December 2, 1982

Docket No. 50-155
LS05-82-12-004

Mr. David J. VandeWalle
Nuclear Licensing Administrator
Consumers Power Company
1945 W. Parnall Road
Jackson, Michigan 49201

Dear Mr. VandeWalle:

SUBJECT: SEP TOPIC III-3.A, EFFECTS OF HIGH WATER LEVELS ON STRUCTURES
BIG ROCK POINT NUCLEAR POWER PLANT

Enclosure 1 is a revised draft evaluation of SEP Topic III-3.A, "Effects of High Water Levels on Structures." This assessment compares your facility with the criteria currently used by the staff for licensing new facilities. We request that you review the enclosed evaluation for factual correctness and identify any differences in the as-built design prior to the commencement of the integrated assessment.

Enclosure 1 reflects the results of our review of the core spray room. Enclosure 2 is a revised statement of differences for the integrated assessment. Enclosure 2 reflects the change in Enclosure 1.

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This evaluation will be a basic input to the integrated plant safety assessment for your facility unless you identify changes needed to reflect the as-built conditions of 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.

ADD:
G. Staley

Sincerely,

Original signed by:

Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing

8212070299 821202
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Enclosures:
As stated

cc w/enclosures:
See next page

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

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SYSTEMATIC EVALUATION PROGRAM
TOPIC III-3.A

BIG ROCK POINT

I. INTRODUCTION

The potential effects of loads due to ground water, flood water and waves on safety related structures was reviewed. The purpose of this review was to determine if such effects, as currently defined, will jeopardize the structural integrity of any of the plant's safety related structures.

II. REVIEW CRITERIA

Standard Review Plan 3.4 defines analysis procedures for flood loadings and Regulatory Guide 1.102 defines acceptable flood protection.

III. RELATED SAFETY TOPICS AND INTERFACES

1. Flood water levels and protection requirements are reviewed in SEP Topics II-3.A, II-3.B.

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

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

4. Classification of structures which need be seismic Category I is reviewed in SEP Topic III-1.

IV. REVIEW GUIDELINES

The effects of flood levels on safety related structures, as described in references 5 and 6, were evaluated in accordance with the criteria outlined in references 1, 2 and 3. Reference 4 provided little guidance concerning water levels or structural design criteria. Reference 5 described design basis water levels which were considered to have been those originally used in the plant design. Reference 6 described currently acceptable water levels which are somewhat higher.

V. EVALUATION

A. Containment

The containment is a 130 foot diameter steel sphere with its base at elevation 565.5. (Elevations refer to height in feet above mean sea level.) Finished grade is at elevation 593.

Reference 5 indicates that if the high ground water level is postulated at elevation 583.5 the internal structural dead load of the containment will be at least 5 times the buoyant force. The buoyant force at elevation 583.5 is about 3800 KIPS while the buoyant force to elevation 593 is approximately 8300 KIPS. Based on the conclusion of reference 5 and an examination of the containment drawings it was concluded that

buoyant forces would not cause any net upward force on the containment or its supports.

Since flooding of the containment is not a consideration and since dynamic effects of flood water are not postulated, it was concluded that the containment would not be affected by flooding to elevation 593.

B. Turbine Building

The turbine building is a steel framed structure with several large concrete walls integrated into the building. The slab-on-ground is at elevation 593. The licensee previously investigated the design of the structure for flooding to elevation 583.6.

According to reference 6, the design basis flood level for the south-east corner of the turbine building is at elevation 597.8 and for the west side of the turbine building is at elevation 595.5'. We have concluded that for the design basis flood level, overall, the turbine building would suffer no adverse effects and is capable of withstanding the highest flood levels determined from reference 6. The effects of flooding on safety related equipment or systems will be determined in Topic II-3.B, Flooding Potential and Protection Requirements.

C. Pumphouse

The pumphouse is a reinforced concrete structure with a steel framed roof. The floor slab elevations for the pump equipment are at elevation 581.3 and elevation 583.5.

A diesel generator room with its floor at elevation 589 is adjacent to the pump room. Grade is at about elevation 586 to 588. According to reference 5 the structure was found to be adequate for water level up to at least elevation 583.5.

In reference 6 DFBL to elevation 590.9 is postulated. From a study of the structural drawings it was concluded that the structure could adequately withstand such water levels if the building is allowed to flood. If the building does not flood and equalize hydrostatic forces, further investigation of the structure is required in order to determine if it will remain undamaged.

D. Other Structures

The grade elevation of the stack is at 596.6. Based on this fact and a study of the geometry and foundation of the stack, we have concluded that the stack will not suffer any adverse effects from flooding at the Big Rock Point site.

We have since been provided with structural drawings of the core spray room. This structure is essentially a concrete box which is set in the ground below the fuel cask loading dock. Slab at ground is at elevation 584. Top of the room is about elevation 596. Grade is at elevation 592.5.

Based on a study of the structural information, it was found that the structure would not be affected by flood loads to elevation 596 (postulated DBFL).

E. Effect of Ground Water on Structures

The design basis for the highest still ground water is stated in the SER for SEP Topics II-3.A, B and C. In that evaluation, we recommend a ground water level at plant grade be assumed (el 592.5 ft. msl), but for load combinations with seismic or other extreme environmental loadings, the highest recorded lake level (el 584 ft. msl) may be used as the ground water elevation. All of the above calculations for flooding loads assumed the DBFL coincident with the ground water level at grade. However, the licensee must verify that the ground water level of 583.6, which was used in their original design, was used in the correct load combinations for the plant in conjunction with the resolution of Topic III-7.B.

VI. CONCLUSION

We have concluded that the containment building, turbine building, core spray room, and the stack are adequately designed to withstand the effects of a DBFL. The pumphouse must be evaluated to assure that either it will flood or if it remains unflooded at the DBFL that it will not be damaged. The effects of flooding on safety-related equipment or systems will be determined in Topic II-3.B, "Flooding Potential and Protection Requirements."

In conjunction with the resolution of Topic III-7.B, the licensee must verify that the groundwater level of 583.6, which was used in their original design, was used in the correct load combinations for the plant.

VII. REFERENCES

1. 10 CFR, Appendix A, GDC #2.
2. USNRC Standard Review Plan, Sections 3.4 and 3.8.
3. USNRC Regulatory Guide 1.102.
4. Final Hazards Summary Report (FHSR) for Big Rock Point dated November 14, 1961.
5. Letter from Consumers Power Company to NRC dated August 8, 1980, "Response to Request for Additional Information on SEP Structural Topics."

6. Technical Evaluation Report, J. Scherrer, "Hydrological Considerations," TER-C5257-424, Franklin Research Center, Philadelphia, Pa., July 28, 1982.

The above references as well as construction drawings for the plant were reviewed.

TOPIC NO.	TITLE
III-3.A	Effects of High Water Levels on Structures

The effects of flood levels on safety-related structures were evaluated in accordance with the criteria outlines in General Design Criteria 2 (10 CFR 50, Appendix A) using the guidance provided by Sections 3.4 and 3.8 of the Standard Review Plan and Regulatory Guide 1.102.

The design basis flood level for the southeast corner of the turbine building is at elevation 597.8 and for the west side of the turbine building is at elevation 595.5'. For such a postulated event, there would possibly be some damage to loose siding, roller doors or light interior partitions. The possible effect of such failures on safety-related equipment or systems must be determined.

We have concluded that the containment building, turbine building, core spray room, and the stack are adequately designed to withstand the effects of a DBFL. The pumphouse must be evaluated to assure that either it will flood or if it remains unflooded at the DBFL that it will not be damaged. The effects of flooding on safety-related equipment or systems will be determined in Topic II-3.B, "Flooding Potential and Protection Requirements."

In conjunction with the resolution of Topic III-7.B, the licensee must verify that the groundwater level of 583.6, which was used in their original design, was used in the correct load combinations for the plant.