



Docket No. 50-293

Mr. A. Victor Morisi, Manager
Nuclear Operations Support Department
Boston Edison Company
M/C Nuclear
800 Boylston Street
Boston, MA 02199

DISTRIBUTION:
Docket File
NRC PDR
Local PDR
ORB#2 Reading
D. Eisenhut
S. Norris
K. Eccleston

OELD
SECY
IE-2
T. Barnhart-4
L. Schneider
D. Brinkman
ACRS-10
OPA, C. Miles
R. Diggs
NSIC
ASLAB
Gray File

MAR 20 1982

Dear Mr. Morisi:

The Commission has issued the enclosed Amendment No. 55 to Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station. This amendment consists of changes to the Technical Specifications (TS) in response to your application dated September 30, 1981 and subsequent discussions between the NRC staff and your staff. These changes have been discussed with, and agreed to by, your staff.

This amendment revises the Technical Specifications to incorporate limiting conditions for operation and surveillance requirements for the Containment Atmosphere Dilution (CAD) System installed at Pilgrim.

We have also completed our review of your submittals of June 15, 1981, July 7, 1981, October 16, 1981, and February 23, 1982 concerning modifications made to this combustible gas control system at Pilgrim.

Based upon our review of your submittals, we conclude that the combustible gas control system for Pilgrim satisfies the requirements of 10 CFR 50.44, except for the requirements of 10 CFR 50.44(c)(3)(11) and (111), which are not required to be implemented before July 1982. We also conclude that the Technical Specifications proposed for operation with the CAD system are acceptable.

Copies of the Safety Evaluation and Notice of Issuance are also enclosed.

Sincerely,

ORIGINAL SIGNED BY

8204270507

Kenneth T. Eccleston, Project Manager
Operating Reactors Branch #2
Division of Licensing

- Enclosures:
1. Amendment No. 55 to DPR-35
 2. Safety Evaluation
 3. Notice

Previous concurrence sheet concurred on by:

ORB#2	ORB#2	ORB#2	AD:OR
SNorris	KEccleston	DVassallo	TNovak
3/2/82	3/2/82	3/9/82	3/15/82

cc: w/enclosures
See next page

OELD
W. Chandler
3/18/82

OFFICE							
SURNAME							
DATE							

Mr. A. Victor Morisi
Boston Edison Company

cc:

Mr. Richard D. Machon
Pilgrim Station Manager
Boston Edison Company
RFD #1, Rocky Hill Road
Plymouth, Massachusetts 02360

Resident Inspector
c/o U.S. NRC
P.O. Box 867
Plymouth, Massachusetts 02360

Henry Herrmann, Esquire
Massachusetts Wildlife Federation
151 Tremont Street
Boston, Massachusetts 02111

Plymouth Public Library
North Street
Plymouth, Massachusetts 02360

Massachusetts Department of Public Health
ATTN: Commissioner of Public Health
600 Washington Street
Boston, Massachusetts 02111

Water Quality & Environmental Commissioner
Department of Environmental Quality
Engineering
100 Cambridge Street
Boston, Massachusetts 02202

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

Ms. JoAnn Shatwell
Office of the Attorney General
Environmental Protection Division
1 Ashburton Place
19th Floor
Boston, Massachusetts 02108

U. S. Environmental Protection
Agency
Region I Office
Regional Radiation Representative
JFK Federal Building
Boston, Massachusetts 02203

Ronald C. Haynes
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406



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. 55
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 30, 1981 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:

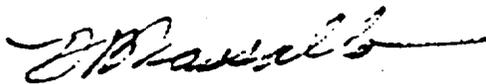
B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 55, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

8204270509

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 20, 1982

ATTACHMENT TO LICENSE AMENDMENT NO. 55

FACILITY OPERATING LICENSE NO. DPR-35

DOCKET NO. 50-293

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the area of change.

Remove

Insert

--

157b

171

171

--

171a

3.7.A PRIMARY CONTAINMENT4.7.A PRIMARY CONTAINMENT7. Containment Atmosphere Dilution7. Containment Atmosphere Dilution

- a. Within the 24-hour period after placing the reactor in the Run Mode the Post-LOCA Containment Atmosphere Dilution System must be operable and capable of supplying nitrogen to the containment for atmosphere dilution. If this specification cannot be met, the system must be restored to an operable condition within 30 days or the reactor must be at least in Hot Shutdown within 12 hours.
- b. Within the 24-hour period after placing the reactor in the Run Mode, the Nitrogen Storage Tank shall contain a minimum of 1500 gallons of liquid N₂. If this specification cannot be met the minimum volume will be restored within 30 days or the reactor must be in at least Hot Shutdown within 12 hours.
- c. There are 2 H₂ analyzers available to serve the drywell.

With only 1 H₂ analyzer operable, reactor operation is allowed for up to 7 days. If the inoperable analyzer is not made fully operable within 7 days, the reactor shall be in at least Hot Shutdown within the next 12 hours.

With no H₂ analyzer operable, reactor operation is allowed for up to 48 hours. If one of the inoperable analyzers is not made fully operable within 48 hours, the reactor shall be in at least Hot Shutdown within the next 12 hours.

- a. The post-LOCA containment atmosphere dilution system shall be functionally tested once per operating cycle.
- b. The level in the liquid N₂ storage tank shall be recorded weekly.
- c. The H₂ analyzers shall be tested for operability once per month and shall be calibrated once per 6 months.
- d. Once per month each manual or power operated valve in the CAD system flow path not locked, sealed or otherwise secured in position shall be observed and recorded to be in its correct position.

BASES:

3.7.A & 4.7.A Primary Containment (Cont'd)

The primary containment is normally slightly pressurized during periods of reactor operation. Nitrogen used for inerting could leak out of the containment but air could not leak in to increase oxygen concentration. Once the containment is filled with nitrogen to the required concentration, no monitoring of oxygen concentration is necessary. However, at least twice a week the oxygen concentration will be determined as added assurance. Mark I Containment Long Term Program testing showed that maintaining a drywell to wetwell pressure differential to keep the suppression chamber downcomer legs clear of water significantly reduced suppression chamber post LOAC hydrodynamic loads. A pressure of 1.17 psid is required to sufficiently clear the water legs of the downcomers without bubbling nitrogen into the suppression chamber at the 3.00 ft. downcomer submergence which corresponds to approx. 84,000 ft.³ of water. Maximum downcomer submergence is 3.25 ft. at operating suppression chamber water level. The above pressure differential and submergence number will be used in the Pilgrim I Plant Unique Analysis to be submitted to the NRC.

Post LOCA Atmosphere Dilution

In order to ensure that the containment atmosphere remains inerted, i.e. the oxygen-hydrogen mixture below the flammable limit, the capability to inject nitrogen into the containment after a LOCA is provided. A minimum of 1500 gallons of liquid N₂ in the storage tank assures that a three-day supply of N₂ for post-LOCA containment inerting is available. Since the inerting makeup system is continually functioning, no periodic testing of the system is required.

The Post-LOCA Containment Atmospheric Dilution (CAD) System is designed to meet the requirements of AEC Regulatory Guides 1.3, 1.7 and 1.29, ASME Section III, Class 2 (except for code stamping) and seismic Class I as defined in the PNPS FSAR Section 12.2.3.5 and Section 2.5.3.

In summary, the limiting criteria are:

0 0 9 0 1 0

1. Maintain hydrogen concentration in the containment during post-LOCA conditions to less than 4%.
2. Limit the buildup in the containment pressure due to nitrogen addition to less than 28 psig.
3. To limit the offsite dose due to containment venting (for pressure control) to less than 300 Rem to the thyroid.

By maintaining at least a 3-day supply of N_2 on site there will be sufficient time after the occurrence of a LOCA for obtaining additional nitrogen supply from local commercial sources. (1) The system design contains sufficient redundancy to ensure its reliability. Thus, it is sufficient to test the operability of the whole system once per operating cycle. The H_2 analyzers will provide redundancy for the drywell i.e., there are two H_2 analyzers for the Unit. By permitting reactor operation for 7 days with one of the two H_2 analyzers inoperable, redundancy of analyzing capability will be maintained while not imposing an immediate interruption in plant operation. Monthly testing of the analyzers using H_2 will be adequate to ensure the system's readiness because of the design. Since the analyzers are normally not in operation there will be little deterioration due to use. In order to determine H_2 concentration, the analyzers must be warmed up 6 hours prior to putting into service. This time frame is acceptable for accident conditions because a 4% H_2 level will not be reached in the drywell until 16 hours following the accident. Due to nitrogen addition, the pressure in the containment after a LOCA will increase with time. Under the worst expected conditions the containment pressure will reach 28 psig in approximately 45 days. If and when that pressure is reached, venting from the containment shall be manually initiated per the requirements of 10CFR50.44. The venting path will be through the Standby Gas Treatment system in order to minimize the off site dose.

- (1). As listed in Pilgrim Nuclear Power Station Procedure No. 5.4.6 "Post Accident Venting".

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 55 TO FACILITY LICENSE NO. DPR-35

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

Principal Authors: L. Ruth
R. Kendall
K. Eccleston

I. INTRODUCTION

The Boston Edison Company (licensee), by submittals dated June 15, July 7, and October 16, 1981, has furnished a description and a safety analysis of its combustible gas control system (CGCS) for the Pilgrim Nuclear Power Station. We have completed our review of the proposed system against the requirements of 10 CFR Section 50.44 except for the requirements of 10 CFR 50.44(c)(3)(ii) and (iii), which are not required to be implemented before July 1982.

By letter dated September 30, 1981 (as revised by subsequent discussions with the NRC staff), Boston Edison also transmitted a license amendment application to incorporate limiting conditions for operation (LCOs) and surveillance requirements for this system.

Since the notice of hearing on the application for a construction permit for Pilgrim was published prior to December 22, 1958, use of a purge/repressurization system is permitted if certain conditions are satisfied. The Licensee has proposed the use of such a system which is called a containment atmosphere dilution (CAD) system. Our evaluation of the proposed system follows.

II. EVALUATION

A. Functional Performance

10 CFR Section 50.44(a) requires a method for control of hydrogen gas that may be generated in a BWR primary containment following a postulated LOCA by metal-water reaction of fuel cladding and coolant, radiolytic decomposition of coolant, and metallic corrosion. The Licensee has stated in their letters of July 2 and October 16, 1981 that the hydrogen generation estimates are based upon the requirements of 10 CFR Section 50.44 and that the hydrogen concentration is maintained below the flammability level (4 volume percent) by a bleed and feed method (purge method as defined in 10 CFR Section 50.44). The amount of time following onset of the accident until purging or venting of the primary containment must be initiated is controlled by a repressurization technique consisting of nitrogen addition to the primary containment. The Licensee has indicated that repressurization will be initiated within eight hours following onset of a postulated LOCA. The Licensee has further indicated that the hydrogen concentration will not reach 4 volume percent after a postulated

8204270511

LOCA based on nitrogen addition and restoring and controlling primary containment pressure within the range of 22 to 28 psig by venting.

The Licensee will monitor the hydrogen levels using two redundant, remotely operable, seismically qualified analyzers. These hydrogen analyzers shall be tested for operability once per month.

The Licensee performed calculations of the containment hydrogen concentration based on a nitrogen addition rate of 30 SCFM to both the drywell and torus starting eight hours after the LOCA. The Licensee calculated a maximum drywell concentration of 3.65 volume percent occurring approximately 40 hours after onset of the postulated accident. The maximum calculated torus concentration is 3.61 volume percent. We performed confirmatory calculations using the COGAP-2 computer code. These calculations confirmed that the hydrogen concentration could be maintained at or below the 4 volume percent level by nitrogen addition with the repressurization system. Based on these calculations we find the Licensee's system capable of maintaining the hydrogen concentrations at 4 volume percent or less following onset of a postulated LOCA, which is in conformance with the applicable requirements of 10 CFR 50.44.

B. Design Features

As required by 10 CFR 50.44, the proposed system must comply with 10 CFR Part 50, Appendix A, General Design Criteria (GDC) 41, 42 and 43. These criteria require that the proposed Combustible Gas Control System (CGCS) have suitable redundancy in components and features; have suitable interconnections; have leak detection capability; provide isolation and containment; function after loss of power with concurrent single failure, and be periodically inspected and be periodically pressure and functionally tested.

To meet the redundancy, interconnection, and loss of power with coincident single failure criteria of 10 CFR Part 50, Appendix A, GDC 41, without assuming accessibility, the Licensee has provided 16 solenoid valves to provide redundant paths to and from the drywell and torus for venting and nitrogen makeup after onset of a LOCA. The solenoid valves are designed to remain closed against maximum containment pressure, to vent containment so that the maximum containment pressure will not be exceeded, and to provide a nitrogen flow sufficient to maintain the hydrogen concentration inside the containment below the flammability limits. The existing vent and makeup valves will continue to be used for all nonaccident operating modes. The valves in each of the added parallel paths are powered from independent emergency buses for both the torus and drywell. The solenoid valves are normally keylocked closed, receiving no isolation signal and opened only for test and emergency conditions. Indicator lights are provided on panels C170 and C171 to continuously monitor valve position. The Licensee has stated that the post-LOCA containment atmosphere dilution system is designed to seismic Category I criteria. Since this is in accordance with the design basis requirements, we find this acceptable. Control of the valves is remote

manual via keylocked switches which are mounted on separate Class 1E control panels (post-accident monitoring panels C170 and C171) located in the main control room. No single failure could be identified which could preclude the availability of CGCS system flow paths. The licensee has stated that the solenoid valves are ASME III Class 2 and are qualified environmentally and seismically to the requirements of IEEE 323-1974, IEEE 382-1973, and IEEE 344-1975 for the expected conditions. The valves are rated at 120 Vac and are designed to operate between 80 and 110 percent of rated voltage. Based on our review we find that since the control system and the solenoid valves have been designed in accordance with these criteria, they are acceptable.

The indicator lights on panels C170 and C171 are driven by reed type limit switches mounted within the valve electrical housing. Contacts from all control switches are wired to provide annunciation (CONTAINMENT ATMOSPHERE CONTROL VENT/SAMPLE VALVE OPEN) when a valve is open. All containment vent and purge valves (both new and existing) receive power from distribution boards Y3 and Y4. The maximum load on this transformer occurs after a LOCA when all of the new valves could be energized at the same time. The Licensee has determined that the total loading due to operation of all components required following a LOCA does not exceed the transformer rated capacity. The staff has reviewed the licensee's proposal and concludes that the design is acceptable.

By letter dated January 27, 1982 we requested the Licensee to provide additional information to show that certain single failures of the electrical system will not defeat containment isolation capability. The Licensee responded to this concern by letter dated February 23, 1982.

To satisfy single failure concerns regarding containment isolation dependability of the added flow paths provided through the 16 solenoid valves, we require (and the licensee has agreed to implement) operating procedures which direct the reactor operators to use the added flow paths only in the event that the originally installed flow paths are unavailable for post-LOCA hydrogen control. This operating procedure will provide assurance that containment isolation capability will not be defeated by an overvoltage condition in the electrical system supplying power to the (normally deenergized) solenoid valves. We have reviewed the licensee's February 23, 1982 response and its commitment to develop and implement appropriate operating procedures and have determined that the information provided by the Licensee demonstrates that containment isolation capability will not be defeated by single failures of the electrical system. Subject to implementation of the revised operating procedures as described above, we find that the system satisfies the redundancy, interconnection and loss of power with coincident single failure criteria of GDC 41.

GDC 42 requires that the CGCS be designed to permit periodic inspection. The Licensee has indicated that the system is designed to be periodically inspected because significant components of the system are located outside of the primary containment and are accessible for inspection.

GDC 43 requires that the CGCS be designed to permit periodic pressure and functional testing. The Licensee has indicated that the Containment Atmospheric Cleanup System at Pilgrim is designed to satisfy the requirements of 10 CFR Part 50, Appendix J for leak rate testing. However, we require that the newly added solenoid isolation valves be

included in the Licensee's leak test program. We discussed this requirement with the Licensee on January 22, 1982, and the Licensee has committed to adopt this requirement. The Licensee has further indicated in their letters of September 30, 1981 regarding proposed changes to the Technical Specifications that the post-LOCA Containment Atmosphere Dilution System shall be functionally tested once per operating cycle and the hydrogen analyzers shall be tested once per month and calibrated once every six months.

Based on these considerations, we conclude that the proposed CAD system satisfies the requirements of GDC 42 and 43.

C. Technical Specifications

The Licensee proposed Technical Specifications to incorporate LCOs and surveillance requirements for operation with the CAD system. We have reviewed these Technical Specifications and find them in accordance with the latest version of the Standard Technical Specifications (NUREG-0123, Rev. 3). Consequently, we find them acceptable since they implement a previously reviewed and approved action of the Commission.

D. Summary

Based on our review of the Licensee's submittals, we conclude that the modified combustible gas control system for Pilgrim (1) will perform its required safety function assuming the loss of either onsite or offsite power and a single failure without requiring access to the reactor building, (2) satisfies the requirements of IEEE Standard 279-1971, and (3) satisfies the requirements of 10 CFR 50.44, except for the requirements of 10 CFR 50.44(c)(3)(ii) and (iii), which are not required to be implemented before July 1982.

We also conclude that Technical Specifications limiting conditions for operation and surveillance requirements for operation with the modified system are in accordance with the latest revision of NUREG-0123, Standard Technical Specifications for GE BWRs and are acceptable.

III. ENVIRONMENTAL CONSIDERATIONS

We have determined that the amendment does not involve a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR 51.5(d)(4) that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of the amendment.

IV. CONCLUSIONS

We have concluded, based on the considerations discussed above, that: (1) because the amendment 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 amendment 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 the amendment will not be inimical to the common defense and security or to the health and safety of the public.

UNITED STATES NUCLEAR REGULATORY COMMISSIONDOCKET NO. 50-293BOSTON EDISON COMPANYNOTICE OF ISSUANCE OF AMENDMENT TO FACILITY
OPERATING LICENSE

The U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 55 to Facility Operating License No. DPR-35, issued to Boston Edison Company, 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 the Technical Specifications to incorporate limiting conditions for operation and surveillance requirements for the containment atmosphere dilution system.

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 was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR 51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.

8204270517

For further details with respect to this action, see (1) the licensee's application dated September 30, 1981. (2) Amendment No. 55 to License No. DPR-35, and (3) the Commission's 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, North Street, 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 Licensing.

Dated at Bethesda, Maryland, this 20th day of March 1982.

FOR THE NUCLEAR REGULATORY COMMISSION



Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing