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April 15, 2008 (10:00am)

OFFICE OF SECRETARY  
RULING MAKINGS AND  
ADJUDICATIONS STAFF

U.S. NUCLEAR REGULATORY COMMISSION

In the Matter of Entergy (Pilgrim Nuclear Power Station)

Docket No. 50-293-LR Official Exhibit No. 26

OFFERED by: Applicant/Licensee Inter Pilgrim Watch Ex 13  
NRC Staff Other \_\_\_\_\_

IDENTIFIED on 4-10-08 Witness/Panel \_\_\_\_\_

Action Taken: ADMITTED REJECTED WITHDRAWN

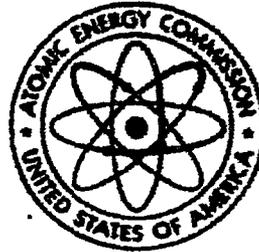
Reporter/Clerk Thibault

**related to operation of**

# **PILGRIM NUCLEAR POWER STATION**

## **BOSTON EDISON COMPANY**

**DOCKET No. 50-293**



**May 1972**

### **UNITED STATES ATOMIC ENERGY COMMISSION**

### **DIVISION OF RADIOLOGICAL AND ENVIRONMENTAL PROTECTION**

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Station on historic landmarks.<sup>32</sup> The Council concluded "that the probable effect on these properties (Plymouth Rock and Forefathers Faith Monument) cannot be judged to be sufficiently adverse to warrant Council comment." A copy of this correspondence was forwarded to the Massachusetts Historical Commission. The plant stack, about 4.5 miles across Plymouth Bay from the site, can barely be seen from the Plymouth Rock memorial.

The Station buildings are on the offside of Pine Hills south of the Town of Plymouth and Plymouth Rock. There is no evidence that the site has any specific historical significance.

#### D. ENVIRONMENTAL FEATURES

The Station site is along the rocky western shoreline of Cape Cod Bay. The Station proper is on the Bay side of the northeast end of Pine Hills, a ridge of low hills about four miles long and trending in a north-south direction. These hills reach a maximum height of 395 feet and form the major drainage divide in the area. A portion of the site before clearance and construction is shown in Figure 2. (For comparison of the site with the Station nearly completed, see Figure 7.)

The geology of the site is recognized as primarily surficial glacial deposits.<sup>24</sup> The natural surface stratum in the station area consists of approximately 20 feet of silty and clayey fine sands with scattered boulders. Bedrock is about 30 to 90 feet below mean sea level.

Cape Cod Bay has a surface area of about 430 square nautical miles or about 365,000 acres.<sup>7</sup> Depths generally increase rapidly from shore and the greatest depths of about 180 feet occur at the mouth of the Bay. The volume of the Bay is about  $1.6 \times 10^{12}$  cubic feet. The net movement of water at the site is in a southeasterly direction and averages less than 0.1 knot over the entire depth. Currents within 1/2 mile of shore are much slower than those farther out. The counterclockwise circulation of water in the Bay is reduced by the presence of submarine ledges offshore near the plant site. Water of the Bay is exchanged by at least three processes: (1) tidal exchange, (2) the general counterclockwise circulation, and (3) wind-induced motion. The intertidal volume represents about 9% of the mean volume of the Bay. The fractional rate of renewal of the waters of the Bay per day by tidal action is about 4%; the fractional rate of renewal by inflowing currents

is about 9% per day. This action, together with wind induced flows, indicates an approximate circulation rate or renewal of at least 10% per day. This rate would provide a mean residence time for plant discharges of about 10 days. During continuous plant operation the plant's liquid effluents are expected to reach an equilibrium in the Bay. Therefore, no concentration of Station effluents is expected because they will be continually flushed out of the Bay.

Seasonal temperature fluctuations of the water in the vicinity of the Station (as measured at Cape Cod Canal, about 10-miles downcoast from the site) exhibit typical annual cycles. In August, the month of peak water temperatures, the surface water temperatures of record (1955-1962) range from 42°F to 73°F with an average of about 65°F.<sup>33</sup> Low surface water temperatures occur between December and April and range between 30° and 40°F. Daily variations of 7-9°F have been observed and a differential of up to 10°F commonly exists between surface and bottom temperatures during the months of June through October. During this period, a weak thermocline is often present. Temperatures ranges and means as measured from 1955 to 1962 at Cape Cod Canal are shown in Figure 3.

Weekly temperature ranges taken from thermograph records at 2 feet, 10 feet and on the bottom of the Bay off Rocky Point (located about 500 yards NNW of the mouth of the discharge canal) from June 1970 to December 1970 are shown in Figure 4.

Surface topography is such that surface drainage from the Station is seaward and surface water will not leave the Station property otherwise.<sup>7</sup> Subsurface water follows the surface topography, resulting in overall movement of water toward the Bay.

The main features of the weather of eastern Massachusetts are variety and changeability since it lies in a transition zone of westerly air currents which encompass the southward movement of polar air masses and northward movement of tropical air masses. The area is frequently situated in or near the tracks of low pressure systems during the fall, winter and spring seasons. As a result, the region has no dry season, with summer precipitation coming in the form of showers or thunderstorms. The coastline location of the site results in seasonal temperatures which are less extreme than inland locations due to onshore winds in the summer (seabreeze) and the presence of relatively warm water in