

BOSTON EDISON

Pilgrim Nuclear Power Station
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BECo 89- 103

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U.S. Nuclear Regulatory Commission
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License DPR-35
Docket 50-293

RESPONSE TO REQUEST FOR UPDATED INFORMATION ON
PROPOSED LICENSE EXTENSION SUBMITTAL (TAC #60939)

In our letter dated February 28, 1986, Boston Edison Company requested an extension to the Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station.

On May 16, 1989, you verbally requested we provide information regarding our updated ALARA program and current population projections to the year 2012. In addition to the updates, you requested we provide an evaluation regarding the effect that operation of Pilgrim might have on the preservation of historic properties situated near Pilgrim.

Enclosed is the information you requested. The updated sections are numbered similarly to the original submittal allowing for easy substitution and review.

This updated information in no way affects the original submittal in regards to your April 23, 1986, 10CFR50.92 evaluation of our license extension request. This supplemental information can be used for your environmental assessment of this request.

Enclosures: (A) 2.1.3 ALARA Program Update
(B) 2.2 Population Estimates Update
(C) Protection of Historic Properties (36 CFR Part 800)

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2.1.3 As Low As Reasonably Achievable (ALARA) Program Update

In accordance with 10CFR20.1(c) and plant technical specifications, Pilgrim Nuclear Power Station (PNPS) has established an ALARA Program.

The purpose of the ALARA Program is to maintain occupational radiation exposures "As Low As Reasonably Achievable". The program assures that ALARA is integrated into all aspects of plant design, operation, maintenance and planning.

In 1985, the ALARA Program experienced an extensive upgrade. The controlling document for the PNPS ALARA Program, Nuclear Operations Procedure 83RC1, was revised to formally establish an ALARA Committee. Membership of the ALARA Committee includes the Plant Manager as Chairperson, Planning and Outage Department Manager, Plant Support Manager, Radiological Section Manager, Plant Operations Section Manager, Maintenance Section Manager, Technical Section Manager, Chemistry Division Manager, Construction Division Manager, Field Engineering Section Manager and Sr. ALARA Engineer. This committee establishes department and Station exposure budgets, which are approved by the Station Director, and reviews and approves high exposure (>25 Person-Rem) tasks at PNPS.

The ALARA group is responsible for the review of all Radiation Work Permits issued at PNPS. The level of management review required is dependent upon the pre-job exposure estimate for the task.

The review criteria is:

- Less than 5 Person-Rem requires review and approval by an ALARA Specialist.
- Greater than or equal to 5 and less than 10 Person-Rem requires approval by the Radiological Technical Support Division Manager.
- Greater than or equal to 25 Person-Rem requires review and approval by the ALARA Committee.

The review by the ALARA group is focused on pre-work planning and application of engineering controls (i.e., shielding, decontamination, containments, etc.) to ensure exposure reduction. Because ALARA is integral to the planning process, the ALARA group was reorganized under the Planning Division. The Radiological Protection Manager maintains oversight of the ALARA Program within the Planning Division. This recent move allows the ALARA group to input Radiological and ALARA steps into the Maintenance Work Plan thereby allowing for proper sequencing of ALARA steps. It also reduces the number of "ALARA holds" at the work performance stage but, more importantly, we are seeing a decrease in exposure usage.

2.1.3 As Low As Reasonably Achievable (ALARA) Program Update (continued)

The Plant's ALARA performance is assessed after each outage and annually during normal operations and is documented in an ALARA report. The report lists exposures incurred on major jobs and summarizes the ALARA lessons learned for future use. The report allows the ALARA Committee to identify ALARA-related inadequacies in designs or procedures used for equipment installation, operation, surveillance, and maintenance. Results of these post-job critiques provide knowledge that is used to improve future designs and reduce exposures on the same or similar jobs in the future.

Similarly, Pilgrim Station also sets an annual plant exposure goal based on data from previous ALARA reports, NRC, INPO and Departmental inputs. Station cumulative exposure is reviewed by management on a weekly basis to identify adverse trends, thus ensuring timely corrective action when necessary.

Boston Edison's long-term commitment to ALARA is evidenced by the program's continued review of lessons learned and new technology. For example, during RFO #7, an "ALARA Coordinator" was appointed by the Radiological Protection Department to assist the Maintenance Section. The Coordinator, along with an augmented staff of ALARA Specialists, worked to ensure all phases of work were reviewed for ALARA concerns.

Due to the success of the "ALARA Coordinator" in helping reduce exposures during RFO #7, management subsequently approved the appointment of a full-time Radiological advisor to the Maintenance Section and a full-time advisor to the Operations Section. Their responsibilities include implementation of exposure-saving methods to their assigned section.

New ALARA training programs have been established for all plant personnel. These training programs stress the need for pre-planning of work and assist the worker in alternative methods for maintaining exposures ALARA. Examples of training programs are: ALARA Job-Reviews, Containments, Radioactive Spill Response, Power Ascension and H₂ Water Chemistry Impact, etc.

Source Term Reduction Program

Boston Edison has established a task force to implement a source term reduction program. The task force is reviewing a variety of methods for reducing sources. Efforts in this area have led to development and implementation of an Engineering ALARA Design Manual. The manual gives Engineering a detailed list of methods to reduce exposure and Stellite concentrations by using alternate alloys. Other methods of source reduction such as chemical decontamination and component replacement are being evaluated on a case-by-case basis. In the maintenance area, repair of valves and equipment that require resurfacing will have controls to eliminate the introduction of machining by-products, for example; dust from grinding operations, into the system which might become activated.

Boston Edison has purchased "state-of-the-art" equipment to reduce personnel exposure. Equipment such as the Surrogate Tour System allows individuals to view areas by using 65,000 photographs on a video disc and a computer program. Exposure savings have been realized in the planning of work in high-radiation areas.

2.1.3 As Low As Reasonably Achievable (ALARA) Program Update (continued)

Control Rod Drive Flange Radiation Shields were used during RFO #7 to reduce radiation dose rates during undervessel activities. An estimated 205 Person-Rem savings was realized. The shields will be used in future outages for undervessel activities.

To reduce exposure for surveillance of high-radiation areas, Boston Edison plans to purchase a surveillance robot and remote monitoring equipment (i.e., CCTVs, Water Windows and Wall Scopes). Funding for this equipment has been included in the 1989-1990 budget.

Occupational Exposure

Since the ALARA Program upgrade in 1985, Pilgrim Station's annual exposure has dropped dramatically. Continued improvements to the ALARA Program and aggressive Rem management is expected to further reduce our annual exposure.

We have reviewed exposure usage during normal operations and refueling outages at other BWRs similar in design and vintage to Pilgrim Station. They use an average of 250 Person-Rem during normal operations and 700 Person-Rem for refueling outages. Pilgrim Station's goal by 1995 is 150 Person-Rem during normal operations and 550 Person-Rem for refueling outages.

In projecting exposure for the years 2008 - 2012, Pilgrim estimates that an average of 350 Person-Rem per year will be used during the requested extension period. The 350 Person-Rem is an average of normal operation and refuel outage exposure.

To summarize, with the advances in technology, industry standards and our commitment to ALARA Boston Edison has made significant improvements in its ALARA Program.

The ALARA Program supports the Corporate goal of reducing occupational radiation exposure. This reduction will be accomplished through source term reduction, improved reliability and maintainability, better work planning and improved individual attitudes toward keeping exposures at Pilgrim Station ALARA.

2.2 Population Estimates Update

The Boston Edison Environmental Report of September, 1970, provided an estimated resident population distribution for the years 1965 and 2015. In 1980, these figures were updated in Amendment 40 of the Pilgrim 2 Preliminary Safety Analysis Report. The data obtained at that time was based on estimates which included 1975 state census data, Health Service Administration projections, and data specific to towns within the 10 mile radius of the plant and was utilized to provide 1980 permanent population projections.

The May 20, 1974 Environmental Report for Pilgrim Unit 2 provided an assessment of the impact that operation of both Pilgrim units (1 and 2) would have on the projected population to the year 2020. In section 5.3.6 "Summary of Annual Radiation Doses" the assessment concludes "...the potential incremental radiation exposure to individuals and the surrounding population represents a very small percentage increase over the exposure due to natural background radiation."

The Final Environmental Statement (FES) related to the proposed Pilgrim Station Unit 2, issued by the AEC in September, 1974, referenced peak population projections within the 10 mile radius of the Pilgrim site (both units). Figure 2.2A of the FES projected the population for the year 2000 as 185,180 and for the year 2020 as 252,877.

In 1981, a study was completed by HMM Associates which updated the population distribution around Pilgrim. The distribution of the permanent resident population for 1980, within 10 miles of the site, and within the Emergency Planning Zone (EPZ) was determined using 1980 Census data, the most recent Geological Survey Maps, and results of a limited field survey performed by HMM. In addition, projected populations for the year 1990 town population totals was allocated to large areas based on a comparison of the 1970 and 1980 Census data. The 1981 study projected the permanent resident population within the EPZ for 1990 to become 73,530.

Table 2-1 of Appendix 5 of the Pilgrim Emergency Plan lists the most recent (1988) population figures available. This table estimated the population within the EPZ for Pilgrim to be 70,274.

To respond to your request for updated population projections we requested KLD Associates to provide a new permanent population projection extending to the year 2012. Using their own figures and those provided by the Massachusetts Institute for Social and Economic Research (MISER) of the University of Massachusetts at Amherst, KLD provided the following information. The total permanent population projected to reside within the Emergency Planning Zone for Pilgrim is now estimated to be 127,073 by the year 2012. A table containing this information is provided as an attachment to this enclosure.

These figures indicate that for the requested three years and nine months license extension period, the population within the EPZ will increase by less than 7% of the total EPZ population projection for the year 2008, the present date of license expiration.

Thus, because operation of both units 1 and 2 was previously determined to have a very small impact on the population projected to the year 2020, operation of Pilgrim Unit 1 alone should have little impact on extending the present license three years and nine months beyond the present expiration date to the year 2012.

PROJECTED PERMANENT POPULATIONS OF TOWNS
WITHIN THE PILGRIM STATION EPZ

	1995 MISER <u>Proj.</u>	2000 KLD <u>Proj.</u>	2005 KLD <u>Proj.</u>	2010 KLD <u>Proj.</u>	2012 KLD <u>Proj.</u>
Plymouth	47,980	53,234	59,063	65,531	68,178
Kingston	10,746	12,825	15,380	18,355	19,700
Carver	8,152	9,359	10,693	12,157	12,773
Duxbury	16,212	18,076	20,253	22,581	23,539
Marshfield	<u>2,053</u>	<u>2,266</u>	<u>2,514</u>	<u>2,776</u>	<u>2,883</u>
Total within EPZ:	85,143	95,760	107,903	121,400	127,073

Notes:

1. The projected populations for 1995 were calculated by the Massachusetts Institute for Social and Economic Research (MISER) of the University of Massachusetts at Amherst.
2. Projections to later years were estimated by extending the trends of annual growth rates into the future.
3. A staff member of MISER indicated that they are currently extending their population projections into the 21st century.
4. The entire towns of Plymouth, Kingston and Duxbury lie within the Pilgrim EPZ. It is estimated that 58 percent of the population in Carver, and 8 percent of the Marshfield population reside within the EPZ. The above figures are estimated population within the EPZ.

Protection of Historic Properties (36 CFR Part 800)

In accordance with the requirements of 36 CFR Part 800 "Protection of Historic Properties", Boston Edison reviewed the "State Register of Historic Places/1988", published by the Massachusetts Historic Commission, for the current listings of historic sites surrounding Pilgrim Nuclear Power Station (PNPS). Representatives of the Pilgrim Society, the Plymouth Historical Commission, the Massachusetts Historical Commission, the Plymouth Chamber of Commerce, and the U. S. Department of the Interior were contacted regarding information about the sites and to assure us the listings are complete.

The State Register lists 131 historic sites located in Plymouth in an area generally contiguous to Plymouth Rock, which is approximately 4 1/2 miles from Pilgrim Station. They are mostly in designated historic districts containing multiple, individually owned and occupied houses. Others are individual sites or houses, the most notable being Plymouth Rock, Cole's Hill Burial Ground, and the National Monument to the Forefathers. It should be noted that with the exception of 3 sites; Cole's Hill, the Old County Courthouse, and Plymouth Rock, all Plymouth locations listed in the State Register were designated as historic sites after Pilgrim began operation.

Since December, 1972, when Pilgrim started commercial operation, there is no known evidence of deterioration of any of these historic sites due to the operation of Pilgrim Station.

A similar assessment regarding protection of historical sites was noted in the FES issued by the AEC for Pilgrim 2 dated September, 1974. Section 2.3 "Historic Significance" states:

According to the Massachusetts Historical Commission State Survey Director, none of the nearby historic sites will be impacted by construction of Unit 2. The staff agrees that no areas valued for their natural significance will be affected by the construction or operation of Unit 2 or the related transmission line corridor. The Conservative Commission of the Town of Plymouth agrees with this view.

In addition, the Pilgrim Unit 2 Environmental Report, Amendment 6, dated September, 1976 provides the following in Section 2.3.1 "Review and Consultations:

The Pilgrim Station site has been considered in accordance with the National Historical Preservation Act. In this regard, on April 25, 1968, Harold L. Price, Director of Regulation, AEC, requested George B. Hartzog, Jr., Director, National Park Service, to obtain comments from the Advisory Council on Historical preservation relative to the effects of Pilgrim Station on the general area of Plymouth Rock and Forefather's Faith Monument. In a letter dated May 20, 1968, Robert R. Garvey, Executive Secretary of the Advisory Council on Historical Preservation, considered the effect of the Pilgrim site upon these National Register properties. It was concluded that: "The probable effect upon these properties cannot be judged to be sufficiently adverse to warrant Council comment."

Using the aforementioned assessments and the 1986 criteria of 36 CFR 300.9: "Criteria of effect and adverse effect", it is concluded that operation of Pilgrim Nuclear Power Station for the requested three year and nine months license extension will cause no adverse effect or induce any detrimental impact on the historic sites located in Plymouth.