February 27, 1987

Docket No. 50-293

Mr. James M. Lydon
Chief Operating Officer
Boston Edison Company
800 Boylston Street
Boston, Massachusetts 02199

Dear Mr. Lydon:

SUBJECT: HYBRID CONTROL ROD BLADES (TAC 62851)

Re: Pilgrim Nuclear Power Station

The Commission has issued the enclosed Amendment No. 98 to Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station. This amendment is in response to your application dated September 5, 1986.

The amendment revises the Technical Specifications to allow the control materials in the reactor control rod blades to be either the presently used boron carbide powder ($B_4C$) compacted to approximately 70% of theoretical density or a hybrid combination of boron carbide powder and solid hafnium.

A copy of our related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notices.

Sincerely,

Original signed by
Rajender Auluck, Project Manager
BWR Project Directorate #1
Division of BWR Licensing

Enclosures:
1. Amendment No. 98 to License No. DPR-35
2. Safety Evaluation



cc w/enclosures:
See next page

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cc:
Mr. Alfred E. Pedersen, Station Manager
Boston Edison Company
RFD #1, Rocky Hill Road
Plymouth, Massachusetts 02360

Resident Inspector's Office
U. S. Nuclear Regulatory Commission
Post Office Box 867
Plymouth, Massachusetts 02360

Chairman, Board of Selectmen
11 Lincoln Street
Plymouth, Massachusetts 02360

Office of the Commissioner
Massachusetts Department of
Environmental Quality Engineering
One Winter Street
Boston, Massachusetts 02108

Office of the Attorney General
1 Ashburton Place
19th Floor
Boston, Massachusetts 02108

Mr. Robert M. Hallisey, Director
Radiation Control Program
Massachusetts Department of
Public Health
150 Tremont Street, 2nd Floor
Boston, Massachusetts 02111

Regional Administrator, Region I
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Mr. James D. Keyes
Boston Edison Company
25 Braintree Hill Office Park
Braintree, Massachusetts 02184

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

BOSTON EDISON COMPANY

DOCKET NO. 50-293

PILGRIM NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 98
License No. DPR-35

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Boston Edison Company (the licensee) dated September 5, 1986, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-35 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 98 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective 30 days after the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Rajender Auluck

Rajender Auluck, Project Manager
BWR Project Directorate #1
Division of BWR Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: February 27, 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 98

FACILITY OPERATING LICENSE NO. DPR-35

DOCKET NO. 50-293

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

| REMOVE | INSERT |
|---|---|
| 206m | 206m |

## 5.0 MAJOR DESIGN FEATURES

### 5.1 SITE FEATURES

Pilgrim Nuclear Power Station is located on the Western Shore of Cape Cod Bay in the Town of Plymouth, Plymouth County, Massachusetts. The site is located at approximately 41°51' north latitude and 70°35' west longitude on the Manomet Quadrangle, Massachusetts, Plymouth County 7.5 Minute Series (topographic) map issued by U.S. Geological Survey. UTM coordinates are 19-46446N-3692E.

The reactor (center line) is located approximately 1800 feet from the nearest property boundary.

### 5.2 REACTOR

A. The core shall consist of not more than 580 fuel assemblies of 8x8 (63 fuel rods), P8x8R (62 fuel rods), and BP8x8R (62 fuel rods).

B. The reactor core shall contain 145 cruciform-shaped control rods. The control materials shall be either boron carbide powder ($B_4C$) compacted to approximately 70% of theoretical density or a combination of boron carbide powder and solid hafnium.

### 5.3 REACTOR VESSEL

The reactor vessel shall be as described in Table 4.2.2 of the FSAR. The applicable design codes shall be as described in Table 4.2.1 of the FSAR.

### 5.4 CONTAINMENT

A. The principal design parameters for the primary containment shall be as given in Table 5.2.1 of the FSAR. The applicable design codes shall be as described in Section 12.2.2.8 of the FSAR.

B. The secondary containment shall be as described in Section 5.3.2 of the FSAR.

C. Penetrations to the primary containment and piping passing through such penetrations shall be designed in accordance with standards set forth in Section 5.2.3.4 of the FSAR.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 98 TO FACILITY OPERATING LICENSE NO. DPR-35

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

## 1.0 INTRODUCTION

By letter dated September 5, 1986 (Ref. 1) from J. E. Edward, Boston Edison Company (BECo), to J. A. Zwolinski, NRC, BECo proposed changes to the Pilgrim Nuclear Power Station (PNPS) Unit 1 Technical Specifications to incorporate a new design of control blades. The new design provides for replacement of the boron-carbide absorber rods with hafnium absorber rods (HAR) in the outer regions of the control blade. The new design is intended to increase control rod assembly life and eliminate intergranular stress corrosion cracking (IGSCC) of absorber tubes containing boron carbide.

The major design changes of the control blades are as follows:

1. Replacement of $B_4C$ absorber rods with solid hafnium absorber rods at the tip positions of each blade to increase control rod assembly life.

2. The use of an improved $B_4C$ absorber rod tube material from presently used commercial grade type 304 stainless steel to a high purity type 304 stainless steel to avoid IGSCC during the lifetime of the assembly.

In addition, there are other associated material and dimensional changes including a reduction in sheath wall thickness to preserve total control blade weight and changes from stellite to PH13-8 Mo and Inconel X-750 of the pin and roller materials to eliminate cobalt-bearing stellite materials (Ref. 2).

PROPOSED CHANGES TO TECHNICAL SPECIFICATIONS SECTION 5.2.B

| Current | Proposed |
|---|---|
| The reactor core shall contain 145 cruciform-shaped control rods. The control material shall be boron carbide powder ($B_4C$) compacted to approximately 70% of theoretical density | The reactor core shall contain 145 cruciform-shapped control rods. The control materials shall be either boron carbide powder ($B_4C$) compacted to approximately 70% of theoretical density or a combination of boron carbide powder and solid Hafnium. |

## 2.0 EVALUATION

The new GE BWR hybrid control rod blades using hafnium control materials and its associated structural and geometry changes has been previously reviewed by staff and approved based on approved methodologies and parameters in the approved GE topical report NEDE-22290-A, "Safety Evaluation of the General Electric Hybrid 1 Control Rod Assembly" dated September 1983.(Ref. 2). Therefore, the staff concludes that the use of the control material hafnium and its associated structural materials and geometry changes are acceptable for Reload 7 operation and the proposed technical specification changes are acceptable.

## 3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of this amendment.

## 4.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security nor to the health and safety of the public.

## 5.0 REFERENCES

1. Letter from J. E. Howard, Boston Edison Company, to J. A. Zwolinski, NRC, September 5, 1986.

2. Safety Evaluation of the General Electric Hybrid Control Rod Assembly, NEDE-22290-A dated September 1983.

Principal Contributor: U. Cheh

Dated: February 27, 1987

February 27, 1987

MEMORANDUM FOR: Sholly Coordinator

FROM: John A. Zwolinski, Director
BWR Project Directorate #1

SUBJECT: REQUEST FOR PUBLICATION IN BI-WEEKLY FR NOTICE - NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE (TAC 62851)

Boston Edison Company, Docket No. 50-293, Pilgrim Nuclear Power Station, Plymouth County, Massachusetts

Date of application for amendment: September 5, 1986

Brief description of amendment: The amendment revises the Technical Specifications to allow the control materials in the reactor control rod blades to be either the presently used boron carbide powder ($B_4C$) compacted to approximately 70% of theoretical density or a hybrid combination of boron carbide powder and solid hafnium.

Date of issuance: February 27, 1987

Effective date: 30 days after the date of issuance.

Amendment No.: 98

Facility Operating License No. DPR-35. Amendment revised the Technical Specifications.

Date of initial notice in Federal Register: December 3, 1986 (51 FR 43678)

The Commission's related evaluation of the amendment is contained in a Safety Evaluation dated February 27, 1987 .

No significant hazards consideration comments received: No.

Local Public Document Room location: Plymouth Public Library, 11 North Street, Plymouth, Massachusetts 02360.

Jack N. Donohew, Jr., Acting Director
BWR Project Directorate #1, DBL

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