

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-293/84-02

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, and Charlotte, North Carolina

Inspection Conducted: January 3-13, 1984, at Plymouth, Massachusetts
January 3-6, 1984, at Charlotte, North Carolina

Inspectors: *Lewis M. Gray*
E. M. Gray, Lead Reactor Engineer

2/9/84
date

Lewis M. Gray
R. McBrearty, Reactor Engineer

2/9/84
date

E. Thomas Shaub
T. Shaub, Reactor Engineer

2.9.84
date

Approved by: *A. T. Gody*
A. T. Gody, Chief
Management Programs Section

2/9/84
date

Inspection Summary:

Inspection During January 3-13, 1984 (Report No. 50-293/84-02)

Areas Inspected: Routine unannounced inspection of the recirculation piping replacement program including welding activities, the plant maintenance program, and ultrasonic test qualification and licensee actions on previous inspection findings. The inspection included 96 hours of inspection at the sites and 4 hours of inspection in the regional office.

Results: No violations were identified.

1. Persons Contacted

Boston Edison Company (BECO)

F. Famulari, QA, ISI
H. Brannan, QA Manager
*N. Brosee, Chief Maintenance Engineer
*J. Crowder, Plant Engineer
R. DeLoach, QC Group Leader
*E. Grahm, Compliance Group Leader
D. Kuba, Maintenance Staff Engineer
*C. Mathis, Nuclear Operations Manager
M. McGuire, Senior Supervisor Electrical Engineer
P. Moraites, Senior Supervisor Instrument and Control Engineer
J. Nicholson, IGSCC Project Manager
K. Roberts, Outage Manager
F. Schellenger, QA Engineer
R. Swanson, Construction Group Manager
E. Ziemianski, Manager, Nuclear Operations Support
M. Williams, ISI Engineer

General Electric Company (GE)

P. Bingham, Project Manager
M. Hart, QA Manager
C. Johnson, Weld Supervisor
J. Plantz, Lead Weld Supervisor

NRC

J. Johnson, Senior Resident Inspector

*Indicates presence at exit meetings on January 6, 1984, and January 13, 1984.

Independent Testing Laboratories (ITL)

J. Harrison, Level II
W. Swain, President

2. Licensee's Response to IE Bulletins

IE Bulletin 83-02

Bulletin 83-02 requires that licensees of BWR facilities, identified in Table 1 of the Bulletin, perform a demonstration of the effectiveness of the ultrasonic testing (UT) methodology used to examine welds in recirculation system piping. These demonstrations are to be performed at the EPRI NDE Center on service-induced cracked pipe samples made available for this purpose.

During the current outage, a portion of the recirculation system piping was ultrasonically examined by personnel who, on June 7 and 8, 1983, successfully completed the required demonstration using conventional ultrasonic techniques.

The licensee has elected to perform the remaining scheduled weld examinations using the projected image scanning technique (P-scan) and personnel who are experienced in the use of the technique and associated equipment.

On January 4, 5, and 6, 1984, the licensee sent personnel to the EPRI NDE Center to perform the demonstration using the P-scan technique and equipment. Four technicians participated, two individually and two working as a team.

Scanning, data acquisition, data interpretation and evaluation was completed within the allotted time in all cases.

The results submitted by the individuals and by the team failed to identify the required number of cracks (80 percent of the total number present) and were considered unacceptable.

Other personnel from the same ISI contractor, and P-scan equipment have been qualified on service induced cracked pipe samples at the NDE Center. The demonstration on January 4, 5, and 6, 1984, was an attempt to qualify additional personnel and equipment.

Based on the above, the licensee will perform the remaining examinations using P-scan techniques and equipment which have been successfully demonstrated at the NDE Center. Scanning will be done by personnel who have received training in the use of the scanning probe, but who have not used the equipment at the NDE Center. These technicians, when scanning, will be in constant voice communication with qualified personnel who are operating the monitoring and data acquisition equipment in a low radiation area. Data interpretation and evaluation will be done by these qualified individuals.

Because the data acquisition system records on magnetic tape all ultrasonic signals emanating from each weld, it is not necessary for the individual manipulating the probe to be able to recognize IGSCC signals although he should be trained in the proper use of the scanning equipment. The information available to the data evaluator (Level II or Level III) is comparable to a method in which the technician records every indication which appears on the cathode ray tube screen.

The inspector stated that licensee's proposed use of examination personnel and equipment was acceptable and met the requirements of IEB 83-02 and the Shutdown Order.

No violations were identified.

3. Licensee Actions on Previous Inspection Findings

(Closed) IFI (293/82-02-02) The licensee had not incorporated all station calibrations into the master surveillance schedule. The inspector reviewed Revision 6 of the Master Surveillance Tracking Program Test/Technical Specification listing and the Instrument and Control department's weekly listing to verify that station calibrations required by Technical Specification (TS) or to support TS reading were included and being performed as scheduled. Based on the above this item is closed.

(Closed) Violation (293/82-02-03) Performance of the TS related surveillances 8M3.11-1 through 8M3.11-4 with uncalibrated test equipment. The inspector reviewed the procedure established to control and ensure calibration of test equipment prior to performing TS surveillances, "Calibration of Non controlled Lab Equipment," Revision 0, June 30, 1982. In addition, the inspector reviewed the results of surveillances 8M3.11-1 through 8M3.11-4 performed December 6-7, 1983, and other similar time response tests to verify that calibrated test equipment was used to perform the surveillance tests. Based on the above, this item is closed.

(Closed) Violation (293/81-36-06) Failure to provide tool/item accountability and adequate housekeeping during Main Steam Isolation Valve (MSIV) maintenance in accordance with Station Housekeeping Procedures. MSIV maintenance/modification was in progress this outage. The inspector witnessed a portion of the maintenance and verified that the MSIV caps/plugs were installed on the valves where the valve internals were removed for maintenance; and that the work space was well kept and the tools were stored on location. In addition, the inspection reviewed PDCR 83-48, MSIV modification, to ensure the work instruction required a cleanliness inspection prior to closure. Based on the above this item is closed.

(Open) Violation (298/82-02-04) Failure to use approved procedures to perform safety-related maintenance. Two of the three cited examples dealt with maintenance performed on the HPCI Turbine Stop Valve and Hydraulic Actuator using unapproved General Electric Service Information Letters (SIL). The licensee has established Nuclear Operations Procedures (NOP) that required all technical information received from vendors to be evaluated by the Nuclear Engineering Department for applicability and be implemented via a plant Design Change Request. The plant design change package is approved by the Operations Review Committee (ORC) prior to implementation. This portion of the item is closed.

The third example cited was replacement of a section of the Reactor Water Cleanup System piping using an unapproved procedure. This issue is still open pending further NRC review.

4. Recirculation Piping Replacement

The determination of the presence of intergranular stress corrosion cracking (IGSCC) in portions of the weld heat affected zones of the 12" risers and 20" headers of the reactor recirculation piping RCS has resulted in

the Boston Edison (BECO) decision to replace these components. The decision concerning replacement of the 28" RCS pipe component will be made subsequent to decontamination of the RCS system and ultrasonic examination of additional selected welds.

The inspector conducted an on site review of the preliminary activities directed toward replacing the recirculation piping. The specific areas covered were:

- Welding Training and Qualification
- Weld Equipment
- Weld Wire Issue and Control
- Contractor Inspection of Work in Progress
- BECO Quality Assurance of Project
- BECO Quality Control Inspection
- Procedures or Plans

- WP 8.8.6, Automatic Welding Procedure
 - Weld Operator Qualification Procedure
 - Production Control Manual P1A-AE-11 (GE)
 - Project Quality Plan of December 22, 1983 (BECO)

The welding operator qualification plan recognizes important variables such as weld machine type, remote video operation and weld filler metal (P8 VS P42) type, that, while not defined as essential variables by ASME Code Section IX, are significant factors in the production of sound welds. The weld operator selection, training and qualification sequence of screening, training, qualification, badging, video remote training, qualification by remote video control with stainless filler material and subsequent training with inconel filler material meet both ASME Code qualification rules and ALARA requirements to minimize radiation exposure through training and mockups.

Welding is to be controlled through preparation of detailed technique sheets for each pipe size, position and weld machine with data based on welded mockup results. Travelers to detail specific instructions, procedures, inspections and in process examinations are intended to be a part of control of work operations. Weld consumable material issue is to be controlled by a weld issue chit initiated by the weld foreman or supervisor, to provide traceability between the weld material and weld joint number.

The prime contractor (GE) is responsible for inspection (QC, RT, and PT) of work in progress.

BECO in the Project Quality Plan has implemented a QA audit plan for activities of contractors and suppliers.

No violations or areas of concern were noted by the inspector in the above areas as reviewed. As this inspection was preliminary to work activities, certain procedures essential to the work activity were not yet prepared or were in the approval stages. These procedures, including QC surveillance by BECO of contractor work, welding procedures, and special travelers, will be examined during subsequent inspection of the pipe replacement work.

5. Safety-Related Maintenance

a. References/Requirements

- Technical Specifications - Section 6 (Administrative Controls)
- Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," November 3, 1972
- ANSI N18.7-1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants"

b. Review of Safety-Related Maintenance Program

The licensee's overall program for the performance of corrective maintenance was inspected to determine the adequacy of equipment control and release for performance of maintenance, establishment of a preventive maintenance program, and to determine that:

- administrative controls for these programs had been established;
- responsibilities for performing various aspects of the program had been designated;
- Records maintenance procedures activities had been established;
- responsibility for preventive maintenance including schedules, documentation and review had been established;
- control of special processes had been established;
- methods for equipment control during maintenance had been established;
- responsibilities for hold points, inspection/surveillance and sign-off by QA/QC personnel had been established;
- responsibilities and the criteria for designating the activity as safety/non-safety related had been established; and

- responsibilities for performing both post maintenance testing and functional/operational testing to meet TS operability had been established.

The following procedures were reviewed to verify the above attributes were incorporated into the maintenance program:

- 1.4.6, Housekeeping, Revision 6, June 24, 1982
- 1.4.5, PNPS Tagging Procedure, Revision 13, September 15, 1983
- 1.5.3, Maintenance Requests, Revision 16, March 4, 1983
- 1.5.5, Cutting Welding and Hot Work Fire Safety, Revision 15, February 2, 1982
- 1.5.7, Unplanned Maintenance, Revision 11, November 28, 1979
- 1.8.2, PM Tracking Program, Revision 1, June 8, 1983
- 3.M.1-1, Preventive Maintenance, Revision 3, May 13, 1983
- 3.M.1-11, Routine Maintenance, Revision 2, February 2, 1979
- 3.M.4.19, Maintenance Record System, Revision 1, August, 1979

The inspector reviewed and discussed in detail the Procedure Update Program (PUP) with the Chief Maintenance Engineer (CME). The PUP program was established to upgrade maintenance procedures technically and will include: (1) validating and administratively controlling the Technical Manual library; (2) updating procedures to include accurate references; (3) verification of equipment name plate data; and (4) upgrading and refining the Preventive Maintenance Program after the initial PM's and evaluation of major breaker (4160V and 480V breakers) is completed.

c. Review of Implementation of Safety-Related Maintenance Activities

Safety-related maintenance was inspected on a sampling basis to determine that:

- Technical Specification requirements were satisfied while equipment was out of service;
- selected maintenance activities had been performed in accordance with administrative procedures as detailed in Paragraph 5b;
- an approved procedure was used for those maintenance activities which could be considered beyond the skills normally possessed by qualified maintenance personnel;

- inspections of maintenance activities as required by administrative procedures were performed; and
- records to substantiate quality of work and parts used were available (this includes documentation associated with procurement, inspections, and test results) for a sample of parts that were utilized in the maintenance/repairs listed below.

Documentation of the following maintenance activities were reviewed.

- 83-1-10, Inspect and repair 28B RHR valve, completed February 10, 1983
- 83-3-1, Repair leaking accumulator for CRD 30-15, completed January 14, 1983
- *-- 84-12-1, Install tap in RWCU to support decon operation (active)
- 83-12-55, "B" RWCU pump seal leaking, completed October 25, 1983
- 83-23-34, Repair or replace HPCI suction pressure transmitter included Temporary Modification 83-43, completed September 30, 1983
- 83-37-3, "A" SBTG failed Technical Specification surveillance repair or replace charcoal filtration system, included Temporary Modification 83-017, completed February 12, 1983
- 83-45-160, Repair torus low level alarm, completed July 19, 1983
- 83-45-159, Repair inoperative IRM, completed July 18, 1983
- *-- 83-45-274, Calibrate IRM's in accordance with 3M2-5.2 channel A-H (ongoing at time of inspection)
- *-- Construction Work Order 83-264, Implement PDCR 83-48 MSIV Modification and Maintenance (ongoing at time of inspection)

In addition to the documentation review, the inspector observed ongoing maintenance activities (those marked with an asterisk in paragraph 5.c) and reviewed the active maintenance request file to verify that: proper administrative controls were established for the work; procedures were being used; qualified personnel were performing the work; QC was informed prior to start of work or when Q-parts were needed; and ALARA considerations were considered as applicable. No deficiencies were noted.

The inspector reviewed the following procedures either associated with the IR documentation review or randomly selected to review for technical adequacy. These procedures are all to be incorporated into the Procedure Upgrade Program.

- 3.M.4-20, Valve Disassembly and Assembly, Revision 1, April 13, 1977
- 3.M.3-6, 480V Load Center Breaker Maintenance, Revision 4, December 30, 1983
- 3.M.3-8, Inspection/Troubleshooting - Electrical Circuits, Revision 5, November 9, 1983
- 3.M.4-8, M.S. Isolation Valve Disassembly and Reassembly, Revision 6, October 21, 1982

d. Review of Preventive Maintenance Activities

The inspector reviewed the current preventive maintenance schedule and the outage preventive maintenance schedule to assess the adequacy of the overall preventive maintenance program. In response to the Salem ATWS event, the licensee had committed to substantially upgrade the FM program. The licensee's current plans for preventive maintenance include:

- Major inspection and overhaul as necessary of all safety-related 4160V and 480V circuit breakers this outage, then every cycle thereafter;
- Inspection of all limitorque valves this outage; thereafter, all containment isolation limitorque valves each cycle and the remainder of the limitorques every other cycle;
- In response to an IE Bulletin, change out all HFA relays as relay conversion kits are received;
- Inspection of Safety-Related Motor Control Centers this outage and then one-third per cycle; and
- Vibration analysis will be performed monthly on applicable running pumps.

The inspector reviewed and discussed the PM program and scheduling with the chief maintenance engineer to verify that the program was dynamic, in that equipment operational history and results from completed PM's were factored into the frequency and scheduling determination.

The following PM procedures were reviewed for technical adequacy:

- 3.M.1-15, Vibration Monitoring for Preventive Maintenance, Revision 0, August 1, 1979;
- 3.M.1-16, Machine Vibration Data Collection for PM, Revision 0, August 1, 1979;

3.M.1-17, Machine Vibration Analysis, Revision 0, August 1, 1979; and

3.M.3-5, Inspection/Overhaul of 4.16V breakers, Revision 3, November 23, 1979.

e. QA/QC Interface With Maintenance Activities

To ensure that the Qualify Control group was involved in safety-related maintenance activities, the inspector reviewed the Quality Control Inspection Reports (QCIR) generated for the Maintenance Requests identified in paragraph 5.c. and discussed the licensee's involvement with the work. The licensee's QC group covers 100% of safety-related maintenance either with hold points, surveillance, spare parts traceability verification, and/or documentation review depending on the significance of the work.

The inspector discussed the findings and associated corrective action for the July, 1983, Maintenance Audit with the Site QA Audit Supervisor and an auditor involved in the July audit to ensure that all findings were resolved and timely corrective action taken. In conjunction with the audit program, the licensee has recently developed a QA surveillance program that will cover operational and maintenance activities. The station's maintenance program is undergoing a major revision and therefore the weekly QA surveillances of maintenance activities have yet to begin.

In addition to QC coverage of routine maintenance, the inspector reviewed the QC coverage of contracted maintenance and modifications during outages. The licensee is currently generating checklists to ensure adequate coverage of contractor activities and modifying QC procedure 7.02, "Site Contractor and Subcontractor Surveillance," to provide guidance for use of these checklists.

The inspector discussed the Project Quality Plan (PQP) for the recirculation piping replacement and the total lack of BECO QC involvement with this activity with licensee QA/QC personnel. The licensee is currently revising the PQP to include BECO QC coverage and developing checklists for surveillance of this activity.

f. Findings

No violations were identified.

The licensee currently has a large backlog of maintenance requests (MR) (i.e., 1861 for 1983, 318 for 1982, and 144 for 1981). The current system for tracking MR's is unable to distinguish between safety and non-safety related MR's and does not provide any real meaningful information about the MR's. The licensee efforts to reduce the MR backlog to a manageable level by the completion of the current extended outage will be reviewed in a subsequent NRC inspection (293/84-02-01).

During the documentation review of completed maintenance activities, the inspector had trouble retrieving records to support the post maintenance TS operability testing. The licensee's representative acknowledged the inspector's finding and stated that: (1) records for post maintenance operability testing are the responsibility of the operations department and are forwarded to the Document Control Center with other surveillance tests and not as part of the work package; and (2) they were currently working to streamline the QA records process and provide more timely record processing and retrieval.

6. Review of Housekeeping and Cleanliness Program

The licensee's overall program for the maintenance of general plant housekeeping was inspected for adequate maintenance of cleanliness, protection of open safety-related systems and components, the cleaning of systems and components and to determine that:

- administrative controls of these programs have been established;
- requirements and responsibilities for general plant housekeeping have been established;
- requirements and responsibilities have been established for protection of previously cleaned systems and components and for protection of open safety-related systems which require special cleanliness controls; and
- methods have been established for cleaning of systems and components which have special cleanliness requirements.

The inspector reviewed the results of the housekeeping tour performed during the inspection and discussed the results and planned corrective action with the licensee. In addition, the inspector reviewed maintenance procedures associated with the primary system to ensure cleanliness and inspection requirements were incorporated.

No violations were identified.

7. Exit Interview

An exit interview was held by each inspector at the conclusion of that inspector's portion of the inspection. The scope and findings of the inspection were discussed. At no time during these inspections was written material provided to the licensee by an inspector.