U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket No.: 50-293

Report No.: 93-05

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

Facility: Pilgrim Nuclear Power Station

Location: Plymouth, Massachusetts

Dates: February 11 - March 13, 1993

Inspectors: J. Macdonald, Senior Resident Inspector
D. Kern, Resident Inspector
S. Hansell, Region I Inspector

Approved by: Eugene M Kelly — April 1, 1993
E. Kelly, Chief — Date
Reactor Projects Section 3A

Scope: Resident safety inspections in the areas of plant operations, radiological controls, maintenance and surveillance, emergency preparedness, security, safety assessment and quality verification, and engineering and technical support. Initiatives selected for inspection included a detailed walkdown of the high pressure coolant injection system using PRA failure data and a maintenance program review.

Inspections were performed on backshifts during February 11, 16; March 2-5, and 9-12. "Deep" backshift inspections were performed on February 14 (9:20 am - 2:45 pm) and March 13 (2:10 pm - 12:00 midnight).

Findings: Performance during this inspection period is summarized in the Executive Summary. The 120 VAC safeguards buses Y-3 and Y-4 unexpectedly de-energized in response to the March 13, 1993 automatic reactor trip. The cause of the Y-3 and Y-4 trip remains unresolved (URI 50-293/93-05-01). Unresolved items regarding the HPCI/RCIC inverters (91-04-01) and a non-Code repair to the salt service water system (92-14-01) were closed.

## EXECUTIVE SUMMARY

### Pilgrim Inspection Report 93-05

**Plant Operations:** The station was effectively readied for the March 13th storm. Initial operator response to the automatic reactor trip was excellent, including clear communications and strong Nuclear Watch Engineer command and control. Recovery of electrical buses A-3, Y-3, and Y-4 was well controlled. A detailed walkdown of the high pressure coolant injection (HPCI) system found that it is being tested and operated in accordance with design basis documentation.

**Radiological Controls:** Initiatives to reduce the volumes of liquid effluent and solid low level radioactive waste have been effective.

**Maintenance and Surveillance:** New fuel inspection activities were properly conducted. Improvements in the fuel handling and transfer processes were noted. Personnel were well briefed on recent fuel handling events at other facilities. Longer term maintenance trends indicate improvements in corrective and preventive maintenance ratios, reduced backlogs, improved work package quality, and decreasing instances where rework was required.

**Emergency Preparedness:** Meteorological conditions and plant response to the storm of March 13-14 were properly reviewed with respect to emergency action level entry conditions.

**Security:** The security force appropriately prepared for the March 13th storm. Compensatory measures were posted in advance of the onset of severe weather.

**Safety Assessment and Quality Verification:** The Section Manager self-assessment process is effective and receives appropriate management support. Assessment issues are trended on a bi-monthly basis.

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## DETAILS

### 1.0 SUMMARY OF FACILITY ACTIVITIES

At the start of the report period Pilgrim Nuclear Power Station was operating at approximately 100% of rated power. On February 15, reactor power was briefly reduced to 72 percent to isolate a small steam leak on the "B" reactor feed pump suction pressure gage. Repair of the pressure gage was coordinated with a planned main condenser backwash on February 21.

On February 25, the reactor core isolation cooling (RCIC) turbine steam supply valve failed to fully open due to stem binding during planned surveillance testing. The RCIC system was declared inoperable and correctly reported to the NRC. The valve stem was repaired and RCIC was returned to service on February 28. The high pressure coolant injection system was removed from service on March 4 for planned maintenance and returned to service on March 5. Reactor power was reduced briefly on March 3, 5, and 6 for main condenser backwashes to clear marine fouling.

A severe winter storm developed and on March 13 the reactor tripped due to a turbine load reject which was caused by effects of the storm. The reactor was being maneuvered to cold shutdown at the end of this report period.

### 2.0 PLANT OPERATIONS (71707, 40500, 90712)

#### 2.1 Plant Operations Review

The inspector observed the safe conduct of plant operations (during regular and backshift hours) in the following areas:

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|---|---|
| Control Room | Fence Line (Protected Area) |
| Reactor Building | Turbine Building |
| Diesel Generator Building | Screen House |
| Switchgear Rooms | |
| Security Facilities | |

Control room instruments were independently observed by NRC inspectors and found to be in correlation amongst channels, properly functioning and in conformance with Technical Specifications. Alarms received in the control room were reviewed and discussed with the operators; operators were found cognizant of control board and plant conditions. Control room and shift manning were in accordance with Technical Specification requirements. Posting and control of radiation contamination, and high radiation areas were appropriate. Workers complied with radiation work permits and appropriately used required personnel monitoring devices.

Plant housekeeping, including the control of flammable and other hazardous materials, was observed. During plant tours, logs and records were reviewed to ensure compliance with station procedures, to determine if entries were correctly made, and to verify correct communication of equipment status. These records included various operating logs, turnover sheets, tagout, and

lifted lead and jumper logs. The inspector observed the reactor building operator rounds on March 2, 1993. The nonlicensed operator's walkdown was a very thorough, detailed and comprehensive review of the reactor building and associated equipment. The operator was knowledgeable of current plant conditions and maintenance being performed in the reactor building. The operator effectively communicated problems and expected alarms to the main control room.

## 2.2 Reactor Trip due to Turbine Load Reject during Winter Storm

A severe winter storm with the potential for hurricane force winds was forecast for the period March 13-15, 1993. In preparation for the storm, the licensee reviewed procedure 5.2.2 "High Winds (Hurricane)" and implemented portions appropriate to the approaching storm. The inspector toured the plant and determined that licensee preparation was appropriate including the assignment of additional operations personnel to monitor the intake structure. Control room personnel were alert and maintained communications with the load dispatcher to verify stability of the offsite power distribution grid.

On March 13, at 4:28 pm, the reactor automatically tripped in response to a turbine generator load reject from 100 percent power due to electrical flashover in the 345 KV switchyard and a subsequent breaker trip. Snow and ice had coated the insulators on switchyard breaker ACB 105, resulting in a current path to ground. The resultant flashover caused breakers ACB 104 and 105 to open. Safety relief valve (SRV) 203-3A automatically cycled to relieve pressure, and Group II and Group VI primary containment isolation system actuations occurred, as designed, due to normal reactor water level response to the reactor trip. The licensee properly reported these actuations in accordance with 10 CFR 50.72. Immediately following the trip, the licensee identified two electrical system anomalies. Nonsafety related electrical bus A3 failed to automatically transfer to the startup transformer and 120 VAC safeguard buses Y3 and Y4 were deenergized. Operators promptly (within 20 minutes) inspected the condition of the electrical supply breakers and reenergized busses A3, Y3, and Y4 in accordance with established procedures.

A second flashover resulted in loss of one of the two offsite 345 KV supply lines (Bridgewater) at 4:40 pm. The two emergency diesel generators (EDGs) were manually started and aligned to buses A5 and A6 (4160 VAC vital buses) to provide a more reliable power supply. At 5:10 pm, the remaining 345 KV supply (Canal line) was lost due to offsite power disturbances. As a result, power was lost to buses A1-A4 (4160 VAC non vital buses). Two additional power sources (23 KV offsite line via the station shutdown transformer and the Station Blackout Diesel) remained available to supply the A5 or A6 buses as backup to the station EDGs. The Nuclear Watch Engineer maintained outstanding command and control of the watch section in response to the trip. Operators were knowledgeable and communications were clear. The decision to supply the A5 and A6 busses from the EDGs was sound. Operators and other supporting station personnel were observed to be attentive and actively supporting the plant shutdown. However, during an intake structure tour, the inspector observed an operator who appeared to be experiencing difficulties maintaining complete attentiveness in the severe storm environment.

The operator was stationed near the travelling screens as a contingency for storm response, and was not fulfilling a Technical Specification requirement. When questioned by the inspector, the operator displayed complete awareness. The inspector promptly brought this matter to the attention of plant management and discussed outside tour assignments with the control room Nuclear Operations Supervisor. Operations management review, including disciplinary action, was in process as of the end of this inspection period.

The licensee cooled down the reactor using high pressure coolant injection (HPCI) for reactor pressure control and reactor core isolation cooling (RCIC) for reactor vessel (RV) level control. Maintenance personnel performed a detailed inspection of the 345 KV switchyard and relay house with the Operations Section Manager, and concluded that switchyard equipment had responded as designed to the flashovers. Following independent review of electrical schematics, the inspector found the licensee's assessment of switchyard performance acceptable. On March 13 at approximately 10:00 pm, the Canal line was restored and buses A1-A4 were reenergized.

At 11:00 pm HPCI was secured due to a high torus water level condition, and RV pressure began to increase. Operators used SRVs to limit the pressure rise while torus water level was reduced and HPCI was restored to service. On March 14 at 2:44 pm, the shutdown cooling mode of residual heat removal (RHR) was established. The Bridgewater line was restored at 4:13 pm.

The licensee closely observed reactor vessel (RV) water level indications during the reactor depressurization, monitoring for signs of level instrument "spiking" which had been observed during previous depressurizations. Prior to the reactor trip, the reactor had been at power operation for 81 days. Preliminary observations identified small level indication "spikes" (2 to 4 inch magnitude) beginning at approximately 180 psig on the narrow range RPS/ECCS "B" reference leg instrumentation. No "spiking" was observed on the "A" reference leg instrumentation. Larger "spiking" which had been observed on previous depressurizations (resulted in some cases in a Group I isolation) was not present. Licensee review of cooldown data to assess RV level instrument performance was in progress at the conclusion of this inspection period.

Continuous resident inspector site coverage was maintained from approximately 2:00 pm on March 13 through 12:00 noon on March 14. The resident inspector was present in the control room at the time of the reactor trip and monitored the licensee's response to the event. The NRC Region I Incident Response Center was manned in the Monitoring Mode and was in communication with the site during portions of the storm. The licensee's post-trip review and associated inspector followup, including the cause of the loss of Y3 and Y4 safeguards busses, (URI 50-293/93-05-01) were in progress at the end of the inspection period.

### 2.3 **Engineered Safety Feature System Walkdown (71710)**

The inspector conducted a detailed independent walkdown of the High Pressure Coolant Injection (HPCI) system. Probabilistic risk assessment failure modes for the HPCI system described in NUREG/CR-5924, "HPCI Risk Inspection Guide," October 1992, were utilized in this walkdown. The walkdown included the following items: (1) verify whether the HPCI system components are correctly aligned and the lineup checklists match plant drawings; (2)

determine the adequacy of system housekeeping and cleanliness; (3) verify system valve material condition and proper labelling; (4) verify that instrumentation is properly installed and parameter values are consistent with the existing plant conditions; (5) verify that the required support systems essential to system performance are operable; and (6) review the documentation required to demonstrate system operability.

The inspector performed a walkdown of all accessible HPCI components to determine if the system component position and labels matched the lineup checklist information. Overall, the system was correctly aligned, labeled, and component labels matched the HPCI piping and instrument drawing (P&ID). One exception was an instrument root isolation valve, 23-HO-189, "HPCI Gland Seal Cond Cooling Water Supply Header PI-2301-81 Root Valve," was found out of position for existing plant conditions. The closed valve isolated a local pressure indication gauge and did not effect the HPCI system operability.

The licensee promptly verified and opened valve 23-HO-189 to match the valve lineup sheet and P&ID normal position. A plant operator conducted a walkdown of all other HPCI instrument root isolation valves and found no discrepancies. The licensee wrote a Problem Report, No. 93-9062, to document the problem and ensure that proper corrective actions were taken. The inspector determined that the mis-positioned valve was an isolated occurrence. The licensee's corrective actions were prompt and adequate to address the problem.

The HPCI valve checklist, procedure PNPS 2.2.21 Attachment 2, clearly defines the valve physical location, description, print location, control location, and normal position for each system valve. The valve labels were easy to read and used good human factor criteria. An example was that all labels contain the valve information on the front and back of the metal plate. The inspector reviewed the current HPCI valve, breaker and instrument lineups. The lineups were complete, second verified, and reviewed by shift supervision to ensure HPCI system operability.

The material condition of the HPCI pump, turbine, and associated equipment was good. The licensee continues to pursue decontamination of the radiological areas. An example was noted in the HPCI room, which was 80 percent accessible without the use of protective clothing. In conclusion, the inspector determined that the licensee maintained good control of the HPCI system, and no problems which would impact upon operability were found.

## 3.0 **RADIOLOGICAL CONTROLS** (71707)

### 3.1 **Radioactive Waste (Radwaste) Control Program**

The inspector reviewed radwaste disposal data for the past three years and determined that licensee radwaste program initiatives had been effective and had resulted in a significant reduction in the generation and discharge of radioactive waste. Liquid radwaste effluent volume was reduced by a factor of ten with curie content reduced by a factor of two. Solid radwaste volume was reduced by a factor of two with a smaller reduction in curie content noted.

Initiatives included stricter controls over what material is brought into the radiological control area (RCA), shipment of solid radwaste to an intermediate site for consolidation/compaction prior to final disposal, higher availability of onsite liquid radwaste processing systems, and reduction of the number of onsite radioactive material storage areas from 15 to 7. Management has approved and provided initial funding for a long term Radwaste Improvement Program intended to further reduce radwaste. The inspector concluded that the licensee had implemented an effective program to minimize the generation and discharge of radwaste.

## 4.0 MAINTENANCE AND SURVEILLANCE (37828, 61726, 62703, 93702)

### 4.1 Observation of the New Fuel Inspection

The inspector performed an independent observation of licensee inspection and channeling of the new nuclear fuel. The work was performed in accordance with the criteria in procedure No. 4.2, "Inspection and Channeling of Nuclear Fuel." The new fuel inspection progressed at a controlled pace.

The licensee has incorporated a positive change for the movement of new fuel from the fuel inspection stand to the spent fuel pool (SFP). The new procedure has personnel use the reactor building crane to move the new fuel to the SFP fuel preparation machine, then use the refuel bridge to move the fuel bundle into the correct SFP storage rack. The previous procedure had the personnel use the reactor building crane to move the new fuel bundle from the inspection stand directly to the SFP storage rack. The new method allows personnel closer to the SFP storage racks, on the refueling bridge, to lower the new fuel into the correct SFP storage rack.

The inspector questioned personnel on the refuel floor about their knowledge of the history of dropped new fuel bundles at Pilgrim and other facilities. The personnel questioned were familiar with the dropped fuel bundle events and were briefed on the topic prior to the start of the new fuel inspections. The inspector independently concluded that the licensee had substantial controls in place to prevent new fuel damage.

### 4.2 Maintenance Program Review

The inspector reviewed various aspects of the maintenance program to determine whether the corrective and preventive maintenance programs were effectively implemented to maintain plant equipment at an acceptable state of readiness. Over the period of December 1991 through March 1993, the backlog of running repair corrective maintenance requests (MR) - repairs that can be performed with the plant online - was reduced from 1000 to approximately 600. Although the backlog remained above the licensee's goal of 400 MRs at the end of this report period, the inspector concluded that the MR backlog had been properly prioritized and scheduled according to a well managed plan. The inspector noted that while the MR backlog remained stable during the last six months, the rate of preventive maintenance (PM) task completion increased and the frequency of job rework decreased. The licensee successfully focussed

attention on reducing the MR backlog of the heating, ventilation, and air conditioning and radwaste systems. The inspector independently concluded that this work improved system availability and a reduced radwaste effluent liquid discharge, as discussed in Section 3.1. Several factors including tool availability, work package quality, schedule coordination, material availability, and supervisor training were concluded by the inspector to have contributed to the overall improvement in plant material conditions.

In September 1992, the maintenance department leased a carbon dioxide (CO2) decontamination machine and initiated an aggressive program to reduce the onsite inventory of contaminated tools and components. This machine replaced the preexisting decontamination trailer which was removed in preparation for a major salt service water piping modification. The machine sprays a small stream of frozen CO2 particles against the tools to remove surface contamination. Surface contamination levels were reduced by up to a factor of 100 and on contact radiation levels were reduced by as much as a factor of 10. Decontamination of components from contaminated systems significantly reduced personnel exposure and the time needed to complete several major jobs including reactor water cleanup pump and radwaste system repairs. Based on initial success of the program, the tool management division purchased a CO2 decontamination machine in January 1993. As of March 1993, seven storage vans and approximately 400 storage drums of contaminated tools/components have been decontaminated, repaired, and returned to inventory available for issue. The decontamination program in addition to the upgrade of a tool issue facility located within the radiological controlled area (RCA) has significantly improved availability of tools for maintenance work.

The Planning and Work Control divisions were reassigned from the Outage section to the Maintenance section in early 1992 to improve the planning and scheduling process. Also, three additional experienced maintenance supervisors were assigned to the Planning division to improve work package quality. Work package preparation for many of the periodic PM jobs has been automated by loading job specific information into a computer system. Automation of work package planning is important considering the potential future growth of PM tasks at Pilgrim Station. A reliability centered maintenance program (RCM) was established in 1992 to review 48 selected systems and revise the list of applicable PMs. Implementation of the RCM program recommended PMs is intended to improve system reliability and reduce the number of needed corrective repairs. Based on completed review of the first 14 systems, the overall number of PMs could double. Planners intend to continue loading work packages onto the computer system so that many packages can be automatically regenerated for periodic use in the future. Planners have been effective at generating sufficient work packages to support the increased rate of MR & PM completion and maintain a working backlog of task ready work packages.

The inspector noted that there was a significant increase in backlog of overdue electrical running repair PMs in December 1992. This resulted from grouping a large number of breaker PMs (with a five year periodicity) during the 1987 outage when a large contracted maintenance force was onsite. Subsequent scheduling of the breaker PMs did not account for the significant impact of the breaker PMs becoming due essentially simultaneously. The Electrical Division has made

satisfactory progress toward reducing the backlog. However, continued efforts to address the backlog are warranted. The Maintenance Section Manager confirmed that resources would be applied to reduce the electrical PM backlog while maintaining the MR backlog at an acceptable level. The PM coordinator stated that the next scheduling cycle would stagger the due dates of the electrical breaker PMs over the five year period to preclude recurrence of a similar significant impact. The inspector determined that these actions were satisfactory.

Regularly scheduled meetings have improved overall work coordination efforts and maintenance supervisor effectiveness. Operations representatives have taken a lead role in weekly work coordination and daily scheduling meetings. All maintenance disciplines are represented and very well prepared for the daily meeting. This has resulted in better daily work coordination and more efficient planning of system outage maintenance.

## 5.0 EMERGENCY PREPAREDNESS (40500)

The licensee reviewed the emergency plan prior to and during the March 13 winter storm. The nuclear watch engineer determined that site conditions, including wind speed and offsite power availability, did not satisfy emergency action level entry conditions. Independent inspector review concluded that the licensee determination was correct.

## 6.0 SECURITY (71707)

Selected aspects of plant physical security were reviewed during regular and backshift hours to verify that controls were in accordance with the security plan and approved procedures. This review concluded that performance was acceptable and included the following security measures. Security force staffing, vital and protected areas barrier integrity, maintenance of isolation zones, behavioral observation, and implementation of access control including access authorization and badge issue, searches of personnel, packages and vehicles and escorting of visitors. Security preparations for and compensatory measures established during the March 13, 1993 winter storm were excellent. Additional staff were positioned in remote locations to improve observation of the perimeter boundary, and to provide for potential compensatory measures. The inspector noted security force personnel to be more regularly rotated and, as a result, were alert and well focussed as weather conditions and visibility degraded. No security systems were lost as a result of the storm.

## 7.0 SAFETY ASSESSMENT AND QUALITY VERIFICATION (92701)

### 7.1 Self-Assessment

On December 14, 1989, the licensee issued the Final Assessment Report (FAR) that represented completion of the Confirmatory Action Letter 86-10, Power Ascension Test Program. In the FAR, the licensee discussed an initiative in which section managers would conduct semi-annual assessments to be presented to department managers, directors, and Vice Presidents. The semi-

annual assessments were in addition to more routine internal Quality Assurance Department audits and surveillances, management on shift assessments, peer reviews, and other external industry sponsored performance evaluations.

Recently, licensee Regulatory Affairs management indicated the intention to modify the section manager assessment periodicity to approximately every fifteen months to better coincide with other internal and external evaluation processes. Additionally, in light of the other evaluation processes, the licensee conduced the semi-annual section manager assessment periodicity was too frequent to allow for issue resolution and effective performance trending.

The inspector reviewed results from the semi-annual assessments dating back to July 1990. The issues were largely non-regulatory in nature. Assessment issues are categorized into one of three areas: 1) management performance, 2) operational/technical, or 3) work environment. A management team is assigned to each category to clarify and establish solution statements for each issue. The May 1992 self assessment summary report developed the most formal issue status and trending matrix. An overview of self assessment issue status is presented to the Nuclear Matters Committee during the bi-weekly committee meetings.

The inspector concluded that the self assessment process was well controlled, appropriate management oversight was evident, and issues were currently trended effectively. The process of modifying the periodicity to approximately every fifteen months to coincide with other evaluation processes is appropriate and does not represent a potential decrease to current regulatory or safety effectiveness.

## 8.0 ENGINEERING AND TECHNICAL SUPPORT (71707)

### 8.1 Followup of Previously Identified NRC Items

#### 8.1.1 (Closed) URI 50-293/91-04-01.3, Trip of High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) 125 VDC Inverters During Restart of Recirculation Pump

Previous reports documented the safety concern regarding potential inadvertent tripping of the HPCI/RCIC 125 VDC inverters in response to incoming AC voltage transients resulting from the start of large AC motors. Initial licensee action included installation of upgraded HPCI and RCIC inverters and a determination of operability as documented in NRC Inspection Report 50-293/91-29. Followup actions included a long term assessment of battery charger performance which concluded that the three station 125 VDC battery chargers should be upgraded to eliminate existing battery charger output voltage irregularities.

The licensee developed a plant design change (PDC 92-38) which included stringent procurement specifications for transient voltage response. The specification required significant vender testing which effectively minimized the need to establish plant limiting conditions for post installation testing. Procurement specification E11A (revision 3) and PDC 92-38 required transient voltage

response to remain within the band of charger float voltage +/- 12 percent. The inspector reviewed the vendor test data and found the results to fully satisfy the specified acceptance criteria. However, the inspector noted that subsequent to the licensee design review and acceptance of the vendor battery charger final test report, procurement specification E11A was revised (revision 4) to modify environmental qualification requirements. The revision had no impact on the transient voltage response criteria or test results. The inspector questioned whether or not the existing licensee procurement receipt process captured the criteria of the latest procurement specification revision (E11A revision 4). The licensee provided documents which appropriately resolved the inspector's concerns.

Two upgraded 125 VDC battery chargers were installed in accordance with PDC 92-28 and placed in service during this inspection period. The inspector observed selected portions of installation and post work testing. Installation work packages and procedure TP92-098, "125 VDC Battery Charger Post Work Test" were of high quality. Maintenance workers were knowledgeable and displayed a questioning attitude during installation and testing. The test and modification supervisor provided timely resolution to all questions. Installation and testing of the third 125 VDC battery charger is scheduled to be complete in April 1993. Licensee corrective actions have properly addressed this issue. This item is closed.

### 8.1.2 (Closed) VIO 50-293/92-14-01, Unauthorized Non-Code Repair to the Salt Service Water (SSW) System

A wooden plug was used to perform an unauthorized non-code repair of a SSW system flange. This violation addressed failure of the licensee corrective action process to identify, document, and properly correct the SSW system deficiency in a timely manner. Initial corrective actions were documented in NRC Inspection Report 50-293/92-14. Long term actions taken to preclude recurrence included field walkdowns of similar systems to identify and address potential related deficiencies, revision of procedures 1.5.3, "Maintenance Requests" and 1.5.3.1, "Maintenance Request Cancellation, Prioritization, and Emergent Work", to improve work control, and formal review of this event by maintenance section personnel. In addition, this event has been incorporated into the training program for new hire contractors and into the continuing training program for licensed operators and maintenance personnel.

The inspector reviewed the procedure revisions and training plan documents and concluded that licensee corrective actions were appropriate to preclude recurrence of this event. This is closed.

## 9.0 NRC MANAGEMENT MEETINGS AND OTHER ACTIVITIES (30702)

### 9.1 Routine Meetings

At periodic intervals during this inspection, meetings were held with senior plant management to discuss licensee activities and areas of concern to the inspectors. At the conclusion of the reporting period, the resident inspector staff conducted an exit meeting on March 22, 1993, with licensee management summarizing the preliminary findings. No proprietary information was identified as being included in the report.

## 9.2 Management Meeting

On February 25, 1993, Dr. Thomas Boulette, Senior Vice President, Nuclear and members of his staff met with Mr. Thomas T. Martin, Regional Administrator and members of his staff at the Region I office in King of Prussia, PA. The purpose of the meeting was to discuss the implementation of Phase II of the three phase organizational restructuring, Phase III projections, personnel development programs, and recent station management changes.

## 9.3 Other NRC Activities

On February 11-12, 1993, Mr. James C. Linville, USNRC Region I, Chief, Reactor Project Branch 3 visited Pilgrim. Mr. Linville met with the Resident Inspector Staff, attended the routine resident inspector inspection period exit meeting, toured the facility, and met with senior station management to discuss issues of current interest.

On the evening of February 3, 1993, the NRC conducted a public meeting in Plymouth, MA to update the status of the reactor vessel water level instrumentation "spiking" concerns and to receive questions on this subject from officials and members of the public.

The meeting was convened at approximately 7:00 pm. Following introductions, the NRC staff presented a brief update of generic and Pilgrim specific activity and experience on the spiking issue. Overhead slides that supported the presentation are included as Attachment 1. In addition to the spiking issue, questions and comments were also received relating to motor operated valve testing programs, operability determination processes, generic issue response schedules, and treatment of employees who raise safety concerns. Documentation submitted to the NRC during the meeting by interested parties is included as Attachment 2.

The meeting was attended by approximately 100 members of the public. NRC attendees at the February 3rd meeting included the following:

**NRC Attendees**

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|---|---|
| C. William Hehl | Region I, Director, Division of Reactor Projects |
| Ashok C. Thadani | NRR, Director, Division of Systems Technology |
| Timothy E. Collins | NRR, Chief, BWR Systems Section |
| Eugene M. Kelly | Region I, Chief, Reactor Project Section 3A |
| John B. Macdonald | Region I, Senior Resident Inspector PNPS, Reactor Projects Section 3A |
| David M. Kern | Region I, Resident Inspector PNPS, Reactor Projects Section 3A |
| Ronald B. Eaton | NRR, Project Manager, Project Directorate 1-3 |
| Amy E. Cubbage | NRR, Reactor Engineer, BWR Systems Section |
| Diane P. Screnci | Region I, Office of Public Affairs |
| Jane F. Fitzgibbon | Region I, Office Resident Assistant PNPS, Reactor Projects, Section 3A |

## INFORMATION PROVIDED AT 8/29/92 MEETING

- POTENTIAL FOR REACTOR WATER LEVEL INDICATION ERRORS DUE TO DISSOLVED NON-CONDENSIBLE GASES
- BWROG REGULATORY RESPONSE GROUP WAS ACTIVATED
- NRC ISSUED INFORMATION NOTICE 92-54 AND GENERIC LETTER 92-04
- STAFF CONCLUDED THAT INTERIM PLANT OPERATION IS ACCEPTABLE

ATTACHMENT 1

## ACTIONS TAKEN SINCE 8/29/92 PUBLIC MEETING

- LICENSEE RESPONSES TO GENERIC LETTER VERIFIED PLANT SPECIFIC APPLICABILITY OF GENERIC ANALYSES
  - AUTOMATIC SYSTEM RESPONSE NOT IMPACTED
  - PROCEDURES IN PLACE TO ASSURE LONG TERM CORE COOLING
  - OPERATORS SENSITIZED TO THE PHENOMENON AND POTENTIAL LEVEL INDICATION ERRORS
- BWROG SUBMITTED LONG-TERM PLAN FOR RESOLUTION OF ISSUE
- ADDITIONAL OPERATOR GUIDANCE DEVELOPED BY BWROG AND SENT TO ALL BWR FACILITIES
- 10/29/92, 12/15/92, 1/15/93: MEETINGS HELD WITH BWROG TO DISCUSS OPERATOR GUIDANCE AND LONG TERM PLAN
- BWROG IS PROCEEDING ON SCHEDULE WITH LONG-TERM PLAN

## BWROG LONG-TERM PLAN

- PROGRAM FEATURES:
  - COLLECT PLANT SPECIFIC DATA
  - DEVELOP ACCEPTANCE CRITERIA
  - DEVELOP ANALYTICAL MODEL
  - PERFORM FULL-SCALE TESTING
  - DETERMINE NEED FOR HARDWARE OR PROCEDURAL CHANGES
  - EVALUATE EFFECTIVENESS OF POTENTIAL MODS
  - DEFINE LONG-TERM CORRECTIVE ACTIONS
  - INDIVIDUAL PLANT IMPLEMENTATION

## STAFF ACTION PLAN

- REVIEW OF BWROG TESTING PLAN
- TOUR BWROG TEST FACILITIES AND OBSERVE TESTING
- INSPECT OPERATOR GUIDANCE AND TRAINING
- REVIEW LONG-TERM CORRECTIVE ACTIONS
  - HARDWARE MODIFICATIONS
  - PROCEDURAL MODIFICATIONS

## STAFF POSITION

- AS DISCUSSED IN GENERIC LETTER NO. 92-04, INTERIM PLANT OPERATION IS ACCEPTABLE
- ISSUE IS IMPORTANT AND NEEDS ATTENTION
- FOR LONG TERM, STAFF EXPECTS EACH LICENSEE TO DEMONSTRATE INSTRUMENTATION IS OF HIGH FUNCTIONAL RELIABILITY
- IT IS ACCEPTABLE FOR LICENSEES TO RESOLVE THIS ISSUE CONSISTENT WITH THE SCHEDULE FOR COMPLETION OF THE BWROG LONG-TERM PLAN

# NOTIFICATION OF PUBLIC MEETINGS

MEETINGS WITH APPLICANTS/LICENSEES, INTERVENORS, VENDORS OR OTHER MEMBERS OF THE PUBLIC

- NRC POLICY STATEMENT - 43 FR 28058, JULY 28, 1978
- NRR OFFICE LETTER - MAY 24, 1988
- OPEN TO GENERAL PUBLIC AS OBSERVERS
- CHAIRPERSON MAY INVITE PUBLIC PARTICIPATION
- NOTICE 7 TO 10 WORK DAYS IN ADVANCE (TO EXTENT PRACTICAL)
- LESS THAN 1 WEEK NOTICE REQUIRES DAILY HIGHLIGHT
- RECORDING UPDATED WEEKLY (301) 492-7424

## BACKGROUND

- PILGRIM HAS EXPERIENCED REACTOR VESSEL WATER INSTRUMENTATION SPIKING DURING REACTOR DEPRESSURIZATION
- SPIKES HAVE BEEN OF SUFFICIENT AMPLITUDE TO CAUSE GROUP I ISOLATIONS
- THROUGH APRIL 1992, THERMODYNAMIC PERFORMANCE PRIMARY ROOT CAUSE
- NONCONDENSIBLE GASES RECOGNIZED AS A POTENTIAL CONTRIBUTING FACTOR
- INSTRUMENTS ON "A" & "B" RACKS RESPOND DIFFERENTLY

  @ 450 PSIG, "B" SIDE SPIKING BEGINS 4 INCHES, 30 SECOND DURATION

  @ 65 PSIG "A" SIDE SPIKING 2 INCHES, 20 SECONDS
- AMPLITUDE INCREASES AS PRESSURE DECREASES
- AT LOW PRESSURE SPIKES BECOME IRREGULAR AND REMAIN PRESENT LONGER
- INSTRUMENT BEHAVIOR WAS PREDICTABLE AND REPEATABLE
- INSTRUMENT RACK EXTERNAL LEAKAGE IDENTIFIED AND CORRECTED, INTERNAL LEAKAGE QUANTIFIED

- ISSUE STATUS UPDATED; REVIEWED AND APPROVED BY ONSITE REVIEW COMMITTEE

- NRC ATTENDED ORC MEETING, INDEPENDENTLY ASSESSED LICENSEE ANALYSIS, AND AGREED WITH CONCLUSIONS

- TWO SHUTDOWNS SINCE RESTART; 12/13 AFTER 20 DAYS OF OPERATION AND 12/20 SHORTLY AFTER RESTART

- CONDENSATE POT TEMPERATURES AND EXTERNAL INSTRUMENT RACK LEAKAGE TRENDING

ATTACHMENT 2

# Citizens Urging Responsible Energy

Statement submitted by Mary C. Ott, Co-Chairman at the February 3, 1993 Nuclear Regulatory Commission Meeting in Plymouth, Massachusetts

The last time the NRC conducted a meeting on the subject of Pilgrim's reactor vessel water level instrumentation problems in August, 1992, we were assured that:

1. there was a small likelihood of such a problem occurring

2. that reactor operators had received special training to compensate for the fact that the plant had no back up measuring device to ensure that the fuel was covered to prevent a meltdown.

3. that you were studying the problem

Boston Edison is telling Pilgrim's neighbors that the absence of this device is merely a nuisance, akin to having your check book out of balance. They say they have fixed the problem by tightening "fittings".

As the NRC continued to "study" this non-problem, the problem happened again, during a shutdown on October 24th.

The NRC has also just issued an examination report on the results of testing 10 initial operator applicants and 2 requalification retake examinations to operators who did not pass exams in May, 1992.

The report says "the following subjects were missed by a least 40% of the applicants evaluated on the subjects indicating a generic weakness in the subject:" It then goes on to cite 14 critical areas of concern which are fundamental to analyzing and responding to a control room emergency - yet the NRC passed all but one operator!

As to whether this is a non-issue, CURE has obtained a copy of January 15, 1993 General Electric Memo sent to the Boiling Water Reactor Owners Group about a meeting with the NRC's Nuclear Reactor Regulation Branch on the subject of reactor vessel water level indication. GE says, in part:

"While Thadani (NRR) and his staff appeared to be impressed with the apparent insights afforded by the experiment, their statements, comments, and questions indicated the following important points:

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"(a) The overall schedule for coming to a conclusion regarding resolution of the issue is 'fixed'..Thadani forcefully expressed unwillingness to inform either the Commission or the congressional oversight committees of any delay. Thadani's frequent expression of concern regarding such an eventuality clearly showed both the political and legal implications for the staff."

"(b) The program must plainly explain the Pilgrim data."

"(c) It will be very difficult to convince Nuclear Reactor Regulation (and, by implication, the Commission) that the issue is of such inconsequence that no actions (including plant modifications) are necessary. The burden of such a showing is clearly and completely on the industry. Thadani also stated that, if any utilities conclude that "no action" is appropriate, he wants to find out about it as early as possible, i.e., 'don't tell me as late as July."

(d) The staff is quite concerned regarding further impacts from the forthcoming public meeting regarding the issue as it relates to the Pilgrim plant.

Now this sounds like a whole lot of concern to us.

Additionally, we have discovered that the individual heading Boston Edison's program to resolve the instrumentation problems was, in fact, a former NRC resident inspector at the Nine Mile Point Nuclear Plant from 1982-1986, the site of major radioactive spills in 1981, 1985 and 1986. Since the NRC's Code of Conduct includes restrictions on seeking future employment by present NRC employees and on post-employment activities by former NRC employees, has the NRC evaluated Mr. Hudson's employment at Boston Edison with regard to these regulations prior to February 3, 1992?

Finally, the untimely passing of Pilgrim's head of engineering and the recent resignation of Pilgrim's Senior Vice-President Nuclear are of great concern to us.

We see a lack of stability on all fronts necessary to effectively deal with this dangerous situation at Pilgrim. Accordingly, we request that the NRC err on the side of caution and issue a shutdown order, effective immediately until a deliberate course of action is defined.

Thank you.

To N.R.C

FEB 3 1993 N,R,C, STAFF AND PILGRIM STAFF.

SUBJECT IS AN OPEN REVIEW OF VIOLATIONS OF FEDERAL CODES AT PILGRIM.

1- REVIEW OF ACCIDENTS AT PILGRIM ON MAY 21,1977 .

2- REVIEW OF RADIATION EXPOSURES OF EDSON A BROOKS ON JULY 31, 1977.

3- ED BROOKS IS FIFTEEN YEARS TRYING TO GET WORKMANS COMP FROM PILGRIM FOR ACCIDENTS THAT CAUSED CANCER THREE TIMES IN ED BROOKS BODY.

( ED BROOKS DEMANDS DAMAGES FOR THE THREE CANCERS AND HOSPITAL AND DOCTOR BILLS FOR FIFTEEN YEARS AT COMPOUNDED INTEREST.

4- REVIEW OF MY BROTHER IN LAWS RADIATIONS THAT KILLED FRED SPANO . ACCIDENT HAPPENED MAY 21,1977, FRED DIED ON JUNE 17, 1980.

POLITICAL CONSPIRACY

REVIEW OF HOW FRED SPANOS RADIATION CASE AGAINST PILGRIM WAS TRADED FOR A BUILDING CONTRACT,
( BUILDING WAREHOUSE IN DEDHAM ALONG AM TRACT RAIL LINE.

THE CONSPIRACY BY PILGRIM AND STATE SENATOR NED KIRBY LASTED 12 YEARS.

OTHERS INVOLVED- ATT, WILLIAM WELD , Now GOV

MILLWRIGHT LOCAL 1121 BOSTON MASS,
EDWARD CASEY,
WALTER OLIVERE,
IN LAW JUDAS DOM SPANO,

STATE S/S JUDGE GEORGE JACOBS.

HALE AND DORR ATT, JAMES SAINT CLAIR,

THIS REVIEW WILL TAKE MORE TIME TO RESOLVE THEN FEB 3, 93 . IF WE APPOINT PEOPLE FROM THE BOSTON EDISON PILGRIM PLANT, THE NRR- (N,R,C, AND ED BROOKS. ED REQUESTS WE HOLD REVIEW AT THE PLYMOUTH MASS, OFFICES OF THE NEW
( STATE SENATOR THERESE MURRAY.

Edson A Brooks
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Hehl

# NRC Meeting
# Plymouth Mass
# February 3, 1993

Good evening ladies and gentlemen, I am Paul Blanch. For those who are not familiar with me or my background, I am presently Supervisor of Instrumentation and Controls Engineering for Northeast Utilities in Berlin CT. I have been an employee of NU for over 20 years and prior to joining NU, I received a Bachelor of Science degree in Electrical Engineering after serving seven years in the Navy Nuclear Power program. Just last week I received an award from Control Magazine for Utility Engineer of the Year for my efforts in identifying nuclear safety issues.

The statements made by me are my own opinions and do not necessarily reflect the position of Northeast Utilities.

I am here in this area for two distinct purposes. For most of the day today I have been testifying before the NRC Inspector General's Office related to irresponsible NRC regulation that includes direct harassment of me by the NRC Staff, intentional false statements by high level NRC Officials, and the NRC's total persecution of individuals identifying safety concerns to either their employer or to the NRC themselves.

I am not here because I am vindictive or a disgruntled employee, but only because of my concern about the safety of nuclear power. I have nothing to gain personally, and am speaking out with great risk to my career in the nuclear industry.

My secondary purpose is to inform the residents of this area that due to this irresponsible, arrogant Agency, the residents are being exposed to risks that have not been considered during the initial licensing of the Pilgrim plant.

The NRC and the industry constantly publicize the fact that the chances of a major catastrophe associated with a nuclear plant are acceptable. These risk studies assume that all NRC regulations are being followed. These studies did not account for the fact that the NRC and the industry constantly ignore and cover-up many deficiencies. These deficiencies were not part of the basis assumed in the risk analysis.

My concern is not only the vessel level monitors, Thermo Lag insulation or Rosemount transmitters but those other issues that have not been recognized or are being withheld from public scrutiny. One of these issues that the general public is not fully aware of relates to the ability of the Emergency Core Cooling Systems to operate during accident conditions. NRC has stated that some tests indicate that engineering related to the design of emergency systems "...may not be conservative for all design basis conditions." This particular problem is so severe that the NRC has given Pilgrim **five years** to determine if the emergency systems will even operate during accident conditions.

The problems with vessel level are not the most significant contributor to risk, but serve as a primary example to the residents of the Pilgrim area, as to how the NRC fails to address any safety issue that may impact the economic viability of a single nuclear plant or a generic problem that may effect many plants. I continuously observe the NRC's refusal to impose the requirements of regulations approved by Congress.

In late May of 1992, Mr. Kelly of the NRC asked me if I could provide any information about the reactor level "spiking," or "notching" problem that was constantly being observed during every Pilgrim shutdown. At this time there was mutual respect between Mr. Kelly and myself and

he was well aware of my expertise in the I&C field, especially in the area of level measurement.

Shortly after my conversation with Mr. Kelly, I received the data from Pilgrim Engineers and within two days I informed both Pilgrim and the NRC that the symptoms are the result of non condensable gases in the reference legs used to monitor level in the reactor. This is not a complex problem, and any individual with a basic understanding of elementary physics could have come to the same conclusion with the data from Pilgrim.

After Pilgrim, the NRC and General Electric received this assessment there was instant denial. Pilgrim's reaction was that of denial, the NRC wanted to ignore the problem, and General Electric attempted to crucify me. When I informed another utility of this problem, General Electric contacted this utility and attempted to discredit me personally by referring to me as a "loose cannon" and otherwise inferring that I had no idea of what I was talking about. From personal experience, I have learned that this is a commonly used tactic to discredit individuals to prevent a significant issue from recognition.

After informing Pilgrim and the NRC of this potentially catastrophic failure, I reviewed some historical data from Millstone Unit 1. This data, which was so small that the Millstone operators failed to observe it for twenty years, indicated the presence of the same problem. This was confirmed during a plant shutdown on July 4, 1992. Our immediate action was to evaluate the operability of the instruments fed from these reference legs and it was the conclusion of all involved, that operating with this deficiency not only violated NRC Regulations, but that the operators were not properly trained to deal with this situation. It is noteworthy that, unlike Pilgrim, Millstone 1 has a diverse system to measure level that is not

susceptible to this problem and we still considered the plant unsafe to operate.

After concluding that it was not safe to operate with this defect, we immediately sought out the industry experts to assist us in the repair of this problem. During this investigation I personally authorized S. Levy Inc. to study this problem prior to the issuance of a formal purchase order. By the NRC's interpretation, this was a violation of NU's procedures and therefore the NRC issued a Violation to NU and stated that "Blanch violated Commission rules" in a further attempt to discredit me. This is nothing more than the normal "strong arm, big bully" techniques commonly employed by the NRC to suppress any individual who criticizes the almighty Regulator. NU is the only utility that admitted to the significance of this problem and the only utility to receive a violation for aggressively resolving the problem. This is like issuing me a ticket for jaywalking, while rapes and murders are being ignored. The very clear message here is that the NRC actively discouraged other utilities from fixing the problem.

NRC regulations specifically require not only utilities but also suppliers of equipment report any defect or potential defect of Systems Structures or Components (SSC) to the NRC in a timely manner. General Electric has been aware of this potential defect since last February and to the best of my knowledge, has not reported the defect as required by NRC Regulations. Westinghouse has been aware of the problem since 1989 and has never reported the problem in accordance with the NRC regulations. Further, Pilgrim management has been aware of a potential problem for years and was aware of the specifics since last June, yet they have still not reported the problem in accordance with NRC reporting requirements.

NRC Generic Letter 91-18 clearly requires the utility to perform a prompt determination of operability at the

time either a "degraded or non conforming" condition is identified. By the NRC definition in this letter, this is both a degraded and a non conforming condition that the NRC and Pilgrim have been aware of for years. I believe a logical question from the residents surrounding Pilgrim is why did it take a request by me on October 23, 1992, to the NRC before Pilgrim performed an operability determination on November 20, 1992. Does the NRC consider this to meet the NRC definition of a "prompt determination"? This is exactly the same question asked by Attorney Hadley of the NRC Chairman on July 21, 1992.

In addition to a degraded and non conforming condition the NRC and the Pilgrim staff were well aware that this gas problem also affected devices required by the plant Technical Specifications, yet they failed to comply with this requirement for at least five months. I repeatedly inquired about the operability of the interlocks and finally on November 20, 1992, the NRC and Pilgrim staff developed some pathetic justification for operability and the NRC bought it.

The NRC staff initially required every utility to fix the level measurement during the next shutdown within three months from the date of the August NRC Generic Letter. During a little publicized meeting with the Commissioners in November the NRC yielded to industry pressure that it was OK to allow every BWR to operate until 1994 before they fix the problem.

Even though I am the individual identifying the issue initially, the industry has conveniently excluded me from participation in this study. When the study is conducted by the GE owners, and a specific outcome is desired, I believe that they will continue to ignore any data or tests that do not support their desired outcome. For instance, the group is now publicizing the fact that the problem is less severe than initially thought. This is supported by a basement

experiment using gases different form those in the reactor and water that is also chemically different. The water is then pressurized by a bicycle pump. Vibrations that will exist during accident conditions, which will impact the severity of the problem are not being considered in the testing program. I also believe that the reference leg temperatures and the super saturated nature of the mixture are not being considered. It is my strong belief that these tests and conclusions will never receive any independent review by experts outside the nuclear industry.

On December 18, 1992, Mr. Hadley and I had a long discussion with four members of the NRC Commissioners Staff expressing our concerns related to the conduct of internal NRC meetings and also meetings with the "industry." As a result of this conference call the Commission Staff confirmed in writing on January 11, 1993, that we would be informed of any meetings on this subject. On January 22,

1993, I received a copy of a letter from General Electric that discussed a meeting with the NRC Staff and General Electric, in preparation for this meeting tonight. This NRC/GE meeting was not publicly announced and neither Mr. Hadley or myself was ever informed of the meeting or its outcome. This is but one more example of how the NRC Staff even ignores directives from the Commissioners.

Pilgrim has now been aware of this problem for years and with the NRC endorsement, has ignored all reporting requirements, refuses to implement a straight forward fix and has misrepresented vital information to the residents of the Pilgrim area. The next time the operators observe the problem, they will again attempt to convince the public that the problem has been resolved by some additional efforts. Short of fixing the real problem, the only fixes for

this gas problem which have not been tried by Pilgrim are DiGel and GasX.

This industry has a "mind-set" that any technical problem can be resolved by studies and a sharp pencil. I have still not received any explanation as to how operators determine reactor water level from humidity, temperature and drywell pressure.Rather than admitting to any real problem, the industry will expend more time and money to convince themselves and the general public that there was never a problem in the first place. I'm sure that Boston Edison has spent more ratepayer dollars convincing the public that there is no problem than the cost of fixing the problem. If I were a resident of this area, I would demand that this problem and all other major issues effecting the safety of Pilgrim be repaired as soon as possible and not continue to believe that there are no problems.

Given this pathetic failure of not only the Pilgrim management but with the full knowledge and encouragement of the regulators, I would not feel at all safe living in the vicinity of this plant. At least in Connecticut the Operations personnel at Millstone and Connecticut Yankee have the integrity and the openness to recognize true safety problems and not look for every excuse to continue operating in an unsafe manner.

Ladies and gentlemen, nuclear power is a necessity and can be operated with minimal risk, however, unless we demand proper regulation that concentrates on true safety rather than paper, we will pay an enormous price.