSU w&E(27)
ADD: G. Staley

Original signed by:

James J. Shea, Project Manager
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Enclosure:
As stated

cc w/enclosure:
See next page

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NRC FORM 318 (10-80) NRCM 0240 OFFICIAL RECORD COPY USGPO: 1981—335-960

Millstone Unit 1
Docket No. 50-245
Revised 3/30/82

Mr. W. G. Counsil

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SYSTEMATIC EVALUATION PROGRAM

TOPIC III-3.A

MILLSTONE NUCLEAR POWER STATION, UNIT 1

TOPIC: III-3.A, Effects of High Water Level on Structures

I. INTRODUCTION

The original design basis high water level including dynamic effects for nuclear power plants is reviewed in SEP Topics II-3.A, B. Should the design basis level or dynamic effects increase from that assumed in the original design, the ability of plant structures to withstand this new loading is reviewed. The objective is to provide assurance that high water levels will not jeopardize the structural integrity of Seismic Category 1 structures and that components located within these structures will be adequately protected.

II. REVIEW CRITERIA

10 CFR 50 Appendix A (GDC 2) requires that structures, systems and components important to safety be designed with adequate protection against natural phenomena including flooding.

III. RELATED TOPICS AND INTERFACES

A. Floodwater levels, protection requirements and water induced loads are reviewed in SEP Topics II-3.A, B.

B. Inservice inspection requirements for water control structures are reviewed in SEP Topic III-3.C.

C. Dam integrity is reviewed in SEP Topic II-4.E.

D. Classification of structures is reviewed in SEP Topic III-1.

E. Design codes, criteria and load combinations are reviewed in SEP Topic III-7.B.

IV. REVIEW GUIDELINES

Standard Review Plan 3.4 defines analysis procedures for flood loadings and Regulatory Guide 1.102 defines acceptable flood protection. A review of the structural design procedures and design loadings for flooding at the site was conducted by searching docket files and comparing the design parameters with the conclusions reached in SEP Topic II-3.B and appropriate Standard Review Plan sections.

The review may be revised if the results of SEP Topic II-3.B are changed.

V. EVALUATION

The original design basis water level at Millstone 1 is the probable maximum flood (PMF) level and is stated in the FSAR as being elevation 19.0 ft. above mean sea level (msl). All structures (except the intake structure) which do not have reinforced concrete walls are protected to elevation 19.0 ft. msl by providing a reinforced concrete flood wall to this elevation. The intake structure is designed for a water level of elevation 32.4 ft.msl. This level accounts for an assumed 13.4 ft. msl stillwater level and for non-breaking waves above this level as they strike the structure.

No structural details are described in the FSAR. The dynamic effects of waves were not considered. SEP Topic II-3.B concludes that the stillwater probable maximum hurricane (PMH) water level is elevation 18.11 ft.msl and that the plant is adequately protected to this level with the floodgates properly in place.

Regarding wave action, SEP Topic II-3.B concludes that a standing wave reaching elevation 22.3 ft. msl would form against the floodwalls during the design basis stillwater level of elevation 18.11 ft. msl. SEP Topic II-3.B states that these waves could result in forces exceeding the design basis of the walls and sides of the buildings above the walls.

SEP Topic II-3.B concludes that the wave forces utilized in the original design of the intake structure are conservative; however, surging in the intake structure from the openings below has not been considered. Therefore, the only open item regarding the intake structure is systems, not structural, related and will be addressed in SEP Topic II-3.B.

SEP Topic II-3.B also investigated the site for waves and surges from lesser hurricanes and has concluded adequacy.

The licensee has stated that plant structures were designed to resist hydrostatic and uplift pressures resulting from groundwater rising to grade. The licensee should demonstrate that structures are adequate to resist this load in combination with other extreme loadings.

VI. CONCLUSIONS

The staff concludes that the Millstone 1 facility can withstand the stillwater level resulting from a PMH but may not withstand the forces resulting from wave action; although plant structures were designed for forces resulting from groundwater at grade, the load combination utilized for considering this load is unknown.

The licensee should demonstrate that 1) Millstone 1 structures can adequately withstand wave forces in combination with the maximum stillwater resulting from a PMH (any in-leakage due to this water level should be addressed in SEP Topic II-3.B); and 2) plant structures can adequately resist forces resulting from groundwater at grade in combination with other extreme loadings, or that the original design loadings would envelope conservatively predicted groundwater levels combined with other extreme loadings.