

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-293/85-11

Licensee: Boston Edison Company
800 Boylston Street
Boston, Massachusetts 02199

Facility: Pilgrim Nuclear Power Station

Location: Plymouth, Massachusetts

Dates: May 7, 1985 - June 8, 1985

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6/28/85
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Approved By: G. Meyer
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for Section No. 3A, Projects Branch No. 3

6/28/85
Date

Inspection Summary: Inspection No. 50-293/85-11 on May 7 - June 8, 1985

Areas Inspected: Routine unannounced safety inspection of plant operations including: Followup of previous inspection findings, operational safety verification and ESF walkdown, followup of events and non-routine reports, surveillance and maintenance activities, followup actions on NRC bulletins and circulars, the potential for overpressurization of low pressure ECCS piping, and health physics activities. The inspection involved 216 inspection-hours by two resident inspectors and one region-based inspector.

Results: No violations were identified. The inspector performed a one-time inspection of ECCS overpressure protection (Section 8) which resulted in one unresolved item concerning the acceptability of the HPCI manual initiation method. Also, the inspector closed 11 previous inspection findings, 6 Bulletins, and 5 Circulars.

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DETAILS

1. Persons Contacted

Within this report period, interviews and discussions were conducted with members of the licensee and contractor staff and management to obtain the necessary information pertinent to the subjects being inspected.

2. Followup on Previous Inspection Findings

(Closed) Follow item (81-35-03). Review acceptability of licensee's program for calibration frequency of radiation survey instruments. Subsequent NRC review of radiation surveys including instrumentation used has not identified any violations or significant problems resulting from this area of concern. A program inspection (NRC Report No. 83-20) included a review of instruments and equipment. No violations were identified. In addition, as a result of the NRC's November 29, 1984 Order Requiring a Radiological Improvement Plan (RIP), the licensee's independent assessor has implemented internal review and audit of proper use and calibration of radiation survey instruments. This item is closed.

(Closed) Follow item (82-10-06). Review events surrounding reactor vessel level divergence during reactor startup. NRC Report No. 82-10 documents the problem identified in March, 1982 with the "A" reactor vessel level instrumentation drifting upward as reactor pressure was increased. NRC Report No. 82-12 documents a review of LER 82-11, and describes a problem with implementing the T.S. limiting condition for operation of reactor vessel water level instruments and proposed troubleshooting procedures.

The licensee performed an investigation of possible problems during the last refueling outage. This included a review of ventilation in the area and a ultrasonic exam of the reference leg piping. No specific piping problems were identified.

The licensee's investigation has concluded that the root cause of the level indication anomaly is excessive cooling in the area of the "A" reference leg which, at low reactor steam temperatures, inhibits the ability of the condensing chamber to provide adequate makeup. This event was again identified during plant startup in December, 1984 and is described in LER 84-19. In the 1982 and 1984 events, re-filling the reference leg has corrected the incorrect high indication on the "A" loop level instrumentation. The licensee has stated in LER 84-19 dated January 24, 1985 and in their initial response dated November 28, 1984 to NRC Generic Letter No. 84-23 "Reactor Vessel Water Level Instrumentation in BWRs", that modifications to the reactor vessel water level instrumentation are being planned. This follow item is closed for administrative purposes. The licensee's proposed modifications to the reactor vessel level instrumentation as described in LER 84-19 and in response to the NRC's Generic Letter 84-23 will be followed in a future inspection (85-11-01).

(Closed) Follow Item (82-19-03). RCIC valve checkoff list (COL). The inspector had noted five errors in the Reactor Core Isolation Cooling (RCIC) valve checkoff list (COL) from Procedure 2.2.22. On December 19, 1984, a walkdown of the RCIC system was performed and the COL was utilized. The inspector found the COL errors to have been corrected. The walkdown is documented in Inspection Report 50-293/84-39. This item is closed.

(Closed) Deviation (82-19-08). Failure to inspect the status of certain fire doors (non-locked, non-alarmed) on a daily basis. The licensee's response dated September 15, 1982 describes corrective actions including incorporation of fire door inspections into the check list completed by the operator on a plant tour (Procedure 2.1.16, Nuclear Power Plant Operator Tour). Revision 43 to Procedure 2.1.16, dated March 27, 1985 includes a daily check of certain fire doors and a once-per-shift check of others. The inspector also reviewed selected fire doors (that are not locked nor alarmed) listed in Procedure 8.B.17, Inspection of Fire Doors and Dampers, Revision 7, Attachment A, in order to ensure that they were included in the NPO tour sheets, and being checked daily. No problems were identified. This item is closed.

(Closed) Follow item (83-09-02). Review administrative controls used for preliminary update of the Q-List while awaiting modification documentation closeout. The licensee has implemented actions to close out past design changes (which had remained open for several years) in accordance with the Performance Improvement Program. The licensee had initiated controls using a new Section, No. VI, of the Q-List for those safety related components associated with open plant design change packages. This was subsequently revised by the licensee and another method established. This current method involves two parts as described in NOP 83E1, Control of Modifications to Pilgrim Station, and Section II of the PNPS Q-List. First, Section 7.1.6 of NOP 83E1 requires that selected controlled documents (including the Q-List) be approved and issued prior to the Nuclear Operations Manager accepting the modification. Second, Section 2.1 of the PNPS Q-List states that all components and equipment within the defined boundaries of the safety related systems shall be considered "Q" unless determined to be non-Q by engineering evaluations.

In addition, interviews with the licensee's Nuclear Engineering Department staff indicate good communication with the plant maintenance staff regarding any question of component safety classification prior to modification package closeouts. This item is considered closed.

(Closed) Violation (83-09-03). Failure to maintain the Q-List up to date. The licensee's response dated July 6, 1983 describes corrective actions to update the Q-List with safety related equipment. The inspector verified that the safety related equipment in question, reactor vessel water level and pressure transmitters and power supplies, have been added to the BECo Q-List, Section III. In addition the licensee has also instituted a new Section IV, Management Quality Control Items. This section is provided to control equipment important to safety such as fire protection, post accident instrumentation (Reg. Guide 1.97), equipment in proximity to or which could affect safety

systems (such as the refueling platform), and some equipment which provides a back up function to a safety system (such as the ATWS recirculation pump trip and the backup scram valves). This item is closed.

(Closed) Violation (83-09-04). Failure to bring the Final Safety Analysis Report (FSAR) up to date in accordance with 10 CFR 50.71 (e). In their July 6, 1983 response to this item, the licensee described additional changes that would be incorporated into the FSAR to provide information regarding Anticipated Transient Without Scram (ATWS) recirculation pump trip (RPT) and alternate rod insertion (ARI) equipment and function. Also, because the licensee also requested the violation be withdrawn, a meeting between the NRC and the licensee was held on September 21, 1983 to discuss the requirements for updating the FSAR. The details of this meeting are described in NRC Inspection Report No. 83-19, Paragraph 2.C.

NRC Region I management personnel discussed this item with NRC (NRR), Division of Licensing, in order to ensure a consistent approach. This review resulted in the following conclusions: 1) new analyses required as a result of NRC requirements or submitted by a licensee should be incorporated if they relate to the FSAR, 2) any analysis or system modification which is reflected in a Technical Specification must be incorporated in the FSAR update, and 3) this specific example regarding ATWS RPT/ARI was supported by a safety evaluation, and an associated Limiting Condition for Operation and Surveillance Requirements and should have been incorporated in the FSAR update.

The inspector provided the results of this guidance to the licensee and stated that the violation would stand. The inspector also reviewed the FSAR and verified that Figures 7.8-2 (reactor vessel instrumentation) and 8.6-1 (power supplies) have been revised. Also, the licensee has added a new chapter to the FSAR, No. 3.9, and has provided a word description as well as functional block diagram. This item is considered closed.

(Closed) Unresolved item (83-09-08). Review part number-quality relationship with respect to licensee procurement from General Electric Company. NRC Report No. 83-10 documents initial NRC review of this item. The licensee has received a response from the General Electric Company (G-HK-3-076 dated June 2, 1983) which answers questions regarding component replacement by part number, i.e. replacement in kind. General Electric Company has verified in this letter that 1) specifications and quality requirements of a particular component are historically maintained, and 2) the part number is synonymous with a part drawing which is backed up by a design record file, specifications and all quality and documentation requirements. This item is closed.

(Closed) Follow Item (83-10-03). Review licensee's long term actions to correct an inadequate electrical terminal (excessive number of wires on one terminal). The licensee approved Plant Design Change No. 83-22, Standby Gas Treatment (SBGT) System Power Supply Modification. This change added a twelve point terminal block to distribute 480V power to heater contactors in SBGT panels C68 and C69. The inspector reviewed records of this modification which was implemented during the last refueling outage. Post work testing was per-

formed in accordance with TP 84-219 on October 13, 1984. This test demonstrated proper operation of the SGBT heaters (as well as other components). This item is closed.

(Closed) Violation (83-23-03). Procured and installed a solenoid coil for a safety related system (HPCI remote trip) as a commercial item without approved procedural controls. The licensee's responses dated January 3, February 15, and April 26, 1984 describe corrective actions including approval of a Nuclear Operations Procedure (NOP).

The licensee's Nuclear Engineering Department initiated and the Quality Assurance Manager approved NOP 84A8, dated July 20, 1984, Control of Commercial Quality Items. This procedure provides controls for procuring safety related items that are not specifically engineered and are of a nature such that the quality can be verified by BECo receipt inspection or testing. The procedure includes controls for component evaluation, procurement, receipt inspection, and testing. The inspector also reviewed the implementing procedure (NED 4.05 dated October 1, 1984) and the log of Commercial Quality Item engineering evaluations. In addition, the inspector verified that this method of procurement was authorized by and consistent with the BECo QA Manual, Section 4.4.3. This item is closed.

(Closed) Unresolved Item (84-33-01). Review design requirements for the reactor building truck lock. On March 21, 1985 the inspector discussed the design requirements of the Pilgrim reactor building truck lock with the NRR licensing project manager who summarized the Containment System Branch position that the truck lock need not be a Class I seismic structure, and that the requirements of the Technical Specifications for secondary containment integrity be maintained. The inspector verified that the plant endorses this policy which requires at least one door in the truck lock shut, and maintenance of the reactor building intact. In addition, the station has also implemented a policy to keep the inner truck lock door normally shut. The inspector also noted that the licensee has initiated changes to the FSAR to clarify the design requirements of the truck lock. This item is resolved and closed.

3. Operational Safety Verification and ESF Walkdowns

a. Scope and Acceptance Criteria

The inspector observed control room operations, reviewed selected logs and records, and held discussions with control room operators. The inspector reviewed the operability of safety-related and radiation monitoring systems. Tours of the reactor building, turbine building, switchgear rooms, HPCI room, RCIC room, battery rooms, and control room were conducted.

Observations included a review of equipment condition, security, house-keeping, radiological controls, and equipment control (tagging).

The inspector also verified the operability of selected engineered safety feature (ESF) systems by performing a walkdown of portions of those systems.

b. Findings

- (1) Between May 9 and 13, 1985, the licensee conducted a test of hydrogen water chemistry by injecting hydrogen into the suction of the feed pumps and measuring resulting changes in coolant oxygen levels. Both onsite and offsite radiation levels were monitored during the test. Oxygen was added to the offgas during the test to compensate for the injected hydrogen and ensure that offgas recombiners functioned properly.

The inspector reviewed the temporary licensee Procedure No. 85-30, for the test and visually inspected the temporary gas lines and equipment. The inspector verified that the procedure was consistent with the technical specifications for main steam line radiation monitor settings. These settings were increased during the test runs, but returned to normal levels between each run and at the end of the test.

Onsite and offsite (within the owner controlled area) dose rates increased by up to a factor of four during the test due to higher levels of N-16 in reactor steam. Dose rates outside the owner controlled area increased by less than a factor of two. The offsite dose rates did not exceed the limits for unrestricted areas in 10 CFR 20. Radioactive effluent release rates did not change.

The inspector had no further questions. No inadequacies were identified.

- (2) On May 15 and 16, 1985, the inspector walked down portions of the high pressure coolant injection system (HPCI) located in the HPCI room and portions of the salt service water system located in the auxiliary bay. During the walkdowns, the as-found valve positions were checked against station drawings and procedures. No inadequacies were identified.
- (3) On May 16, 1985 at 9:53 a.m., the licensee initiated a plant shutdown after Failure and Malfunction Reports were issued concerning welds on four pipe hangers. The hangers were H-10-1-18SR and H-10-1-29SR (residual heat removal system), H-13-1-1SG (reactor core isolation cooling system), and H-23-1-SH (high pressure coolant injection system). Each hanger was found to have a weld that was undersized relative to installation specifications. In addition, a weld on hanger H-10-1-18SR was not liquid penetrant inspected as required by the installation package.

The shutdown was terminated at 10:15 a.m. on May 16, 1985, after an engineering evaluation indicated that the welds, while smaller than specified, were acceptable. The licensee engineering group also decided that the lack of a penetrant test was not sufficient reason to declare hanger H-10-1-18SR inoperable, given the design margin in the weld and postulated operational stresses.

Later on May 16, dye penetrant indications were detected in the weld on H-10-1-18SR. The licensee declared the low pressure coolant injection (LPCI) system inoperable, pending the completion of a weld repair to the hanger. The repair was completed and the LPCI system declared operable the following day. The licensee is evaluating the amount of metal removed from the weld during the repair to verify the initial judgement, i.e., that the hanger would be operable with an indication.

No inadequacies were identified concerning licensee response to the problems identified in the Failure and Malfunction Reports.

The weld problems were identified by the contractor who installed the hangers as a result of a licensee-requested audit of the contractor QA program. The audit results were presented to the licensee at a meeting on May 15, 1985.

At the end of the inspection period, the licensee indicated that the contractor QA program was under review and that a final report on the program would be issued in the near future. The licensee has scheduled routine meetings between contractor and licensee QA representatives. The purpose of these meetings is to identify and resolve contractor QA problems. The nature and resolution of the contractor QA problems will be reviewed during a subsequent inspection (85-11-02).

- (4) On May 18, 1985 at 5:50 a.m., the high pressure coolant injection (HPCI) system was declared inoperable after two damaged 20 KIP snubbers were identified on the steam exhaust line following a routine HPCI pump operability test. One of the snubbers was broken and the other snubber was bent. The snubber supports were also damaged. One of the snubbers had been found damaged after a previous surveillance test on March 31, 1985 (NRC Inspection Report 85-06).

During the surveillance test on May 18, the turbine started, tripped, slowed, and automatically restarted. The licensee could not determine the cause of the turbine trip. The licensee believes that the quick restart generated a water hammer in the steam exhaust line which damaged the snubbers. The licensee visually inspected the HPCI exhaust line penetration into the torus following the test and found no damage.

A preliminary hydrodynamic analysis of the HPCI exhaust line was subsequently conducted. It concluded that the exhaust line piping and torus penetration would remain operable during a design basis accident without the snubbers. Safety Evaluation No. 1831 documents this analysis. The analysis assumes that the snubbers damaged on May 18 are not required during an accident. A licensee evaluation of the long term effects of the water hammers in the line is planned.

The licensee indicated that the HPCI system reached the design flow rate in about 31 seconds during the test on May 18. This time period exceeds the start time used in the FSAR accident analysis, 25 seconds, and reflects the additional time required by the turbine trip and restart. The licensee reviewed and accepted a safety analysis prepared by General Electric, No. 1830, which indicates that the HPCI system can take as long as 90 seconds to reach design flow rate during an accident. Based on this evaluation, the licensee believes that it is acceptable, although not preferable, for the HPCI turbine to trip and restart on an automatic initiation.

To lessen that chance of overspeed trips during the monthly pump surveillance test, the licensee changed the surveillance procedure to require a slow start of the turbine using the manual turbine test speed control. As long term corrective action, the licensee plans to install a modification to the HPCI turbine control system which is designed to smooth out the HPCI starts and prevent spurious trips.

The HPCI system isolated during a post maintenance test on May 23, 1985. The system operated acceptably with no turbine trips during three subsequent tests later that day. The inspector watched the first test from a point just outside the HPCI room and did not observe appreciable movement in the exhaust piping during the test.

The licensee indicated that the system isolation on May 23 was caused by a false high HPCI steam flow signal generated by residual air trapped in the steam flow instrument sensing lines. The air may have been introduced into the lines during a recent instrument calibration. The HPCI turbine also tripped during the first test on May 23, but the licensee believes that the trip was caused by the system isolation and not by an additional system problem.

On May 24, 1985 at 2:38 p.m., the licensee declared the HPCI system operable following an Operating Review Committee (ORC) review of HPCI test data and safety evaluations. The results of future HPCI surveillance tests will be reviewed during routine inspections of the licensed program. The inspector had no further questions at this time.

The HPCI system was successfully operated during an inadvertent primary containment isolation and reactor scram on June 15, 1985. At that time, the turbine was manually started and run in the test mode.

(recirculation to the CST) to draw off steam from the reactor and control pressure. This event will be described in a future routine NRC Resident Inspection Report.

- (5) On May 29, 1985 at 12:15 a.m., the HPCI system isolated on a false high HPCI steam flow signal. The system was in the standby mode at the time of the isolation with no appreciable steam flow in the HPCI steam line. The licensee declared the system inoperable, pending a review of the cause of the isolation.

The review indicated that the set points on one of two high steam flow switches, differential pressure switch no. 2353, had drifted. Both the positive and negative set points in the switch were found low by about 40 inches of water pressure.

The licensee subsequently replaced the switch mechanism. The old mechanism was disassembled, but no reason for the set point drift was identified. The licensee calibrated the replacement mechanism and checked the set points several times before declaring the switch operable. The set points on the other HPCI flow switch were checked and found to be acceptable.

The inspector reviewed previous surveillance data on the flow switches. No trends in switch performance were identified. The inspector had no further questions at this time.

- (6) On May 30 and June 6, 1985, one loop of the containment cooling subsystem was declared inoperable following the failure in the closed position of valve, MO-1001-34A, in the residual heat removal system. In each case, the motor operator on the valve overloaded and the motor had to be subsequently replaced. The inspector verified that the licensee initiated the procedure for having one containment cooling loop inoperable after each failure.

During subsequent discussions, the licensee stated that after the second motor failure, the grease in the belleville spring pack on the operator torque switch was replaced. If the grease had hardened with age, the torque switch may not have operated properly to protect the motor operator. The licensee also repaired a crack in the handwheel operating assembly. This crack may have caused binding in a motor operator bearing leading to excessive motor current.

The licensee indicated that the initial maintenance and testing of the 1001-34A motor operator did not identify the root cause of the first failure because the operator was not disassembled. The inspector had no further questions at this time.

The control room log for May 30, 1985 indicated that "one containment cooling subsystem" was inoperable after the motor operator failure. The log was corrected later that day to show that one loop of the containment cooling subsystem was inoperable. The control room supervisor who made the entry indicated that he became confused over the definition of the containment cooling subsystem, but corrected his mistake after checking the basis of the technical specifications. A second instance of confusion over the definition of a cooling subsystem is discussed in Section 4.a.(1) of this report. A previous instance is documented in Detail 3.b.1 of NRC Inspection Report 50-293/85-06.

Section 3.5 of the technical specifications uses the term "subsystem" in LCO's for various emergency cooling functions. However, the extent of each subsystem is not defined for some functions, e.g., the low pressure coolant injection subsystem. Since LCO action statements can vary, depending on whether a loop or a subsystem is inoperable, the operators should know how each is defined. At the exit meeting, the licensee indicated that a memo discussing the meaning of the cooling subsystems would be issued to the operations staff by the end of June 1985. The licensee is seeking to clarify the technical specifications as a long-term corrective action. The depth of operator understanding of the cooling subsystems will be reviewed during future routine inspections of the control room. The inspector had no further questions at this time.

4. Followup on Events and Nonroutine Reports

a. Events

- (1) On May 16, 1985 at 8:38 p.m., a reactor shutdown was initiated following the failure of a prelubrication pump on the "B" diesel generator to start after a routine diesel generator surveillance test. The "A" pump for the low pressure coolant injection (LPCI) system was inoperable at this time due to a defective pipe hanger weld (hanger H-10-1-18SR discussed in Detail 3.b.3 of this report). At 9:19 p.m., an unusual event was declared as required by the licensee emergency plan because a plant shutdown had been initiated due to the loss of emergency core cooling systems. The NRC was promptly notified of the shutdown and unusual event via the ENS telephone line.

The prelubrication pump is designed to circulate warm oil through the diesel while in the standby mode, reducing mechanical wear from fast starts. The thermal trips for the pump motor were found in the tripped state. The licensee reset the trips and electrically tested the motor. The motor performed within acceptable limits and did not draw excessive current. At 12:17 a.m. on May 17, 1985, the "B" diesel generator was declared operable and the reactor shutdown

terminated. The unusual event was also terminated. The "A" LPCI pump was returned to service later that day at the completion of the pipe hanger repair.

The inspector reviewed the licensee actions in the control room during the shutdown. No inadequacies were identified in the actions taken.

However, the Watch Engineer on duty indicated that the LPCI subsystem could be considered operable if two of four LPCI pumps were available. In fact, three pumps are required. The engineer discussed the requirement at length with the inspector, using the technical specification LCO's to justify his position. The next day, the engineer acknowledged that three pumps were required for LPCI operability.

The technical specifications do not clearly indicate how many pumps must be available for the LPCI subsystem to be operable. The requirement for three pumps is indirectly given in the LPCI surveillance specification, i.e., a combined flow rate for three pumps is specified. In addition, one specification incorrectly refers to the LPCI "subsystems" (plural). There is actually only one LPCI subsystem, with two loops. Licensee corrective actions are discussed in Detail 3.b.7 of this report.

- (2) On May 23, 1985 at 9:40 a.m., a reactor shutdown was initiated and an unusual event was declared after the "B" diesel generator prelube pump motor tripped on high current. The "B" diesel generator was declared inoperable while the prelubrication pump-motor unit was replaced. The high pressure coolant injection (HPCI) system was also inoperable on May 23 due to the repair of damaged snubbers on the steam exhaust line (Detail 3.b.4 in this report). The shutdown was required by the technical specifications and the unusual event required by the licensee emergency plan (see previous item). The NRC was promptly notified of the event via the ENS telephone line.

The prelubrication pump-motor unit was replaced. The new unit was tested and the diesel declared operable at 4:23 p.m. on May 23. The old unit was disassembled and evaluated. Broken internal gear teeth and a seized bearing were noted. The licensee had no explanation for the damage and indicated that this was the first time the pump had been replaced.

At the exit interview, the licensee stated that diesel generator starting time and operating characteristics were not affected by the prelubrication pump. However, the licensee indicated that the repair and testing activities on the pump-motor unit made the "B" diesel generator inoperable.

The "B" diesel generator was returned to service and the shutdown terminated at 4:23 p.m. on May 23. The unusual event was also terminated.

The inspector observed control room activities during the shutdown and did not identify any problems.

b. Review of Licensee Event Reports (LERs)

Licensee Event Reports submitted to the NRC Region I office were reviewed to verify that the details were clearly reported and that corrective actions were adequate. The inspector also determined whether generic implications were involved and if on site followup was warranted. The following reports were reviewed:

<u>No.</u>	<u>Subject</u>
85-10	Secondary Containment Dampers Inoperable
85-11	Absolute Versus Gauge Containment Pressure Transmitters

The event in LER 85-10 was reviewed during inspection 50-293/85-08. No inadequacies were identified in the LERs listed above.

5. Surveillance Testing

The inspector reviewed the licensee's actions associated with surveillance testing in order to verify that the testing was performed in accordance with approved station procedures and the facility Technical Specifications.

A list of items reviewed is included at the end of this report in Attachment A. No inadequacies were identified during these reviews.

6. Maintenance and Modification Activities

a. Scope

The inspector reviewed the licensee's actions associated with maintenance and modification activities in order to verify that they were conducted in accordance with station procedures and the facility Technical Specifications. The inspector verified for selected items that the activity was properly authorized and that appropriate radiological controls, equipment tagging, and fire protection were being implemented.

A list of the items is included at the end of this report in Attachment A.

b. Findings

Repetitive failures of the MO-1001-34A valve in the residual heat removal system are discussed in detail 3.b of this report. Repetitive failures of the prelubrication pump on the "B" diesel generator are discussed in Detail 4.a of this report. The inspector discussed these failures with licensee personnel and reviewed the corrective maintenance. No inadequacies were identified.

7. Followup Actions Regarding NRC Bulletins and Circulars

IEB 80-06; Engineered Safety Feature (ESF) Reset Controls. The licensee was requested to ensure the resetting of ESF signals would not cause ESF components to automatically return to non-safety positions. The licensee's proposed actions are described in letters #80-118 dated June 27, 1980, #81-156 dated July 8, 1981 and #82-299 dated November 15, 1982.

The licensee's course of action included an engineering review of control wiring diagrams and an extensive testing program utilizing 21 special test procedures. Based on the results of the review and the testing, the licensee physically modified some reset controls and revised some operating procedures to comply with the Bulletin.

The inspector reviewed the three licensee letters and seven of the completed test procedures. The inspector verified that the licensee had installed the keylocked switches for resetting the isolation of secondary containment, which they had committed to do. Also, the inspector verified that the three effected operating procedures (2.2.40, 2.2.50, and 2.2.147) had been revised to reflect the modified reset controls.

Based on the inspector's review and confirmation of committed licensee actions, this bulletin is closed.

IEB 80-15; Possible Loss of Emergency Notification Systems (ENS) With Loss off Off-Site Power. The licensee found that no interruptable power supply (UPS) existed for the ENS lines at Pilgrim. In response letter #80-282 dated November 7, 1980, the licensee stated that an UPS was installed and tested on July 31, 1980. The licensee stated that the UPS power comes from the security system and is alarmed for loss of power. Further the licensee committed to change Station Procedure 2.2.17, Communications, to provide actions to be taken if NRC notifications were required and the ENS line was inoperable.

In Inspection Report 50-293/80-27 and 50-293/82-01, the inspector verified that ENS extensions with UPS existed in the Control Room, Technical Support Center, and Emergency Operations Facility. The Bulletin remained open pending possible NRC initiated modifications (speakers or headsets).

The inspector found that no additional NRC initiated modifications to ENS lines have been made. Also, the inspector found that Procedure 2.2.17 contains guidance on NRC notifications if ENS lines are inoperable.

Based on the satisfactory completion of the licensee's committed actions, this Bulletin is closed.

IEB 81-02; Failure to Gate Type Valves to Close Against Differential Pressure. Initial NRC review of the licensee actions is documented in NRC Report No. 84-04. The open issue was a review of controls associated with valve packing material. The licensee stated that maintenance on the only applicable valve, No. 1301-16, was performed in accordance with Procedure 3.M.4-10, Valve Maintenance, February 6, 1985. This procedure requires that Attachment A be completed whenever packing is replaced. The preferred material is an all-graphite packing. The licensee stated that this packing would be specified for the RCIC 1301-16 valve. In addition, Attachment C is also required to be completed on the valve operator because the valve has a stroke time specified in the Technical Specifications. This attachment requires a measurement of opening and closing current as well as recording the recommended and measured torque switch settings. These controls were deemed acceptable. This Bulletin is closed.

IEB 83-02; Stress Corrosion Cracking in Large-Diameter Stainless Steel Recirculation Piping at BWR Plants. This Bulletin was issued to inform all licensees about recent generic pipe cracking problems involving BWR plants and to require specific actions of BWR facilities: 1) demonstrate the effectiveness of UT methods at the EPRI-NDE center, 2) augment the ISI program to examine recirculation system welds, and 3) report the results of the inspection and any corrective actions including a susceptibility matrix.

Subsequent to the issuance of this Bulletin, on August 26, 1983 the NRC issued "IGSCC Inspection Order Confirming Shutdown" for Pilgrim with requirements similar to IEB 83-02: 1) conduct UT examinations, 2) provide a list of welds not being examined, 3) demonstrate competence of UT inspection personnel, 4) take actions based on inspection results, and 5) provide a report of the inspection results.

NRC review of the licensee's UT personnel and procedure competence is documented in Reports 83-14 and 84-02. The results of inspections and repairs are documented in NRC Reports 84-08 and 84-19. Additionally, the NRC performed independent measurements of the quality of welding following piping replacement activities. This review is documented in Report 84-21.

Following a review of the licensee's submittal regarding results of their inspections and corrective actions, the NRC (NRR) issued a letter to Boston Edison Co. dated December 4, 1984. This letter informed the licensee that the requirements of the August 26, 1983 IGSCC Order had been satisfactorily met and that the plant could be returned to full power. Two requests were made to the licensee regarding 1) a Technical Specification change for reactor

coolant system leak detection and leakage limits (NRC Generic Letter 84-11), and 2) a plan for mitigation or repairs to cracking on the recirculation nozzle thermal sleeves.

The inspector verified that the reactor coolant system leakage Technical Specification proposed changes were submitted to NRR on February 4, 1985. The licensee has implemented interim controls via station procedures.

The inspector concluded that the actions requested by IEB 83-02 are complete and that the Bulletin is closed. However, resolution of the cracking identified on the recirculation nozzle sleeves including the licensee's plan for mitigation will be followed in a future NRC inspection (85-11-03).

IEB 81-03; Flow Blockage of Cooling Water to Safety System Components by Corbicula (Asiatic Clams) and Mytilus (Mussels). This Bulletin reported instances of severe fouling of plant cooling systems (including heat exchangers and other components) due to various types of clams. Licensees were requested to determine whether clams were present in the vicinity of the station and to inspect and test plant equipment.

Initial NRC review of the licensee's actions is documented in Report No. 81-35. Since 1981 the licensee has implemented various methods to control biofouling of plant cooling systems. This has included chlorination studies, frequent flow tests, and heat exchanger backwashes (cleaning by reversing flow through the heat exchanger). The licensee has had the two reactor building closed cooling water (RBCCW) heat exchanger heads rebuilt, including stiffening the partition plates.

In April, 1981, the Environmental Protection Agency gave BECo permission to continuously chlorinate the salt service water system in order to control mussel larvae. This system was put in operation in 1982 and has reduced the maintenance required of the salt service water pumps and RBCCW heat exchangers. The licensee provided the results of their "Mussel Control Program" and chlorine minimization study to the NRC in an additional response to this Bulletin dated February 28, 1983.

In addition, more instrumentation was added (via PDCR 81-56, SSW Instrumentation and Control Modifications) to provide better system performance results. The inspector verified that the licensee continues to perform monthly salt service water system tests which include acceptance criteria based on both loop flow and heat exchanger differential pressure.

The licensee has also submitted a proposed technical specification change to NRR (BECo letter 84-123 dated August 9, 1984). This change provides a specification on heat removal capability (in units of BTU/hr) in lieu of just a pump flow capability as presently exists. This will provide additional controls over biofouling of the RBCCW heat exchangers and salt service water piping. The inspector determined that the concerns of the Bulletin had been adequately addressed. This Bulletin is closed.

IEB 83-03; Check Valve Failure in Raw Water Cooling Systems of Diesel Generators. This Bulletin discusses concerns related to detachment of a check valve disc from the pivot arm in raw cooling systems of diesel generators at other power reactor facilities. Licensees were requested to review the diesel cooling systems and the pump and valve test program to ensure that these check valves were being properly tested. Boston Edison Co. submitted a report, dated April 27, 1983, which described the results of their review. The Pilgrim diesel cooling system is of a different design than those experiencing this problem. It is a closed system with a radiator-type heat exchanger, a cooling pump and temperature control valve, and no check valves. The inspector also reviewed the piping and instrumentation drawings for the facility "raw cooling" water systems, namely the salt service water system (M212, Rev. E10), the reactor building closed cooling water system (M215, Rev. E14), and the turbine building closed cooling water system (M216, Rev. E7). This review verified no cooling loads for the diesels. In addition, the inspector noted that the licensee had included the diesel generator transfer oil system check valves in their Inservice Testing Program submitted to NRR dated February 27, 1984. This Bulletin is considered closed.

IEC 80-22, 81-01, 81-08, and 81-09. In a May 16, 1985 discussion with the inspector, a representative of the licensee's Regulatory Affairs Group, stated that the following IE Circulars had been received, reviewed and dispositioned.

<u>Circular</u>	<u>Subject</u>
80-22	Employee qualification records
81-01	Honeywell pushbutton switches
81-08	Foundation materials
81-09	Effluent monitoring

As Circulars, these issues were a low enough priority that no licensee response or action was required. Based upon the low priority, and the licensee's closeout, these items are closed.

IEC 81-06; Potential Deficiencies Affecting Certain Foxboro 10 to 50 Milliampere Transmitters. The inspector reviewed the licensee's actions in response to this Circular. A review was performed by the Engineering Department of the transmitters on the Pilgrim Environmental Qualification Master List as well as the safety-related Q-List. The results of this review are documented in licensee memo RA&P 84-151 dated July 31, 1984 which concludes that the affected devices are not in use at Pilgrim and no further action is planned. This Circular is closed.

8. Potential for Overpressurizing Low Pressure ECCS Piping

The inspectors conducted a review of the potential for overpressurizing low pressure piping in emergency core cooling (ECCS) systems during the current inspection period.

a. Scope

During the review, system drawings and operating procedures were examined. Valves separating high and low pressure sections of the ECCS systems were identified. The inspectors discussed testing, operation, and maintenance activities which could lead to system overpressurization with licensee personnel. The licensee reviewed licensee event reports issued since 1973 for reports of overpressurization incidents.

b. Findings

- (1) The ECCS component configurations given in NUREG/CR-2069 were reviewed and corrected component lineups forwarded to the regional NRC office. The corrected lineups included the valves used to separate high and low pressure sections of the ECCS systems and the ECCS piping design pressures.
- (2) A summary of the testing of valves separating high and low pressure sections of the high pressure coolant injection (HPCI) system and the core spray system is given in Attachment B. The following items were noted during a review of the test program:

- The test program does not include leak tests of check valves other than tests required by 10 CFR 50 Appendix J. This program has been submitted to NRR for approval as the second ten-year Inservice Test Program (IST). The licensee is currently discussing the acceptability of the testing program with NRR.
- Two motor-operated injection valves and a check valve separate high and low pressure sections of the core spray system. The injection valves are interlocked to prevent both from opening simultaneously at reactor pressures greater than 400 psig. The valves are deenergized and tagged during ECCS logic tests (Procedure No. 8.M.2-2.10.1). No inadequacies were identified in the testing and operation of these valves which could lead to an overpressurization event.
- A check valve and two motor-operated injection valves in the high pressure HPCI pump discharge line protect the low pressure pump suction piping at those times the HPCI pump is not in operation. The pump suction piping (80 psig design pressure at 170 F) was inadvertently overpressurized during a HPCI logic test in 1983 (Licensee Event Report No. 83-48). At that time the two injection valves, 2301-8 and 2301-9, were accidentally opened at the same time while the testable check valve was held partially open by a rusty operator. During the last refueling outage, the licensee replaced the HPCI injection check valve with a new non-testable check valve.

A contributing factor to the overpressurization event was the inadvertent opening of both HPCI injection valves during a logic surveillance test. The inspector noted that no special precautions concerning the injection valves were currently included in one of the HPCI Logic Test Procedures, No. 8.M.2-2.10.4.4. This test opens the normally-closed 2301-8 valve. If the adjacent normally-open 2301-9 valve is not closed prior to the test, then the low pressure HPCI piping would be isolated from RCS pressures by only the HPCI check valve.

The licensee indicated at the exit meeting that the surveillance procedure would be modified to require double verification of the closing of the 2301-9 valve. The licensee has also reviewed test procedures for the reactor core isolation cooling (RCIC) system and modified those procedures to ensure that both RCIC injection valves are not inadvertently opened.

The inspector had no further questions concerning the HPCI logic test procedures.

-- The inspector noted that the HPCI normal system operating procedure, No. 2.2.21, requires that both the 2301-8 and 2301-9 valves be opened prior to starting the HPCI turbine during a manual injection into the RCS. This method relies on the HPCI discharge check valve to protect the low pressure HPCI system piping, prior to system initiation. If the check valve leaked or otherwise failed to function, the HPCI system could be overpressurized and damaged at the time when the system was manually initiated to inject water into the RCS. The inspector discussed the acceptability of the HPCI manual initiation method with the Chief Operating Engineer. The licensee stated at the exit meeting that the method would be reviewed. The acceptability of the licensee's HPCI operating procedure is unresolved, pending the completion of the licensee review (85-11-04).

(3) The following was noted during a review of maintenance and modification activities affecting valves at ECCS pressure boundaries:

-- The licensee conducted an extensive valve betterment program during the last outage, which included refurbishment of a number of pressure boundary valves. This program was reviewed by a regional specialist inspector (NRC Inspection Report No. 50-293/84-31). No problems were identified during that review.

-- The testable check valves in the ECCS systems were either modified by removing the air operators and testing mechanism or totally replaced during the last outage.

- Quality control personnel review all safety related maintenance requests prior to work and insert appropriate inspection requirements and hold points for each task. The QC activities are documented in QC inspection reports.
- The Watch Engineer is required to review each maintenance request for the adequacy of planned system isolation prior to work.
- Post work testing following valve maintenance is required to be conducted by the valve maintenance procedure, No. 3.M.4-10. The tests include valve timing, operating currents, and torque switch settings. In addition, the operations staff is required to verify valve operability prior to returning valves to service. The operability tests are documented on the maintenance request form.
- The inspector reviewed maintenance history for the HPCI and core spray valves that isolate high and low pressure piping.

No inadequacies were identified concerning maintenance and modification activities affecting valves at ECCS pressure boundaries.

9. Health Physics Activities

- a. On May 10, 1985, the licensee notified the resident inspector that a potential existed for an unmonitored release of radioactive materials from the site via the sanitary sewage system. The licensee had noted that plugs in floor drains in the hot machine shop had leaked, permitting a contaminated discharge into the sanitary sewage system. The sewage is piped to onsite tanks. Waste from these tanks is routinely transferred via trucks to the Plymouth municipal sewage system. Low levels of activity (less than 5% of the 10 CFR 20 release limits to unrestricted areas) have been detected in portions of the onsite sanitary waste system outside the process buildings. No radioactivity has been detected offsite. The licensee repaired the plugs and temporarily halted sewage transport offsite until sampling verified that the material being sent offsite was not contaminated. This matter was reviewed further by a regional NRC specialist inspector during subsequent NRC Inspection No. 50-293/85-13.
- b. On May 14, 1985, the inspector attended a Radiological Oversight Committee (ROC) meeting at the licensee corporate office. The meeting was chaired by the Vice President, Nuclear Operations. Various radiological topics were discussed, including the ongoing fuel pool cleaning activities, the morale of health physics technicians, and recent Radiological Occurrence Reports. No inadequacies were identified.
- c. On June 5, 1985, the licensee notified the resident inspector that a thermoluminescent dosimeter (TLD) used by a contractor during May 1985 had indicated an unusually high shallow radiation dose during routine

monthly processing. The badge indicated 250 mR deep and 7,400 mR shallow dose. The licensee restricted the contractor who had worn the badge from posted radiation areas and conducted an evaluation of the TLD measurement. The licensee evaluation indicates that the TLD had a false shallow radiation dose as the result of badge contamination earlier in the monitoring period. This matter was referred to regional specialist inspectors for additional followup during future routine inspections.

- d. The following information is included in this report to assist NRC management in following radiation exposure at the station. The monthly personnel radiation exposure for May 1985 was 69.0 person-rem. The total yearly exposure through May 31, 1985 was 335.5 person-rem.

10. Management Meetings

During the inspection, licensee management was periodically notified of the preliminary findings by the resident inspectors. A summary was also provided at the conclusion of the inspection and prior to report issuance. No written material concerning inspection results was provided to the licensee during this inspection, other than documents available in the public document room.

ATTACHMENT A

The following is a list of surveillance and maintenance items reviewed during this period.

Portions of the following tests were reviewed:

- HPCI post work tests on May 23, 1985.
- A QC visual inspection of the HPCI exhaust line and torus penetration on May 18, 1985.
- TIP axial alignment on May 22, 1985.
- Secondary damper inspection during May, 1985.
- HPCI high steam flow switch calibration on May 29, 1985 and previous calibrations during 1985.
- HPCI and core spray logic test procedures were reviewed for the potential to generate overpressurization in low pressure piping.

Portions of the following maintenance items and temporary modification were reviewed:

- MR 85-332 - Repair prelubrication pump motor on "B" diesel generator.
- MR 85-347 - HPCI trip
- MR 85-348 - HPCI hanger baseplate repair
- MR 85-344 - HPCI snubber exhaust line broken
- MR 85-1550 - MO-1001-34A valve repair

ATTACHMENT B

PRESSURE ISOLATION VALVE TESTS

<u>Valve</u>	<u>Test Type</u>	<u>Frequency</u>	<u>Procedural Precautions</u>	<u>Regulatory Requirement</u>	<u>Comment</u>
<u>Core Spray System</u>					
Check valve, 1400-9A,B	Exercise to open position	Refueling	---	IST	--
MO-1400-24A,B MO-1400-25A,B	App J leak test, Type "C" Test	Refueling	---	IST	--
	Stroke Time	Quarterly, power operation	Caution statement about opening both 1400-24 and 25 valves simultaneously, independent verification of valve position after test required.	IST	Stroke time trended
	Position indication check	Once per two years, no operat. condition specified	---	IST	--
	Motor operated valve operability (stroke time)	Monthly, as required by T.S.; Once per cycle from alternate shut down panel	Caution statement about opening both 1400-24 and 25 simultaneously, independent verification of valve position after test required.	T.S.	--
MO-1400-24A,B MO-1400-25A,B	Logic system functional test	Once per six months	Valves 1400-24 and 25 are de-energized and tagged during test.	T.S.	--

<u>Valve</u>	<u>Test Type</u>	<u>Frequency</u>	<u>Procedural Precautions</u>	<u>Regulatory Requirement</u>	<u>Comment</u>
<u>HPCI System</u>					
Check Valve, 2301-7	Exercise to open position	Refueling	---	IST	--
MO-2301-8 MO-2301-9	App J leak test, type "C" test (2301-8, only)	Refueling	---	IST	--
	Stroke time	Quarterly, power operation	Opening and closing sequence of 2301-8 and 9 valves specified, independent verification of valve positions after test required.	IST	Stroke times
	Position indication check	Once per two years, no operat. condition specified.	---	IST	--
MO-2301-8 MO-2301-9	Motor operated valve operability (stroke time)	Monthly, as required by T.S.; once per cycle from alternate shut down panel	Opening and closing sequence of 2301-8 and 9 valves specified, independent verification of valve positions after test required.	T.S.	--
MO-2301-8 MO-2301-9	Logic system functional tests	Once per six months	See Insp. Report Section 10.	T.S.	--