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Geologic Survey, Wash. D. C.  
(Arthur S. Baker)

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Harold L. Price, Dir. of Reg.

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Of Three Mile Island Site

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UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY  
WASHINGTON, D.C. 20242

JAN 17 1960

Mr. Harold L. Price  
Director of Regulation  
U.S. Atomic Energy Commission  
4915 St. Elmo Avenue  
Bethesda, Maryland 20545

Dear Mr. Price:

Transmitted herewith in response to requests by Mr. Roger S. Boyd is a review of geologic and hydrologic aspects of the Threemile Island site south of Harrisburg, Pennsylvania, proposed by the Metropolitan Edison Company for location of a nuclear-powered thermal electric station.

The review was prepared by H. H. Waldron and E. L. Meyer and has been discussed with members of your staff. We have no objection to your making this review a part of the public record.

Sincerely yours,

*William M. Baker*  
Acting Director

Enclosure

1589 313

Review of Geologic and Hydrologic Aspects of Threemile Island  
Nuclear Station Site  
Dauphin County, Pennsylvania

AEC Docket 50-289

HYDROLOGY

The site is located on an island in the Susquehanna River about 6 miles south of Harrisburg in Dauphin County, Pennsylvania.

The largest flood discharge on the Susquehanna River in the Harrisburg area since 1784, occurred on March 19, 1936. This flood was probably also the largest since 1740. It reached a discharge of 740,000 cfs (cubic feet per second) at the Harrisburg gage. Records of floodmarks published by Grover (1937) suggest that the peak stages reached around Threemile Island ranged from 299 feet near the upstream tip to 295 feet near the downstream tip.

Ice jams have also caused high stages on the Susquehanna River. Records show that an ice jam in February 1904 caused stages that were up to 3 feet higher than corresponding stages of the 1936 flood at Highspire and Middletown, about 2 to 4 miles upstream from the site.

The highest elevation on Threemile Island is 306 feet and the site grade will be established at 304 feet. A dike ranging in top elevation from 310 to 305 feet will be constructed around the site. The design is based on a discharge of 1,100,000 cfs, which corresponds to a preliminary estimate by the Baltimore District, U. S. Corps of Engineers, of the maximum probable flood discharge in this reach, and on computations by the applicant of the stages that would be reached by this flood.

These computations appear to result in a reasonable estimate of the maximum probable stages at Threemile Island. The provision in the dike design of 6 feet of freeboard above the maximum probable flood should be sufficient to raise the level of protection above water levels that could be reached by wave runup or ice jams.

Condenser cooling for the power plant will be provided by a cooling tower. Maximum makeup requirements and maximum effluent flow from the cooling tower are not given but may be assumed to be small compared to the minimum flow of the river.

The Susquehanna River is used for municipal water supply downstream from the site by several small communities and by the cities of Lancaster, Chester and Baltimore. Operational releases of radioactivity as limited by 10 CFR 20 would be further greatly diluted by the river flow.

Reference

Grover, N. C., 1937, Floods of March 1936, Part 2. Hudson River to Susquehanna River region: U. S. Geological Survey, Water-Supply Paper 779.

GEOLOGY

The analysis of the geology of the Threemile Island Atomic Power Station, as presented in AEC Docket No. 50-289 and supplements, was reviewed and compared with the available literature. The analysis appears to be carefully derived and to present an adequate appraisal of these aspects of the geology that would be pertinent to an engineering evaluation of the site.

Although 3 postulated faults are shown on the geologic map of the area (Appendix 2D-Addendum 1), the projected traces of which would pass through or nearby the site, the available local and regional geologic and geophysical evidence does not appear to substantiate the existence of any of these postulated faults in the immediate vicinity of the site. The border fault of the Pennsylvania Triassic Basin, however, lies approximately 5 to 6 miles north of the site; elsewhere in the eastern United States many of the earthquake epicenters appear to be located in the immediate vicinity of comparable geologic structures.

Logs of borings, as shown in Appendix 2A and in Figure 2A-2, indicate that foundation conditions in sound bedrock (Gettysburg Shale) underlying the site should be adequate for the proposed facility. During construction, however, some minor modifications of foundation design may be required due to variations in the thickness of the weathered zone on the Gettysburg Shale. The relationship between rock structures and potential shear strengths of the rock also may necessitate some modifications of design during construction in order to ensure the integrity of the more heavily loaded foundations. Any such modifications, however, should be within the limits of standard engineering design and practice.