

United States of America  
Atomic Energy Commission

In the Matter of  
Boston Edison Company  
Pilgrim Nuclear Power Station

Docket No. 50-293

Statement by Charles F. Kennedy, Director,  
Division of Water Resources and Frank Grice,  
Director and W. Leigh Bridges, Assistant  
Director, Division of Marine Fisheries, Department  
of Natural Resources, Commonwealth of Massachusetts

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1596 283

Plymouth, Massachusetts  
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My name is Charles F. Kennedy and I am the Director and Chief Engineer of the Division of Water Resources, Massachusetts Water Resources Commission, which was established by Chapter 21, ss. 8-16 of the Massachusetts General Laws.

Also present at this hearing is a member of my staff, Mr. Clinton E. Watson, a Resources Planner with the Division of Water Resources.

The Water Resources Commission has been assigned the responsibility of coordinating for the Department of Natural Resources the review of Environmental Impact Statements submitted under the provisions of the Environmental Policy Act of 1969. In carrying out this responsibility, we have drafted and submitted a letter to the Atomic Energy Commission dated May 2, 1972 which comprises the review response of the resource agencies of the Commonwealth to the Pilgrim Nuclear Power Station Environmental Impact Statement. Briefly, this letter questions the accuracy of the Environmental Impact Statement, particularly in regard to certain substantive issues relating to marine resources.

Rather than read the entire letter, which is twelve pages in length, I will submit a copy to the Board and allow particular major points to be addressed by representatives of the Division of Marine Fisheries, following my statement.

Massachusetts General Laws, Chapter 21, s. 43, empowers the Water Resources Commission, through its Division of Water

1596 284

Pollution Control, to issue permits for the discharge of industrial waste into any waters of the Commonwealth. An interim permit was issued on January 8, 1969 to Boston Edison which had an expiration date three years following the Power Station's initiation of operation. The permit is subject to a proviso that the discharge of effluents from the station will not be harmful to human or marine life, and was issued based on established water quality criteria. This criteria states that allowable temperature increase will not exceed the recommended limits on the most sensitive water use. In the case of the Pilgrim Nuclear Power Station, the most sensitive water use was determined to be "marine fisheries". Ongoing studies should establish a more definitive limit, and should any problems arise as a result of the operation of the effluent discharge, corrective action will be mandated by the Water Resources Commission.

To continue with the Department of Natural Resources statement, I would like to introduce Mr. Frank Grice, Director of the Division of Marine Fisheries.

Mr. Chairman, members of the Atomic Safety and Licensing Board, my name is Frank Grice, Director of the Division of Marine Fisheries, Department of Natural Resources. I earned a bachelor of science degree in wildlife management from the University of Massachusetts in 1950 and did graduate work in fisheries biology in 1953 and 1954 at the University of Minnesota. I am a certified Professional Fisheries Scientist by the American Fisheries Society, and have worked in a

professional capacity as a fishery biologist for the State of New Hampshire and the Commonwealth of Massachusetts for a total of 20 years. In addition, I directly supervised ecological investigations on the effects of power generation in relation to the marine resources of the Cape Cod Canal for three years.

The Massachusetts Division of Marine Fisheries is responsible for protection, management and enhancement of living marine resources within territorial limits. While the Division has no regulatory authority concerning the operation of Pilgrim Nuclear Power Station, the Massachusetts Water Resources Commission through the Division of Water Pollution Control determined in 1968 that the most sensitive water use was marine resources in relation to Pilgrim Nuclear Power Plant.

In a statement before this Board on June 18, 1968, I expressed deep concern over possible deleterious effects of plant operation on the marine resources. This concern was predicated on the Division's experience and information received on other power plants in Massachusetts and elsewhere. Because of the lack of specific information on chemical, mechanical, radiological and thermal considerations relating to the resources and operation of Pilgrim Nuclear Power Station, I recommended a thorough ecological study with at least two years of preoperational and two years of postoperational assessment with complete financing by the applicant. The intent of the recommendation was to provide a factual basis for maximum resource protection for the first unit.

1596 286

I am pleased to report that Boston Edison Company has recognized its responsibility for protecting both the environment and public interest by initiating and funding the proposed investigation. I believe we have taken a necessary first step toward the protection of the marine environment in the vicinity of Rocky Point.

At this time I am going to call on Leigh Bridges, Assistant Director of the Division to review the studies in progress, the effects to date on the marine resources, and future environmental considerations.

Mr. Chairman, members of the Atomic Safety and Licensing Board, my name is W. Leigh Bridges, Assistant Director of the Division of Marine Fisheries, Department of Natural Resources. I received a bachelor of science degree in wildlife management from the University of Massachusetts in 1959, and a master of science degree in fisheries biology from Southern Illinois University in 1961. I am a certified Professional Fisheries Scientist by the American Fisheries Society, and have worked in a professional capacity as a fishery biologist for the State of Rhode Island and Commonwealth of Massachusetts for a total of 11 years. In addition, I have directly supervised three marine resources power plant studies for the past three years. I am also the Division's administrative representative and Chairman of the Administrative-Technical Committee for the Pilgrim Nuclear Power Plant Investigations.

1596 287

On March 14, 1969, Boston Edison Company contracted the Division of Marine Fisheries to determine the impact of Pilgrim Nuclear Power Station on important marine resources in the vicinity of Rocky Point. The duration of the contract is four years with provisions for extension, where the plant has not operated a minimum of 50% of the time during any quarter of the post-operative phase.

The study program is coordinated by an Administrative-Technical Committee, comprised of representatives from state and federal agencies and institutions which have either regulatory authority or an interest in environmental aspects of power generation. Representation on the Committee includes the Environmental Protection Agency, the U.S. Fish and Wildlife Service, National Marine Fisheries Service, Massachusetts Division of Water Pollution Control, Massachusetts Division of Marine Fisheries, University of Massachusetts and Boston Edison Company. The functions of the Committee are to provide overall direction of the study, review and approve results of investigations, and recommend changes in scope where necessary. The Committee has played an active and most important role in the development and conduct of the entire research effort.

Concern for economically important resources has been a major factor in study design. Qualitative and quantitative evaluations of lobster and finfish populations have been conducted and will continue after plant operation. Plankton collections have been made twice monthly, and fish egg and larvae studies are being performed. A detailed life history of the

Irish moss has been completed, and harvest studies are underway. Continuous ambient seawater temperatures are recorded at the plant site. An intensive seasonal survey of the benthic community has been initiated and will continue after plant operation. These studies include qualitative and quantitative changes as well as biomass determinations. Laboratory studies include bioassays on the effects of chlorine and upper thermal tolerances of lobster and five important finfish in the area.

These base line studies will be of paramount importance in assessing the future operational impact of Pilgrim Unit No. 1 on the biota. Postoperational studies currently planned or being proposed will include an evaluation of plankton entrainment, expanded Irish moss studies, verification of thermal plume characteristics and its effects on pelagic finfish, and fish mortality studies on the intake structure.

The results of the entire research program will be utilized to recommend corrective measures and operational changes, where in the judgement of state and federal agencies such changes are necessary for resource protection. The company has already agreed to mitigation and correction of adverse effects. Necessary provisions for resource protection will be incorporated in the applicant's state discharge permit at the time of renewal. In the case of a major debilitating effect, mandatory changes in permit requirements can be made at any time.

In relation to the Environmental Impact Statement, the Atomic Energy Commission and applicant have tended to minimize potential adverse effects. The Division of Marine Fisheries and

the Department of Natural Resources have previously commented by letter on these statements and detailed review is not necessary at this time. However, it is our opinion that certain assertions on thermal and mechanical effects of plant operation are judgments which can neither be supported or refuted until the plant is operating.

We have experienced at least two thermal fish kills involving several thousands of fish in relation to one fossil fueled plant. Similarly, we have evidence of fish entrapment at another fossil fuel plant averaging 600 adult fish per day for a three-month period with resultant fish mortalities ranging from 9 to 24%. Although monetary losses may be small in relation to the total investment in these plants and the benefit of the power produced, they are, in my opinion, significant marine resource losses requiring correction. The losses were not predictable in advance due to lack of information on the habits and behavior of the fish and inadequacies in location, operating regime, and structural design of the plants with respect to environmental considerations. It is noted, however, that once deficiencies are apparent at a plant site, technology is available to minimize these adverse effects. Additional capital investment may be required but this would only be a fraction of the net value of the plant and power produced. Enforcement of corrective measures then becomes a matter for state and federal regulatory agencies.

The Division also disagrees with the final impact statement, whereby the Commission estimated Irish moss losses resulting from construction of the facility at 40,000 lbs, valued at \$1,000.



Our calculations, based on measurements at the site, indicate that plant construction destroyed approximately 1400 ft. of a shore line habitat for Irish moss. Considering 1971 harvest statistics, this area would have produced an average of 52,000 lbs of sea moss. This quantity is equivalent to 13.9% of the total harvest in the vicinity of Rocky Point and Manomet. The estimate does not consider the harvest during the first two weeks in June prior to implementation of the study. Therefore, it is conceivable that the loss could have been as high as 60,000 lbs. We must also disagree with the \$1,000 value utilized by the Commission. This value was apparently estimated at the producer level and does not consider the ultimate value of the product at the consumer level.

Relative to future considerations, the Commission has limited its impact review to the first Pilgrim unit. The applicant, however, has already announced its intention to construct Unit 2 by 1978 and Unit 3 by 1982. As a resource agency, we must consider and plan for these eventualities now. We believe we can take steps to minimize resource damage that may be caused by Unit 1. However, we are concerned that if large volumes of additional sea water are required for once-through cooling in the second and third units, the entrainment of plankton, ichthyoplankton and lobster larvae will be major environmental considerations. It is noteworthy that the company is presently soliciting entrainment and additional resource assessment proposals during the planning stages of these additional facilities. We therefore recommend that existing studies be continued and

necessary additional studies be conducted on the impact of all units on the environment.

With the age of rapid power development at hand, it is becoming increasingly apparent that resource enhancement as well as adequate protection will be a public interest consideration as well as vitally necessary. The Department of Natural Resources and the Division of Marine Fisheries strongly recommend that resource enhancement be an integral part of the planning and development of any additional units at the Pilgrim site.

In closing, I would like at this time to introduce for the record, Mr. Randall Fairbanks of the Division's staff. Mr. Fairbanks and I will be available to answer questions throughout these hearings. Mr. Fairbanks is a Research Analyst and Project Leader of the Division's studies at Pilgrim Nuclear Power Station. He earned a bachelor of science degree in wildlife management from the University of Massachusetts in 1960 and has been employed by the U.S. Fish and Wildlife Service and the Commonwealth as a Professional Fishery Biologist for 12 years. In addition, he has performed ecological studies associated with the effects of power plant for the past six years, and is senior author of the Division's publication entitled "An Assessment of Power Generation on the Marine Resources of the Cape Cod Canal", published in 1971. He also serves as the Division's technical representative to the Administrative-Technical Committee on Pilgrim Nuclear Power Plant Investigations.

1596 292