September 4, 1987

Docket No.: 50-293

Boston Edison Company
ATTN: Mr. Ralph E. Bird
Senior Vice President - Nuclear
800 Boylston Street
Boston, Massachusetts 02199

Dear Mr. Bird:

SUBJECT: Issuance of Amendment No. 106 to Facility Operating License No. DPR-35 (TAC NO. 45699) - Pilgrim Nuclear Power Station

The Commission has issued the enclosed Amendment No. 106 to Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station. This amendment consists of changes to the Technical Specifications in response to your application dated May 20, 1987.

This amendment changes the Technical Specifications to add a timer to the automatic depressurization system (ADS) which formerly required operators intervention.

A copy of our Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's Bi-Weekly Federal Register Notice.

Sincerely,

/S/

Richard H. Wessman, Senior Project Manager
Project Directorate I-3
Division of Reactor Projects I/II

Enclosures:
1. Amendment No. 106 to DPR-35
2. Safety Evaluation

cc w/enclosures
See next page

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

SEP 4 1987

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cc w/enclosures:
See next page

Mr. Ralph G. Bird
Boston Edison Company

Pilgrim Nuclear Power Station

cc:

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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. 106
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 May 20, 1987 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:

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(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 106 , 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

Victor Nerses, Acting Director
Project Directorate I-3
Division of Reactor Projects I/II

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 4, 1987

AMENDMENT NO. 106 TO FACILITY OPERATING LICENSE DPR-35 -
PILGRIM NUCLEAR POWER STATION

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Docket No. 50-293
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S. Varga
B. Boger

ATTACHMENT TO LICENSE AMENDMENT NO. 106

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 areas of change. The corresponding overleaf pages are provided to maintain document completeness.

Remove Pages	Insert Pages
49	49
73	73
73a	73a
--	73b*
109	109

*Denotes new page

TABLE 3.2.B (Cont'd)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum # of Operable Instrument Channels Per Trip System (1)	Trip Function	Trip Level Setting	Remarks
1 1 1	Core Spray Pump Start Timer LPCI Pump Start Timer LPCI Pump Start Timer	0<t<1 sec. 4<t<6 sec. 9<t<11 sec.	In conjunction with loss of power initiates sequential starting of CSCS pumps
1	Auto Blowdown Timer	≥90, ≤120 sec.	In conjunction with Low Low Reactor Water Level, High Drywell Pressure and LPCI or Core Spray Pump running interlock, initiates Auto Blowdown.
2	ADS Drywell Pressure Bypass Timer	11 ± 2 min.	Permits starting CS and LPCI pumps and actuating ADS SRV's if RPV water level is low and drywell pressure is not high.
2 2	RHR (LPCI) Pump Discharge Pressure Interlock Core Spray Pump Discharge Pressure Interlock	150 ± 10 psig 150 ± 10 psig	Defers ADS actuation pending confirmation of Low Pressure core cooling system operation. (LPCI or Core Spray Pump running interlock.)
2	Emergency Bus Voltage Relay	20-25% of rated voltage resets at less than 50%	1. Permits closure of the Diesel Generator to an unloaded emergency bus. 2. Permits starting of CSCS 4 kV motors.

For most parameters monitored, as listed in Table 3.2.F, there are two (2) channels of instrumentation. By comparing readings between these two (2) channels, a near continuous surveillance of instrument performance is available. Meaningful deviation in comparative readings of these instruments will initiate an early recalibration, thereby maintaining the quality of the instrument readings.

The Safety - Safety/Relief Valve position indication instrumentation provides the operator with information on selected plant parameters to monitor and assess these variables during and following an accident.

In response to NUREG-0737, modifications were made to the ADS logic to extend automatic ADS operation to a class of transients that involve slowly uncovering the core without depressurizing the vessel or pressurizing the drywell. These transients were analyzed assuming no high pressure injection systems (feedwater, HPCI or RCIC) are available. Only ADS is considered available to depressurize the vessel, permitting operation of LPCI. The transients generally involve pipe breaks outside containment. Automatic ADS would not occur on low water level because high drywell pressure would not be present and ADS logic has a high drywell pressure permissive. The modification added a timer to the ADS logic which bypasses the high drywell pressure permissive, and a manual inhibit switch which allows the operator to inhibit automatic ADS initiation for events where automatic initiation is not desirable.

An analysis was performed to determine an upper time limit on the bypass timer. The goal was to ensure ADS is automatically initiated in time to prevent peak clad temperature (PCT) from exceeding 1500°F for a limiting break, which was determined to be a Reactor Water Cleanup line break. The analysis concluded that there are 18 minutes between the low water level initiation of the timer and the heatup of the cladding to the limit. Since the logic includes a 2 minute delay already, the bypass timer upper limit can not be more than 16 minutes, which provides a conservative margin for PCT and allows sufficient time for operator intervention if required. A minimum time delay is incorporated to allow RPV water level to recover, resetting the timer and preventing depressurization. The choice of a timer setting of 11 minutes places the setting in the middle and provides maximum tolerance from either limit. (Reference: GE Report "Bypass Timer Calculation for the ADS/ECCS Modification for Pilgrim Station" December 16, 1986).

The recirculation pump trip/alternate rod insertion systems are consistent with the "Monticello RPT/ARI" design described in NEDO-25016 (Reference 1) as referenced by the NRC as an acceptable design (Reference 2) for RPT. Reference 1 provides both system descriptions and performance analyses. The pump trip is provided to minimize reactor pressure in the highly unlikely event of a plant transient coincident with the failure of all control rods to scram. The rapid flow reduction increases core voiding providing a negative reactivity feedback. High pressure sensors and low water level sensors initiate the trip. The

recirculation pump trip is only required at high reactor power levels, where the safety/relief valves have insufficient capacity to relieve the steam which continues to be generated in this unlikely postulated event. Requiring the trip to be operable only when in the RUN mode is therefore conservative. The low water level trip function includes a time delay of nine (9) seconds ± one (1) second to avoid increasing the consequences of a postulated LOCA. This delay has an insignificant effect on ATWS consequences.

Alternate rod insertion utilizes the same initiation logic and functions as RPT and provides a diverse means of initiating a reactor scram. ARI uses sensor diverse from the reactor protection system to depressurize the scram pilot air header, which in turn causes all control rods to be inserted.

References

1. NEDO-25016, "Evaluation of Anticipated Transients Without Scram for the Monticello Nuclear Generating Plant," September 1976.

2. NUREG-0460, Volume 3, December 1978.

Drywell Temperature

The drywell temperature limitations of Specification 3.2.H.1 ensure that safety related equipment will not be subjected to excess temperature. Exposure to excessive temperatures may degrade equipment and can cause loss of its operability.

The temperature elements for monitoring drywell temperature specified in Table 3.2.H were chosen on the basis of their reliability, location, and their redundancy (duel - element RTD's). These temperature elements are the primary elements used for the PCILRT.

The temperature limits specified in 3.2.H.1 are based on the BECo report entitled Drywell Temperature Report, dated January 28, 1982. The limits derived from this report take into consideration the long-term effects of ambient temperature on equipment design limits and material degradation of components required for accident mitigation or plant shutdown. The evaluation process addressed the actual assessment of potential damage and the determination of equipment status from the standpoint of both qualification integrity (for safety-related equipment) and reliability to perform it's intended function.

If the drywell temperature exceeds the limits specified in 3.2.H.1 an engineering evaluation must be initiated in order to determine whether any safety related component has been adversely affected.

The limiting drywell temperature value of 215°F (Section 3.2.H.2) was selected as to guarantee that ECCS trips occur on/or before present Technical Specification values.

The time interval of 30 minutes between successive drywell temperature instrument readings (Section 3.2.H.1) was selected so as to guarantee that ECCS trips occur on/before present Technical Specification values in the event of a drywell temperature excursion in excess of 215°F.

The instrument check interval of once per shift provides adequate assurance of equipment operability based upon engineering judgement.

3.5.D Reactor Core Isolation Cooling (RCIC) Subsystem (Cont'd)

2. From and after the date that the RCICS is made or found to be inoperable for any reason, continued reactor power operation is permissible only during the succeeding seven days provided that during such seven days the HPCIS is operable.

3. If the requirements of 3.5.D cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to or below 104 psig within 24 hours.

3.5.E Automatic Depressurization System (ADS)

1. The Automatic Depressurization Subsystem shall be operable whenever there is irradiated fuel in the reactor vessel and the reactor pressure is greater than 104 psig and prior to a startup from a Cold Condition, except as specified in 3.5.E.2 below.

4.5.D Reactor Core Isolation on Cooling (RCIC) Subsystem (Cont'd)

d. Flow Rate at 1000 psig — Once/3 months

e. Flow Rate at 150 psig — Once/operating cycle

The RCIC pump shall deliver at least 400 gpm for a system head corresponding to a reactor pressure of 1000 to 150 psig.

2. When it is determined that the RCIC subsystem is inoperable, the HPCIS shall be demonstrated to be operable immediately and weekly thereafter.

4.5.E Automatic Depressurization System (ADS)

1. During each operating cycle the following tests shall be performed on the ADS:

a. A simulated automatic actuation test shall be performed prior to startup after each refueling outage. The ADS manual inhibit switch will be included in this test.

b. With the reactor at pressure, each relief valve shall be manually opened until a corresponding change in reactor pressure or main turbine bypass valve positions indicate that steam is flowing from the valve.

c. Perform a test from the alternate shutdown panel to verify that the relief valve solenoids actuate. Test shall be performed after each refueling outage prior to startup.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO TECHNICAL SPECIFICATIONS FOR ADS LOGIC MODIFICATIONS BOSTON EDISON COMPANY PILGRIM NUCLEAR POWER STATION DOCKET NO. 50-293

1.0 INTRODUCTION

By letter dated May 20, 1987 (R. G. Bird, BECo, to U. S. Nuclear Regulatory Commission, with Attachments), the Boston Edison Company submitted revisions to the Technical Specifications (TS) for Pilgrim Station to reflect modifications to the Automatic Depressurization System (ADS). The modifications were committed to and described by the licensee in BECo letters dated September 24, 1986 and January 28, 1987. Specifically, the changes include identification of the additional instrumentation in the TS Table 3.2.B (Instrumentation that Initiates or Controls the Core and Containment Cooling Systems) and a surveillance requirement for the new instrumentation. In support of these changes, the submittal included an ADS bypass timer calculation report by General Electric (Attachment C to the base document of May 20, 1987) to justify an upper time limit on the bypass timer modification to the ADS logic. The staff has reviewed the relevant portions of the submittal and has prepared the following evaluation.

2.0 EVALUATION

2.1 Conformance to Requirements of NUREG-0737, Item II.K.3.18

The revised Technical Specification changes reflect the addition of a bypass timer and a manual inhibit switch to the ADS/low pressure ECCS pump logic.

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The modifications were made in response to NUREG-0737, Item II.K.3.18, "ADS Logic Modification" and were identified as one of the approved options in the NRC evaluation of the BWR Owners' Group generic response to the subject NUREG-0737 Item. The staff safety evaluation was provided to the licensee by NRC letter dated June 3, 1983. The staff evaluation stated that the time delay associated with the manual inhibit switch must be justified by analysis and the facility technical specifications must be modified to require testing of the timer. The licensee's submittal included documentation of both of these requirements.

The required bypass timer calculation was performed by General Electric and reported in Attachment C to the base change proposal document. The analysis was an investigation of a class of transients and events of the type associated with a loss of high pressure injection and delayed ADS actuation. The analysis was performed with approved transient and accident methodologies and used conservative initial conditions and assumptions. The goal was to determine a bypass timer upper limit to provide a conservative margin to peak clad temperature (PCT) for a limiting pipe break. The upper limit on timer delay was established as 18 minutes between low water level initiation of the timer and the heatup of the fuel cladding to within acceptable limits. Consideration of the original two minute timer delay initially present in the ADS logic results in a bypass timer time limit restriction of not greater than 16 minutes for a margin to the PCT limit. The Technical Specification proposed time limit of 11 ± 2 minutes was selected by the licensee as a compromise which allows the operator sufficient time to inhibit automatic initiation of the ADS based on his observation of plant conditions and the analyzed upper time limit of 18 minutes. The staff finds appropriate consideration has been given to the bounding time limits and the proposed TS limit is acceptable.

The staff safety evaluation transmitted to the licensee on June 3, 1983 included a requirement for a surveillance test of the bypass timer. The proposed TS revision addresses this requirement and is acceptable.

2.2 Technical Specification Changes

The Pilgrim Technical Specification changes resulting from the accepted proposal are as follows:

1) Table 3.2.B, page 49: The Table identifying "Instrumentation that Initiates or Controls the Core and Containment Cooling Systems" was revised to add the bypass timer data associated with the approved modification.

2) Section 3.2 Bases pages 73, 73a and 73b: Discussion paragraphs on page 73 summarizing the modification and analytical basis were added to reflect response to the staff requirement in its SE for Item II.K.3.18. The additional material required page number modifications (73a and 73b) for material which contains no text changes from the previous TS.

3) Surveillance Requirement 4.5.E.1.a, page 109: The statement "The ADS manual inhibit switch will be included in this test" was added in accordance with a staff requirement stated in its SE for Item II.K.3.18.

The replacement TS pages identified in the licensee's request are acceptable as proposed.

3.0 ENVIRONMENTAL CONDITIONS

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff had 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 published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such

finding. Accordingly, the 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 or environmental assessment need be prepared in connection with the issuance of the amendment.

4.0 CONCLUSIONS

The staff has reviewed the bases material provided by the licensee for the proposed TS changes to accommodate the ADS modifications to Pilgrim Station made in response to NUREG-0737, Item II.K.3.18 "ADS Logic Modification". Based on the results of our review discussed in Section 2.0 of this SE, we conclude that the proposed Technical Specification changes are consistent with the design changes and are acceptable.

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 health and safety of the public.

Dated: September 4, 1987

Principal Contributor: M. McCoy