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HYDROLOGIC ENGINEERING DES INPUT

PLANT NAME: Three Mile Island Nuclear Generating Station, Unit 2
LICENSING STAGE: OL
DOCKET NUMBER: 50-320
RESPONSIBLE BRANCH: Environmental Projects Branch #4
REQUESTED COMPLETION DATE: September 23, 1975
REVIEW STATUS: Hydrologic Engineering Section, SAB - Awaiting Comments on DES

Enclosed for your use in preparing the Draft Environmental Statement is Hydrologic Engineering Input, prepared by T. Johnson and W. Bivins. We have included short summaries for the subsections requested by the EPM.

W. P. Gammill
for

Harold R. Denton, Assistant Director
for Site Safety
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Form AEC-318 (Rev. 9-53) AECM 0240 ☆ U. S. GOVERNMENT PRINTING OFFICE: 1974-526-1

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HYDROLOGIC ENGINEERING DES INPUT

THREE MILE ISLAND NUCLEAR GENERATING STATION

DOCKET NO.: 50-320

2.5 Hydrology

2.5.1 Surface Water Hydrology

The Susquehanna River has a drainage area of approximately 25,000 square miles above the site and is rather extreme in its flow characteristics. Following is a summary of data as recorded 11 river miles upstream at the Harrisburg gage:

Minimum daily flow	1,700 cfs
Average annual flow	34,000 cfs
Mean annual flood	300,000 cfs
Maximum flood	1,020,000 cfs

The main tributaries in the vicinity of the site are the following:

Stream	Drainage Area	Average Annual Discharge
Conodoguinet Creek	483 sq. mi.	594 cfs
Yellow Breeches Creek	227 sq. mi.	290 cfs
Swatara Creek	567 sq. mi.	935 cfs
Conewago Creek (West)	510 sq. mi.	579 cfs

Additional data on the seasonal flow variation and frequency of low flows are given in ER Figures 2.5-6 and 2.5-7, respectively.

Because of the threat of flooding, the station is to be protected from floods up to those with flow rates of 1,100,000 cfs by an extensive dike system around the island. On June 24, 1972, rains from tropical storm Agnes resulted in a flood volume of about 1,000,000 cfs, considerably in excess of the previous maximum recorded flood of 740,000 cfs in 1936,

but below the probable maximum flood for the Three Mile Island location. For floods greater than the levee design flood and up to the probable maximum flood (1,625,000 cfs), the Station is designed to be shut down and waterproofed; the dike is designed to allow water to back into the plant area from the downstream (southern) end of the island. An evaluation of flooding potential and the dike erosion protection may be found in the staff's safety evaluation report.

The river and the streams in the vicinity are presently used for water supplies, both public and industrial, power generation, boating, fishing, and recreation. Sport fishing is done in all streams in the general area of the site; however, there is no commercial fishing. The applicant has identified 11 downstream surface water users within 50 miles of the site. The nearest user of surface water is five miles downstream. Approximately 1155 cfs is withdrawn from the river at this location by the Brunner Island steam-electric generating station; a portion of the withdrawal is used as potable water.

A pumped storage facility consisting of two reservoirs and dams is proposed for completion in 1983-84 on Stony Creek, approximately 13 miles northeast of Harrisburg and upstream of Three Mile Island. Detailed design data are not yet available for the project. The project will, however, afford some degree of low flow augmentation for the Susquehanna River.

2.5.2 Groundwater Hydrology

Groundwater occurs at TMI under water table conditions. The water table reaches its maximum elevation at the highest topographic point in the center of the island and falls off toward both shores. A variation of about 5 feet occurs from either side to the center, producing a gradient of approximately 0.6 percent toward the river. At observation points in and surrounding the plant area, water levels occurred generally at a depth in excess of 15 feet and ranged from 14 to 19 feet. The groundwater level occurred at a maximum of 6.2 feet above the top of rocks with less than 1 foot of head existing above the soil-rock interface at one point of observation. The water level of the Susquehanna River, normally flowing at elevation 278 feet, controls TMI groundwater levels. Infiltration of groundwater from the Station into the underlying Gettysburg shale and transmission to onshore water supplies is unlikely, since groundwater levels are higher on either river shore than on the island, with hydraulic gradients sloping toward the river.

2.5.3 Water Quality

Water quality data for the Susquehanna River has been collected from 1962 through 1971 by the Pennsylvania Department of Health. The data are given in ER Figures 2.5-1 through 2.5-4. Data on analyses of Susquehanna River water at the site, taken by Gilbert Associates, Inc., are given in Figures 2.5-5 through 2.5-8. Table 2.5-1 of the ER supplement gives additional water quality data from April 1974 through August 1974.

3.3 Plant Water Use

The major water requirements of the plant are due to evaporation, drift, and blowdown from the natural draft cooling towers. The cooling water is taken from the Susquehanna River at a maximum rate of 54,500 gpm (for both units). River water is also evaporated by the mechanical draft cooling towers and is used to dilute the treated radwaste before dishcarge to the river.

Natural draft cooling towers have been constructed to dissipate the heat rejected from the turbine cycle. The circulating water is recycled and chemically treated. Before discharge to the river, the heated water is cooled in mechanical draft cooling towers, which are operated in such a manner as to return water and wastes to the Susquehanna River at approximately the same temperature as the river.

A diagram showing plant water use is given in ER Figure 3.4-1.

6.1 Preoperational Programs

6.1.1 Hydrological

The physical parameters of the Susquehanna River near the plant site, such as temperature, conductivity, pH, dissolved oxygen, turbidity, color, odor, and other chemical properties have been studied since 1962; the data are given in ER Figures 2.5-1 through 2.5-8. Additional data are given in Table 2.5-1 of the ER Supplement.