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U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-293/81-31
Docket No. 50-293
License No. DPR-35 Priority -- Category C
Licensee: Boston Edison Company
800 Boylston Street
Boston, Massachusetts 02199
Facility Name: Pilgrim Nuclear Power Station
Inspection at: Plymouth, Massachusetts
Inspection conducted: October 1-31, 1981
Inspectors: Jon R Johnson 11/24/81
J. Johnson, Senior Resident Inspector date signed
Harold Eichenholz 11/24/81
H. Eichenholz, Resident Inspector date signed
Jon R Johnson for. 11/24/81
S. Collins, Reactor Inspector (Oct. 6-9, 1981) date signed
Approved by: T. C. Elsasser 11/30/81
T. C. Elsasser, Chief, Reactor Projects date signed
Section No. 1B, Projects Branch No. 1

Inspection Summary:

Inspection On October 1-31, 1981 (Report No. 50-293/81-31)

Areas Inspected: Routine unannounced safety inspection of plant operations including an operational safety verification during long term shutdown, follow-up on events occurring during the inspection, surveillance and maintenance activities, a review of I.E. Bulletins and a review of contractor labor actions. The inspection involved 165 inspector hours by the two resident inspectors and one reactor inspector.

Results: Of the five areas inspected, no items of noncompliance were identified.

DETAILS1. Persons Contacted

J. Aboltin, Sr. Reactor Engineer
G. Anderson, Watch Engineer
A. Caputo, Fire Protection Engineer
G. Fiedler, Watch Engineer
J. Frazer, I&C Supervisor
E. Graham, Sr. Plant Engineer
R. Machon, Nuclear Operations Manager (Pilgrim Station)
C. Mathis, Deputy Nuclear Operations Manager
J. McCann, Watch Engineer
J. McEachern, Security Supervisor
T. McLaughlin, Sr. Compliance Engineer
J. Seery, Staff Assistant, Nuclear Safety
J. Smith, I&C Supervisor
P. Smith, Chief Technical Engineer
K. Taylor, Day Watch Engineer
R. Trudeau, Chief Radiological Engineer
S. Wollman, Shift Technical Advisor
E. Ziemianski, Management Services Group Leader

The inspector also interviewed other members of the health physics, operations, maintenance, security, and technical staffs.

2. Operational Safety Verification During Long Term Shutdowna. Scope and Acceptance Criteria

The inspector observed control room operations, reviewed selected logs and records, and conducted discussions with control room operators. The inspector verified the operability of selected emergency systems and verified proper return to service of the affected components. Tours of the reactor building, 4160V switchgear rooms, cable spreading room, auxilliary bay, turbine building, intake structure, station yard and the control room (daily) were conducted. The inspector's observations included a review of equipment condition (including control room annunciators), potential fire hazards, physical security, housekeeping, and the implementation of radiological controls and equipment control (tagging).

The inspector reviewed the documentation associated with liquid radioactive waste discharges, and the logs, records and control room instrumentation pertaining to gaseous release rates from the station.

The inspector also reviewed the special configuration of plant systems during the maintenance/refueling outage which began on September 26, 1981.

These reviews and observations were performed in order to verify conformance with the Code of Federal Regulations, the facility Technical Specifications, and the licensee's procedures.

b. Findings

- (1) On October 1, 1981, the inspector discussed concerns with the licensee management resulting from a tour of the control room on September 27, 1981. The inspector noted that although the reactor vessel had been previously vented, other evolutions in progress had initiated a closure of the venting path. The licensee management took immediate action to stop core drilling operations in the reactor building until the vent path was reestablished. The inspector verified that the requirements of the Technical Specifications for secondary containment integrity had been met, and although no items of noncompliance were identified, the inspector expressed concerns to the station management concerning the degree of attention to detail in the control room. The inspector will continue to review this area during future routine inspections of the facility.
- (2) During tours of the station on October 3-4, 1981, the inspector noted that the 'A' 125v. d.c. battery bank was removed from service for the preplanned replacement of batteries. The inspector questioned the licensee concerning the effect that the loss of the 'A' 125v. d.c. battery would have on the upcoming refueling activities, and in particular on the Core Spray System(s) operability requirements.

Following a review by the licensee of the possible effects of the loss of this battery system (including Diesel Generators, Standby Gas Treatment System, and Control Room Ventilation) the licensee decided that the 'A' battery bank should be returned to service.

The inspector verified that the 'A' 125v. battery bank was returned to service on October 6, 1981, prior to fuel movement.

Although no items of noncompliance were observed, the inspector expressed concern to senior station management about outage planning and the control of safety-related activities during refueling/maintenance outages.

The licensee management stated that additional resources had been assigned to the current outage planning effort (including two licensed operators) and that continued attention would be placed in this area.

The review of safety-related system configurations and system operability will continue to be reviewed by the inspectors during routine tours of the facility.

- (3) On October 21, 1981, the inspector expressed concern to the licensee's management regarding general radiation exposure considerations observed in the reactor building. Many personnel were observed dressing in anti-contamination clothing and standing around in radiation areas waiting to get briefed by HP technicians prior to entering the specific work areas.

The licensee representative stated that actions had already been initiated to correct this situation and involved staggering the assignment of working hours for these large groups of maintenance personnel.

During subsequent tours of the reactor building, the inspector noted marked improvement in the numbers of personnel at the change areas waiting for instructions/equipment from HP personnel.

The inspector had no further questions at this time, but stated that the area of unnecessary radiation exposure would be reviewed during future inspections.

- (4) On October 23, 1981, during a review of logs and records in the control room, the inspector noted that the Carbon Dioxide Tank level had just recently been reported (on the OPER 08 tour sheet) to be at a level of 58%. The inspector questioned the Watch Engineer on duty about this reading because of the Technical Specification limit of a minimum level of 60%.

The Watch Engineer immediately initiated the fire patrols required by the Technical Specifications and verified that the tank level was about 58% and 300 psig.

The inspector reviewed previous log entries and verified that this was the first reading which was below the T.S. limit and that the licensee had complied with the limiting conditions for operation action statement. The inspector expressed concern that the CO₂ tank would be allowed to get to this level without refilling.

Following discussions with the inspector, the licensee revised procedure No. 2.1.16 (OPER 08 tour sheet) to require reorder and refilling of the CO₂ tank at a level of 75% vice 60%. The inspector had no further questions. No items of noncompliance were identified.

3. Followup on Events Occurring During the Inspection

a. Notification of Potential Masonary Wall Failure.

On September 25, 1981, the licensee informed the inspector of the results of an analysis performed in response to I.E. Bulletin 80-11, which identified a block wall (51' elevation Turbine Building) which would fail to retain it's structural integrity following certain design base events (seismic, high energy pipe break, tornado).

This event, the licensee's investigation, and corrective actions are described in LER No. 81-54 (as updated and revised).

The inspector verified that the plant was placed in the cold shutdown condition by about 6:30 am on September 26, 1981 and verified that this condition satisfied the requirements of the Technical Specifications for the equipment affected by the block wall failure.

The licensee requested relief from the Technical Specification Sections 3.7.B.1.c, 3.7.B.1.e, 3.7.B.2.a, and 3.7.B.2.c, regarding the Standby Gas Treatment System (SGTS) and the Control Room High Efficiency Air Filtration System (CRHEAFS). On October 2, 1981, NRR granted this relief for the period of October 3-12, 1981, based upon the licensee's submittals dated September 30, 1981, and October 2, 1981. This verbal T.S. relief was followed up by written confirmation from NRR dated October 6, 1981, and has subsequently been incorporated into the facility license as Amendment No. 50.

The inspector attended an ORC meeting on October 3, 1981 to observe the licensee's discussions concerning the review and approval of additional administrative controls to be implemented during this relief period.

The inspector reviewed the following documents:

- Special Order 81-03, Compensatory Measures for Degraded Masonary Wall 212.1
- TP 81-48, Amplifying Instructions Regarding Block Wall Failure Analyses

The inspector verified that the following compensatory measures were in effect for refueling evolutions:

- The 'B' Train of SGTS and CR Ventilation System would be run continuously and if not, fuel movement would cease.
- The status of the 'B' train of these systems would be monitored via the annunciators on panel C-7.
- Standby Liquid Control Tank Heater temperatures would be monitored on a daily basis.

- Detailed instructions provided to inform operators how to return shutdown cooling to service upon loss of indication to the two suction valves MOV 1001-43 'A' and 'C'.
- Instructions in place to cease fuel movement upon notification of a tornado watch or an earthquake.

The inspector verified that these controls were in effect during the movement of fuel out of the reactor vessel between October 6-17, 1981.

On October 22, 1981, and October 29, 1981, the licensee provided updated LER 81-54 submittals which identified two additional potential block wall failures.

The inspector will continue to review the licensee's actions regarding potential masonry wall failures during future routine inspections of the facility including followup of I.E. Bulletin 80-11.

No items of noncompliance were identified.

- b. Drywell High Temperature - Reactor Vessel Level Oscillations. On September 26, 1981, during a plant cooldown in preparation for a refueling outage, operators in the control room experienced a series of reactor scrams and reactor vessel isolations due to Yarway level indicator oscillations. This event was reviewed by the ORC on September 30, 1981 and reported to the NRC on October 1, 1981 in LER No. 81-55.

The inspector reviewed this event with licensee personnel including the operations, technical, and management staff. The inspector also reviewed logs and records pertaining to temperature and level data.

The level oscillations took place with the drywell ambient temperature (80 foot elevation) at about 240°F and the reactor coolant system at about 220°F. The cause of the oscillations is attributed to flashing of the reference legs. It was observed that both the Yarway and Gemac level instruments showed oscillations. Following a survey of all available information, plant operations personnel determined that no loss of coolant had actually occurred and continued the cooldown.

During subsequent discussions with licensee personnel, it was determined that one possible reason for not observing the level oscillations during previous cooldowns was the fact that the drywell was not deinerted by ventilating with outside air during this cooldown and depressurization. The inspector verified that the Technical Specification requirements for containment atmosphere and reactor coolant system cooldown rates were met.

On October 6, 1981, the inspector discussed this event with senior station management. The inspector questioned the licensee regarding the scope of the planned investigation, and the information which would be reported to the NRC. The licensee stated that the scope of evaluation would include the following: a review of electrical, mechanical, and structural components affected by the high temperatures; planned repairs would be made to the salt service water system, RBCCW heat exchangers, drywell coolers and duct work; that these planned corrective actions would be described in the 14 day LER report; and that a comprehensive updated LER would be provided to the NRC describing the resolution of the problems identified, prior to plant startup from the current refueling outage.

The inspector reviewed the 14 day LER 81-55/01T-0 dated October 15, 1981, and noted that these planned actions were described as previously stated.

Pending completion of the licensee's evaluation, and corrective actions to resolve the concerns relating to the high temperatures in the drywell, this item is unresolved (50-293/81-31-01).

- c. Design Deficiency of the Reactor Building Closed Cooling Water Heat Exchanger. On October 6, 1981, the licensee determined that bypass flow previously observed in the 'B' RBCCW heat exchanger was due in part to a design deficiency involving the a water side pass partition plates. Recent calculations by the licensee have shown that the original heat exchanger design did not give adequate attention to construction standards (TEMA Section C-8, 132) pertaining to operating differential pressures.

This design deficiency is described in LER 81-49 updated on October 8, 1981.

The licensee has evaluated the existing conditions of the heat exchangers and has proposed design changes to be implemented prior to plant startup to ensure the acceptability of the partition plates during plant operation.

Pending a review of the licensee's actions to modify the RBCCW heat exchanger partition plate, this item is unresolved (50-293/81-31-02).

- d. Average Power Range Monitor (APRM) Bypass Switch. As a result of questions raised by the onsite NSSS representative, the licensee issued a Failure and Malfunction Report on October 20, 1981, regarding the operation of the APRM Bypass Switches.

The inspector reviewed this condition with the licensee's I&C Supervisor and Chief Technical Engineer. The six APRM Channels are grouped (A,C,E) and (B,D,F) for reactor protection system inputs. Two bypass switches on control room panel No. 905 allow manual bypass of one of three channels in each trip system. However, these APRM channels are grouped into (A,E,D) and (C,B,F) in the reactor manual control system for the rod block functions. Therefore, using the bypass switches,

two out of three APRM inputs to the rod block circuits may be bypassed at the same time violating the T.S. requirements for Rod Block Instrumentation (T.S. Table 3.2.c).

The inspector provided this information to NRC management for review pertaining to a generic nature and discussed the proposed corrective actions with the licensee personnel. The inspector verified that the licensee has placed caution tags on the two bypass switches to inform operators of the potential switch alignments that would conflict with the T.S.

The licensee's long term plans include the submission of T.S. changes or the implementation of electrical circuit logic changes.

Although no items of noncompliance were identified, the inspector will continue to review the licensee's actions regarding the APRM bypass switches during future inspections of the facility.

This event has subsequently been reported by the licensee in LER No. 81-60.

- e. Fire in Turbine Building. On October 22, 1981, at about 10:43 am, a fire was observed in the Turbine Building, 51 foot elevation. The inspector responded to the scene at about 10:50 am and observed the fire to be extinguished and a critique in progress. The cause of the fire was determined to be sparks from a cutting/welding evolution which ignited a container of alcohol about 10 feet away. No equipment damage resulted and no radioactive contamination was involved.

The inspector discussed this event with the licensee's Fire Protection Officer and senior station management. The inspector verified that the following actions had been taken in accordance with station procedure No. 1.5.5:

- fire protection blankets were in place
- a properly issued cutting/welding permit had been issued
- the fire watch was properly posted, had been properly trained, and
- a properly issued fire extinguisher was in place with the fire watch.

The inspector reviewed the following documents:

- Failure/Malfunction Report No. 81-162.
- Fire Incident Report Memo MSG 81-636 dated October 23, 1981
- Fire Incident Report to V.P.-Nuclear, Memo AD 81-254, dated October 26, 1981.
- Memo to all station personnel dated October 26, 1981.

The licensee identified two instances where station procedures were not followed. These involved the inappropriate storage of isopropyl alcohol and the failure of the fire watch to ensure that all combustibles are removed from an area within 30 feet of the hot work operation.

The licensee's corrective actions included the following:

- immediate removal of the unauthorized isopropyl alcohol (used in chemistry sampling) and verbal reprimand of the personnel involved,
- a survey of the plant for transient combustibles,
- the issuance of a policy statement to all personnel which, in addition to describing this incident, informed personnel of the stop work authority of the personnel performing fire protection surveillances and the possibility of disciplinary action for procedure violations, and
- increase surveillances of potential fire hazards.

The inspector determined that the licensee had properly evaluated the cause of the fire, the procedure violations involved, and had taken appropriate and timely corrective actions.

The inspector will continue to review potential fire hazards during future routine inspections of the facility.

- f. Fixed CO₂ System Test Failure. On October 26, 1981, a planned discharge test of the CO₂ system was aborted due to unsatisfactory conditions. The special test (T.P. 81-55) was being conducted as requested by NRR to demonstrate that the system would actually operate as designed.

Two problems identified are described below:

- the CO₂ concentration in the cable spreading room versus time was unacceptable, and
- the temperatures in the cable spreading room were predicted to be unsatisfactorily low for electrical component operation.

The licensee declared the CO₂ system inoperable initiated the fire patrols required by T.S. 3.12.D, and is conducting an engineering evaluation to determine whether system modifications are necessary.

This event is described in LER No. 81-58.

No items of noncompliance were identified. The inspector will review the licensee's long term corrective actions during future inspections of the facility.

4. Strike Plan Implementation

On October 30, 1981, a picket line was set up at the contractor entrance to the facility as a result of a dispute involving a non-union vendor which had been assigned a contract to perform valve maintenance at the station during the current refueling outage.

The inspector discussed this event with the licensee management and verified that licensee personnel were not affected and that station operations, security, and radiation protection were not impacted. The inspector had no further questions. No unacceptable conditions were identified.

5. Surveillance Activities

The inspector reviewed the licensee's actions associated with surveillance testing in order to verify that the testing was performed in accordance with station procedures and met the Technical Specification limiting conditions for operation.

Portions of the following tests were observed/reviewed:

- Daily and once/shift refueling surveillance checklist (OPER 14, OPER 13) on October 8, 1981 and October 15-17, 1981 during refueling evolutions.
- 8.M.2-1.2.1 Reactor Water Cleanup High Flow on October 21, 1981.

No items of noncompliance were observed.

6. Maintenance Activities

a. General Maintenance Review

The inspector reviewed selected maintenance items to verify that the activity was properly authorized, and that appropriate radiological controls, equipment control tagging, and fire protection were being implemented in accordance with the licensee's procedures and the facility Technical Specifications.

The items/documents reviewed are described below:

- Maintenance Request (M.R.) 81-9-5, and 81-19-16; Rebuild disc/seat on A050-42A, and B.
- M.R. 81-46-234; Inspect and Test Breaker No. A-607, 'B' Core Spray Pump, and perform modification in accordance with PDCR 81-19.
- Removal of the 'A' 125v. d.c. Battery Bank from service. The inspector's comments related to this activity are described in Paragraph 2.b.(2).

No items of noncompliance were identified.

b. Review of Maintenance on the Fixed CO₂ System

(1) Scope - Acceptance Criteria

On October 1, 1981, at about 10:00 am, the CO₂ tank outlet valves were shut and red-tagged as isolation for Maintenance Request (MR) No. 81-24-319, "Install a 3 hour rated fire damper in the carbon dioxide exhaust duct - Cable Spreading Room".

The inspector reviewed the licensee's activities surrounding this maintenance item in order to determine whether the actions were performed in accordance with the Technical Specifications and the licensee's procedures. This review included discussions with control room operators, maintenance, and station management personnel, and an operational safety verification of equipment control and system operability requirements.

(2) Discussion

At about 8:45 am on October 2, 1981, during a routine tour of the station, the inspector questioned the licensee concerning the method of isolation for M.R. No. 81-24-319, and the status of any fire patrols related to the isolation of the CO₂ tank outlet valves. The control room Operating Supervisor stated that when the M.R. was issued on October 1, 1981, the Maintenance Supervisor was informed of the requirement for a fire patrol.

The inspector toured the affected areas including the cable spreading room, 23' elevation switchgear room, and 37' elevation switchgear room. After observing that no fire patrol was evident in these areas, the inspector immediately returned to the control room and informed the Operating Supervisor of this observation.

The licensee immediately returned the CO₂ system to an operable status for these three areas at about 9:00 am on October 2, 1981, and initiated discussions with affected personnel in order to determine the cause of the event and whether further actions were required.

At about 11:30 am on October 2, 1981, the inspector discussed this event with senior station management who stated that additional immediate corrective actions would include a continuous fire patrol in the cable spreading room. The inspector also stated that this event was of additional concern because of the apparent repeated failures in the recent past to properly document and control fire patrols required by the Technical Specification (T.S.) (See Inspection Reports 50-293/81-07, and 50-293/81-16). The licensee's representatives acknowledged the inspector's statements. The inspector also questioned the licensee concerning the reportability of this event. The licensee stated that the reportability of this event would be reviewed.

The inspector verified that the CO₂ tank had been returned to service at about 9:00 am on October 2, 1981, and that a fire patrol had been initiated in the Cable Spreading Room at about 9:50 am on October 2, 1981.

On October 5, 1981, the inspector questioned senior station management concerning the cause and additional proposed corrective actions. The licensee stated that disciplinary action was being considered for a responsible individual and that consideration was being given to providing additional information in the control room (listing of areas requiring fire patrols) to assist station supervision to track and follow required fire patrols.

On October 6, 1981, the inspector again questioned the licensee concerning reportability of this event. The licensee stated that a determination had not been made as yet regarding reportability.

The licensee forwarded a written followup report, LER 81-56/01X-0, to the resident inspector at 9:00 am on October 8, 1981, and to the NRC Regional Office at about 9:45 am on October 8, 1981.

(3) Findings

Technical Specification 3.12.D, CO₂ System, requires that the CO₂ system be operable in the Cable Spreading Room, 23' elevation switchgear room, and the 37' elevation switchgear room when equipment in the area is required to be operable, or if the CO₂ system is not operable, that a continuous fire patrol with backup fire suppression equipment for the unprotected area(s) be established within 1 hour.

The inspector noted that the plant was in the cold shutdown condition (with fuel in the reactor vessel but no fuel movement in progress) during this period of time. The inspector reviewed the Technical Specifications to determine what equipment in these areas (C.S.R., and switchgear rooms) was required to be operable. T.S. Section 3.12.B requires two fire pumps to be operable at all times. (The motor driven fire pump receives power via panel A4 which is in the 23' elevation switchgear room). However, T.S. 3.12.B also allows one fire pump to be out of service for a period of 7 days.

Although this event is not being cited by the NRC as an item of non-compliance because of plant conditions in effect (the position of the reactor mode switch) the inspector expressed serious concerns to the licensee's senior management about the failure to exercise good judgement in the control of this maintenance activity.

The control of safety related activities will continue to be reviewed during future routine inspections of the facility.

7. I.E. Bulletin Followup

The inspector reviewed the licensee's actions in response to I.E. Bulletin 79-09 (Failure of GE type AK-2 Circuit Breaker in Safety Related Systems) to determine whether these actions addressed the concerns of the Bulletin.

The causes of failure in AK-2 circuit breakers reported in the Bulletin were attributed to binding within the under voltage device or out-of-adjustment conditions in the linkage mechanism resulting from inadequate preventive maintenance at the affected facilities.

The inspector reviewed the licensee's response dated May 23, 1979 and determined the following:

- The licensee stated that GE Type AK-2 breakers are utilized in safety related 480 volt load centers B1, B2, and B6, but do not contain the under voltage device (an optional accessory) as identified in the Bulletin. The inspector noted that load centers B1, B2, and B6 provide power to essential 480 volt auxiliaries required during abnormal operational transients and accidents. The emergency buses remain energized and are fed from the 4160 volt buses A5 and A6. (Reference Procedure 2.2.7, 480v. A.C. System).

The inspector reviewed Station Procedures No. 3.M.3-2, "480v. Load Center Breaker Trip Device Calibration Test", and No. 3.M.3-6, "Inspection and Overhaul of 480v. Load Center Breakers", referenced in the licensee's May 23, 1979 response, for content and determined that procedure 3.M.3-6 established criteria for inspection and maintenance consistent with GE Service Advice Letter No. 175.

The inspector verified by a sample review of the 1980 refueling outage records, that these procedures are performed once per cycle as stated in the licensee's response.

Through discussions with the Station's Electrical Engineering staff and a review of applicable diagrams, the inspector confirmed the licensee's submittal of May 23, 1979.

This Bulletin is considered closed.

8. Unresolved Items

Areas for which more information is required to determine acceptability are considered unresolved. Unresolved items are discussed in Paragraphs 3.b, and 3.c.

9. Exit Interview

At periodic intervals during the course of the inspection, meetings were held with senior facility management to discuss the inspection scope and findings.