UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 151 TO FACILITY OPERATING LICENSE NO. DPR-35

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

1.0 INTRODUCTION

By letters dated June 7, 1993, August 9, 1993, and December 10, 1993, the Boston Edison Company (BECo) proposed changes to the Pilgrim Nuclear Power Station Technical Specifications (TSs) for Operating License No. DPR-35. The proposed changes revise TS surveillance test intervals from 18 to 24 months to accommodate a 24-month fuel cycle. The licensee evaluated the proposed changes in accordance with the guidance provided in NRC Generic Letter (GL) 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-month Fuel Cycle," dated April 2, 1991. The Pilgrim Nuclear Power Station (PNPS) has sufficient fuel loaded for a 24-month operating cycle.

On June 7, 1993, BECo proposed an increase to the surveillance intervals of certain instrumentation, related instrument calibration frequencies, and setpoints. The Instrumentation and Controls Branch (HICB) completed a review of this submittal and issued a Safety Evaluation (SE) on November 17, 1993. On August 9, 1993, BECo requested changes in some specific setpoints to accommodate a 24-month fuel cycle and addressed the design change mechanism to be used for effecting the setpoint changes. BECo also addressed associated procedural controls to be used to maintain control of the critical parameters identified in the calculations. HICB completed a review of the August 9, 1993, submittal and issued a SE on December 1, 1993. In the December 10, 1993 submittal BECo proposed changes in additional setpoints to accommodate the 24-month fuel cycle and provided justification for extending the surveillance interval for those components and systems that are not related to instrument setpoint changes. HICB completed a review of the December 10, 1993, submittal and issued a SE on February 17, 1994. This SE merges the three SEs in a single document.

2.0 BACKGROUND

Improved reactor fuels allow licensees to consider an increase in the duration of the fuel cycle for their facilities and longer fuel cycle increases the time interval between performance of TS surveillance requirements. GL 91-04 outlines generic guidance to licensees for providing the support required to change TS to allow 24 month surveillance intervals. GL 91-04 also includes

requirements for evaluation of the impact on safety from an increase in surveillance interval. GL 91-04 further requires that a licensee should address the issue of instrumentation errors/setpoint methodology assumptions when proposing an extended instrumentation surveillance interval. Specifically, the licensee must evaluate the effects of an increased calibration interval on the instrument uncertainties, equipment qualification, and vendor maintenance requirements to ensure that an extended surveillance interval does not result in exceeding the assumptions stated in the safety analysis.

3.0 EVALUATION

3.1 Submittal dated June 7, 1993

BECo has established a Setpoint Control Program that includes instrumentation setpoint calculations to support PNPS TS changes required for a 24-month fuel cycle. A sample setpoint calculation, ABB Impell Project Number 25-226, for Reactor Vessel Low-Low Level Instruments LIS263-72A, B, C, and D, was submitted for staff review.

The licensee used the as-found/as-left instrument calibration data to statistically analyze the probability and confidence level drift errors for the level indication instruments (LISs). The 95%/95% probability and confidence level for the four level switches were statistically analyzed to determine if the data sets were normal or bounded by a normal curve. The results showed that none of the data exhibited time dependency and sufficient data were bounded by the 95% probability/95% confidence values that established that these data are valid estimates of instrument drift. This analysis included 120-day drift data from July 2, 1987, through October 29, 1992, for the LISs; however, the licensee used the manufacturer's drift specification of transmitters because there were not enough data points for a valid statistical analysis of transmitters at this time.

The licensee proposed to change the reactor low-low level trip level setting from -49" to -46" (79.96" above top of active fuel). This trip setpoint was determined from the normal operation lower limit 20" and included errors due to sensor drift, rack equipment drift, sensor tolerance, and rack equipment tolerance. However, after applying additional allowance for errors associated with environmental conditions, circuit leakage, process calibration, rack equipment, and sensor, the analytical limit for reactor low-low level became -56.9" from instrument zero.

BECo requested General Electric Company (GE) to provide a report for the justification of changing the analytical limit for low-low reactor water level from its current -49" from instrument zero to -57" from instrument zero. GE provided a Summary Report (DRF A00-03983) for the justification for changing the analytical limit for low-low reactor water level instruments that provide initiation of the following safety systems:

- o High-pressure coolant injection and reactor core isolation cooling,
- o Emergency diesel generators,
- o Low-pressure coolant injection and Core Spray,
- o Main steam isolation valve closure and isolation valves for drywell equipment,
- o ADS and bypass timer,
- o Recirculation pump trip

The impact of the change in the analytical limits for the above safety system functions for transients, loss-of-coolant accident, breaks outside primary containment and containment isolation were evaluated and determined by GE not to have any adverse impact on plant safety.

The licensee's analysis of the effect of instrument drift requires the following setpoint changes to ensure the extended interval does not result in exceeding an instrument's acceptable setpoint tolerance.

o Reactor Protection System (RPS) (Table 3.1.1)

	from	to
- High Reactor Pressure	1085 psig	1063.5 psig
- High Drywell Pressure	2.5 psig	2.22 psig
- Reactor Low water Level	9 inch	11.7 inch

o Primary Containment Isolation (PCIS) (Table 3.2.A)

- Reactor Low Water Level	9 inch	11.7 inch
- Reactor Low-Low Water Level	-49 inch	-46.3 inch
- Reactor High Water Level	48 inch	45.3 inch
- High Drywell Pressure	2.5 psig	2.22 psig
- Low Pressure Main Steam Line	880 psig	810 psig

o Core Spray and Containment Cooling Systems (Table 3.2.B)

- Reactor Low-Low Water Level	-49 inch	-46.3 inch
- Reactor High Water Level	48 inch	45.3 inch

The following changes were made to NOTES FOR TABLE 3.1.1 RPS:

NOTE 3. Permission to bypass [main condenser low vacuum trip and main steam line isolation valve closure trip] when reactor pressure is 600 psig is changed to 576 psig.

The setpoint change to the turbine first stage pressure bypass in the following note was made to assure a reactor trip at a lower load rejection to prevent the reactor vessel safety valves from operating.

NOTE 4. Permission to bypass [turbine control valve fast closure trip and turbine stop valve closure trip] when turbine first stage pressure is less than 305 psig is changed to 112 psig.

The licensee made the necessary changes to the Table Notes and the BASES sections associated with the above Tables. The Table 3.2 low pressure main steam line setpoint change was submitted in BECo's letter dated May 20, 1993, (Ref. 3). Reactor Protection System (Scram) Instrument Calibration for average power range monitor high flux, output signal, and flow bias signal calibration frequency will remain at 18 months.

The licensee proposes to change following instrument function test frequency from 1 month to 3 months.

Table 4.2.A Minimum Test and Calibration Frequency for Primary Containment Isolation System

- o Reactor low-low water level
- o Reactor high water level
- o Main steam low pressure

Table 4.2.B Minimum Test and Calibration Frequency for Core Standby Cooling Systems

- o Reactor Water Level

The licensee has identified that the basis for change of test frequency for these instruments from 1 month to 3 months is their failures relative to the hours in service for identical components. The licensee used Figure 4.1.1, "Graphical Aid in the Selection of an Adequate Interval Between Test" to determine the 3-month test frequency. This figure is a plot of the number of unsafe failures verse exposure hours [M FACTOR] (number of identical components times instrument operating hours) for various test time intervals. The licensee has provided a safety analysis which determined that operating the plant with the proposed changes to the PNPS TSs will not involve a significant increase in the probability or consequence of an accident previously identified, create the possibility of a new or different kind of accident from any accident previously analyzed, or involve a significant reduction in the margin of safety.

3.2 Submittal dated August 9, 1993

BECo has established a Setpoint Control Program (SCP) that includes instrumentation setpoint calculations to support PNPS technical support changes required for a 24-month fuel cycle. A sample setpoint calculation, ABB Impell Project Number 25-226, for reactor vessel low-low level instruments LIS263-72A, B, C, and D, was submitted on June 7, 1993, for the staff's review. The staff has found acceptable the licensee's method of determining instrument drift error and application of the SCP.

The licensee analysis of the effect of instrument drift requires the following setpoint changes to ensure that the extended interval does not result in exceeding an instrument's acceptable setpoint tolerance.

o Reactor Protection System (RPS) (Table 3.1.1)

	from	to
- Scram Discharge Instrument Volume (SDIV) SDIV High Water Level	39 gal	38 gal
- Main Steam Line High Radiation	7x Normal full Power Background	5x

o Core and Containment Cooling Systems (Table 3.2.B)

	from	to
-Reactor Hi water Lv	307 " above vessel zero	-151 " indicated level
-Cont Hi Press	1 less than p less than 2 psig	1.55 less than p less than 1.82 psig

Additional Remarks : Instrumentation set to trip before 1.82 increasing and reset before 1.55 decreasing.

-Hi Drywell Press	2.5 psig	2.22 psig

o Control Rod Block Instrumentation Setpoints Table 3.2.C-2

-SDIV High Water Level,	18 gal	17 gal

o Instrumentation that Initiates Recirculation Pump Trip and Alternate Rod insertion Table 3.2-G

-Hi Reactor Dome Press	1175 + or - 15 psig	1175 + or - 5 psig
-Low-Low Reactor Water Lv	77.26 " above the top of the active fuel	-46.3" indicated Lv

The licensee made the necessary changes to the Table Notes and the BASES sections associated with the above Tables.

The licensee has provided a safety analysis which determined that operating the plant with the proposed changes to the PNPS TSs will not involve a significant increase in the probability or consequence of an accident previously identified, create the possibility of a new or different kind of accident from any accident previously analyzed, or involve a significant reduction in the margin of safety.

3.3 Submittal Dated December 10, 1993

BECo's evaluation was based on the use of historical plant maintenance and surveillance data to support the proposed 24-month surveillance intervals.

Reactor Protection System

TS Table 3.1.1, Item 1 No text change

The reactor mode switch has a specified test interval of once every refueling outage. Extending to a 24-month refueling cycle would result in an increase in the test interval for the reactor mode switch from once every 18 months to once every 24 months.

Logic System Functional Test

	from	to
TS Table 4.2.A, Items 1-5	Once/18 months	Once/operating cycle
TS Table 4.2.B, Items 1-9	Once/18 months	Once/operating cycle
TS Table 4.2.C, System Logic Check	Once/18 months	Once/operating cycle
TS Table 4.2.D, Items 1 and 2	Once/18 months	Once/operating cycle

Logic system functional tests are required to be performed once every 18 months. Changing to a test interval of once per operating cycle would result in an increase in the test interval from once every 18 months to once every 24 months.

TS Table 4.2.G — No text change

The reactor high pressure and reactor low-low water level instrumentation have a specified test interval of once during each refueling outage. Extending to a 24-month refueling cycle would result in an increase in the test interval for the reactor high pressure and reactor low-low water level instrumentation from once every 18 months to once every 24 months.

TS 4.8.H — No text change

The mechanical vacuum pump has a specified test interval of once during each operating cycle. Extending to a 24-month refueling cycle would result in an increase in the test interval for the mechanical vacuum pump from once every 18 months to once every 24 months.

Simulated Automatic Actuations

TS 4.5.A.1.a	No text change
TS 4.5.A.3.a	No text change
TS 4.5.C.1.a	No text change
TS 4.5.D.1.a	No text change
TS 4.5.E.1.a	No text change
TS 4.7.A.2.b.1.a	No text change

Surveillance of simulated automatic actuations are required to be performed prior to startup following a refueling outage. Extending to a 24-month refueling cycle would result in an increase in the test interval for the simulated automatic actuations from once every 18 months to once every 24 months.

Core Standby Cooling System

	from	to
TS Table 4.2.B.7	Once/operating cycle	Once/18 months

The core spray sparger D/P (differental pressure) has a specified test interval of once every operating cycle. Changing the surveillance interval to once every 18 months would not change the amount of time between tests of the core spray sparger D/P.

Reactivity Control

TS 4.3.A.1	No text change

Sufficient control rods are required to be withdrawn following a refueling outage when core alterations are performed to demonstrate that the core can be made subcritical at any time. Because this surveillance is event dependent and not based on time, extending the refueling cycle length does not affect the validity of this demonstration.

Control Rod Drives

TS 4.3.B.1.a	No text change
TS 4.3.B.1.b	No text change
TS 4.3.C.1	No text change

Control rod coupling integrity is verified when rods are withdrawn for the first time after a refueling outage. Because this surveillance is event dependent and not based on time, extending the refueling cycle length does not affect the validity of this verification.

Standby Liquid Control System

TS 4.4.C.4	No text change

The standby liquid control system solution B^{10} enrichment is tested anytime boron is added and during each refueling outage. Because this surveillance is event dependent and not based on time, extending the refueling cycle length does not affect the validity of this test.

HPCI and RCIC Flow Rate

TS 4.5.C.1.e	No text change
TS 4.5.D.1.e	No text change

The HPCI pump and RCIC pump have a specified flow rate test interval of once during each operating cycle. Extending to a 24-month refueling cycle would result in an increase in the test interval for the HPCI and RCIC pumps from once every 18 months to once every 24 months.

Automatic Depressurization System

TS 4.5.E.1.b — No text change

Each automatic depressurization system relief valve is required to be manually opened once during each operating cycle. Extending to a 24-month refueling cycle would result in an increase in the test interval for the relief valves from once every 18 months to once every 24 months.

Leakage Detection Systems

	from	to
TS 4.6.C.2.a.2	Once/18 months	Once/operating cycle
TS 4.6.C.2.b.3	Once/18 months	Once/operating cycle

The drywell sump monitoring system and the drywell atmospheric radioactivity monitoring system are required to be calibrated at least once every 18 months. Changing to a test interval of once per operating cycle would result in an increase in the test interval for the drywell sump monitoring system and the drywell atmospheric radioactivity monitoring system from once every 18 months to once every 24 months.

Safety and Relief Valves

TS 4.6.D.2 — No text change

At least one of the relief/safety valves is required to be disassembled and inspected each refueling outage. Extending to a 24-month refueling cycle would result in an increase in the disassembly interval for the relief/safety valves from once every 18 months to once every 24 months.

Shock Suppressors (Snubbers)

	from	to
TS 4.6.I	Once/18 months	Once/operating cycle

Snubbers are required to be inspected at least once every 18 months. Changing to an inspection interval of once per operating cycle would result in an increase in the surveillance interval for the snubbers from once every 18 months to once every 24 months.

	from	to
TS 4.6.I.2.A	Once/18 months	Once/operating cycle

A representative sample of snubbers are required to be functionally tested at least once every 18 months. Changing to a test interval of once per operating cycle would result in an increase in the surveillance interval for the snubbers from once every 18 months to once every 24 months.

TS 4.6.I.3.B — No text change

The installation and maintenance records for each safety related snubber is required to be reviewed at least once per cycle. Extending to a 24-month refueling cycle would result in an increase in the review interval for the snubbers from once every 18 months to once every 24 months.

Suppression Chamber and Drywell Surface

TS 4.7.A.1.e — No text change
TS 4.7.A.2.d — No text change

The suppression chamber, drywell, and torus interiors are required to be inspected every refueling outage. Extending to a 24-month refueling cycle would result in an increase in the surveillance interval for the suppression chamber, drywell, and torus interiors from once every 18 months to once every 24 months.

Containment Atmospheric Dilution System

TS 4.7.A.7.a — No text change

The post-LOCA containment atmosphere dilution system is required to be functionally tested once per operating cycle. Extending to a 24-month refueling cycle would result in an increase in the surveillance interval for the post-LOCA dilution system from once every 18 months to once every 24 months.

Standby Gas Treatment System

	from	to
TS 4.7.B.1.a (1)	Once/18 months	Once/operating cycle
TS 4.7.B.1.a (2)	Once/18 months	Once/operating cycle
TS 4.7.B.1.a (3)	Once/18 months	Once/operating cycle
TS 4.7.B.1.a (41)	Once/18 months	Once/operating cycle

The standby gas treatment system is required to be tested once every 18 months. Changing to a test interval of once per operating cycle would result in an increase in the surveillance interval for the standby gas treatment system from once every 18 months to once every 24 months.

Control Room High Efficiency Air Filtration System

	from	to
TS 4.7.B.2.a	once/18 months	once/operating cycle
TS 4.7.B.2.b	once/18 months	once/operating cycle
TS 4.7.B.2.c	once/18 months	once/operating cycle
TS 4.7.B.2.d	once/18 months	once/operating cycle

The control room high efficiency air filtration system is required to be tested once every 18 months. Changing to a test interval of once per operating cycle would result in an increase in the surveillance interval for the standby gas treatment system from once every 18 months to once every 24 months.

Secondary Containment

TS 4.7.C.1.c	No text change

The secondary containment capability to maintain 1/4 inch of water vacuum is required to be demonstrated at each refueling outage prior to refueling. Extending to a 24-month refueling cycle would result in an increase in the demonstration interval for the secondary containment's capability to maintain a vacuum from once every 18 months to once every 24 months.

Auxiliary Electrical System

TS 4.9.A.1	No text change
TS 4.9.A.2	No text change

The diesel generators and the station and switchyard batteries are required to be tested once per operating cycle. Extending to a 24-month refueling cycle would result in an increase in the surveillance interval for the diesel generators and the station and switchyard batteries from once every 18 months to once every 24 months.

Core Alterations

TS 4.10	No text change

The refueling interlocks and the source range monitors are required to be functionally tested prior to any fuel handling with the head off the reactor vessel. Extending to a 24-month refueling cycle would result in an increase in the test interval for the refueling interlocks and the source range monitors from once every 18 months to once every 24 months.

Alternate Shutdown Panels

TS 4.12 No text change

The alternate shutdown panels are required to be demonstrated OPERABLE once each cycle. Extending to a 24-month refueling cycle would result in an increase in the demonstration interval for the alternate shutdown panels from once every 18 months to once every 24 months.

Correction of Editorial Errors and Addition of Changes

The licensee provided corrections of editorial errors that were contained in the June 7, 1993, and the August 9, 1993 submittals. These corrections were to the following TS and BASES:

TS 3.1.1, page 27
Bases 3.1, pages 39 and 40
TS 3.2.A, page 46a
TS 3.2.B, page 47
TS 4.2.B, page 61
Bases 3.2, page 68

The licensee made the necessary changes to the Table Notes and the BASES sections associated with the above Tables.

The licensee has provided a safety analysis which determined that operating the plant with the proposed changes to the PNPS TSs will not involve a significant increase in the probability or consequence of an accident previously identified, create the possibility of a new or different kind of accident from any accident previously analyzed, or involve a significant reduction in the margin of safety.

4.0 CONCLUSION

The licensee has demonstrated that the proposed changes have a small net effect on safety, that historical plant maintenance and surveillance data support the proposed extended surveillance intervals, and that the assumptions in the plant licensing basis are still bounding with the incorporation of a 24-month surveillance interval. BECo has analyzed instrument drift error associated with the 24-month refuel cycle and adjusted trip setpoints in accordance with their Setpoint Control Program. The licensee provided a safety analysis of these setpoint changes and found no significant effect upon safety. The staff reviewed the licensee's proposed changes to the TSs and find these changes acceptable. We, therefore, find the proposed TS changes to increase the surveillance interval from 18 to 24 months acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Massachusetts State Official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC 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 the amendment involves no significant hazards consideration, and there has been no public comment on such finding (59 FR 2863). 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.

7.0 CONCLUSION

The Commission 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

8.0 REFERENCES

1. Letter from E.T. Boulette, Senior Vice President - Nuclear, Boston Edison Company to NRC, "Proposed Changes to Technical Specifications: Request for Changes Supporting a 24 Month Fuel Cycle," dated June 7, 1993.

2. Generic Letter 91-04 from James G. Partlow, Associate Director for Projects - Office of Nuclear Reactor Regulation - NRC, to All Holders of Operating Licenses or Construction Permits for Nuclear Power Reactors "Guidance on Preparation of a License Amendment Request for Changes in Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991.

3. Letter from E.T. Boulette, Senior Vice President - Nuclear, Boston Edison Company to NRC, "Proposed Changes to Technical specifications: Main Steam Isolation Valve Turbine Inlet Low-Pressure Setpoint," dated May 20, 1993.

4. Letter from E.T. Boulette, Senior Vice President - Nuclear, Boston Edison Company to NRC, "Proposed Changes to Technical Specifications: Request for Changes Supporting a 24 Month Fuel Cycle," (Submittal 2), dated August 9, 1993.

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