

MAY 23 1975

Docket No. 50-293

Boston Edison Company
ATTN: Mr. Maurice J. Feldmann
Vice President
Operations and Engineering
800 Boylston Street
Boston, Massachusetts 02199

Gentlemen:

The Commission has issued the enclosed Amendment No. 10 to Facility License No. DPR-35 for the Pilgrim Nuclear Power Station. This amendment includes Change No. 12 to the Technical Specifications and is in response to your request dated April 2, 1975 and a supplement thereto dated May 22, 1975.

This amendment revises the Pilgrim Nuclear Power Station Unit 1 airborne effluent release limits in a manner to provide reasonable assurance that releases of radioactive iodines and particulates with half lives greater than eight days to unrestricted areas would be as low as practicable.

Copies of the related Safety Evaluation and the Federal Register Notice also are enclosed.

Sincerely,

Original signed by
Dennis L. Ziemann

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Reactor Licensing

Enclosures:

1. Amendment No. 10 to License No. DPR-35 w/Change No. 12
2. Safety Evaluation
3. Federal Register Notice

cc w/enclosures:
See next page

see previous yellow for concurrence

OFFICE ➤	RL:ORB #2	RL:ORB #2	TR:ETSB	OELD	RL:ORB#2	RL:AD/ORs
SURNAME ➤	RMDiggs	PWO' Connor:tc	JCollins		DLZiemann	KRGoller
DATE ➤	5/23/75	5/23/85	5/21/75	5/21/75	5/23/75	5/1/75

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Docket No. 50-293

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This amendment revises the Pilgrim Nuclear Power Station Unit 1 halogen and particulate effluent release Limiting Conditions for Operation in a manner consistent with the Commission's current format and numerical guidelines.

Copies of the related Safety Evaluation and the Federal Register Notice also are enclosed.

Sincerely,

Dennis L. Ziemann, Chief
 Operating Reactors Branch #2
 Division of Reactor Licensing

Enclosures:

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x7403 SURNAME →	RMDiggs	PWO' Connor	JCollins		DLZiemann	
DATE →	5/ /75	5/ /75	5/ /75	5/ /75	5/22/75	

MAY 23 1975

cc w/enclosures:

Mr. Dale G. Stoodley, Counsel
Boston Edison Company
800 Boylston Street
Boston, Massachusetts 02199

Mr. J. Edward Howard, Superintendent
Nuclear Engineering Department
Boston Edison Company
800 Boylston Street
Boston, Massachusetts 02199

Mr. Grant Baston, Pilgrim Division Head
Boston Edison Company
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Quality Assurance Manager
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Boston, Massachusetts 02199

Anthony Z. Roisman, Esquire
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Washington, D. C. 20036

Plymouth Public Library
North Street
Plymouth, Massachusetts 02360

Mr. J. E. Larson
Senior Licensing Engineer
and Co-ordinator
Boston Edison Company
RFD #1
Rocky Hill Road
Plymouth, Massachusetts 02360

Mr. David F. Tarantino
Chairman, Board of Selectman
11 Lincoln Street
Plymouth, Massachusetts 02360

cc w/enclosures and BEC's
filings of 4/2/75 and
~~5/21/75~~ **5/21/75**

Henry Kolbe, M. D.
Acting Commissioner of Public
Health
Massachusetts Department of
Public Health
600 Washington Street
Boston, Massachusetts 02111

Mr. Wallace Stickney
Environmental Protection Agency
JFK Federal Building
Boston, Massachusetts 02203

BOSTON EDISON COMPANY

DOCKET NO. 50-293

PILGRIM NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 10
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 April 2, 1975, as modified by letter dated May 22, 1975, 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; and
 - 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.
2. Accordingly, the license is amended by a change to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 3.B of Facility License No. DPR-35 is hereby amended to read as follows:

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"B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications, as revised by issued changes thereto through Change No. 12."

3. This license amendment is effective as of May 23, 1975.

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by
Dennis L. Ziemann

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Reactor Licensing

Attachment:
Change No. 12 to the
Technical Specifications

Date of Issuance: MAY 23 1975

OFFICE ➤						
SURNAME ➤						
DATE ➤						

ATTACHMENT TO LICENSE AMENDMENT NO. 10
CHANGE NO. 12 TO THE TECHNICAL SPECIFICATIONS
FACILITY OPERATING LICENSE NO. DPR-35
DOCKET NO. 50-293

Delete pages 179 and 191A. Add the new pages numbered 179, 179A, 179B, 191A and 191B. The revised pages have marginal lines indicating where the changes appear.

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3.8.B Airborne Effluents

1. The release rate of gross activity except for halogens and particulates with half-lives longer than eight days, shall not exceed:

$$\frac{Q_s}{0.25/E_s} + \frac{Q_v}{0.10/E_v} \leq 1$$

where:

Q_s = release rate from main stack in Curies/second.

Q_v = release rate from the reactor building exhaust vent in Curies/second.

E = average energy per disintegration (MeV/dis) in the stack (s) and vent (v) effluent.

2. (a) The release rate limit of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days, released to the environs as part of the gaseous wastes from the site shall be such that:

$$1.8 \times 10^5 Q_v + 1.8 \times 10^4 Q_s \leq 1$$

where:

Q_v = release rate from the reactor building exhaust vent in curies/sec.

Q_s = release rate from the main stack in curies/sec.

4.8.B Airborne Effluents

1. The gross and particulate activity of all gaseous wastes released to the environment shall be monitored and recorded:
- For effluent streams having continuous monitoring capability, the activity and flow rate shall be monitored and recorded.
 - For effluent streams without continuous monitoring capability, the activity and release volume shall be monitored and recorded and the release rate shall be controlled to within the limits specified in 3.8.B.1.

2. Gross radioactivity of gaseous effluents shall be monitored and recorded to enable release rates of gross radioactivity to be determined on an hourly basis.

3.8.B. Airborne Effluents (Cont'd)

- (b) The average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter shall be such that:

$$13[1.8 \times 10^5 Q_V + 1.8 \times 10^4 Q_S] \leq 1$$

- (c) The average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any period of 12 consecutive months shall be such that:

$$25[1.8 \times 10^5 Q_V + 1.8 \times 10^4 Q_S] \leq 1$$

- (d) The amount of iodine-131 released during any calendar quarter shall not exceed 2 Ci/reactor.

- (e) The amount of iodine-131 released during any period of 12 consecutive months shall not exceed 4 Ci/reactor.

- (f) Should any of the conditions of 3.8.B.2(f)(1) or (2) listed below exist, the licensee shall make an investigation to identify the causes of the release rates, define and initiate a program of action to reduce the release rates to the design objective levels. The design objectives stipulate that the annual total quantity of all radioiodines and radioactive material in particulate forms with half-lives greater than eight days, above background, from all reactors at a site should not result in an annual dose to any organ of an individual in an unrestricted area from all pathways of exposure in excess of 15 mrem, and that the annual total quantity of iodine-131 discharged from each reactor at a site should not exceed 1 Ci. The licensee shall report these actions to the NRC within 30 days from the end of the quarter during which the releases occurred.

4.8.B. Airborne Effluents (Cont'd)

3.8.B Airborne Effluents (Cont'd)

- 12
- (1) If the average release rate per site of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter is such that:

$$50[1.8 \times 10^5 Q_V + 1.8 \times 10^4 Q_S] \leq 1$$

- (2) If the amount of iodine-131 released during any calendar quarter is greater than 0.5 Ci/reactor
3. The release rate of gross gaseous activity from the main stack shall not exceed 0.10 curies/second when averaged over any calendar quarter.

4.8.B Airborne Effluents (Cont'd)

3. An isotopic analysis shall be made of a representative sample of the gaseous radioactivity being released which shall identify and determine the quantity of the principal radio-nuclides, except tritium, released:

BASES:

3.8.B and 4.8.B Airborne Effluents

Radioactive gases are routinely discharged from the station via the main stack and potentially from the building exhaust vent. The limits in Specification 3.8.B are derived to keep the off-site doses as low as practicable and below the limits given in 10 CFR 20. These specifications apply to the interim period prior to operation of the augmented gaseous holdup system; when appropriate changes will be made to the specifications.

Detailed dose calculations have been made by the applicant and are contained in Appendix E of the FSAR. These calculations consider site meteorology and isotopic content of the effluent. Independent dose calculations for several locations off-site have been made by the AEC staff. The AEC staff method utilized on-site meteorological data developed by the applicant.

The method utilized by the staff is described in Section 7-5.2.3 of "Meteorology and Atomic Energy-1968". The results of these calculations were more conservative than those generated by the applicant and were thus chosen to be used as the basis of establishment of the limits. The equation given in Specification 3.8.B.1 provides a method to be used in summing the airborne effluents from the main stack and the building exhaust vent that will assure that total off-site doses are not in excess of the limits specified in 10 CFR 20. The continuous release of radioactive noble gases in airborne effluents at the rates permissible by Specification 3.8.B.1 are calculated by the Commission's staff to correspond to an upper limit dose of 500 mrem per year at the most restrictive land boundary (SW of the station). The permissible release rate from the plant stack alone by this specification is about 0.36 curies/sec based on an average disintegration energy of 0.7 Mev.

The application of the average disintegration energy for the released radioactive gases makes the formula appropriate to a wide range of release conditions and extended holdup periods.

The release rate Specifications for a radioiodine and radioactive material in particulate form with half-lives greater than eight days are dependent on existing radionuclide pathways to man. The pathways which were examined for these Specifications are: 1) individual inhalation of airborne radionuclides, 2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, and 3) deposition onto grassy areas where milch animals graze with consumption of the milk by man. Methods for estimating doses to the thyroid via these pathways are described in Draft Regulatory Guide 1.AA. The offsite location with the highest anticipated thyroid dose rate from radioiodines and radioactive material in particulate form with half-lives greater than eight days was determined using on-site meteorological data and the expressions described in Draft Regulatory Guide 1.AA.

Specification 3.8.B.2(a) limits the release rate of radioiodines and radioactive material in particulate form with half-lives greater than eight days so that the corresponding annual thyroid dose via the most restrictive pathway is less than 1500 mrem.

BASES:

3.8.B and 4.8.B Airborne Effluents (Cont'd)

For radioiodines and radioactive material in particulate form with half-lives greater than eight days, the most restrictive location is a dairy cow located 5600 meters in the west direction (vent $X/Q = 2.2 \times 10^{-7}$ sec/m³; stack $X/Q = 1.8 \times 10^{-8}$ sec/m³).

12 Specification 3.8.B.2(b), (c), (d) and (e) establishes upper offsite levels for the releases of radioiodines and radioactive material in particulate form with half-lives greater than eight days at twice the design objective annual quantity during any calendar quarter, or four times the design objective annual quantity during any period of 12 consecutive months. In addition to the limiting conditions for operation of Specifications 3.8.B.2(a) through (e) the reporting requirements of 3.8.B.2(f) provide that the cause shall be identified whenever the release of gaseous effluents exceeds one-half the design objective annual quantity during any calendar quarter and that the proposed program of action to reduce such release rates to the design objectives shall be described.

Specification 3.8.B.3 establishes as low as practicable limits for the release levels of gaseous effluents for the interim period. The values chosen are consistent with interim limits used for other BWR's without augmented systems. Under these specifications, the licensee will be required to take such actions, including reducing station power, or other appropriate measures, as may be necessary to keep the average radioactive gaseous releases below this level, but afforded the flexibility regarding short-term plant operation to maintain station power for public needs.

Specification 3.8.B.6 requires that the primary containment atmosphere receive treatment for the removal of gaseous iodines and particulates prior to its release whenever the reactor is in the RUN mode. This specification provides a further reduction from this source of release of iodines and particulates from the station.

The surveillance requirements given under Specification 4.8.B provide assurance that radioactive gaseous effluents from the station are properly controlled and monitored over the life of the station. These surveillance requirements provide the data for the licensee and the Commission to evaluate the station's performance relative to radioactive gaseous wastes released to the environment. Reports on the quantities of radioactive materials released in gaseous effluents shall be furnished to the Commission on the basis of Section 6.6 of these Technical Specifications. On the basis of such reports and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 10 TO LICENSE NO. DPR-35

(CHANGE NO. 12 TO THE TECHNICAL SPECIFICATIONS)

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

INTRODUCTION

The existing technical specification limits on radioactive materials for the Pilgrim Nuclear Power Station Unit 1 were written in accordance with the Commission's then proposed "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion As Low As Practicable for Radioactive Material In Light Water-Cooled Nuclear Power Reactor Effluents" for the liquid effluents but not for the airborne effluents. The existing specifications for the airborne effluents were to apply to the interim period prior to operation of the augmented gaseous holdup system and were expected to maintain the off-site doses from airborne effluents as low as practicable. The existing specifications for the release of gross activity contain a limit on release rate averaged over a calendar quarter which was considered by the staff to represent as low as practicable releases for the gaseous holdup system existing prior to the augmented system becoming operational. However, the existing specifications for the release of halogens and particulates with half lives greater than eight days do not provide for averaging over a calendar quarter; they were considered to be adequate for meeting the intent of the as low as practicable criterion due to the extremely conservative calculational model then in use by the staff.

On April 2, 1975 Boston Edison requested a change to the Pilgrim Unit 1 Technical Specifications which would identify remedial action to be taken in the event the release rates for halogens and particulates with half lives greater than eight days exceed the limiting conditions for operation established for these variables. We reviewed the requested change and

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determined that additional limiting conditions for operation relating to iodine and particulate releases were necessary to provide reasonable assurance that releases of radioactive iodines and particulates to unrestricted areas would be as low as practicable. Boston Edison was informed of these additional conditions and on May 22, 1975 submitted a supplement to its April 2, 1975 request that included the additional conditions requested by the Commission.

EVALUATION

The existing technical specification limits relating to radioactive iodine and particulate release limits were determined using an extremely conservative calculational model that assumed a reduction factor of 700 for the allowable maximum permissible concentration in air to limit Iodine-131 in an unrestricted area to the values given in 10 CFR Part 20. These specifications also assumed the meteorological dispersion factor, X/Q, associated with the site boundary in the most critical 22.5 degree sector at which a hypothetical cow was assumed to be located. The proposed technical specification limits were determined by the staff using the more realistic calculational model contained in Regulatory Guide 1.42 (March 1974). This model takes into account the location of a real cow located 5600 meters to the west and considers the ecological chain from the release of the Iodine-131 in a cloud through deposition on the grass to the real cow producing milk and consumption of the milk by a child and the resulting thyroid dose. Using this model for I-131 in an unrestricted area, the proposed technical specification limit given in Specification 3.8.B.2(a) could result in a child's thyroid dose of 1500 mrem or equivalent to the 10 CFR Part 20 concentration limits. Proposed Specifications 3.8.B.2(b), (c), (d) and (e) establish quarterly and annual limits in accordance with the staff's Regulatory Position given in Regulatory Guide 1.42 (March 1974) which assure that the release of radioactive iodine and particulates with half lives greater than eight days averaged over periods of a calendar quarter and a year will not exceed twice the design objective annual dose of 15 mrem to the child's thyroid in any quarter or four times the design objective annual dose in any period of 12 consecutive months. Proposed Specification 3.8.B.2(f) establishes release rates of radioactive iodine and particulates with half lives greater than eight days to be averaged over a calendar quarter for which the licensee shall investigate the cause of the releases and initiate action to reduce the release rates, consistent with similar specifications at other reactors.

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The specification changes do not change the basic allowable annual release rate for radioactive iodines and particulates with half lives greater than eight days. For both the existing and the proposed technical specifications, the maximum release rate meets the 10 CFR Part 20 limits for radioactivity in effluents to unrestricted areas averaged over a year. The differences between the allowable release rates of the specified radioisotopes in the existing and proposed technical specifications are caused by the assumptions used in the calculational models. The existing limits were based on a hypothetical cow located at the most restrictive site boundary in the southwest sector at a distance of approximately 550 meters while the proposed limits are based on a real cow located in the west sector at a distance of approximately 5600 meters. The added distance would result in additional dispersion of the radioactive material contained in a cloud release. The existing limits were based on a gross reduction factor of 700 to the 10 CFR Part 20 concentration limits to account for all reconcentration effects in the ecological chain from the deposition of radioiodine on the grass through the cow-milk cycle to the child's thyroid. The proposed limits are based on experimental data for these effects with specific parameter values for each factor which results in an overall reduction in the ratio for a given air concentration of radioiodine to the resulting thyroid dose of approximately 3.

These specification changes add more restrictive limits on release rates for a calendar quarter and for 12 consecutive months which are significantly less than the 10 CFR Part 20 limits for annual release rates and will assure that the radioactive iodines and particulates with half-lives greater than eight days from the Pilgrim Nuclear Power Station are maintained as low as practicable. These changes do not affect any safety related feature of the reactor and concern solely routine operating ~~effluent~~ limitations.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the change does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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 or to the health and safety of the public.

Date: MAY 23 1975

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UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-293

BOSTON EDISON COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY
OPERATING LICENSE

Notice is hereby given that the U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 10 to Facility Operating License No. DPR-35 issued to the Boston Edison Company (the licensee), which revised Technical Specifications for operation of the Pilgrim Nuclear Power Station (the facility), located in Plymouth County, Massachusetts. The amendment is effective as of its date of issuance.

The amendment revises provisions in the Technical Specifications for the facility's airborne effluent release limits in a manner to provide reasonable assurance that releases of radioactive iodines and particulates with half lives greater than eight days to unrestricted areas would be in accordance with Regulatory Guide 1.42.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment is not required since the amendment does not involve a significant hazards consideration.

For further details with respect to this action, see (1) the application for amendment dated April 2, 1975, as modified by letter

dated May 22, 1975, (2) Amendment No. 10 to License No. DPR-35, with Change No. 12, and (3) the Commission's concurrently issued related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Plymouth Public Library on North Street in Plymouth, Massachusetts 02360. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Reactor Licensing.

Dated at Bethesda, Maryland, this 23rd day of May 1975.

FOR THE NUCLEAR REGULATORY COMMISSION

~~Original signed by~~
Dennis L. Ziemann

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Reactor Licensing

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UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-293

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*indicate
clearly
the nature
of the action*