

November 6, 2003

Mr. Michael Balduzzi  
Site Vice President  
Entergy Nuclear Operations, Inc.  
Pilgrim Nuclear Power Station  
600 Rocky Hill Road  
Plymouth, MA 02360-5508

SUBJECT: PILGRIM NUCLEAR POWER STATION - NRC INTEGRATED INSPECTION  
REPORT 05000293/2003007

Dear Mr. Balduzzi:

On September 27, 2003, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Pilgrim reactor facility. The enclosed integrated inspection report documents the inspection findings, which were discussed on October 7, 2003, with Mr. W. Riggs and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The security program was also inspected during this period. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

On the basis of the results of this inspection, no findings of significance were identified.

Since the terrorist attacks on September 11, 2001, NRC has issued five Orders and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance controls over access authorization. In addition to applicable baseline inspections, the NRC issued Temporary Instruction 2515/148, "Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures," and its subsequent revision, to audit and inspect licensee implementation of the interim compensatory measures required by order. Phase 1 of TI 2515/148 was completed at all commercial power nuclear power plants during calendar year '02 and the remaining inspection activities for the Pilgrim Nuclear Power Station were completed in July 2003. The NRC will continue to monitor overall safeguards and security controls at the Pilgrim Nuclear Power Station.

Mr. Michael Balduzzi

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Sincerely,

/RA/

Clifford Anderson, Chief  
Projects Branch 5  
Division of Reactor Projects

Docket No. 50-293  
License No. DPR-35

Enclosure: Inspection Report 05000293/2003007  
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No: 50-293

License No: DPR-35

Report No: 05000293/2003007

Licensee: Entergy Nuclear Operations, Inc.

Facility: Pilgrim Nuclear Power Station

Location: 600 Rocky Hill Road  
Plymouth, MA 02360

Inspection Period: June 29, 2003 - September 27, 2003

Inspectors: W. Raymond, Senior Resident Inspector  
C. Welch, Resident Inspector  
D. Silk, Sr. Emergency Preparedness Specialist  
P. Frechette, Physical Security Inspector  
P. Cataldo, Senior Resident Inspector  
F. Arner, Senior Project Engineer  
J. Laughlin, Emergency Preparedness Specialist  
D. Schroeder, Resident Inspector

Approved By: Clifford Anderson, Chief  
Projects Branch 5  
Division of Reactor Projects

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## SUMMARY OF FINDINGS

IR 05000293/2003-07; 06/29-09/27/03; Pilgrim Nuclear Power Station.

The report covered a 13-week period of inspection by resident and region-based inspectors. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609 "Significance Determination Process" (SDP). The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified

B. Licensee Identified Violations

None

## REPORT DETAILS

### Summary of Plant Status

Pilgrim Nuclear Power Station operated during the period at 100 percent (%) core thermal power, except for short periods of operation at reduced power for routine condenser maintenance, testing and rod pattern adjustments.

On September 6, 2003, while operating at 100% power, plant power decreased to approximately 35% due to the trip of the A reactor recirculation pump following the loss of 480 volt bus B-1 and its associated loads at 11:51 a.m. Power to Bus B1 was restored at 11:51 p.m. on September 6, and the A recirculation pump was restarted at 9:07 a.m. on September 7. The plant resumed operation at full power at 11:20 p.m. on September 7.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

##### 1R01 Adverse Weather Protection (71111.01)

###### a. Inspection Scope

###### High Temperatures (2 samples)

The inspector reviewed the licensee's procedures for high ambient temperatures to verify that risk significant systems would be protected from adverse weather. The inspector reviewed licensee methods to protect essential equipment in the switchgear rooms, the emergency diesel generator rooms and the salt service water pump rooms. The inspector reviewed the procedures and design basis documents listed in the attachment to this report to verify that licensee controls were appropriate to protect essential equipment.

The inspector reviewed the licensee response to adverse conditions during periods of high ambient temperatures in August 2003. The inspector reviewed licensee actions to implement compensatory measures to protect essential equipment, and verified that the emergency diesel generators (EDG) were in the proper summer mode alignment for high temperature conditions. The inspector toured the intake structure, turbine building switchgear rooms, and emergency diesel generator areas to verify adequate protection for excessive temperatures.

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Adverse Weather (2 samples)

The inspector reviewed the licensee response to Hurricanes Fabian and Isabel during September 2003 and to prepare the site for potential adverse weather conditions. The inspector reviewed licensee actions to implement compensatory measures to protect essential equipment using procedures 5.2.2, "High Winds," and 2.1.37, "Coastal Storm - Preparations and Actions." The inspector toured the site, the intake structure and the emergency diesel generator areas to monitor the status of licensee preparations. Neither storm posed a significant impact on the site area.

The inspector verified that the licensee was identifying weather and environmental related problems that could affect the operation of mitigating equipment in the corrective action program and that the issues were properly resolved.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

1. Partial System Alignment (3 samples)

a. Inspection Scope

The inspector completed a partial review of the high pressure coolant injection (HPCI) and reactor core injection cooling (RCIC) systems during periods when the opposite system was out of service for scheduled preventive maintenance and testing. The inspector conducted a partial review of the B residual heat removal (RHR) system during the time when the A RHR system was out of service for scheduled maintenance. The inspector reviewed the appropriate system drawings and valve line-up procedures to walkdown and verify the correct system lineup. The Updated Final Safety Analysis Report and the Technical Specifications were reviewed to ascertain the required system configuration. The inspection covered the following three samples:

- HPCI System walkdown - July 16 - 17, 2003
- RHR System walkdown - August 20, 2003
- RCIC System walkdown - August 25, 2003

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)a. Inspection Scope (7 samples)

The inspector toured selective areas of the plant to observe conditions related to: (1) transient combustibles and ignition sources; (2) the material condition and readiness of fire protection systems and equipment; and (3) the condition and status of readiness of fire barriers used to prevent fire damage or fire propagation. The inspector verified that any identified degraded conditions were compensated by compensatory measures until appropriate corrective actions could be taken. The inspector also reviewed the applicable fire hazard analysis fire zone data sheets and selective surveillance procedures to ensure that the specified fire suppression systems surveillance criteria were met. The inspection covered the following seven samples:

- Fire Zone 1.9A, A RHR Valve Room
- Fire Zone 1.3, HPCI Pump /Turbine Room
- Fire Zone 1.10B, B RHR / HPCI QUAD
- Fire Zone 2.3, Battery Room A
- Fire Zone 2.4, Battery Room B
- Fire Zone 2.2, Switchgear Room A
- Fire Zone 4.1, B Train Diesel Generator Room

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)a. Inspection Scope1. External Flooding (1 sample)

To assess the site's potential for flooding due to hurricane Isabel, the inspector reviewed the updated final safety report and the individual plant examination for external events report. A walk down of the site was performed to assess the site's drainage capabilities and to identify potential flooding pathways into the process buildings. The periodic functional check of the switch yard sump pump was verified complete. Corrective actions associated with licensee event report 97-007-00, to prevent water entry into the radwaste corridor via electrical conduits from the switchyard, were verified complete. The diesel generator building scupper drains were checked for free movement.

2. Internal Flooding (1 sample)

The inspector reviewed various documents and drawings of the reactor building quadrants and torus room. The purpose of the review was to assess the potential for flooding via the floor and equipment drains to result in the common mode failure of the emergency core cooling system components. The documents reviewed are listed in the attachment to this report. Additionally, a walkdown of the quadrants and torus room was performed to identify potential water pathways and where possible to visually verify changes made to the equipment drain system to prevent flooding of the quadrants via the equipment and floor drains. Satisfactory completion of the periodic operational check of the quadrant level alarms was also verified.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

a. Inspection Scope (1 sample)

The inspector observed the performance of an operating crew during a simulator exam on September 16, 2003. The exam was performed in accordance with Scenario SES-057A. The scenario involved operational transients and design basis events. The inspector verified that the crew met the training scenario objectives and performed the critical tasks. The inspector verified proper use of the system operating procedures and emergency operating procedures. The inspector observed the licensee actions to implement the emergency plan and to make event classifications and notifications. The inspector also verified that the post-scenario critique discussed any relevant lessons learned and that discrepancies during the scenario were discussed with the crew to enhance future performance. The inspector verified corrective actions were identified for areas for improvement.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation (71111.12B)

a. Inspection Scope (5 samples)

The inspector reviewed the periodic evaluation required by 10 CFR 50.65 (a)(3) for the Pilgrim facility to verify that the structures, systems, and components (SSCs) within the scope of the maintenance rule were included in the evaluation and, balancing of reliability and unavailability was given adequate consideration. The inspector reviewed the licensee's most recent periodic evaluation report which covered the interval from May 20, 2001 through May 13, 2003. The inspector verified that the periodic evaluation was completed within the required two year time period.

The inspector selected the following systems that were listed in an (a)(1) status for detailed review:

- Reactor Building Closed Cooling Water
- Heating Ventilation Air Conditioning
- 125 Volt DC

The inspector verified: (1) goals and performance criteria were appropriate, (2) industry operating experience was considered, (3) problem identification and resolution of maintenance rule-related issues were addressed, (4) corrective action plans were effective, and (5) performance was being effectively monitored. The inspector verified that adjustments were made in action plans for SSCs in (a)(1) status as a result of the licensee's review of system performance against established goals. The inspector reviewed documentation for a sample of high safety significant SSC's to verify that the licensee balanced reliability and availability/unavailability and adjusted (a)(1) goals as necessary.

The inspector selected the following samples of high risk significance SSCs that had been in (a)(2) status:

- 4160 V and 480 V AC
- High Pressure Coolant Injection

The inspector verified that Entergy had established appropriate performance criteria for these systems and that Entergy had examined any functional failures experienced by these SSCs against those performance criteria for consideration of moving the SSC to an (a)(1) status. A total of five SSCs were selected as inspection samples for review during this inspection.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope (7 samples)

The inspector evaluated on-line risk management for planned and emergent work. The inspector reviewed maintenance risk evaluations, work schedules, recent corrective actions, and control room logs to verify that other concurrent planned and emergent maintenance or surveillance activities did not adversely affect the plant risk already incurred with the out of service components. The inspector verified that the licensee took the necessary steps to control work activities, took actions to minimize the probability of initiating events and maintained the functional capability of mitigating systems. The inspector assessed Pilgrim's risk management actions during plant walkdowns. The inspector also discussed the risk management with maintenance,

engineering and operations personnel. The inspection covered the following seven samples:

- MR 02107673, Planned maintenance on RBCCW PS-4008, July 15
- MR 03114118, Emergent Maintenance on RHR Heat Exchanger Cooling Valve 30-HO-88, August 5
- MR 03115373, Relay 5A-10B Did Not Reset During Test (CR 200303155), August 25
- MR 03115143, Disconnect switch 104A has hot spot, August 29
- MR 03115728, HPCI Turbine Repair Stop and Hydraulic Trip Valves, August 30 (CR 200303302)
- MR 03115750, HPCI Overspeed Trip Valve Repair (CR 200303302)
- MR 03114375, 'B' Feedwater 3<sup>rd</sup> Point Heater Extraction Steam Leak

The inspector reviewed licensee activities during the period from August 29 through September 2, 2003, to investigate and repair the high pressure coolant injection system after it was declared inoperable during a routine surveillance test. This matter is also discussed in Section 4OA3 of this report.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions (71111.14)

a. Inspection Scope (2 samples)

The inspector assessed the control room operator performance during the following unplanned (1) and planned (1) non-routine evolutions:

- the unplanned power reduction to 35% full power and entry into single loop operations following the trip of the A recirculation pump due to the loss of 480 volt bus B1 on September 6. This matter is also discussed in Section 4OA3 of this report.
- the inspector observed operator performance during restart of the A reactor recirculation pump and recovery from single loop operations on September 7 to assess their communications, procedure usage, and control of the evolution. Procedures 2.2.84, Reactor Recirculation System and 2.4.24, Reactor Vessel Cold Water Stratification were reviewed and the pre-evolution brief observed.

The inspector evaluated personnel performance in coping with these evolutions (i.e., adequacy of personnel performance, procedure compliance, use of the corrective action process, etc.) against the requirements and expectations contained in technical specification and station procedures.

Where applicable, the inspector performed walkdowns of affected areas both in-plant and in the main control room, evaluated the initiating causes of the unplanned events to determine if personnel error contributed to the event, and reviewed main control room logs and plant computer data to ensure plant systems responded as expected.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope (3 samples)

The inspector reviewed selected operability determinations to assess the adequacy of the evaluations, the use and control of compensatory measures, compliance with the technical specifications, and the risk significance of the issues. The inspector used the technical specifications, Final Safety Analysis Report, associated Design Basis Documents and PNPS Procedure 1.3.34.5, "Operability Evaluations," as references. The inspection covered the following three samples:

- CR 200303155, RPS Relay 5A-10A Did Not Re-energize During Turbine Stop Valve Test, August 22
- OE 03-028, A EDG Emergency Start Relay Not Properly Tested (CR 200303548)
- CR 200303281, HPCI gland seal blower overload alarm due to inadequate selection of new relay device.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope (4 samples)

The inspector reviewed post-maintenance test activities on risk significant systems to verify that the effect of the test on the plant had been evaluated adequately, test equipment was appropriate and controlled, the test was properly performed in accordance with procedures, and the test data met the required acceptance criteria, and the test activity was adequate to verify system operability and functional capability following maintenance. The inspector verified that systems were properly restored following testing and that discrepancies were appropriately documented in the corrective action process. The inspector reviewed the following four samples of post maintenance testing (PMT) activities:

- MR 02107673, Inspect/Upgrade Barton Switch Assembly on PS-4008 (8.E.30.1 Attachment 1)

- 3.M.4-81 for MR 03115728, HPCI Turbine Stop Valve Balance Chamber Adjustment, September 1
- 8.5.4.1, HPCI Pump Operability Test for MR 03115728 on September 1
- MRs P9800668, 03113103, 03115639 associated with change-out of D912 breaker cubicle for the HPCI gland seal blower motor.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope (5 samples)

The inspector reviewed and observed surveillance testing to verify that the test acceptance criteria was consistent with technical specifications and Updated Final Safety Analysis Report requirements, the test was performed in accordance with the written procedure, the test data was complete and met procedural requirements, and the system was properly returned to service following testing. The inspector observed pre-job briefs for the test activities. The inspector verified that systems were properly restored following testing and that discrepancies were appropriately documented in the corrective action process (CR 200302697, 200302894, and 200302842).

The inspection covered the following five samples of surveillance tests:

- 8.5.3.14, SSW Flow Rate Operability Test
- 8.5.3.2.1, Salt Service Water Pump Quarterly and Biennial (Comprehensive) Operability and Valve4 Operability Test (SSW Pump D; P208D, only)
- 8.4.1, Standby Liquid Control Pump Quarterly and Biennial Capacity and Flow Rate Test
- 8.5.4.4, HPCI Valve Quarterly IST Test on September 1
- 8.5.5.1, RCIC Pump Operability Flow Rate and Valve Test at Approximately 1000 psig.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modification (71111.23)

a. Inspection Scope (1 sample)

The inspector selected one sample of a temporary modification for review to verify that the licensing bases and performance capability of the associated risk significant systems had not been degraded through the modification. The temporary modification selected for review was:

- Temporary Alteration per MR 03116083 and 03116084 to operate primary containment isolation valves AO 7011A and AO 7071A on Loss of Bus B1. The temporary modification provided for the determination of reactor coolant system leakage rates.

The inspector reviewed the design and licensing basis assumptions and the administrative controls to determine the adequacy of the temporary modification. In addition, the inspector reviewed the associated safety evaluation screening to verify that the safety issue pertinent to the changes were properly addressed. The inspector also reviewed the post-installation testing plans to verify the tests would assure the affected components were ready for operations. The inspector reviewed the control room logs to verify that selected temporary modifications were properly recorded. The inspector reviewed licensee condition reports (CRs) related to temporary modifications to verify that identified problems were appropriately resolved. Additional references used in this review are identified in the attachment to this report.

b. Findings

No findings of significance were identified.

**Emergency Preparedness (EP)**

1EP3 Emergency Response Organization (ERO) Augmentation (71114.03)

a. Inspection Scope (1 sample)

The NRC documented an unresolved item (URI) in Inspection Report 50-293/03-010 (URI 50-293/03-010-01) concerning Entergy's established controls, including periodic testing, to ensure the capability of meeting the minimum and timely staffing requirements in the Emergency Plan (E-Plan), Part 2, Section B.1 (Table B-1), for 30 and 60-minute augmented ERO responders. This was based on 1) emergency plan implementing procedures (EPIPs) which do not ensure the minimum required staffing levels for emergency response facility activation, 2) non-pager holder responders being called in manually rather than through use of the automated call-out system, and 3) previously



inadequate off-hours testing of minimum staffing levels. This issue was unresolved pending NRC review of the June 30, 2003, call-in drill and the associated drill report, any Entergy program changes deemed necessary to ensure adequate periodic augmentation testing, and the significance and enforceability of the issue.

The inspector reviewed the results of the June 30, 2003, off-hours ERO activation drill (Activation Drill Report 03-03), and discussed the results with Entergy staff. This drill was conducted to test the ERO's ability to mobilize and respond in accordance with the Emergency Plan's Table B-1 staffing requirements. Primary notification systems were used to notify augmented responders, who then provided an estimated time of arrival at their emergency response facility.

The inspector verified that, based on the results of the drill, Entergy was capable of meeting the minimum and timely E-Plan staffing requirements of Table B-1. Additionally, Entergy staff agreed to perform this drill in a manner to specifically test their ability to meet the Table B-1 requirements. Previously, the licensee had conducted off-hours activation drills in such a manner as to test timely emergency response facility activation, not Table B-1 minimum staffing capability, and the EIPs did not ensure that the minimum staffing requirements would be met.

The inspector also noted that the Entergy staff was in the process of changing the ERO call-out process such that all ERO personnel would be notified by pagers or phone calls from the Computerized Automated Notification System (CANS) when required to respond in an emergency. Previously, the 21 non-pager holder responders required by Table B-1 were not called by the CANS.

Therefore, URI 50-293/03-010-01 is closed.

b. Findings

No findings of significance were identified.

**3. SAFEGUARDS**

3PP2 Access Control (71130.02)

a. Inspection Scope (4 samples)

The following activities were conducted during the inspection period to verify that the licensee has effective site access controls, and equipment in place designed to detect and prevent the introduction of contraband (firearms, explosives, incendiary devices) into the protected area as measured against 10 CFR 73.55(d) and the Physical Security Plan and Procedures:

Site access control activities were observed, including personnel and package processing through the search equipment during peak ingress periods on July 22 and July 23, 2003. On July 23, 2003, observation of vehicle search activities was also

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conducted. On July 22, 2003, testing of all access control equipment; including metal detectors, explosive material detectors, and X-ray examination equipment was observed.

b. Findings

No findings of significance were identified.

3PP3 Response to Contingency Events (71130.03)

a. Inspection Scope (3 samples)

The following activities were conducted to determine the effectiveness of the Pilgrim Station response to contingency events, as measured against the requirements of 10 CFR 73.55 and the Pilgrim Station Safeguards Contingency Plan:

On July 24, 2003, a review of documentation associated with the Pilgrim Station force-on-force exercise program was conducted. The review included documentation of training exercises conducted since the first quarter of 2002, when the exercises were resumed post September 11, 2001.

On July 22, 2003, performance testing of the Pilgrim Station intrusion detection and alarm assessment systems was conducted. This testing was accomplished by one inspector who toured the plant perimeter and selected, and subsequently observed performance tests, of areas of potential vulnerability in the intrusion detection system. Concurrently, a second inspector observed the alarm assessment capabilities from the Central Alarm Station. During the walkdown of the intrusion detection system, 11 specific performance tests were conducted.

The inspector reviewed guard staffing, shift schedules and the control and use of overtime. The inspector also reviewed the shift scheduling and assignments for guard supervisors and the licensee's ability to implement the protective strategies as stated in the Security Plan. The inspector observed licensee shift staffing and discussed the defensive strategies with licensee Security Management during the period of August 7 through 13, 2003.

b. Findings

No findings of significance were identified.

#### 4. OTHER ACTIVITIES (OA)

##### 4OA1 Performance Indicator Verification (71151)

###### a. Inspection Scope

###### 1. Security (3 samples)

On July 24, 2003, a review was conducted of the licensee's programs for gathering, processing, evaluating, and submitting data for the Fitness-for-Duty, Personnel Screening, and Protected Area Security Equipment Performance Indicators (PIs) to verify these three PIs had been properly reported as specified in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 1 and Rev. 2. The review included the licensee's tracking and trending reports, personnel interviews and security event reports for the PI data collected from the 2nd quarter of 2002 through June 2003.

###### 2. Emergency Preparedness (3 samples)

The inspector reviewed the licensee's process for identifying the data that is utilized to determine the values for the three EP performance indicators (PI) which are: 1) Drill and Exercise Performance, 2) Emergency Response Organization (ERO) Participation, and 3) Alert Notification System (ANS) Reliability. The review assessed data submitted to the NRC from the second quarter of 2002 (since the last EP PI verification inspection) up to, and including, the second quarter of 2003. Classification, notification and protective action opportunities were reviewed from licensed operator simulator sessions and site ERO drills and exercises. Attendance records for drill and exercise participation were reviewed for verification purposes. Test results of the ANS testing were reviewed for accuracy and completeness. The inspector reviewed this data using the criteria of NEI 99-02, Revision 2, "Regulatory Assessment Performance Indicator Guideline."

###### 3. Emergency AC Power System Unavailability (1 sample)

The inspector reviewed licensee actions to track and report the NRC performance indicator data elements for the Emergency AC Power System unavailability. The inspector reviewed licensee condition reports, portions of operator logs, maintenance rule records, and NRC Inspection reports for the period of October 2002 to July 2003 to determine the accuracy and completeness for the reported emergency diesel generator performance indicators (PIs). The inspector verified that the licensee had classified equipment unavailability in accordance with NRC endorsed criteria contained in NEI 99-02, "Regulator Assessment of Performance Indicator Guideline." The inspector reviewed licensee actions to address deficiencies in the emergency electrical power supplies that might impact system availability, and verified the items were addressed in the corrective action program.

###### 4. High Pressure Injection System (HPCI) and Heat Removal System (RCIC) Unavailability (2 samples)

The inspector reviewed the mitigating system cornerstone safety system unavailability performance indicator (PI) data for the HPCI and RCIC systems to assess the accuracy and completeness of reported data. The inspector reviewed licensee condition reports, portions of operator logs, maintenance rule records, and NRC Inspection reports for the period of January 2003 through June 2003. The inspector verified that the licensee had classified equipment unavailability in accordance with NRC endorsed criteria contained in NEI 99-02, "Regulator Assessment of Performance Indicator Guideline."

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

The inspection covered the following two samples to review the effectiveness of licensee corrective actions. Additional references used in the review are listed in the attachment to this report.

1. Condition Report CR-PNP-2003-0642 (1 sample)

a. Inspection Scope

Reactor Safety Cornerstone - Mitigating Systems

On February 22, 2003, the breaker for residual heat removal system valve MO-1001-29A tripped open on thermal overload when the valve was taken to the full open position for plant operation in shutdown cooling. Immediate actions were taken to investigate the cause of the failure, repair the motor operator and to restore the RHR loop to an operable status. The licensee determined that the valve failed because four fasteners in the cartridge mounting plate backed out, which impacted the proper operation of the valve limit switches. The licensee's actions to address this issue were selected for review because they impact safety significant components that could impact a reactor mitigating system.

The inspector reviewed the licensee's weak link analysis to determine the impact on valve MO-1011-29A, and to evaluate the event for reportability. The licensee also reviewed the industry operating experience for the failure and took action to determine the extent of the condition in other safety related motor operated valves at Pilgrim. The licensee developed a list of potentially susceptible valves and prioritized the valves for inspection based on risk significance. The licensee inspected the valves during plant operations and during the refueling outage, and expanded the scope of the inspections as necessary depending on the inspection results. Although other cartridge plate and torque switch fasteners were found slightly loose (for example, by a 1/4 turn), none were significant to impact proper valve operation. The licensee reviewed the industry standard maintenance practices for motor operated valves and enhanced the Pilgrim procedures to check the fasteners during preventive maintenance checks and to apply loctite on the fasteners to ensure they remain secure.

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The inspector reviewed the licensee's root cause analysis and corrective actions in Condition Report 20030642 to address this condition to ensure corrective actions commensurate with the significance of the issue were identified and implemented by the licensee. The inspector determined that the licensee classified the condition appropriately and considered the corrective actions to address the conditions to be reasonable. The inspector verified selected corrective actions to be complete.

b. Findings

No findings of significance were identified.

2. Condition Report CR-PNP-2003-0736 (1 sample)

a. Inspection Scope

Reactor Safety Cornerstone - Barrier Integrity

During a plant startup on February 27, 2003, the operator observed a 15 second reactor period when control rod 22-35 was withdrawn from position 08 to 10 in accordance with the banked position withdrawal sequence. Immediate actions were taken to insert control rods and defer the startup until an engineering evaluation was completed to determine the cause and corrective action for the short reactor period. The licensee determined that the reactor anomaly was caused by boron depletion in the D230 control blades. The licensee's actions to address this issue were selected for review because they impact a safety significant components that could impact a reactor safety barrier.

The inspector reviewed the licensee's root cause analysis and corrective actions in Condition Report 20030736 to address this condition to ensure corrective actions commensurate with the significance of the issue were identified and implemented by the licensee. The inspector determined that the licensee classified the condition appropriately and considered the corrective actions to address the conditions to be reasonable. The inspector verified selected corrective actions to be complete.

The licensee evaluated the impact of potential control blade boron depletion on reactor shutdown margin and the rod drop analyses. The reduced worth of 26-35 was calculated to reduce shutdown margin; however, shutdown margin remained well above the design and technical specification minimum values. Similarly, the calculated (enhanced) worth of adjacent rod 22-35 was well below the rod drop analysis screening criteria.

The licensee took measures during refueling outage RFO#14 to minimize operation with D230 blades with potential significant depletion. The licensee replaced control blades and shuffled control blades with high nodal exposures to locations that will place the rods at position 48 during subsequent operation and thereby reduce boron loss. The licensee revised procedures to prevent rod withdrawals near high exposure rods at the approach to critical. The inspector observed the licensee implement the procedures to reduce notch worth during reactor startup. The licensee issued an industry notice to supplement the industry operating experience recommendations to highlight the Pilgrim experience

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with high notch worth. The licensee included lessons learned from the February event in the training programs for operators, reactor engineering and engineering support personnel.

b. Findings

No findings of significance were identified.

4OA3 Event Follow-up (71153)

1. Loss of Safeguards Bus B-1 (1 sample)

a. Inspection Scope

During steady state plant operation at 100% full power on September 6, 2003, 480 volt bus B-1 and its associated loads de-energized at 11:51 a.m. The bus de-energized due to trip of supply breaker B101 on an apparent high instantaneous current (electrical fault). The associated plant transient resulted in a momentary spike in reactor power as pressure control swapped from the electrical pressure regulator to the mechanical pressure regulator followed by a drop in power to approximately 70% due to the loss of the A reactor recirculation pump. Reactor power was further reduced by the operators to approximately 35% in accordance with station procedures and the plant was verified in a stable condition. Other impacts associated with the event included: a loss of feedwater heating to the 2<sup>nd</sup> and 3<sup>rd</sup> point heaters; a loss of the A train of reactor building closed cooling water, salt service water, standby gas treatment, control room emergency air filtration systems; and, the loss of the containment cooling mode of the A train of residual heat removal. The high pressure coolant injection system, reactor core isolation cooling system, and A emergency diesel generator were in a degraded condition but available. The impact on this equipment caused the licensee to enter multiple technical specification shutdown limiting conditions for operations (LCOs).

There was no release due to the event and public health and safety were maintained at all times. The event did not cause nor require the initiation of either the emergency core cooling or reactor protection systems. Subsequent licensee investigation identified the cause of the breaker trip to be the result of a failed current transformer in the breaker overcurrent protective circuitry. There was no actual fault on the breaker, Bus B1, or its associated loads.

The inspectors responded to the plant and provide round-the-clock coverage until electrical power was restored, the shutdown LCOs were exited, and plant operation with two reactor recirculation loops was restored. During this period the inspectors reviewed and/or verified that Technical Specification requirements were properly identified and entered, that the event was properly classified in accordance with the emergency action level procedures, and that the proper 10 CFR 50.72 notifications were made. Operator performance was reviewed and/or observed during the period and the more significant operator actions verified against station procedures. The equipment response was also reviewed and verified against station procedures and electrical drawings. The plant

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transient was verified to be within the plant's design analysis. The compensatory actions established for the degraded safety systems were reviewed and discussed with station personnel. The licensee's response to the event was assessed in regard to identification and resolution of the problem, resource availability, consideration for risk and risk insights relative to potential vulnerabilities should a concurrent event occur. Actions to trouble shoot the breaker failure and restore power to B-1 and its associated loads were also reviewed/observed. Restoration of bus B-1, its associated loads and the idle reactor recirculation pump were also observed (see Section 1R14). Bus B1 was re-energized at 11:51 p.m. on September 6, the recirculation pump was restarted at 9:07 a.m., and plant operation at full power resumed at 11:20 p.m. on September 20, 2003.

b. Findings

No findings of significance were identified.

2. HPCI Inoperable During Surveillance Test (1 sample)

a. Inspection Scope

On August 29, 2003, after about 25 minutes of operation in the full flow test mode, the operators manually tripped the HPCI system and declared it inoperable after HPCI automatically tripped and reset two times. The operators declared HPCI inoperable at 1:50 p.m. on August 29, entered the technical specification limiting condition for operation (LCO), and made an 8-hour notification to the NRC.

During the period from August 29 to September 2, the licensee provided management coverage, engineering support and two review teams to diagnose the HPCI system response, investigate the failed components, evaluate the causes for HPCI inoperability, effect repairs to address the cause of the failures, and conduct post work testing to verify HPCI operability. The corrective actions addressed concerns with the potential extent of condition. The inspector observed the licensee response activities in progress. The licensee exited the technical specification LCO at 6:56 a.m. on September 2, 2003.

The licensee documented the event in Condition Report 200303302 and initiated a root cause investigation. The inspector reviewed the licensee immediate actions to restore the HPCI system to an operable status. During subsequent investigation, the licensee identified that the turbine stop valve (TSV) stem had failed and that the hydraulic portion of the mechanical overspeed trip device had malfunctioned. The turbine stop valve stem was replaced and the failed unit was sent offsite for analysis. The licensee adjusted the stop valve balance chamber pressures in accordance with industry operating experience recommendations to reduce stresses on the stem during turbine operations. The licensee addressed several issues in the hydraulic overspeed trip system, including replacement of the pressure control (Robert Shaw) valve, cleaning debris in the internal 'F' port of the hydraulic trip device, and adjusting the spring tension on the trip reset plunger in accordance with industry operating practices. The inspector also reviewed licensee actions to address HPCI deficiencies identified during the repairs (reference Condition Reports 200303305, 3321, 3324 and 3343).

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HPCI operated satisfactorily when tested per procedure 8.5.4.1 on startup from refueling outage RFO #14 on May 13, 2003. HPCI operated successfully for 25 minutes during the August 29 test. The August 29 test was the first quarterly test of the HPCI system since the refueling outage. The licensee investigations and followup reviews were still in progress at the conclusion of the inspection. These actions included an evaluation of the causes and long term corrective actions for the adverse conditions noted above, and an evaluation of the impact that the noted deficiencies had on the ability of the HPCI system to perform its safety function.

This item is unresolved pending completion of the NRC review of: the licensee HPCI test process and past test results; the licensee maintenance practices for the HPCI system, including the use of industry operating experience; the results of the licensee root cause evaluation and long term corrective actions; the licensee actions to evaluate the event for reportability per 10 CFR 50.73; and, a determination of whether the HPCI system was able to perform its safety function during plant operations prior to August 29 (**URI 50-293/2003-07-01**).

b. Findings

No Findings of significance were identified.

3. Licensee Event Report Review and Closeout (3 samples)

(Closed) LER 50-293/2003-001: Manual Scram and Required Shutdown due to Recirculation Motor Generator Set Trip: The inspector reviewed the corrective actions associated with Licensee Event Report (LER) 50-293/2003-001, when the A recirculation pump tripped due to a mechanical failure of the motor generator rotor field slip ring. The inspector also reviewed the operator actions to insert a manual scram as required by plant procedures during the controlled shutdown when the core flow entered the restricted region of the power-flow map. Licensee corrective actions were described in Condition Report 2003-00634. This event was also described in NRC Report 2003-04. The LER provided an accurate description of the event and the licensee followup actions. This LER is closed.

(Closed) LER 50-293/2003-002: Unplanned Automatic Closure of the Main steam Isolation Valves and Reactor Scram Due to Operator Error During Plant Startup: The inspector reviewed the corrective actions associated with Licensee Event Report (LER) 50-293/2003-002, when a reactor operator inadvertently operated the bypass valve opening jack instead of the mechanical pressure regulator. The error caused an automatic closure of the main steam isolation valves and a reactor scram from low power during a reactor startup. Licensee corrective actions were described in Condition Report 2003-02159. This event was also described in NRC Report 2003-06. The LER provided an accurate description of the event and the licensee followup actions. This LER is closed.



(Closed) LER 50-293/2003-003: Automatic Scram from Load Rejection at Full Power due to Transformer Fault: The inspector reviewed the corrective actions associated with Licensee Event Report (LER) 50-293/2003-003, when the failure of the unit auxiliary transformer caused a full load reject and automatic reactor scram from full power on June 1, 2003. Licensee corrective actions were described in Condition Report 2003-02284. This event was also described in NRC Report 2003-06. The LER provided an accurate description of the event and the licensee followup actions. This LER is closed.

4OA6 Meetings, Including Exit

The inspector presented the inspection results to the licensee at the conclusion of the inspection on October 7, 2003. The licensee agreed with the facts presented at the exit.

Senior NRC management were on-site for meetings and plant tours on July 22 and August 19-21, 2003.

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee

D. Burke	Security Operations Supervisor
G. Choquette	System Engineer
M. Dagnello	Maintenance Superintendent
P. Dietrich	General Manager, Acting Vice President
J. Falconieri	Component Engineer
S. Hudson	Maintenance Rule Coordinator
K. Kampschneider	System Engineer
F. Mulcahy	System Engineer
A. Niederberger	System Engineer
D. Noyes	Assistant Operations Manager
E. Olson	Operations Manager
R. Rose	Security Manager
E. Solomon	Emergency Preparedness Planner
T. Sowdon	Emergency Preparedness Manager
K. Sullivan	Emergency Planner
Y. Urim	System Engineer

#### NRC Personnel

L. Doerflein	Branch Chief, Systems Branch, Division of Reactor Safety
P. Frechette	Senior Physical Security Inspector
T. Walker	Operations Engineer
T. Dimitriadis	Physical Security Inspector
W. Raymond	Senior Resident Inspector
C. Welch	Resident Inspector

### LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

#### Open

05000293/2003007-01	URI	Review of HPCI Surveillance Failure Evaluation and Determine Impact on Operability
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#### Closed

05000293/2003010-01	URI	Established controls may not be capable of meeting the E-Plan minimum and timely staffing requirements for augmented ERO responders
05000293/2003001	LER	Manual Scram and Required Shutdown due to Recirculation Motor Generator Set Trip
05000293/2003002	LER	Unplanned Automatic Closure of the Main steam Isolation Valves and Reactor Scram Due to Operator Error During Plant Startup

## LIST OF DOCUMENTS REVIEWED

**References for Section 1R01 Adverse Weather**

2.2.8, "Standby AC Power Systems"  
2.2.45, "Screen House Heating and Ventilation Systems"  
2.2.108, "Diesel Generator Cooling and Ventilation System"  
2.1.35, "Control Room Readings"  
2.2.32, "Salt Service Water System"  
ARP C1R-F6, SSW Loop Header Temperature High  
Technical Specification 3/4.5 Bases, Ultimate Heat Sink Temperature Limits  
License Amendment 176 for TS 3/4.B.4 Ultimate Heat Sink  
Final Safety Analysis Report (FSAR) Sections 10.9.3  
Condition Report 200303073, Main Steam Tunnel Area Temperatures  
Condition Report 200303110, Safeguards Area Temperature Switch  
Condition Report 200303067, High Temperature  
Condition Report 200303256, SSW Loops Inoperable due to elevated Temperatures

**References for Section 1R04**

2.2.22, "Reactor Core Isolation Cooling System (RCIC)"  
RCIC System P&ID M246

**References for Section 1R06**

Plant Design Change 97-13, Installation sump pump in switchyard manhole No 2.  
Maintenance Request 19600524, conduits exiting manholes in switchyard MH1, 2, 3 should be sealed to prevent water leaking into radwaste building  
LER 97-07-00, Safeguards buses de-energized and losses of off-site power during severe storm while shutdown  
FRN 98-01-88, Quadrant Drains  
Calculation S&SA 60, Flooding due to ECCS Leakage Outside Containment  
Office Memorandum 985701872 Review of PNPS Internal Flooding Analysis In Light of INPO's Significant Event Report 50-84.  
Equipment and Floor drain drawings M-408, M-409, M-410, and M-411  
Procedure 2.5.2.71, Radwaste Collection System  
Condition Reports 199509581, 199709246, 199709250, 199709252, 199709253, 199809537  
8.E.10, LPCI System Instrument Calibration  
8.E.23, HPCI System Instrument Calibration

## **References for Section 1R12**

### Condition Reports

CR 200209689, 200209698, 200302392, 200303471, 200303482

### Operating Experience

OE 13891, OE 14599, OE 15223, OE 15456, OE 15508, OE 15508, OE 15574, OE 16218, OE 16737, OE 16777

### Drawings

2300-21-13 Rev E2  
B997-X RevE1  
E13 Rev E78  
E14 SH1 Rev E33  
M215 SH1 Rev E49  
M215 SH2 Rev E46  
M215 SH3 Rev E38  
M215 SH4 Rev E44  
M215 SH5 Rev E7  
M243 Rev E49  
M244 SH1 Rev E30  
M282 Rev E15  
M287 Rev E37  
SE155 SH1 Rev E39

### System Health Reports

Reactor Building Closed Cooling Water System, 2<sup>nd</sup> Quarter, 2003  
NSR HVAC, 2<sup>nd</sup> Quarter, 2003  
24-HVAC System (safety related), 2<sup>nd</sup> Quarter, 2003  
46G-Station DC and Battery System, 2<sup>nd</sup> Quarter, 2003  
120V AC (46K), 2<sup>nd</sup> Quarter, 2003

### Maintenance Requests

MR 01117894, 02116408, 03103906, 03110306, 03114122, 03115782, 03115786, 10001491  
and 19802368

## **References for Section 1R19**

8.E.30.1,Closed Cooling Water System (CCWS) Instrumentation Calibration and Functional Test  
PDC/FRN 03-18, Barton Model 288A/289A Locking Screw  
CR 200209673

**References for Section 1R23**

MR 03116083, Troubleshoot/open AO-7011 per 3.M.1-34  
MR 03116084, Troubleshoot/open AO-7017 per 3.M.1-34  
Operations Standing Order 03-07  
Meeting Minutes for Onsite Safety Review Committee 2003-028  
8.7.4.3, Miscellaneous Containment Isolation Valve Quarterly Operability  
3.M.1-34, Generic Troubleshooting and Maintenance Procedure  
ENN-DC-136, Attachment 9.5 - Temporary Alteration Method of Control

**Reference for Section 3**

EP-AD-150, Emergency Preparedness Performance Indicator Tracking Guideline, Rev 0  
Security Audit, QA-03-008, March 28, 2003  
Safeguards Event Log, June 2002 - June 2003.  
Security Equipment Testing Procedures  
Performance Indicator Report, June, 2003

**References for Section 4OA2**

Root Cause Analysis for CR 20030736  
Fact Finding Report for CR 20030736  
ENN-NF-103, Reactivity Management Program  
Procedure 9.29, Programming of the Rod Worth Minimizer, Revision 23  
Operating Experience dated 4/29/03 on Pilgrim Short Reactor Period  
Service Information Letter 637, Shutdown Margin for Plants with Duralife 230 (D230) Control  
Blades  
Reactor Engineering Memorandum dated 4/2/03 Control Blade Moves for RFO#14  
Engineering Memorandum NEA-03-043 on D230 Lifetime Exposure Recommendations  
Engineering Memorandum NEA-03-062 on D230 Control Blades  
Pilgrim Reactor Coolant Chemistry Trends for Boron  
Condition Report 20030642 for MO-1001-29A  
Condition Report 200109393 for MO-1400-25B  
Procedure 3.M.3-24.16, Operation Procedure for MO-1001-29A dated 2/25/03  
Procedure 8.Q.3-8.2, Limitorque Valve Operator Maintenance  
Maintenance Request P9900349 LPCI Injection valve 29A Preventive Maintenance  
Procedure 8.1.1.1, Inservice Pump and Valve Testing Program  
Condition Report 2003-1079 PM on MO-1400-24A  
Calculation No. M1035, Evaluation of Overthrust Condition on MO-1400-25B  
Condition Report 200301476, PM on MO-1201-5  
Condition Report 200301519, PM on MO-1400-25A

## LIST OF ACRONYMS

ANS	Alert and Notification System
CANS	Computerized Automated Notification System
CFR	Code of Federal Regulations
CR	Condition Reports
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
EPIP	Emergency Plan Implementing Procedure
ERO	Emergency Response Organization
ICM	Interim Compensatory Measures
IR	Inspection Report
LER	Licensee Event Report
MG	Motor Generator
MR	Maintenance Request
OE	Operability Evaluations
PI	Performance Indicator
PNPS	Pilgrim Nuclear Power Station
RFO	Refueling Outage
SSC	System, Structure or Component
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item